MONDAY 0830-1000
RM 40-43

1M KEYNOTE ADDRESS RM 40-43 MON 0830-1000

Introduction: M. Robinette, Mayo Clinic – Scottsdale

The Cochlea and OAEs
David T. Kemp
UCL Centre for Auditory Research, The Ear Institute, London

Twenty five years ago, in September 1979 the first international conference on “Nonlinear and Active Mechanical Processes in the Cochlea” was held at the Institute of Laryngology and Otology (ILO) London. That meeting was the point-of-no-return in a revolution in our thinking about the cochlea which had begun 10 if not 30 years earlier.

OAEs were only one of many new phenomena presented then. Hair cell motility, bi-directional transduction, sharp basilar membrane tuning and mechanical nonlinearity were all represented and hotly debated. Gradually over the next decade a new view of the cochlea emerged as research groups in widely differing fields published further startling findings. OAEs became a practical tool.

This presentation reviews the fascinating scientific process leading to recognition of the cochlea as a sound imaging system with its own mechanical wave amplifier: a supremely delicate example of natural nanotechnology. It sheds light on why the mammalian cochlea needed to evolve in this way and why OAEs are an inevitable consequence.

By de-mystifying terms like ‘nonlinearity’ and ‘active processes’ and by stripping away the technical jargon surrounding OAEs it becomes easier to understand OAEs and the limitations of today’s OAE technology. This leads to insights into how and why a great increase in clinical application is possible.

MONDAY 1030-1230
RM 40-43

2M ROUND TABLE RM 40-43 MON 1030-1230

NEW PERSPECTIVES ON THE MOLECULAR BIOLOGY OF HEARING

Moderator: J. M. Miller, University of Michigan

Mechanisms and Prevention of Drug-induced Hearing Loss
Leonard P. Rybak
Department of Surgery, Division of Otolaryngology, Southern Illinois University School of Medicine, Springfield, IL USA

Outer hair cells of the cochlea undergo apoptosis and cell death following exposure to ototoxic drugs, such as the aminoglycoside antibiotics and the anticancer agent, cisplatin. Recent insights into the molecular mechanisms involved in these processes have enabled researchers to develop strategies for intervention that may prevent or attenuate hair cell damage and hearing loss from these drugs. These drugs have a common effect of increasing the production of reactive oxygen species (ROS). These molecules appear to trigger a series of biochemical reactions in the tissues of the inner ear that result in cell death. The pretreatment with various compounds, such as antioxidants and iron chelators, may reduce or prevent hair cell loss and hearing threshold elevation in animal experiments. The use of inhibitors of various steps downstream in the cell death pathway also can protect against hair cell death. These exciting new findings suggest that methods for preventing sensorineural hearing loss from ototoxic drugs administered to patients may be achieved in the near future. lrybak@siumed.edu
MONDAY 1030-1230
RM 40-43

**Noise Induced Hearing Loss: Mechanisms and Interventions for Prevention**

Richard A. Altschuler,  
Kresge Hearing Research Institute, University of Michigan

Increased understanding of the intracellular response to noise is leading toward interventions for prevention or reduction of noise induced hearing loss. One strategy is to identify natural protective mechanisms and enhance them. We have identified three such pathways. One is the classic Stress Pathway involving heat shock proteins. Loss of this pathway decreases recovery from noise while its enhancement provides 30 Db of protection. We also find that neurotrophic factors such as GDNF are upregulated by noise and provide a significant decrease in noise induced hearing loss. Finally we find that the enhancement of oxidative stress pathways will also provide a significant reduction in damage from noise. shuler@umich.edu

**Interventions to Prevent Degeneration, Regrow, and Replace the Auditory Nerve.**

Josef M. Miller  
Kresge Hearing Research Inst, Univ. of Michigan, Ann Arbor, MI, USA; Center for Hearing & Communication, Karolinska Institutet, Stockholm

Auditory nerve cell death occurs following loss of hair cells. Recent insights into the molecular mechanisms involved have enabled us to define intervention strategies that may prevent or even reverse these processes. In vitro studies suggest loss of neurotrophin support, changes in cellular oxidant state, and changes in intracellular Ca\(^{2+}\) as contributing factors. We have demonstrated the significance of these factors in vivo. Neurotrophic factors (NTF) and antioxidants enhance spiral ganglion cell (SGC) survival and electrical excitability following deafferentation. Chronic electrical stimulation (ES) supports SGC survival, and its effectiveness is eliminated by the administration of an L-type Ca\(^{2+}\) channel blocker (verapamil), indicating the importance of intracellular Ca\(^{2+}\) homeostasis. ES and NTF also promote SGC peripheral process regrowth. Furthermore, we have recently demonstrated that exogenous neural cell implants in the inner ear survive, migrate into the auditory nerve and generate neural contacts, which may lead to the rebuilding or replacement of the auditory nerve. These interventions may improve benefits of cochlear implants. This work was supported by NIH Grant RO1 DC 03820 and UAW/GM funds; NTFs supplied by Amgen. josef@umich.edu

**Strategies for Developing Cures for Sensorineural Deafness**

Yehoash Raphael  
Kresge Hearing Research Institute, University of Michigan

Studies at the molecular level have identified genes that regulate the development of the inner ear. With better characterization of the gene products, it is possible to harness the molecular knowledge for developing protective and reparative therapies. Such therapies often depend on the ability to introduce genes into specific target cells, with the expectation that the gene products of these transgenes will provide protection or repair. Math1 is the mouse homolog of atonal, a Drosophila transcription factor gene. Math1 is necessary for the embryonic development of hair cells. To determine the outcome of Math1 gene therapy in experimentally-deafened guinea pigs, we used adenovirus-mediated gene transfer technology and expressed Ad.Math1 in non-sensory cells that remained in these deafened ears. Control animals were inoculated with adenovirus vectors with no gene insert (Ad-empty). Math1 inoculated ears contained new hair cells in the organ of Corti. No new cells were observed in any of the control animals. Our results suggest that adenovirus-mediated over-expression of Math1 in deafened guinea pigs leads to generation of new cochlear hair cells.

Supported by GenVec, UAW/GM and NIH-NIDCD grants R01 DC01634 and P30 DC 05188.
Yoash@umich.edu
3M DAMAGE AND REPAIR RM 40-43 MON 1400-1530

Moderator: Kathleen C. M. Campbell, Southern Illinois University School of Medicine

Workers’ Attitudes Towards The Risk Of Hearing Loss

Eva B. Svensson* ***, A-C Johnson * ***, T.C. Morata****
*Nat.Inst.for Work.Life,Umeå,Sweden;**Technical Audiology,Karolinska Institutet,Blå v.hus15,Danderyd,Sweden;***Center for Hearing&Comm.Research,Karolinska Institutet,Stockholm,Sweden;****NIOSH,Cincinnati,Ohio,USA

The beliefs and attitudes toward the risk of hearing loss and their impact in hearing protector (HPD) use were investigated among Swedish workers (n=313) exposed to styrene and/or noise and non-exposed controls, using a survey. The content areas were designed to test constructs of attitude-behavior models. The results were analyzed for each content area. 90% of the respondents considered hearing loss a serious problem, 85% believed HPDs could protect their hearing. 55% found it difficult to hear warning signals when using HPDs, and 45% considered HPDs uncomfortable. These issues must be addressed to promote more effective use of HPDs. Eva.b.svensson@cns.ki.se

Hearing Ability in the US: NHANES, 1999-2004

Christa L Themann*, Howard J Hoffman**, Charles F Dillon***, John R Franks*
*NIOSH, Cincinnati USA; **NIDCD, Bethesda USA; ***NCHS, Hyattsville USA

Collecting health data is the first step towards prevention. The National Health and Nutrition Examination Survey is collecting audiometric threshold data and related information from a nationally-representative sample of US adults, aged 20 to 69 years. Data collection began in 1999 and continues through 2004; the data provide the first national estimate of hearing ability in US adults in nearly thirty years. The survey methodology will be explained and preliminary findings will be presented. Implications of these data for directing occupational and other hearing loss prevention efforts and their utility in monitoring progress in prevention will be discussed. clt6@cdc.gov

Uncomfortable Noise Induces Autonomic Reactions

K. Ogawa, M. Masuda
Department of Otolaryngology, School of Medicine, Keio University, Tokyo, Japan

Tinnitus, internal uncomfortable noise, is well known to induce several emotional and psychosomatic problems such as anxiety and insomnia. This indicates that tinnitus is closely related to the emotional, limbic and the autonomic nervous system. In order to clarify the effects of uncomfortable noise on autonomic nervous system, the authors investigated the autonomic reactions including skin sympathetic nerve activity induced by uncomfortable noise. The subjects were healthy adults without tinnitus and tinnitus patients. During and after the stimulation by noise of uncomfortable level, skin resistance and temperature were recorded using ProComp. From the results of this study, we discuss the effects of tinnitus on the autonomic nervous system. ogawak@sc.itc.keio.ac.jp

Drugs to Prevent Permanent Noise-Induced Hearing Loss

Kathleen C. M. Campbell
Southern Illinois University School of Medicine

A variety of pharmacologic and dietary agents have been proposed as potential otoprotective agents for noise-induced hearing loss. A wide variety of agents, with various mechanisms of action, have been studied.
MONDAY 1400-1530
Rm 40-43

This presentation will review the most promising otoprotective agents. It will then focus on our work with D-methionine as an otoprotective agent in preventing noise-induced hearing loss in chinchillas including histologic, electrophysiologic, and biochemical measures. We are working with the FDA and seeking clinical trials populations. Dr. Campbell has worked with the FDA on clinical trials studies previously as a consultant to companies testing potentially ototoxic drugs. kcampbell@siumed.edu

Drugs to Prevent Ototoxic Hearing Loss

Kathleen C. M. Campbell
Southern Illinois University School of Medicine

Over the last decades, a wide variety of pharmacologic agents have been tested as potential otoprotective agents for aminoglycoside, cisplatin, and carboplatin-induced hearing loss. This presentation will first review the most promising otoprotective agents. It will then focus on our animal studies with D-methionine as an otoprotective agent in preventing cisplatin/carboplatin-induced and aminoglycoside-induced (gentamicin and amikacin-induced) hearing loss. Data presented will include histologic, electrophysiologic, and biochemical analyses. We are working with the FDA and seeking clinical trials populations. Dr. Campbell has worked with the FDA on clinical trials studies previously as a consultant to companies testing potentially ototoxic drugs. kcampbell@siumed.edu

New Technology and the Fight Against NIHL

Al Yonovitz
SoundSafety Pty Ltd

The global prevalence of the harmful effects of industrial noise remains high. Industrial noise risk assessment is generally made with reference to industry and site specific factors, as well as sound level meter and dosimeter recordings. NoiseCheck is an Australian designed personal “noise badge” designed to address issues that have not been overcome using current hearing conservation programs. It is worn by the worker and displays in real time the cumulative level of noise exposure during a shift. The large display indicates the percentage of daily allowable exposure and factors in the type of ear protection worn. Al.yonovitz@cdu.edu.au

MON 1400-1530
RM 36-39

4M SPEECH RECOGNITION RM 36-39  MON 1400-1530

Moderator: David J. Lilly, VA National Center, Portland, Oregon

A Sound Recognition Test For Korean Children

Heekyung Bae, Junghak Lee*, Jinsook Kim**
Dongsan Hearing and Speech Center, Seoul, Korea. *Hallym University Medical Center, Department of Otolaryngology. ** Hallym University, Division of Speech Pathology and Audiology

The purpose was to develop a sound recognition test for Korean children(SRT-KC). The SRT-KC consists of 30 sounds, 15 Korean onomatopoeic words and 15 environmental sounds, with picture plates. Each plate has four pictures. Subjects included 15 normal and 15 hearing impaired children aged 3-6 years. The correct response rates for normal group were 80% or greater for all tested sounds; for hearing-impaired group, however, the rates were less than 80% for 3 sounds. It is suggested that SRT-KC be utilized for a valuable clinical and rehabilitative tool with minor modification and further study. 77scallett@hanmail.net
Learning Effect with the Danish Hagerman Sentence
Lotte Hagen Hernvig, Steen Oestergaard Olsen
Department of Audiology, GN ReSound, Taastrup, Denmark

The short term and a possible long term learning effect among aided hearing impaired listeners were investigated. Signal to noise ratio (SNR) at speech reception threshold (SRT) was found in six trials at two sessions. Twenty (20) hearing impaired subjects were tested wearing their own hearing aid as fitted by their hearing clinics. The learning effect was calculated as the difference between the SRT (expressed as dB SNR) at the first trial and the following trials. Results will be presented and implications for evaluation of speech enhancing algorithms using this type of measurements will be discussed. lhernvig@gnresound.dk

Speech Intelligibility in Patients With MS
David J. Lilly, Michele M. Hutter, Julie A. Saunders, Dennis N. Bourdette, Stephen A. Fausti, M. Samantha Lewis
VA National Center for Rehabilitative Auditory Research, Portland, Oregon, USA

For a group of 20 patients with a clinical diagnosis of definite multiple sclerosis (MS) and a matched control group of 20 subjects without MS, we measured speech intelligibility binaurally in the sound field for the IEEE sentences in a babble surround of 16 speakers talking simultaneously. Our findings suggest that patients with MS have significantly more difficulty understanding speech in a background of multi-talker babble than the control subjects. This finding holds even when the MS patients have little difficulty with speech intelligibility in quiet. Our findings will be discussed within a general framework of spatial release from masking. lillyd@ohsu.edu

Effects of Stimulation rate on Cantonese Lexical-tone Recognition in Cochlear Implant Recipients
*Institute of Human Communicative Research & Division of Otorhinolaryngology, Department of Surgery, The Chinese University of Hong Kong **Cochlear Ltd., Sydney, Australia ***Department of Ear Nose and Throat, Queen Elizabeth Hospital, Hong Kong.

This study investigated rates of electrical stimulation on speech recognition and subjective preference measures in nine Cantonese-speaking cochlear implant recipients. Special emphasis was on investigating subjects' performance on lexical-tone identification, which provides insights on how well cochlear implant represents subtle changes of F0 that carries lexical-semantic information in the tonal language Cantonese. The ability of the existing speech-processing scheme in representing F0 for speakers with different F0 range will be discussed. Cochlear implant recipients should be given the opportunity to use higher stimulation rate (analysis rate), and be evaluated on any benefits on speech recognition, especially on lexical-tone identification and subjective evaluation, over lower stimulation conditions. kevinyuen@surgery.cuhk.edu.hk

Comparison of Speech Perception Skills in a Multi-lingual Environment among Three Filipino Sisters with Cochlear Implants: A Case Report
Hubert DC Ramos
University of Santo Tomas, Manila, Philippines

Apart from the relative individual idiosyncrasy among sisters, differences in their speech perception skills would be interesting to note considering the homogeneity of their learning environment. Notwithstanding the multi-lingual environment in a country like the Philippines, this study identified key determinants in the speech perception abilities of the three sisters implanted with the European Cochlear Implant. Interaction between cause of deafness, auditory performance and speech perception skills was determined and analyzed to facilitate qualitative evaluation of factors affecting the acquisition and development of speech among the pre-lingual deafened children. Results will be presented in tabulated form. hubs_r@hotmail.com
MONDAY 1400-1530
RM 36-39

Development of Speech Audibility Index and Speech Temporality Index

Ttasuo Nakagawa
Yokohama National University, Yokohama, Japan

In order to be able to identify speech for persons with hearing impairment, it is necessary that amplified speech is audible and at the same time that the temporal structure of the amplified speech replicate that of the original speech as much as possible. A speech audibility index and a speech temporality index were developed to examine hearing aid performance for speech amplification. Using these two indexes, various hearing aid settings were evaluated in a 2 cc-coupler. It was found that the two indexes are useful to predict hearing-aid performance in listening speech. nakagawa@edhs.ynu.ac.jp

MONDAY 1545-1715
RM 40-43

5M AMPLIFICATION I RM 40-43 MON 1545-1715

Moderator: Lena Wong, University of Hong Kong

Occlusion With Unilaterally Versus Bilaterally Fitted HA

Charlotte Thunberg Jespersen+, Juergen Kiessling*, Barbara Brenner*, Jennifer Groth+, Ole Dyrlund Jensen+ + GN Resound, Taastrup, Denmark, *Department of Audiology, Justus-Liebig University Giessen, Germany.

The benefit of bilaterally fitted hearing aids is well-documented, but many patients wear only one hearing aid due to occlusion related complaints. We quantified subjective occlusion in the unilateral versus bilateral condition for a variety of vent designs in custom hearing aids and earmolds. The subjective occlusion in both normal-hearing participants and experienced hearing aid users was higher for bilaterally fitted hearing aids with all vent designs. The extra occlusion created by wearing a second hearing aid became smaller the more open the fitting was. These results suggest that open hearing aid fittings can help promote bilateral hearing aid use. cjjespersen@gnresound.dk

Occlusion Effect of Earmolds with Different Venting

J. Kiessling*, B. Brenner*, C. T. Jespersen+ , J. Groth+, O. Dyrlund Jensen+ *Department of Audiology, Justus-Liebig University Giessen, Germany; + GN Resound, Taastrup, Denmark

The benefit of hearing aid fittings is strongly affected by the occlusion effect. In this study occlusion was quantified for five coupling systems with different venting. Nine normal hearing listeners and ten experienced hearing aid users were provided with conventional custom earmolds, shell-type earmolds with a novel vent design, and a non-occluding standard eartip of a commercial hearing instrument. The occlusion effect was measured by a probe microphone system and subjectively rated in test and retest sessions. Results show that the new venting system causes significantly lower occlusion effect than traditional earmolds with the same vent diameter. Occlusion effect associated with the non-occluding standard eartip is comparable to the unoccluded ear. Subjective rating correlates with the measured occlusion on the worse ear and its test-retest reproducibility is better than for the measured effect. Our results suggest that subjective judgement of occlusion is directly related to the acoustic mass of the air column in the vent the amount of perceived occlusion may be predicted by the vent dimensions. Juergen.Kiessling@hno.med.uni-giessen.de
Performance in Noise for Four Hearing Device Styles

Laurel Olson, Karrie Recker
Starkey Labs, Eden Prairie, MN USA

Directional research has focused primarily on the performance difference of omni directional and directional modes in various configurations and environments. However, very little information is available regarding comparisons of various device styles. This research focused on a comparison of CIC, ITC, ITE, and BTE devices. Devices were matched for output and subjects were evaluated with the HINT in a diffuse noise situation to evaluate each of these styles. Preliminary data indicated that subjects obtained more benefit with directional devices than with non-directional devices. Further, subjects obtained more benefit with ITE devices in the directional mode compared to the other hearing aid styles. laurel_olson@starkey.com

Clinical Trial of DSP Hearing Instruments

Randi Wetke
Aarhus University Hospital, Audiological Department

A clinical field trial compared two hearing instruments (HI) with different DSP technologies to investigate possible differences in performance and/or acceptance. CIC HIs were evaluated in 25 subjects with mild-moderate sensorineural hearing impairment using a double-blind, randomized, cross-over design. Methods of evaluation included the objective Just Follow Conversation (JFC) test and the subjective Questionnaire for Clinical Test of Hearing Aids. Subjects performed significantly better (p < .05) with HI B on the JFC test, the Questionnaire, and final preferences. The study’s implications for public health care in Denmark will be discussed. wetke@audioweb.dk

A Causal Model of Hearing Aid Satisfaction

Lena L. N. Wong**, Louise Hickson**, Bradley McPherson*
*University of Hong Kong, Hong Kong, China;**University of Queensland, Brisbane, Australia

The effect of performance and disconfirmation on hearing aid satisfaction was established using structural equation modeling (SEM). Disconfirmation is defined as an evaluation of how performance deviates from expectations. Using a 2-stage approach, data from 232 Chinese speaking hearing aid users with various use experience were subjected to SEM. Results show that performance plays a very important role in determining satisfaction. Although the effect of disconfirmation is minor its inclusion does improve the model fit. The application of SEM in audiological research and the advantages of SEM over other statistical approaches will be highlighted. llnwong@hku.hk

Sound Quality Measures of a Noise Reduction System

Jennifer Robinson, Andrew Dittberner, Laurel Christensen, and Carla Sims
GN ReSound Group

Digitally implemented noise reduction algorithms are commonly found in today’s hearing instruments. Most systems claim to provide improved comfort when listening in noisy situations. This presentation will detail a study of the sound quality of a noise reduction system. Twenty subjects rated the sound quality of speech in quiet, speech in noise, and music without and without noise reduction active on several dimensions of sound quality. Results will be discussed along with implications for everyday benefit from noise reduction systems. robinsonj@beltone.com
Otoacoustic emissions were studied in normally hearing carriers of mutations related to Usher syndrome and connexin 26 deafness. Transient and distortion product OAEs and TEOAE suppression were compared to age and gender matched control subjects. Mean OAE amplitude was reduced in connexin 26 carriers while mean OAE amplitude was similar in Usher carriers and control subjects. In contrast, Usher carriers showed reduced mean suppression amplitude while connexin 26 carriers showed suppression amplitude comparable to control subjects. These results suggest phenotypic differences in OAEs in these two mutation groups. [Supported by NIH NIDCD R01-DC03679 to LJH and American Hearing Research Foundation.] lindahood@worldnet.att.net

Factors influencing DPOAE growth function

David T Kemp and Edward McCrindell
ILO, University College London, UK

Distortion product OAE intensity is strongly dependant on both stimulus intensity and stimulus frequency ratios. Boege and Janssen (JASA 2002) used a linear L2,L1 formula to determine a DP threshold which correlated significantly with hearing threshold. We explored DPOAE intensity experimentally with variable f2/f1 and L2/L1, and compared our findings with simple cochlea model predictions. Our aim was to better understand the origins of DPOAE intensity functions and hence improve cochlea assessment by DPOAE. We demonstrate why many normal ears do not produce linear DPOAE growth trends when plotted as DP sound pressure against stimulus Db intensity using the stimulation formula adopted by Boege and Janssen.
emission@dircon.co.uk

Tinnitus and Normal Thresholds: Cochlear Lesions?

Ann-Cathrine Lindblad
Technical Audiology, Karolinska Institutet, Stockholm, Sweden

Cochlear and efferent function in tinnitus patients was tested to investigate possible cochlear damage. Tone thresholds, otoacoustic emissions including contralateral suppression were measured, and also thresholds for brief tones at the peaks and in the valleys of intensity modulated noise, (Psychoacoustical Modulation Transfer Function), to distinguish between classical hearing loss and effects of impulse noise. Inner hair cell function was tested by forward masking. Several subjects had deficient efferent control, some had TEOAEs and PMTFs suggesting impulse noise incidents. Some had large masking effects for long masker-probe intervals. Sometimes when no damage was found, tinnitus could be matched to SOAEs.
Anncat.lindblad@cns.ki.se

Microwave Exposure & Gentamicin: Combined Effects


Pigmented and albino guinea pigs were treated 5 days/week with gentamicin (GM) at 60 and 75 mg/kg/day, for 2 to 4 weeks. Their left ears were simultaneously exposed or sham-exposed to GSM microwaves, via a loop antenna, at specific absorption rates of 1, 2 and 4 Watts/kg. Each ear was tested by distortion product otoacoustic emissions and auditory brainstem responses before, at the end, and one month after the end of the treatment/exposure period. A slight alteration of both measures at high frequencies, typical of GM ototoxicity, was systematically observed, with no significant differences between the exposed and sham-
exposed ears. Partially supported by Project GUARD Potential adverse effects of GSM cellular phones on hearing (European Commission, 5FP, QLK4-CT-2001-00150, 2002-2004).
Jean-marie.aran@bordeaux.inserm.fr

**DPOAE, ABR & ASSR In Normal And High Risk Newborns: A Mexican Experience**

Monica López-Vázquez, Reyna Martinez & Pedro Berruecos
Hospital General de Mexico, Mexico City, Mexico

To determine the role of ASSR in a high-risk newborn screening program we performed DPOAE in normal newborns with a Pass/Fail criterion of 3Db S/N ratio. Those who failed underwent click ABR and ASSR, as well as high-risk newborns. Newborns with abnormality in one of the tests, were assessed two months later to complete the diagnostic procedure. We had results of 1320 normal newborns with OAEs and 226 high risk newborns but included in our analysis only the 153 that completed the tests. Five babies had unilateral and seven had bilateral HL. The advantages and disadvantages of ASSR in our NHS program as well as the difficulties and problems we are facing in it are discussed. kefasmex@yahoo.com

**Objective Verification Of Infant Speech Perception Using Cortical Auditory Evoked Potentials**

Katrina B. Agung, Suzanne C. Purdy, Catherine McMahon, Harvey Dillon, Philip, Newall
Macquarie University, Sydney, Australia.

With the implementation of universal newborn hearing screening infants are being fitted with hearing aids at less than six months of age. The aim of the current study was to record cortical auditory evoked potentials in infants to objectively demonstrate that speech sounds which sample points across the whole range of speech frequencies were detected and could be differentiated from each other based on measurements of cortical response latency, amplitude, width and area and based on time frequency analysis. Cortical responses to these speech sounds were recorded in 20 infants and 10 adults with normal hearing. There were significant effects of stimulus duration on the responses, with shorter duration stimuli producing larger amplitudes and earlier latencies than longer duration stimuli. katrina.agung@nal.gov.au
7M POSTER SESSION IN EXHIBIT HALL MON 1730-1830
Poster Assignment is the Number Preceding the Abstract

1. World Council on Hearing Health – The Imperative for a Global Coalition on Hearing

Susan Greco
Deafness Research Foundation’s World Council on Hearing Health Washington, DC USA

The purpose is to: exemplify the growing global problem of hearing loss; explore the success and failure of past global initiatives in curbing the growth of hearing loss and educating the public about hearing detection, prevention and treatment; present the objectives of the WCHH; and demonstrate the imperative for the formation of the WCHH, comprised of global experts representing non-profit organizations, professional associations, government bureaus, and industry. The method that will be used is the rational model. The results will conclude that such a coalition of experts is the most effective modum operandi for curtailing hearing loss worldwide. sgreco@drf.org

2. Effects of a Hearing Information Campaign

Viktor Weichbold, Patrick Zorowka
Division of Hearing Voice and Speech Disorders, Department of Otolaryngology, Medical University Innsbruck, Austria

This study investigated the effects of an information campaign about the risks of high sound levels on students’ hearing-protective behaviours at discotheques. 600 high-school students were asked at the beginning and one year after the campaign: (1) the frequency of ear-plug use, (2) the frequency of intermittent recovery periods during discotheque attendance. After the campaign, the number of students who never used ear plugs at discotheques, decreased from 89% to 86%. The number of students who frequently had respite periods, increased from 67% up to 76%. The changes are statistically significant, but not satisfactory in terms of practical relevance. Viktor.weichbold@uklibk.ac.at

3. Statistical Study Of Audiometries Performed During One Year At An Otorhinolaryngology Clinic

Patricia F. M. Capaz, Cláudia M. Valete-Rosalino and Maria I. Kós
Clínica Prof. Arthur Octavio Kós, Rio de Janeiro – Brazil

The aim of this study is to analyze the prevalence of audiometric examinations at an otorhinolaryngology clinic in Rio de Janeiro, Brazil. The audiometric results of 3019 patients were distributed in seven categories: normal, sensorineural hearing loss, conductive hearing loss with tympanograms of type B or C, conductive hearing loss with tympanograms of type A or As, mixed hearing loss with tympanograms of type B or C, mixed hearing loss with tympanograms of type A or Ar and hearing loss in isolated frequencies. Among the several results obtained, we can highlight: a significant increase of sensorineural hearing loss for ages above 40; a clear prevalence of conductive hearing loss for children between 0 and 9 years-old, a higher prevalence of conductive, mixed hearing loss and loss at isolated frequencies in women. patricia_capaz@yahoo.com

4. Teleaudiology in Brazil

Deborah Viviane Ferrari
Universidade de Sao Paulo, Bauru, Brazil

The geographical and economical characteristics of Brazil make difficult the access to education and health care. The Brazilian Teleaudiology Program (TP) aims to use information and communication technology to overcome such difficulties. This poster will describe the first actions of the TP, including: the creation of a Teleaudiology Department affiliated to Brazilian Council of Telemedicine and Telehealth; the development of a web based distance-learning course for health care professionals and the development of directive and dynamic communication tools for patients’ education and counseling. The strategies for implementation as well as the preliminary results obtained with the TP will be discussed. ferrari_deborah@yahoo.com
5. **Using Telehealth to Support Universal Newborn Hearing Screening Programs**

Mark Krumm  
Utah State University, Logan, Utah USA

Universal newborn hearing screening (UNHS) programs are becoming increasingly common throughout the world. Unfortunately, UNHS programs in rural areas may lack the resources for effective UNHS hearing services. UNHS services provided through telehealth technology may provide greater capacity to isolated areas. To assess the value of telehealth technology, 20 infants were administered DPOAE and ABR tests face to face and through telehealth technology. The results of this study indicate that there was no difference between face to face testing and testing using telehealth technology. Therefore, audiologists should consider telepractice as a method for UNHS service provision in rural areas. mkrumm@cc.usu.edu

6. **Homogeneity of the 18 QuickSIN Lists**

Rachel McArdle, Richard H. Wilson# Mead Killion*, P. Niquette*  
VA Medical Center, Bay Pines, FL  #VA Medical Center, Mountain Home, TN, *Etymotic, Inc.

Pilot data showed a significant performance difference between List 3 and List 4 of the QuickSIN for listeners with sensorineural hearing loss but not for the listeners with normal hearing. In the current study, the homogeneity of the 18 QuickSIN sentences at each of the six signal-to-noise ratios (SNR from 25 to 0 Db) was evaluated and the overall 50% correct points were examined on 72 listeners with sensorineural hearing loss. The results showed significant variability among sentences at the same SNR even though about half of the lists had 50% points at essentially the same signal-to-noise ratio. Rachel.mcardle@med.va.gov

7. **Speech-in-babble with Varying Linguistic Context**

Richard H. Wilson and Rachel McArdle  
VA Medical Center, Mountain Home, TN and VA Medical Center, Bay Pines, FL

A mixed-model design was used to examine the use of digit, word, and sentence materials for measuring speech-recognition abilities in multitalker babble of listeners with normal hearing and listeners with impaired hearing. Two trials were conducted with each of the three speech materials presented in multitalker babble. The materials each provided significantly different results from listeners with normal hearing and listeners with hearing loss. The mean separation between groups in signal-to-babble ratio was 7.7 Db. The psychometric functions for the digit and word materials and List 4 of the QuickSIN were systematic, whereas List 3 of the QuickSIN was irregular. richard.wilson2@med.va.gov

8. **Cantonese Speech Intelligibility Index**

Lena L. N. Wong, Amy S.Y. Ho, & Elizabeth W. W. Chua  
University of Hong Kong

A Speech Intelligibility Index for Cantonese (SIIC) was derived. Speech intelligibility was measured on 78 normal hearing listeners using sentences from the Cantonese version of the Hearing In Noise Test in 136 conditions (17 low or high pass filtering conditions x 8 SNR conditions). A crossover frequency of 1148 Hz shows that low frequency is more important for Cantonese speech understanding. The SIIC was found to predict speech intelligibility with 84% accuracy in another sample of 10 normal hearing subjects evaluated at various noise levels and signal to noise ratios. The development and application of the SIIC will be discussed. llnwong@hku.hk

Minji Shim, Laura Smith-Olinde
UAMS/UALR, Little Rock, USA

This study examined English word recognition by adults in quiet and noise. Five American English, 7 Chinese, 6 Japanese, and 6 Korean speakers participated. NU-6 lists were used to obtain scores at 6 signal-to-noise ratios (SNR=0 to +20 Db & quiet). Scoring was phonemic, spoken whole word, and written whole word. Results indicate: 1) significant differences between Asian and English speakers at all SNRs; 2) Asian speakers need at least a +15 Db SNR to achieve scores similar to their own quiet condition; and 3) phonemic scoring yields significantly higher percent correct scores than either whole word method.

SmithOlindeLauraK@uams.edu

10. Simulating Test Reliability and Rate of Diagnostic Error

Dennis J. McFarland, Anthony T. Cacace
The Laboratory of Nervous System Disorders, The Wadsworth Labs, NYS Health Department; Department of Neurology, The Neurosciences Institute, Albany Medical Center, Albany, NY

We examined test reliability by simulating performance using a simple statistical model. Test scores were a combination of common trait effects and error. We then applied a 1 standard deviation (SD) criteria to detect the correspondence between trait (common effect) and observed scores. With a single test, a test-retest correlation of 0.80 or greater is required to insure that correct detections are greater than errors (false alarms and misses). With a test battery, agreement between tests is also required to maintain a reasonable ratio between correct detections and errors. Adequate reliability is required to avoid excessive diagnostic errors. cacacea@mail.amc.edu

11. Hearing Loss, Mental Retardation or Both?

Gilbert R. Herer,* Judy K. Montgomery,** Theodore J. Glattke,*** Hideo Itoh,**** Doris Nekahm-Heis*****
*Children's National Medical Center, Washington, DC, USA, **Chapman University Orange, CA, USA, ***University of Arizona, Tucson, AZ, USA; ****Hiroshima International University, Hiroshima, Japan; *****University Hospital Innsbruck, Austria

Outcome data from hearing screening of over 10,000 persons with developmental disabilities were collected from 1999-2004. Screening consisted of using otoscopy, DPOAE, tympanometry, and puretone audiometry. Results showed 30% of Special Olympics athletes from 124 countries failed the screening. Half of referral group had results suggesting sensorineural hearing loss in one or both ears needing further exploration. The other half needed medical examinations for possible middle-ear conditions. This poster presents the hearing screening process used at Special Olympics events, outcome data from the last 4 years, and the role audiologists have in assessing/treating individuals with high functioning developmental disabilities.

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12. Comparison of Four Temporal Resolution Tests

Gail D. Chermak and Jowan Lee
Washington State University, Pullman, WA, USA

Four temporal resolution tests (i.e., Auditory Fusion Test-Revised, Random Gap Detection Test, Binaural Fusion Test, and Gap in Noise Test) were administered to ten children with normal hearing and to one child age with minimal auditory processing deficits. Statistically significant differences among the four temporal resolution tests resulted from differences in stimulus type (i.e., clicks, tones, or noise). From a clinical perspective, however, none of the means fell below one standard deviation from the published norms, suggesting that all tests yielded results that would be interpreted similarly by clinicians. Implications for diagnostic testing of temporal resolution are discussed.

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13. A Spanish Central Auditory Processing Test Battery

Adrian Fuente & Bradley McPherson
Division of Speech and Hearing Sciences, The University of Hong Kong, Hong Kong, Hong Kong SAR

The purpose of the research was to obtain norms for a central auditory processing test battery to be used with Spanish speaking populations. The test battery comprises speech-in-noise, binaural fusion and filtered speech tests together with four tests already developed by other authors, but with no norms reported for Spanish speaking populations (staggered spondaic word, random gap detection, pitch pattern sequence and duration pattern sequence). Forty normal hearing Chilean adults were assessed. As expected, correlations were found between subtests within the same test category. For assigning normal and abnormal categorization, 90\% percentiles were defined as cut-off scores for individual subjects.

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14. Development of a New Electromagnetic Hearing Aid

STUDENT SCHOLARSHIP AWARD

*Tohoku University, Sendai, Japan, **The University Of Electro-Communications, Tokyo, Japan, ***Massachusetts Eye & Ear Infirmary, Boston, U.S.A., ****Stanford University, Palo Alto, U.S.A.

To circumvent some of problems in conventional implantable hearing aids such as necessity of the invasive surgery and cosmetic factors, a prototype of a non-implantable electromagnetic hearing aid was constructed. The principle of the hearing aid is that a lightweight coil is attached to the tympanic membrane and is excited by electromagnetic force. The fundamental property, i.e., an acoustical gain of the hearing aid was evaluated using human temporal bones. The experiments showed that the acoustical gain of more than 20 Db was obtained by the hearing aid in the frequency range of 0.5 – 5.0 kHz.

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15. Amplitude Growth of Lower- and Upper-Sideband DPOAEs

STUDENT SCHOLARSHIP AWARD

Lyubov S. Nemanov, Barden B. Stagner, Glen K. Martin, and Brenda Lonsbury-Martin
Department of Otolaryngology, University of Colorado Health Sciences Center, Denver, CO

Because of the nonlinear aspects of cochlear transduction, presentation of two tones to the ear produces families of distortion-product otoacoustic emissions (DPOAEs) referred to as lower sideband (LSB) and upper sideband (USB) DPOAEs. Most DPOAE literature has focused on the parameters necessary to elicit the largest and most prominent LSB DPOAE at the 2f1-f2 frequency. By ignoring DPOAEs other than the 2f1-f2 emission, a considerable amount of information regarding cochlear nonlinearity is discarded. As more energy is applied to the nonlinearity, or as f2/f1 ratios are decreased, more sidebands DPOAEs are produced. By studying multiple DPOAEs simultaneously insight into changes in the cochlear nonlinearity, such as a shift in the operating point or changes in the I/O map, may be detected that cannot be revealed by examining a single DPOAE. The purpose of the present study was to investigate LSBs (f2f1, 3f1-2f2, 4f1-3f2, and f2-f1) and USBs (2f2-f1, 3f2-2f1, 4f2-3f1) in normal and noise-damaged rabbit ears as a function of f2/f1 1ratio (1.05, 1.25 and 1.4.) at different f2 frequencies (2, 4, 8, and 11.3 kHz) over a range of primary-tone levels (75 to 45 Db SPL). Each of four rabbits was exposed to a monaural, 2 kHz, 110 Db SPL octave band noise (OBN) in the right ear only and data was collected before and after noise exposure in both ears. Experimental findings revealed that in noise exposed ears USBs and LSBs behaved differently. While all LSBs reflected the DPOAE loss pattern of the 2f1-f2 LSB DPOAE, USBs showed either no change or enhancement. When the primaries were closer together (f2/f1 = 1.05) both USBs and LSBs behaved similarly and failed mirror the 2f1-f2 DPOAE loss pattern. For some frequencies at the higher f2/f1 ratio (1.4) USB DPOAEs could not be detected in normal ears.

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16. Otoacoustic Emissions and the Glycerol Test
Tetsushi Sakashita*, Toshiyuki Shibata*, Hideo Yamane* and Chie Hikawa**
*Osaka City University Graduate School of Medicine, Osaka, Japan; **PL Hospital, Osaka, Japan

To investigate the manner of change in distortion product otoacoustic emissions (DPOAEs) during the glycerol test, their input/output functions at 1001, 1501, and 2002 Hz were measured before and after the testing for 16 ears with Meniere’s disease. Significant changes in input/output function were observed for at least one frequency in all 8 ears and 6 of 8 ears with and without positive test results, respectively. In a total of 12 ears, increase in maximum level of DPOAEs (max. DP level) and/or lowering of the detection threshold were shown, but two ears exhibited decrease in max. DP level.

17. Temporal Resolution and Retrocochlear Hearing Loss
Toshiyuki Shibata, Tetsushi Sakashita, Hideo Yamane, Chitoe Hashimoto
Osaka City University Graduate School of Medicine, Osaka, Japan

To study the effect of temporal resolution on the speech recognition ability, the gap detection thresholds (GDTs) of the five frequencies of 0.25, 0.5, 1.0, 2.0, 4.0 kHz for dichotic stimuli were measured in 23 patients with retrocochlear hearing loss.

18. Reference Equivalent Threshold Force Levels for Speech of Three Types of Audiometric Bone Conduction Receivers
Toshimas Matsuhira, Kiyoko Iho, Kazue Asano, Makito Okamoto
Kitasato University and Kitasato University Hospital, Sagamihara, Japan

The vibratory force levels of three types of bone conduction receivers corresponding to the mean speech recognition thresholds for Japanese speech audiometric test lists were measured for 20 otologically normal listeners, and then compared with the reference equivalent threshold force levels (RETFLs) for speech specified in IEC 60645-2 and recommended in JIS T1201-2. Statistically significant inter-receiver differences existed up to 4 Db. These differences were considered to originate from inter-receiver differences of frequency response, indicating that the RETFL for speech for individual receivers must be determined unless the frequency response of the receiver is not specified.

19. Effects of Ossicular Fixation on Ear Transmission
Takuji Koike, Toshimitsu Kobayashi, Hiroshi Wada
Department of Mechanical Engineering and Intelligent Systems, The University of Electro-Communications, Tokyo, Japan

A finite-element model of the middle ear was constructed to examine the effects of the fixation of the middle-ear ligaments and tendons on the transmission characteristics of the middle ear. The effect of the fixation of the anterior malleal ligament or posterior incudal ligament on the transmission characteristics was found to be small. However, when the stapedial annular ligament and the posterior incudal ligament were simultaneously fixed, the efficiency of the sound transmission of the middle ear decreased depending on the combination of the stiffness of each part even if the degree of each fixation was not too serious.
20. Intraoperative Measurement of Ossicular Mobility

Michio Murakoshi*, Takuji Koike**, Yu Yuasa***, Ryo Yuasa***, Toshimitsu Kobayashi*, Hiroshi Wada*
*Tohoku University, Sendai, Japan; ** The University of Electro-Communications, Tokyo, Japan; ***Sendai Ear Surgicenter, Sendai, Japan

Information on ossicular mobility is essential for tympanoplasty. However, it has been experimentally evaluated with palpation using a hook by a surgeon, thus leading to subjective results depending on the surgeon’s skill. In this study, therefore, a new apparatus for quantitative measurement of ossicular mobility was developed. An attempt was then made to measure ossicular mobility of patients with otosclerosis and chronic otitis media. Results show that this new apparatus enables us to estimate the change of mobility between pre- and post-treatment for ossicular fixation, as well as to distinguish the differences in ossicular mobility between normal and fixed ossicles.

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Traditionally, audiology has been concerned primarily with hearing and its impairment. The recent WHO-ICF (2001) framework has drawn attention to the need for audiologists to broaden their approach by considering how the individual actively uses the heard signal in listening, comprehending, and communicating. In this session, I will provide an overview of the cognitive processes underlying listening and comprehending. I will demonstrate how an individual-differences approach provides important theoretical insights into how hearers listen and comprehend, and I will describe how these individual differences can be reliably measured.

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Auditory-Cognitive Interactions and Aging

Bruce Schneider
University of Toronto

There is a strong correlation between hearing loss and cognitive performance in aging. We will consider possible interconnections between hearing and cognition that could produce this strong correlation. One possibility is that widespread neural degeneration affects both the sensory and cognitive systems (the common cause hypothesis). A second possibility is that hearing loss degrades the information required for effective cognitive performance (the information-degradation hypothesis). A third is that top-down compensatory mechanisms are engaged to offset the negative effects of hearing loss on bottom-up information processing. Recent support for the latter two hypotheses has implications for audiological assessment and treatment. bschneid@utm.utoronto.ca

The Role of Working Memory Capacity in Auditory, Audiovisual, and Visual Speech Understanding

Jerker Rönnberg
The Swedish Institute for Disability Research (SIDR), Linköping and Örebro Universities.

Complex working memory capacities are crucial for speech understanding, with and without hearing aids. Subcomponents of a working memory system for ease of speech understanding (ESU) rely on the quality of phonological representations, lexical access speed, and explicit storage and processing capacity. Individual variations in these components affect understanding speech in the visual, audiovisual, and auditory modes. ESU depends on high complex working memory capacity which (a) supports decoding of poorly perceived speech, (b) tolerates demanding speech processing schemes in hearing and sensory aids, and (c) aids prospective, schema-driven inference-making. The notion of cognitive hearing aids is discussed.
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Benefits from Linear and Non-Linear Hearing Aids in Relation to the Interaction Between the User’s Cognitive Capacities and Listening Conditions

Stuart Gatehouse
MRC Institute of Hearing Research (Scottish Section)

This presentation reports the interaction between the audiometric and cognitive characteristics of listeners, and test conditions. The analyses show significant interactions between hearing impairment and cognitive ability, and the extent to which, when tested unaided, listeners can derive advantage from temporal structure in a background noise. An analysis of the benefits of amplification shows significant interactions between cognitive ability, the temporal characteristics of interfering noise, and the time constants of non-linear amplification rationales. Listeners with greater cognitive ability derive greater benefit from temporal structure in background noise when listening via fast time constants, with facilitated “listening in the gaps”.

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Auditory Reorganization In Subjects With Hearing Aids

D Gabriel, E Veuillet, JF Vesson, L Collet
CNRS UMR 5020 Neurosciences et Systèmes sensoriels

Patients with high frequency steeply sloping hearing losses exhibit local improvements in frequency discrimination performance near the cut-off frequency (Fc) of their hearing loss, suggesting an over-representation of Fc in the primary auditory cortex. We assessed if this plasticity could be reversed by means of auditory rehabilitation. We measured the frequency difference limens (DLFs) of 9 subjects (tested without hearing aid) with a steep hearing loss before and during their auditory rehabilitation. A significant decrease of DLFs was observed around Fc. The hearing aid fitting thus normalized the DLF performance, suggesting the occurrence of a new cerebral plasticity.

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Detection of a Break in the Sound Correlation: A Measurement of the Auditory Memory and Aging

Liang Li, Juan Huang, Xihong Wu, James G. Qi, Bruce A. Schneider
Speech and Hearing Research Center, Peking University, Beijing, China and Center for Research on Biological Communication Systems, University of Toronto at Mississauga, Mississauga, Ontario, Canada.

When the delay between two correlated and spatially separated sounds is sufficiently short, only a fused image is perceived (the precedence effect). Here we show that listeners’ detection of a break in the correlation between two correlated noise sounds improves as the delay between the two sounds decreases. Younger listeners could detect a smaller correlation break than older listeners, even at delays larger than the threshold for fusing the two sounds (the echo threshold). These results indicate that the processing of dynamic correlations between two noise sounds is related to auditory memory, which declines with age.

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The Use of an Audiologic Rehabilitation Program Designed for Elders in Brazil

Iêda Chaves Pacheco Russo
Pontifícia Universidade Católica de São Paulo  PUC-SP

Purpose: To assist Brazilian hearing impaired elderly individuals to reduce the barriers to communication that resulted from hearing loss, through an audiologic rehabilitation program. Method: Ten hearing impaired elderly individuals aged from 60 to 90 years old were submitted to the AR program consisted of holistic evaluation; hearing aid selection, fitting and orientation; audiogram explanation; variables influencing speech perception; counseling and teaching communication strategies. The HHIE was used to evaluate the global progress. Results: All individuals presented a decrease in the perceived hearing handicap after the AR. Conclusion: Elder individuals can benefit of proper and constant stimulation, based in education and adequate information, thus coping with hearing aids and hearing loss. irusso@terra.com.br

The Role of Assessment of Cognitive Development in Amplification and Intervention of Hearing Impaired Babies.

M.Angelina N. Martinez, Beatriz C. Novaes, Beatriz C. Mendes
Catholic University of S. Paulo – PUCSP, Brazil

The actual possibility for assessment of infant hearing does not decrease the importance of behavioral observation, which supplies valuable information about the maturational development of Auditory Pathways and its integration with all Central Nervous System and is fundamental for the comprehensive analysis of all results of the tests battery. This observation requires from the audiologist the knowledge of cognitive development, mainly, the construction of listening schema and its role in the construction of reversibility of mental images. This research based on Piaget’s theory provides a model that explains the auditory significations system construction. The findings permit us to conclude that the mental image is the element of connection between the sensible experience and the symbolism determining the continuity from the action to language. angelina@pucsp.br

A Critical Analysis Of Auditory Processing Subcategories

Tori J.S. Gustafson* and Robert W. Keith**
*Texas Tech University, **University of Cincinnati

A popular classification of auditory processing disorders was devised by Katz based on patterns of errors found on the SSW test. A study of 159 cases of APD that examined the APD categories was conducted comparing SSW results and results of several language and auditory processing measures. Results failed to replicate the APD categories, raising questions of the construct validity of APD categories and remediation suggestions that are often proposed. This presentation will review those results and propose alternate approaches. robert.keith@uc.edu

The Self-Perception and Reality Of Hearing Status

Vishakha Waman Rawool
Southwest Missouri State University, Springfield, USA

In this study, 30 socially active older non-hearing aid users were administered the Survey for Client Acceptance of Hearing Loss and Aids (SCAHLA, Rawool, Hearing Review 2000). Audiograms were also obtained from the same individuals. Based on the criterion of 35 Db or higher thresholds in the better ear at any of the test frequencies ranging from 0.25 to 8 kHz, all individuals had a hearing loss. However, only 15 reported that they had a hearing loss. All individuals thought that hearing aids were too expensive. Detailed audiograms and other findings revealed through the administration of SCAHLA will be discussed. Vwr313f@smsu.edu
Objective and Subjective Hearing Aid Assessment Outcomes

Lisa Lucks Mendel, Ginger A. Gray, Bridget G. Lee
The University of Memphis, USA

Specific sentence recognition assessments were validated as objective outcome measurements that document improvements in speech understanding with hearing aids. The QuickSIN, HINT, and SPIN-R tests were administered to experienced hearing aid users to determine if they could adequately document improvements in speech understanding with hearing aids compared to subjects’ self assessments of their performance using the Hearing Aid Performance Inventory (HAPI). Results revealed that the aided QuickSIN SNR loss was significantly better than the unaided SNR loss; the HINT threshold in quiet was significantly better aided versus unaided; and no significant differences were measured for the SPIN unaided versus aided. These results suggest that the QuickSIN is the most sensitive of the tests used here to measure speech perception performance in noise compared to subjective perceptions reported on self-assessment outcomes. lmendel@memphis.edu

Low Frequency Gain Prescriptions – Evidence of Insufficiency

H. Christopher Schweitzer, Desmond A. Smith, Sally K. Jessee
HEAR 4-U Intl. Lafayette, CO USA; Acoustimed (Pty) Ltd, Johannesburg, S.A.; Univ. No. Colorado, USA

Keidser et al (2000) showed a discontinuity between open ear sound pressure levels and subjective loudness experience under closed cavity conditions such as occur in hearing aid fittings. An electronic model was developed with outputs in close agreement with the Keidser et al finding that approximately 9 dB adjustment at 500 Hz is needed for equal loudness at 3 kHz. This paper describes complex differences in measures of Sound Pressure Level, Sound Power, Loudness and the influence of source impedance on acoustical power in closed canal conditions. Implications for hearing aid fitting improvements especially in low frequency gain are discussed. familyhearing@qwest.net

Comparison of Objective and Subjective Outcomes NAL-NL1 and DPP Prescriptions

Kevin C. P. Yuen*, Anna C. S. Kam**, Polly S. H. Lau***
*Institute of Human Communicative Research & Division of Otorhinolaryngology, Department of Surgery, The Chinese University of Hong Kong; **Phonak (Hong Kong) Hearing Centre; ***Division of Speech and Hearing Sciences, The University of Hong Kong

The amplification outcomes of two hearing aid prescriptions: NAL-NL1 and Digital Perception Processing (DPP), of ten moderate to moderately-severe hearing-impaired adults were compared in the same digital hearing instrument. Sentence recognition in noise performance is better for DPP prescription in half of the subjects while no difference is found between the prescriptions in the other subjects; and both prescriptions are better than the subjects’ own hearing instruments using the NAL-RP prescription. The two prescriptions are not different in phoneme and word scores from mono- and di-syllabic word test in noise. Subjects prefer DPP to NAL-NL1 when listening to music, speech and environmental sounds by paired-comparison judgment. The adaptive directional microphone system offers better speech recognition in noise than the multi-band noise cancellation system, when signal and noise directions are different. kevinyuen@surgery.cuhk.edu.hk
TUESDAY 1100-1230
RM 36-39

Hearing Aid Benefit: Electro-acoustic Measures
Victor Bray & Michael Nilsson
Sonic Innovations Laboratory

Measures evaluated the change in signal to noise ratio (SNR) associated with the factors of multi-channel compression, digital noise reduction, and directionality. In-phase and out-of-phase recordings were made through digital hearing aids using the hearing in noise test (HINT) with uncorrelated noise in a diffuse sound field. Through signal manipulation, the respective contribution to change in SNR for each factor was quantified, creating a Noise Reduction Index (NRI). The predictive power of NRI measures on behavioural measures (see companion paper) will be discussed.

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Hearing Aid Benefit: Behavioural Measures
Victor Bray & Michael Nilsson
Sonic Innovations Laboratory

Clinical measures evaluated the factors of multi-channel compression, digital noise reduction, and directionality to determine their respective contribution towards changing speech intelligibility in noise (SIN) for hearing impaired listeners. A standardized test system using the hearing in noise test (HINT) with uncorrelated noise in a diffuse sound field was employed at multiple test sites across hundreds of hearing aid fittings. Results were a significant (p < .05) contribution from all three factors in improving SIN. The results lead to a model for predicting hearing aid benefit for SIN as a function of degree of hearing loss and amplification technology.

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Functional Gain Estimation of the Bone Conduction Hearing Aid
Toshimasa Matsuhira, Keiko Suzuki, Yuki Hara, Hajime Sano, Makito Okamoto
Kitasato University, Sagamihara, Japan

The validity of a formula estimating functional gain of a bone conduction hearing aid from the pure-tone thresholds of the wearer and the output characteristics of the hearing aid was examined. Subjects were six (6) persons with conductive hearing loss and 11 normal hearing adults whose bilateral ear canals were plugged to produce a simulated hearing loss. Functional gains of a bone conduction hearing aid were measured and were compared with the estimation using the above formula. The results suggested that although the estimation errors were larger than that for the air conduction hearing aids, our estimation has a potential of clinical use.

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TUESDAY 1400-1530
RM 40-43

4T Special Session BEYOND AMPLIFICATION RM 40-43
TUESDAY 1400-1530

Moderator: Robert W. Sweetow, University of California, San Francisco

When individuals have hearing loss, physiological changes in their brain interact with relearning of sound patterns. These changes may be age associated, or related to the hearing impairment. Some hearing-impaired adults may make compensatory strategies that result in successful hearing aid use. Others, however, may not be so fortunate. Modern hearing aids can provide adequate audibility, but do not rectify frequency resolution, temporal integration, susceptibility to noise interference, and cognitive deterioration. Recent neuroscience discoveries demonstrate that enhanced learning can occur from training specific regions of the brain in precise manners. In this session, aspects of how the brain learns and adapts to novel hearing patterns will be explored. Emerging interactive computer programs designed to facilitate successful compensatory strategies will be discussed.
Beyond Amplification: The Effects of Age-Related Auditory Processing Changes on Hearing Aid Success.

Kathleen Pichora-Fuller
University of Toronto

Beyond Amplification: What Older People Need, What They Want And What They Get

Adrian Davis
MRC Hearing and Communication Group


Jennifer Henderson-Sabes
University of California, SFO

Beyond Amplification: An introduction to Listening and Communication Enhancement

Robert Sweetow
University of California, SFO

5T EVALUATION ISSUES AND OUTCOMES RM 36-39

Distinguishing Perception And Cognition In Audiological Tests

Hugo Fastl
TU Muenchen, Muenchen, Germany

In subjective as well as objective tests used in audiology it is sometimes not easy to separate effects of perception from effects of cognition. Therefore, a procedure has been developed which leaves basic perceptual correlates of sounds, i.e. their loudness-time-patterns untouched, but largely obscures the information about the sound source. In essence, the sound first is analyzed by an FTT analysis, and - after spectral broadening - resynthesized by inverse FTT. Using this procedure, basic auditory correlates important for the perception of sounds like loudness or sharpness remain constant, but higher aspects of cognition, e.g. realizing that the sound stems from a specific sound source, are largely lost. The rationale of the different steps constituting the procedure is outlined, and the underlying theory is illustrated by acoustic demonstrations. Applications in subjective as well as objective audiological tests will be discussed.

Varied Presentations of Acoustic Neuroma

Hilary B. Shanin
Rush University Medical Center, Chicago USA

This session demonstrates the wide variability in audiologic presentation of acoustic neuroma. Several case studies exhibiting different findings will be reviewed. Each confirms the importance of audiologic assessment of the auditory and vestibular systems in these patients. The audiologist's role is significant; measures of auditory and vestibular function may impact course of treatment. Use of ABR, OAEs and ENG will be highlighted.
Audiologic Evaluation in Girls with Turner’s Syndrome

Ignacio Mora-Magaña*, Patricia Fuchs-Gomez**, Nelly Altamirano*
• Instituto Nacional de Pediatría; ** DIF-Iztapalapa

The purpose of this study was to evaluate ears and hearing of girls with Turner’s syndrome. Audiologic files of 76 girls with Turner’s syndrome, mean age of 135 +/-54 months, were reviewed. We found a difference between healthy right ear (re) to non healthy re agree to Jerger’s criteria (p=0.045). Not so for the left ear (le) (p=0.454). Conclusion: In Turner’s Syndrome, hypoacusis is associated to middle ear pathology. At birth, the ear is healthy, but it tends to deteriorate with time. If we find hearing loss in patients Turner’s Syndrome, hypoacusis is not a part of this syndrome. Pedro63@prodigy.net.mx

Suprathreshold Mapping by Loudness Difference Limen Test

Christopher Schweitzer, Desmond A. Smith, Sally K. Jessee
University of Northern Colorado, Greeley, Colorado USA & Acoustimed (pty) Ltd, Johannesburg, S.A.

Conventional audiometric pure tone tests are useful as a diagnostic map of thresholds at standard frequencies. However, they provide inadequate supra-threshold data pertinent to hearing aid fitting. Loudness Discomfort measures are important, but insufficient. Loudness scaling and loudness matching tests are time consuming and often difficult for untrained listeners to perform. A simple test of the loudness Difference Limens at various frequencies and hearing levels above the hearing threshold was developed, with a view towards improved hearing aid prescription. Only yes/no responses with minimal training are required. Initial data and their relevance to hearing aid prescriptions are presented.

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Development of a Test of Virtual Spatial Hearing

STUDENT SCHOLARSHIP AWARD

Sharon Cameron*; Harvey Dillon**; Philip Newall*
• Macquarie University, Sydney, Australia; ** National Acoustic Laboratories, Sydney, Australia

The Test of Virtual Spatial Hearing (TVSH) produces a three-dimensional auditory environment under headphones, using a standard audiometer and PC. In a three-alternative forced choice adaptive procedure the listener is required to indicate the intelligibility level of target continuous discourse presented at 0 degrees azimuth, in the presence of distractor sentences also presented at 0 degrees azimuth (mixed condition), or simultaneously at +/- 90 degrees azimuth (separate condition). Normally hearing adults, and children aged 7 to 9 years, had a significantly lower threshold in the separate condition, due to their ability to use binaural cues to distinguish the speech from the background noise when it was separated in location by 90 degrees. The degree of this ‘separation effect’ (up to 10 dB) was dependent on the similarity of the vocal quality of the speakers of the distracter sentences (either Female Speaker 1, or Female Speakers 2/3). A study on practice effects has revealed that there is no significant effect of learning on performance on the TVSH. Future studies with children with suspected auditory processing disorder will focus on their ability to use either spatial cues, tonal cues, or a combination of cues, to distinguish the target discourse from the distracter sentences. sharon.cameron@optusnet.com.au
**First Croatian BiCI Combi 40+ - 5 Years Follow-up**

Robert Trotic, Boris Pegan, Branko Kekic, Mihael Ries, Branka Sindija, Sanja Vlahovic

ENT Department, University Hospital Zagreb, Vinogradska 29, 10000 Zagreb, Croatia

We describe a post-lingually deafened patient due to meningitis, who underwent bilateral cochlear implantation (MED-EL Combi 40+) as one stage procedure. The patient has been follow-up for five years. Aided threshold gives a PTA of 35 dB on right ear, 30 dB on left ear and with both implants a PTA of 26 dB. Results for speech identification and recognition demonstrated an increased performance when both implants are used together. Test for Croatian words and sentences understanding in a noise environment, has been improved 40% with both CIs on. BiCI showed post-operative excellent hearing and communicative outcomes in our patient. [trotic@hotmail.com](mailto:trotic@hotmail.com)

**Electric-Acoustic Stimulation of the Cochlea: Results to Date**

David Fabry+, Bruce Gantz++, Chris Turner++, Aaron Parkinson*, Julie Moorhead*

+ Phonak, Warrenville, IL ,++University of Iowa Iowa City,* Cochlear Americas, Englewood, CO USA

The purpose of this study was to investigate electroacoustic stimulation in cases involving severe to profound high-frequency hearing loss. Patients received a cochlear implant with a 10mm electrode array designed to provide electric stimulation of high-frequency hearing, while permitting low-frequency hearing to be stimulated acoustically. Audiometric and speech perception measures in quiet and in noise were made pre- and postoperatively. It is possible to insert a short-electrode array without total loss of residual low-frequency hearing. Patients show improved speech perception in quiet and in noise. [dave.fabry@phonak.com](mailto:dave.fabry@phonak.com)

**The Loudness Function Formation in Cochlear Implant Users.**

George A. Tavartkiladze, Alexander V. Kruglov, Lilia A. Potalova

National Research Center for Audiology and Hearing Rehabilitation, Moscow, Russia

The peculiarities of the loudness function formation in cochlear implant users have importance both for the better results in the implant programming and for understanding of the sound perception mechanisms realized by the cochlear implant. These peculiarities were studied in 6 patients using Nucleus CI24M cochlear implants. The dependence of threshold levels on the rate and duration of the stimulation as well as electrophysiological parameters of the excitation temporary summation at the spiral ganglion level (NRT) and subcortical nuclei level (electrically evoked middle latency responses) were investigated. The data obtained indicate the existence of the excitation temporary summation at the levels of spiral ganglion and midbrain. At the same time the loudness growth with the increase of the stimulation rate was higher than the excitation summation effect. That means that loudness growth function could not be explained only by the excitation summation. [gtavartkiladze@audiology.ru](mailto:gtavartkiladze@audiology.ru)

**CI Fitting Based on Compound Action Potentials and Speech**

Christina Willeboer, Bert A. van Zanten & Guido F. Smoorenburg

University Medical Center, Utrecht, The Netherlands

We sought to determine if the efficiency of the fitting procedure of cochlear implant processors could be improved. In a prospective balanced cross-over design we compared speech performance using the conventional fitting procedure to a procedure in which we use the profile of the electrically evoked compound action potential threshold levels. The profile is shifted until we find the threshold for live speech (new T-levels) and the loudness comfort level (new C-levels). Speech performance is measured in quiet and in
Fitting of Cochlear Implants Based on the Acoustic Reflex

K. Stephan, V. Koci, K. Welzl-Müller
Innsbruck Medical University, Innsbruck, Austria

As the minimum age at implantation decreases, behavioral fitting procedures are difficult to apply and so the need for methods based on objective test procedures becomes more important. One possible approach to estimate comfort levels is the electrical stapedial reflex threshold measured postoperatively. For the clinical routine application a special protocol was developed: 1) Checking reflex threshold using multichannel stimulation; 2) Testing reflex threshold for single channel stimulation with stimulation paradigm identical to common fitting procedure; 3) Setting of comfort levels for each channel based on electrical reflex threshold data. Settings based on this protocol were very well accepted. kurt.stephan@uibk.ac.at

7T POSTER SESSION IN THE EXHIBIT HALL
TUESDAY 1600-1730

1. A Comparison of ASSR and Tone Burst ABR
Frank Jensen and Randi Wetke
Aarhus University Hospital, Audiological Department.

When collecting reliable ASSR and tone burst ABR hearing threshold data on infants, systems need to perform fast and precise operations. ASSR, tone burst ABR, and behavioral thresholds were collected on a group of 15 normal hearing subjects and results were compared according to their validity and time used for test performance. Several elements point out the difference between the two physiologic measures, making ASSR the system superior in terms of accuracy and time involved. f_jensen77@yahoo.dk

2. Effects of Tinnitus Retraining Therapy
Shoko Kato, Hideo Yamane, Tetsushi Sakashita, Toshiyuki Shibata.
Osaka City University Graduate School of Medicine, Osaka, Japan

Effects of Tinnitus Retraining Therapy (TRT) on tinnitus habituation and psychological aspects of patients were studied. We performed TRT for 23 patients with refractory tinnitus and examined the visual analogue scale (VAS) for tinnitus-induced annoyance and tinnitus handicap inventory (THI) to evaluate tinnitus habituation. The self-rating depression scale (SDS), state-trait anxiety inventory (STAI), and emotional intelligence scale (EQS) were also examined for evaluation of their psychological aspects. After 3 months of TRT, significant improvements in VAS-value and THI-score were observed. The scores of SDS and STAI reduced after 6 months of TRT. The EQS-scores correlated negatively to the THI-scores. shoko-kato@oct.zaq.ne.jp

3. What Do Japanese Parents Think About a Cochlear Implant?
Katsura Kuwahara* and Nobuyuki Nonaka**
*University of Cincinnati, Cincinnati, OH, USA, **Kagawa Kodama Gakuen, Takamatsu, Kagawa, Japan

The purpose of this pilot study is to understand parents’ perceptions of the effects of cochlear implants on their children. Interviews were conducted in Japan with five mothers of infants and toddlers (birth through age five) with profound hearing loss who have had cochlear implants or are waiting for one. The interview protocol is composed of open-ended, semi-structured questions designed to help professional educators better understand what parents expect as a result of cochlear implant use. kuwahaka@email.uc.edu
4. Audera Predicts Hearing Levels of Normal Hearing Subjects

Masatsugu Masuda
Keio University, Tokyo, Japan

The Audera is a system to objectively detect thresholds of auditory steady-state responses and provide us with frequency-specific hearing patterns as audiograms. We used this system in the examinations of 15 adult subjects with normal hearing. The results and conclusions were: (1) For sleeping subjects, Audera could predict their pure-tone hearing levels (PTHs), (2) For alert subjects, Audera could predict their PTHs at only 250 Hz and 500 Hz. (3) These prediction values were reproducible. masu13@sc.itc.keio.ac.jp

5. The Real Benefits of Bilateral Versus Unilateral Hearing Aid Fitting

William Noble* and Stuart Gatehouse**
*School of Psychology, University of New England, Armidale, Australia **Institute of Hearing Research, Scottish Section, Glasgow

A new self-report scale addresses dynamic and static spatial hearing contexts, as well as speech hearing in traditional (quiet, noise, groups) and highly demanding contexts (divided and rapidly shifting attention), plus clarity of sounds and effort of listening. It was applied in three samples: people prior to fitting with amplification; people with at least 6 months experience of unilateral fitting; those with at least 6 months of bilateral fitting. For most traditional speech hearing contexts there was a benefit in fitting one aid, and little further benefit with two. By contrast, speech hearing in demanding contexts showed further benefit of amplification in both ears versus one. Directional, distance and movement components of spatial hearing showed no benefit from one hearing aid, whereas all components, especially distance and movement, showed clear advantage of two. Finally, clarity of sounds, and effort needed in conversation, showed bilateral advantage. In a previous study all of these functions strongly drove the experience of handicap. The conclusion is that the benefit of fitting two hearing aids will not be demonstrated so long as traditional speech hearing contexts are relied on to make the case. wnoble@une.edu.au

6. Predicting Real-World Preference for Directional Technology

*University of Pittsburgh, Pittsburgh PA, **University of Iowa, Iowa City, IA *** Vanderbilt University, Nashville TN ****Siemens Hearing Instruments, Piscataway NJ

A group of 49 adults (mean age 62 years) evaluated 2nd order directional microphone instruments in the real-world for three different settings: omnidirectional, directional, and automatic switching between directional and omnidirectional. After ten days the subjects selected their preferred setting. A discriminant function analysis was used to evaluate whether one of the following measures was predictive of real-world microphone setting preference: HINT, SPIN, HHI(E)(A), APHAB or the IOI-HA. Results revealed that the pre-test HHI(E)(A) score was the only variable that had a significant impact on predicting group identity. The group who preferred the adaptive directional listening condition had a significantly higher (more handicap) HHI(E)(A) score than either the group that had no preference or the group who preferred the omnidirectional setting. gus@gusmueller.net

7. Listening Performance with Hearing Aids in Reverberation

Kimio Shiraishi*, Megumi Inou*), Kiyoshi Yonemoto**, Akihide Imamura***
*Department of Acoustic Design, Faculty of Design, Kyushu University, Fukuoka, Japan **Faculty of Social Welfare, Iwate Prefectural University, Iwate, Japan ***Department of Otorhinolaryngology, School of Medicine, Fukuoka University, Fukuoka, Japan

Some hearing-impaired persons who use hearing aids complain of listening difficulty in reverberant environments. However, no method is currently available for hearing aid fitting in reverberation. In this study, we produced speech materials with three kinds of reverberation times (0 s, 1.0 s and 2.0 s). Listening tests for hearing-aid wearers using the speech materials were carried out in a soundproof booth and in an actual reverberant environment. No difference in listening performance appeared in these two conditions. Our
finding shows the validity of using speech materials with artificial reverberation time to predict listening performance in natural reverberation. kimio@design.kyushu-u.ac.jp

8. Duration Pattern Test in Children with Learning Disabilities

V.L. Garcia, D.A. Silva
Faculdade de Odontologia de Bauru, Universidade de São Paulo, Bauru, SP, Brazil

This work investigated the performance of children children with and without specific learning disabilities on the Duration Pattern Test. Thirty-two children were evaluated, 20 normal developmental and 12 with learning disabilities. The number of correct marks was described, and the variables gender, age, ears and performance between groups were studied. It was found that there was no significant difference between the genders as well as between findings concerning the right and the left ears. When the comparison between the groups was done, a lower performance could be observed in learning disabilities children. vlgarcia@uol.com.br

9. Audiometric Profile and Auditory Complaints of Hypertensive Individuals

Kátia Miriam de Melo Silveira, Ieda Chaves Pacheco Russo
UNIFENAS/ PUCSP  São Paulo- Brazil

We sought to compare hearing thresholds of hypertensive individuals to non-hypertensive ones, according to gender and age, and verify auditory complaints. Pure tone audiometry and a questionnaire were administered to 25 hypertensive and 25 non-hypertensive individuals from 35 to 65 years old. Results: 92% of hypertensive individuals presented mild to moderate high frequency hearing loss, against 18% of the control group. The complaints were: phobia (11.17%), dizziness (11.17%), tinnitus (10.11%), darkening of sight (10.11%) and depression (7.89%). It is of great importance to perform audiologic evaluation of hypertensive individuals, since hearing is fundamental for personal and social development. katiamiriam@aci-franca.org.br

10. Are There Any Medicines Effective Against Sudden Sensorineural Hearing Loss?

K Ogawa, J Kanzaki, Y Inoue
Department of Otolaryngology, School of Medicine, Keio University, Tokyo, Japan

The etiology of sudden sensorineural hearing loss (SSNHL) is still unknown, thus there is no established therapeutic strategy for SSNHL. The cocktail therapy (combination therapy) has been frequently used for two or more probable causes of SSNHL including viral infection and cochlear circulatory disturbance. However, there is so far no evidence what medicine is effective for SSNHL. The Acute Severe Hearing Loss Study Group sponsored by the Japanese Ministry of Health, Labor and Welfare has performed a control study on the effectiveness of each medicine for SSNHL. We summarize the results of this study, and discuss the therapeutic strategy for SSNHL with a review of the literature. ogawak@sc.itc.keio.ac.jp

11. Tinnitus and Noise Exposure among School Children in Sweden

K.M. Holgers, B. Pettersson*
Shalgrenska University Hospital, Goteborg, Sweden, *National Board of Health and Welfare, Stockholm, Sweden

Although there are many reports on the impact of leisure noise on hearing, the scientific evidence of a relation between leisure time noise and hearing loss in young people is inconclusive. The present study included 671 students (13-16 y.o.) answering questionnaires concerning hearing, noise exposure and aspects of health. The risk for noise-induced tinnitus was more than 4 times higher for subjects visiting concerts 6-12 times per year compared to those who never went to concerts and the risk for TTS was 9 times higher for subjects with verified hearing loss compared to those without. Exposure to leisure noise is correlated to tinnitus and with increasing dosage of noise exposure, the risk increases. Km.holgers@telia.com
12. Development of Digitally Recorded Speech Audiometry Materials
Richard W. Harris and David L. McPherson
Brigham Young University, Provo, Utah, USA

To date we have developed digitally recorded materials for use in measurement of the Speech Reception Threshold and Speech Discrimination performance in the following languages: English, Spanish, Italian, Brazilian Português, Polish, Russian, Korean, and Japanese. We are currently completing normative data collection for Mandarin Chinese and Vietnamese. All of our materials have been digitally recorded using native talkers in a large anechoic chamber using 44.1 kHz sampling rate and 24-bit quantization. Normative data has been collected in each language using 20 normally hearing subjects. This has resulted in development of psychometrically equivalent words for SRT and equivalent lists/half-lists for speech discrimination. richard_harris@byu.edu

13. A Case Study in Optimizing Newborn Hearing Screening Program Outcomes
Randi Winston,
National Center For Hearing Assessment and Management, The EAR Foundation of Arizona

Well-established or not, it is essential to review Newborn Hearing Screening (NHS) programs against original goals, using recognized quality assurance guidelines. A case study is shown to illustrate application of quality indicators to a 7000+ birthing center: Banner Desert Medical Center in Mesa, AZ. The quality indicators used are from Joint Committee on Infant Hearing 2000 Position Statement (JCIH). In combination with the implementation of enforced policies, procedures and protocols, key JCIH quality indicators are used to assess program efficacy for both inpatient and outpatient screenings. This poster will highlight this program’s procedures, focusing on the key components of leadership, program reporting, and the integration of OAE-ABR screening equipment with the effective reporting tools. rlwinston@aol.com

14. Internet-Based Follow-up to New Hearing Aid Users
Ariane Laplante-Lévesque*/**, Kathleen Pichora-Fuller*, and Jean-Pierre Gagné**
*University of Toronto, Mississauga, **Université de Montréal, Montréal, Canada

Many investigators have shown that audiological follow-up can have positive results on the outcome of the hearing aid fitting process. Because of its interactive nature, the Internet could be a valuable tool to provide a personalised, timely, and effective follow-up to adults who are new hearing aid users. A frequent Internet contact was offered to three participants during the first month following the hearing aid delivery. Their experiences, along with the reactions of their audiologist, were explored using a multiple case-study design. Overall, the participants appreciated the Internet contacts. They reported various needs that the Internet contacts could fulfill. ariane.laplante.levesque@utoronto.ca

15. Chronic Tinnitus: Results One Year after Therapy
Annette U. Schmidt, Hannelore Engeler, Viktor Weichbold
Kunigunde Welzi-Müller Innsbruck Medical University, Austria

Our department provides two forms of therapy for chronic tinnitus: individual (retraining) and group therapy. Retrospectively we evaluated 61 patients with the Goebel and Hiller questionnaire. First results after six months showed a significant improvement in both groups versus no change in a control group. What we are now interested in is: 1. Does the improvement remain after one year? 2. Is there a difference in the long time results between the two therapy forms? Conclusion: We found a significant improvement in both groups and no difference between the two. Age, gender, psychiatric diseases and hearing impairment did not affect the outcome. annette.schmidt@uklibk.ac.at
16. Risk Factor Abnormalities in Patients at Risk for Falls

Lynn S. Alvord
Henry Ford Hospital, Detroit, MI

Patients who had recently fallen were evaluated on various risk factors and test performance scores with the ultimate goal of attributing causes of falls. Assessment of the following factors was performed: previous falls, multiple medications, major illness, metabolic, cardiogenic, CNS, muscular weakness or degeneration, vestibular, visual, osculoskeletal, pulmonary, environmental, depression, footwear and alcohol ingestion. Detailed evaluation of vestibular, oculomotor control and postural maintainance was made using computerized dynamic posturography, VNG, rotary chair testing as well as other health status and medication indices. Abnormalities on these factors are reported descriptively for the group and comparatively between and within patients. Characteristics of these patients are reported in hopes that this analysis will aid in the determination of causes of falls as well as which tests to include in a comprehensive falls assessment clinic.  

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17. Subjective Evaluation of Sound Amplification Benefit and Satisfaction in Elderly Individuals

Fernanda Helena de Macedo Assayag, Iêda Chaves Pacheco Russo
Pontifícia Universidade Católica de São Paulo  PUC-SP

Purpose: to determine the benefit and satisfaction with hearing aid usage, as well as to correlate them.
Method: Seven hearing impaired hearing aid experienced users, aging from 70 to 87 years answered to the APHAB and the IOI-HA. Quantitative and qualitative methods were utilized in the overall analysis. Results: Four subjects (57, 1%) presented global benefit and satisfaction. Conclusion: It was not found direct relationship among satisfaction and benefit in this population. We strongly recommend the use of these self-inventories in the Brazilian reality.  

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18. Audiologic Observations on Bus and Trailer Drivers

Ignacio Mora-Magaña*, Gabriel Heredia-Breton**, Patricia Fuchs-Gomez***, Pedro Gutiérrez-Castrellón
* Inst. Nal. de Pediatría; **Medicina Preventiva del Transporte; ***DIF-Iztapalapa

This study was designed to describe hearing status in trailer and bus drivers. We examined 141 audiologic files of trailer and bus drivers. Results: 141 men. Mean age was 37.7±10.6 year. Bus drivers (bd) 41%, trailer drivers(td) 59%. We found a significant difference in right ear results between bd and td, not associated with labor time and age. We did not find a significant difference (on the left ear between the two groups. After 20 years of employment, there is not difference between vehicle type in hearing loss. Conclusion: Hearing damage is more often seen in trailer divers than in bus drivers.

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19. Cochlear Potentials for Estimating the Prognosis in Patients with Sudden Sensorineural Hearing Loss

Hiroaki Nishida
Nishida Ear Clinic, Yokohama, Japan

Electrocochleography (ECochG) was performed by extratympanic procedure (ET) in 44 cases (44 ears) of patients with sudden SNHL and 22 cases (22 ears) in a control group. AP, SP and CM were recorded for clicks and 0.5 and 1.0 kHz tone bursts at 90 dB nHL. Patients with sudden SNHL were divided into two groups: satisfactory and unsatisfactory. AP and SP responses induced in patients with good prognosis were larger that those recorded in patients with poor prognosis and the difference between the two groups was statistically significant.  

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20. Sound-Field Intervention in Cross-Cultural Classrooms

Robyn Massie and Harvey Dillon
National Acoustic Laboratories, Sydney, Australia

This study examined the impact of sound-field intervention on the educational outcomes for children in cross-cultural classrooms. Twelve classes of Grade-2 children participated. For classes 1 to 8, the environments were alternated between “ON” and “OFF” listening conditions mid-year. Beneficial effects of intervention were demonstrated in reading, writing and numeracy skills. They occurred irrespective of whether the children had English as a native language or had English as a second language. Classes 9 to 12 alternated between single-channel and dual-channel transmission options. Using different numbers of microphones did not affect the rate of acquisition of educational outcomes. robyn.massie@hearing.com.au
WEDNESDAY 0830-1030  
RM 40-43  

WEDNESDAY 29 SEPTEMBER 2004

1W Round Table – PEDIATRICS  RM 40-43  0830-1030

Moderator: Deborah Hayes, University of Colorado Health Sciences Center

**Historical Overview and Current Perspective on Electrophysiologic Measures in the Evaluation of Infants and Young Children**

Stig Arlinger  
Dept of Audiology, Linköping University, SE-Linköping, Sweden

Since behavioral test methods are difficult to apply with reliability on infants and small children, the introduction of electrophysiologic measures in the mid-1960-ies was met with great expectations. These measures include responses generated in various parts of the auditory pathways from the cochlea to the auditory cortex and association areas. The ideal response should cover as much as possible of the auditory pathways, be resistant to sleep and sedation, and show limited maturation with age. In addition, a favorable signal-to-noise ratio is desirable to make it easy to record. The presentation will discuss the experiences available with the various auditory evoked potentials in pediatric applications.  
stig.arlinger@inr.liu.se

**Clinical Techniques for Assessing Brain Development and Plasticity in Hearing-Impaired and Cochlear-Implanted Children**

Anu Sharma  
Callier Center for Communication Disorders, University of Texas at Dallas,

We are investigating the plasticity and development of the human central auditory pathways in normal-hearing, hearing-impaired and cochlear-implanted children. Our measure of central auditory maturation are cortical auditory evoked potentials (CAEPs). Currently we are assessing the sensitivity of the latency of the P1 CAEP as a marker of central auditory development in hearing-impaired children. We find that CAEPs are powerful, objective markers of central auditory system plasticity and maturation. CAEPs may serve as much needed clinical indicators of central auditory development in infants and children who receive intervention through conventional amplification, cochlear implants or a combination of the two technologies.  
anu.sharma@utdallas.edu

**Behavioral Assessment of Speech Perception in Deaf Infants Following Cochlear Implantation**

Derek M. Houston  
Department of Otolaryngology – Head & Neck Surgery  
Indiana University School of Medicine

Current behavioral measures of hearing-impaired children’s speech perception and language skills are not suitable for infants who are too young to follow instructions. To assess these skills in deaf infants following cochlear implantation, we have borrowed techniques used by developmental scientists to study speech perception in normal-hearing infants. I will describe studies using the Visual Habituation procedure and the Preferential Looking Paradigm to investigate deaf infants’ attention to speech, speech discrimination, audiovisual perception, and word-learning skills before and after implantation. I will also discuss possible ways of using these techniques to track individual infants’ progress in acquiring speech perception skills.
The Legendary Marion Downs: International Advocate for Hearing Impaired Children
Jerry Northern, American Academy of Audiology

This Special Session has been organized to honor the career and contributions of Dr. Marion Downs. For more than 35 years, Dr. Downs has been relentless in her pursuit to make identification and audiology of infants and children with hearing loss an important medical and audiological priority as well as an important public health issue. Her advocacy for pediatric audiology has focused international attention to the importance of good hearing in childhood development. This presentation will review the career and contributions of Dr. Downs and her voluminous contributions to pediatric audiology. JNorth1111@aol.com

The Ups and Downs of Universal Newborn Hearing Screening
Karl R. White
Utah State University, Logan, Utah

More than 90% of all newborns in the United States are now screened for hearing loss and good progress is being made in connecting those who need it with appropriate follow-up and services. This paper will briefly review the history of newborn hearing screening programs in the United States, describe the current status of newborn hearing screening, diagnosis, and intervention programs, discuss how the work of early visionaries like Marion Downs has influenced what has been accomplished, and summarize some of the challenges and issues that still need to be addressed. Karl.white@usu.edu

Changing the World: The International Influence of Marion Downs
Deborah Hayes,
University of Colorado Health Sciences Center

“Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has.” Margaret Mead

Margaret Mead’s famous aphorism could easily be changed to …never doubt that a single woman can change the world… in the case of Marion Downs. While the United States is the world’s leader in newborn hearing screening and early intervention, in large part due to Marion’s early studies and persistence, her influence on international programs cannot be overstated. Currently, early hearing detection and intervention (EHDI) programs are being developed on every populated continent. Developers of those programs rely on Marion’s early studies, published opinions, and moral support to move forward, often in the face of seemingly insurmountable odds. This presentation will describe the current status of international EHDI programs. Hayes.Deborah@tchden.org

Audiologists: Key to Hearing Health Screening Programs
Gilbert R. Herer
Children’s National Medical Center, Washington, DC

From mass hearing screening of all newborns to similar screening of specific disability groups, audiologists are key to establishing needed programs. This public health model involves identifying those at risk and referring them for diagnostic/intervention services at the earliest possible time, the essentials to good hearing health. This presentation is dedicated to Marion Downs, a leading role model for hearing screening in a public health framework. It will report seven years (1997-04) of outcome data for 47,000 babies from a
universal newborn hearing screening (UNHS) program. This program led to a similar one for identifying hearing loss among 10,700 adult athletes with intellectual disabilities participating in Special Olympics events. Their outcome results will be reviewed, too. We are indebted to Marion Downs for leading the way for audiologists to be the key professionals in the earliest identification of hearing loss.

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**Unexpected Spin-Offs of Newborn Hearing Screening**

Marion P. Downs, M.A., D.H.S., S.Sc. (Hon)
University of Colorado School of Medicine, Department of Otolaryngology

The world-wide success of newborn hearing screening, and the subsequent earlier identification of hearing loss in infants, has provided an interesting array of important clinical applications. This presentation will briefly discuss auditory neuropathy/disfunction, cochlear implants, unilateral hearing loss, and genetics as outgrowths of universal newborn hearing screening.

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**WEDNESDAY 1100-1230**

**RM 36-39**

3W Special Session  PEDIATRIC VESTIBULAR EVALUATION

RM  36-39  WED 1100-1230

Moderator: Robert Trotic, Zagreb, Croatia

**Vestibular Evaluation: Is it for Children?**

Dana Day and Terry Fife
Arizona Balance Center, Phoenix, AZ

Dizziness is one of the most common reasons why adults seek medical attention, but is this just an adult disorder? We will discuss vertigo and dizziness in children, some common causes and some not so common, what to look for and when to refer. Treatment options for children with vestibular disorders or dizziness as a complaint will be presented. An open discussion on history taking, vestibular testing techniques and how you may want to modify your current techniques in order to obtain reliable results for the referring physician. As well as, “bedside” evaluation techniques that may be helpful and can be used in your office. A presentation of case studies will conclude our discussion on pediatric vestibular testing.
4W Special Session  NEONATAL SCREENING MODELS
OUTSIDE THE US: PROTOCOLS AND TECHNOLOGY
RM  40-43

The session will be divided in three parts namely: “The Past and the Present” , “Update on the NHS Technologies” and “ What the Future holds for NHS”. The main objectives of the session are: (i) to present the development of screening practices outside the US and to underline the factors which cause problems in the evaluation of the tested population; and (ii) to underline set of solutions which are presently available (ie using different or more reliable technologies). The session will include short contributions from the following NHS programs: Australia, Brazil, China (Hong-Kong), Mediterranean-zone (Portugal, Greece, Albania, Turkey and Cyprus), Netherlands and Poland. In order to create space for further discussion the last part of the session will be dedicated to “EHDI intervention” issues related to threshold estimation by ASSR, ABR and Cochlea-scan methodologies. Dr. Cone-Wesson (USA) will provide information on ASSR-based screening in comparison to the currently used AABR technology.

Katia de Almeida      Bradley McPherson,    Pedro Berruecos
University of Santa Casa, Brasil    University of Hong-Kong , China  National University of Mexico

Marzanna Radziszewska-Konopka    Bert van Zanten    Barbara Cone-Wesson
Children’s Mem Hlth Inst, Poland  University of Utrecht, Netherlands  University of Arizona

5W NEW APPROACHES RM 36-39 WEDNESDAY 1400-1530

The Implementation and Evaluation of an Internet Screening Hearing test for Youngsters.

Jan A.P.M. de Laat
Department of Audiology, University Medical Center, Leiden, Netherlands

Our recently developed internet screening hearing test for youngsters, who are between 12 and 24 years of age, is comparable with the National Telephone Screening Hearing Test for Adults, which has been designed successfully by colleagues of the Free University Medical Centre in Amsterdam, Netherlands, and completed, by more than 120,000 adults in one year. The National Hearing Foundation in The Netherlands developed these tests to make it possible to perform a hearing health care screening at home, as is usual for other health care items, like blood pressure, body temperature, etcetera. The second reason is to achieve a better awareness of the issue of good hearing and to rehabilitate patients in an earlier stage than today: only one third of the hearing impaired and possible hearing-aid users have been seen by hearing experts. The third reason is the notification of unexpected growth of the number of youngsters who visit discos, house parties, and rock concerts and who complain of sudden and permanent hearing impairment. Both tests will be demonstrated. japmdelaat@lumc.nl
Modernisation of NHS Hearing Aid Services (MHAS) in England

Adrian C. Davis¹, Pauline Smith², Melanie Ferguson², Delia Gamble¹
¹MRC Hearing and Communication Group, University of Manchester, UK and ²MRC Institute of Hearing Research, Nottingham University, UK

With the advent of new technology the NHS has embarked on an ambitious modernisation of the hearing aid departments to get the hearing impaired a better deal. By 2005 each of 188 departments in England will have been modernised. Outcomes were obtained in a number of domains (self-reported hearing scales, speech in noise, quality of life and acoustical). The evaluation showed that there were substantial benefits from introducing new protocols, that the effect of DSP hearing aids was statistically significant and moderate in nature, that ITE hearing aids got better scores on many self-report tools and that it was quite difficult to show advantages of bilateral over unilateral fitting with the outcome measures used. The major issues that have emerged as key to the way forward are 1) we need to build capacity in audiology to meet the need 2) how can we employ skill mix in audiology to meet the capacity gap and 3) how does the profession change to meet these needs!

Modernisation of NHS Paediatric Hearing Aid Services (MCHAS) in England

Amy McLauchlan², John Bamford², Adrian C Davis¹, Mary Hostler²
¹MRC Hearing and Communication Group, University of Manchester, UK and ²Human Communication and Deafness Group, University of Manchester, UK

In parallel with the modernisation of the adult hearing aid services there has been considerable modernisation of the paediatric hearing aid services. The overall aims of these evaluation studies were: (i) to understand how best to introduce DSP hearing aids into children’s hearing aid and support services, and (ii) to assess the likely benefit of a service based on DSP hearing aid provision compared with the current high-quality analogue-based service. We addressed these questions in a number of ways, the major study being a quasi-random controlled cross-over comparison of children’s performance with DSP linear and DSP nonlinear fittings compared with their previous analogue linear fittings. Feedback from both audiology and education services indicated satisfaction with DSP hearing aid fitting, although indicating it is more time-consuming and challenging than in the previous analogue-based service. amy.mclaughlan@man.ac.uk

Training and Guidelines for Rollout of Modernised NHS Hearing Aid Services

Dee Gamble¹, Amy McLauchlan², John Bamford², Adrian C Davis¹, Graham Sutton¹
¹MRC Hearing and Communication Group, University of Manchester, UK and ²Human Communication and Deafness Group, University of Manchester, UK

On the basis of the findings from MHAS and MCHAS the roll-out of modernised services has taken place managed by a unique combination of healthcare professionals, scientists and voluntary sector. The training for MHAS focuses on getting skills in place to accomplish the patient journey using the Patient Management Systems, Real Ear Measures, Hearing Aid fitting software and outcome measures. MCHAS (Modernising Children’s Hearing Aid Services) aimed to enable paediatric audiology and support services and encourage further modernisation and quality assurance through the local Children’s Hearing Services Working Group and bring together awareness of the MCHAS guidelines for best practice. Further detail is shown at http://www.mhas.info. delia@mrchear.man.ac.uk
Audit of Modernising Hearing Aid Services – has it worked!

Graham Sutton¹, Martin Evans¹, Amy McLauchlan², Dee Gamble¹, John Bamford², Adrian C Davis¹, Suzanne Tyler¹

¹MRC Hearing and Communication Group, University of Manchester, UK and ²Human Communication and Deafness Group, University of Manchester, UK

In the last three years there has been a revolution in the way that modern NHS hearing aid services are delivered to the public in England. In all trained sites there is evidence of a new engagement with technology and a developing understanding of, and commitment to, the key elements of a modernised audiology service. Even at this early stage there are emerging examples of good practice in areas like project management, effective handling of waiting lists and good use of the new electronic Patient Management System (PMS). The modernising of MHAS and MCHAS programmes has also led to a radically changed training and education programme for future audiologists in England.
Abstracts - XXVIIth International Congress of Audiology

THURSDAY 0830-1000
RM 40-43

THURSDAY 30 SEPTEMBER 2004

1 TH Special Session CURRICULUM, PRACTICE GUIDELINES & ETHICS RM 40-43 THURS 0830-1000

Moderator: George Mencher, Assistant Secretary General, ISA

This is a special session developed by the International Society of Audiology to present: 1) a model curriculum for training audiology personnel; 2) an example of a minimum standard for practice in terms of hearing aid fittings and services; and 3) a model “Code of Ethical Practice/Code of Conduct” and samples of the process required to develop such a code. These issues are all considered of vital import to many countries in the world, but particularly to the developing world, as audiology programs and services continue to grow and expand.

Overview of Reason for the Presentation and how ISA Plans to Assist

George Mencher (Canada)

Model Curriculum: European Confederation of Audiological Societies (EFAS)

Stig Arlinger (Sweden)
Hans Verschuure (Netherlands)

When EFAS was formed in 1992, one of the aims was to work for improved quality standards by setting examples and defining goals that in a long-term perspective would improve European audiology. Thus, a model training program was formulated based on 3 years of theoretical training followed by one year of practical training and thesis work. The focus for this programme is the general audiologist, the professional who is seen as the primary contact person for hearing impaired individuals. In addition to general audiologists, audiological specialists with different backgrounds at the graduate university level will complement and provide support at the major audiological centers. The model exists as an illustration of the width of the professional field of audiology, and of the need for a thorough education of those who are to practice. Although originally designed with Europe in mind, it offers an excellent model to other regions of the world.

Good Practice Guidance for Adult 1st Time Hearing Aid Fittings & Services: Generic Consensus Statement

Stuart Gatehouse (UK)
Bill Noble (Australia)

The aim is to draw up guidelines for the configuration and delivery of services which generalize across healthcare-delivery contexts, and in principle, though not necessarily in detail, apply to developing as well as developed countries. Guidelines are derived from published evidence and consensus good practice from audioligists internationally. They cover requirements for initial assessment, baseline and optimal technical provision, advice and counseling, follow-up both technical and advisory, and outcome evaluation. The guidelines offer a template for the development of more specific standards for individual service contexts.

Code of Conduct - Code of Ethics

Shirley DeVoe (Canada)
Ieda Russo (Brazil)
George Tavartkiladze (Russia)

A profession’s code of ethics forms standards of professional conduct, demonstrates a professions’ willingness to monitor itself and to enforce standards of conduct. It also provides guidance and support to the members of the profession, informs consumers and professionals about the kind of cooperation they
have a right to expect, and serves as a guide to ethics committees. The presentation will discuss the value of a code of ethics for any organization, but will review the current statutes relative to ethical behaviour within ISA. Discussion will include essential information to consider when developing a Code of Ethics, and specific steps to consider when writing a Code of Ethics for ISA. A draft model document as a basis for discussion will be presented.

THURSDAY 0830-1000
RM 40-43

2 TH Special Session  FREQUENTLY ASKED QUESTIONS ABOUT ASSRS  RM 36-39

Moderator:  Linda Hood, Kresge Hearing Research Laboratory, New Orleans
Barbara K. Cone-Wesson
University of Arizona, Tucson, Arizona, USA

Auditory steady-state responses (ASSRs) are a useful method for threshold estimation in infants and young children. Audiologists have questions about technique and interpretation as they begin to incorporate ASSR tests in their electrophysiological battery. For example:

1) How are regression formulae and correction factors used?
2) Is it safe to test at >80 Db HL?
3) What are the best stimuli?
4) How do I perform an ASSR bone-conduction test?

Answers, based upon the published literature and clinical experience, to these and other questions will be provided. Attendees are encouraged to submit questions for discussion at this session conewess@u.arizona.edu

THURSDAY 1030-1200
RM 40-43

3 TH INTERNATIONAL GRAND ROUNDS  RM 40-43

Moderator: Richard Nodar, Cleveland Clinic

Clinical Grand Rounds is a concept is borrowed from medicine. This session will feature five renowned clinicians and scholars, each of whom will present a case study that is interesting, instructive, challenging to clinicians, or a diagnostic quandary. The presenter usually begins with the patient’s symptoms, followed by questions such as, “What test should we begin with?” Or, “What do you think?” The ensuing discussions provide a unique opportunity, not only to learn, but also to exchange international approaches and techniques. Speaker/Participant interaction is encouraged and an important feature of this popular tradition at the International Congress.

Richard H. Nodar, U.S.A.
Pedro Berrueccus, Mexico
Kathleen Campbell, U.S.A
Robert Cowan, Australia
Hans Verschuure, The Netherlands
Loudness and Auditory Steady State Responses

Franz Zenker Castro*, Vanesa Santos Hernández**, Eneko Larumbe Zabala**, Rafael Fernández Belda*, José Juan Barjas de Prat***.
*Clínica Barajas. **Fundación Canaria para la Previsión de la Sordera. ***Universidad de La Laguna.

This study evaluated the use of multiple auditory steady-state responses (ASSRs) to estimate the growth of loudness in listeners with normal hearing. Behavioural and electrophysiological intensity functions were obtained in listeners with normal hearing. Slope analyses for the behavioural and electrophysiological intensity functions were separately performed. A significant relationship was obtained between loudness and the ASSRs. The results of this study established a relationship between loudness and the amplitude of the ASSR for listeners with normal hearing. This procedure would be advantageous in very young patients or other difficult-to-test populations, where subjective judgements of loudness cannot be provided reliably.
arajas@clinicabarajas.com

Advances In Auditory Event Related EEG Modulation

Anthony T. Cacace, Dennis J. McFarland
Department of Neurology, The Neurosciences Institute, Albany Medical Center; The Laboratory of Nervous System Disorders, The Wadsworth Labs, NYS Health Department, Albany, NY

The vast majority of studies on the EEG response to auditory stimulation are based on time domain analysis (averaging) of individual trials. Mounting evidence indicates that this strategy does not provide a comprehensive representation of underlying neural activity. Newer signal processing approaches and alternative conceptualizations are needed. Frequency domain analysis can complement and/or replace time domain analysis and minimize loss of information. We compare and contrast event related locked and unlocked EEG activity, synchronization and desynchronization effects in different frequency bands, and alternative models of information processing. These methods provide new ways to explore dynamic EEG responses to auditory stimulation. cacacea@mail.amc.edu

How Useful are Electrophysiologic Measures in Diagnosing Individual Cases of APD?

Robert W. Keith
University of Cincinnati

A review of current approaches to APD assessment finds increasing interest in use of electrophysiologic measures to document the diagnosis. This paper reviews the controversies related to the routine use of electrophysiologic measures in APD assessment. In addition, early and late electrophysiologic findings will be presented in 3 representative cases of individuals with severe APD diagnosed by behavioral tests that have normal EP findings. The implications of these findings will be discussed. robert.keith@uc.edu

Auditory Gating in the Middle Latency P50 Response

David L. McPherson, Richard W. Harris & Amanda Rasmussen
Brigham Young University, Provo, Utah, USA

This study examines the scalp distribution of the P50 auditory sensory gated response in young subjects with no history of personal or family neuropsychiatric disorder. A matched stimulus paradigm of paired 1000
Hz tone pips was used to elicit the sensory gated response. The sensory gating of P50 was determined at 21 electrode sites across the scalp. The amplitude and latency of the P50 response to stimulus one (S1) and stimulus two (S2) were measured. The differences between S1 and S2 amplitude were analyzed. The scalp distribution of the P50 ratio was determined. Results show the varying degrees of gating at 21 locations across the scalp. The scalp distribution for both S1 and S2 indicates frontal lobe activity (where control of working memory and planning of future tasks occur). The maximum amount of suppression indicates that the suppression processing occurs lateral to the vertex. This suggests that C3 or C4 would be a better recording site for observing auditory sensory gating of P50 than the traditional vertex recording.  
david_mcpherson@byu.edu

Conceptional Age Effects on the ABR

Raymond M. Hurley,* Annette Hurley,** Charles I. Berlin,**  
*University of South Florida, Tampa, FL USA, **LSU Health Sciences Center New Orleans, LA, USA

The purpose of the present investigation was to test the hypothesis/theory that preterm and term infants have the same ABR latency values at the same conceptional age (CA). Of the 308 infants used, 144 were preterm and 164 were term and ranged in CA from 36 weeks to 74 weeks. The infants were divided into eleven CA groups. All infants had ABR responses at 25 dB nHL to clicks. When the infants were grouped as preterm versus term, the preterm group had significantly longer latencies. However, when matched by CA, the preterm latency delay was not consistent across the CAs. rhurley@chuma1.cas.usf.edu


M. Angelina N. Martinez, Beatriz C. Novaes, Dr. Beatriz C. Mendes  
Catholic University of S. Paulo - PUCSP, Brazil

The goal of this study was to investigate the correlation between auditory steady-state response (ASSR) thresholds and visual reinforcement audiometry (VRA) thresholds in infants. The study was a prospective clinical trial. Twenty-five pediatric patients ranging in age from 5 to 7 months were evaluated using multiple ASSR and VRA measures in free field. All were diagnosed as normal hearing. Strong correlations were found between ASSR and VRA free field thresholds for all tested frequencies, 500, 1000, 2000 e 4000Hz. The results of this study indicate that the ASSR may provide a reasonable alternative for estimate audiograms with frequency-specific information what is essential to correct gain and maximum output prescription in fitting hearing aids or cochlear implant indication. angelina@pucsp.br

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THURSDAY 1330-1500
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5 TH WORLD TOUR RM 40-43 THURSDAY 1330-1500

Moderator: Jackie Clark, University of Texas, Dallas

Report on ISA’s Humanitarian Audiology Committee

Jackie L. Clark
UT Dallas/Callier Center

Many are not aware that there is a new International Society of Audiology Humanitarian Audiologist Ad Hoc Committee that has been formed. This presentation will be an update detailing the accomplishments and future plans of this new committee that is formed by like-minded philanthropic individuals from around the world. Some of the functions of the committee that will be discussed include: World Health Organization Liaison; Industry Liaison; Student Liaison; Hearing Health Care Professional Organizations Liaison; and Website manager. These like-minded Audiologists focus on facilitating and encouraging volunteer humanitarian projects worldwide. jclark@utdallas.edu
Audiology in Mozambique

Jackie L. Clark
UT Dallas/Callier Center

Since first providing basic audiology services in 1998, many new audiology projects have been introduced in Mozambique. Considered one of the poorest countries in the world, hearing health care would seem to be one of the low priorities addressed well after curing Malaria or Cholera. However, this presentation will provide the current state of affairs for audiology practice and philanthropic service provided within Mozambique. jclark@utdallas.edu

Affordable Hearing Aids Through South – South Social Enterprise

R. Brouillette*, B. McPherson**
*Godisa Technologies Trust, Otse, Botswana, **University of Hong Kong

In 2002, approximately 6,000,000 hearing aids were sold. The WHO estimated that 32,000,000 were actually needed. Only 12% of those sold were distributed within developing nations. Will delivery in developing countries improve during the next decade? This presentation highlights practical strategies being used to provide affordable hearing aids and signaling devices in developing nations. Social enterprises in India, Vietnam, the Philippines and Botswana illustrate ways to reduce the gap between need and provision. National hearing health care can be monitored by the Hearing Health Resources and Needs Questionnaire developed by the ISA Humanitarian Audiologists’ Group. dbmcpher@hkucc.hku.hk

Overview of Godisa

Howard Weinstein
Godisa Technologies Trust, Otse, Botswana

This presentation provides an overview of the history and organization of Godisa, an organization developed through the United Nations Trust to manufacture and distribute inexpensive hearing aids and accessories to persons in developing countries. Godisa is 20 months old. In the first year it has developed 4 hearing aids, a solar charger, 2 rechargeable batteries, including a #13 rechargeable, and a low cost portable ear mold lab. The evolving distribution model and future plans for the provision of hearing aids to charitable organizations will be reviewed. mwb@info.bw

Working on Hearing Screening for Target Ages in Developing-Countries

Mónica López-Vázquez & Pedro Berruecos
Hospital General de México, Mexico City

Three different programs were designed with the resources available in a developing country to cover special ages in which prevalence of hearing loss is high: 1) Neonates: High-risk neonates are referred to the Audiology Department for early diagnosis and intervention through a rational application of OAEs, ABR and ASSR in an open population Hospital where 25 babies are born daily. 2) Pre-school children: Hearing screening is performed with “Eargames”, a software designed to evaluate hearing thresholds at different frequencies while the child plays, without the participation of specialized personnel. 3) Elderly. Hearing Handicap Inventory for the Elderly in Spanish (HHIE-S) is used a questionnaire to identify the need of audiological assessment in elderly non-institutionalised patients. kefasmex@yahoo.com
Hearing Loss in Australian Aboriginal People

Al Yonovitz, Nancy Dold
Charles Darwin University, Darwin, Australia

The health of Aboriginal people in the Northern Territory is disastrously poor. Chronic kidney disease is 100 times greater in Aboriginal communities compared with non-Aboriginals. Infectious diseases remain rampant. Life expectancy for an Aboriginal person is 15-17 years less than a non-Aboriginal person. Otitis media and consequent conductive hearing loss is endemic in Aboriginal communities in the Northern Territory. Studies of Aboriginal children estimate that 50-80 percent are affected by CSOM with associated conductive hearing loss. This presentation will not address the frontiers of knowledge but the frontiers of present need. It is our understanding of the real consequences of hearing loss, suffused with humanitarian motives that we can expect to achieve our goals as audiologists. al.yonovitz@cdu.edu.au

Impact of Environment on Single and Dual Directional Microphone Systems

Andrew Dittberner & Ruth Bentler
University of Iowa, Iowa City, IA

The use of two omni-directional microphones, in conjunction with either an electrical or digital delay network, allows for the realization of a first-order directional microphone system. However, contrary to a single directional microphone design, directional systems with two omni-directional microphones may, hypothetically, be more susceptible to environmental conditions (e.g. humidity) due to the additional requirement of matched frequency responses, in terms of intensity and phase, to ensure optimal directional characteristics. This study examined the impact of environmentally diverse North American regions (re: humidity, temperature, elevation) on the directional characteristics (re: directivity index) of single and dual directional microphone systems. AndrewD@beltone.com

Using the PHAP to Understand the Benefits of Amplification

M Jane Steinberg, Lois FA Martin, Peter J Blamey
Dynamic Hearing, Melbourne, Australia

The Profile of Hearing Aid Performance (Cox and Gilmore, 1990) was administered to 41 subjects with mild to severe hearing loss fitted with a 64-channel ADRO® hearing aid. Analysis of the PHAP results versus hearing loss showed that benefit for speech in quiet increased as hearing loss increased. For speech in noise and difficult listening conditions, benefit was uniform across the range of hearing loss. These results are consistent with objective measures of speech perception in noise and preference judgements showing that the ADRO® strategy performs well for a wide range of hearing loss and environments. jsteinberg@dynamichearing.com.au
Use of FM with children who have APD

David Fabry*, Iris Arweiler**, Bruno Schlegel***
*Phonak Hearing Systems, Warrenville, IL USA **Phonak Stafa, Switzerland *** Sprachheilschule St. Gallen, Switzerland

This study focused on three selected classes (students aged 6-12 years old) at the Language Remedial School in St Gallen, Switzerland, with the goal to identify the benefits of using an FM system with children with normal peripheral hearing (ALL thresholds were better than 30 dB HL) and a variety of a variety of auditory and speech deficits. One-half of each class received an FM system (Phonak MicroEar), which was worn during lessons. Objective (Basel sentence test and Audiolog software) and subjective (questionnaire) evaluations were conducted at the study's onset, and also at several time intervals over seven months? time. Results indicated an average increase of over 25 dB improvement in signal-to-noise for both low- and high-probability speech sentences in a 60 dB SPL steady background noise. Both children and teachers reported a subjective improvement in performance existed for children wearing the FM device. Results will be discussed.
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Output Limiting: Subjective Performance in the Real World

Catherine Palmer*, David Fabry**, Jessica Green*
*University of Pittsburgh, USA, **Phonak Hearing Systems, Warrenville, IL USA

A multi-site study assessed the benefit of different signal processing schemes (wide dynamic range compression, compression limiting, and peak clipping) in patients with severe hearing losses. The results indicate that, on average, the three signal processing strategies produced similar results for perceived benefit and compared favorably (on the IOI and APHAB) to a group of mild-to moderately-impaired users of linear amplification. Individual preferences, however, differed considerably across individuals. Previous hearing aid experience had a strong impact on preference. These findings suggest that there is not an optimal signal processing strategy for patients with severe hearing loss, and that use of multiple signal processing strategies may be a useful acclimatization tool in this fitting population.
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A New Open-Platform Digital Amplification Strategy

M Jane Steinberg, Lois FA Martin, Peter J Blamey, Hayley J Fiket
Dynamic Hearing, Melbourne, Australia

An open platform dsp was used to compare two processing strategies in one hearing aid. One program, featured the ADRO® strategy with 64 independent frequency channels, slow time constants and computational rules to adapt the gain to maintain a comfortable output within the listener’s dynamic range. The second program featured a three-channel WDRC strategy which had fast time constants. Sentence scores for the ADRO® program were significantly higher than for the WDRC program with a mean advantage of 4.6%, 11.9% and 14.2% observed at three presentation levels in quiet and an advantage of 7.3% in noise. jsteinberg@dynamichearing.com.au

CLOSING CEREMONY
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