

Clarissa Wentzel<sup>1</sup>, De Wet Swanepoel<sup>1,2,3</sup>, Faheema Mohamed-Asmail<sup>1</sup>, Vinaya Manchaiah<sup>1,2,3,4</sup>

1. Department of Speech-Language Pathology and Audiology, University of Pretoria, South Africa
2. Virtual Hearing Lab, Collaborative initiative between University of Colorado School of Medicine, Aurora, Colorado, USA, and University of Pretoria, Pretoria, South Africa
3. Department of Otolaryngology-Head and Neck Surgery, University of Colorado School of Medicine, Aurora, Colorado, USA
4. UCHHealth Hearing and Balance, University of Colorado Hospital, Aurora, Colorado, USA

## Introduction

For many adults newly fitted with hearing aids, the journey toward better hearing unfolds gradually. Beyond the initial fitting session, users often need time to adjust to amplified sound—a process known as *auditory acclimatization*. This phenomenon, defined as improved auditory performance over time following consistent hearing aid use, beyond what can be explained by task familiarity or formal training (Arlinger et al., 1996). While this process is considered key to long-term benefit, its nature and extent remain somewhat elusive in clinical practice.

A recent systematic review sought to clarify what clinicians can expect during this early phase of hearing aid use (Wentzel et al., 2025). By synthesizing evidence across 25 controlled studies, the review examined changes in speech recognition, self-reported benefit, and electrophysiological outcomes. Here, we explore the main findings to offer practical insights that audiologists can use to guide and support their patients during the initial weeks and months for first-time hearing aid users.

## Evidence of Acclimatization: What Do We Know?

### *Speech Recognition*

Among the studied outcomes, speech recognition—particularly in noise—showed the most consistent evidence of acclimatization. In 10 out of 18 studies included in the systematic review, new hearing aid users demonstrated measurable improvements over time. These gains were generally modest but clinically relevant, often amounting to a 2–3 dB improvement in signal-to-noise ratio or a few percentage points in word recognition. For instance, Munro and Lutman (2003) found significant gains in aided performance at higher intensity levels, with improvements of 1.0%, 2.6%, and 3.6% at 55, 62, and 69 dB SPL, respectively, while the non-aided ear showed consistent declines. Similarly, Wright and Gagné (2021) observed a meaningful 2dB improvement within just four weeks. Such improvements were less common in quiet environments, suggesting that the perceptual learning process may be more pronounced when listening demands are higher. Importantly, some studies suggested these changes may be confounded by practice effects. However, in a well-controlled study, Dawes et al. (2014) observed similar improvements in both new and experienced users, likely reflecting increased test familiarity rather than true acclimatization.

### ***Self-Reported Outcomes***

Patient-reported outcomes offered a more nuanced picture. Tools such as the Abbreviated Profile of Hearing Aid Benefit (APHAB), Hearing Handicap Inventory for Elderly (HHIE), and Glasgow Hearing Aid Benefit Profile (GHABP) consistently reflected improvements in listening ease and communication over time, especially when measured over several weeks or months. However, these changes were not universally observed.

Satisfaction-oriented instruments like the International Outcome Inventory for Hearing Aids (IOI-HA) and Satisfaction with Amplification in Dailey Life (SADL) were less sensitive to change, suggesting that users may experience functional benefit without necessarily feeling more satisfied or emotionally positive about their hearing aids.

This highlights the importance of using the right outcome measures at the right time—and recognizing that patients may perceive progress in some areas more readily than in others.

### ***Electrophysiological Measures***

Seven studies in the review assessed electrophysiological outcomes, including auditory brainstem responses (ABRs), cortical auditory evoked potentials (CAEPs), and late event-related potentials (ERPs), to explore neural adaptation associated with hearing aid use. Four reported increases in N1 and P2 amplitudes—indicators of neural plasticity that may reflect the auditory system’s adaptation to amplified sound. Karawani et al. (2022), for example, observed cortical changes as early as two weeks after fitting. In contrast, three studies found no significant changes in latency or amplitude over time. The inconsistency in electrophysiological findings may be attributed to differences in protocols, populations, or follow-up durations. While the data is promising, the current evidence base does not yet support using electrophysiological measures for routine monitoring of acclimatization.

Overall, current evidence indicates that some users experience acclimatization—particularly in speech-in-noise recognition and self-reported outcomes such as the APHAB, HHIE, and GHABP. However, these improvements are generally modest and inconsistent across studies, suggesting that acclimatization may play a role in the adjustment process but is unlikely to be the primary factor in hearing aid success. Therefore, post-fitting clinical support should extend beyond perceptual learning to address broader challenges, such as hearing aid handling and daily use.

## **Why Does Acclimatization Vary Across Users?**

Not all new hearing aid users experience noticeable improvements. This variability reflects both individual differences and how acclimatization is understood. Dawes and Munro (2017) suggested that gaps between clinical experience and research findings may stem from outdated ideas about acclimatization. Variations in outcome measures—whether speech tests, questionnaires, or electrophysiological responses—as well as differences in testing protocols, device settings, and usage patterns, add to the inconsistency. Other factors also play a role. Age, degree of hearing loss, and practice effects can influence results (Palmer et al., 1998). Methodological differences, such as small sample sizes, short follow-ups, and the type of control groups, may further blur true acclimatization effects. In some cases, improvements may simply reflect increased test familiarity rather than real perceptual change. Together, these complexities highlight why clinicians should expect wide variability in acclimatization outcomes—and why personalized follow-up and support are essential for each patient.

## **How Long Does Acclimatization Take?**

Most studies indicate that the first 3 to 12 weeks of hearing aid use represent a critical window for perceptual learning and adjustment. During this time, meaningful improvements—particularly in speech recognition in noise—often begin to emerge, sometimes within the first month. Self-reported outcomes may continue to improve beyond this initial period, especially when users wear their devices consistently and receive appropriate support. For clinicians, this timeframe provides a key opportunity to monitor progress, identify challenges, and fine-tune treatment plans through counselling and exposure to real-life listening situations. Capturing early baseline measurements is essential for accurately tracking acclimatization

## **What Factors Influence Acclimatization?**

Consistent daily use emerged as a key facilitator of acclimatization. Users who wore their hearing aids for more than four hours a day were more likely to show improvements across outcomes. The degree of hearing loss also appeared to play a role, with greater severity sometimes linked to more noticeable change. In contrast, age and cognitive status were not reliably associated with acclimatization outcomes. Similarly, variations in stimulus type or test format—such as word versus sentence materials—did not consistently influence whether acclimatization was detected.

Interestingly, studies comparing new users to non-users showed more evidence of acclimatization than those comparing new to experienced users. This suggests that the choice of control group could affect how strongly acclimatization effects appear. This may also be due in part to ceiling effects among experienced users or differences in baseline listening expectations.

## Clinical Implications

Although acclimatization does not occur uniformly across all users or measures, the evidence supports its relevance in clinical care—particularly in the first few months post-fitting. Improvements may be modest, but they are meaningful for users in everyday communication and quality of life. Clinicians should encourage regular hearing aid use early on, ideally through structured follow-up within the first 3–6 weeks. While not all users will report dramatic changes, subtle improvements in speech-in-noise understanding or communication ease should be acknowledged and reinforced. Promoting realistic expectations about the pace and extent of change can help prevent discouragement and promote continued use. Supplementing speech recognition tests with self-report tools such as the APHAB or HHIE can provide a broader view of progress, particularly for users whose objective gains may be minimal. These tools can also serve as valuable conversation starters about specific listening challenges or goals. Table 1 provides some clinical implications with regard to auditory acclimatization.

**Table 1. Clinical implications of auditory acclimatization across different outcome domains**

<b>Outcome Domain</b>	<b>Acclimatization Observed</b>	<b>Clinical Implication</b>
Speech recognition in noise	Consistent improvement	Reinforces early use; monitor progress at 3-6 week follow-up sessions
Speech recognition in quiet	Inconsistent evidence	Less reliable for detecting change; use with caution
Self-reported measures	Variable but often positive changes	Select responsive tools; use to track functional benefit (e.g. APHAB, HHIE GHABP)
Electrophysiological measures	Some cortical changes reported	Suggests plasticity; not yet ready for routine clinical application

## Conclusion

Auditory acclimatization represents an important part of the adjustment process for new hearing aid users. Highly individualized, acclimatization is most evident in outcomes such as speech recognition in noise and certain self-report questionnaires, though overall effects remain variable across studies. Given this variability, acclimatization may support but is unlikely to drive successful outcomes on its own. Rather than relying solely on this process, clinicians can play a central role in facilitating adjustment through proactive counselling, tailored education, and consistent follow-up focused on early use, device handling, and stigma reduction (See table 2). By doing so, they help patients not just adapt to amplification but to achieve lasting and meaningful communication improvements.

**Table 2. Key points clinicians should know when supporting new hearing aid users.**

<b>Clinical Focus</b>	<b>Key Points</b>
Adjustment Takes Time	Patients need support and realistic expectations as they adjust to amplified sound.
Evidence of Improvement	Modest but meaningful gains, especially in speech-in-noise performance, are typical with consistent use.
Variability Across Users	Outcomes differ based on individual factors and study methods—expect diverse progress.
Timing of Changes	The first 3–12 weeks post-fitting are critical for perceptual learning and adjustment.
Factors That Matter Most	Daily hearing aid use drives success more than age or cognition
Clinician Role in Success	Early counseling, consistent follow-up, and tracking functional gains to maximize outcomes.

## References

- Arlinger, S., Gatehouse, S., Bentler, R., Byrne, D., Cox, R., Dirks, D., Humes, L., Neuman, A., Ponton, C., & Robinson, K. (1996). Report of the Eriksholm Workshop on auditory deprivation and acclimatization. *Ear and Hearing, 17*(3), 87S.
- Dawes, P., Munro, K. J., Kalluri, S., & Edwards, B. (2014). Acclimatization to hearing aids. *Ear and Hearing, 35*(2), 203-212. <https://dx.doi.org/10.1097/AUD.0b013e3182a8eda4>
- Dawes, P., & Munro, K. J. (2017). Auditory distraction and acclimatization to hearing aids. *Ear and hearing, 38*(2), 174-183.
- Karawani, H., Jenkins, K., & Anderson, S. (2022). Neural Plasticity Induced by Hearing Aid Use. *Frontiers in Aging Neuroscience, 14*, 1-12. <https://dx.doi.org/10.3389/fnagi.2022.884917>
- Munro, K. J., & Lutman, M. E. (2003). The effect of speech presentation level on measurement of auditory acclimatization to amplified speech. *The Journal of the Acoustical Society of America, 114*(1), 484-495. <https://dx.doi.org/10.1121/1.1577556>
- Palmer, C. V., Nelson, C. T., & Lindley IV, G. A. (1998). The functionally and physiologically plastic adult auditory system. *The Journal of the Acoustical Society of America, 103*(4), 1705-1721.
- Wentzel, C., Swanepoel, D. W., Mahomed-Asmail, F., Beukes, E., Dawes, P., Munro, K., Almufarrij, I., & Manchaiah, V. (2025). Auditory acclimatization in new adult hearing aid users: A registered systematic review of magnitude, key variables, and clinical relevance. *Journal of Speech, Language, and Hearing Research, In Press*.
- Wright, D., & Gagné, J. P. (2021). Acclimatization to hearing aids by older adults. *Ear and Hearing, 42*(1), 193-205. <https://dx.doi.org/10.1097/AUD.0000000000000913>