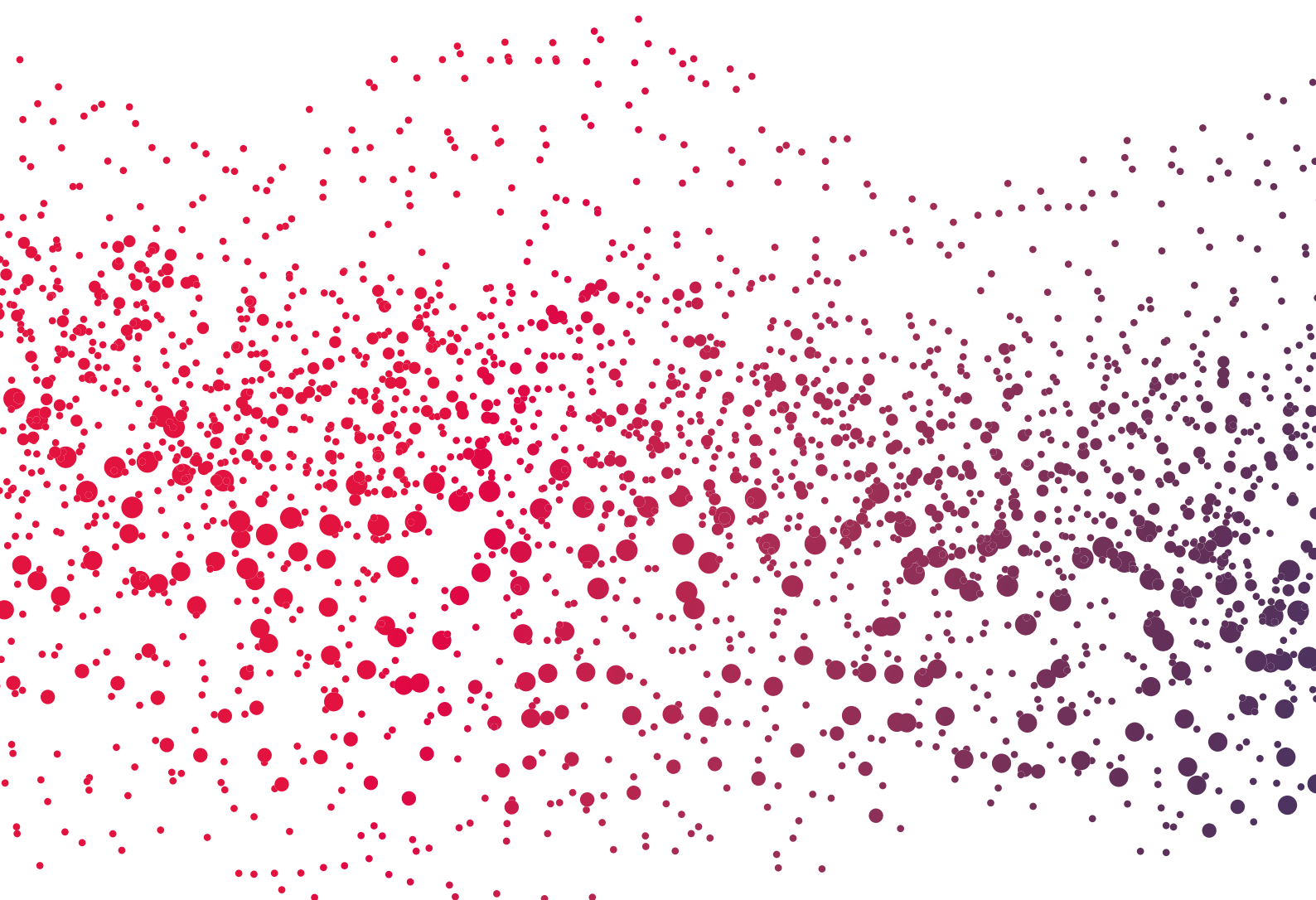


# **CRS** SCIENTIFIC JOURNAL

Otology & Audiology Article Review



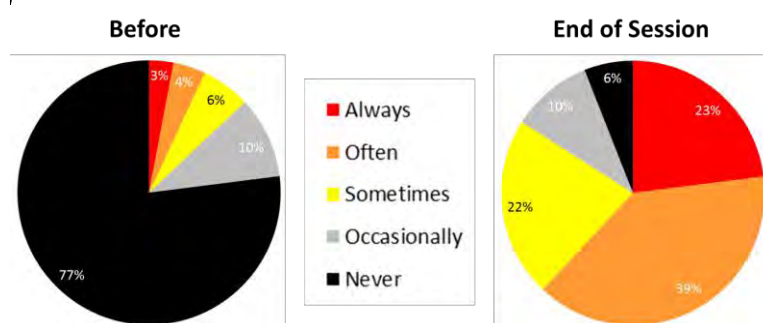
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JULY 2014

- A Systematic Review of Ethical Knowledge in Audiology (1980-2010)
  - Naud'e A.M & Bornman J.
  - *American Journal of Audiology* Vol. 23; 151-157 (June 2014).
  - *This article examines the development of the ethical knowledge in Audiology, in the last three decades, in light of the technological progress, the changes of health care focus toward the patient and the audiologists need to make professional and moral decisions in the daily clinic work.*
- Do Hearing Loss and Cognitive Function Modulate Benefit from Different Binaural Noise-Reduction Settings?
  - Tobias Neher, Giso Grimm, Volker Hohmann, and Birger Kollmeier
  - *Ear & Hearing*; 35; e52–e62(2014)
  - *The aim of this study was to explore whether the degree of hearing loss and/or cognitive function modulates benefit from and the preference for different binaural noise reduction settings.*
- Effects of Nonlinear Frequency Compression on Speech Identification in Children With Hearing Loss
  - Andrea Hillock-Dunn et al.
  - *Ear & Hearing*; 35;353-365 (2014)
  - *This study investigates methodology and the efficiency of Non Linear Frequency Compression (NLFC) fitting on speech discrimination in quiet and competing noise environments.*
- A Treatise on the Thresholds of Inter octave Frequencies: 1500, 3000, and 6000 Hz.
  - Wilson R and McArdle R.
  - *J Am Acad Audiol* ;25(2):171–186 (2014).
  - *The purpose of this project was to examine the relationships between the thresholds of the adjacent octave frequencies and the threshold of the inter octave frequency using audiograms from over a million veterans collected throughout the Department of Veterans Affairs (VA) facilities. Based on examination of these relations, validate the 20 dB rule used to decide the need for doing threshold assessment of inter octave frequencies.*
- The characteristics of Audioscan and DPOAE measures in tinnitus patients with normal hearing thresholds.
  - Zhao F., Stephens S. D. G., Ishak W. S. & Meyer-Bisch C.
  - *International Journal of Audiology* 2014; 53: 309–317
  - *The study was conducted on 45 subjects who reported normal hearing thresholds from routine pure-tone audiometric examination, but reported the presence of tinnitus. DPOAE measures and Audioscan threshold measurement were obtained and compared. The notches in DPOAE amplitude were comparable to that of Audioscan notches in terms of its centre frequencies.*
- Approaches to Tinnitus Management and Treatment.
  - Marc Fagelson
  - *Seminars in Hearing*. 2014;35(2):92–104.
  - *This article provides a comprehensive overview of tinnitus interventions under 2 categories - treatments and management approaches. It provides the most recent references for each of these techniques.*
- Tinnitus, Hyperacusis, and Misophonia Toolbox.
  - Meltzer JB and Herzfeld M.
  - *Seminars in Hearing*. 2014; 35(2):121–130
  - *This article is an update that reviews available treatment options for Tinnitus spectrum disorders (Tinnitus, Hyperacusis and Misophonia) with a special focus on tools (devices & material) to build a Tinnitus Toolbox for Audiologist dispensation and patient education.*

SHORTIES (only this short abstract)

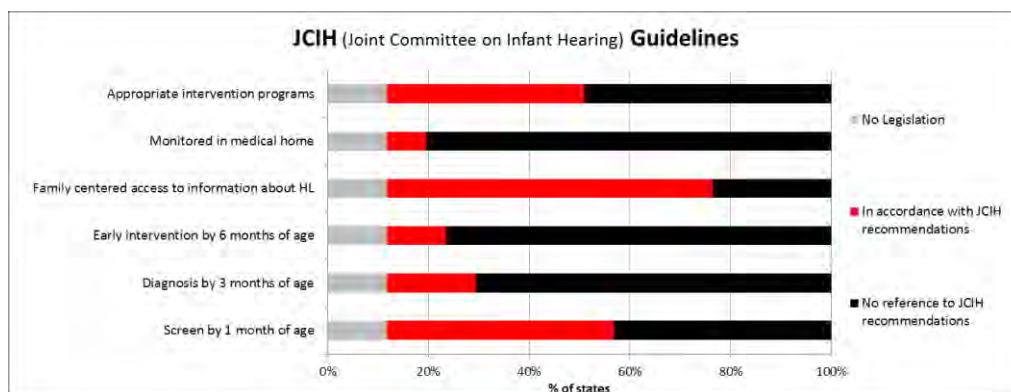
- Predicting Hearing Thresholds in Occupational Noise-Induced Hearing Loss by Auditory Steady State Responses.
  - Attias, J. et. al.
  - *Ear & Hearing* 2014; 35; 330–338
  - *In the United States the monetary award for noise induced hearing loss (NIHL) is often based on the level of the pure-tone hearing loss. Auditory Steady State Responses (ASSR) were studied in 157 subjects with noise-induced hearing loss. The ASSR objective test results accurately predicted moderate to severe NIHL when subtracting a mean difference of -12dB.*
- Hearing Loss Prevention Education Using Adopt-a-Band: Changes in Self-Reported Earplug Use in Two High School Marching Bands.
  - Auchter, M.; Le Prell, C.
  - *American Journal of Audiology* 2014, Vol. 23; p211–226
  - *Two High School bands participated on a voluntary level in watching a video about hearing loss and discussing hearing loss with Doctor of Audiology students. Use of hearing protection reported by 94% of students after the training was considered useful by them while in marching band.*
  - *Before training, 23% of students reported using hearing protection. End-of-season survey revealed an increase to 62% of the students voluntarily participating in the study who were wearing hearing protection.*



- Immigration Within the United States: Prevalence of Childhood Hearing Loss Revisited.
  - Pape, L. et. al.
  - *American Journal of Audiology* 2014, Vol. 23; p238–241
  - *A review of data from 2-countries with a large number of immigrants coming to the United States reveals a likely higher prevalence of hearing loss in immigrant children of 5 out for every 1,000 babies compared to the United States rate of 3.7 out of every 1,000 babies. This means that the prevalence of hearing loss in the US is underestimated if this aspect is not considered.*

*Overall a very strange article, where the arguments are fairly weak and the overall impact on the number of hearing impaired children is debatable (based on data – the difference would be 44 babies for 2013 for both Mexican and Chinese immigrants.)*

- Legislation Impacting Audiology and the Provision of Audiological Services: A Review of Legislation Across the United States.
  - Messersmith, J., et al.
  - *American Journal of Audiology* 2014, Vol. 23; p142–150
  - *Review of state-specific legislation revealed all states require audiologists to hold licensure with only some states regulating treatment of children with hearing loss. Reference is made to the JCIH (Joint Committee on Infant Hearing) Guideline. Legislation for insurance coverage in each state is not consistent with requirements for Early Hearing Detection Intervention (EDHI) or hearing assistive technology (HAT). Additionally, a state may mandate hearing aid coverage. However, this mandate does not apply to the self-funded programs often provided by private companies.*



- **Seminars in Hearing: Special issue on Tinnitus.**
  - *Seminars in Hearing*. 2014; 35(2); p65–156
  - *Seminars in Hearing*, once again, offers us a comprehensive overview of matters which are of interest to dispensing audiologists.

*Definitions of tinnitus, hyperacusis and, more recently, misophonia are elaborated and discussed in several articles by renowned audiologists.*

*The origin, assessment tools and possible treatments of these disorders are discussed. Differential diagnoses and possible treatments are presented.*

*Melanie Herzfeld offers us a complete toolbox of approaches of tinnitus for the rehabilitative audiologist (see detailed review p 15).*

*Jastreboff gives an overview of his TRT and his approach to hyperacusis and misophonia (a determination he launched, and is now widely accepted).*

*This issue of "Seminars in Hearing" provides us with many things to think about in our daily practice when being presented with clients who are reporting these phenomena.*

*How can we cope with them, where can we contribute to active intervention or to make an appropriate referral to other disciplines?*

*What are the highlights?*

- *The importance of a proper approach while counseling.*
- *The link between hearing instruments with built-in connectivity and the many apps providing therapeutic noise, special music programs, meditation sounds etc.*
- *The wide range of possibilities being presented to the dispensing audiologist to provide reliable solutions.*
- *The therapies that are comparing tinnitus therapy with treatment for chronic pain.*
- *The relationship with chronic fatigue syndrome, fibromyalgia and post-traumatic stress disorder.*
- *That there is currently no FDA-approved drug for tinnitus.*
- *That processes of hyperacusis show similarities with migraine.*
- *That phonophobia differs from misophonia in the way that misophonia often is linked with particular individuals, and provokes disgust and anger (whilst often being well aware that their reaction triggers are unreasonable), while phonophobia is linked with sound and elicits fear.*
- *That, in case of hearing loss, amplification should be the first solution to be considered.*
- *That mindfulness-based training is more widely chosen to elicit greater parasympathetic activity*

*Misophonia: An overview (recommended article)*

*Despite of the lack of evidence-based information about misophonia (no known etiology, no known pathophysiology, no definition, no standard criteria for diagnosis) this article is recommended*

*reading.. We get a concrete description of possible symptoms, trigger sounds, thoughts, feelings and reactions. To me, it's important that dispensing audiologists can recognise and understand this condition so that they are able to manage it in a professional manner and will know when to refer the patient.*

*Tinnitus: An overview (recommended article)*

*The neurophysiology of tinnitus is described in this concise article.*

*Evaluation and management of tinnitus is well summarised. The four approaches to evaluation and management are elaborated. Considering the rather high prevalence of tinnitus, it is extremely important to provide complete and relevant information to clients. In the final part, there is also information about TMS (transcranial magnetic stimulation) . This was useful coverage, because clients are beginning to refer to it.*

*Hyperacusis as a Symptom of Superior Semicircular Canal Dehiscence (SSCD)*

*Interesting article but, in my opinion, less relevant for dispensing audiologists. As you can see in the diagram below, superior semicircular canal dehiscence (SSCD) is characterised by a pathological opening in the bone overlying the superior semicircular canal and this can make the inner ear hypersensitive. In such cases, hearing protection, although not generally recommended, can be useful for some clients immediately after exposure to intense sounds. Overall, this article contains information mostly of relevance to clinical audiologists.*

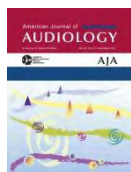
*Tinnitus, Hyperacusis, and Misophonia Toolbox (recommended article – see detailed review p16)*

*This article shows the range of the tools for treatment and management of these three conditions but mostly for tinnitus. It is important to make the right choice from the various possibilities available to the dispensing audiologist and, when appropriate, to know when referral for a multidisciplinary approach is indicated.*

*At the end of the article several tinnitus devices are highlighted. Interesting to check them out through Google to view the promotional videos.*



## A Systematic Review of Ethical Knowledge in Audiology (1980-2010)



Naud'e A.M & Bornman J.

*American Journal of Audiology*. Vol. 23; 151-157  
(June 2014).

*Audiology is a hybrid profession – on the one hand, audiologists provide health care and, on the other, they dispense technology especially hearing instruments. These mixed roles create ethical challenges and moral dilemmas in every day professional activities. This article is trying to examine the development of ethical knowledge in Audiology, in the last three decades, in the light of technological progress, changes of health care focus toward the patient and the audiologist's need to make professional and moral decisions in daily clinic work.*

*The authors reviewed 27 articles that discussed ethical issues in Audiology from 1980 to 2010. The articles were sorted according to the following categories: Decade; Ethical approach; Component of morality, topic or ethical principle; Primary role of the audiologist. The articles were analysed in a two-phase mixed quantitative and qualitative research method.*

*The results showed that most of the articles were published in the 2000's and discussed a variety of ethical subjects such as conflict of interest, informed consent, research integrity etc. The increased number of articles in the 2000's is in line with the technological development and the expansion of Audiology as a hybrid profession. It is also indicative of the wide reflection, within the profession, on practice and on the audiologist's professional and moral actions. 48% of the articles emphasised the audiologist's role in rehabilitation management with regard to hearing instrument dispensing. This finding is not surprising since this is the subject that creates most of the moral dilemmas in the professional lives of audiologists.*

*No article examined the patient's point of view. Although there is growth in the ethical knowledge over the years, the authors identified gaps in the current knowledge. Future studies in this area are crucial due to the close relationship between professional and ethical decision making.*

*The importance of this study lies in the question the authors raised: do we – audiologists from different countries, cultures, religious, organisations - have the ethical knowledge to guide us in our daily work with our patients? Our patients are similar and we are all facing the same dilemmas.*

*The more we know about our patients, our practice and the technology we are fitting, and how to combine it with moral sensitivity, judgment, motivation and courage, the better will be the care which we will be able to give our patients.*

*Since 20 out of 27 articles were found in "Seminars in Hearing", one can also raise the question about whether this is because this journal is more focused on ethical aspects, or if the authors didn't search in all the available publications on this topic.*

## Do Hearing Loss and Cognitive Function Modulate Benefit From Different Binaural Noise-Reduction Settings?

*Tobias Neher, Giso Grimm, Volker Hohmann,  
and Birger Kollmeier*

*Ear & Hearing; 35; e52–e62(2014).*



*There is little known on the interaction of hearing loss ↔ hearing aid algorithms ↔ cognitive skills.*

*Aim of the study was to explore whether the degree of hearing loss and/or cognitive function modulates benefit from and the preference for different binaural noise reduction settings.*

*Results, based on measures of speech intelligibility, listening effort and overall performance show that:-*

*→ The effect of different noise reduction settings interact with neither:-*

- Degree of hearing loss*
- Working memory capacity*

*→ Hearing aid users with poorer cognitive function prefer more aggressive noise reduction even at the expense of poorer speech intelligibility*

*Test setup:-*

*Forty elderly listeners (at least 60 years of age), with symmetrical sloping sensorineural hearing losses in the mild to severe range, participated (31 of 40 were habitual HA users).*

*The test population is stratified into four age-matched groups with mild or moderate pure-tone average hearing loss (PTA) and either larger or smaller working memory capacity.*

*The algorithm under consideration is a binaural coherence-based noise reduction scheme that suppresses reverberant signal components as well as diffuse background noise at mid to high frequencies. The strength of the applied processing was varied from inactive to strong, and testing was carried out across a range of fixed signal-to-noise ratios.*

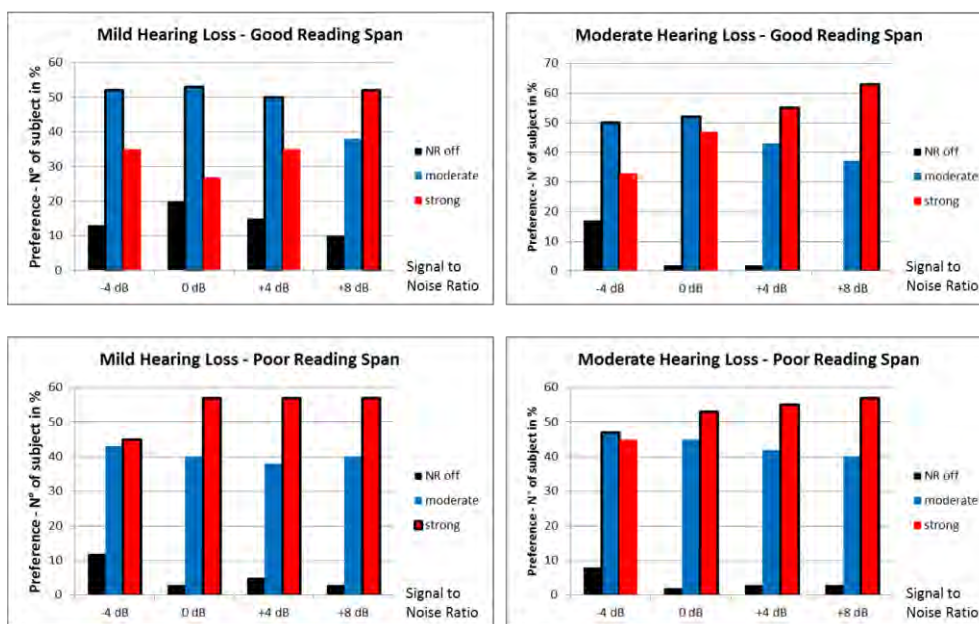
*All measurements were made using headphone simulations of a frontal speech target in a busy cafeteria.*

*Test results:*

*Analysis of the speech scores: for all groups, speech recognition was unaffected by moderate NR processing, whereas strong NR processing reduced intelligibility by about 5 %. Analysis of the VRT task scores (indexing listening effort), revealed a similar pattern. This is while moderate NR did not affect VRT performance; strong NR impaired the performance of all groups slightly).*

*Preference scores collapsed across SNR (-4, 0 and 4 dB) showed that all groups preferred some over no NR processing. Furthermore, the two groups with smaller WM capacity preferred strong over moderate NR processing. For the two groups with larger WM capacity, preference did not differ significantly between the moderate and strong settings.*

## Preference of Noise Reduction Level



### Clinical implications

*According to the authors, if this NR algorithm were to be applied in clinical practice, it would be important to find a setting that would minimise its adverse effects on speech recognition whilst at the same time maximising any other benefits such as greater listening comfort or ease of listening for the individual user.*

*Unfortunately they only focused on performance in a speech in noise or a visual task test – while noise reduction may have impact on other important communications aspects like listening fatigue (long term), concentration, ability to remember what has been communicated etc ...*



**Effects of Nonlinear Frequency Compression on Speech Identification in Children With Hearing Los.**



*Andrea Hillock-Dunn, Emily Buss, Nicole Duncan, Patricia A. Roush and Lori J. Leibold*

*Ear & Hearing; 35;353-365 (2014).*

*To analyse the influence of Nonlinear Frequency Compression (NLFC) on speech identification, the authors enrolled 17 children (experienced hearing aid users and accustomed to NLFC) to evaluate the impact of NLFC on consonant discrimination in quiet and spondee identification in complex competing noise compared to NLFC off. They also compared a new experimental “UWO – University of Western Ontario NLFC” fitting procedure to the default Phonak Sound Recover NLFC fitting procedure (Alexander 2009) with Phonak Naida V SP BTE hearing aids.*

*Overall there was no significant average group difference between the NLFC on and off condition – both for the speech in quiet and for the speech in background noise conditions. Intra-individual analysis suggests that children with higher degree of hearing loss in high frequencies are more likely to benefit from NLFC for spondee identification (children whose compression settings were more aggressive and whose increase in audible frequency bandwidth with NLFC on was greater).*

*Comparison between the two fitting methods didn’t highlight any general preference. A deeper analysis suggested that more aggressive compression ratios may ameliorate mid-frequency consonant discrimination but may also alter spondee identification in noisy environment in case of excessive compression ratio (UWO procedure)*

*Conclusions are that NLFC should be activated only in case of absolute necessity and that its fitting must be as moderate as possible regarding its capacity to affect speech cues discrimination in a complex noisy environment.*

*One can question why there was not a longer acclimatisation schedule in this study and why subjects were selected that performed so well on both speech in quiet and speech in noise tasks even when NLFC was not activated. On the other hand, they all had long term experience with Non Linear Frequency Compression. Since NLFC is available in more and more high end hearing aids – there is a need for well conducted evidence-based studies.*

## A Treatise on the Thresholds of Interoctave Frequencies: 1500, 3000, and 6000 Hz



Richard H. Wilson and Rachel McArdle

*J. Am. Acad. Audiol.*;25(2):171–186 (2014)

*In pure-tone audiometry, the frequencies – 1500 Hz, 3000 Hz and 6000 Hz are called intermediate frequencies or interoctaves. The boundary frequencies are 1000-2000 Hz, 2000-4000 Hz and 4000-8000 Hz. Usually, the 20 dB rule is used to find out if the thresholds at mid octaves need to be measured (test thresholds at intermediate frequencies when adjacent octave thresholds differ more than or equal to 20 dB).*

*The authors have done a thorough search for the basis of the 20 dB rule in the literature. They have noted that only recently, audiology text books have a mention of this rule. ANSI (2004) standard asked to apply the 20 dB rule for all intermediate frequencies whereas ASHA (2005) says the 20 dB rule is applicable for lower frequencies and the thresholds at 3000 Hz and 6000 Hz should be established.*

*This retrospective analytical study was conducted to examine the relations among thresholds at adjacent octave frequencies and validate the 20 dB rule to examine the intermediate frequencies. A similar and relevant clinical question to be answered with this retrospective analysis is whether interoctave thresholds can be predicted from the thresholds of the adjacent or bounding octave frequencies instead of measured, which would save the clinical audiologist valuable time during an audiometric exam.*

*More than a million audiograms from the VA database were studied using computerised analysis. Each ear audiogram was treated as a separate entity and the audiogram should have both interoctave and adjacent octave thresholds in order to be included in the study.*

1. *The mean thresholds for the left and right ears in the low-frequency range (250–1000 Hz) are within 0.5 dB, whereas in the higher frequencies the mean thresholds for the left ear are 1–2 dB higher (poorer) than the corresponding mean thresholds for the right ear.*
2. *The majority of the 1000–2000 Hz threshold differences were  $\geq 20$  dB, whereas the majority of the 4000–8000 Hz threshold differences  $< 20$  dB. The 2000–4000 Hz threshold differences were about equally divided about the 20 dB mark.*
3. *The negative slope (the lower frequency threshold minus the higher frequency threshold in each of the 3 pairs) was also studied. Where the negativity of the difference was highest at low frequency (1000-2000 Hz threshold difference) and the lowest at the high frequencies (4000-8000 Hz threshold difference).*
4. *The median of the boundary frequencies thresholds (estimated) was calculated and its difference with the actual interoctave frequency threshold (measured) was evaluated. At 1500 Hz in 9.5% audiograms the measured thresholds were different from the estimated ones. As the interoctave frequency increased from 1500 to 6000 Hz, this percentage increases to 28.2%.*
5. *Further analysis to check the 20 dB rule showed that, when thresholds at boundary frequencies differ by less than 20 dB, a simple mean of these thresholds can accurately predict the interoctave frequency threshold. When the difference was more than 25 dB, the predictability diminished, calling a need for actual measurement of the interoctave frequency threshold. Hence, the 20 dB rule holds good.*
6. *However, the data suggest that the rule can be revised to 25 dB with little or no effect on the accuracy of prediction of the interoctave frequency threshold.*

*This study has a huge database covering different types of audiograms and has very high accuracy of results. This article is the first to provide the historic evidence for the 20 dB rule, which is not commonly highlighted. The statistical methods are very effective and set an example of sorts to study a simple audiogram configuration. Finally, the article successfully established the science behind 20 dB rule, which is basic in our daily clinical functioning.*

**The characteristics of Audioscan and DPOAE measures in tinnitus patients with normal hearing thresholds.**



Zhao F. , Stephens S. D. G. , Ishak W. S. & Meyer-Bisch C.

*International Journal of Audiology* 2014; 53: 309–317.

The well-known statistics of tinnitus prevalence indicate that 10-17% of total population report experiencing tinnitus whereas only 2-7% of them seek some kind of medical help for the same. It is also reported that 10-15% population presenting at clinics with a tinnitus problem have normal hearing thresholds in a routine pure-tone audiometry evaluation.

Numerous studies have indicated abnormal (low amplitude) TEOAE/ DPOAE recordings in such subjects. These findings support Jastreboff's discordant theory which states that IHC/ OHC damage, however mild, can trigger tinnitus.

45 subjects (age range from 15-50 years, 21 of them had bilateral tinnitus) who complained of tinnitus and showed normal hearing thresholds were inducted into the study. Two tests of special focus were employed – Audioscan (sweep frequency testing in the predetermined frequency range at 64 frequencies per octave), because such smaller frequency steps can detect smaller notches in the audiogram which otherwise go undetected in octave audiometry. DPOAEs were recorded (f1 and f2 varied in 1/8 octave steps). Apart from a pitch matching test, routine octave audiometry was also done.

The Audioscan was an automatic test, a notch as an Audioscan result was defined as the frequency at which a drop of threshold by 15 dB or more is recorded. The deepest DPOAE notch was defined as the frequency at which the amplitude fell by less than -10 dB and that was compared with the Audioscan notch. Age –appropriate normative data in deciding the notches (both for Audioscan and DPOAE) was applied. Based on the tinnitus pitch matching, they were regrouped into low frequency (below 2000 Hz), mid frequency (2000-4000 Hz) and high frequency (above 4000 Hz). Following were the results:

1. 12 out of 45 subjects showed abnormal (compared to age and gender matched controls) Audioscan notches ranging from 250 to 8000 Hz. DPOAEs showed abnormal notches in 8 subjects.
2. The tinnitus frequencies (pitch matching) matched well with Audioscan notches at mid frequencies when compared to high frequencies. The correlation of the notches and pitch was low at low frequencies (attributed to variability in tinnitus pitch matching). Similar patterns in correlations were observed between DPOAE notches and tinnitus frequencies.
3. A significantly high positive correlation was seen between Audioscan notches and DPOAE notches in 500 to 4000 Hz frequency region, but not at higher frequencies (attributed to OHC function recording limitations at high frequencies).

The results did not indicate if DPOAE notches or Audioscan notches could be helpful in linking them with tinnitus at low and high frequencies. Authors attributed this to difficulties and variability in measuring tinnitus pitch and also indicated that tinnitus origin may vary with its pitch. It is also significant to note that abnormal Audioscan or DPOAE notches are more likely in tinnitus patients who show normal hearing.

The study had examined the long standing argument that a high resolution audiometry can demonstrate more evidence for the origin of tinnitus in subjects with normal hearing. The design of the study was simple and the subject numbers were high.

## Approaches to Tinnitus Management and Treatment

Marc Fagelson.

*Seminars in Hearing. 2014;35(2):92-104*



The article starts by mentioning the fact that none of the 14 Tinnitus Interventions mentioned in the Cochrane database prove to more effective than a placebo in an RCT design. The author classifies these interventions into Treatment procedures and Management strategies. Tinnitus treatment procedure must have an objective for substantial reduction or elimination of tinnitus sound. Tinnitus management targets the patient's reaction to tinnitus or their reaction to its presence.

### Tinnitus Treatments:

1. **Surgical Interventions:** Surgery could be the first choice of intervention in cases where tinnitus could be related to a specific pathological condition. Conditions such as dangerous vascular disorders or malformations; temporomandibular joint syndrome; Meniere's disease; chronic eardrum perforation; otosclerosis; severe to profound hearing loss (Cochlear Implant); chronic unresolving tinnitus (implanting pulse generating electrodes on the auditory cortex)
2. **Repetitive Magnetic Stimulation and Neuromodulation:** Changes of neural firing rates, cortical maps, neural synchrony and spectro-temporal mapping indicate the need for direct stimulation of the affected cortical areas. The procedures under this approach are transcranial direct current stimulation (tCDS) or rTMS (repetitive transcranial magnetic stimulation). These techniques have potential to ameliorate tinnitus. The parameters of stimulation are highly customised and needs careful administration.
3. **Pharmacological Intervention:** Though there is no evidence of better effect than a placebo, some drugs provide relief in specific conditions- Antidepressants in case of severe chronic tinnitus; Anticonvulsants for vascular origin tinnitus. Inconsistent positive effects were shown in systemic or intratympanic administration of steroid, vasodilators or antiviral drugs.
4. **Audiologic/ Sound-based Intervention:** Sound therapy agents that influence cortical reorganisation such as tinnitus maskers or enriched sound environments.

### Tinnitus Management:

1. **Audiologic/ Sound-based Intervention:** Enriched sounds can be used as a masker, relaxation agent or as an attention grabber under this approach. A simple masker, hearing aid with special characteristics (open fit and special program for picking up environmental sounds) can be used. Progressive Tinnitus Management (PTM) uses a combination of all the three types of sounds. Neuromonics Tinnitus Treatment (NTT) which used acoustic desensitisation methods based on patient-specific measures is a popular method under this approach.
2. **Neutraceuticals/ Supplements:** They address problems caused by tinnitus such as anxiety post-traumatic stress disorder and depression. Zinc, ginkgo biloba, antioxidants, and a few selected vitamins (A, C and E) can be used for this purpose.
3. **Counseling and Psych-based Interventions:** They provide relief from associated tinnitus problems and improve awareness of tinnitus. The most common approach is Cognitive Behavioral Therapy (CBT). Tinnitus Retraining Therapy (TRT) is also extensively based on this approach.

This article provides a comprehensive overview of tinnitus interventions under 2 categories - treatments and management approaches. The author provides the most recent references for each of these techniques. The entire responsibility for selecting a method is put on the therapist / physician. However, the author fails to provide level of evidence and quality of evidence for each of these approaches.



## *Tinnitus, Hyperacusis, and Misophonia Toolbox*



*Meltzer JB and Herzfeld M.*

*Seminars in Hearing. 2014; 35(2):121–130*

*Though tinnitus has for a long time been managed by several professionals, audiologists are best placed to help patients with Tinnitus. This article may be divided into 2 parts – One is a short but very useful review of the 6 Tinnitus Management Approaches currently practiced by audiologists, ranging from simple Sound Therapy to web-based Tinnitus Activities Treatment. The second part of the article focuses on helping the readers build their own Tinnitus Tools Box depending on the management approach they are familiar with. The Tinnitus Toolbox comprises:*

*Tinnitus Assessment Tools – Tinnitus Handicap Inventory/ Tinnitus Reaction Questionnaire/ Tinnitus Functional Index/ The Iowa Tinnitus Handicap Questionnaire*

*Sound Therapy Demo Tools – Depending on the Tinnitus Device that is recommended to a patient, the audiologist gives a demonstration of the sound from a Sound Library.. In many cases, this can precede the selection of device type*

*Wearable Tinnitus Device – PAXX/ Neuromonics/ Widex Zen Tones/ SoundCure Serenade*

*List of Websites for Tinnitus Education and Help – Appendix 1 of the article. SoundMixer from the ATA's website is a very good tool where a patient can pick the sounds and export them to a digital device*

*Tinnitus Distraction Tools – Stress balls etc.*



*Sound Mixer Software from [www.ata.org/sound](http://www.ata.org/sound)*

*The Hyperacusis Toolbox should comprise:*

*Wearable Sound Generator: PAXX/ SoundCure Serenade*

*Well reviewed study. It reminds that when dealing with tinnitus, a range of tools is essential for effective service delivery. The resources and references are up to date. However, the authors have not made recommendations from their own experience or available review studies. The information pertaining to Hyperacusis and Misophonia is limited in this article.*