Canadian Audiologist
The Official Publication of the Canadian Academy of Audiology

Beyond the Audiogram: Are We Missing Half the Picture?

Published April 8th, 2026

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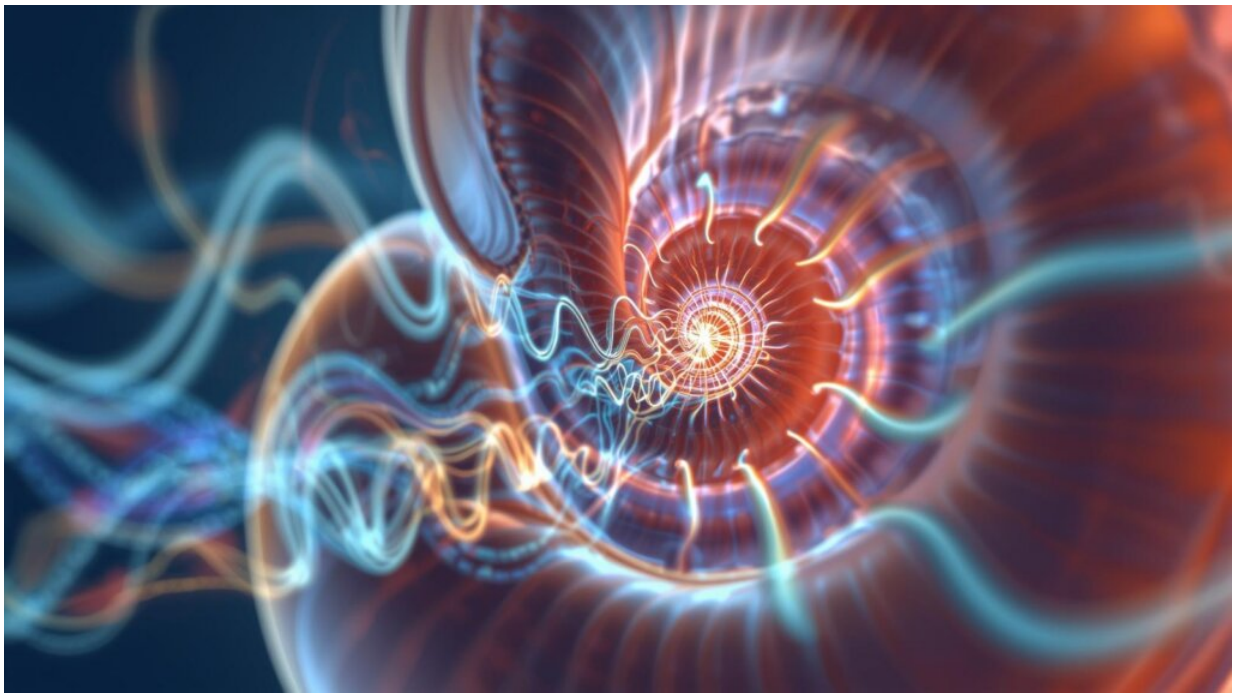

For many patients, the hearing test feels definitive. You sit in a sound booth, listen for a series of tones, and leave with a graph that seems to summarize your auditory health. If the results fall within normal limits, the conclusion is reassuring: “Your hearing is fine.”

But what if it isn’t?

Across clinics, audiologists are seeing more patients who describe very real listening difficulties - trouble hearing in noise, persistent tinnitus, sensitivity to sound, or a vague but persistent sense that something is off. Yet their audiograms often look unremarkable. In these moments, the issue may not be the patient’s hearing - it may rather be the limits of what we (their Audiologist) are measuring during a so-called comprehensive assessment.

The standard audiogram has long been the backbone of audiology. It is efficient, reliable, and essential. But it tells us only how well a patient detects sound within a relatively narrow frequency range, typically up to 8 kHz. Beyond that lies a significant portion of the cochlea—one that we rarely assess in routine clinical practice.

Which raises an uncomfortable question: **Why are we not testing extended high frequencies more routinely? Why are we ignoring half of the cochlea?**

The basal region of the cochlea, responsible for high-frequency hearing, is particularly vulnerable to early damage. Noise exposure, ototoxic medications, and age-related changes often affect these regions before conventional thresholds shift (Liberman & Kujawa, 2017; Mehrparvar et al., 2011). Patients may begin to experience tinnitus, difficulty hearing in noise, hidden hearing loss, or subtle distortions in sound quality, even when their standard audiogram remains within normal limits. In other words, early signs of dysfunction may be present; we are simply not measuring them.

Extended high-frequency audiometry can detect these early changes. Several studies have shown that individuals with normal conventional thresholds may exhibit deficits above 8 kHz, particularly following noise exposure or tinnitus (Mehrparvar et al., 2011; Monson et al., 2014). For some patients, these findings provide the first objective validation of their symptoms. Despite its clinical value, extended high-frequency testing remains underutilized.

Part of the hesitation may be practical. Time constraints, calibration challenges, and variability in normative data have all limited widespread adoption. But as our understanding of auditory disorders evolves, so too should our approach to assessment. If clinically relevant pathology extends beyond 8 kHz (as the literature suggests), then excluding this region from routine testing risks overlooking important diagnostic information.

Of course, extended high frequencies are only one part of a more comprehensive picture.

Even within the conventional frequency range, precision matters. Masked bone conduction, for example, remains critical for accurately distinguishing between the conductive and sensorineural components of hearing loss. Without appropriate masking, cross-hearing can obscure true thresholds, particularly in cases of asymmetry or mixed pathology (Hood, 1960). What appears to be a straightforward sensorineural loss may, with proper technique, reveal a more complex underlying condition.

Objective measures further expand our understanding. Otoacoustic emissions (OAEs) provide direct insight into outer hair cell function and are often sensitive to early cochlear changes that are not yet reflected in behavioural thresholds (Probst et al., 1991). It is not uncommon to observe reduced OAEs in patients with normal audiograms, suggesting subclinical damage that may contribute to difficulties in complex listening environments.

Acoustic reflex testing offers another valuable perspective. By assessing the integrity of the auditory pathway through the brainstem, reflex patterns can help identify neural involvement that may not be apparent on the audiogram alone. Abnormal reflex findings, particularly when inconsistent with behavioral results, may indicate retrocochlear pathology or disruptions in neural transmission (Jerger & Hayes, 1983).

When further clarification is needed, auditory brainstem response (ABR) testing allows us to examine neural timing and synchrony along the auditory pathway. ABR has long been recognized as a critical tool for identifying retrocochlear disorders and auditory neuropathy, particularly in cases where patient-reported symptoms exceed expectations based on behavioral testing (Hall, 2007). It bridges the gap between subjective experience and objective measurement.

Individually, each of these tests provides a piece of information. Together, they offer a far more complete understanding of auditory function.

For patients, this difference is meaningful. There is a profound shift between being told "everything looks normal" and being told, "we're seeing changes that help explain what you're experiencing." The latter validates their concerns and creates a pathway toward management. The former often leaves patients feeling dismissed.

As audiologists, we pride ourselves on precision. But precision is not only about how accurately we measure, but it is also about what we choose to measure. If we limit our assessments to a narrow slice of the auditory system, we risk missing dysfunction that lies just beyond our routine protocols.

So perhaps the question is not whether advanced testing is necessary in every case. Rather, the question is whether our current definition of "standard" is sufficient.

Because hearing does not stop at 8 kHz, the cochlea does not end where our audiogram does. And for many patients, the answers we are searching for exist just outside the boundaries we have grown accustomed to testing…Maybe it's time we started looking there.

References

1. Hall, J. W. (2007). *New handbook of auditory evoked responses*. Pearson.
2. Hood, J. D. (1960). The principles and practice of bone conduction audiometry. *Laryngoscope, 70*(9), 1211–1228.
3. Jerger, J., & Hayes, D. (1983). The cross-check principle in pediatric audiometry. *Archives of Otolaryngology, 109*(10), 684–689.
4. Kujawa, S. G., & Liberman, M. C. (2017). Translating animal models to human therapeutics in noise-induced and age-related hearing loss. *Hearing Research, 349*, 57–66.
5. Mehrparvar, A. H., Mirmohammadi, S. J., Davari, M. H., Mostaghaci, M., Mollasadeghi, A., Bahaloo, M., & Hashemi, S. H. (2011). Conventional audiometry, extended high-frequency audiometry, and DPOAE for early diagnosis of noise-induced hearing loss. *Iranian Red Crescent Medical Journal, 13*(6), 402–408.
6. Monson, B. B., Hunter, E. J., Lotto, A. J., & Story, B. H. (2014). The perceptual significance of high-frequency energy in the human voice. *Frontiers in Psychology, 5*, 587.
7. Probst, R., Lonsbury-Martin, B. L., & Martin, G. K. (1991). A review of otoacoustic emissions. *Journal of the Acoustical Society of America, 89*(5), 2027–2067.