8-20-2013

Can't Hold Me Back! Constraint-Induced Movement Therapy for Children with CP: Evidence Based Review

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Recommended Citation

Can’t Hold Me Back! Effect of Modified Constraint-Induced Movement Therapy for Children with Cerebral Palsy: An Evidence Based Review

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CREATE Day, August 2013

Presented in Partial Fulfillment of the Master of Science in Occupational Therapy degree at Thomas Jefferson University

Objectives of Presentation
1) Discuss steps used to conduct a systematic review of current literature regarding the effects of modified Constraint-Induced Movement Therapy (mCIMT) for children with cerebral palsy
2) Compare evidence for specific protocols for implementing mCIMT in practice
3) Analyze if mCIMT is a useful and feasible treatment approach for pediatric practice settings
4) Examine clinical implications when using mCIMT with children

Clinical Question: What are the effects of modified Constraint-Induced Movement Therapy on children with hemiplegic cerebral palsy to increase participation in childhood occupations?

Research Methods
Databases: PubMed, CINAHL, Scopus

Search Terms: ped*, child*, cerebral palsy, unilateral cp, hemiplegic cp, asymmetric motor impairment, congenital hemiparesis, constraint-induced movement therapy, constraint induced therapy, modified constraint induced movement therapy, CIMT, forced-use therapy, occupational therapy, childhood occupations, play, social interaction, participation, childhood activity (* = wild card)

Results
Total articles yielded: 1274
Articles used for review: 15

Level of Evidence:
- Level I: 11 Randomized Controlled Trials
- Level II: 1 Controlled Trial
- Level III: 3 Pretest-Posttest Design

Themes:
Outcome Measures: AHA, PMAL, Jebsen, BOT-2, CFUS
- Clinically significant (+) outcome measures in relation to age of clients:
  - AHA (+) 18 months - 6 years
  - PMAL (+) 6-8 years
  - Jebsen (+) 9-13 years & 13-18 years (level 3 evidence)
  - BOT-2 (+) 4-8 years, 6-8 years, 9-13 years, 13-18 years
  - CFUS (+) 4-8 years & 9-13 years

Type of Constraint: Hand based, full arm (cast or cotton sling)
- A hand based constraint was found to be statistically significant and clinically meaningful for ages 18 months-18 years.
- A hand based constraint might be the best option as it is the least restrictive but still has potential for gains

Protocol: Therapy Duration (hours/day: 1-2 hours, 3-4 hours, 6-7 hours), Length of Intervention (Range: 10-70 days)
- mCIMT may be tolerated longer by older children
- Length of time in constraint may not be significant
  - No AHA score improvement between children wearing constraint for a range of 16-120 hours (Eliasson et al., 2005)
  - Same improvements seen in 3 hour and 6 hour groups (Deluca et al., 2012)
- Consecutive days of constraint wear did not appear significant
- Positive biomechanical and functional gains remained up to 12 months post-intervention

Inclusion Criteria:
- 2003-present, English language, Peer-reviewed, 0-18 years old, Levels of evidence: I, II, III

Exclusion Criteria:
- Studies including NDT, Botox, animals, and/or robots

Article Critique Resource:
Appendix M (Law & MacDermid, 2008)
- More high-level research necessary to further identify ideal protocols for children

**Themes (continued):**

*Implementation: Home program vs. no home program*
- Level I evidence showed positive clinical significance for studies only in clinic, and less clinical significance for those with a home program
- Therapy in home is more beneficial than in clinic when administered by therapist

**Bottom Line**

While many of the studies reviewed controlled for different variables (age, duration, constraint), all of the children made gains with the different variations of mCIMT implemented. Least restrictive methods were still found to be beneficial, including a shorter duration and smaller, hand-based constraint. Future research should focus on determining minimal efficacy threshold, impact of neuroplasticity on motor learning, and generalization to a larger population.

**References:**


**Cited in handout

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