

Title: Effects of rhythmic and multisensory stimulations on procedural learning for children with cerebral palsy

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Abstract:

Introduction: Motor rehabilitation of children with cerebral palsy (CP) is based on concepts of motor learning. In our study we used an adapted serial reaction time task (SRTT) to investigate the conditions that could facilitate procedural motor learning for children with CP by introducing auditory cues presented either simultaneously with visual cues or with a regular rhythm. Given that multisensory stimulations are known to improve motor speed and auditory rhythm induces spontaneous motor areas activations, we expect to improve procedural learning with these additional stimulations, compared to control conditions (e.g., visual stimuli alone or irregular rhythm).

Methods: 17 children with typical development (TD) and 6 children with CP performed the SRTT in four conditions: with a Regular Metronome (RM), with Congruent Audio-Visual stimulations (CAV), with Only Visual stimulations (VO) and with an Irregular Metronome (IM). RT and errors were computed with Matlab script. ANOVAs with Group (TD vs CD) and Condition (RM, CAV, VO, IM) were performed on the evolution of RT and errors between B1-B4 (general learning), B4-B5 (specific learning) and B5-B6 (recall). T-tests test was used as post-hoc comparisons (all $p < 0.05$).

Preliminary results: As shown by Block*Condition interaction, CAV and RAS seem to facilitate specific sequence learning, ($F(3, 57)=7,5651, p=,001$) and recall ($F(3, 57)=7,1309, p=,001$) of the repeated sequence after presentation of random stimuli.

Conclusion: Our results suggest that CP children are able to perform procedural motor learning. Both auditory rhythmic and combined auditory and visual congruent sensory information promote specific procedural learning for TD and CP children.