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Music Perception with the Double Electrode Mode in the Nucleus Freedom CI System

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The Nucleus Freedom CI System offers the possibility to stimulate two adjacent electrodes simultaneously, resulting in 22 real and 21 virtual electrodes, and a total of 43 channels. It was shown by Busby and Plant (2005) that the stimulation of the virtual electrodes evokes a different pitch perception than the stimulation of the corresponding single electrodes alone. However, it was not clear if a processing strategy that is based on virtual channels will give better representation of the signal, especially in terms of pitch perception. The aim of the present study was therefore to test music perception of a 43 channel versus the standard 22 channel map.

Method:

Four adult CI users took part in the study. First, the procedure after Busby and Plant (2005) was carried out, that is, pitch ranking tasks were done on electrode level. All subjects were able to rank most electrodes correctly; only on the basal side, some (real and virtual) electrodes could not be resolved for some of the subjects. Next, a 43 channel map was programmed on a research processor, and the subjects had to listen to this map at home for one to two weeks, to compare the quality of music to the quality when using the standard map. After this, pitch ranking of complex tones and an instrument recognition test were carried out in the lab for the 43 channel and the standard maps.

Results and conclusion:

With the 43 channel map, pitch and timbre perception were not significantly improved, compared to the standard 22 channel map. Also, the standard map was subjectively preferred. Thus, even if pitch ranking on electrode level was mostly correct with virtual electrodes, a coding strategy based on this principle did not give much benefit.

Literatur:

Busby, P. A., and Plant, K. L. (2005).

