

Evaluation of New Replacement Hearing Aids with Hearing in Noise Test (HINT) in Cochlear Implant Candidates prior to Decision for CI Surgery

Abstract

Introduction

Understanding speech in challenging hearing environments results in increased auditory and cognitive processing as well as sustained effort resulting in feelings of fatigue. Listening effort is studied by an established method in hearing research, called pupillometry. Pupillometry is observed objectively by measuring the pupil dilation during speech perception in noise.

To understand if new replacement hearing aids (HA) improve speech intelligibility with constant listening effort compared to existing HAs, this can be studied with a measurement of the signal to noise ratio (SNR) for speech perception.

If new HAs improve speech intelligibility, the decision of CI surgery might be postponed or even withdrawn.

Materials and Methods:

A sample of 10 bilateral HA users referred for CI, aged 23-82 years performed a Danish Hearing in Noise Test (HINT).

HINT with current HAs and again with one month post fitting new replacement HAs (Phonak Link M or GN ReSound LiNX Quattro/Resound ENZO Q).

New HAs were fitted using National Acoustic Laboratories Non-Linear version 2 (NAL-NL2) prescription and verified with Real Ear Measurement (REM). The participants wore pupil glasses from Oticon Medical during the HINT at two test sessions. Session one: an adaptive SNR of 70% correct word recognition score at 65 dB SPL. Session two: a fixed SNR identified by the adaptive test.

Results

In this preliminary study 2 out of 10 patients showed a clear improvement in SNR with a mean difference of 18 dB (SD4,2 dB) and one patient with slightly decrease in performance.

7 out of 10 patients showed only a change in SNR of -4 dB to +2 dB with a mean difference of 0,14 dB (SD=2,0 dB).

When comparing old HAs with new HAs we found a non-significant improvement of -2,8 dB (95% CI -8,9 – 3,3, p=0,16)

Conclusions:

Even though the SNR using HINT was not improved significantly with replacement HAs, we found a trend of improved SNRs with constant listening effort with replacement HAs.