Longitudinal Outcomes of a CIMT and HABIT Program for School-Aged Children

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Introduction
Constraint Induced Movement Therapy (CIMT) and Hand Arm Bimanual Intensive Therapy (HABIT) have been effective interventions for children with unilateral hemiparesis. Few studies have examined longitudinal effects of these combined and interventions over a 6 and 12 month time frame.

Purpose
The purpose of this study was to measure the long term efficacy of a group-based, CIMT and HABIT summer camp for school-aged children with varying neurological conditions to improve upper extremity performance, bilateral coordination, and occupational performance.

Methods
- **Design**: Quantitative repeated measures
- **Hypotheses**: Following CIMT and HABIT camp, at 6 and 12 months, participants will maintain statistically significant gains above baseline in 1) UE performance of affected extremity, 2) bilateral and bimanual function, and 3) occupational performance.
- **Participants**: N=7 children with unilateral hemiparesis resulting from various neurological etiologies ages 5-9 years, 5 returned for 6-8 month follow-up and 4 returned at 12 months.
- **Setting**: Pediatric rehabilitation clinic in an urban Midwestern city and community outpatient facilities (swimming pools, gyms, parks).
- **Instruments**: Bruininks-Oseretsky Test of Motor Proficiency, 2nd ed. (BOT-2), Box and Blocks, The Melbourne Assessment 2nd ed. (MA2), and Pediatric Evaluation of Disability Inventory (PEDI).
- **Camp description**: 6 hour camp, 5 days/week for 1 month, bivalve constraint cast applied for 4 hours per day, 1.5 hours of HABIT per day. Outings involved 2.5 hours of HABIT per week.

Results
- **Significant results were found for the PEDI Feeding subtest (z=−2.00, p=.046, z=−2.00 p=.046) at 6 and 12 month follow-up, and PEDI Functional Skills (z=2.02, p=.043) at the 6 month follow-up.**
- **Differences approaching statistical significance were shown in Melbourne Accuracy (z=−1.84, p=.066, z=−1.83, p=.068) and Fluency (z=−1.84, p=.066, z=−.83, p=.068) at both 6 and 12 month follow-ups.**
- **No significant values were found in bilateral and bimanual function.**

Discussion
- **Hypothesis 3 was partially accepted. Functional self-care skills and feeding skills indicate occupational performance improved after camp and remained significantly above baseline. This may be due to participants performing self-care skills daily.**
- **Hypotheses 1 and 2 were rejected. Scores on UE accuracy and fluency approached significance. Others were not significant.**
- **Greatest gains were noted post-camp, but most did not remain significantly above baseline. These findings support much of the literature on CIMT and HABIT longitudinal studies (add references).**
- **Poor compliance with home program may have led to a decline in gains in UE function and bimanual skills.**
- **Limitations for this study included sampling bias, intervention bias, measurement bias, maturation bias, and attrition.**

Conclusions
This study aimed to measure the long-term effects of CIMT and HABIT up to 12 months after intervention which few studies have done. This study evaluated not only UE function and bimanual performance, but also occupational performance. The CIMT and HABIT camp was found to be effective method for delivering these interventions to multiple children at once. Researchers suggest that in order to maintain gains, more intensive HABIT training, simpler HEP programs with frequent monitoring, and intermittent therapy sessions be implemented.

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