Hippotherapy: an intervention to habilitate balance deficits in children with movement disorders – a clinical trial.

Source: Silkwood-Sherer DJ, Killian CB, Long TM, Martin KS. Hippotherapy: an intervention to habilitate balance deficits in children with movement disorders – a clinical trial. *Phys Ther.* 2012;92:707-717.

Purpose: Is hippotherapy an effective treatment strategy to improve balance and function as measured by performance of activities of daily life in children with mild to moderate balance problems? Does a correlation exist between changes in balance and function?

Design/Methods: This repeated measures design study used a sample of convenience cohort of 16 children ranging in age from 5-16 years with documented balance deficits. Inclusion criteria for this study were that the children were able to stand for 4 seconds without an assistive device and that the children were able to follow instructions for the balance assessment protocol. The children had varying diagnoses including: cerebral palsy (n=5), Down syndrome (n=3), pervasive developmental delay (n=2), autism (n=2), visually impaired (n=2), developmental coordination disorder (n=2), and cerebellar hyperplasia (n=1). Assessment measures included the Pediatric Balance Scale (PBS) and the Activity Scale for Kids – Performance version (ASK-p). The PBS was administered first during all testing sessions and was videotaped, randomized to baseline and posttest measures, and sent to 3 pediatric physical therapists for scoring. The ASK-p questionnaire was then administered and completed by the children who were cognitively able or filled out by the same parent/guardian during all testing sessions. Two baseline measures were complete 7 days apart to assess the stability of the test measures with hippotherapy (HPOT) intervention initiated immediately following the second baseline measure. Post-test assessment took place 24-48 hours following the final HPOT intervention session. Hippotherapy intervention consisted of 6 weeks of bi-weekly 45 minute sessions that were individualized to the child based on his/her response to the treatment session and fatigue level.

Results: Baseline interrater reliability for the PBS was ICC (2,1) = 0.88 (95%CI = -1.0=1.0) to 0.94 (95%CI = .08-1.0) for posttest measures. There was found to be statistically significant differences between PBS ($p<.0001$) and ASK-p ($p<.0001$) between all assessment periods. Post hoc analysis found no difference between baseline measures ($p\leq0.017$) but did find statistically significant differences between pre- and post-intervention scores. The difference between baselines and posttest measures resulted in a large effect size for the PBS (d=1.59) and ASKp (d=1.51) scores following HPOT intervention. A statistical association was found between the PBS and AKSp posttest scores as indicated by a Spearman rho correlation of .700 (p=.003). A correlation between change in PBS and ASKp scores was not found ($r_s=0.13$, $p>.05$). The ceiling limit score was reached on the PBS by 14 of the 16 participants with the exception of single leg stance (SLS), tandem stance, alternating stool touch, and forward reach.

Conclusion: Following 16 weeks of hippotherapy intervention with the direction of a physical therapist, all three children improved in motivation levels.

Strengths:
Balance and functional performance in activities of daily life appear to be improved when hippotherapy is used as a treatment strategy in children with mild to moderate balance deficits.

Limitations:
There were only three participants in this study, so in the future it would be beneficial to see if results prevailed with a larger sample size.

Practical Application: Children with mild to moderate balance difficulties, regardless of diagnosis, may benefit from the use of hippotherapy as an integrative physical therapy treatment approach to assist in improving balance and performance in activities of daily life.