Perceptual benefits of patient-driven fine-tuning using machine-learning technology

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Objectives: To investigate the use of a machine-learning tool as a means of patient-driven fine-tuning to optimize the sound quality and performance of hearing instruments. The use of a sound classifier system (Fluid Sound technology) was also investigated in this process.

Background: Modern hearing aid technologies include advanced features that allow the patient to experience greater sound quality, comfort and performance. However, these technologies are based on assumptions of what a patient prefers in a given situation. When these assumptions are incorrect, settings are not optimized for the user. Sound Sense Learn (SSL) in Widex EVOKE was designed to give users the ability to optimise their listening experience according to their listening intention using an app-based tool.

Methods: Two laboratory studies were conducted, each employing a double-blind design. The studies were conducted at two different sites: one internal Widex site and one independent external site. All participants had sensorineural hearing loss. Participants were asked to make adjustments using SSL while listening to several sound scenarios. Subsequently, recordings of all sound scenarios were made through hearing aids mounted on KEMAR. Participant blindly rated 3 types of recordings: 1) No SSL adjustments and sound classification OFF, 2) Sound Classifier ON, 3) SSL adjusted and sound classifier ON.

Results: Statistically significant benefits were seen for sound quality and listening comfort for a number of sound environments when the sound classifier was turned ON and even further benefits were observed with SSL adjustments.

Conclusions: The vast majority of participants were able obtain perceptual benefits of SSL in one or more scenarios, indicating that EVOKE users can expect benefit when using SSL. The sound classifier system (Fluid Sound technology) also provides automated benefit to the user.