

Immediate and Long-Term Effects of Hippotherapy on Symmetry of Adductor Muscle Activity and Functional Ability in Children with Spastic Cerebral Palsy

Source: McGibbon NH, Benda W, Duncan BR, Silkwood-Sherer D. 2009. Immediate and long-term effects of hippotherapy on symmetry of adductor muscle activity and functional ability in children with spastic cerebral palsy. *Arch Phys Med Rehabil.* 2009;90:966-974.

Purpose:

This study had two objectives: 1) to investigate the immediate effects of hippotherapy compared to barrel-sitting on symmetry of adductor muscle activity during walking in children with cerebral palsy (CP) (phase I) and 2) to investigate the long-term effects of 12 weeks of hippotherapy on adductor activity, gross motor function, and self-concept (phase II).

Design/Methods:

Phase I was a pre- and post-test randomized controlled trial that utilized digital sEMG and videography during walking to assess the immediate effects of HPOT on adductor muscle activity in 25 children completing HPOT intervention and 22 completing barrel intervention. Intervention procedures were directed by a licensed physical therapist with testing procedures performed by an experienced pediatric physical therapist (masked to randomization). Each child was rated using the GMFCS prior to baseline testing to assess the potential relationship between level of disability and degree of treatment response. Intervention consisted of the child seated facing forward on the horse as it was led with a steady pace for 10 minutes. The control group consisted of the child sitting astride a barrel with similar dimensions of a horse, facing forward for 10 minutes while quietly watching a horse-related video on a television in front of them. Three assistances were in place identical to their positions during the HPOT sessions. Surface EMG electrodes were applied per standard placement guidelines on all children. Children walked at a normal pace along a 20-foot marked pathway for 2 trials, 1 down and 1 back while data was collected. *Phase II* consisted of 6 children from phase I who completed a 36 week repeated-measures design study. This study was divided into three 12-week segments which included baseline (no hippotherapy intervention), treatment (once-weekly, 30 minute individualized hippotherapy sessions), and post-treatment (no hippotherapy). Test measures were assessed at T1 (phase I pretest data), T2 (12 weeks following phase I), T3 (following 12 weeks of intervention), and T4 (12 weeks following termination of intervention). Data was collected as in phase I along with the administration of the Gross Motor Function Measure-66 (GMFM-66), the Self-Perception Profile for Children and the Pictorial Self-Perception Profile for Young Children.

Results:

Phase I showed statistically significant decreases in adductor muscle asymmetry following HPOT intervention as compared to no significant difference found in the barrel sitting group. A large effect size (1.32) was found following hippotherapy intervention. *Phase II* found improved adductor muscle symmetry in 4 out of the 6 children with maintenance of these improvements following the 12 week washout period. All 6 children demonstrated improved GMFM-66 scores and maintained these improvements at T4. Variable results were found using the self-perception profiles with 5 of the 6 children showing improvement in at least 1 area.

Conclusion:

Children with spastic CP may demonstrate decreased spasticity and improved adductor muscle asymmetry following intervention utilizing hippotherapy.

Strengths:

Phase I provided comparison to a control group and phase II included a 12 week baseline period to determine stability of measures prior to providing intervention. Test measures were performed by a blinded clinician to decrease bias.

Limitations:

Adductor activity was measured only during walking, not during other functional motor tasks, small sample size, no randomization or control group for phase II, and the inclusion of children with mixed types of CP.

Practical Application:

The utilization of hippotherapy intervention for as little as 10 minutes may have significant effects on spasticity and muscle symmetry in children with spastic CP which may carryover to functional improvements in gross motor activities.