Spring 4-1-2021

Antagonistic Asynchrony in Muscle Recruitment Pattern of Forward Reach Movement In Children With Cerebral Palsy.

Sanya Anklesaria

1. **Title:** Antagonistic Asynchrony in Muscle Recruitment Pattern of Forward Reach Movement In Children With Cerebral Palsy. **Authors: Sanya Anklesaria, Amitesh Narayan, Shyam Krishnan, Ganaraja Bolumbu.**

Key Words: Cerebral Palsy; Forward reach movement; Agonist activity; Antagonist activity.

Abstract:

Objective: To analyze the order and timing of Biceps Brachii and Triceps Brachii muscle recruitment pattern differences between Children with CP and Typically Developing (TD) children during forward reach task in seated position. **METHOD:** Convenience sample of thirty-eight children (n=19 CP and n=19 TD); mean age 5y 11mo [SD-1y 10mo] for CP and 6y 11mo [SD- 2y 2mo] for TD were included. Activities of Biceps Brachii and Triceps Brachii muscles were recorded by surface electromyogram (EMG) during forward reach task in seated position after obtaining ethical clearance. The onset muscle activation was determined by rectified EMG signals related to the onset of Biceps Brachii and Triceps Brachii muscles. Data was analyzed using unpaired Student's't' – test and Chi-square test. **RESULTS:** In CP, during forward reach task, there is a greater likelihood of Biceps Brachii firing prior to Triceps Brachii as compared to TD, for whom greater probability of Triceps Brachii firing first. (Likelihood ratio (LLR) =28.164; $p<0.001$). **CONCLUSION:** In TD children, the Triceps Brachii have elevated bio-potential, generated earlier during the task, followed by Biceps Brachii, where as in the CP group the sequence were reversed (LLR 28.164; $p<0.001$) during forward reach task in seated position. The altered activity pattern of neural circuits could be responsible for the altered activation pattern and prolonged movement time in children with CP while doing a comparable task, which needs further investigation.