An EEG Examination of Early Visual Processing in Cochlear Implant Using Children

INTRODUCTION
- Auditory deprivation at early ages is believed to influence primary sensory processing and some higher-level cognitive domains, such as attention and learning.
- A possible explanation is cross-modality plasticity (CMP), which is the reallocation of neural resources of deprived sensory systems by intact sensory systems.
- We aim to identify evidence of CMP by comparing the visual evoked potentials (VEP) of Cochlear Implant (CI) using children and age-matched typically developing (TD) children.

SUBJECTS
- CI using Subjects:
  - n = 28 (20 males, 8 females)
  - Mean age = 74 months
  - Age Range: 46-128 months
  - Implanted < 31 months
- TD Controls:
  - n = 28 (12 males, 16 females)
  - Mean age = 77 months
  - Age Range: 31-122 months

MATERIALS & METHODS
- This study uses a novel passive electroencephalogram (EEG) paradigm that rapidly and reliably collects the neural activity along visual and auditory pathways of the participants.
- Visual stimuli: center cartoon with two peripheral flickering checkerboard rings. EEG recorded with a BioSemi Active Two System.
- 19 cap electrodes, 2 mastoid references.

RESULTS
- Both groups exhibited visual evoked potentials (VEP) at both occipital electrode sites in response to visual stimuli onset.
  - First positive peak (P1) between 100-200 msec
  - First negative peak (N1) between 200-300 msec

FUTURE DIRECTIONS
- Evaluate if observed adaptations are due to intra-modal or cross-modal plasticity.
- Examine the influence of concurrent auditory and visual stimuli on VEP morphology.
- Evaluate the visual response of the flickering stimuli in the frequency domain.

REFERENCES

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Corina Lab
Contact US
Speech Neurorehabilitation and Cybernetics (Miller)
Lab
https://millerlab.faculty.ucdavis.edu