The Brain during Movement Execution and Movement Observation in Children

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Objective

To understand and characterize the oscillatory brain state during movement observation and movement execution in children with cerebral palsy and compare to that of typically developing children.

Methods

15 Children with upper limb paralysis will be recruited.

- **GRASSP Assessment**: clinical impairment measure for the upper limb for each will be conducted

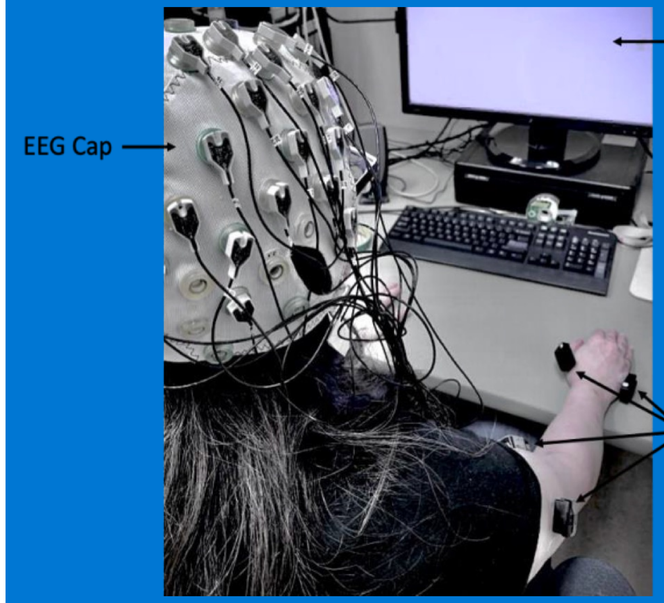
- **Equipment Set Up:** 64 channels EEG + EMG Sensors on both hands: FDI , ADM, EDC, and Biceps muscles
- **Motor Execution Trials (ME):** Squeezing the ball in the respective hand on cue
- **Motor Observation Trials (MO):** Observing video playbacks of hand squeeze motions while at complete rest
- **Imitation Trials (ME+MO):** Observing video playbacks of hand squeeze motions while imitating the observed movement

Data Analysis

Time-Frequency Analysis of the EEG and EMG signals will be performed to extract Event-Related Desynchronization/Synchronization and Readiness Potential (Biomarkers of movement intention, initiation and manifestation)

Progress

- Data Collection Ongoing
- 4 youth (2 females) with cerebral palsy have completed the study to date (mean age: 15.75 ± 2.87)



Mirror Neurons discharge during hand movement as well as observation of hand movement

Mirror neurons play an essential role in motor learning and recovery

We hypothesize that the activation of mirror neuron system as the result of motor observation may be a valuable avenue in bringing new upper limb rehabilitation techniques to children

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