A critical appraisal of "The Effect of Hippotherapy on Gait in Patients with Spastic Cerebral Palsy"

Sarah Reagor, SPT

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Abstract: This paper's main goal was to critique the article *"The Effect of Hippotherapy on Gait in Patients with Spastic Cerebral Palsy."* Overall, the article is a good source of evidence because its strengths outweighed its weaknesses. The article proved the clinical question of hippotherapy improving gait patterns in patients with cerebral palsy correct. All sections of this article had strengths as well as weaknesses, but generally speaking, it could be considered a credible source on hippotherapy as a physical therapy intervention. There were some limitations on this study, as it was conducted with a small experimental group, was only a week long, and did not have a control group, but further investigations can be conducted in the future to further prove this hypothesis correct.

Introduction

The study that is being critiqued in this paper is testing the effect of equine-assisted therapy on gait patterns in children with spastic cerebral palsy. Cerebral palsy is a very common neurological disorder and can cause motor and postural functioning issues. Many studies have been conducted to understand the effects of hippotherapy on individuals with cerebral palsy. Most of these experiments have been shown to improve gait patterns and efficiency in individuals affected with spastic cerebral palsy. Hippotherapy provides proprioceptive stimuli that can increase an individual's movement. The purpose of this critical appraisal was to determine whether this article was a good source of evidence to prove that hippotherapy intervention improved gait patterns in those with cerebral palsy. The clinical question this critical

appraisal is trying to prove is "will hippotherapy positively impact postural control and gait patterns in individuals with cerebral palsy (CP)?"

Methods

The databases used to find this article were *PubMed, CINAHL,* and *SPORTDiscus.* PubMed was used first because it has a large selection of articles and the research question was very specific. After only finding a few articles on PubMed, Angelo State's Database Search was utilized. Finally, *SPORTDiscus* was used to find more articles regarding hippotherapy intervention on children with spastic cerebral palsy. This sports medicine focused bibliographic has more than 2.4 million records and includes physical therapy interventions. The keywords that were used during these searches were "hippotherapy, cerebral palsy, walking, gait." No limits were placed on these searches as it was a very specific research question and relevant research articles were already in limited suppl. Inclusions in the search criteria were individuals with cerebral palsy, the intervention as hippotherapy, and the goal being the effect on gait, walking, etc. Without these inclusions, thousands of articles regarding the effects of hippotherapy on all types of populations and different interventions regarding gait and walking patterns on individuals with cerebral palsy came up. Finding around 20-30 articles was the optimal amount before beginning the review portion of the article search. All articles were reviewed by first making sure they pertained to the above mentioned research question and were experimental studies.

This article was chosen because it appeared to be the most relevant to the clinical question chosen for this appraisal. The article that was chosen is called *"The Effect of Hippotherapy on Gait in Patients with Spastic Cerebral Palsy."* The journal that this study was

included in *Acta Gymnica* 2013, Volume 43, Number 4. It was published in October 2013 and the corresponding author was Veronika Fizkova. Other authors included in this article are Eva Kejci, Zdenek Svoboda, Milan Elfmark, and Miroslav Janura. This study was conducted in the Czech Republic.

Results

Summary of the study

Cerebral palsy (CP) is a neurological disorder that occurs in an individual prenatally or postnatally. It can lead to issues in motor functioning, balance, and gait. Hippotherapy has been correlated with improvement of these factors as well as an increase in functioning and self-sufficiency. This study attempts to prove this statement by selecting 11 individuals with spastic CP and intervening with a 1-week hippotherapy course. Individuals' gaits and joint angles were measured prior to the experiment. During the study, individuals were provided motion and proprioceptive stimuli by physiotherapists that tested their postural control. By the end of the study, all joint angles and gait patterns were observed again. The most important joint angle was a decreased internal rotation of the hip, which helped in improving "horse gait" and "crouch gait" in individuals with CP. Overall, this study proved that hippotherapy has a direct positive correlation to improved gait patterns in those with CP.

Appraisal of the study introduction

The introduction was relatively thorough. The authors elaborated on hippotherapy well and showed evidence to support that it is a helpful intervention in patients with cerebral palsy.

The aim of the study was clearly identified in the introduction and the authors used mostly credible evidence to support their claims. The variables were clearly identified, and there is a definite transition from explaining how cerebral palsy affects motor and postural functions to how they are affected by hippotherapy.

However, there were some weaknesses to the introduction of this article. The experimenters could have elaborated on the prevalence of cerebral palsy and defined exactly what "spastic" cerebral palsy is. Though the authors used credible journals as their primary sources, there were a few outdated articles used as evidence from the 1980s and 1990s, which makes them a little less credible. Overall, the introduction had its strengths, but it had some weaknesses as well.

Appraisal of the study methods

The methods section was short and to the point. There were eleven subjects included in the study, and none were lost, which is a strength of the methods section. All subjects were chosen because of their clinical diagnosis—spastic cerebral palsy. Most were around 14 years of age and could walk independently, which means the results of the functional outcome measures used were less biased. The actual hippotherapy intervention was described well. Also, the outcome measures used to define a significant difference before and after the experiment were described in detail. The fact that the author included the planes that each measurement was taken in was very helpful. The Wilcoxon statistical analysis used to test significant change appeared to be the correct statistical analysis to be used in this situation.

There were several weaknesses in the methods section. There was only one group included in this study—the experimental group. There was no actual "control" group, which makes this experiment

quasi-experimental. Though the intervention was described well, the pedagogical aids, objects handled, and tactile stimulation were not elaborated on and a normal non-physiotherapist would need to have some more elaboration on what aids were used. A limitation in this study is that someone experienced with therapeutic horses and patients with cerebral palsy would need to be in charge of the exercises for safety purposes. The only description of the machine used in to measure joint angles was its name. A little more description of the the Plug-In Gait Model as well as its reliability and validity would have been helpful for the reader to visualize exactly how the measurements were taken. The data collection could not be easily replicated because whoever recorded the data would need to know how to accurately operate a Plug-In Gait model so as to reduce bias. Also, the statistical analysis used to measure the results before and after was not explained/justified well in the methods section.

Appraisal of the study results

The results section was written in an organized and clear manner. The authors separated each of the measurements of the different joint angles they observed into their own separate paragraphs, which is very helpful for the reader. They also described what plane the joint angles were viewed in, which gave the reader a visual as to how they were observing the joint angles. Also, the authors explained whether the measurement had been significantly changed using the p-value, which was helpful in connecting the data processing to the results. The authors reported all outcome measures that were presented in the methods section (i.e. all joint angles). All results appeared to be statistically significant.

There were some weaknesses associated with the results section of this study. The authors did not specify exactly how the joint angles are connected to gait patterns/postural control—i.e. whether they wanted to see a decrease or increase in the angles. This was spoken about earlier in the paper and during the discussion section, but if the reader is strictly looking at the results section, the results were

not clearly addressing the research question or hypothesis. Also, though the authors stated how the joint angles were significant, they did not define whether the overall gait of each patient had been significantly improved. The tables in the results section were somewhat confusing because the units were not clearly stated in the results.

Appraisal of the study discussion

The discussion section was very helpful after the extremely concise results section. The discussion section interpreted the results of the study and tied it to existing literature. The discussion explained each joint angle in the same order that was stated in the results section and how it connected to gait pattern. Also, limitations were described in the discussion section. Overall, the conclusion of the paper was very short, but it did explain how this study improved gait patterns in subjects with cerebral palsy. It covered the psychosocial aspects such as how improving gait patterns would also improve self-sufficiency, self-reliance, and independence. Also, the authors concluded that future studies would be needed to further prove their hypothesis.

Though the discussion was written relatively well, there were a few weaknesses. The discussion section went into detail about how gait patterns could differ between patients with CP which could have been added into the introduction/background instead. Some of the literature used to support the findings was outdated (1980s and 1990s). There was also one article that was cited different in than the other articles and was not found anywhere online. The authors could have also specified what kind of studies needed to be conducted in the future. One other weakness was that no clinical significance was mentioned. Though the reader knows hippotherapy can be helpful in a clinical setting, the authors should have made it a point to tie it to an application of study.

Discussion

This study is significant to my clinical question because it proves it correct. It shows a direct correlation to hippotherapy and improved gait patterns in individuals with CP. Hippotherapy is significant to physical therapy practice because this is a creative way for patients with cerebral palsy to practice their balance, posture, and stability, which will increase their ease of walking. Rather than performing monotonous exercises frequently in a clinical setting, patients and physical therapists can create a fun, outdoor learning environment by using hippotherapy as a PT intervention.

Using hippotherapy as a physical therapy intervention would be very helpful when trying to come up with new and creative ways to keep children with special needs entertained and focused. Hippotherapy is beneficial to the patient because it shows to improve their proprioception, balance, and gait patterns. Improved gait patterns can increase a patient's independence and quality of life. Hippotherapy is also a way for therapists and patients to bond and turn what could be considered a monotonous therapeutic session into a fun task. However, with unpredictable animals and environments, there are increased risks of accidents happening during hippotherapy. These risks could be reduced with the help of calm horses and experienced caregivers. Most studies performed over hippotherapy and those with CP have shown no safety hazards. Overall, the benefits of hippotherapy appear to outweigh the risks. Longer hippotherapy studies conducted with a larger population could improve the argument of using hippotherapy as a physical therapy intervention in children with cerebral palsy.

I do feel comfortable using this research article as evidence to support hippotherapy with a future patient. There were some weaknesses to the study, but generally speaking, it was a well written, well thought out study. I would feel somewhat comfortable performing this intervention, as I do have experience with horses and children with disabilities. However, I would need a person more experienced

in hippotherapy and horseback riding in general to teach me before implementing it into a clinical setting.

The article appraised in this paper was considered a good source of evidence when deciding on whether hippotherapy intervention improved gait patterns in children with cerebral palsy. The strengths of the paper outweighed the weaknesses. However, more research can always be done to improve upon the idea of hippotherapy improving CP patients' quality of life. Also, when taking this intervention into consideration, physical therapists must consider the potential safety risks and include a well-trained horses and caregivers in the therapeutic sessions.