ESR1. Attempting to reconstruct auditory neural generators using EEG

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Congenital single-sided deafness (cSSD) is a condition that affects 30 out of 100.000 children. This condition is characterized by profound hearing loss in one ear and normal hearing (NH) in the other. The lack of binaural hearing generates an aural preference syndrome. In this syndrome the NH ear creates brain auditory projections into the affected ear, leading to a brain asymmetry.

Currently, there are no standard treatments for this condition. Nevertheless, based on evidence on patients with bilateral and unilateral deafness, it is expected that cochlear implants (CI) may partially restore binaural hearing. Thus, preventing the aural preference syndrome.

My doctoral research aims to investigate whether the use of CIs changes the aural preference syndrome in children with cSSD, and how this affects brain plasticity. This will be done using measures of electroencephalography (EEG) and brain functional connectivity.

To calculate the brain functional connectivity, it is necessary to first determine the neural generators associated with the integration of auditory processing. In the past, MRI has been used to determine the subcortical neural generators. However, EEG has a high temporal resolution, which makes it more adequate for the analysis of auditory processing.

Before analysing the brain's neural generators in children, it is necessary to reconstruct these generators in adults. This study aims to determine whether it is possible to reconstruct the cortical and subcortical neural generators, associated with auditory processing using EEG from normal-hearing adults. To do this, the auditory steady-state responses (ASSRs) and the minimum norm imaging (MNI) methodology were utilized. To evaluate the neural generators obtained, the apparent latency values were calculated and compared with the literature. The results from this study will be presented during the workshop.