

RESEARCH SYNOPSIS: A PILOT STUDY

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RESEARCH SYNOPSIS

The Effect of Hippotherapy on Motor Control, Adaptive Behaviors, and Participation in Children with Autism Spectrum Disorders, a Pilot Study.

SOURCE

Ajzenman, H., Standeven, J., & Shurtleff, T. (In press). The effect of hippotherapy on motor control, adaptive behaviors, and participation in children with autism spectrum disorders, a pilot study. *The American Journal of Occupational Therapy*.

INTRODUCTION/RESEARCH QUESTION

Postural control plays an important role in development, potentially impacting activity participation and performance in a variety of daily occupations. A study by Fournier, et al. (2010) suggested that children with autism spectrum disorders (ASD) have a delayed postural control system, with noted increased postural sway compared to typically developing children.

PURPOSE OF THIS INVESTIGATION

To determine if incorporating hippotherapy as a treatment tool in occupational therapy can improve function and participation in children with ASD. Specifically, can postural control, adaptive behaviors, and participation improve after 12 weeks of occupational therapy incorporating hippotherapy?

METHODS/DESIGN

Using a single group pre-post design, six children ages 5-12 with ASD participated in 12 weeks of intervention for 45 minutes per week. Four boys and two girls made up the study population; all had specific types of ASD, including Asperger's syndrome and autism. All therapy sessions were provided by a licensed occupational therapist or certified occupational therapy assistant. A progression strategy for treatment was created that examined five domains: motor control, functional communication, cognition, social skills, and interactive play. This hierarchical approach was developed to provide uniform treatment while offering flexibility for the use of clinical judgment as part of the treatment sessions and progression of skilled tasks.

Data was collected one week prior to and one week post intervention. Postural stability data was gathered through objective center of mass and center of pressure data points collected from simultaneous recordings of an eight video motion capture system and a single force plate while a participant stood quietly for approximately 20 seconds over multiple trials. Adaptive behaviors and participation were evaluated through the use of parent-report measures. The Vineland Adaptive Behaviors Scale-II was used to measure adaptive behaviors and performance in daily activities through communication (receptive, expressive, written), daily living skills (personal, domestic, community), socialization (interpersonal relationships, play and leisure time, coping skills), and motor skills (fine and gross). The Child Activity Card Sort (a modified version of the Preschool Activity Card Sort) was used to explore engagement in self-care, community mobility, high demand leisure, low demand leisure, social interaction, domestic, and educational activities through the use of a card sort based on personal, familial, or environmental factors impacting participation.

RESULTS/DISCUSSION

Significant improvements in postural control were observed in children with ASD after hippotherapy in a variety of postural sway components, such as the amount of sway in the anteroposterior and mediolateral directions, area of sway, decreased movement variability (decreased inconsistencies in postural control movements), and coupling of center of mass over center of pressure (an important indicator of postural stability). Significant decreases in postural sway ($P < 0.05$) in these variables with large effect size (moderate change, $d = 0.05$ to clinically significant change, $d > 0.08$) implied improved postural stability after hippotherapy for children with ASD. These findings suggest that participants developed basic righting and equilibrium reactions to remain stable while performing therapy activities during equine movement, which potentially translated to improved postural control during standing and other functional activities.

Significant changes were also observed in performance of activities as reported in the Vineland

Adaptive Behaviors Scale-II, including communication (receptive expression) and socialization (coping). No significant changes were seen in the other subdomains of communication and socialization, and there were no significant improvements in daily living and motor skills. However, significant improvements were observed in participation in daily activities (Child Activity Card Sort), specifically in self-care, low demand leisure, and social interactions. No significant changes were recorded with respect to community mobility, high demand leisure, domestic, and educational participation. With improved postural control, children may have developed automatic postural mechanics promoting improved performance in basic fundamental skills such as receptive communication and coping, all of which were integrated into this dynamic therapy approach. As a result of these developed skills, children with ASD may be more willing to engage in a variety of activities, using newly developed motor patterns to engage in basic daily tasks. With improvements in receptive communication, coping, and social skills, a “virtuous cycle” is potentially created wherein parents/caregivers continue to offer more opportunities with noted increases in participation, and children subsequently develop more skills and are thus more willing to engage in daily activities.

LIMITATIONS/FUTURE STUDIES

This study contained a small sample size with a wide range of ages and types of ASD; however, its purpose was to explore objective changes in children with ASD after incorporating hippotherapy as a treatment strategy, and to use this work as part of a larger study that is currently being completed. Fidelity

of treatment was not ensured, as the consistent use of the treatment progress strategy was not monitored throughout the study. Although this makes the results less applicable to a wider population, the results may be representative of a typical clinical setting that incorporates equine movement and where a wide variety of clinical judgment is used to meet the needs of individual clients. Further research is needed to investigate the length and intensity of hippotherapy as a treatment strategy to promote overall occupational performance and participation in children with ASD.

CLINICAL APPLICATION

The results of this study suggest that hippotherapy is a useful treatment strategy for improving postural control, basic fundamental adaptive behavior skills, and engagement in daily activities for children with ASD. This pilot work provides a foundation for future studies to explore the impact of hippotherapy as a treatment strategy in occupational, physical, and speech therapy in children with ASD and other neurodevelopmental disorders. This study suggests that there are potential performance and participation benefits of hippotherapy beyond sensorimotor skill development, which should be further explored and implemented in both clinical and research settings. ◀

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Heather is a North Carolina licensed occupational therapist. She works as an independent contractor for a pediatric community based practice, incorporating hippotherapy as a treatment strategy for some of her clients. This pilot study was part of her doctorate work at the Washington University in St. Louis School of Medicine Program in Occupational Therapy. She can be reached at: hfajzenm@gmail.com

