NOISE SUPPRESION AND COCHLEAR IMPLANT SPEECH UNDERSTANDING IN AURALIZED REVERBERANT SOUND FIELDS

This is a revised abstract after final data collection and analyses

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In positive signal-to-noise ratios and damped test rooms, the Advanced Bionics' ClearVoice (CV) noise suppression has been shown to improve speech understanding in noise (SPIN). This study aims to test CV in reverberant conditions with stationary and multitalker noise. Furthermore, it is tested which setting of the Input Dynamic Range (IDR) is optimal when using CV.

Method. All reverberant conditions were generated using the Odeon software, simulating an actual classroom (T30:0.7s). Experienced users of the Advanced Bionics CII and 90K implant were provided with CV. All materials were fed to audio input of the Harmony processor. LIST sentences were presented in quiet and at a fixed signal-to-noise ratio. Two levels of reverberation were simulated (T30: 0.3 and 0.8s) at two distances (0.5 and 3.0m).

Results. SPIQ showed a similar decrement with increasing reverberation with and without CV medium. Only small and non-significant effects on SPIQ and SPIN were found. The largest effect was an improvement for stationary SPIN with simulated reverberation (RT 0.8) at 3m with CV medium on (7%). There was no significant difference for reverberant SPIQ and stationary SPIN using IDR settings of 40, 60 and 80 dB, and CV settings off, low and high. Subjective benefit was slightly higher for CV medium re CV off, but this did not reach significance; this was also the case for the identification of musical timbre.

Conclusions. Overall, no significant effect of CV was found iin this study using auralized sound fields. A trend was visible that CV may help SPIN in certain real-life conditions in some subjects, although it cannot be excluded that SPIQ in highly reverberant conditions is negatively affected, possibly due to the elimination of low-level speech modulations. Tests with a larger subject number may provide conclusions that are more definite. In addition, results may have suffered from ceiling effects.

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