THE SUPERIOR SOUND QUALITY OF WIDEX ALLURE

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The foundation of Widex' commitment to optimal sound quality is research showing that sound quality is central to a positive hearing aid experience, with effects of sound quality also on users' mood and well-being. This paper explains the key design choices that support the Widex sound quality and reports two studies demonstrating the superiority of the Widex Allure sound quality over other hearing aids on the market. A sound quality preference was observed for more than 80% of participants in both studies. With significant advances also in fitting, feedback management, speech intelligibility, and noise reduction, Widex Allure represents a comprehensive hearing aid solution that covers listening needs across real-life situations.

Key findings

- The sound quality of Widex Allure was preferred by 86% of participants in Study 1.
- In Study 2, 84% of participants preferred the sound quality of Widex Allure, despite all participants being regular wearers of other brands and thus habituated to processing schemes that differ substantially from Widex.

The new Widex Allure hearing aids represent a significant technological advance with improvements in a range of areas, including fitting, noise reduction (Balling, Vormann, & Mansour, 2025; Herrlin et al., 2025), speech intelligibility (Weber & Branda, 2025), and feedback management (Balling, Vormann, Rose, and Hau, 2025). At the same time, Widex' dedication to creating the best possible sound quality for its users remains constant.

This unwavering dedication to sound quality informs all stages of Widex hearing aid development. For Allure, it starts with the W1 chip, which represents a significant step forward in terms of processing speed and efficiency. This chip implements many processing algorithms, but at the heart of it all is the choice of analysis filter bank, which is fundamental to all signal processing. In contrast to other major manufacturers, Widex hearing aids operate with a time-domain filter bank, which allows the analysis bands in the hearing aids to mimic the logarithmic cochlear filters in the human ear. This enables the lowest signal processing delay in the hearing aid industry, thereby avoiding artefacts associated with longer processing delays (Balling et al., 2022). Other design choices that are fundamental to sound quality are the high sampling rate, which enables a wide frequency bandwidth, and the wide input dynamic range. All these signal processing choices are essential to delivering a natural hearing experience across situations.

Key technologies supporting superior sound quality in allure

- W1 chip with time-domain filter bank
- Industry-leading signal processing delay
- 33.1 kHz sampling rate
- TruInput technology with linear dynamic input in the range from 5 to 113 dB SPL.
- Dynamic Feedback Controller applying frequency shift only when necessary.
- TruAcoustics: using the acoustic calibration during fitting to adjust settings to the venting and resonances of the specific coupling in the specific ear.

On top of the signal processing choices, the hearing aid fitting is of course critical. Here, the Widex design principle of tailoring the sound to the user is implemented both in Allure's TruAcoustics, which adjusts gain to the ear anatomy and coupling of the individual user, and in the Speech Enhancer Pro, which adjusts the noise reduction to the hearing loss of the user.

Crucially, sound quality is not in focus to cater to a niche of experts. Rather, this Widex focus is justified by several research findings. One such is the fact that 94% of respondents in a large-scale survey of hearing aid users indicate that sound quality is important or very important to them (Ziegler et al., 2024). This importance is likely driven not only by the sound quality in and of itself, but also by the benefits that a natural hearing experience confers in terms of users being able to live their lives without being distracted by the unpleasantness of artificial sound quality.

Clinical implications

Sound quality is important to a large majority of hearing aid wearers and has effects on mood and well-being.
The superior sound quality of Widex Allure gives patients a great starting point for a positive hearing aid experience.

Further motivation for prioritizing the sound quality of hearing aids comes from Lelic, Picou, et al. (2024), who report how sounds of nature are among the most important "rediscoveries" made by new hearing aid users. The sounds of nature thus contribute to positive experiences with wearing hearing aids, and we know that focusing on such positive experiences in turn improves hearing aid outcomes in both new and experienced users (Lelic, Herrlin, et al., 2024; Lelic, Parker, et al., 2024) and even results in improved speech-in-noise performance (Lelic, Nielsen, et al., 2024). A high-quality representation of such sounds is the first step towards positive experiences with hearing aids and may additionally enable hearing aid users to experience a whole range of benefits from experiencing natural soundscapes, including less pain, lower stress, enhanced mood, and improved cognitive performance (Buxton et al., 2021).

Another highly relevant avenue of research is the work by Picou and colleagues (Branscome et al., 2025; Picou et al., 2025) showing how individually preferred sound quality is correlated with higher ratings of mood and well-being. This research provides strong support for sound quality as a hearing aid attribute with important implications for the quality of life of hearing aid users.

Summing up, sound quality is important or even crucial for user success with hearing aids, which is the reason behind the long and consistent Widex commitment to providing the best possible hearing aid sound quality. The Allure hearing aid platform is a new platform but remains rooted in this Widex commitment to sound quality. This paper reports two studies that were conducted in order to ensure a consistently preferred sound quality, comparing the sound quality of the Allure devices to other major hearing aid brands, and making sure that new advanced features on the platform never compromise sound quality.

Method

The two studies reported in this paper used the same method to study hearing aid wearers' evaluations of sound quality at two different sites. Study 1 ran at Widex headquarters in Lynge, Denmark, and Study 2 at Hörzentrum Oldenburg gGmbH in Oldenburg, Germany. Both studies were based on recordings of sound samples with different hearing aids to enable direct and systematic pairwise comparisons of the sound quality of different hearing aid brands. The results of Study 2 are also reported by Balling, Vormann, Rose, and Hau (2025).

Sound samples

The studies focused on music samples because music allows systematic assessment of sound quality. This does not mean that the sound quality benefits are limited to music (see Balling et al., forthcoming). The music samples used in the study represented different genres, with a jazz trumpet extract (15 seconds), a classical violin extract (15 seconds), and a rhythmic piano extract (16.1 seconds).

Hearing aids

The hearing aids included in the study were the new Widex Allure RIC (ARRD1) compared to premium devices from four other major hearing aid manufacturers. All hearing aids were fitted using M-receivers and open couplings. The hearing aids were programmed to an N3 hearing loss (Bisgaard et al., 2010), using the proprietary fitting rationale and default fitting for each manufacturer, with no fine-tuning or adjustment of features but running a feedback test/acoustic calibration for all fittings.

Recordings

Recordings were made in a sound-attenuating room with the hearing aids fitted to a Head-and-Torso Simulator (HATS) Type 5128 from Brüel & Kjær with ear-simulator Type 4620. The music samples were played back from a loudspeaker in front of the HATS and recorded using the HATS ear canal microphone. The recordings were post-processed to eliminate the ear canal resonance of the HATS using a free-field-to-eardrum function, to avoid doubling the ear canal resonance when participants listened over headphones. In addition, all recordings for a given sample were broadband normalized to have the same RMS value, to enable a systematic comparison of signal processing effects that would not be driven by differences in loudness.

Participants

Both studies used the same inclusion criteria, requiring participants to be experienced hearing aid users (> 6 months of mostly full-time wear) and have a symmetrical sensorineural hearing loss, with no fluctuations, active ear disease, or other complex hearing conditions.

In study 1, 14 individuals with hearing loss participated. They were three females and 11 males, aged between 61 and 96 (mean 78 years). Their hearing loss fell within a range from an N2 (Bisgaard et al., 2010) hearing loss to 10 dB above an N3 hearing loss.

In study 2, 25 individuals participated. They were 14 females and 11 males, aged between 59 and 87 years (mean 75 years). This study operated with a slightly tighter hearing loss range of N3 +/- 10 dB, to match the N3 recordings used, with a deviation allowed of up to 10 dB at one frequency per ear. The participants of Study 2 also took part in the studies reported in Balling, Vormann, Rose, & Hau (2025) and Balling, Vormann, & Mansour (2025).

Procedure

In both studies, participants listened to the recordings over headphones (Study 1: beyerdynamic DT770, Study 2: Sennheiser HD600). After signing the relevant consent forms, participants adjusted the volume to a comfortable listening level and proceeded to a brief training on pairwise comparisons of sound samples. Study 1 was run using Senselab Online™, while Study 2 was run using a Matlab-based interface specifically created for pairwise comparisons.

Both studies involved comparisons for all three music samples between the Widex Allure recording and recordings of each of the four other hearing brands, for a total of 12 comparisons. For each comparison, the participant listened to two samples, A and B, and evaluated the sound quality on a scale from +3 (Study 1: "A is much better than B", Study 2: "Strongly prefer A") to -3 (Study 1: "B is much better than A", Study 2: "Strongly prefer B"), with 0 indicating that the two options were judged as equal, in the relevant languages (Danish for Study 1 and German for Study 2). Which brand was assigned to A and B was randomized, as was the order of brands for a given sample. The music samples were blocked so that all recordings of one music sample appeared together; these blocks appeared in a random order. The music ran continuously in a loop with participants switching between A and B as many times as they liked, though in Study 2 a minimum of three switches was required before participants could indicate their preference. The experiment was self-paced, and the participants completed this part of the study in 10-15 minutes.

Statistical analysis

The statistical analysis of the results was done in R version 4.3.3 (R Core Team, 2024), using Wilcoxon signed-rank tests to compare the observed mean ratings in the pairwise comparisons to the no-difference value of 0. This was done across conditions as well as separately for the different hearing aids. Because the hypotheses were one-tailed, testing whether Widex Allure was preferred over the other recordings, one-tailed statistical tests were used to accept or reject the hypotheses. Linear mixed-effects regression models (Bates et al., 2015; Kuznetsova et al., 2017) with rating as the dependent variable, music sample and HA manufacturer as fixed factors, and participant as a random factor were used to investigate whether there were differences in the degree of preference between the different manufacturers.

Results

The ratings show a significant preference for Widex Allure in both studies (Study 1: V = 102, p = 0.001; Study 2: V = 279.5, p = 0.0001). Figure 1 illustrates the mean preference per participant across all comparisons, showing that for Study 1 (left), 86% of participants had an average preference for Widex Allure, with the corresponding number in Study 2 (right) being 84%. Interestingly, the sound quality preference for Widex Allure is approximately the same in Study 1, where ten out of 14 participants wore Widex devices in their daily lives, as in Study 2, where none of the participants were Widex wearers. Participants' own hearing aids are important because sound quality preference could be expected to align with the brand that listeners are used to, but the current results show that the Widex Allure sound overrules the force of habit to create a preference that seems to be independent of current hearing aid.

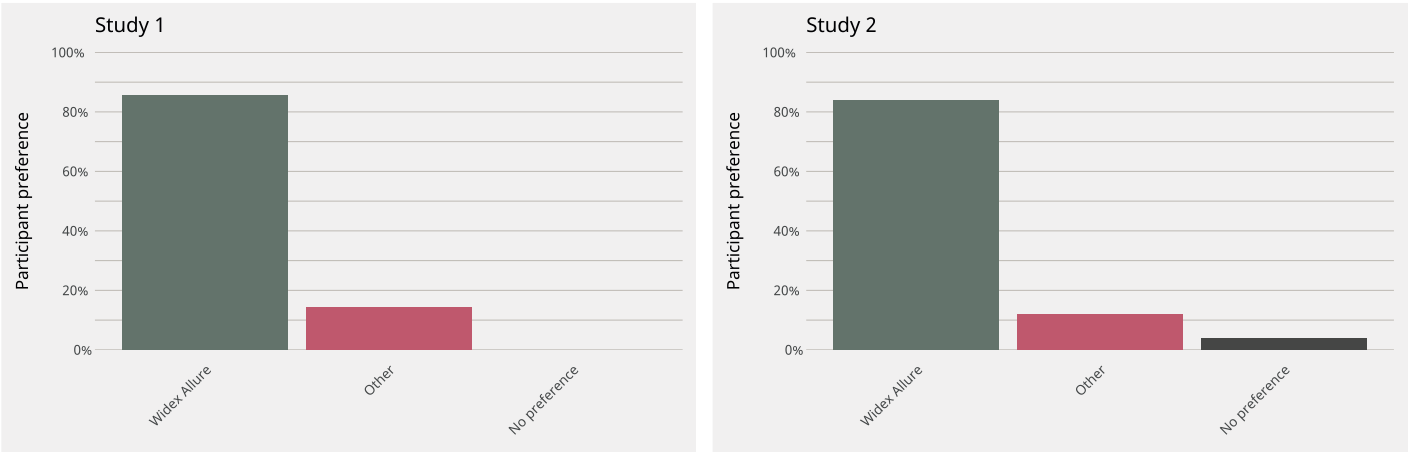

Figure 1: *Participants categorized by their mean preference across all comparisons. The figure shows a significant preference for Widex Allure in both studies, with 86% of participants in Study 1 and 84% of participants in Study 2 demonstrating a preference for Widex Allure.*

In addition to the overall results shown in Figure 1, it is also interesting to consider how the sound quality preference for Widex Allure differs between brands. For both studies, the linear mixed-effects models used to investigate this indicated a significant effect of hearing aid brand – in other words, the degree of preference for Widex Allure varies depending on the hearing aid that it is compared to. However, although the degree of preference differs, there is a significant preference for Widex Allure against all four other hearing aids in Study 1, and against three out of four other hearing aids in Study 2, with no significant difference to the fourth hearing aid. The ratings divided by brand are illustrated in Figure 2.

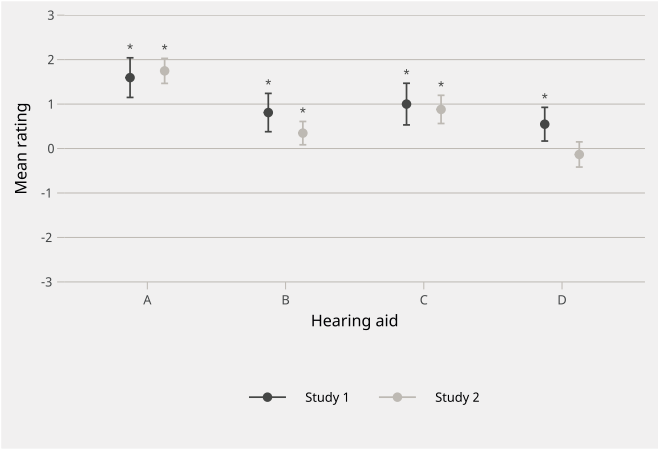

Figure 2: *Mean preference rating of the Widex Allure hearing aids against each of the other hearing aids in the study, for Study 1 (dark bars) and Study 2 (light bars). Asterisks are used to mark significantly higher ratings for Widex Allure within the individual study.*

Sound quality and feedback management

The studies reported were run in order to investigate the sound quality of Widex Allure platform broadly, but the results are also more specifically relevant for a major innovation on the platform, namely its intelligent new feedback management system, the Dynamic Feedback Controller. Feedback management is especially important to consider because it is closely related to sound quality. The problem of managing acoustic feedback can be mostly solved using frequency shifting whereby the amplified signal is shifted by a given small frequency difference, e.g. between 10 and 20 Hz. This means that the original and amplified signals are decorrelated, allowing the feedback management system to adapt its model of the feedback path and cancel feedback efficiently. Frequency shifting is used across the board in the hearing aid industry, but the cost of this way of handling feedback is often significant sound quality distortions, because the mixing of the frequency-shifted amplified sound with the non-shifted direct signal creates a warbling effect that distorts the sound. Therefore, on Widex Allure, frequency shifting is restricted in three main ways (see details in Balling, Vormann, Rose, and Hau, 2025) to preserve the sound quality:

- Limited to a specific frequency range
- Tailored to the individual's specific combination of hearing loss and openness of fitting
- Dynamic depending on the acoustical stability of the hearing aid at any given point in time.

There are clear theoretical reasons why these restrictions would serve to safeguard sound quality, but of course it remains important to test empirically. The sound quality ratings for music in the current study confirm that the improved feedback management on Widex Allure (shown by Balling, Vormann, Rose, and Hau, 2025) is achieved while maintaining superior sound quality.

At the same time, a range of other signal processing choices are likely contributors to the significant preference for Widex Allure. These include at the most fundamental level the time-domain filter bank and low signal processing delay of Widex hearing devices, but also aspects like high sampling rate, large input dynamic range, slow compression, and more.

Perspectives and clinical implications

The findings of the studies reported here clearly support a systematic sound quality advantage for Widex Allure over the hearing aids of other main manufacturers. This has important clinical implications because we know, as discussed in more detail above, that sound quality is important to the overwhelming majority of hearing aid users, and that it may enable a whole range of positive experiences that in turn improve hearing aid outcome. Interestingly, the preference for Allure is observed both for listeners who are already used to Widex hearing aids and signal processing and for listeners who are used to the sound of competitor devices. A minor, but interesting point about the results is the large age range of the participants, especially in Study 1, where the oldest participant was 96 years old. This shows that the differences tested are audible to a participant sample that matches the age range of a wide population of hearing aid users.

Combined with improvements in key areas such as noise reduction, speech intelligibility, and feedback management, the sound quality advantage makes Widex Allure the obvious choice for the large majority of users that care about sound quality, equipping them with a hearing aid that combines improved performance with superior quality and helping them live their lives without having to worry about their hearing loss.

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