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Title: Frequency specific objective AEP-based assessment of hearing perception in noise.

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ABSTRACT:

Background: The electrophysiological objective evaluation of hearing perception under noise conditions could be very useful as early indicator of auditory damage, usually causing a reduction of the hearing quality (and a reduction of speech intelligibility) and not necessarily associated to an increase of the hearing thresholds (for this reason, known as hidden hearing loss, HHL).

Methods: We propose a protocol for recording ABR and MLR responses to frequency specific stimuli (tone bursts) with and without background noise. The responses elicited by tone bursts of different intensity and frequency, in the presence and absence of background noise, are estimated with appropriate deconvolution methods and are compared.

Results: In this pilot study including 8 subjects (with no reported hearing impairment), the changes in the ABR and MLR waves associated to the presence of noise are evaluated and analyzed taking into account factors like the age and exposition to noise. The presence of noise causes significant changes in the amplitudes and latencies of the responses depending on the stimuli and noise levels.

Conclusions: The experimental results suggest that the electrophysiological assessment of the hearing perception in noise could be valuable for early detection of HHL. An optimization of the protocol (to obtain reliable information with minimum duration of the exploration) is necessary. The promising results of this study invite to design a more extensive study involving a larger population (including normal hearing and hearing impaired subjects) in order to identify appropriate parameters for evaluating HHL.