

# Hippotherapy, Children and Cerebral Palsy

Subjects: Nursing

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Cerebral palsy is described as a group of permanent neuromotor-type disorders caused by non-progressive injuries in the developmental stages of the central nervous system, and which have serious repercussions on the quality of life of affected children due to the physical and psychological damage it entails for them. Today, it is the leading cause of physical disability in childhood. Since there is no cure for this disorder, treatment is based on the improvement of symptoms, which is not always achieved through conventional therapies. For this reason, the need arises to investigate other alternative therapies, such as hippotherapy, to determine the main effects of hippotherapy as a rehabilitation therapy in children with cerebral palsy. As a conclusion, we found that hippotherapy provides benefits at physical, psychological, cognitive and social levels in children with cerebral palsy, and thus it should be considered as a complementary rehabilitation therapy to conventional treatments.

Keywords: hippotherapy ; equine assisted therapy ; children ; cerebral palsy

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## 1. Introduction

Cerebral palsy (CP) is a group of permanent neuromotor-type disorders that are caused by nonprogressive disturbances during the prenatal, perinatal or postnatal (2–3 years) stages of development of the central nervous system. Children affected by this syndrome present with postural and motor disability that entails limitations in their functional abilities and physical activity, leading to impaired physical, psychological and social development. The prevalence of CP in developed countries is between 2 and 2.5 per 1000 live births. It is the main cause of physical disability in childhood.

There are many factors that can lead to CP. Depending on the stage at which the disturbances take place, they can be prenatal, perinatal or postnatal, although perinatal is the most common and represents 60% of cases. It is of great importance to understand these factors in order to prevent the development of CP and allow for early detection. This will ensure a closer surveillance that will enable a better quality of life for these children from the start and avoid a worse progression of the disorder. The diagnosis of CP is usually reached after the neonatal period when the first distinctive signs of the disorder are detected, although earlier on, certain neurological signs may arouse suspicion.

Among the most noticeable early signs are abnormal muscle tone, reflexes and posture and developmental delays. Other clinical signs and symptoms include sensory-perceptual alterations (hearing problems, vestibular or balance disorders, clumsy hands and fingers), impaired coordination, muscle spasms, speech impairment and learning disabilities (although in some cases, these functions may be preserved), spasticity and tremors, involuntary movements, abnormal posture and muscle tone, seizures or mental impairment (difficulty concentrating and developing ideas, anxiety). CP has a highly variable presentation; therefore, it can be classified according to three different criteria in order to facilitate comprehension and treatment: according to the part of the body that is affected, according to motor function or according to severity.

There are different tools for the evaluation of CP. The most commonly used scales include the Gross Motor Function Classification System (GMFC system), the Ashworth scale, between measurement and spasticity and the Berg balance scale to assess balance abilities.

As no curative treatment exists for cerebral palsy, treatment usually involves specific physiotherapy techniques and psychological therapies that aim to improve the child's symptoms and quality of life.

There are several types of treatment. Among the most conventional treatments are "Bobath therapy" and "Vojta therapy", focused mainly on posture and movement disorders, attempting to normalize them as much as possible, as well as different early stimulation therapies that work at the central nervous system level in a sensory way.

In the past few years, another type of therapy, known as "complementary" therapy, has started to gain visibility. Among such therapies is hippotherapy or therapy with horses, supported by its many benefits at both physical and mental levels in different diseases, including CP.

The therapeutic use of horses goes back to ancient times. In the fifth-century B.C., Hippocrates described the usefulness of horse riding in the treatment of different ailments such as insomnia or in the improvement of muscle tone in his writings "On Regimen".

Hippotherapy is a kinetic rehabilitation therapy that has effects on physical, mental and emotional aspects. It is directed at patients with neurological/neuromotor alterations of degenerative or traumatic origin. It is based on the utilization of the horse's movements, which provide sensitive and motor stimuli, for the treatment of different disorders in which the patient is able to perform no or little movement on the horse. This therapy contributes to functional and psychological rehabilitation and improves basic abilities and social adaptation.

Since the person is not able to execute any action on the horse, it is the horse who acts upon the patient, and in so doing, becomes a co-therapist and take on a major role in the therapy. The horse is guided by an expert in equine therapy who directs it at the most adequate rhythm for each patient (walk or trot, but never gallop).

Hippotherapy has three known therapeutic principles. Firstly, the transmission of body heat. The horse's body temperature is 38° and may reach 38.8° during exercise. This temperature, higher than the human body's, is useful for the extension and relaxation of muscles and ligaments and for the increase in sensory perception due to the tactile stimuli it generates.

Secondly, the transmission of rhythmic impulses. When walking, the horse sends around 90–110 rhythmic impulses or vibrations to the pelvic belt. These impulses are generated from the alternate elevation of the lumbar muscles and the horse's back. Such elevations create an oscillating movement in the patient's pelvis, so the patient must adapt and straighten the trunk. In doing so, balance, postural control and coordination are improved. On a psychotherapeutic level, the impulses generate a feeling of being worthy, awakening in turn feelings of safety and protection that build up the patient's self-confidence.

The third principle is the transmission of a three-dimensional locomotion pattern. This pattern is similar to human gait, where three different movements are generated: anteversion-retroversion, lateral-rotational displacement and descent-elevation. This creates an increase in elasticity and flexibility of the pelvic ligaments. It also contributes to the stabilization and coordination of the trunk and head due to the automation of the rhythmic pattern of the horse. The similarities with the physiologic pattern of human gait enable its acquisition while remaining seated, with no need for the use of the lower extremities.

In order to achieve the most effective treatment possible, the nursing staff involved in such therapies must always be qualified and trained in the field of equine therapy, with a total understanding of the characteristics and behaviors of the horse and the possibilities it entails for healthcare.

CP remains the main cause of physical disability in childhood; therefore, there is a need for research in new alternative methods that will complement conventional medical treatments in order to achieve the most effective improvement of symptoms possible.

In countries such as the United States of America, France or England, there have been noticeable results in the application of hippotherapy in the treatment of different disorders, possibly due to the existence of equine therapy federations and the requirement of professional qualifications.

Equine therapy does not have the expected relevance due to the high costs of this type of treatment, as well as the possible prejudices parents may have regarding the risks of treatment with animals due to fears of irreparable damage that they may cause their child.

## **2. Does hippotherapy have a beneficial impact in the rehabilitation treatment of children diagnosed with CP?**

In general, the assessment of the effects obtained from the treatment was carried out immediately after applying equine therapy over a certain period (from a couple of weeks up to a year). Only McGibbon et al. and Rodríguez Laiseca and Lerma Castaño evaluated after a period of therapeutic inactivity, yielding conflicting results.

In the first of the mentioned studies, researchers found that hippotherapy is effective whilst its application is continuous; however, in the second study, results showed that the effects of such treatment persist beyond discontinuation of therapy sessions. Matusiak-Wieczorek et al. and Lucena-Antón et al. compared the action of rehabilitation with only physiotherapy and that of a combination of physio and hippotherapy.

On the other hand, McGibbon et al. also compared the difference between treatment with hippotherapy and conventional physiotherapy on a stationary barrel, for an improvement in adductor muscle asymmetry.

The results favored hippotherapy for greater improvements. Regarding the variables considered in the different studies:

### **3. Gross Motor Function**

Three studies evaluated the effects of hippotherapy on this variable and all agreed on an improvement after treatment. Both Paternina and Villegas Guerrero found that there is an increase in movement-related functions, allowing the children to initiate and, in some cases, complete postural changes autonomously, as well as a decrease in involuntary movements than limit motor coordination when performing activities. McGibbon et al. also found that the improvements in gross motor function last up to 12 months after treatment.

### **4. Balance and Posture Control**

Five studies assessed the variables of balance and posture. Fernández-Gutiérrez et al. concluded that after the application of equine therapy there are clear improvements in body weight distribution and the location of center of gravity, leading to a greater postural stability.

According to Matusiak-Wieczorek et al. and Paternina, a better stability and control of the head, neck, trunk and extremities (more so upper than lower) also play a role in postural improvement.

On the other hand, such postural stability leads to an important increase in balance.

However, results are conflicting in the degree of improvement, as Fourmantin found that the improvement in balance was progressive over the duration of therapy, whilst Delgado Fernández and Sánchez Gómez reported that the true difference was only detected after 6 months of treatment.

Paternina also found that achieving a certain balance and functional posture favors children's mobility and autonomy and therefore improves their quality of life.

### **5. Spasticity and Muscle Tone**

Six studies considered the effects of hippotherapy on spasticity and muscle tone.

We found that they all focused on the increase in size and muscle tone, essential factors in reducing spasticity.

Fourmantin, Rodríguez Laiseca and Lerma Castaño and Jami Vargas et al. observed that such reduction in spasticity happens on a general level, but the second study highlighted three specific muscle groups: elbow flexors, plantar flexors and hip extensors. In that same study, the authors indicated the necessity of continuous application of hippotherapy for the maintenance of these effects.

The three remaining studies, which include those of McGibbon et al., Lucena-Antón and Reyes Domínguez, focused on a reduction in the spasticity of hip adductor muscles. Their results were also positive due to an improvement in the range of movement and muscle symmetry, which facilitate walking.

### **6. Psychological, Cognitive and Social Effects**

McGibbon et al., Paternina and Jami Vargas et al. also analyzed psychological, cognitive and social variables in their studies. They all found an improvement in self-esteem and self-perception.

The second study observed that hippotherapy improved socialization of children with CP due to contact with the horse, and the third study emphasized the stimulation of concentration and attention over the course of therapy.

### **7. Dependency for Activities of Daily Living (ADL)**

Finally, the article by Paternina and the study by Delgado Fernández and Sánchez Gómez included dependency for activities of daily living as a variable in their research. Both studies found that, to a lesser or greater extent, there was an improvement in the independent performance of activities of daily living after treatment with horses.

## 8. Conclusions

This report shows that hippotherapy has positive effects on the health of children with CP. It is true that there are authors such as McGibbon et al. and Rodríguez Laiseca and Lerma Castaño who clarify this aspect in their studies, debating whether the efficacy of this therapy goes beyond its specific application or not.

It should also be noted that there are discrepancies between the authors Fourmantin and Delgado Fernández and Sánchez Gómez on whether the improvement in balance was progressive during the duration of therapy or appeared months later. In any case, none of these authors deny the positive effects of hippotherapy on the health of children with CP, so it should probably be considered as a complementary rehabilitation therapy to conventional treatments.

The main variables that benefit from hippotherapy are gross motor skills, control of balance and posture, spasticity and muscle tone, dependency for activities of daily living and the psychological, cognitive and social spheres.

Due to the limited literature available on hippotherapy, there is a great need for more reviews on this topic, including studies with larger sample sizes and a common methodology regarding duration of therapy and study variables.

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