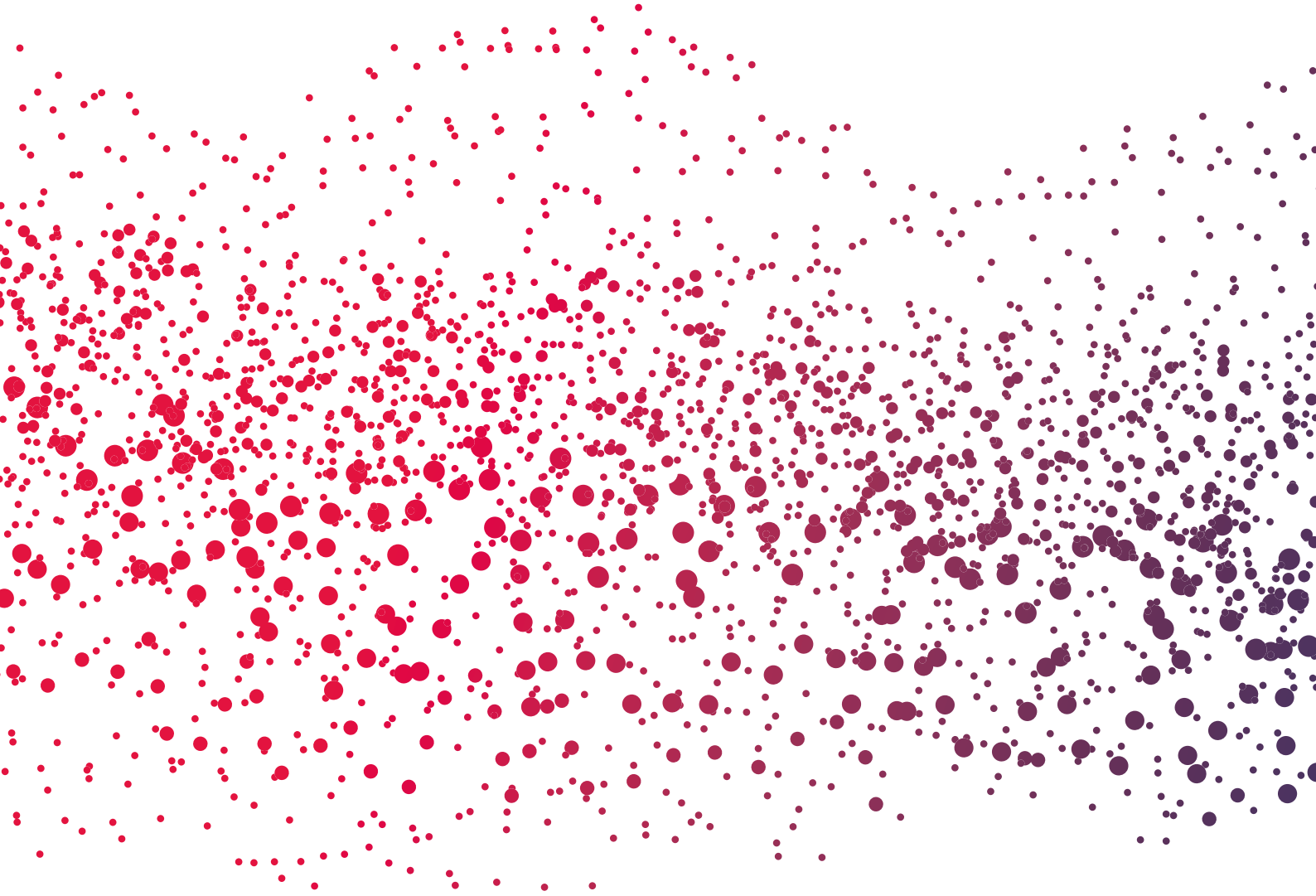
AMPLIFON CENTRE FOR RESEARCH AND STUDIES

CRS SCIENTIFIC JOURNAL

Otology & Audiology Article Review



OCTOBER 2014

- Use of Wireless Technology for Children with Auditory Processing Disorders Attention – Deficit Hyperactivity Disorder and Language Disorders. (p 11)
  - *Erin C. Schafer, et al.*
  - *Semininars in Hearing 2014;35:193–205.*
  - *Children with normal hearing may experience auditory listening difficulties in classroom settings because of auditory processing disorders (APD), attention deficit hyperactivity disorder (ADHD) and autism spectrum disorders (ASD) and these may be exacerbated by typical classroom noise and reverberation. The authors in this study suggest how use of remote microphone technology may be beneficial towards overcoming listening difficulties and enhancing auditory performance.*

- Benefits of Integrating Wireless Technology with Hearing Instruments. (p 12)
  - *Carrie Spangler.*
  - *Semininars in Hearing 2014;35:246–256.*
  - *The challenges for audiologists to meet the listening and fitting needs of the patients are discussed. The use of connectivity devices should improve the self-efficacy skills of the hearing impaired. Three cases are presented where hearing aid users are fitted with wireless connection devices. The problem, the possible solution, the advantages and disadvantages are listed.*

- Audio-visual training is better than auditory - only training for auditory – only speech – in – noise identification. (p 12)
  - *Bjorn Lidestram, et al.*
  - *Journal of the Acoustical Society of America. 136 (2), August 2014.p EL142-146*
  - *Better speech in noise identification is demonstrated through the use of audio-visual training versus auditory training. It is suggested how multisensory experiences recalibrate unisensory maps in the brain.*

- Effects of Frequency Compression and Frequency Transposition on Fricative and Affricate Perception in Listeners with Normal Hearing and Mild to Moderate Hearing Loss. (p 13)
  - *M. Alexander, Judy G. Kopun, & Patricia G. Stemalcowicz.*
  - *Ear & Hearing, Vol. 35, N°. 5, 519–532.*
  - *The authors compare the efficacy in adults with normal and mild to moderate sensorineural hearing with the use of two frequency lowering algorithms, widely implemented in hearing aids, and with a novel algorithm not used on currently available hearing instruments. The test conditions were Nonlinear Frequency Compression, the novel Spectral Decimation and Frequency Transposition.*

- Development and validation of a questionnaire for hearing implant users to self – asses their auditory abilities in everyday communication situations: the Hearing Implant Sound Quality Index (HISQUI19). (p 14)
  - *Edda Amann & Ilona Anderson.*
  - *Acta Oto-Laryngologica. 2014; 134: 915–923.*
  - *Hearing aid or CI. user questionnaires can arguably be too comprehensive. According to the authors of this explorative uncontrolled single group study, the Hearing Implant Sound Quality Index (HISQUI19) is a valid tool for quantifying the self-perceived level of auditory benefit that cochlear implant (CI) users experience in everyday listening situations. It is also argued that this self-assessment tool represents a more robust marker of benefit than objective tests in clinical settings.*

- Spatial Design of Hearing Aids Incorporating Multiple Vents. (p 15)
  - *Daniel Stevenson, Grant Searchfield & Xun Xu.*
  - *Trends in Hearing (January - December 2014) Vol. 18: p 1–10*
  - *Multiple vented earmoulds are capable of achieving similar feedback and occlusion performance but are likely to require a greater area to achieve this venting compared to traditional venting. It is estimated that, even with a conservative vent packing of 0.4, multiple venting equivalent to at least a single 2 mm vent is achievable.*

- Spatial and temporal modifications of multitalker speech can improve speech perception in older adults. (p 16)
  - *Brian Gyg & Valeriy Shafiro.*
  - *Hearing Research, Vol. 310 (2014) 76 - 86.*
  - *Reducing speech tempo by 25% improves speech perception in elderly listeners with age appropriate hearing (EAH) listeners in attentionally demanding conditions. The performance on the selective attention task improved when the talker was identified by spatial location rather than a specific keyword.*

- Socio-Demographic, Health, and Tinnitus Related Variables Affecting Tinnitus Severity. (p 17)
  - *Hoekstra C., Wesdorp F., et al.*
  - *Ear & Hearing, Vol. 35, N° 5, 544–554.*
  - *This study suggests that it's recommended to ask the patient for information on six variables during a standard visit. A clinician can recognise a patient at risk more easily and quickly. If a prognosis for more severe tinnitus is found, the clinician should offer the patient a follow-up. Also, counselling might be improved by acknowledging these variables.*

- Addressing patient's psychosocial concerns regarding hearing aids within audiology appointments for older adults. (p 18)
  - *Katie Ekberg, Caitlin Grenness & Louise Hickson.*
  - *American Journal of Audiology, Vol. 23, p 337–350, (September 2014).*
  - *A must-read for every hearing-care specialist, trainer, teacher who is convinced of the importance of patient-centered care in audiology and willing to ask the question: in what way am I really addressing the concerns of my patient*

- Comparison between Self-Reported Hearing and Measured Hearing Thresholds of the Elderly in China. (p 19)
  - *Mingfang Diao, Jianjun Sun et al.*
  - *Ear & Hearing. 35 (5): p. e228-e232, September/October 2014.*
  - *The evaluation of the efficacy of the Mandarin Chinese version of the Hearing Handicap Inventory for the Elderly-Screening(HHIE-S).*

Auditory Neuropathy Spectrum Disorder: A Review

Norrix LW and Velenovsky DS.

Journal of Speech Language and Hearing Research. 2014; 57 (4): 1564-1576.

Auditory Neuropathy Spectrum Disorder (ANSD) is the term used to describe the condition in which an individual has present OAEs and/or a CM but an absent or abnormal ABR. The article provides background information about ANSD, the battery of tests used to diagnose ANSD, and resources for remediation and management strategies.

ANSD Profile:
As the above definition suggests, ANSD diagnosis is easier when ABR is absent. This may become complex when ABR is present because there is no clarity on defining what 'abnormal ABR' is. As the site of origin seems to OHCs, presence of any type of OAE or Cochlear Microphonics (CM) will lead to the diagnosis. Absent or elevated stapedial reflexes would further confirm this diagnosis. These 3 tests are absolutely essential for the diagnosis of ANSD.

From the management perspective, it is important to recognize 5 gross types of ANSD: a sensory loss (IHC loss); a synaptic dysfunction; a neural hearing loss (axonal loss or dys-synchrony due to demyelination); a mixed type; a mosaic type (where OAEs will diminish over time eventually to become absent, whereas CM will be more gradually diminishing). However, it is difficult to differentiate them using the above tests.

ANSD Causes:
Genetic: 40% ANSD cases have genetic (syndromic and non-syndromic) causes. The most frequently described non-syndromic genetic causes are due to mutations in the DFNB9, DFNB59, and AUNA1 genes, each resulting in faulty protein coding. ANSD may be part of an inherited syndrome, such as Charcot–Marie–Tooth or Friedreich's ataxia, in which individuals can exhibit a range of sensory and/or motor neuropathies. These conditions cause permanent ANSD.

Acquired: The most significant perinatal risk factor for acquired ANSD is an extended NICU stay, where hypoxia, prematurity, and hyperbilirubinemia are potential causes of ANSD. These perinatal conditions can result either in permanent or transient ANSD, in many cases this may improve with maturation. Hence tests need to be repeated based on the history.

Late-acquired ANSD can be caused by genetic and non-genetic factors such as immune responses, infections, systemic diseases, malignancies, toxic substances, nutritional deficiencies, and endocriopathies.

These individuals present hearing thresholds ranging anywhere from normal hearing to severe or profound hearing loss. The main difficulty they seem to face is understanding speech in noise. Hearing aids, cochlear implants, and frequency modulated (FM) systems

are technologies available to improve audibility and clarity for those with ANSD. Hearing aids and/or FM systems are typically the only remediation option for children under the age of 1 year regardless of degree of hearing loss, until their thresholds can be determined.

Although some individuals diagnosed with ANSD benefit from amplification, others do not. Similarly, the overall speech and language outcomes for children diagnosed with ANSD and fitted with a CI are mixed. There are children who benefit; some do not based on the etiology. When adequate progress is not being made, alternative modes of communication and/ or supplementing with lipreading and natural gesture, total communication, and sign language should be explored.

This review article provides all-in-one summary and updates from diagnosis to management of children and adults with ANSD. Authors made appropriate comparison and quotation of various position statements and research articles to help the reader. It is a very good refreshing update about ANSD.

NRT test in auditory neuropathy patients with cochlear implants.

Fei Ji et al .

Acta Otolaryngologica. 2014; 134(9):930-942.

Both Sensorineural Hearing Loss (SNHL) and Auditory Neuropathy or Auditory Dyssynchrony (AN/AD) are peripheral conditions of the inner ear and the auditory nerve. Severe to Profound degree of SNHL and AN both have been recommended to be candidates for Cochlear Implantation.

This is a retrospective of study of 1680 implanted patients. Out of which 7 pre-lingual children showed classic AN symptoms (absent recordings of ABR and robust TEOAE responses) and were implanted with CI (Experimental Group). 21 children with prelingual Severe to Profound SNHL were also implanted CI (Control Group). They all had received Nucleus CI24R implants which use Neural Response Telemetry as a procedure to record ECAP (electrically evoked Compound Action Potentials).

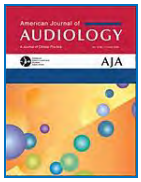
Intra-operative NRTs were recorded in all patients whereas post-operative recordings were made in all cooperative subjects. Standard procedures were used recording the NRTs. In-built algorithms were used to identify N1-P1 and their amplitudes and thresholds. The parameters that were compared between the groups were:- the incidence of valid ECAPs (%), the threshold of N1, and optimal N1-P2 amplitude (microV). Wilcoxon's non-parametric test and Chi-Square tests were administered to draw statistical comparison between the groups.

- *The intra-operative and post-operative NRT incidence was 43% and 67% in the AN group and 95% and 100% in the SNHL group respectively*
- *Statistical tests showed no significant difference between AN and SNHL groups in terms of the threshold of N1*
- *Statistical tests showed that the N1-P2 optimal amplitudes were not significantly different between the groups*
- *Though low incidence of NRT was reported, the authors demonstrated that such patients showed significant improvement in behavioural tests in follow-up studies.*

The authors have reminded us from the literature that in subjects with absent ECAPs, hearing was near normal. They recommend the use of ECAP is a simple of indicator of hearing reconstruction status but not as a prognostic tool.

This retrospective study provides one of many such studies on this subject to take informed decisions. Significant finding from this study is – No difference in NRT parameters between both groups. Also, the authors were quick to point that NRT solely cannot be a test of prognosis. Availability of few AN patients in the study limits its ability to draw larger implications. The terms 'experimental' and 'control' groups were rather loosely used.

Current Trends in Pediatric Cochlear Implant Candidate Selection and Postoperative Follow-Up.



Uhler K and Gifford RH.

American Journal of Audiology. 2014; 23(3):309-325.

The Minimum Speech Test Battery (MSTB) is the protocol of speech perception tests used for adults using CIs. MSTB has been revised over time to reflect changes in CI technology and rehab procedures. The latest version of MSTB comprises of word and sentence level tests. However, there is no paediatric version of MSTB (PMSTB), though several attempts have been made in the past to develop one. PMSTB can standardise the outcome measures reduce the variability in outcome reporting and will be of great help for every child being assessed before and after CI.

To develop a PMSTB, the current practices and protocols that are currently used by professionals providing services to paediatric CI candidates/recipients need to be understood through surveys (about assessing paediatric CI candidacy, post-operative follow-up & outcomes).

Surveys inquired about:- (1) the use of subjective and objective measures of auditory development, (2) speech perception tasks, (3) vestibular assessment, (4) cognitive assessment, (5) time of activation, (6) use of objective programming methods, (7) members of the CI team, (8) speech and language evaluations, and (9) the practice of bilateral cochlear implantation. Surveys were conducted in paper form (Phase I) and electronic form sent through email (Phase II). 10% and 19% were the response rates in both phases, amounting to about 117 audiologists (working with CI) participating in the survey.

Some of the results are:

1. *CI Candidacy – 73% use in situ verification of hearing aids; 2.6% use eABR*
2. *Parent Questionnaires - The top three questionnaires most widely used were IT-MAIS (82%), MAIS (59%), and LittlEARS (47%)*
3. *Speech Perception Measures – Early Speech Perception (ESP, Low Verbal) for 0-23 months age group was most commonly used. For 25–35 months, the most commonly used assessment tool was the ESP-LV (63%), the Mr. Potato Head task (29%), and the Northwestern University of Children's Perception of Speech (NUCHIPS; Elliot & Katz, 1980; 30%). For the 36+ months age group a variety of tests such as PB-K, MLNT, LNT, WIPI and NUCHIPS.*
4. *Initial Activation: Majority of centres reported conducting initial activations over a 1-day period (51%), followed closely by 2-day period (43%).*

Based on the variability of results seen, the authors strongly recommended the need for a PMSTB and also underlined its urgency.

This survey study first delineates a spectrum of variations in 3 major areas related to CI in the paediatric population - assessing pediatric CI candidacy, postoperative follow-up & outcomes. This is a very important study at this juncture where the use of CI has become so common yet with no agreement on procedures and criteria. With a detailed discussion dedicated to the urgency of the need for a common protocol (named it as PMSTB), it made a firm case for one. However, the authors did not made any recommendations on what criteria should be a part of this protocol and what tests should be a part of this battery.

Development of a test battery for evaluating speech perception in complex listening environments.

Brungart DS, Sheffield BM and Kubli LR

The Journal of the Acoustical Society of America. 2014; 136 (2):777-790

Individuals with SNHL known to have 2 components in their auditory impairment – one related to the audibility loss and the other related to the speech understanding loss in challenging environments. Existing clinical procedures to test speech-in-noise abilities (e.g. QuickSIN) use relatively simple situations and clinical speech-in-noise tests are generally presented diotically with clearly and carefully articulated speech signals presented in the presence of stable and predictable noise backgrounds. They are devoid of the binaural cues, reverberation effects and AV cues that typically occur in real-world situations. These limitations affect the measurement outcomes and ultimately clinician's decisions about the selection of appropriate hearing aid features.

This study aimed at developing an extended battery of speech-in-noise tests that assess the functional hearing performance of listeners in a variety of different listening environments and provide preliminary normative data for these conditions. The authors selected QuickSIN for these modifications. The QuickSIN is a clinical speech-in-noise test designed to rapidly determine the minimum SNR (SRT50) a listener requires to correctly identify 50% of the keywords in a low-context sentence in the presence of a four-talker babble noise. The following 8 modifications were done to QuickSIN:

(1) Standard four-talker babble (2) N0Sπ: Identical to the standard condition but with the phase of the target talker shifted 1800 in the right ear (3) Audiovisual (AV): Identical to the standard condition but with a video signal of the target talker presented on an LCD monitor in the listener's booth (4) AV+ N0Sπ (5) Spatial: In the standard spatial condition, head-related transfer functions (HRTFs) from
KEMAR were used to simulate a spatial condition (6) Reverb: RT60 time of 0.25 s was used (7) Time-compressed reverb: The time-compressed reverb condition was identical to the reverb condition, except that the target speech signal was time compressed (8) Speech-shaped noise (SSN): In the SSN condition, both the left and right channels contain the target mixed with continuous speech-spectrum shaped noise.

The material was tested on 49 listeners with normal hearing in 16 listening conditions (each of the condition was repeated for reliability testing) where the median time for each condition is 100 seconds. SRT0, SRT50 and SRT100 were measured. Several statistical methods were used to analyse the data. The normative data can be best summarised using the following graph. Scores for each of these conditions is comparable to what is reported in the literature and the test-retest reliability was also high. Results also showed that correlation between each of the tasks is low, indicating that they are addressing different aspects of listening ability.

This study is based on long known limitations of speech-in-noise tests and a careful study of literature. Selection of the 8 listening conditions (making them practical) and incorporating them in QuickSIN material has been the success of the study. Statistical analysis from various aspects suitably strengthens the objectives of the study. The success of the study also lies in developing the normative data from a large group of normal hearing listeners. However, the material needs to be tested among SNHL listeners and correlated with listening need analysis.

The Effect of Hearing Aid Microphone Mode on Performance in an Auditory Orienting Task

Brimijoin, W. Owen et al

Ear & Hearing. 35:e204-e212, September/October 2014.

15 hearing aid wearers participated in this study. They all did the localisation task with omni- and with adaptive directional microphone mode. They were instructed to locate the female talker in male talker babble and press a button if they did. The study shows that adaptive directional microphone mode helps listener to locate sounds within beam quicker than in omnidirectional mode. If the target sound is played outside the beam, localisation is quicker with omnidirectional microphone mode. Only in the adaptive directional mode, the listeners sometimes turn to the wrong direction while searching for the target sound.

So, wide beam will help listener to locate quickly in a wider angle of target sounds but smaller beam can improve SNR in noisy situations. But beware; the listener may have understanding problems with a small beam because he will only get better SNR when he is facing the wanted signal. When this signal needs to be located first, searching behaviour can make him/her miss the start of sentences.

Well conducted study – localisation tested with speech so relevant for daily situations. Maybe consider testing localisation with speech in Amplifon Hearing Centres – localisation with narrow band noise signals in quiet: keep the microphone mode in mind! - helps you develop a critical look on microphone mode in relation to localisation and SNR

Extended high-frequency (9-20 kHz) audiometry reference thresholds in 645 healthy subjects

Valiente A.R., Trinidad A., et al.

International Journal of Audiology 2014; 53: 531–545

Extended high frequencies (EHFs) are needed to localise sounds and understand in noise. In current clinical audiology, EHFs are only tested to monitor otoxicity (e.g. during cancer treatments) but they could also be used to determine the impact of noise trauma in an early stage. Nowadays, correct interpretation of EHFs is difficult because previous studies were inaccurate due to different selection criteria (insufficient age categories) and inconsistent calibration procedures.

The purpose of this study was to collect data of the complete human ear spectrum (0.125-20 kHz) for 645 healthy participants (5-90 years) whereas age should be the only contributing factor for hearing loss (presbyacusis). Participants were divided into seven age categories and afterwards results were compared graphically and statistically with the results of previous studies.

EHFs (9, 10, 11.2, 12.5, 15, 16, 18 en 20 kHz; dB SPL) were tested with a closed circumaural earphone and conventional frequencies (0.125-8 kHz; dB HL) were measured with a supra-aural earphone, both following the ascending method with pure tones. Thresholds were measured up to 120 dB SPL and harmonic distortions were measured at 105 and 110 dB SPL at 9 kHz (18 and 19.6 kHz harmonics), 10 kHz (20 kHz harmonic) and 11.2 kHz (21.6 kHz harmonic).

We can conclude that compared with the greater part of previous studies, hearing thresholds increase in function of frequency and age. Subjects younger than 40 years respond up to 18 kHz, 40-49 year old participants up to 14 kHz and subjects older than 50 years up to 11.2 kHz.

For the 20-69 years old group, thresholds were lower for females than for males, especially at 12.5 and 16 kHz. The highest frequencies show more dispersing data which underlines the high variability of the total population.

This study suggests that EHFs should be introduced into audiological evaluation to determine early hearing loss caused by noise exposure, ototoxic medication and genetic disorders. Using all the results of previous studies and this study, standards/reference equivalent threshold sound pressure levels (RETPLs) could be developed. To determine hearing damage, the patient's result could be compared to those RETSPLs. Other influencing factors should also be considered: cardiovascular risks, noise exposure, anatomical differences (ear canal).

EHFs could lead to earlier diagnosis of hearing damage which could counsel the patient to use custom made hearing protection. It could also explain why conventional audiometry, ANL, SPIQ and SPIN can't detect a hearing problem while the patient has problems with understanding in noise/localising sounds. But what would be the clinical value of EHFs in practice for the oldest patient groups if patients older than 50 years respond less to frequencies above 11.2 kHz?

Well conducted study with a large sample size. In contrast with all previous studies where only graphical analysis was used, statistical analysis showed important results which could lead to international standards for the complete human hearing spectrum.

Wireless Technology to improve Communication in Noise

Linda M. Thibodeau & Cheryl De Conde Johnson.

Seminars in Hearing 2014; 35:p 157–158.

Wireless technologies can present complementary hearing and rehabilitative solutions even outside of the educational settings. The benefits are not solely confined to persons with hearing loss and there is a growing body of evidence of its efficacy with special groups within the population, at high risk of compromised educational performance, such as in children with autism, auditory processing disorders and attention deficit disorders. FM or wireless transmission system technology is rapidly evolving and, with the greater accessibility to improve signal to noise ratios, the challenge for professionals is that of understanding all the potentials in application and benefits.

The evidence on the real possibilities and benefits provided by remote microphone systems is rather convincing and could be further implemented not only in special needs groups within the population but extended to anyone experiencing difficulties in challenging acoustic scenarios.

Use of Wireless Technology for Children with Auditory Processing Disorders Attention – Deficit Hyperactivity Disorder and Language Disorders

Erin C. Schafer, et al.

Seminars in Hearing 2014; 35:p193–205.

Twelve normally hearing children between 6-11 years of age were identified with various disabilities such as APD, ADHD, and ASD. FM Systems were fitted to all participants via A.A.A recommended real ear probe microphone measurements to meet the Desired Sensation Level prescriptive targets and within the DSL recommended MPO levels. All candidates performed a battery of auditory function tests and questionnaires were given to parents and teachers. The objective and subjective results lend support of the beneficial use of DSL target fitted FM Systems.

Very convincing study of an often underrated and misinterpreted problem in certain school-aged populations. The initial identification of one of the underlying conditions, and subsequent systematic use of FM Systems, may mitigate the difficulties encountered in school settings and provide the conditions for better academic achievements.

Benefits of Integrating Wireless Technology with Hearing Instruments

Carrie Spangler.

Seminars in Hearing 2014; 35:p 246–256.

Wireless technology in connection with hearing aids is a hot issue at the moment both in our society and in hearing aids. Connectivity can provide benefits for improving speech understanding and to connect with today's devices which are used more commonly by normal hearing people.

Carrie Spranger discusses the challenges for audiologists to meet the listening and fitting needs of patients. The use of connectivity devices should improve the self-efficacy skills of the hearing impaired. She presents 3 cases where hearing aid users were fitted with wireless connection devices, using the counseling tool from the Ida Institute: "The Living Well" (adults) and "My World" (children) This was done to decide if and how these devices should be used. For these 3 cases, the problem, the possible solution, the advantages and disadvantages are listed up.

It's an ongoing challenge for both the audiologist and the patient to put up with the fast development of the "Unified Communication" where all sorts of devices are connected to each other to meet the variety of communication needs and to improve the ability to understand in daily life environments.

Audio-visual training is better than auditory-only training for auditory-only speech-in-noise identification

Bjorn Lidestram, et al.

Journal of the Acoustical Society of America. 136 (2), August 2014.p EL142-146.

The speech-in-noise performance was tested on sixty young participants divided into three separate groups (audio – visual training, auditory only training, and no training) to investigate the effects of audio-visual versus auditory training. The training groups were presented with words and consonants at 0 dB signal to noise ratio with stimuli being either audio-visual or only auditory. The no-training group watched a movie clip with no speech identification tasks required. Speech–in-noise identification was measured prior and after training. Results demonstrate that only audio visual training improved speech-in-noise identification, thus corroborating existing research.

As the average age of the candidates recruited for the test was 23.2 years, it is not possible to use the findings as a reference model for an older population group. Strangely, no prior auditory screening test was conducted on the supposedly normally hearing candidates recruited. Even with these limitations, the results still suggest the possible utility of audio-visual training for the hard of hearing population using hearing devices. Certainly merits further investigation within the hearing aid user population.

Effects of Frequency Compression and Frequency Transposition on Fricative and Affricate Perception in Listeners with Normal Hearing and Mild to Moderate Hearing Loss

M. Alexander, Judy G. Kopun, & Patricia G. Stemalcowicz.

Ear & Hearing, Vol. 35, N°. 5, 519–532 (2014).

Twenty four normally hearing listeners with ages ranging from 18-50 years and twenty four hearing impaired listeners aged between 18 – 74 years participated in the test. The listeners had to complete two 60-90 min sessions to identify VC's recorded from hearing aids and under different frequency lowering algorithm settings. For the hearing impaired, performance was worse with the FT algorithm compared to other conditions. Normally hearing listeners using the FT algorithm compared significantly worse than in other conditions. The activation of this algorithm reportedly degraded the /s/ and /z/ identification.

The authors contradict the findings made by Kuk et al for the FT algorithm although admitted having used completely different test procedures. The findings seem to suggest the interesting potential of frequency lowering algorithms, depending upon the level of SNHL. The authors suggest that FT can potentially yield more benefit for severe to profound hearing loss listeners, but not so for those with mild to moderate SNHL.

Development and validation of a questionnaire for hearing implant users to self – asses their auditory abilities in everyday communication situations: the Hearing Implant Sound Quality Index (HISQUI19)

Edda Amann & Ilona Anderson.

Acta Oto-Laryngologica. 2014; 134: 915–923.

The HISQUI19 was assessed on 75 MED-EL CI users from hearing implant centres in Germany and Austria to quantify self-perceived auditory benefit and in line with the W.H.O. inclusion of psychological and social domains in the definition of "health". Statistical analysis suggests very slight and non-significant relationship between the final score obtained and age of implant. Gender did not influence self-perceived auditory benefit. Another factor showing only slight yet not significant higher self-perceived auditory benefit was the duration of hearing loss. Surprisingly no significant differences emerged between unilateral and bilateral CI users.

Table: Items listed with regard to content: distinguishing/allocating/understanding.

Domain Item	*Sentence n°*
Distinguishing between different voices/speakers	*1, 10, 14*
Identifying music sound	*3, 6*
Sound localization	*5, 13, 16*
Talking on the phone	*2, 8*
Watching TV, listening to the radio	*7, 11*
Understanding speech in public situations (speech in noise)	*9, 12, 15*
Participating in conversations (speech in noise)	*4, 18, 19, 17*

Rather surprising was the omission of hearing loss levels in the non-treated ear among monolateral C.I. users. It would have been of great interest to have included bimodal C.I users' performances. Although in need of a further multicentre randomized controlled trial, the study was very carefully organised – very promising the meaningfully "user friendly" 19 item questionnaire – possibly an incentive for wide spread implementation.

Spatial Design of Hearing Aids Incorporating Multiple Vents.

Daniel Stevenson, Grant Searchfield & Xun Xu.

Trends in Hearing (January - December 2014)
Vol. 18: p 1–10.

A set of 60 left ears and 49 right ears has been used in a statistical shape model to assess expected shape variation within the ear canal. Principal component analysis and the narrowest portion of the ear canal were used to create 3D models of two hearing aid shells: one with multiple 0,4 mm vents and the other with a single large 3-mm vent. The multiple vents fit in around the important electronic componentry more easily and are able to use the free space in the shell which larger vents cannot do. This provides considerable flexibility of location, shape and size of the other hearing aid commentary within the hearing aid shell.

The maintenance of a multivented device presents a challenge in terms of keeping vent paths clear.

The acoustics of multiple vented earmoulds are not discussed in this article; the authors did an earlier publication about this (multiple vented earmoulds are capable of achieving similar feedback and occlusion performance but are likely to require a greater area to achieve this venting). It is estimated that even with a conservative vent packing of 0.4, multiple venting equivalent to at least a single 2 mm vent is achievable.

Spatial and temporal modifications of multitalker speech can improve speech perception in older adults.

Brian Gygi & Valeriy Shafiro.

Hearing Research, Vol. 310 (2014) 76 - 86.

For speech perception in real life, both divided and selective attention is important. In this study, the divided attention was assessed by the sensitivity to call-sign words in the beginning of the utterance. The selective attention was measured by the accuracy of identifying colour and number keywords in the later part of the utterance.

Exp. 1. The performance of 13 elderly listeners with age-appropriate hearing (EAH) on both tasks was evaluated. Similar to young normal hearing (YNH) listeners, decreasing the speech tempo by 25% shows improvement on both divided and selective attention. EAH listeners performed significantly less accurately than YNH listeners in both tasks.

Exp. 2. For YNH adults, spatial separation is effective in separating the processing demands of the divided and selective attention task. For the 10 elderly persons in this experiment, the divided attention task was not affected by spatial separation of the stimuli, whereas the performance on the selective attention task was positively influenced. This supports the notion that spatial separation decouples the identification (selective attention) task from the detection (divided attention) task. In this experiment, performance of EAH and YNH listeners did not differ significantly.

The study demonstrates that reducing speech tempo by 25% improves speech perception in EAH listeners in attentionally demanding conditions. The performance on the selective attention task improved when the talker was identified by spatial location rather than a specific keyword.

Socio-Demographic, Health, and Tinnitus Related Variables Affecting Tinnitus Severity.

Hoekstra C., Wesdorp F., et al.

Ear & Hearing. 35: 544–554, September/October 2014.

Tinnitus is a phantom auditory perception of meaningless sound in the absence of an external or internal acoustic stimulus. It affects 7 to 19% of the adult population. In up to 5% of the population, tinnitus interferes with the ability to lead a normal life. Despite previous research, it remains unclear which individuals may develop tinnitus to such a degree that it negatively affects their quality of life. Knowledge about the factors that are associated with tinnitus severity may contribute to (1) a better recognition of individuals who might develop problems (2) a better follow-up (3) a better counselling of vulnerable patients.

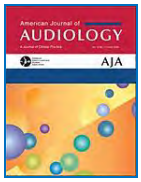
The purpose of this study is to identify socio-demographic, health and tinnitus variables that independently relate to tinnitus severity. This study investigates variables previously described in the literature as well as additional variables.

A total of 309 patients (age: 7 – 82 years; tinnitus duration: 2 months – 48 years) were included in this study. All patients completed two questionnaires: Tinnitus Questionnaire (TQ) and the Tinnitus Handicap Inventory (THI). 28 variables were included: socio-demographic, health and tinnitus variables. The study focuses on these three groups because these variables are easily evaluated in a standard visit.

Three variables were found to have a significant effect on tinnitus severity when measured on both the TQ and THI: (1) percentage of awareness during the day, (2) self-reported depression and/or anxiety, (3) loudness measured on a VAS. Three other variables were included in one of the two questionnaires: level of education, somatic complaints, tinnitus variability in loudness and/or pitch on a VAS.

This study suggests that it's recommended to ask the patient for information on these six variables during a standard visit. A clinician can recognise a patient at risk more easily and quickly. If a prognosis for more severe tinnitus is found, the clinician should offer the patient a follow-up. Also, counselling might be improved by acknowledging these variables.
Further research is needed to investigate the causal relationship between these variables and tinnitus severity.

Addressing patient's psychosocial concerns regarding hearing aids within audiology appointments for older adults.



Katie Ekberg, Caitlin Grenness & Louise Hickson.

American Journal of Audiology. 2014; 23(3): 337–350.

Different surveys and studies have shown that how the audiologist/hearing health care professional communicates with their patient has an influence on the understanding, commitment and, thus, the purchase decision of the patient.
Key factors such as knowledge, empathy, patient-centered traits and actions, acknowledgement of the patient as an individual, have been proven to be important in patient-centered care. Facilitators in this patient-centered care are the interpersonal skills of the clinicians. Such skills are needed to deal with the negative, emotional reactions which a patient can have during their hearing rehabilitation and as a reaction to the diagnosis of hearing impairment.

This article focuses on the reaction of audiologists/hearing care specialists when confronted with patients who have concerns regarding hearing aids and/or the diagnosis of hearing loss.

The study in the article consisted of filming 63 conversations (initial hearing assessments) between audiologists and patients. Afterwards they transcribed the conversations. Out of the analysis of these conversations, it was clear that the majority of the reactions of audiologists were not oriented to the psychosocial nature of a patient's concern. Not really addressing their concerns (instead having reactions like laughing, ignoring and unhelpful non-verbal reactions) left patients insecure and led to counterproductive outcomes from the appointment. It seemed that audiologists were clearly task driven and focused on providing technical information to patients. They preferred to move on with the conversation having their own goal in mind, instead of responding in an empathic manner to the emotional nature of the patient's remarks/ questions/etc. In this way, they neglect the needs of the patients and are failing to make a good transition from diagnosis to rehabilitation recommendations. Also, the efficiency of the audiology appointment is questionable, since it leaves the patient insecure and more difficult to convince to agree with the rehabilitation plan of the audiologist.

A must-read for every hearing care specialist, trainer, teacher who is convinced of the importance of patient-centered care in audiology and willing to ask the question: in what way am I really addressing the concerns of my patient?

Comparison between Self-Reported Hearing and Measured Hearing Thresholds of the Elderly in China.

Brimijoin, W. Owen et al

Ear & Hearing. 35 (5): p. e228-e232, September/October 2014.

The aim of this study is to examine the performance of the HHIE-S (Mandarin Chinese version) and to identify aged individuals with hearing loss using the measured hearing thresholds of the elderly in Beijing.

The HHIE-S is a diagnostic tool to identify elderly people with hearing difficulties. This instrument consists of 10 questions designed to assess perceived emotional and social problems that are associated with impaired hearing. The HHIE-S score calculation: never = 0, sometimes = 2, always = 4 with a maximum score of 40.

Pure-tone audiometry was also conducted. The PTA was calculated over the frequencies of 0,5; 1,2; 4 kHz for the better ear hearing level. Sensitivity, specificity and positive and negative predicted values were calculated for the HHIE-S values using > 40 dB PTA between 500 Hz and 4 kHz as cut-off point for the hearing loss for the better ear.

Results: 727 persons (> 60 years) were examined with the HHIE-S. There is no correlation between age and the HHIE-S score. The elderly may consider that their reduced hearing sensitivity is part of the normal ageing process. Hearing loss is less a handicap than for older adults in other cultures

There is a correlation between the PTA and the HHIE-S. The agreement between the HHIE-S score >6 and the pure-tone test was acceptable (0.809). This findings has confirmed the usefulness of an HHIE-S score >6 for moderate hearing loss. Cut-off scores of >6 provide reasonable sensitivity and specificity.

Conclusion: According to the study, the Chinese version of the HHIE-S is a reliable and valid screening instrument. The results can be generalized to seniors of the same age, gender and noise exposure in other Chinese cities. It's more cost-effective and easy to do the questionnaire in community clinics, homes and senior centres than a tonal audiometry. It's an instrument to discover the quality of life. The degree of hearing loss can also be determined.

Well conducted study – usual as a good screening instrument, but in China because of the under capacity of pure-tone screening, also useful for assessing the type and degree of handicap caused by hearing impairment.