

# Children with Hemiplegia

Subjects: Pediatrics

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It is a great research to know the importance of applying unimanual therapies with containment at home in children with hemiplegia.

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## 1. Introduction

Infantile cerebral palsy (ICP) is a non-progressive encephalopathy that produces a series of permanent disorders, affecting motor and postural development in children<sup>[1]</sup>. The disease prevalence in developed countries is 2–2.5 cases per 1000 live births<sup>[1]</sup>. One of the most frequently occurring forms of ICP is hemiplegia, where one vertical body side is affected, as a consequence of brain damage that primarily affects one hemisphere<sup>[2]</sup>. Movements in the affected upper limb are slower and clumsy and accompanied by mirror movements. Moreover, there are deficits in the selective control in the fingers of the affected hand. Consequently, there is a reduction in the use of the affected hand, commonly known as “developmental disregard”, which interferes with activities of daily living<sup>[3]</sup>. Children with hemiplegia do not acquire a typical movement experience in their affected upper limb, unlike adults who have suffered a stroke later in their lifetime. Thus, the therapy used must provide the opportunity to experiment with the affected side, granting as much functionality as possible to the affected upper limb<sup>[4]</sup>.

## 2. Treatment

Constraint-induced movement therapy (CIMT) is designed to improve the affected upper limb motor function after stroke, and consists of three key components: (1) repetitive, unimanual task-oriented training for six consecutive hours per day during 10–12 days; (2) adherence-enhancing behavioral strategies (transfer package); and (3) constraining the use of the less affected arm, usually by wearing a glove during waking hours<sup>[5][7]</sup>. CIMT modifications were proposed by Page et al.<sup>[8]</sup> using less than three non-consecutive hours of therapy per day applying the unaffected arm containment. These studies reported an increased use in the affected arm<sup>[8][9]</sup>.

Interventions with modified CIMT (mCIMT)<sup>[8][9]</sup> at an early age could expand primary neural networks through the experience and practice of their affected upper limb, since it implies a structured practice, demands attention to the task and encourages the practice and use of the affected segment. Thus, the training and repetitive tasks would be aimed at treating children from four years of age, who have the ability to execute the task for longer periods of time<sup>[8]</sup>.

The mCIMT is effective at promoting the functional use of the affected upper limb in children with hemiplegia<sup>[10][11][12][13]</sup>. Different studies in stroke patients have shown that mCIMT improves performance in tasks such as picking up a cup, grasping a spoon or holding a book<sup>[8][9][14][15]</sup>. The home environment provides a rich natural context to facilitate motivation, engagement and repetition in functional activities of daily living<sup>[16][17]</sup>. A “transfer package” technique facilitates treatment gains into real-world activities, such as reinforcement of treatment adherence and the emergence of new behaviors, thereby improving the spontaneous use of the trained affected upper limb in infantile hemiplegia<sup>[18][19]</sup>. Thus, mCIMT improves functionality in the affected upper through enhanced practice.

The use of unaffected manual containment in mCIMT would result in improvements in affected upper extremity function in children with hemiplegia (4-8 years) compared to the same protocol without containment (UTWC). Unaffected hand restraint may reduce “developmental neglect or nonuse,” thereby increasing spontaneous use and quality of movement in the affected upper extremity in children with hemiplegia.

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