Testing the functionality of the auditory pathway in children with cochlear implant using the CAEP method

Munivrana Dervišbegović, Boška

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Abstracts

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P33 Testing the functionality of the auditory pathway in children with cochlear implant using the CAEP method

Boška Munivrana Dervišbegović
Polyclinic for the rehabilitation listening and speech SUVAG, Zagreb, Croatia

Prelingually hearing impaired children, users of a cochlear implant (CI) have the opportunity for development of hearing and speech. There are three factors that influence successful use of CIs: age at implantation, duration of speech and hearing rehabilitation and auditory level after implantation. If all these criteria are satisfied most children reach the expected outcome. In this study, using cognitive auditory evoked potential technique (CAEP), the way of processing auditory stimuli was investigated. The study included 10 children who are CI users, aged 8-10 years who are successful CI users. In the second group were 10 healthy age-matched controls. The measurements were performed with a 32-channel Neuroscan electroencephalographic system. The cap with channels according to the international 10-20 system was used. Recording was performed twice. Different type of stimuli were used: (1) tone burst stimulations (TB, 1 kHz, 2 kHz), and (2) speech stimulations (DS, double syllable stimuli, both consisting of two consonants and two vowels characteristic of the Croatian language). The stimuli were presented in an oddball paradigm, requiring a conscious reaction of the subjects to target stimuli. Latencies and amplitudes of CAEP waves were analyzed, as well as the reaction time and number of responses. The results showed differences in the CAEP peak amplitudes between these two groups. The latencies of the waves did not differ for the DS stimulus, while for TB stimulus, there was a difference for the N2 wave. There was also a difference in reaction times for both stimuli, while there was no difference in response accuracy.

P34 Biophysically-inspired end-to-end time-domain speech enhancement

Chuan Wen, Sarah Verhulst
Hearing Technology @ WAVES, Dept. of information technology, Ghent University, Belgium

Deep neural network (DNN) speech enhancement approaches have recently achieved great performance. There are numerous applications that benefit from the speech enhancement model, including automatic speech recognition (ASR) and hearing aids. The majority of these previous methods were developed in the time-frequency (T-F) domain. However, the T-F domain approach has some limitations, including a high minimum delay in reconstructing the signal from the T-F domain representation, poor generalizability in unseen noise, and bad performance at negative signal-to-noise ratio's (SNRs). To address these problems, we propose a biophysically inspired end-to-end time-domain neural network that adopts bio-inspired features from CoNNear, a neural network that accurately simulates some biophysical properties of the human auditory system such as sharp and level-dependent filter tuning.