

The Effects of Physical Therapy Delivered as an Intensive Model Incorporating Equine Movement on a Child with Mild Intellectual Disability and Chiari Malformation: A Case Study

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Background

There is mixed research on optimal dosage of Physical Therapy (PT) for children with generalized motor and developmental delays. Current research indicates there may be a correlation between hours of therapy and positive outcomes in coordination and gross motor function¹, but available studies are limited.

PT incorporating equine movement has been widely studied in patients with Cerebral Palsy¹, but research is limited in other populations such as those with generalized developmental and gross motor delays^{2,3,4}.

Purpose

To evaluate the effects of PT delivered in an intensive format and with the use of equine movement on balance and coordination in a child with mild intellectual disability (MID).

Case Description

MA is an 11-year-old girl with a diagnosis of a unilateral Chiari malformation and mild intellectual disability (MID). She presents with impaired coordination and balance, and decreased physical endurance.

She has been receiving school-based PT, Occupational Therapy, and Speech Therapy, and home-health therapy services. She had been receiving PT via telehealth since July 2020.

Her PT goals were to improve balance and coordination in order to participate more fully with her peers at school during sports and group activities.

Methods

July 26th-29th 2021 from 8am-12pm

The clinic was conducted in a "summer camp" format at a local Flagstaff ranch with MA and 3 other children.

Traditional ground-based PT interventions included: outdoor UE/LE gross motor training, balance and proprioception activities, and UE/LE coordination tasks.

30 mins of Hippotherapy intervention was provided daily as specified by the American Hippotherapy Association, and included: balance and coordination activities, postural dynamics, core strengthening, and vestibular interventions via equine movement.

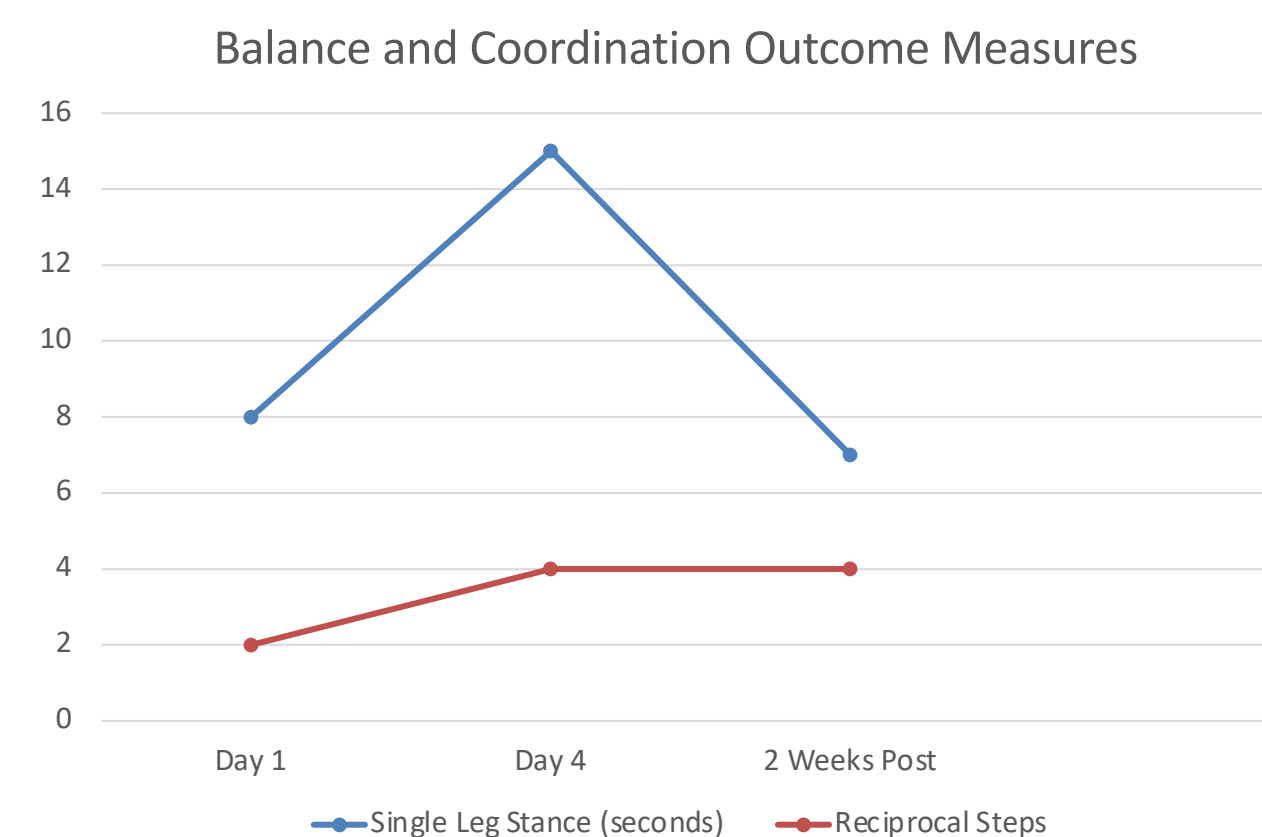
Evaluation Findings

Short Form Bruininks-Oseretsky Test of Motor Proficiency Second Edition (BOT-2) July 8, 2021

- Percentile ranking 1 (Well-Below Average)
- Lowest scores in bilateral coordination and balance

Day 1 of Clinic (7/26/21)

- Single Leg Stance held for 8 seconds in 1 out of 3 trials
- 5 Jumping Jacks over 45s with noted pauses halfway through action
- Stump balance beam: Moderate Assistance for loss of balance correction. Completion of 2 reciprocal steps. MA consistently exhibited >20 degrees of lateral sway



2 Weeks Post Clinic



4 Months Post Clinic



Outcome Measures

Balance

- Single Leg Stance
- Observational & video analysis

Coordination

- Jumping Jacks
- Observational & video analysis

*The stump balance beam evaluated both balance and coordination.

Discussion

Favorable effects:

MA demonstrated improved balance and coordination in functional tasks, and decreased need for both tactile and verbal assistance. She completed more reciprocal stepping in less time needed for motor planning, and exhibited increased confidence. After 2 weeks with no PT services she remained confident and performed a two-foot takeoff and landing, and she retained the amount of reciprocal stepping. MA's posterior pelvic tilt also decreased notably from day 1 to day 4 with improvements in muscular coordination.

Continued research is warranted in intensive pediatric clinics to determine optimal dosage for pediatric patients and full implications of equine movement on children with developmental delays. Research should be conducted to attempt to isolate variable factors of PT completed in enriched environments⁵ and the intensive model to determine variable influence.

Limitations:

Variable patient participation, and alternating activity times. When equine movement was utilized earlier in the day, MA expressed less interest in groundwork PT. It was difficult to re-test measures daily as MA preferred other activities.

Treatment Findings

Day 4 of Clinic (7/29/21)

- Single Leg Stance held for 15 seconds in 1 out of 2 trials
- 5 Jumping Jacks over 10 seconds with decreased pause and decreased need for verbal cueing
- Stump Balance Beam: Stand by Assist for cueing and 4 reciprocal steps. <10 degrees of sway

2 weeks post-clinic (8/12/21)

*MA did not receive therapy services for 2 weeks

- Single Leg Stance held for 7 seconds in one of three trials
- 10 Jumping Jacks 10 completed with a two second pause halfway through action
- Stump Balance Beam: SBA and 4 reciprocal steps. Two-foot jump off. <20 degrees of lateral sway

References

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