Symmetric gain provides more comfort for first-time users with asymmetric hearing loss

Introduction

Most hearing aid fitting techniques have been based on the assumption that the hearing loss is similar between both ears. Asymmetrical hearing loss describes the situation where the hearing loss is significantly different between the two ears. Classic hearing aid algorithms prescribe asymmetric gain for asymmetric losses. However, for first-time users this can lead to some discomfort – they may feel that the hearing aids are unbalanced or too loud. It may also lead to reduced speech intelligibility as high amplification in the worse ear may mask the hearing in the better ear.

This study aimed to assess whether first-time hearing aid users preferred a more symmetrical gain prescription (i.e. reduced gain for worse ear, slightly increased gain for better ear).

Methodology

16 participants took part in the study. They were all first-time hearing aid users with asymmetrical hearing losses. The difference between ears at each individual frequency was ≥15 dB, and the difference in PTA0.5-4 was ≥25 dB. Participants were fitted with bilateral Phonak Receiver-In-the-Canal (RIC) hearing aids with two programs:

- Current gain prescription
- New symmetric gain prescription

The tests used were:
- spontaneous acceptance
- A-B comparisons during a 10-minute guided walk
- speech intelligibility test
- MUSHRA (Multi-Stimulus Test with Hidden Reference and Anchor) (EBU, 2000). The MUSHRA test consisted of subjects listening to 3 sound scenes and rating each of the two gain prescriptions on a scale from 0 to 10. They rated them for the dimensions of loudness, shrillness, annoyance, listening effort, L-R balance, and overall preference.

Results

- Spontaneous acceptance: 11 out of 16 people rated the new gain prescription program as better than the current one.
- Guided walk: When asked in several situations, 78% of the ratings were in favor of the new symmetric gain prescription. Comments included: more comfort, less chewing noise and more speech understanding.
- 5 out of 9 MUSHRA ratings showed significant improvement with the new gain prescription program, others showed a trend in a positive direction. Examples are shown in figure 1.
Figure 1: Box plots of the MUSHRA ratings for overall preference (for music and speech) and annoyance (vacuum cleaner)

- Speaker intelligibility: no significant difference between current and new symmetrical gain prescription.

Conclusion

Significantly more people preferred a more symmetric gain setting at the time of fitting and during a 10-minute guided walk. The more symmetric gain setting was rated as significantly better in several listening dimensions. This led to the implementation of a new gain-level algorithm for the next Phonak fitting software release, Target 5.0

References


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