

# Developing a Modified Constraint-Induced Movement Therapy Protocol

## Marit Brown – Creighton University

### BACKGROUND

- Constraint-induced movement therapy (CIMT) is a systematic, multi-component, intensive therapy intervention designed for individuals with hemiparesis (Chamudot, Parush, Rigbi, Horovitz, & Gross-Tsur, 2018).
- Constraint-induced movement therapy includes the use of a constraint on the less affected upper extremity while simultaneously engaging in high intensity, shaping and repetitive therapeutic activities with the more affected upper extremity (Cohen-Holzer, Katz-Leurer, Meyer, Green, & Parush, 2017).
- Research provides supportive evidence for CIMT and modified CIMT (mCIMT) to be effective in improving function and performance of the affected upper extremity (Vaghela, 2014) as well as improving in bimanual functional tasks to complete activities of daily living in children with hemiparesis (Burkhardt, Sheridan, Villavecchia, Hollander, & Garbarini, 2017).

### FOCUSED QUESTION

How does an outpatient pediatric clinic develop and implement a modified constraint-induced movement therapy protocol?



<https://pdfs.semanticscholar.org/4b69/9087930808ae084f2f091d4c1bc16840721.pdf>

### PROGRAM DETAILS

- Participants: children with hemiparesis
- Restraint: elastic bandage wrapped on less affected extremity
- Protocol: 2 hours/day, 7 days/week, 4 weeks
  - 1-hour during OT at clinic and 1-hour at home
  - OR
  - 2 1-hour sessions at home on non-OT days
- Primary outcomes measure: Assisting Hand Assessment (AHA) Hierarchy (Figure 1)

### METHODS

- Conducted a needs assessment and identified a gap in services based on these results.
- Analyzed research on pediatric CIMT, identifying various protocols (Table 1). Utilized this information to create a protocol that would be feasible to the population at Tri-County Therapy (TCT).
- Created informational handouts for parents/caregivers and therapists.
- Constructed a resource binder containing protocol parameters, parent/therapist handouts, and evidential research. Presented this to the staff to introduce the new program, protocol, and available resources.
- Identified clients with hemiparesis who may benefit from the mCIMT program.

### RESULTS

- The need for an mCIMT protocol was established based on results from the needs assessment.
- Two of the eight surrounding pediatric clinics currently offer CIMT programs to patients.
- Ten of the twenty-five occupational therapists among the six TCT offices have experience utilizing CIMT in practice.
- Four clients have been identified at the TCT Ladson office to be potential participants in the mCIMT program (Table 2).
- Clients/caregivers will complete the 4-week CIMT program following provided protocol parameters.
- Goal: observed functional increases in use of the affected upper extremity as measured by the Assisting Hand Assessment (AHA) Hierarchy.
- Clients will be able to complete the program multiple times to continue gaining improvements in functional use of the affected upper extremity.
- Implementing an mCIMT program at TCT would make the clinic more marketable and provide the staff with an opportunity for professional growth.

### BOTTOM LINE FOR OT

- Developing and implementing a new program at an outpatient pediatric clinic requires an in-depth analysis of current research, explorations of available community resources, and determining feasible program parameters to promote best possible outcomes.
- Hemiparesis affects a child's performance in and ability to complete activities of daily living and meaningful occupations.
- Constraint-induced movement therapy should be critically evaluated as a viable treatment option for children with hemiparesis.
- Constraint-induced movement therapy protocol parameters should be analyzed to determine the best fit for a clinic and its clients.
- Multiple types of restraints and restraint materials, ease of application and removal, and time of wear should be considered before determining which restraint to use with clients.
- The upper extremity being restrained should be monitored regularly for skin breakdown and irritation.
- It is recommended that occupational therapists communicate often with the parents/caregivers to ensure the child/family is comfortable with and adhering to the program.

Figure 1. Assisting Hand Assessment Hierarchy

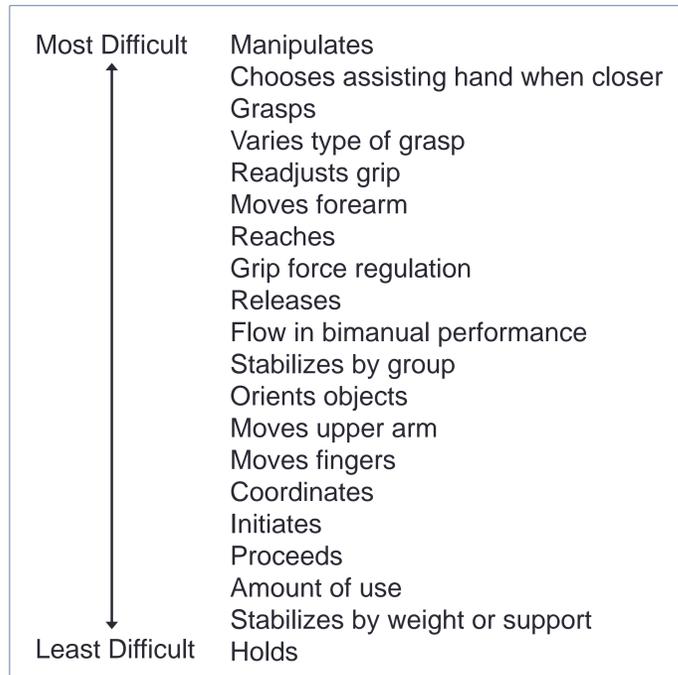


Table 2. Potential Clients for the mCIMT Program

Age	Diagnosis	Affected Upper Extremity
13yr 2mo	Cerebral palsy	Right
3yr	Erb's palsy/brachial plexus	Right
2yr	Grade 3/4 interventricular hemorrhage	Right
1yr	Unilateral polymicrogyria secondary to cerebrovascular accident in utero	Right

Table 1. Sample Research Protocols

Age	Dosage	Frequency	Duration	Type
2.4-10.7 yrs (Chen et al., 2014)	0.5-6 hrs/day	2-7 days/wk	2-10 wks	Sling, glove, mitten, cast
4-8 yrs (El-Kafy et al., 2014)	6 hrs/day	5 days/wk	4 wks	Sling
1.5-7 yrs (Gelkop et al., 2015)	2 hrs/day	6 days/wk	8 wks	Custom gloves
1.5-12 yrs (Zafer et al., 2016)	6 hrs/day	6 days/wk	2 wks	Mitt: hand Sling: elbow

### REFERENCES

Burkhardt, J., Sheridan, J., Villavecchia, P., Hollander, L., Garbarini, J. G. (2017). Effectiveness of constraint-induced movement therapy for functional use in children with spastic hemiplegic cerebral palsy: a systematic review. *American Journal of Occupational Therapy*, 71. doi:10.5014/ajot.2017.71S1-PO6088

Chamudot, R., Parush, S., Rigbi, A., Horovitz, R., & Gross-Tsur, V. (2018). Effectiveness of modified constraint-induced movement therapy compared with bimanual therapy home programs for infants with hemiplegia: a randomized controlled trial. *American Journal of Occupational Therapy*, 72(6). doi:10.5014/ajot.2018.025981

Chen, Y., Pope, S., Tyler, D., & Warren, G. (2014). Effectiveness of constraint-induced movement therapy on upper-extremity function in children with cerebral palsy: A systematic review and meta-analysis of randomized controlled trials. *Clinical Rehabilitation*, 28(10), 939-953. doi: 10.1177/0269215514544982

Cohen-Holzer, M., Katz-Leurer, M., Meyer, S., Green, D., Parush, S. (2017). The effect of bimanual training with or without constraint on hand functions in children with unilateral cerebral palsy: a non-randomized clinical trial. *Physical and Occupational Therapy in Pediatrics*, 37(5), 516-527. doi:10.1080/01942638.2017.1280871

El-Kafy, M. A., Elshemy, S. A., & Alghamdi, M. S. (2014). Effect of constraint-induced therapy on upper limb functions: A randomized control trial. *Scandinavian Journal of Occupational Therapy*, 21, 11-23. doi: 10.3109/11038128.2013.837505

Gelkop, N., Burshtein, D. G., Lahav, A., Brezner, A., AL-Oraibi, S., Ferre, C. L., & Gordon, A. M. (2015). Efficacy of constraint-induced movement therapy and bimanual training in children with hemiplegic cerebral palsy in an educational setting. *Physical and Occupational Therapy in Pediatrics*, 35(1), 24-39. doi: 10.3109/01942638.2014.925027

Vaghela, V. G. (2014). To study the effects of mcimt versus cimt for young children with spastic hemiplegic cerebral palsy: a comparative study. *Indian Journal of Physiotherapy & Occupational Therapy*, 8(2), 136-141. doi:10.5958/j.0973-5674.8.2.075

Zafer, H., Amjad, I., Malik, A. N., & Shaukat, E. (2016). Effectiveness of constraint induced movement therapy as compared to bimanual therapy in upper motor function outcome in child with hemiplegic cerebral palsy. *Pakistan Journal of Medical Sciences*, 32(1), 181-184. doi: http://dx.doi.org/10.12669/pjms.321.8491