

## Improving Gross Motor Function and Postural Control with Hippotherapy in Children with Down syndrome: Case Reports

**Source:** Champagne D, Dugas C. Improving gross motor function and postural control with hippotherapy in children with Down syndrome: case reports. *Physiother Theory Pract.* 2010;26(8):564-571.

### **Purpose:**

How does 11 weeks of hippotherapy intervention affect gross motor function of head and trunk control in two children with Down's syndrome?

### **Design/Methods:**

Assessment measures utilized in this study include the Gross Motor Function Measure (GMFM) at pre- and post-intervention assessments and a multi-axial accelerometer comparison at pre- and mid-intervention assessments. Child 1 was a 28 month old male with difficulties noted in balance, learning and cognitive skills. Child 2 was a 37 month old female with learning and cognitive difficulties noted. Both children had negative x-rays for atlantoaxial instability and had no hyperlaxity of the hip joint. Physician medical consent for participation in this study was provided. Both children communicated through sign language. Each child's parents agreed to hold all medication and to not begin any new activities throughout the 11 week treatment period. Hippotherapy intervention sessions lasted 30 minutes with each child assuming 3 different positions on the horse (forward sitting, backward sitting, and side sitting). The same horse was used for both children. A lightweight helmet, approved for equine activities, was worn by each child along with a handmade safety belt with handles. The equipment used on the horse included a saddle pad, flat surcingle, a licol, and a lead chain. Hippotherapy sessions were led by an experienced occupational therapist (OT) with the assistance of a horse walker and two side walkers. The OT stood at a 45° angle to the treatment team in order to provide immediate and continuous feedback related to the position of the child, the direction of the horse, and the speed of the horse. Each intervention session was videotaped to quantify the amount of stimulation received in each seated position on the horse. The amount of time spent on a forward moving horse was maximized by limiting the number of stops experienced during the intervention sessions. The GMFM-88 for children with Down syndrome was administered using standardized protocol by two experienced physiotherapists, one in person and one via video tape. Pre- and post-intervention assessments had an interrater reliability of 0.96 and 0.97, respectively. Each child's parents were present for the GMFM assessment to provide communication using sign language and verbal cues. Multi-axial accelerometers were used to assess the change in head and trunk control in relation to the horse's forward movement. The child was always seated facing forward during application of accelerometer. Due to a technical problem with an accelerometer only pre- and mid-intervention values were obtained and compared.

### **Results:**

Child 1 had a significant treatment effect in mean GMFM scores when compared at pre- and post-intervention ( $t = 3.058$ ,  $df = 4$ ,  $p < .05$ ) as did child 2 ( $t = 2.662$ ,  $df = 4$ ,  $p = 0.056$ ). The largest improvement was seen in the GMFM walking/running/jumping category for both children. Analysis of accelerometer data found that child 1 had improved mediolateral head stability at mid-intervention and child 2 had improved mediolateral trunk stability at mid-intervention.

### **Conclusion:**

Following 11 weeks of hippotherapy intervention, improved motor performance in fundamental motor skills were seen in two children with Down's syndrome as measured by the GMFM.

### **Strengths:**

The strengths of this study include the use of multi-axial accelerometer; a fairly long intervention period, and use of masked assessors.

### **Limitations:**

This study was limited due to a small sample size, equipment malfunction, and no description of total number of treatment sessions

### **Practical Application:**

Mediolateral trunk and head control may be improved in children with Down's syndrome following hippotherapy intervention which may improve performance in fundamental motor skills such as walking, running, and jumping. GMFM findings in this case study are consistent with findings in other hippotherapy studies of children with cerebral palsy.