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Comparing Speech intelligibility in quiet and in noise using different CI-speech-processors and signal preprocessing

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The effect of the Freedom Cochlear Implant speech processor on speech perception and the subjective rehabilitation success is analyzed in a three-centre study upgrading speech processors for 29 Nucleus-CI24 users.

Speech audiometric tests are carried out to compare the performance using the Freedom processor with the previously used SPRINT, ESPRIT24 and ESPRIT3G. The investigations are carried out prior to the speech processor upgrade and following an at least two weeks period of home use.

The effects of the signal preprocessing algorithms ADRO and BEAM are evaluated as well.

Methode:

The effect of the selected input sensitivity of the speech processor is determined measuring the threshold (L50) with the Freiburg number test.

The Freiburg monosyllable test is performed twice for each 50 dB and 70 dB in quiet.

With the adaptive Oldenburg sentence test (OLSA) in noise, the speech reception threshold is determined with a fixed noise level of 65 dB in two different loudspeaker placements (S0N0 and S0NCI).

Additionally the subjective benefit using the CI systems is compared applying the APHAB (Abbreviated Profile of Hearing Aid Benefit) questionnaire.

Results:

The speech perception at 50 dB using the Freedom speech processor is significantly increased by 15 %. An additional mean improvement of 28.6 % is achieved with ADRO.

At 70 dB there is no significant difference between the speech processors.

The speech perception threshold in noise increases by 1.6 dB for the S0N0 situation and increases upto an average of 3.2 dB using ADRO and 2.6 dB using BEAM.

There is no significant enhancement for S0NCI, also not with the ADRO preprocessing but a noticeable benefit using BEAM of 5.8 dB.

For most of the subjects a clear improvement for speech perception and subjective judgement was observed.

