

## **The Improvements in Muscle Symmetry in Children with Cerebral Palsy after Equine-Assisted Therapy (Hippotherapy)**

**Source:** Benda, W., McGibbon, N., Grant, K. (2003). The improvements in muscle symmetry in children with cerebral palsy after equine-assisted therapy (hippotherapy). *The Journal of Alternative and Complementary Medicine*. 9 (3): 817-825.

### **Purpose:**

To evaluate the effect of hippotherapy on muscle activity in children with cerebral palsy in order to determine changes in symmetry of postural muscle groups.

### **Design/Methods:**

Fifteen children between the ages of 4 to 12, diagnosed with spastic cerebral palsy, were observed for this pretest/posttest design study. In order to be included in this study, children had to sit, stand, and walk independently with or without an assistive device; follow directions; and sit astride a horse or a barrel. Subjects were recruited through physician and physical therapist referrals and from local pediatric clinics. Informed consent was obtained from parents, and assent was also given by the children. The kids were randomly assigned to either the control group or the experimental group. The control group sat astride a 55-gallon, stationary barrel while watching an 8 minute video of hippotherapy. The horse handler, PT, and sidewalker stood in place as they would in a standard hippotherapy session. The experimental group received 8 minutes of hippotherapy on a horse. Four minutes was spent walking clockwise and the other 4 minutes was spent walking counterclockwise. The barrel and hippotherapy both provided mild adductor stretch, warmth from the saddle pad, and symmetrical forward sitting, while hippotherapy exclusively provided the children with a rhythmic and multidimensional movement from the horse. 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. The microvolts recorded by the EMG were then averaged together for each side of the body.

### **Results:**

The children who received hippotherapy showed significant improvement in symmetry of muscle activity in those muscle groups which displayed the highest asymmetry prior to treatment. The children positioned astride the barrel did not see any significant changes in muscle symmetry. The children who received hippotherapy had a mean change of 64.6% in muscle symmetry, while the children on the barrel had a -12.8% change (a 100% change would mean perfect symmetry).

### **Conclusion:**

Receiving hippotherapy for 8 minutes as opposed to sitting on a stationary barrel lead to improved muscle symmetry in children with spastic cerebral palsy. These results indicate that the movement of a horse creates greater improvements than simply passive stretching on a barrel.

### **Strengths:**

The EMG provided an objective measure in order to measure symmetry in muscle activity. Additionally, subjects were randomized. Hippotherapy provides movement similar to the mechanics of a natural human gait while also providing physical, cognitive, emotional, and social stimulation.

### **Limitations:**

The group randomly assigned to the barrel had less asymmetry of muscle activity prior to testing. Due to the small sample size, statistical power was limited. This study does not confirm the lasting effects of hippotherapy.

### **Practical Application:**

Muscle symmetry can be measured and analyzed using EMG. Hippotherapy improved muscle symmetry more than sitting on a stationary barrel. To receive further information, a longer study with more children is needed.

