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The Impact of Body-Weight Supported Locomotor Training in a Toddler with GMFCS Level V Cerebral Palsy: A Case Study

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BACKGROUND AND PURPOSE

- Children with cerebral palsy (CP) classified as Gross Motor Function Classification System (GMFCS) level V present with decreased gross motor function and trunk control that impacts their functional activities and participation in family activities (Palisano et al 2008).
- Research indicates body-weight supported locomotor training (BWSLT) may improve motor control for children with neuromotor disabilities (Damiano & DeJong 2009)
- The toddler years present a window of opportunity for developmental changes.
- Early physical therapy during the toddler years may be a critical time for impacting motor outcomes for children with CP in GMFCS levels IV-V
- **The purpose of this case study was to explore the impact of a 6-week BWSLT intervention on postural control, gross motor function, and quality of life in a young child with cerebral palsy in GMFCS level V.**

CASE DESCRIPTION

- A 3 year-old male was recruited from a local pediatric home health agency.
- Complications during birth caused a true umbilical cord knot, resulting in hypoxic ischemic encephalopathy.
- He was diagnosed with CP at 12 months old.
- His GMFCS classification was Level V.
- He presented with spasticity in all 4 extremities, gross motor delay, truncal ataxia, and decreased head control.
- The child was dependent for all functional mobility and activities of daily living.



Functional Impairments

- Hypotonia of trunk
- Hypertonia of extremities
- Decreased strength
- Decreased balance

Activity Limitations

- Transitional movements (ie supine ↔ sit)
- Creeping
- Standing
- Walking
- Wheelchair mobility

Participation Restrictions

- Play activities
- Family routines (picnics, parties, outings)
- Caregiving routines (eating, dressing, bathing)

METHODS

INTERVENTION

- Attended BWSLT sessions 3 X per week for 6 weeks.
- An experienced pediatric physical therapist and 3 student assistants facilitated the gait cycle on the treadmill.
- Facilitation was decreased when the child demonstrated improved motor control.
- Over the 6 weeks, treadmill speed was systematically increased from 0.7 mph to 1.8 mph and body-weight support was systematically decreased from 50 to 33%.
- Total walking time varied between 11 and 26 minutes (in 3-5 minute bouts) and total standing time ranged from 4 to 13 minutes (in 2-5 minute bouts).
- The child attended 17 of the 18 sessions, missing 1 due to respiratory illness.

EQUIPMENT



MAGS Suspension Vest pediatric harness (Maine Anti-Gravity Systems Inc, Portland, Maine)



SafeGait 360* Balance and Mobility System (Gorbel Medical, Victor, New York)



Gaitkeeper GK 2000T treadmill (LiteGait by Mobility Research, Tempe, Arizona)

OUTCOME MEASURES

- GMFM-66 = Gross Motor Function Measure (Russell et al 2000)
- SATCo = Segmental Assessment of Trunk Control (Butler et al 2010)
- CPCHILD = Caregiver Priorities and Child Health Index of Life with Disabilities (Narayanan et al 2006)

OUTCOMES

	Pretest	Posttest
GMFM-66 Score (SE) 95% CI	20.5 (2.2) 16.3 – 24.8	26 (2) 22.1 – 29.9
SATCo Total Score (Level of Control)	1/20 (Level 0)	2/20 (Level 1)
CPCHILD	61.5	61.91

DISCUSSION

- The outcomes of this case study suggest that gross motor function and trunk control may improve through BWSLT in young children with CP classified as GMFCS level V.
- The child's school physical therapist reported he was able to hold his head up more during the day and showed increased endurance with improved lower extremity control with walking in his gait trainer.
- Quality of life did not improve much after the intervention, as reported by the child's mother.
- The 6 week time frame was chosen based on previous literature, but a longer time frame may have produced greater results.
- The SafeGait 360 has a lower limit of 10 pounds body weight support, which was 33% of the child's weight. Another system may have been better to allow more progressive unweighting for this young child.
- Future research is needed to determine if this type of intervention can improve function across a larger population of toddlers with CP in GMFCS levels V.
- Dosage requirements for this population should also be explored.

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