

Horses and Humans Research Foundation *Advancing Research*

HHRF Webinar Companion, August 2014 Lay Language Summary

Changes in Dynamic Trunk/Head Stability and Functional Reach after Hippotherapy

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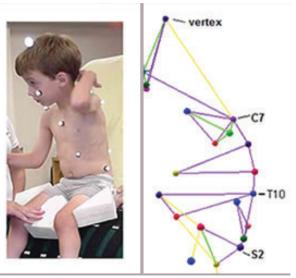
This paper is a follow-up to HHRF's 2014 webinar, developed to be a summary in lay language of the research project as well as to provide interpretative thought on the project's impact on equine-assisted activities and the next steps needed.

Research Project Summary

Note: Hippotherapy (HPOT) is literally defined as therapy using a horse, with hippos being the Greek word for 'horse'. It is a treatment strategy in the context of physical therapy, occupational therapy and speech language pathology. Equine-assisted activities (EAA) is an umbrella term inclusive of all various offerings of equine-based programs and therapies for people with diverse needs.

This research study tested the impact of hippotherapy on posture, head control and reach of 11 children with spastic diplegia cerebral palsy, plus eight age-matched 'typically developing' children as a comparison point. All participants could maintain sitting pos-

ture and could understand and follow directions. Additional criteria guiding subject selection included having had no previous hippotherapy or horse riding experience.



Participant with reflective markers, sitting side-seated on the motorized challenge barrel. The electronic read-outs of the markers illustrated at right.

Each participant had a customized, individualized treatment plan, developed and implemented by an occupational or physical therapist. The common denominator for each treatment plan was 30-45 minutes of mounted, three-dimensional rhythmic movement weekly for twelve weeks. These sessions impart 3-5,000 horse steps, or perturbations, per session, with each step moving the pelvis and challenging postural stability.

Each participant was preand post-tested in a motion lab while sitting on a 'motorized challenge barrel' to measure the impact of the treatment. The children sat both astride and side-seated, which resulted in measures in two of the three dimensions that the horse's ambulation imparts. Six motion cameras captured the movement of reflective markers placed on the participant's body. The systems measured movement, or the children's ability to maintain head control while their pelvis was in motion.

The effect of hippotherapy on the children's upper extremity function was also assessed through a reach test, which measured (also with anatomical markers and digital video) how quickly they could move their hand from their thigh to a target marker. All measures were taken prior to the beginning of

hippotherapy sessions, after a 12 week session and again 12 weeks after the last session. The data was translated from the motion cameras to a computer and were then evaluated.

Research Results

Participants in the study showed significant improvement in their head and trunk control after the 12 weeks intervention of HPOT. The improvement was so drastic that there was no longer significant statistical difference between the six participants with CP and the comparison group of typically developing children when assessing upper body movement.

Reach path ratio testing, which measures arm movement when the partici-

pant reaches for a target object, showed improved efficiency and speed following the HPOT intervention as well. Statistical results were significant, including effect sizes of often more than .8, which means the effects were often grossly observable.

Perhaps one of the most exciting results of this research was the fact that the improvements made during the hippotherapy session were maintained after the sessions ended. The motor improvements were retained for 12 weeks after hippotherapy ended, and in some participants the improvements even continued.

There were some limitations of the study to note: There were no true functional or occupational outcome measures. The study only measured at the participant's impairment level and then extrapolated the functional effect. Also, the sample sizes could be perceived as small, despite being statistically fully powered for head/trunk stability measures. Lastly, there was no control group or pre-HPOT baseline measure other than the comparison of 'typically developing' children

How Does the Research Inform EAA Practices?

1) This research clearly pointed to the positive effect of equine movement on head and trunk stability and functional reach of children with spastic CP following hippotherapy sessions. The common denominator for each test subject was the impact of the three-dimensional rhythmic movement of the horse during a hippotherapy sessions. Many believe that the effect from the equine's three-dimensional gait is imparted in a similar beneficial manner during any mounted session (ie: even without a therapist facilitating specific hippotherapy sessions), but this project does not offer evidence toward that hypothesis.



Image courtesy Carlisle Academy

2) This research suggests that hippotherapy is a therapeutic tool that makes a measurable and visible difference in the basic skills that form the foundation of most functional activities of everyday life. Although it is difficult to claim that statistical significance is equal to clinical significance, it could be maintained that this research is indicative of clinical significance since the effect sizes were large enough to be visible under casual observation.

This research marks a tremendous step toward long-needed affirmation that equine-based therapies support the attainment of goals related to posture, control, core strength and functional reach for children with CP, and likely other populations as well. Program funders and health insurance companies should take note of these impressive results.

- 3) The persistence of these positive gains for participants even when they were no longer receiving HPOT treatment suggests that the motor control improvements learned on a horse may become available as a foundation upon which to build improved functional skills in other aspects of life. Further investigation is needed to quantify these functional skills and the occupational performance and participation improvements that the functional skill development enables.
- 4) Motivational aspects of equine therapy are an assumed strong impact factor in the therapy session. Webinar panelists pointed out that a child would not likely be able to benefit from sitting on the mechanical horse for the simulated 3-5000 perturbations per session because they would not tolerate the physical challenge without the positive motivational factors provided by the live equine and its environment. Hippotherapy, in essence, is prescribed therapy disguised as fun.
- 5) All webinar panelists agree that practice must be supported by evidence.

The participating webinar panelists included Erica J. Gergely, PhD, Victoria Haehl, PhD, Tim Shurtleff, OTD, OTR/L and Kitty Stalsburg, with Philip Tedeschi, MSSW, LCSW acting as facilitator.

Reference: Shurtleff, T. L., Standeven, J. W., & Engsberg, J. R. (2009). Changes in dynamic trunk/head stability and functional reach after hippotherapy. Archives of Physical Medicine and Rehabilitation, 90(7), 1185-1195.

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