Hippotherapy within Physical Therapy Treatment: Helping Patients with Cerebral Palsy Achieve Functional Goals

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Northern Illinois University

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Helping Patients with Cerebral Palsy Achieve Functional Goals

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Hippotherapy within Physical Therapy Treatment: Helping Patients with Cerebral Palsy Achieve Functional Goals

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Abstract

Hippotherapy is a treatment tool that can be utilized by trained occupational therapists, speech language pathologists, and physical therapists. It involves the utilization of a horse’s movement to facilitate certain sensory, adaptive, neuromotor, cognitive, and physical responses from a patient. The purpose of this project is to examine how hippotherapy as a treatment tool in physical therapy benefits children with cerebral palsy. The examination of this subject matter was conducted in a case study format. For twelve weeks, one patient with cerebral palsy’s physical therapy sessions utilizing hippotherapy were observed. During these sessions, her progress towards reaching a specific functional goal, crossing midline dynamically, was tracked. The medium of presentation of these findings is video. A video medium allows viewers of this project to be able to visualize the results for themselves as hippotherapy is a non-traditional treatment tool, and individuals may not be familiar with the ways in which hippotherapy is integrated into a physical therapist’s treatment plan.
I. Introduction/ What is Hippotherapy and Cerebral Palsy?

Merriam-Webster defines “physical therapy” as “therapy that is used to preserve, enhance, or restore movement and physical function impaired or threatened by disease, injury, or disability and that utilizes therapeutic exercise, physical modalities…, assistive devices, and patient education and training (Merriam-Webster)”. Physical therapists operate in many different types of settings such as outpatient clinics, hospitals, rehabilitation centers, homes, and schools. There are many specialties in this profession such as pediatrics, geriatrics, orthopedics, neurology, and women’s health.

Due to the diversity of this profession, physical therapists may choose to specialize in the utilization of specific treatment tools to best treat their patients. One such treatment tool is hippotherapy. Hippotherapy is a treatment tool utilized by speech-language pathologists, occupational therapists, and physical therapists that involves utilizing, as the American Hippotherapy Association states, “the purposeful manipulation of equine movement as a therapy tool to engage sensory, neuromotor, and cognitive systems to promote functional outcomes (American Hippotherapy Association)”. It is key to understand that there is no such thing as a hippotherapist, only physical therapists, speech-language pathologists, and occupational therapists who use hippotherapy as a treatment tool. Also, hippotherapy is not a horseback riding lesson nor recreational in nature. It is a treatment tool that utilizes the horse’s threedimensional movement to achieve the functional goals of a patient.

Hippotherapy can benefit patients with a wide range of diagnoses and impairments such as autism spectrum disorder, down syndrome, impaired coordination, cerebral palsy, traumatic brain injury, stroke, and impaired balance. For the purposes of this case study, this video will
focus on how hippotherapy benefits patients with cerebral palsy. Cerebral palsy is an umbrella term for “group of disorders that affect a person’s ability to move and maintain balance and posture” (Centers for Disease Control and Prevention, 2023). Symptoms are caused by a physical injury to the brain that affects various areas of it. The instance of injury may occur before birth or during early childhood and may be caused by various occurrences such as improper development in the womb, infections that cause brain swelling, brain bleeding, stroke, or a lack of oxygen (Mayo Clinic, 2023). Symptoms present as well as their severity vary from patient to patient.

II. Literature Review

Hippotherapy has unique properties that make it such a beneficial treatment tool. One such benefit is its ability to improve trunk stability in patients. The horse’s movement activates the components of human movement: static, dynamic, weight-shifting, and rotation (Sterba, 2002). The horse leader can increase or decrease the horse’s speed as well as stop, turn, or reverse the horse. These changes in the horse’s movement facilitate stabilization of the core and improve ability to recover from changes in equilibrium (McGibbon et al., 1998). As the patient improves these equilibrium-related abilities their muscles strengthen as well. The increase in trunk stability and strength allows patients to better weight shift and maintain equilibrium on the horse as well as in their daily lives (Sterba, 2007).

Another key attribute of hippotherapy that makes it such a beneficial treatment tool is its ability to provide patients with reciprocal movement that mimics the ambulation pattern of a typical human (Sterba, 2002). The reason a horse is able to mimic this movement is due to the way in which the horse’s pelvis moves. The movement of a horse’s pelvis is able to emulate
many of the movements of a human’s pelvis when walking (Garner & Rigby, 2015). When the patient is on the moving horse, they receive sensory and motor feedback similar to that of someone who is walking (Berg & Causey, 2014). This is especially beneficial to patients who have ambulation-related challenges as their brain has likely not experienced the sensory and motor feedback associated with a typical ambulation pattern.

Additionally, hippotherapy’s utilization of the horse’s movement has a positive effect on tone regulation in children with cerebral palsy. Typically, people with cerebral palsy experience atypical muscle tone (U.S. Department of Health and Human Services, 2023). This can either manifest as hypotonia, loose or relaxed muscles, or hypertonia, stiff or inelastic muscles. Irregular tone can make movement more difficult. The most common type of cerebral palsy is called “spastic cerebral palsy” and makes up approximately 80% of cerebral palsy cases (Centers for Disease Control, 2023). Spastic cerebral palsy is noted to cause hypertonia. The movement of the horse present in hippotherapy has been shown to facilitate relaxation in patients with spastic cerebral palsy (Bertoti, 1998).

III. Introduction to Patient, Clinic, and Goals

From early September 2023 to late November 2023, I studied one patient with cerebral palsy. I specifically studied how hippotherapy as a treatment tool in her physical therapy sessions to explore the impact of this tool on a specific functional goal set by a physical therapist¹. This case study took place at Strides in Motion, an outpatient physical therapy

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¹ Originally, it was planned to explore a second goal as well as the one explored in this case study. This second goal would relate to being able to hold a tall kneeling position while the horse was moving. Due to an unforeseen diagnosis of scoliosis during middle of the data collection period of this case study, I was advised by the patient’s
practice where the physical therapist utilizes hippotherapy as a treatment tool. At Strides in Motion, the horses are directed via a technique known as long-lining. This practice has been adopted by Strides in Motion due to its ability to allow the horse leaders to keep the horse’s body symmetrical, an important aspect of hippotherapy.

The subject of this case study has been attending one, one-hour physical therapy session at Strides in Motion each week for the past year. She is a ten-year old female who has been diagnosed with spastic quadriplegic cerebral palsy (cerebral palsy which affects the four limbs), hydrocephalus (an accumulation of fluid in the brain), and scoliosis (an irregular, lateral curvature in the spine). She is weaker on her right side but has been improving in her ability to support herself using her right hand. Her Symmetrical Tonic Neck Reflex (STNR) has yet to integrate. This reflex causes her arms to extend and legs to flex when she extends her head and visa versa when she flexes her head. In 2019, she underwent a surgical procedure to lengthen her hamstrings. And in 2021, she underwent a selective dorsal rhizotomy (SDR) in order to decrease the spasticity in her legs (Boston Children’s Hospital, 2023).

For the purposes of this case study, the goal of the patient that was studied was to be able to cross her hands across her midline dynamically, meaning when the horse is moving, and maintain equilibrium. It is important to understand how this goal is functional for the patient. Crossing midline dynamically increases upper extremity strength, trunk stability, midline orientation, and ability to maintain equilibrium. These are necessary for tasks such transferring to and from a wheelchair, rolling over, walking, and standing.

physical therapist that it would be in the best interest of the patient to slow down the pursuit of this goal and increase the time period of attainment to one that does not fit into this case study’s allotted time period.
Before the beginning of this case study, the patient was able to cross midline with her arms; however, she needed moderate assistance in maintaining equilibrium.

**IV. Section IV Treatment**

Approximately 30 minutes of each physical therapy session each week was spent stretching and performing exercises in a traditional therapy setting while the remaining 30 minutes was spent utilizing the horse’s movement. Additionally, the patient engaged in a home exercise program in order to support the goals established at physical therapy.

The patient participated in many different types of exercises during her physical therapy sessions utilizing hippotherapy. One such exercise was maintaining a quadruped, or “all-fours”, position dynamically. The movement of the horse combined with holding this position requires the patient to push through her upper extremities, therefore increasing both proximal and distal upper extremity strength. It also assists the patient in the integration of her previously discussed STNR reflex. As she holds a quadruped position on the dynamic base of support, her brain is perceiving crawling which breaks up the head, upper extremity, and lower extremity association linked with the STNR reflex. As this reflex integrates, the movement of her head will no longer affect her arm and leg extension and flexion which will give her increased upper extremity control while crossing midline.

Additionally, the patient worked towards midline orientation and maintaining equilibrium while pushing through her upper extremities on a dynamic base of support, the walking horse. By pushing down on this dynamic base of support, this exercise strengthened the patient’s upper extremities both proximally and distally. This is especially important for strengthening her weaker right arm. In order to cross midline both directions, she needs to be able to support both
with her left and right arms while the other one is reaching across. Also, by establishing sufficient proximal shoulder strength, the patient will be able to better control the distal portions of her upper extremities.

Another exercise that the patient worked on was maintaining midline orientation and equilibrium dynamically while being unsupported by her upper extremities. In doing this, the patient was not able to maintain equilibrium with the assistance provided by supporting her upper extremities on a base of support. Instead, she had to use her trunk muscles to stabilize her body. When the horse leader turned the horse around a corner, in a serpentine motion, or in a circle, the movement of the horse facilitated both trunk shortening and lengthening. The muscles of the patient on the side closest to the inside of the turn shortened, while the muscles on the side closest to the outside of the turn lengthened. Rotation is a key piece to crossing midline. To rotate effectively one must be able to disassociate their shoulder movement from their pelvis movement, something that is made easier when the trunk muscles can effectively shorten and lengthen.

Before attempting to cross midline dynamically, the patient worked on it statically. When the patient crossed midline statically, she did not have to account for the movement of the horse, her base of support. She was able to practice stabilizing her body and maintaining equilibrium with her trunk and single hand while crossing midline. It was important to attempt this skill statically first because adding the dynamic aspect to this exercise would require a higher level of trunk strength that at the beginning of this case study, the patient had not developed. That is one of the many benefits of hippotherapy: adding the movement of the horse can grade up any exercise due to the balance required to maintain equilibrium on an unstable base.
V. Results

At the end of the treatment period, the patient was able to reach the goal of crossing midline dynamically while maintaining equilibrium. Significant improvements were noted in multiple characteristics of the patient such as increased ability to maintain midline orientation, disassociation between the shoulders and pelvis, greater proximal and distal upper extremity strength, and greater control of the upper extremities.

The goal of utilizing hippotherapy applies to functional activities of the patient. One such functional activity is simply crossing the midline. Dissociation between her shoulders and pelvis allows her to better rotate her body without losing her balance. This is supplemented by her newfound upper extremity strength which has improved her control over her arms as she crosses midline and supports her weight.

Another functional activity that has improved is her ability to perform a squat pivot transfer to and from her wheelchair. Her increased upper extremity strength and control has caused her to become more efficient in transferring from both left to right and right to left. Additionally, her ability to maintain equilibrium and find midline orientation has made her transfers more independent than previously.

A third functional activity that has improved is her ability to roll over. With more upper extremity strength and ability to cross midline with her hands, she can better guide her upper body while rolling. Once she has rolled over, her increased upper extremity strength assists her in pushing her body up into a sitting position. Finally, she is able to find midline in a sitting position due to her improved ability to maintain equilibrium.
VI. Concluding Remarks

Over the study period, I have watched this patient achieve the functional goal of crossing midline dynamically as set by her physical therapist. The physical therapist’s utilization of hippotherapy as a treatment tool has been instrumental in the attainment of this goal. The exercises done in her treatment utilizing hippotherapy benefitted many aspects of her physical well-being that are evident in the strides she has made in her ability to perform functional activities such as wheelchair transfers, rolling, and crossing midline.
VII. References

https://www.americanhippotherapyassociation.org/assets/docs/AHA-%20Recommended%20Terminology.pdf


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