

# Guidelines for future research in constraint-induced movement therapy for children with unilateral cerebral palsy: an expert consensus

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## Summary

The aim of this consensus group of nine international experts was to clearly define current knowledge of CIMT, identify knowledge gaps and provide prioritized directions for future research. A rigorous literature was conducted and the results were presented to the consensus group for discussion. The panel developed several definitions for various methods of CIMT including: signature constraint-induced movement therapy, modified constraint-induced movement therapy, hybrid CIMT, and forced use therapy. For the purposes of this paper, CIMT is used as an umbrella term of all modified and hybrid versions of CIMT.

## Results

The summary of the current evidence regarding 11 important questions is provided in the article. These topics are: long term-outcomes following CIMT, the effects of repeated CIMT, transfer to bimanual performance, type of restraint used, environment and context of training, provider of CIMT, outcomes according to age of candidates as well as severity, amount of training provided, type of structured training provided, effect of lesion characteristics and corticospinal projections on outcome. In summary, CIMT is effective in improving the upper limb abilities in children with hemiplegia and these improvements are similar in children who undergo alternative models of structured training such as a bimanual approach. Most studies used removable constraints, however, a small proportion have used non-removable devices. No studies have yet to investigate the use of removable vs. non-removable constraints and compliance with program. Frequency of daily training varies widely across studies with most studies including 5-7 sessions per week. The lengths of program are also variable with the mean length ranging from 2-10 weeks. The mean participant age is 2-7 years old but varies widely in the literature from 7 months to adolescence. Commonly used outcome measures are subdivided into 6 categories: (1) measures of body function/structure; (2) unimanual measures of speed and dexterity; (3) unimanual measures of quality of movement/skills; (4) effectiveness of the use of the assisting

hand in bimanual performance; (5) parental questionnaires regarding amount and quality of use of the affected hand; (6) individualized measures of functional performance.

## Directions for future research

Further studies are required to explore longitudinal outcomes, additive effects of CIMT, translation to bimanual performance in functional activities, types of restraints and compliance, the amount and type of structured training provided, the environmental and personal context in which CIMT is delivered as well as the effect of age and severity on outcome.

The authors conclude that the three most pressing questions for future research are the influence of age on treatment effect, the effect of repeated CIMT and whether the amount of training matters. Clinically, important questions for future investigation include the type of restraint used as well as the environment in which CIMT is delivered and who provides CIMT.

## Reference

Eliasson, A.C., Krumlinde-Sundholm, L., Gordon, A.M., Feys, H., Klingels, K., Aarts, P.B...European network for Health Technology Assessment (2014). Guidelines for future research in constraint-induced movement therapy for children with unilateral cerebral palsy: an expert consensus. *Developmental medicine and child neurology*, 56(2):125-37.

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