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Issue 6 - 2007

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Welcome to the sixth issue of Hearing Review.

I have recently taken over as the reviewer for the publication so I hope you enjoy my view of the hearing world. Our previous reviewer Ravi Sockalingam has left for an overseas adventure to Europe. He will be acting as a manufacturing company liaison for academic institutes around the world. Ravi will be maintaining his local link to Canterbury so we wish him well and look forward to hearing from him again.

Thanks to our sponsor GN ReSound, Hearing Review will continue into next year. We are delighted to have their ongoing support for this independent publication. I hope you enjoy the latest edition and welcome your comments and feedback.

Everyone at Research Review wishes you a Merry Christmas and Happy New Year.

Kind regards,

Valerie Looi

Lecturer in Audiology, University of Canterbury

valerielooi@researchreview.co.nz

An internet survey of individuals with hearing loss regarding assistive listening devices

Authors: Harkins J and Tucker P

Summary: In this Internet survey, 423 individuals with hearing loss described their assistive listening device (ALD) use during face-to-face conversation and their satisfaction with ALDs in various listening situations. Most liked the concept of a personal device that could work both with hearing aids and a range of transmission media. They tended to choose Internet-based and peer-based sources of audiological information, and suggested ways for both improving ALDs and for improving information available about them by using the Internet.

Comment: The information from this survey-based study may be of interest to audiologists when recommending and/or counselling ALD use to supplement hearing aids and/or a cochlear implant. For conversations with 1 or 2 people in a quiet setting, most respondents found their hearing aid or cochlear implant to be sufficient. ALDs were reported to be frequently used, and most beneficial, when the user was part of an audience with the speaker being less than 10 feet away (~3 metres). However, there was a high rate of reported difficulty when borrowing ALDs in a public venue, with inadequate signage and a lack of trained staff being the most common issues. Taken together, these two findings suggest that the situation where those with a hearing impairment find ALDs to be the most beneficial are also the same situations where they are more likely to experience a problem accessing the ALD. Decreased costs and enhanced portability were the two most requested improvements for ALDs. Although this was an American study, it would not be unreasonable to expect similar issues for New Zealand.

<http://dx.doi.org/10.1177/1084713807301322>

Reference: *Trends Amplif.* 2007;11:91-100

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A peer mentor training program for aural rehabilitation

Authors: Bally SJ and Bakke MH

Summary: This article describes a new training programme designed to prepare peer mentors to work under the supervision of hearing-health professionals in aural rehabilitation (AR), presents a peer mentor training curriculum, and reports on the current status of the educational programme.

Comment: This descriptive article outlining a postgraduate peer mentor training qualification offered by Gallaudet University (in the USA), provides some 'food for thought' on a different approach to AR. Incorporating coursework, practical placements and other experiential learning techniques, the programme trains hearing-impaired adults to be peer mentors to others with a hearing loss, and to assist with AR. This includes advising on ALDs, conducting communication-training sessions, working with family members to better understand the needs of the hearing-impaired person, advising on day-to-day issues that arise, accessing support services, and assisting peers to best cope with their hearing loss and integrate into society. The mentor's training focuses on facilitating communication, addressing the effects of a person's hearing loss on their day-to-day life and their families, and empowering them to fully maximise their abilities – i.e. a coaching rather than counselling approach. Although New Zealand is probably some way off from offering a similar tertiary-level AR mentoring qualification, the ideas and principles that underlie this programme, along with the details of the programme's contents, may be of interest to professionals involved in developing, implementing and/or revising adult AR programmes.

<http://dx.doi.org/10.1177/1084713807301587>

Reference: Trends Amplif. 2007;11:125-31

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Contribution of high frequencies to speech recognition in quiet and noise in listeners with varying degrees of high-frequency sensorineural hearing loss

Authors: Amos NE and Humes LE

Summary: 36 elderly hearing-impaired (EHI) with varying degrees of high-frequency hearing loss and 24 young normal-hearing (YNH) listeners were assessed to determine how audible high-frequency information contributes to speech-understanding performance. Spectrally shaped speech performance, under both quiet and noise conditions, was equivalent between EHI listeners for different bandwidth conditions and word-recognition performance was unchanged between midband and broadband conditions. Improved speech understanding among YNH listeners was attributed to higher frequencies in the broadband condition.

Comment: The findings of this study have clinical implications in the fitting of hearing aids. Commonly, the frequency response characteristics for a fitting are determined by using one of numerous prescriptive target gain methods. However, clinicians regularly encounter difficulties when trying to achieve the target gain levels for the higher frequencies whilst minimising acoustical feedback. With the results of this study showing that hearing-impaired listeners, irrespective of the degree of high-frequency hearing loss, gain little, if any, measurable speech recognition benefit (in quiet or noise) from the addition of information in the high-frequency band (3200–6400 Hz), it may be possible for clinicians to sacrifice some of the high-frequency gain if acoustical feedback is an issue. This should be applied with caution, though, and only when necessary, as higher-frequency sound components can provide important sound-localisation cues and head-shadow benefits.

[http://dx.doi.org/10.1044/1092-4388\(2007/057\)](http://dx.doi.org/10.1044/1092-4388(2007/057))

Reference: J Speech Lang Hear Res. 2007;50:819-34

Hearing impairment and health-related quality of life: The Blue Mountains Hearing Study

Authors: Chia E-M et al

Summary: In 2431 study participants, bilateral hearing impairment was associated with poorer scores in both physical and mental domains on a 36-item Short-Form Health Survey; scores decreased with worsening impairment. Bilateral hearing-impaired who habitually used hearing aids had better physical component scores than similarly impaired persons without hearing aids or who only used them occasionally. Persons with self-reported hearing loss had significantly poorer health-related quality of life (HRQOL) than corresponding persons without, but HRQOL scores did not differ significantly between persons with unilateral or high-frequency hearing loss and their corresponding counterparts.

Comment: This study reports the details from one part of a much larger and ongoing Australian study that investigates age-related hearing loss in a mostly elderly Australian community. With nearly 3000 participants in the overall study, the results tend to have higher ecological validity than other such studies. As such, the aspect of the study discussed in this article (the effect of hearing impairment on HRQOL) would be generalisable to New Zealand. Apart from the more obvious findings that: i) having a bilateral hearing loss was correlated with poorer QOL ratings than not having a hearing loss, and ii) that increased degree of hearing loss had a greater adverse impact on QOL, the study also reported two additional results worth highlighting. Firstly, only one quarter of those with a hearing loss had hearing aid(s), however, those who did have (and use) hearing aid(s) gave slightly higher overall HRQOL ratings. This brings up the question as to the basis on which hearing aids should be prescribed – e.g. hearing thresholds, patient motivation, perceived hearing ability and/or self-reported difficulties and restrictions? Secondly, more people self-reported having a hearing loss (i.e. felt they had a hearing loss) than whom actually had a measurable hearing loss. This may indicate the need for hearing assessments to additionally incorporate subjective measures of perceived hearing ability/needs, as this (as opposed to the patient's actual threshold) impacts on their HRQOL ratings.

<http://www.ear-hearing.com/pt/re/earhearing/abstract.00003446-200704000-00006.htm;jsessionid=HfmJnvxZk5B27ctNnq4n9z46ghPLDbFyKJnMfrQXv5yVvMQHSbnn1219373867!181195629!8091!-1>

Reference: Ear Hear. 2007;28:187-95

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Relationships among speech perception, self-rated tinnitus loudness and disability in tinnitus patients with normal pure-tone thresholds of hearing

Authors: Huang C-Y et al

Summary: Twenty tinnitus patients with normal hearing were assessed with the Mandarin Speech Perception in Noise Test (MSPIN), the Tinnitus Loudness Scaling (TLS), and the Tinnitus Handicap Inventory (THI). MSPIN scores were significantly lower in tinnitus patients compared with controls (subjects without tinnitus). Whereas a strong positive correlation was seen between TLS and THI scores, correlations between MSPIN and TLS or THI scores were not significant. Good correlation was seen between tinnitus loudness and tinnitus-related disability; neither aspect correlated well with speech perception. Speech recognition was significantly poorer in noisy environments among tinnitus sufferers than among controls.

Comment: The psychological effect of tinnitus and its impact on quality of life has been frequently documented, usually using subjective questionnaires. This Taiwanese study's finding that patients with tinnitus (and normal hearing) scored significantly lower on the speech in noise test than those without tinnitus suggests that tinnitus may have more than an 'annoyance' factor for some patients. This may be useful for audiologists to consider when counselling patients with tinnitus, regardless of the patient's hearing thresholds. It would be interesting to have studies evaluating the efficacy of various tinnitus interventions (such as tinnitus retraining therapy, or the Neuromonics Tinnitus Treatment) include speech in noise tests as more objective efficacy assessments, in addition to the subjective questionnaires that are usually administered.

<http://dx.doi.org/10.1159/000096713>

Reference: *ORL*. 2007;69:25-9

Characteristics of normal newborn transient-evoked otoacoustic emissions: Ear asymmetries and sex effects

Authors: Berninger E

Summary: 60,431 transient-evoked otoacoustic emissions (TEOAEs) obtained from over 30,000 newborns that passed universal hearing screening were analysed for ear asymmetries and sex effects. Highly significant mean lateral asymmetries (right >left) and sex differences (female >male) existed in entire TEOAE level, signal-to-noise ratio of the TEOAE, and in half-octave frequency bands (700–4,000 Hz). Mean lateral and sex entire TEOAE level differences were 1.1 dB and 1.3 dB, respectively. Stimulus levels were not affected by ear or sex.

Comment: This article reports the findings from two hospitals in Sweden which have been running a Universal Newborn Hearing Screening Programme for 6 years. The protocol adopted consisted of TEOAE screening only. A total of 0.18% of screened newborns had a bilateral hearing loss \geq 30dBHL; a further 0.11% had either a unilateral loss or a mild bilateral loss. Right ears had significantly higher mean TEAOE levels than left ears, and females had a significantly higher mean TEAOE level than males. Data from studies such as these will be useful for comparisons once New Zealand's UNHSP has been running nationally for a while. Further, methodological details, and subsequent procedural issues noted by the authors, may be of interest to the UNHSP implementation advisory group that is currently determining the screening protocol, procedures, and referral guidelines to be adopted in New Zealand.

<http://dx.doi.org/10.1080/14992020701438797>

Reference: *Int J Audiol*. 2007;46:661-9

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Disclaimer: This publication is not intended as a replacement for regular medical education but to assist in the process. The reviews are a summarised interpretation of the published study and reflect the opinion of the writer rather than those of the research group or scientific journal. It is suggested readers review the full trial data before forming a final conclusion on its merits.

Parents' preferences for services for children with hearing loss: A conjoint analysis study

Authors: Fitzpatrick E et al

Summary: Forty-eight parents of young children with permanent hearing loss stated their preferences for characteristics associated with intervention services, after the implementation of a universal hearing screening programme in Ontario, Canada. Co-ordinated services, access to parent support, access to information, frequency of services, and location of services were all statistically significant attributes of services. Parents preferred clinic-based over home-based services, and once-weekly over twice- or three times weekly therapy services, and they valued well-coordinated service models that included access to support from other parents.

Comment: In addition to developing appropriate screening procedures and protocols, a successful Universal Newborn Hearing Screening (UNHSP) requires effective, accessible, and well-managed intervention services for those diagnosed with a hearing loss. According to this study, major factors that contributed to family's assessment of an effective intervention programme included: access, frequency, and co-ordination of services, along with the availability of parent support programmes and relevant information. The findings of this study have implications for those involved in the intervention side of New Zealand's UNHSP. Relevant questions that arise include: i) should we have more focus on clinic-based than home-based intervention services; ii) how can we best co-ordinate service provision nationally to ensure maximum efficiency; iii) how can families best access support (including support from other families) and information. It could be worthwhile for New Zealand to conduct a similar survey reasonably early into the roll-out of UNHS in order to ensure that intervention services meet families' needs and expectations. The conjoint analysis method used in this research would be one potential approach for such a study.

<http://www.ear-hearing.com/pt/rearhearing/abstract.00003446-200712000-00012.htm?sessionid=HfsRgmQSF1jmdqG8k1nQDQrvw5Q1cQ13G8VcQTlbtvDxTS7Q2yG6j!1219373867!18119562918091-1>

Reference: *Ear Hear*. 2007;28:842-9

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Will they catch up? The role of age at cochlear implantation in the spoken language development of children with severe to profound hearing loss

Authors: Nicholas JG and Geers AE

Summary: Preschool Language Scale scores were obtained at ages 3.5 and 4.5 years from 76 children who received a cochlear implant by their 3rd birthday, to compare their skills with those of hearing age-mates at age 4.5 years. Scores increased with younger age at implant and lower pre-implant thresholds, even when compared at the same duration of implant use. Scores of the children who received the implant at the youngest ages reached those of hearing age-mates by 4.5 years, but those children implanted after 24 months of age remained behind hearing peers.

Comment: The mean age for paediatric implantation is continually decreasing. With the advent of a Universal Newborn Hearing Screening Programme (UNHSP) here in New Zealand, the potential of still-earlier diagnoses of significant hearing loss, and in turn, a younger implantation age, will be even greater. Studies such as this one highlight the benefits of early implantation on speech and language outcomes. This study suggests that by kindergarten age (~4–5 years), children implanted at 12 months of age could be expected to achieve age-appropriate spoken language levels. However, those implanted later than 30 months of age may never catch up to their age-matched normal-hearing peers. Two education-related implications of this study's findings are: i) expectations of spoken language outcomes for children implanted at an early age should be higher than those implanted after the age of 2.5–3 years; and ii) children implanted at a very young age could be expected to integrate into mainstream education in time for kindergarten or preschool.

[http://dx.doi.org/10.1044/1092-4388\(2007\)073](http://dx.doi.org/10.1044/1092-4388(2007)073)

Reference: *J Speech Lang Hear Res.* 2007;50:1048-62

Cochlear implant outcomes and quality of life in adults with prelingual deafness

Authors: Klop WMC et al

Summary: Eight prelingually deafened subjects (with onset of severe hearing impairment before the age of 4 years and functioning in an oral-aural setting) were implanted at a mean age of 36 years with a CII or 90 K cochlear implant (Advanced Bionics Corp.). Significant postoperative improvements were seen in consonant-vowel-consonant word and phoneme scores, and several quality of life measures. Postoperative speech perception correlated with an emerging factor that was named quality of a patient's own speech production.

Comment: Currently in New Zealand, prelingually deafened adults are not considered candidates for a cochlear implant (CI) due to factors such as insufficient Government funding, and highly variable post-surgery outcomes. This study suggests, though, that despite the large variability in outcomes, many prelingually deafened adults can obtain open-set speech understanding with their implant. Further, and arguably more importantly, the authors report significant improvements in hearing-related quality of life measures. This suggests that this population should not be excluded from consideration for a CI, as they also have the potential to benefit from the device. This should be accounted for when allocating funding for CIs, and also supports the need for increased funding to the two adult CI programs here in New Zealand.

<http://www.laryngoscope.com/pt/re/laryngoscope/abstract.00005537-200711000-00019.htm;jsessionid=HfnG4RJ5Td1hSgts42QdW1rr282YpZnKTNYZLLNVZDv8GyBFQGGMI!219373867!181195629!8091!-1>

Reference: *Laryngoscope.* 2007;117:1982-7

Value of the Promontory Stimulation Test in predicting speech perception after cochlear implantation

Authors: Lee JC et al

Summary: This retrospective review of medical records from 58 patients evaluated correlations between GAP50, GAP100, TDL50 and TDL100 parameters of the Promontory Stimulation Test (PST) and the results of speech perception tests after cochlear implantation (CI). Significant, positive correlations were observed between GAP100 scores and all results of speech perception tests at all time points after CI, while TDL100 scores were significantly correlated with the results of open set one- and two-syllabic word tests at 1 month after CI. GAP100 scores for postlingually deaf patients, especially for gap intervals up to 100 ms, were correlated with all results of speech perception tests after CI.

Comment: The role and predictive value of the PST as a pre-operative assessment tool for cochlear implantation is contentious. At present in New Zealand, it is occasionally used to assess the electrical response of surviving spiral ganglion cells in ears with no residual hearing. This can help in deciding which ear should be implanted. This retrospective study found that the GAP100 score (i.e. the shortest gap interval where a patient can detect a pause between signals at 100% accuracy) could be a useful measure for predicting speech perception outcomes for postlingually-deafened adults, as well as deciding on which ear to implant. The GAP100 interval of 100 ms was recommended as an appropriate cut-off value; patients with GAP100 scores less than this obtained significantly better speech perception scores than those with longer gap interval scores.

<http://www.laryngoscope.com/pt/re/laryngoscope/abstract.00005537-200711000-00020.htm;jsessionid=HfnG4RJ5Td1hSgts42QdW1rr282YpZnKTNYZLLNVZDv8GyBFQGGMI!219373867!181195629!8091!-1>

Reference: *Laryngoscope.* 2007;117:1988-92

Independent commentary by Dr Valerie Looi, Lecturer in Audiology, University of Canterbury

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