
Studies comparing the efficacy of constraint-induced movement therapy and bimanual training in children with unilateral cerebral palsy: a systematic review

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CRD summary

This review concluded that constraint-induced movement therapy for children with hemiplegic cerebral palsy resulted in greater improvements in the unimanual capacity of the impaired arm than bimanual training, though bimanual training improved bimanual performance and self-determined overall life goals. Several limitations in the evidence suggest that such conclusions may not be reliable.

Authors' objectives

To compare the efficacy of constraint-induced movement therapy with bimanual training in improving impaired arm function and overall functional performance among children with hemiplegic cerebral palsy.

Searching

MEDLINE, CINAHL, Science Direct, PsycINFO and The Cochrane Library were searched for relevant publications from January 2006 to November/December 2011. Search terms were reported. Reference lists of retrieved articles and recent issues of relevant journals were also searched.

Study selection

Studies that compared the efficacy of constraint-induced movement therapy with bimanual training in improving impaired arm function and overall functional performance among children with hemiplegic cerebral palsy were eligible for inclusion.

Children in the included studies were aged between two and sixteen years. Treatment ranged from 60 to 90 hours within 10 days to three thrice-weekly sessions over a 10 week period. One study included skills training for parents/caregivers so they could carry out similar activities with the children at home. Unimanual, bimanual and overall functional performance were measured using a variety of different measures.

Three authors assessed study eligibility with disagreements resolved by discussion.

Assessment of study quality

Study quality was scored using the 10-point Physiotherapy Evidence Database (PEDro) scale. This scale evaluated studies on the basis of randomisation, concealment of allocation, baseline comparability, blinding, adequacy of follow-up and reporting of intention-to-treat analysis, between group comparisons and point estimates with measurements of variability. Studies that scored 6 or more points were considered to be high quality.

Two authors independently assessed study quality; disagreements were resolved by discussion or arbitration of a third author.

Data extraction

One author extracted study characteristics; two co-authors checked the accuracy of this extraction, with disagreements resolved by consensus.

Methods of synthesis

Studies were combined in a narrative synthesis.

Results of the review

Seven articles (247 children) were included in the review, of which six were randomised (one used cluster randomisation, three randomised matched-pairs) and one was quasi-randomised. These studies scored between 3 and 7 points on the PEDro quality scale; four were rated 'good', two were rated 'fair' and one was rated 'poor'.

All seven articles reported a significant improvement in function for the impaired arm for both constraint-induced movement therapy and bimanual training, of which five concluded that improvements in arm function and overall functional performance were similar for both therapies. One study reported greater improvement in grasp functions for constraint-induced movement therapy, but greater improvement in bilateral spontaneous use of the affected limb for bimanual training. Another study reported greater improvement in bimanual coordination in daily activities for bimanual training compared to constraint-induced movement therapy.

Authors' conclusions

Constraint-induced movement therapy resulted in greater improvements in the unimanual capacity of the impaired arm compared with bimanual training, though bimanual training participants may see more improvement in bimanual performance and self-determined overall life goals. A combination of both therapies might be an option in the future.

CRD commentary

This review searched several sources to address a clearly defined research question, though it was not clear whether restricting the search to five year period risked missing relevant studies. The authors made efforts to minimise the potential for errors and bias throughout the review process. The authors state that there were seven RCTs, but three of the articles appear to report on a single trial, so the evidence actually appears to be based on five small studies. Only one of these studies included a 'standard treatment' control group, so in most cases it was not possible to establish what proportion of the observed improvement among constraint-induced movement therapy and bimanual training treated participants was truly attributable to these treatments. It was not clear whether the lack of difference between treatments was due to similar efficacy or a lack of statistical power for the included studies. No evidence was presented in the review on any unintended or longer-term consequences of treatment.

Given these limitations, the authors' conclusions about the relative efficacy of these treatments may not be reliable.

Implications of the review for practice and research

Practice: The authors stated that a combination of constraint-induced movement therapy and bimanual training could be an option for improving impaired arm function and overall functional performance among children with hemiplegic cerebral palsy.

Research: The authors stated that the combination of constraint-induced movement therapy and bimanual training should be investigated, as should the optimal components and dosage of each approach, and the feasibility of home practice.

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