CLINICAL TRIALS

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For American Hippotherapy Association, updated February 2005

Dev Med Child Neurol 1998 Nov; 40 (11): 754-62.
Effect of an equine – movement therapy program on gait, energy expenditure, and motor function in children with spastic cerebral palsy: a pilot study.
McGibbon NH, Andrade CK, Widener G, Cintas HL
The purpose of this study was to evaluate the effect of an 8 week program of Hippotherapy on energy expenditure during walking: on the gait dimensions of stride length, velocity, and cadence; and on performance on the Gross Motor Function Measure (GMFM) in five children with spastic cerebral palsy (CP). A repeated-measures within-subjects design was used consisting of two baseline measurements taken 8 weeks apart, followed by an 8 week intervention period, then a post-test. After Hippotherapy, all five children showed a significant decrease (X2®=7.6, P<0.05) in energy expenditure during walking and a significant increase (X2®=7.6, P<0.05) in scores on Dimension E (Walking, Running and Jumping) of the GMFM. A trend toward increased stride length and decreased cadence was observed. This study suggests that Hippotherapy any improve energy expenditure during walking and gross motor function in children with CP.

Pediatric Physical Therapy 2004; 16: 165-172
The Effect of Hippotherapy on Ten Children with Cerebral Palsy
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The purpose of this study was to determine if Hippotherapy was functionally relevant for children with cerebral palsy. A convenience sample of eleven children with cerebral palsy, ages 2.3 to 6.8 years old, were recruited. Ten subjects completed the study with 98% attendance during the treatment phase. The PEDI and GMFM were used to compare gross motor skills and functional status before and after Hippotherapy. Repeated measures were taken every ten weeks for thirty weeks. Subject received Hippotherapy once a week for 30 minutes during the middle ten weeks. The PEDI and GMFM scores were strongly and significantly related on each test date. Pearson product correlation .729 to .812. Post hoc inter-rater for all PEDI subscales and all GMFM dimensions except lying/rolling. To identify the significance of Hippotherapy, a post hoc analysis of multiple comparisons was done with Tukey's test for honest significant difference. The change in the mean score on the PEDI and GMFM total measures were statistically significant during the Hippotherapy treatment period. The mean change in the GMFM crawling/kneeling and PEDI social skills was also statistically significant. **Conclusion:** From the results of this study, Hippotherapy appears to be a viable treatment tool and a means of achieving functional outcomes in children with cerebral palsy.

Pediatric Physical Therapy (1999) 11:89-101
Influence of Hippotherapy on the Kinematics and Functional Performance of Two Children with Cerebral Palsy
Haehl V, Giulani C, Lewis C, Kinesiology Department, Indiana University, Bloomington, IN and the Department of Physical Therapy, University of North Carolina at Chapel Hill, Chapel Hill, NC
Therapists use Hippotherapy to improve postural control in children with neuromotor dysfunction. Understanding the influence of the horse's movement on the child may clarify mechanisms, which influence posture during Hippotherapy. This study was conducted in two phases. First, measures of the kinematic

relationship between the rider and the horse were developed. A kinematic analysis of the rider's trunk and the horse's back was used to describe postural orientation, postural stability, and temporal phase relations of a novice and an experienced rider. Both riders exhibited biphasic movement patterns in response to the horse's movement. The experienced rider had a more vertical orientation of the trunk and delayed postural response to the movement of the horse. Next, we examined the influence of 12 weekly Hippotherapy sessions on the postural control, coordination, and function of two children with cerebral palsy. Both children with cerebral palsy approximated the biphasic movement patterns exhibited by the two children developing typically. Both also demonstrated improved coordination between the upper and lower trunk, and between the lower trunk and the back of the horse. One child's functional mobility improved. Additional research should investigate the kinematic relationship between the patient and horse and the efficacy of Hippotherapy.

Journal of Alternative and Complimentary Medicine. (2003) 9 (6);817-825

Improvement in Muscle Symmetry in Children with Cerebral Palsy after Equine Assisted Therapy (Hippotherapy)

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OBJECTIVE: To evaluate the effect of Hippotherapy (physical therapy utilizing the movement of a horse) on muscle activity in children with spastic cerebral palsy. DESIGN: Pretest/post-test control group.
SETTING/LOCATION: Therapeutic Riding of Tuscon (T.R.O.T.), Tuscon, AZ. SUBJECTS: Fifteen (15) children ranging from 4 to 12 years of age diagnosed with spastic cerebral palsy. INTERVENTIONS: Children meeting inclusion criteria were randomized to either 8 minutes of Hippotherapy or 8 minutes astride a stationary barrel. OUTCOME MEASURES: Remote surface electromyography (EMG) was used to measure muscle activity of the trunk and upper legs during sitting, standing, and walking tasks before and after each intervention. RESULTS:
After Hippotherapy, significant improvement in symmetry of muscle activity was noted in those muscle groups displaying the highest asymmetry prior to Hippotherapy. No significant change was noted after sitting astride a barrel. CONCLUSION: Eight (8) minutes of Hippotherapy, but not stationary sitting astride a barrel, resulted in improved symmtery in muscle activity in children with spastic cerebral palsy. These results suggest that the movement of the horse, rather than passive stretching accounts for the measured improvements.

Pediatric Physical Therapy (1998) 10,143-147*

Trunk Postural Reactions in Children with and without Cerebral Palsy during Therapeutic Horseback Riding

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The purpose of this study was to determine if children with cerebral palsy (CP) demonstrate normal equilibrium reactions when horseback riding. Seven children who were non-disabled (ND) and six children with CP were videotaped in the frontal plane, posterior view, while horseback riding. Lateral trunk displacement of the rider and pelvic movements of the horse were analyzed during six strides using the Peak 5 motion analyzer. Pelvic movements of the horse appeared as a dual frequency sinusoidal curve. Mean lateral trunk displacement for riders who ere ND was 5.8 degrees (SD=0.5), whereas riders with quadriplegic CP responded normally only 10% to 35% of the time. In conclusion, one of the benefits of horseback riding for children with diplegic CP seems to be the facilitation of normal equilibrium reactions in response to the pelvic movement of the horse. However, in

the case of riders with quadriplegic CP, normal equilibrium reactions were elicited infrequently.

*Editor's note: This study uses the term Therapeutic Horseback Riding but does contain information valid for Hippotherapy.