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RANTS! Some Things We Would Change—If We Could

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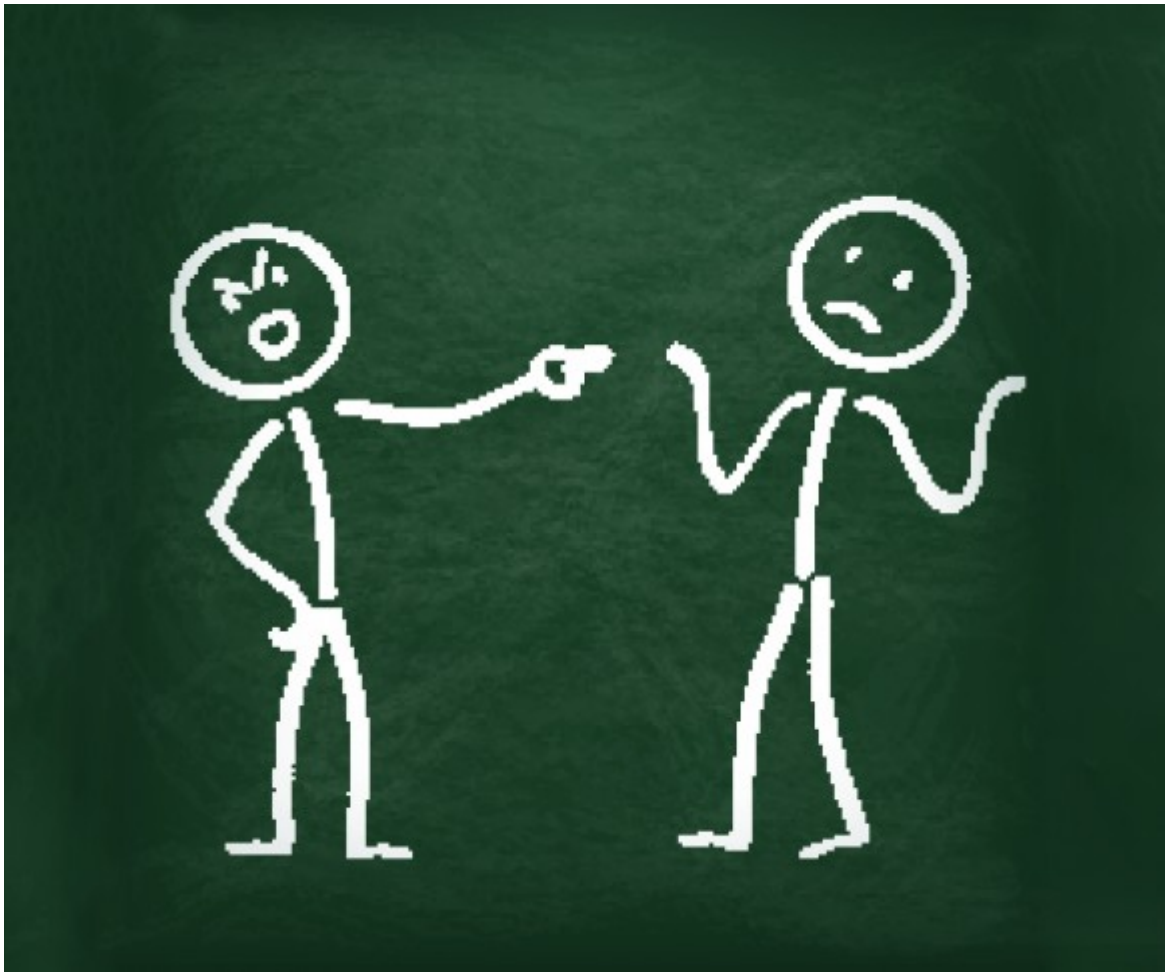
There are a lot of things that might be changed in hearing assessment, treatment, and hearing aid fittings. Here are some opinions from five long-time hearing care professionals who address some of their pet peeves…

Whether it's at a conference, in your clinic, or with any small group meetings of audiologists, the topic eventually moves towards "if you could, what would you change about some aspect of our profession?" This might be a clinical test, a statement by a manufacturer which is more "marketing" than "clinical research," or a way of explaining complex results to your clinical population.



I have asked a few colleagues in the industry and in the clinic to provide their thoughts (some may consider these as "rants") about what they would change if they could. These colleagues have been practicing long enough to see many changes in technology and professional service delivery and offer their perspective as to what we might change, if only we could.

Laurel Christensen is Chief Audiology Officer at ReSound and is a well-respected researcher, audiologist, and administrator at a large hearing aid manufacturer. Similarly, Douglas L. Beck has been with Oticon for the past 10 years as Director of Professional Relations and is among the most prolific authors in our profession. Calvin Staples and I are both clinical audiologists in private practice, having been at our craft for many decades. Finally, Wayne Staab, President of Dr. Wayne J. Staab & Associates, has been a prolific contributor to the hearing aid literature—as much to the clinic as to industry—over the past 43 years.
— Marshall Chasin, AuD

Frequency Lowering For All! Is There Evidence for this Practice in Adult Fittings?

By Laurel A. Christensen, PhD

The manufacturer default settings for a hearing aid fitting are not always the most appropriate settings for individual hearing aid users. Frequency lowering default settings are a good example, particularly since there has been an abundance of research interest in this area that can inform clinical practice. Frequency lowering moves high frequency information to lower frequencies. In commercial hearing aids, one of two techniques is used: frequency compression or frequency transposition. Frequency compression is the more common technique.

Frequency lowering can be turned on in the default settings of more than one hearing aid manufacturer's software. But what is the evidence that this is the best practice for most hearing aid fittings? Research in this area has been equivocal. For adults, numerous studies have demonstrated modest improvement in audibility of some high frequency speech sounds in limited experimental conditions for individuals with varying hearing loss severity.

However, there are two other details that are of vast importance in determining whether it is appropriate to use frequency lowering as a default. One is the high degree of individual variation that is commonly reported in research studies.[1-4] The second important consideration is that there is no consistency in findings on other outcomes than audibility of high frequency speech sounds, including speech recognition in quiet and noise, subjective measures, sound quality, and listener preferences. Additionally, the fitting procedures followed in research studies rarely follow the manufacturer's default settings for frequency lowering. Typically, the manufacturer's default prescribes a milder setting than what is used in research. This calls into question how research findings apply to real-world fittings, where settings often are not changed from the defaults.

Some evidence points to increasing benefit of frequency lowering for the best theoretical candidates, namely, those with severe high frequency losses.[3] Yet, even for these patients, the picture is not clear. For example, Cox et al[5] showed that even adults with measured dead regions benefitted from full bandwidth amplification without frequency lowering. In another study, Perreau, Benter, and Tyler[6] studied individuals fit bi-modally (a hearing aid on one ear and a cochlear implant on the other) and found no significant difference between the frequency-compression and conventional hearing aid for localization and consonant recognition. In fact, spondee-in-noise and vowel perception scores were significantly better with the conventional hearing aid compared to the frequency-compression hearing aid after 2 months of use. The authors concluded that speech perception may be negatively impacted by frequency compression because formant frequencies are too severely compressed and can't be distinguished. Other studies that tested subjects with severe-to-profound hearing loss have shown that some but not all will benefit from frequency compression.[4,7]

Given the high level of individual variation with frequency lowering, some researchers have turned their attention to identifying factors beyond audiometric thresholds that might predict outcomes with this technology. Cognitive functioning may be one such factor. Arehart and colleagues8showed that elderly patients with decreased cognitive function are more susceptible to the distortions caused by frequency lowering. Thus, these older adults may be poor candidates for frequency lowering.

Although continued research is needed to help guide clinical decisions in applying frequency lowering, it is apparent this technique is not for everyone. It should be considered as an alternative for those who demonstrate limited benefit from conventional amplification.

Two Thoughts: The Use of Speech-in-Noise Tests and Going Beyond the "Decibel"

By Douglas L. Beck, AuD

Speech-in-Noise tests: Clearly the primary complaint of the majority of people who seek our services is their inability to understand speech in noise. As such, we really need to objectively measure the ability of our patients to understand speech in noise. We simply cannot and should not

guess, and frankly, we are guessing when we tell people they're having trouble with speech in noise primarily due to their high frequency hearing loss.

There's much more to understanding speech in noise than simple bandwidth; importantly, the correlation between a given audiogram and speech-in-noise listening ability approaches zero. To understand speech in noise, the brain must compare and contrast sounds from the left and right ears (ie, interaural timing differences [ITDs] and interaural loudness differences [ILDs]), the brain must have an excellent signal-to-noise ratio, and of course, the person listening must have a good-to-excellent working memory and must be paying attention such that the brain knows where to attend. The bottom line is we should not and cannot guess at the depth of an individual's speech-in-noise problem. It requires measurement!

Imagine the relief the patient might feel if we actually replicated their most important problem (speech in noise) thus proving we understand it! Further, if we can replicate and measure it (we can!), I would argue we (the patient and the professional) should mutually agree the definition of an excellent hearing aid fitting (ie, the goal of the fitting) would be the provision of improved speech-in-noise performance—which we would objectively measure approximately 30 days after the fitting!

Moving beyond the decibel: We need to consider not using the word "decibel" while speaking with patients. The word "decibel" has little or no meaning to the majority of our patients. We should describe hearing loss in meaningful terms that resonate with the patient, such as percentage. Why not use the Speech Intelligibility Index (SII), the audibility index, or the articulation index (each are different, yet similar) to define what the percentage of conversational speech is perceived by the patient? In fact, why not use that same score (percentage) to set a goal for a hearing aid fitting?

For example, while using percentages, we could simplify the discussion to something like "Mr. Smith, you currently hear 52% of conversational speech sounds due to your hearing loss, and yes, that's a significant part of why you're having difficulty understanding speech-in-noise. With hearing aids, we can provide you 85% to 90% of speech sounds.* Would that be useful?" (*Never promise 100%.)

Assessment vs. Treatment

By Calvin Staples, MS

Why do you need a thorough assessment? Hearing healthcare has changed drastically in the past 5-10 years. Our patient population is aging and many of these older adults present with treatable hearing loss. Depending on the statistics you read and what age groups are considered, somewhere between 35% to 60% of this population presents with a hearing loss. Unlike their parents, these older adults have the luxury of new hearing aid technology that can enhance their ability to hear and help them in their more challenging environments.

However, the key to successful use of hearing aids is the front-end work (a thorough functional assessment), and then ensuring the hearing aids purchased are properly fit. The goal of an assessment cannot focus on the treatment, but should focus solely on understanding communication needs.

Each patient presents with their own story, their own hearing health and life challenges. At the time of the assessment, we as clinicians need to pause and listen to these stories in order to figure out what role we can play, if any. Patients, when it comes to hearing loss, take many weeks, to months, to years, to even consider hearing aids as a treatment source. I think it's our role as hearing healthcare clinicians to educate the patient first and foremost, then provide resources and tools to

help them understand and cope with their hearing/communication problem.

The assessment should be about patient education. Treatment may come into the discussion, but the goal and focus of the assessment should not be on treatment. As the owner of a clinic, I have made a conscious choice that we do not advertise products or really even services; I simply advertise good education around hearing healthcare. As a teacher at a local college, I routinely tell my students that the best clinician is the best educator, and if you know how something works, you might be able to help someone fix it. The hearing aid can only be part of the treatment plan when it comes to helping someone with hearing loss.

There are so many changes to the brain brought on by hearing or not hearing that we are just beginning to understand. Focusing solely on hearing aids is short-sighted. I think we need to focus on ongoing continuous care, using community resources, auditory training, and group work to help our patients receive not only a benefit, but to maximize the benefit of their hearing aids. And the best way to secure this benefit is by fully completing the foundational information (the assessment). To me, the situation can be compared to a house; it may be beautiful, but without a solid foundation, it is unsellable.

The goal of a hearing assessment is to evaluate and challenge the auditory system to ensure there are no health-related concerns, to establish communication needs through functional measures, to evaluate auditory processing delays; when it comes to children, to ensure there is adequate hearing for speech and language development and acknowledge the role healthy hearing plays in academic success and future vocational skills. Healthy hearing plays a vital role in quality of life; it can even impact socioeconomic status.

The hearing aid industry operates on a ~20% return for credit rate. This means for every 5 people who purchase hearing aids, 1 person returns their device. I cannot be certain, but I feel we can do a better job. I think we can ensure people feel engaged with their hearing aids, and expand their success. The key is to verify and validate hearing aid benefit, and the only way to know how to evaluate performance is if you know what you are comparing the success to: the assessment with the unaided benefit vs the aided benefit.

It could be that clinicians have had their focus in the wrong place. We need to focus on the whole patient, not simply the hearing (or hearing aid) portion. If we focused on the whole patient and his/her unique needs, perhaps the return for credit rate would be lower than 5%, if not closer to 1%. Hearing aids should be prescribed for those who are ready for hearing aids, and should include all the support and necessary tools to be successful.

Research suggests that most if not all patients will benefit with properly fit hearing aids and aural rehabilitation programs when following a best-practice protocol. It’s about understanding and addressing communication needs, and these needs must reflect the desired outcomes established during the assessment. Ultimately, it’s about what the patient wants when they walk through your office door.

Strengths and Weaknesses of the Pure-Tone Audiogram

By Marshall Chasin, AuD

Although there is nothing like a pure-tone audiogram to use as a picture to explain things, and perhaps to establish a first-fit setting in a hearing aid, that’s about where its usefulness stops. A measure of acuity is just that: a measure of acuity and not of function.

When comparing otoacoustic emission (OAE) results—a measure of function—with pure-tone results for an individual, we observe that changes will show up in the OAE results long before changes are observed on the pure-tone audiogram. The corollary of that is that, by the time we do see a pure-tone loss, a lot of cochlear damage has already occurred. If prevention of hearing loss is our cornerstone goal, then we need something more sensitive.

Saying to a client that their hearing is normal is an easy thing to say, and even an easier thing to show on a pure-tone audiogram, but that comment is based on simplistic, albeit accessible, data. When larger meta-studies are performed examining whether long term effects of certain types of exposure, or treatment philosophies, pure-tone results tend to give null results. An example of this may be whether long-term exposure to recreational music, such as from portable MP3 music players, is a problem. There may not be any measurable difference in pure-tone audiogram results, but it is known that there are more central changes in the auditory system as a result of this. Do we ignore the more complex but valid data and accept the more simplistic but easier to access data?

Test-retest reliability is an inherent aspect of any basic study. With pure-tone audiometry, each threshold—heard 50% of the time—has a test-retest reliability of 5 dB. A comparison between two tests at the same frequency, before and after a treatment, such as listening to loud noise or music, has a test-retest reliability of 7 dB. This expected distribution of a normal population is enough to swamp any meaningful results.

Pure-tone audiometry is a very gross, albeit practical, type of data. It is easy to explain and show to a client, but at the same time has questionable validity, and differences have questionable reliability.

Program the Aid…and Whatever You Hit is “the Target”

By Wayne J. Staab, PhD

What is the gain/response target of optimal hearing aid amplification? If there is an “optimal” fitting, it might logically be assumed that different hearing aids would provide the same amplification for identical audiograms. If not, then the assumption of “optimal” should be questioned.

Figure 1a shows a moderate hearing loss on the left, and the results of four different premium open-fit RIC hearing aids programmed to that loss (Figure 1b), based on the first-fit programming for a new hearing aid user. Even ignoring targets below 500 Hz and above 4,000 Hz, differences in the target gains vary from about 10 to 18 dB.

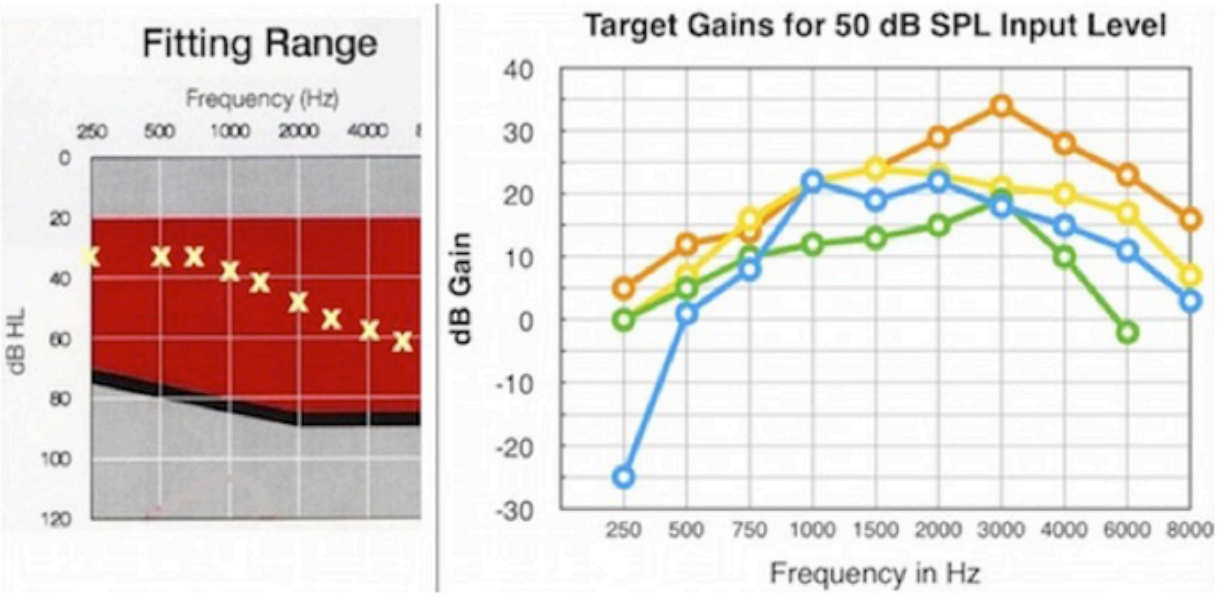


Figure 1a-b. Moderate sloping hearing loss (left) to which four premium RIC open-fit hearing aids were programmed (right). The responses to the right are the 2cc coupler responses for the quick fit for a new user as prescribed by the manufacturers' fitting software.

A logical assumption would seem that the first-fit would be the best recommendation from a manufacture, unless the goal is to provide a hearing aid that does not provide appropriate amplification. But, would anyone actually do this? That would be hard to imagine. It would seem desirable to provide the greatest user listening satisfaction from an initial fitting.

If all four hearing aid target gain responses are "optimal" (according to the manufacturer) for the moderate hearing loss shown, then those not agreeing must be less than optimal. So, which is correct? And by what/whose standards? It is illogical to believe that they are all optimal for the same loss and hearing aid style and ear coupling recommended, with the only difference being the company/model brand.

After all, if the differences are this great, then why not just throw a dart and let whatever it hits be the target?

The expected explanation for these target gain discrepancies is that these numbers are just a "starting point" in the fitting process. Still, these differences are a lot of "starting point" to overcome! Why does it appear that, with hearing aid programmed fittings, to hit the target, we shoot first and call whatever is hit "the target"?

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