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Appraisal

Critically Appraised Papers

Constraint-induced movement therapy early after stroke improves rate of upper limb motor recovery but not long-term motor function

Synopsis

Summary of: Thrane G, Askim T, Stock R, Indredavik B, Gjone R, Erichsen A, et al. Efficacy of constraint-induced movement therapy in early stroke rehabilitation: A randomized controlled multisite trial. *Neurorehabil Neural Repair.* 2014; DOI:10.1177/1545968314558599.

Question: Does modified constraint-induced movement therapy improve arm motor function in people within 4 weeks after stroke? ***Design***: Multisite, randomised, controlled trial with blinded outcome assessment at baseline, after 2 weeks of intervention and at 6-month follow-up. ***Setting***: Five hospitals in Norway. ***Participants***: Inclusion criteria were: individuals within 5-26 days after stroke with unilateral arm or hand paresis, and being able to lift two fingers or extend the wrist at least 10 deg from full flexion. Key exclusion criteria were: a Modified Rankin Scale >4, a prior stroke affecting the upper extremity, and a life expectancy <1 year. Randomisation of 47 participants allocated 24 to the intervention group and 23 to the control group. ***Interventions***: The intervention group received constraint-induced movement therapy for 3 hours/day for 10 consecutive workdays; a mitt was worn on the unaffected upper limb for up to 90% of waking hours. The control group received standard care according to guidelines. Participants in both groups received other multidisciplinary care as needed. ***Outcome measures***: The primary outcome measure was the Wolf Motor Function Test of arm function at 6-months post intervention. Secondary outcome measures were: the Fugl-Meyer upper extremity motor assessment, the Nine-Hole Peg Test, the arm use ratio, and the Stroke Impact Scale. ***Results***: Primary outcome data were obtained from 85% of the participants at 6 months. Intention-to-treat analyses of the primary outcome variable showed no differences between the groups on log-transformed Wolf Motor Function Test time at 6 months (mean difference = –0.07, 95% CI –0.16 to 0.02), although the constraint-induced movement therapy group had a significantly greater improvement in log-transformed Wolf Motor Function Test time at the end of the 2-week intervention (mean difference = –0.14, 95% CI –0.26 to –0.02). There were significant within-group improvements in all secondary variables, but no differences between groups. ***Conclusion***: It is feasible and safe to provide a modified constraint-induced movement therapy protocol within the first 4 weeks after stroke. While constraint-induced movement therapy early after stroke may improve the rate of upper limb recovery compared to standard care, it does not improve long-term function.

[95% CIs calculated by the CAP Editor.]

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Commentary

In spite of strong research showing positive effects of constraint-induced movement therapy on impairments and function, it is not clear how much has been adopted into mainstream clinical practice. I think we are all aware of missed opportunities to take advantage of the profound ability for neuroplasticity during early phase rehabilitation. This article is timely, in that it focuses on constraint-induced movement therapy during this early rehabilitation phase. According to a recent meta-analysis,[1] the results of this study reinforce previous findings that there is no consensus of the effects of constraint-induced movement therapy in the acute phase.

It is important to understand the effects of constraint-induced movement therapy during this acute phase and to identify which protocols and doses are most effective, if any. The effect pendulum swings from constraint-induced movement therapy produces better function and reduces impairments compared to 'standard' therapy, to it is detrimental to recovery if the dose is too high.[2] The authors suggest that there may be short-term effects on the Wolf Motor Function Test and the Nine-Hole Peg Test two weeks after constraint-induced movement therapy but no difference between groups at six months; therefore, 'application of constraint-induced movement therapy in early stroke rehabilitation is not warranted because of limited evidence of lasting effect.' What evidence do we have of the lasting effects of interventions for stroke upper limb function and impairment during current early phase rehabilitation? We do need more research to understand the factors contributing to recovery during this early phase and how to select the interventions that are most beneficial for patient subgroups. The inability of this study to recruit an adequate sample for an overall well-designed study that followed the Extremity Constraint Induced Therapy Evaluation (EXCITE) protocol quite closely[3] should be a wake-up call for researchers. I suggest we take a different approach to participant selection for these studies and broaden our selection criteria to produce a larger sample – then we can stratify accordingly. Otherwise, we will continue to produce evidence that cannot adequately answer these important questions.

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References

1. Thrane G, et al. *J Rehabil Med.* 2014;46:833–842.
2. Dromerick AW, et al. *Neurology.* 2009;73:195–201.
3. Wolf SL, et al. *JAMA.* 2006;296:2095–2104.

http://dx.doi.org/10.1016/j.jphys.2015.02.005