

Title: Deficit in sensorimotor adaptation in children with Cerebral Palsy

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Abstract:

Background: The literature suggests that auditory rhythmic stimulations (RAS) provide motor benefits in children with Cerebral Palsy (CP). However, little is known about sensorimotor synchronization in CP, that is their capacity to intentionally synchronize to RAS and continue to produce the required rhythm.

Methods: 10 children with CP, 9 typically-developed (TD) children and 9 TD adults were required (1) to produce spontaneous tempo with their dominant hand tapping on a buzzer, (2) to synchronize tapping of their dominant hand with RAS and (3) to continue to produce the specified tempo after the withdrawal of the RAS. ANOVAs Group (CP, TD, AD) x Tempo (Same, Different) x RAS Withdrawn (Synchronization, Continuation) were performed on the mean error of tempo and its variability.

Results: For the Different tempo, the mean error of tempo was significantly larger for the Group of children with CP than for the Group of TD children. Moreover, the mean tempo error was significantly larger in Continuation than Synchronization for all Groups.

Discussion: Despite a preserved ability to intentionally synchronize and continue with a tempo similar to their spontaneous tempo, children with CP seem to present an impaired ability to synchronize and continue with a different tempo. These results suggest a specific impairment of sensorimotor adaptation mechanism. Clinical implications for future rehabilitation programs should be considered.