

RESEARCH CRITIQUE

EFFECTS OF HIPPO THERAPY ON BODY FUNCTIONS, ACTIVITIES, AND PARTICIPATION IN CHILDREN WITH CEREBRAL PALSY BASED ON ICF-CY ASSESSMENTS

BY ELLEN ERDMAN, PT, DPT, HPCS



PURPOSE

The authors sought to evaluate the effects of hippotherapy on body functions, activities, and participation in children with various functional levels of cerebral palsy (CP).

SOURCE

Hsieh Y-L, Yang C-C, Sun S-H, et al. Effects of hippotherapy on body functions, activities and participation in children with cerebral palsy based on ICF-CY assessments. *Disability and Rehabilitation*. 2017;39(17):1703-1713.

DESIGN/METHODS

This study was conducted at the China Medical University in Taiwan. Researchers used an ABA trial design to evaluate the effect of hippotherapy on 14 children with CP, ranging in age from 3 to 8 years. Any regular current therapy was permitted to continue during the study period. Participants were divided into 2 groups based on the Gross Motor Function Classification System (GMFCS). Group A included children classified as GMFCS level I-III (6

participants); group B included those at GMFCS level IV and V (8 participants). As there was no separate control group, each child acted as their own control. Children who had received botulinum toxin injections within 6 months, underwent orthopedic surgery within 12 months, or had a diagnosis of severe intellectual disability, uncontrolled seizures, or poor hearing/vision were excluded from the study. Outcomes were measured with the International Classification of Functioning, Disability, and Health – Children and Youth (ICF-CY) checklist, which provides a comprehensive overview of functioning, activities, and participation in a universal language for interdisciplinary assessment of children. The checklist allows impairments/functions to be quantified or rated on a scale. It also accounts for ability/capability compared to actual functional performance. Two assessors, both trained in the use of the ICF-CY checklist, were blinded to the intervention design. Baseline measures were taken at week 0 and week 12 of the child's existing therapy. Then, 30-minute hippotherapy sessions were conducted by a physical therapist once per week for 12 weeks. All sessions followed the same protocol:

- Use of 1 of 2 trained and sound horses, both with symmetrical and free movement
- Fleece pad and flat surcingle
- Horses led by a handler on a

designated track at a steady walking pace

- Physical therapist walked on one side of the horse, assisting at the child's pelvis as appropriate
- All children sat astride, facing forward
- Mounted 5-minute warm-up and cool-down conducted on the static horse
- Hippotherapy consisted of 10 minutes of equine movement in a clockwise direction, followed by 10 minutes in a counter-clockwise direction, all at a steady walk

RESULTS

All participants completed the study. In group A, improvements were noted in the areas of mental functions; sensory functions and pain; functions of the cardiovascular, hematologic, immunologic, and respiratory systems; and neuromusculoskeletal and movement-related functions. Group A also showed changes in learning and applying knowledge, mobility, self-care, and major life areas. Group B demonstrated positive changes in the areas of neuromusculoskeletal and movement-related functions, general tasks and demands, mobility, and major life areas. All changes were statistically significant ($P < 0.05$). Participants in Group B demonstrated a decline in some of these areas during the withdrawal period of the study.

RESEARCHER'S CONCLUSION

The researchers concluded that hippotherapy has a beneficial effect on body functions, activities, and participation in children with CP of all GMFCS levels.

STRENGTHS

While the ICF-CY checklist lacks psychometric data regarding its validity and reliability, it does capture changes in function and participation. Therefore, it allows assessment of each participant's ability and performance before and after intervention in ways that can be meaningful to the individual, society, and payors. The authors used a consistent protocol for each child, which is a methodological strength. While this strict protocol did not allow for individualized intervention, it did permit replication of the method and potentially

eliminated the impact of the skill of the treating therapist as a factor contributing to the effectiveness of the hippotherapy.

LIMITATIONS

The sample size is small and may not be representative of the 3-to-8-year-old population with CP. The ICF-CY has different versions for different ages, and the participants in this study crossed over into both versions. The CIF-CY is a subjective checklist, and its use has not been specifically validated. The use of additional outcome measures would have provided useful information.

COMPETING INTERESTS

No competing interests were reported.

PRACTICAL APPLICATION

Aspects of this study can be directly linked to pediatric and adult treatment.

The framework of the ICF-CY provides a base for describing status and functional performance that can be applied to any client. Therapeutic interventions and goals are based on these performance areas, and clinical decisions are further guided by the client's health conditions, environment, and other personal aspects. The ICF-CY is lengthy but does encompass many areas, and using this checklist may be useful in quantifying a client's status at any given time.

The strict protocol of directing the horse to walk in a clockwise direction for 10 minutes followed by 10 minutes in a counter-clockwise direction is a reminder that the movement of the walking horse is the core of hippotherapy practice. Handling and cues, purposeful manipulation of the equine movement, position changes, and toys may all contribute to the therapeutic experience, but improvements were noted with the simple, strict protocol used in this study. ◀

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RESEARCH CRITIQUE

CHANGES IN DYNAMIC TRUNK/HEAD STABILITY AND FUNCTIONAL REACH AFTER HIPPO THERAPY

BY SARAH BUSSELMAN



NOTE TO READERS:

This specific study does not indicate which therapy service (occupational therapy, physical therapy, speech-language pathology) was provided. The author has acknowledged this as a limitation of this study. Per the recommendations of AHA, Inc., all studies should be therapist-lead with hippotherapy as the treatment approach, strategy, or tool for intervention. As such, it is suggested that all future research studies first indicate the specific therapy service that is incorporating hippotherapy, and then explore the specific impact on various performance and skill areas.

PURPOSE

The main purpose of this study was to determine the impact of hippotherapy on head, trunk, and upper extremity functional reach in children with spastic diplegia cerebral palsy (SDCP). Children with SDCP may receive hippotherapy services, so any outcomes of this research can provide meaningful supporting evidence for professionals who serve this population in a hippotherapy setting. The results of this study may also be applied, with discretion, to children with other diagnoses who engage in hippotherapy sessions and experience difficulty with postural control or functional reach.

DESIGN/METHODS

The study was a non-randomized controlled trial with pre- and post-testing. Participants of the study were purposely recruited for either the experimental or control group. The experimental group met rigorous inclusion criteria and the control group was age-matched to the children with SDCP. The recruitment method was not described in this study, which posed an opportunity for sampling bias. The experimental group, consisting of 11 children with SDCP, was tested for trunk and head control and functional reach before the hippotherapy intervention, 2 weeks after completion of the intervention, and 12-14 weeks post intervention. The control group, consisting of 8 typically developing children, received the testing battery one time for normative data and received no hippotherapy or other intervention. The authors measured head angle, anterior posterior trunk translation, reach path ratio, and elapsed reach time as objective data for changes in head control, trunk control, and functional reach. The hippotherapy intervention consisted of one 45-minute mounted session weekly for 12 weeks.

RESULTS

This study demonstrated good subject retention, as only one child dropped out of the experimental group before the last 12-week post

intervention test. When compared to the control group, the experimental group demonstrated significant differences in head and trunk control and functional reach. These changes were retained for at least 12 weeks. The authors reported that the impairment level of the children with SDCP and the dosage of hippotherapy intervention sessions may have affected the results. The authors suggested that massed practice, variable practice, and vestibular and visual stabilization positively impacted the neurodevelopmental changes of the experimental group.

RESEARCHER'S CONCLUSION

The authors concluded that motor control of the head and trunk increased and functional reach improved for children with SDCP after 12 weekly 45-minute hippotherapy sessions. The authors suggested that hippotherapy can be a valuable therapeutic tool for occupational and physical therapists that may improve function in many activities of everyday life for children with SDCP. It should be noted that the results of this study are indicative of changes at the level of body function and structure, so one can only hypothesize that improvements will impact daily life. More research is needed to establish whether hippotherapy can truly have an observable impact on daily performance and participation for children with SDCP.

STRENGTHS

This study has strong internal validity because the measured outcomes were directly linked to the purpose of this study. This study demonstrated strong reliability with accurate, objective data stemming from excellent reliability for marker placement and test-retest reliability for video motion capture. Researchers used repeated-measures analysis of variance with a *priori* significance level of $\alpha=0.5$, independent sample t-tests, and Cohen's *d* for statistical analysis of the data. The repeated-measures analysis of variance was an appropriate measure to distinguish change when variables, in this case time, were different. In this study Cohen's *d* and independent t-tests were appropriate methods to distinguish effect size and statistical change, respectively. However, because the sample size was small the results may be over-inflated.

LIMITATIONS

Although rigorous, this study does have numerous limitations. These include a short period of intervention, not enough pre-intervention baseline assessments to factor out maturation or other therapies, and a simulated functional reach test. Additional limitations included an overall small sample size and minimization of confounding factors, which makes it difficult to generalize the results to other children with SDCP. The overall small sample size and the control group having fewer children than the experimental group should be recognized as potential factors that could have impacted the statistical analysis and results. The study does not indicate whether the researchers were blinded to group assignment, which introduces opportunity for bias during testing. Additionally, the authors do not describe other confounding factors

such as medication or comorbidities. The broad description of intervention activities and a pilot study that yielded different results suggests difficulty replicating this study.

COMPETING INTERESTS

No competing interests were reported.

PRACTICAL APPLICATION

Overall, this article provided reasonably strong evidence that certain aspects of head and trunk control and functional reach improved in children with SDCP who participated in a 12-week hippotherapy intervention, and these changes persisted over time. This study provides a strong foundation that begins to establish a connection between improvements in body function and structure as a result of hippotherapy that have potential to impact everyday function. ◀

CONGRATULATIONS!

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*This listing was accidentally omitted from the Winter 2017 issue of HIPPO THERAPY Magazine. We apologize for the oversight.



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