Phonak Insight

Love at first sound: the new Phonak precalculation

In order to address the important requirement of both comfort at first fitting and speech understanding, the Adaptive Phonak Digital (APD) precalculation has been enhanced. Two studies carried out at the Hörzentrum Oldenburg, Germany, showed that the enhanced precalculation for first-time users delivers a great first fit acceptance by improving comfort and reducing complaints of shrillness, whilst maintaining excellent speech intelligibility in quiet and noise. Audéo Marvel™ hearing aids deliver the highest first fit acceptance for first time users ever developed by Phonak.

Sofie Jansen and Jane Woodward / July 2018

The challenge of first fit acceptance

Hearing aid adoption rates, particularly for people with mild to moderate hearing losses, have increased over the last 9 years. Despite this, data continues to show that clients with confirmed hearing losses can wait 3 years or more between first noticing their hearing loss and purchasing hearing aids (EuroTrak UK, 2015). The first fit is critical in the adoption of hearing aids as it is the client's first encounter with amplification. The success of a first fitting depends on a number of variables ranging from cosmetics, comfort, sound quality, listening effort and real-life experiences. Specific to sound quality, clients can find it difficult to accept gain in the high frequency range, particularly for those with high frequency hearing loss, as they are no longer accustomed to hearing these sounds. Such sounds can be judged as 'too shrill' or 'tinny' at first fit. At the same time, clients need adequate gain in the high frequencies in order to compensate for their hearing loss and achieve good speech understanding in both quiet

and noisy environments. It is important to provide a comfortable sound quality during the first fit to enable high acceptance of amplification whilst also providing excellent speech understanding. For hearing care professionals it is important that clients leave their office motivated to adapt to amplification, and willing to wear their instruments throughout their day. Indeed, hearing aid satisfaction has been found to positively correlate with duration of use (Kozlowski et al., 2017).

Important findings from a benchmark study

A benchmark study carried out in the Hörzentrum Oldenburg, Germany, between December 2017 and March 2018, compared client first fit acceptance and speech intelligibility using Phonak Audéo B90-312 hearing aids and a competitor's product. Twenty first-time users with mild to moderate hearing losses were recruited, and hearing aids were fitted using the fitting software default settings of each manufacturer. Several important findings were highlighted. There were more initial complaints of 'shrillness' at the first fitting with Audéo B90-312 hearing aids than with the competitor device. Audéo B provided 5-8 dB more gain in frequencies above 3 kHz compared to the competitor hearing aids. However, after a guided trip to a noisy shopping mall during the first appointment, followed by a 2 week home trial, Audéo B was preferred. This may be due to Audéo B's unique features, including StereoZoom and adaptive SoundRecover2. Speech tests showed no significant differences in speech understanding between the two aids. These results suggest that both comfort at first fit and speech intelligibility in complex listening environments in the real world are important for new clients. Thus the success of an initial fitting depends on more than the quiet environment of the HCP's office. So how can HCPs provide great first fit acceptance, together with outstanding speech understanding in the complex and dynamic listening environments that make up everyday life? The answer is the enhanced Adaptive Phonak Digital (APD) precalculation for new hearing aid users.

The enhanced Adaptive Phonak Digital precalculation for initial fittings

Dating back to 2000, APD is a fitting formula developed by Phonak for an optimal fitting of the comprehensive hearing aid portfolio. It is a prescription rule which maps hearing impaired loudness functions into normal hearing loudness functions. APD is based on 16'889 loudness assessments on 290 subjects (Latzel et al., 2013). It has been continuously improved for the highest initial acceptance based on market feedback studies and competitor analysis (Biggins et al., 2016). APD takes into account, among other factors, the wide array of hearing loss configurations; the measurement transducer; the age of the client; Uncomfortable Loudness Level (UCL); and the entered acoustic parameters. APD can also be verified in an external test box using Phonak TargetMatch. APD offers an optimal starting point for the fitting process, and any fine tuning can be based on the client's needs. Within APD there are 3 optimized gain levels for: (1) 80% of target gain for first time users (0-3 months experience); (2) 90% for experienced users (3-12 months experience) and (3) 100% for Long Term User (12+ months experience). The enhanced APD precalculation, relaxes the high-frequency range above 3 kHz for first time users in order to reduce reported shrillness, whilst maintaining excellent speech understanding. The new APD precalculation

can be accessed by the fitter by selecting [First time user] at the initial fit within the Phonak Target software. This is the suggested setting, if an initial fitting is created. The dedicated precalculation addresses the sensitivities of first time users who are often no longer accustomed to hearing the high frequency sounds which are necessary to compensate for their hearing loss. The precalculation for experienced and long term users, as well as other recognized prescription formulae such as DSL and NAL, have remained unchanged.

Research evidence examining the enhanced precalculation from Phonak

Following the benchmark study discussed above, a second study was carried out at the Hörzentrum Oldenburg in April 2018, and examined the new precalculation in comparison to the original. Twenty first time users with mild to moderate hearing loss aged between 61 and 80 years, were fitted with the enhanced APD precalculation for new users using the Phonak Target software defaults without fine tuning. Spontaneous comments were noted for loudness, shrillness, naturalness of own voice, listening effort and subjective speech understanding in the fitter's office and in a shopping mall. Speech intelligibility tests were also carried out. The results support the aim of increasing first fit satisfaction whilst maintaining excellent speech intelligibility. Specifically, shrillness of the fitter's voice significantly improved ($p=< 0.05$) within the fitter's office, highlighting improved first acceptance by new users (Figure 1).

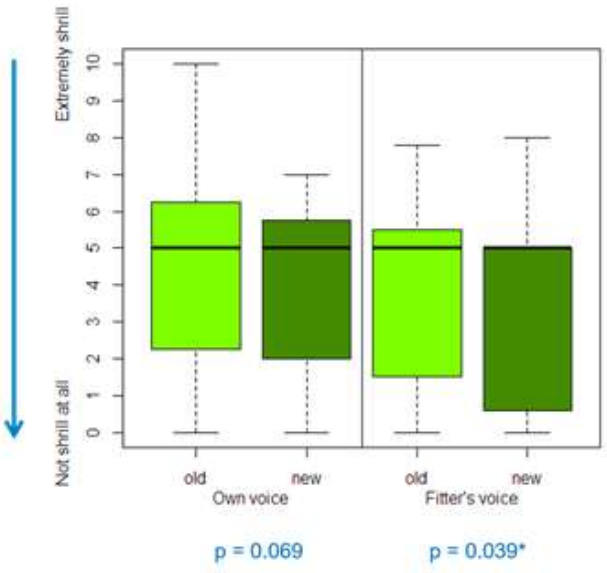

Figure 1: 'Shrillness' ratings in the fitter's office of client's own voice and the fitter's voice, with the original and the new APD precalculation

Loudness ratings in a noisy shopping mall were also rated significantly better ($p=< 0.05$) (Figure 2).

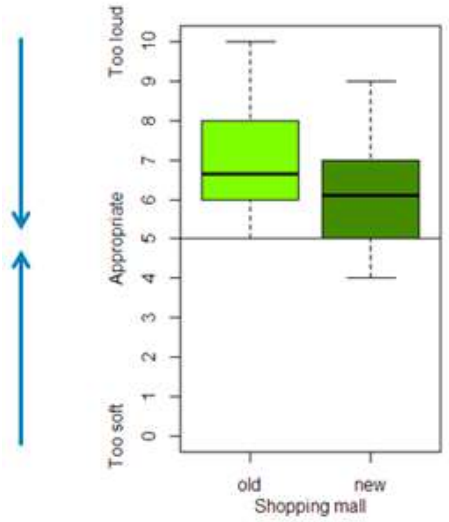

Figure 2: Loudness ratings in a noisy shopping mall with the original and the new APD precalculation

Importantly, there were no significant differences between the old and new precalculation in quiet and noise as measured on speech tests, indicating no compromise in speech intelligibility (Figures 3 and 4).

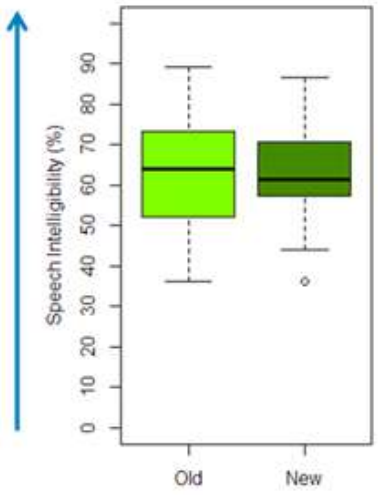

Figure 3: Percentage of speech intelligibility using the German speech in quiet test 'WAKO' with the old and new precalculation

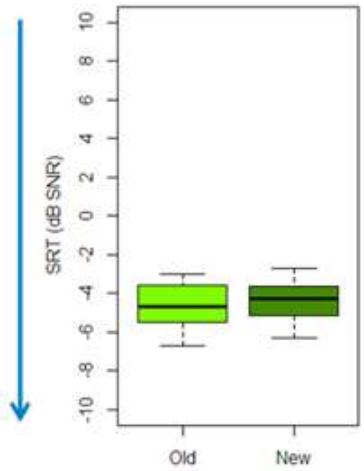

Figure 4: Speech reception thresholds (dB SNR) using the German Gösa Speech in Noise Test with the old and new precalculation

Spontaneous comments from the participants were also examined and analysis showed that participants preferred the new precalculation compared to the old, indicating a higher first fit acceptance (Figure 5).

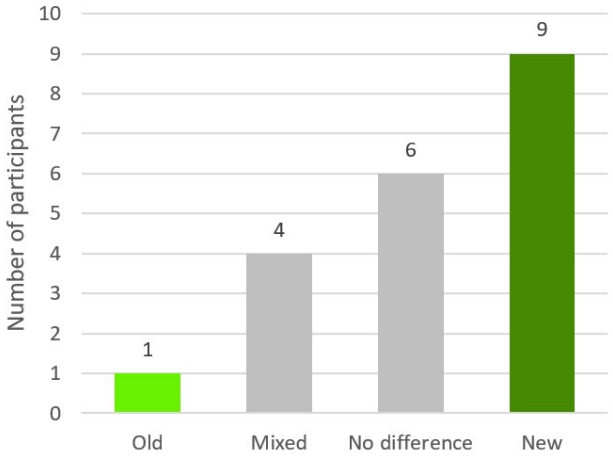

Figure 5: Number of participants preferring the 'old' versus 'new' precalculation in the shopping mall

What about long term hearing performance?

The long term aim for HCPs is to maximize long term hearing performance by increasing gain levels to 100% and listening to clients' needs in order to minimize the effort for later fine tuning changes. This ensures maximal speech understanding. It can be achieved by either turning on the auto Acclimatization function available in Phonak Target, which allows the client's hearing aids to be automatically and incrementally increased to the desired 100% over a selected time period, or the HCP can do so manually at the follow-up appointment.

Audéo Marvel hearing aids deliver the highest first fit acceptance for first time users ever developed by Phonak

The results from the two studies carried out in the Hörzentrum Oldenburg, Germany highlight that the enhanced Phonak APD precalculation for new users delivers exceptional sound quality from the first fit by

improving comfort and reducing the complaint of shrillness, whilst maintaining excellent speech intelligibility in quiet and noise. The goal of providing comfort at the initial fit and at the same time enabling excellent hearing performance in the real world has been met. This is the key to long term client satisfaction. As a result of the study findings, the enhanced precalculation has now been successfully implemented into Phonak hearing instruments using the Marvel platform. Audéo Marvel hearing aids deliver the highest first fit acceptance for first time users ever developed by Phonak.

References

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Jane Woodward holds a BSc in Psychology and an MSc in Audiological Sciences from the University of Southampton, UK. She has 17 years of experience in audiology, working clinically in University hospitals in the UK and Switzerland, in hearing aid and software development and in training.