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Effectiveness of home program intervention for children with cerebral palsy: a double-blind randomised controlled trial

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Abstract
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tional measure of improved upper limb co-ordination. Limitations of this study include small numbers and the wide age variations of participants.

References:

1A.4

Psychometric properties of the ‘extended’ Melbourne Assessment of Unilateral Upper limb Function based on Rasch analysis

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Objective: To establish the psychometric properties of the ‘Extended’ Melbourne Assessment of Unilateral Upper Limb Function (the extended Melbourne Assessment).1

Design: A non-experimental secondary analysis.

Method: A relatively large sample of extended Melbourne Assessment raw scores (n=163) were obtained from nine different studies involving children aged 2.5–15 years with varying types and severity of cerebral palsy affecting their upper limb function. Measurement properties of the data were evaluated using the Rasch measurement model.

Analysis: Individual sub-item scores were grouped into one of four identified sub-scales according to the element of movement quality each was designed to measure. Individual sub-scales were analysed separately using RUMM 2020 software.2 Each sub-scale was evaluated for: overall fit to the Rasch model; suitability of the response scale used; fit of individual items and persons; the presence of items on which respondents performed differently due to variables such as gender or scoring by different scorers (known as differential item functioning or DIF); ability to differentiate between respondents of differing abilities (reported as a person–separation index) and uni-dimensionality.

Results: Results supported the extended Melbourne Assessment as comprising four uni-dimensional sub-scales each measuring a unique element of upper limb movement quality. The sub-scales identified measure movement: range, accuracy, fluency and dexterity. Each sub-scale showed overall fit to the Rasch model and reported a high person separation value of ≥0.92. Seven of the 35 sub-items analysed had disordered score thresholds and these irregularities were corrected. Nine sub-items were found to perform differently when scored by different scorers which indicate further investigation of this variable is required.

Conclusion: These findings provide strong evidence supporting the underlying construct and psychometric properties of the extended Melbourne Assessment. The improvements to the scaling of the measure identified by these findings are currently being incorporated in the development of a revised version of the tool to enhance its measurement potential. Clinicians can be confident when using the revised version of the assessment that the upper limb movement elements of: functional range; accuracy for reach and pointing; movement fluency; and dexterity of grasp, release and manipulation are being measured. Further studies are then necessary to investigate those items that performed differently when scored by various scorers and to determine if the assessment is capable of detecting changes in children’s quality of upper limb movement.

References:

1A.5

Effectiveness of home program intervention for children with cerebral palsy: a double-blind randomised controlled trial

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Objective: Home programs are a major strategy for addressing the health needs of children with disabilities, because experts consider programs essential and because programs actively involve families in intervention. Despite widespread use, there was no high quality research that proves that home programs are effective, only a protocol existed to suggest what types of programs may work.1,2 The objective was to evaluate the effectiveness of home program intervention for children with cerebral palsy empirically.

Design: Double blind randomised controlled trial.

Method: Thirty six children school-aged with cerebral palsy (GMFCS I-V) were randomised into three groups: (1)
home program intervention for 8-weeks ($n=12$); (2) home program intervention for 4-weeks ($n=12$); and (3) a control group, who did not receive home program intervention ($n=12$). All intervention was provided in the general community. The primary end-point was change in performance of functional activities and satisfaction with function, as measured by the Canadian Occupational Performance Measure (COPM), from baseline to 8 weeks. Secondary end-points were change in: (1) COPM scores after 4 weeks; (2) goal achievement at 4 and 8 weeks on the Goal Attainment Scale (GAS); (3) quality of arm movement at 4 and 8 weeks on the Quality of Upper Extremity Skills Test (QUEST); and (4) participation at 4 and 8 weeks on the Children’s Assessment of Participation and Enjoyment (CAPE). Differences between groups were analysed using multiple linear regression modeling, with age and severity treated as covariates.

**Results:** Home programs led to statistically significant and clinical meaningful improvements in performance of functional activities and satisfaction with function, with an effect size of 1.4 (95% CI 0.6–2.2) for the 8-week group and an effect size of 2.4 (95% CI 0.7–4.2) for the 4-week group. Home programs also led to significant and meaningful improvements in goal achievement and quality of upper extremity movement. Home programs did not change participation as measured on the CAPE. There was no difference in the amount of improvements between 4- and 8-weeks of home program intervention.

**Conclusion:** This study generated new knowledge about home program efficacy. The findings can therefore be used to guide clinical practice decisions regarding the home program intervention for children with cerebral palsy.

**References:**

**1A.6 Intensive upper limb therapy following botulinum toxin-A in young children with hemiplegic cerebral palsy: results from a randomised controlled trial**

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A combination of Botulinum toxin-A (BoNT-A) and occupational therapy has been found to be more effective than occupational therapy alone in reducing impairment, improving activity level outcomes and goal achievement for children with cerebral palsy (CP). It is now essential to identify the most effective adjunct therapies following injection of BoNT-A including the timing, frequency and intensity of delivery.

**Objective:** This study aimed to evaluate the effects of modified constraint-induced movement therapy (mCIMT) in comparison to bimanual occupational therapy (OT) following upper limb injection of BoNT-A in children with hemiplegic CP.

**Design:** Randomized, controlled, assessor-blinded trial.

**Method:** Primary outcome at baseline, 1, 3 and 6 months was the Assisting Hand Assessment (AHA). The mCIMT intervention ($n=17$) focused on the hemiplegic hand by restraining the unaffected hand using a neoprene mitt for 3 hours per day. Training used a motor-learning approach focusing on repetitive practice of unilateral tasks and activities. Using a bimanual approach to training, occupational therapy intervention ($n=17$) focused on treatment of hand skills using task specific practice, motor skill acquisition principles and cognitive-motor based intervention. All children received 1 hour individual treatment sessions provided by a therapist twice weekly for 2 months and were required to undertake a home program.

**Results:** Thirty-four children [20 males, 14 females; range 18mo-6y, mean 3y (SD 1.3)] with hemiplegic CP completed the trial. Using a linear regression model, adjusted for baseline performance on AHA and for age at time of injection, preliminary analysis of data for the AHA from 26 children indicates that on average, children receiving mCIMT ($n=14$) scored 0.75 logits less than children receiving bimanual OT ($n=12$) at 3 months (95% CI of unstandardized Beta coefficient: -1.79 to 0.29). This effect was not significantly different from zero ($P=0.149$).

**Conclusion:** This study provides the first-ever randomized controlled trial evidence to demonstrate the effects of a