



2009 CONFERENCE ABSTRACTS

Longitudinal Outcomes of Children Through 84 months of Age

Christine Yoshinaga-Itano, Ph.D.
Professor, University of Colorado, Boulder
Department of Speech, Language and Hearing Sciences

This talk will report on the longitudinal development of 241 infants and toddlers from birth through three years of age on the Minnesota Child Development Inventory and from four years to seven years of age on the Expressive One Word Picture Vocabulary Test and the Test of Auditory Comprehension of Language. Additional information about the speech development on the Goldman Fristoe Test of Articulation will be presented.

Follow-through Challenges from Screening to Diagnosis to Amplification to Intervention

Christine Yoshinaga-Itano, Ph.D.

Several variables have been identified as challenges to improve follow-through characteristics. Colorado statistics have been analyzed to investigate the roles of the types of screening device, the use of a second outpatient screen, the referral rate from screening to diagnosis, the socio-economic status of the families, the age of the mother, neonatal intensive care units, involvement of audiologists as well as the type of screener (nurses, audiologists, volunteers).

Data Management Challenges re: Diagnosis, Amplification and Intervention

Christine Yoshinaga-Itano, Ph.D.

Several systems variables have been identified as characteristics that facilitate the management of data on a state and national level. Each of the 50 states and its territories in the United States have a variety of challenges, including the passing of legislation and the strength of that legislation, the state's ability to implement an accountability system according to the Joint Committee on Infant Hearing's guidelines. The number of infants referred for full audiological evaluations, the availability of diagnostic facilities with pediatric specialty, the type of referral system to early intervention as well as the availability of early intervention specialists with experience and knowledge working with families who have infants who are deaf or hard of hearing are specific variables that influence the state's ability to collect and report data.



Special Populations: Auditory Neuropathy, Unilateral Hearing Loss, Conductive Hearing Loss Or Children From Non-English Speaking Homes

- **Low Income Families.**

Christine Yoshinaga-Itano, Ph.D.

As a result of universal newborn hearing screening programs, increasing information is available on infants and toddlers with characteristics such as auditory neuropathy spectrum disorder, unilateral hearing loss, conductive hearing loss and children from non-English speaking homes. This talk will present some of the challenges as well as the practices that have been implemented for these special populations.

Amplification Update

Ruth Bentler, Ph.D.

Technological innovation continues to abound, from talking hearing aids to trainable processors and more. In this presentation many of these innovations will be discussed and their impact on the market considered.

Practical Considerations for "Open Fits"

Ruth Bentler, Ph.D.

Current innovations in hearing aids have included stylistic changes as well. More traditional behind-the-ear styles have evolved into more sleek and acceptable units due to smaller component size and better feedback management schemes. In this presentation the dos and don'ts of open-fit hearing aids will be discussed. The advantages and disadvantages of placing the receiver into the canal will be considered, and the potential pitfalls for verification outlined.

Directional Microphone Efficacy and Effectiveness

Ruth Bentler, Ph.D.

Most hearing aid manufacturers provide a number of directional microphone options. Single, dual, triple and array microphone designs that are static, automatic and/or adaptive are all available. Signal processing schemes that allow for steering and/or additional gain manipulation are also finding their way to market. Recent data relative to real-world benefit provided will be provided.

60 mins

What's New in Digital Noise Reduction?

Ruth Bentler, Ph.D.

Digital noise reduction schemes are also available in nearly all hearing aids. Wiener filters, modulation counters, and spectral enhancers have been used in the ongoing effort to improve listening in noise. These schemes will be overviewed and new data for adults and children discussed.

New Zealand Audiological Society Inc
PO Box 9724, Newmarket, Auckland 1149
Phone/Fax: 0800 625 166
Email: mail@audiology.org.nz
Website: www.audiology.org.nz



The Universal Newborn Hearing Screening and Early Intervention Programme is Being Implemented

Vickie Rydz, Ministry of Health New Zealand

New Zealand's Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) continues nationwide implementation, which began in 2007 and will be completed by 2010.

A further nine District Health Boards (DHBs) will have joined the Programme by 30 June 2009.

Since 1 July 2008 the following has been implemented:

- national policy and quality standards
- diagnostic and amplification protocols
- newborn hearing screener training programme
- audiologist upskilling course and ongoing support
- antenatal and newborn screening monitoring and evaluation plan.

In 2009/10 the Ministry of Health will be:

- leading the implementation of the UNHSEIP in the remaining 9 DHBs
- developing an audit programme for the UNHSEIP, including an audit tool and selection of auditors
- reviewing the policy and quality standards
- reviewing the Programme's funding and contractual requirements
- developing further consumer resources.

The Ministry of Health and the Ministry of Education will continue to monitor the UNHSEIP and report progress on the implementation of the Programme.

This presentation will describe the implementation and current status of the UNHSEIP.

Case Studies of Early and Not So Early Identification of Hearing Loss - Comparison of New and Old Diagnostic Protocols

Andrea Kelly, MAud, PhD, MNZAS, Auckland DHB & University of Auckland

Michelle Pokorny, MAud, MNZAS Waikato DHB

Kylie Bolland, MAud, MNZAS, Hutt DHB

The new UNBHSEIP diagnostic protocol incorporates the use of 4kHz tone bursts in addition to 500Hz and 2kHz tonebursts in the ABR protocol and includes distortion product otoacoustic emissions. This presentation discusses two cases that illustrate improvements in identification of hearing loss that can be made with the new protocol. Additionally cases of possible early onset of hearing loss following initial passing on screening and some contradictory cases will be discussed with reference to the literature on age of onset of hearing loss and the importance of follow up testing.

New Zealand Audiological Society Inc
PO Box 9724, Newmarket, Auckland 1149
Phone/Fax: 0800 625 166
Email: mail@audiology.org.nz
Website: www.audiology.org.nz



Accessible and Enable New Zealand Audiology Project : Professional Advisory Review of Hearing Aid Applications

Oriole Wilson, Accessalbe and Enable NZ

Hearing aids and other assistive equipment are funded through the Disability Support Services of the Ministry of Health via accessible and Enable NZ for eligible clients. The majority of these clients receive the funding on the basis of their hearing needs in employment.

In 2007 these agencies contracted an audiology advisor to assist with the hearing aid application process. This presentation summarizes the work to date .

This has involved consultation with audiologists via the New Zealand Audiological Society, the Hearing Therapists through Life Unlimited and with the Deaf Blind Coordinators and the Hearing Instrument Manufacturers via HIMADA.

A new application form is being developed and progress on this will be reported.

The consultant audiologist has provided training sessions for the professional advisors and provides on going professional support, advice and review of some applications.

Statistics will be presented to provide a snapshot of the current situation with the provision of hearing aids through these agencies.

Integration of Diagnostic Findings And Hearing Aid Selection And Validation Results To Optimise Outcomes For Children With Hearing Loss

Suzanne C Purdy¹ and Andrea S Kelly^{1,2}

¹ *Speech Science, Department of Psychology, The University of Auckland*

² *Audiology, Auckland District Health Board*

Effective treatment of hearing loss in children requires excellent diagnostic and habilitative skills. This paper will review models of intervention for hearing impaired children, including electrophysiological estimation of hearing thresholds, hearing aid selection based on current evidence, verification of fitting goals using RECD measurements, and validation approaches such as the use of questionnaires and objective electrophysiological measures that can be used to evaluate hearing aid fitting in infants and other children who are difficult to assess behaviourally.



Hearing Aid Features and the Evidence Base *Anne Greville (ACC), Bill Keith & Karen Pullar (both HIMADA)*

There are a plethora of hearing aid features available on the market. The utility of some of these features in meeting the needs of hearing impaired people will be discussed.

Audiologists are faced with challenges in keeping up-to-date with features offered by products, and evaluating whether the products perform as claimed.

The need for an evidence-based approach is discussed

Matching Client's Hearing Needs to Rehabilitative Recommendations *Anne Greville (ACC) & Peter Stubbing (NZAS)*

Hearing Needs Assessment (HNA) requires the audiologist to match the client's hearing needs to device/s and/or services available.

The performance of audiologists in carrying out HNA will be discussed. Examples will be presented, and results of analysis of a sample of assessments will be presented

Cochlear Implantation in Acquired ANSD – 2 Case Reports *Neil Heslop, Southern Cochlear Implant Programme*

Objectives

Cochlear implants are a recognized treatment for children with Auditory Neuropathy Spectrum Disorder (ANSD). Most reports concern children who have difficulty with spoken language acquisition in infancy. This report documents the experiences of 2 children with post-lingually acquired ANSD who were subsequently provided with cochlear implants.

Method

Child GV suffered a viral infection at 5 years. He developed slurred speech, balance problems, and developed an atypical rising audiogram in the moderate-severe range. Appropriate hearing aids were fitted but provided little benefit. He was subsequently referred for cochlear implant assessment which confirmed an ANSD.

Child KS experienced 2 episodes of a meningitis-encephalitis like illness before 3 years. She developed convulsions, balance disturbance, and a moderate-severe rising hearing loss. She had extremely poor speech understanding despite well fitted hearing aids. An ANSD was confirmed and she was subsequently referred for cochlear implant assessment.

Results

The auditory-verbal approach was used for the habilitation of both children.

New Zealand Audiological Society Inc
PO Box 9724, Newmarket, Auckland 1149
Phone/Fax: 0800 625 166
Email: mail@audiology.org.nz
Website: www.audiology.org.nz



Child KS was implanted at 12;8 with a left Freedom cochlear implant system. Pre-implant HINT sentence scores were 33% but improved to 99% at 6 months post-implant. She is now 2 year 3 months post-implant and continues to do well.

Child GV was implanted at 9;6 with a right Freedom cochlear implant system. Pre-implant HINT sentence scores were 56% but improved to 94% at 6 months post-implant. He is now 20 months post-implant and continues to do well.

Discussion

The implications for individuals with ANSD and cochlear implant candidacy are discussed.

The Extent of Hearing Impairment Amongst Australian Indigenous Prisoners in Victoria, and Implications for the Correctional System.

Susan Quinn and Gary Rance, The University of Melbourne

The hearing status of 109 Indigenous prisoners was investigated at five prison locations in Victoria, using audiological methods and face-to-face interview. The study found predominantly mild, sensorineural hearing loss. The rate of conductive hearing impairment was consistent with an age-matched general adult population (UK). All eardrums were intact, and 89% of middle-ears were normally air filled. Results showed 12% of prisoners had a hearing loss (ave. 0.5, 1, 2 & 4kHz \geq 25dB) in at least one ear, compared with 5% in an age-matched Australian adult population. More than a third (36%) had high-frequency, sensorineural hearing impairment (4 or 6 kHz \geq 25dB), in one or both ears. Over half of the inmates (58%) reported hearing problems sometimes, and 4% reported a lot of hearing trouble. The majority of prisoners (92%) reported exposures to loud noise, and tinnitus was reported by 72% of prisoners. For hearing impaired individuals within the correctional system, the reduced ability to communicate with ease may impact detrimentally on daily interactions, and may impede progress through rehabilitation programs.

Assessment on The Vestibular Apparatus Function in Newborns

T. Adamovic, M. Sovilj, K. Ribaric-Jankes, A. Ljubic,

Institute for Experimental Phonetics and Speech Pathology, Belgrade, Serbia

Neurological Department, Clinical Center of Serbia, Belgrade, Serbia

Institute for Obstetrics and Gynecology, Clinical Center of Serbia, Belgrade, Serbia

Neonatal hearing screening is a well established diagnostic method. In contrast, function of the vestibular apparatus and its central pathways is hardly being examined in newborns. However, dysfunction of the vestibular apparatus or its pathways could indicate deafness or delayed maturation of central nervous system.

The aim of this research was to examine functioning of the vestibular apparatus and its pathways in newborns.

In N=100 healthy full-term newborns from regular pregnancies, we performed the following clinical examinations on the third day upon birth: observation of ocular



alignment in the awake state (OAA), testing of the vestibulo-ocular reflex (VOR) and testing of the Moro reflex (MOR). Each test consisted of three attempts. There was a five-second break between each attempt. Testing of MOR and VOR in all newborns was carried out by trained medical staff, whereas the examiner performed instructing, observation and data recording. Besides that, data on body mass on birth, body weight (BW), body length (BL) and head circumference (HC) were recorded for all newborns. The obtained data were recorded by means of a digital camera, then scored and statistically and descriptively processed. In addition, in all neonates Transient Otoacoustic Emission (TEOAE) was performed.

Research results indicate greater presence of MOR compared to VOR in the examined sample ($t=3.45$, with certainty of 99%), as well as that both reflexes in total (MOR and VOR in total) are more present in female than in male babies ($t=2.57$, with certainty of 98%). At the same time, 87% of newborns have normal ocular alignment (eyes are in the midline), whereas in 13% of newborns eyes deviate from the midline (5% of babies have endotropia of the left eye, 5% endotropia of the right eye, 1% endotropia of both eyes, 1% exotropia of the right eye and 1% both eyes directed upwards). Statistically significant connection between babies' gender and ocular alignment was not established.

Key words: vestibular apparatus, Moro reflex, vestibulo-ocular reflex, ocular alignment.

References

- [1] Ahn JC, Hoyt WF, Hoyt CS. Tonic uopgaze in infancz: a report of three cases. Arch Ophthalmol 1989.107:57-58.
- [2] Andre-Thomas C, Autgaerden S. Locomotion from Pre to Post Natal Life. Clinics in Developmental Medicine, Np 24. Spastics International Medical Publications.London, William Heinemann Medical Books Ltd., 1963.
- [3] Barkovich AJ, Kjos BO, Jackson DE, Normann D. Maturation of the neonatall and infant brain: MRI imaging at 1.5T. Radilogy 1988.166:173-180.
- [4] Barnes MR, Crutchfield C, Heriza CB. The Neurophysiological basis of Patient Treatment Vol. II Reflexes in motor development. Atlanta, GA, Stockesville Publishing Co.1978.
- [5] Chen Ch., Wang SJ., Wang CT., Hsieh WS., Young Uh. Vestibular evoked myogenic potentials in newborns. Audiol. neurootol. 2007, 12(1): 59-63.
- [6] Heriza CB. Comparison of leg movements in preterm infants at term with healthz fullterm infants. Physical Therapy 1988, 68:1687-1693.
- [7] Hoyt CS, Mousel DK, Weber AA. Transient supranuclear disturbances of gaze in healthz neonates. Am J Ophthalmol, 1980.89:708-713.
- [8] Lavin PJM. Conjugate and disconjugate eze movements. Chap 15. U:Walsh TJ ed. Neuro-ophthalmology. Clinical signs and symptoms. Phyladephia: Lea and Febiger.1985.
- [9] Leigh RJ, Zee DS. The Diagnosis of central disorders of Ocular Motility. U: The Neurology of Eye Movements. Edition 2. F.A. Davis Company. Philadelphia. 1991, 378-424.



- [10] Martines F., Porello M., Ferrara M., Martines M., Martines E. Newborn hearing screening project using transient evoked otoacoustic emissions: Western Sicily experience. *Int J Pediatr. Otorhinolaryngol.* 2007, 71(1): 107-12.
- [11] Millani-Comparetti A, Gidoni EA. Pattern analysis of motor development and its disorders. *Developmental Medicine and Child Neurology* 1967, 9:625-630.
- [12] Neumann K., Gross M., Bottcher P., Euler HA., Spormann-Lagodzinski M., Polezer M: Effectiveness and efficiency of a universal newborn hearing screening in Germany. *Folia Phoniatr. Logop.* 2006, 58(6): 440-55.
- [13] Peiper A. *Cerebral Function in Infancy and Childhood.* New York. Consultants Bureau, 1963.
- [14] Yvonee S., Sininger Ph.D. Clinical applications of otoacoustic emissions. *Advances in Otolaryngology-Head and Neck surgery* 1993, 7:247-269.
- [15] Shubert M.C., Minor L.B., Vestibulo-ocular Physiology Underlying Hypofunction, *Journal of the American Physical Therapy Association*, 2004, vol 84., pp. 373-385.

Update on the Adult Cochlear Implant Programme (Northern region)

Bill Raymond, Ellen Giles, Grant Searchfield
University of Auckland, Hearing and Tinnitus Clinic

The Adult Northern Cochlear Implant Programme recently moved to the University of Auckland Hearing and Tinnitus clinic. The aim of this presentation is to update professionals on the candidacy criteria, funding and waiting list situation for adults. The Northern programme is currently supporting 148 adult recipients. The improved outcomes for Freedom processor users will be discussed. It is also noteworthy that older clients who have recently been implanted have been very successful in their outcomes.

Overview. The Northern programme currently supports 148 CI recipients. Referrals to the programme have increased this year in comparison to previous years, with a total of 34 referrals in the last 7 months. 93 % of referrals are accepted by the programme. During the last 6 months 76 % of adults assessed were found to be suitable candidates for a CI.

As of Feb 2009 there were 15 adults in assessment (and 29 waiting to start assessment) and 44 adults on the waiting list for surgery. 5 devices will be fully funded in each of the coming two financial years hence the steadily increasing waiting list for adults requiring funding.

Criteria

The CI Candidacy criteria for adults is based on speech discrimination ability in their best aided condition. The cut off margins are; <60% on HINT sentences or < 30% on CNC words presented (both Auditory alone) at 55dB SPL at the ear of the listener.

Outcomes for adults



The current device offered to adults is Cochlear Ltd's Freedom Cochlear implant. Adults generally achieve a good level of aided benefit soon after device activation with results in the region of 20-30dB HL across the speech spectrum. Speech perception ability is naturally more variable, but a significant improvement in speech discrimination over the first 3-6 months following fitting is nearly always seen. Quality of life measures are being undertaken together with a rating of customer satisfaction.

Preliminary investigation into the assessment of functional listening in school aged children with hearing impairment.

Rebecca Bull¹ & Norm Erber, PhD²

¹ RIDBC Jim Patrick Audiology Centre, Royal Institute for Deaf and Blind Children, Sydney, Australia

² RIDBC Renwick Centre, Royal Institute for Deaf and Blind Children / The University of Newcastle, Australia

Early identification, early intervention, and advanced technology have improved outcomes for children with hearing loss. However, for some children there remains a mismatch between audiological results and the language/educational progress. Audiologists typically assess hearing for speech in a clinical setting with standard lists of phonemes, words and sentences. These tests provide verification of fitting strategies and demonstrate benefits of amplification, but rarely reflect real-world communication.

In addition to a standard test battery, evaluation of speech perception in children may require adaptation to the child's level of communication development (Calmels, et al, 2004). A modification of Erber's adaptive assessment procedure (1982, 1992) was performed on five hearing impaired children with AB word lists. Results indicate that they identify test words best when they see the speaker's face and mouth, and that the original auditory-alone percent-correct score does not reflect a child's potential for face-to-face communication.

In keeping with Mendel's 2008 recommendation to produce a communication profile rather than a speech perception score, a visual representation of each child's reliance on four communication factors was created. This simple diagram establishes a meaningful link between audiological results and directions for classroom practice.

In quantifying a child's reliance on key factors, audiologists can give teachers additional meaningful information with the potential to make classroom modifications and program changes. It provides educators with information about areas requiring further attention, and establishes a baseline for repeated testing to monitor the development of specific auditory communication skills.



REFERENCES:

- Calmels, M., Saliba, I., Wanna, G., Cochard, N., Fillaux, J., Deguine, O. et al. (2004). Speech perception and speech intelligibility in children after cochlear implantation. *International Journal of Pediatric Otrhinolaryngology*, 68(3), 347-351.
- Erber. N.P. (1982). *Auditory Training*. Washington, DC: A.G. Bell Association.
- Erber, N. P. (1992). Adaptive screening of sentence perception in older adults. *Ear and Hearing*, 13(1), 58-60.
- Mendel, L. (2008). Current considerations in pediatric speech audiometry. *International Journal of Audiology*, 47(9), 546-553.

Applying Hope in Hearing Therapy

Bruce Kent PhD, Psychologist & Jacqui Taylor Hearing Therapist NZDipHT, LIFE

Hearing therapy services in NZ provided by LIFE Unlimited over the last three years have adopted hope-enhancing practices (Kent & Lissaman, 2007) which are consistent with the shift towards positive psychology (e.g. Seligman et al, 2006, 2005). The construct of hope has been empirically established as a key variable in rehabilitation across a range of health conditions (e.g. Snyder & Taylor, 2000) including hearing impairment (Kent & La Grow, 2007).

The proposed paper presents (a) an overview of the construct (b) a brief summary of the outcome data relating to the role of hope in adjustment to hearing loss, and (c) a case study illustrating how this benefited a hearing impaired client confronting significant challenge. The case study demonstrates the practical utility and efficiency of assessing and responding to the client-determined needs (Duncan, Miller & Sparks, 2004) using the hope construct.

The paper offers audiologists some practice-based evidence of possibilities for responding to the psychosocial needs of people with hearing impairment.

References

- Duncan, B.L., Miller, S.D., & Sparks, J.A. (2004). The heroic client. San Francisco : Jossey-Bass.*
- Kent, B. & La Grow, S. (2007). The role of hope in adjustment to acquired hearing loss. International Journal of Audiology, 46, 328-340.*
- Kent B. & Lissaman, J. (2007). Hope-enhancing hearing rehabilitation. Paper for Adult Aural Rehabilitation Conference, Portland, Maine, May.*
- Seligman, M.E.P., Rashid, T., & Parks, A.C. (2006). Positive psychotherapy American Psychologist, 61, 774–788.*

New Zealand Audiological Society Inc
PO Box 9724, Newmarket, Auckland 1149
Phone/Fax: 0800 625 166
Email: mail@audiology.org.nz
Website: www.audiology.org.nz



Seligman, M.E.P., Steen, T.A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, 60, 410–421.

Snyder, C., & Taylor, J. (2000). Hope as a common factor across psychotherapy approaches: A lesson from the Dodo's verdict. In C. Snyder (Ed.), *Handbook of hope*, (pp.89-108). San Diego: Academic Press.

Notes

Kent & La Grow (2007) article was nominated as one of two most thought provoking articles by The Hearing Journal – The best of audiological literature 2007; The Hearing Journal, 61, 6. Accessed at:

http://www.audiologyonline.com/theHearingJournal/pdfs/hj2008_06_p17-34.pdf