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Abstract title	Sensitivity of an upper limb motion analysis protocol to changes in kinematics and muscle activity after constraint induced therapy in children with hemiplegia
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Topic	2.2 Clinical movement analysis

Abstract text

Introduction: Quantified evaluation of the motor function improvement of the involved upper limb (IUL) of hemiparetic children after constraint-induced movement therapy (CIMT) is currently lacking. The objective is to discuss the validity of an upper limb motion analysis protocol to quantify this improvement.

Patients and methods: This preliminary study includes 5 hemiparetic children who followed a CIMT within a rehabilitation center and 3 typically developing (TD) children. The upper limb motion analysis protocol was followed 1 month before and after CIMT for hemiparetic children and twice a week apart for TD children to evaluate its reliability. The protocol involved performing active simple upper limb movements. Upper limb kinematics was computed from the positions of 29 markers. Activation from 8 upper limb muscles was recorded by surface EMG. Statistical parametric mapping (SPM) was used for statistical analysis.

Results: Reliability of the protocol in TD children was excellent: SPM found no statistical differences inter session, and ratio "inter session error" - "inter trial error" was above 0.80 for all kinematics and muscle activation data, meaning that experimental errors were low. Preliminary results for one hemiparetic child showed that she had a reduced supination active range of motion (AROM) and an antagonist activation of the pronator quadratus during supination compared to TD children. After CIMT, SPM found an improvement of her supination AROM, but no differences for biceps, pronator teres and pronator quadratus activation.

Conclusion: The proposed upper limb motion analysis protocol was reliable, useful for diagnosis and sensitive to changes after CIMT.

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