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## The Impact of Therapeutic Horse Riding on Motor Function and Social Skills of Children with Cerebral Palsy



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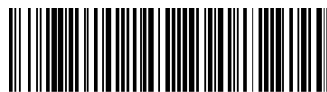
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### ABSTRACT

The purpose of this research is to investigate the impact of Therapeutic Horse Riding on Motor and Social Skills of children with Cerebral Palsy. Social skills are closely related to the quality of social relationships and the ability to communicate and collaborate in general (So & Brush, 2008). Motor function difficulties are common in cerebral palsy and can cause important activity restriction (Rosenbaum, et al., 2007). The sample of the research consisted of 30 participants (18 Special Educators and 12 Therapists). Semi-structured interviews were conducted with all participants in order to be collected sufficient data to triangulate. Results from the qualitative analysis shown that Therapeutic Horse Riding can benefit the development of social skills in children with Cerebral Palsy. Motor function can also be benefitted due to the three-dimensional movement of the horse and heat from the body of it, which improves the blood circulation and contributes directly to the relaxation and reduction of spasticity. Though, the effect of Therapeutic Horse Riding on children with Cerebral Palsy, and other special needs are directly related to the child's particular needs.

## INTRODUCTION

The term Cerebral Palsy describes a disorder whose main characteristics are related to gross motor disability (Palisano, et al., 1997). Cerebral palsy often coexists with epilepsy, mental retardation, behavioral disorders, speech disorders, vision, and hearing disorders. Mental deprivation is a developmental disorder, with significant limitations to mental function and adaptive behavior, as shown in social and adaptive skills. Mental deprivation occurs before the age of 18 months and is a symptom of many known and unknown causes. The classic definition of mental retardation characterizes it in a mental function below the normal, and difficulty in social adaptation (Aggelopoulou-Sakantami, 2004).

Cerebral palsy often co-exists with intellectual disability, vision, hearing and speech disorders, behavioral disorders and epilepsy (Angelopoulou-Sakantami, 2004). The main concern related to mobility problems, is that they are often accompanied by neurodevelopmental disorders which have an effect on growth rate in people with Cerebral Palsy (Bax et al., 2005). In therapeutic horse riding, horse's movement is used as a therapeutic strategy in order to improve the function. It benefits people with brain disabilities physically, psychologically and socially because it is a pleasant athletic activity and at the same time therapeutic (Dimitrakopoulou, 2015). The specific research questions that were studied, are summarized to the effect of Therapeutic Horse Riding on non-verbal social interaction, on organizing the behavior, on the development of emotional skills, on the overall movement coordination, on the development of gross and fine motor ability in children with Cerebral Palsy.

## Theoretical Background

### *Cerebral Palsy*

According to global statistic data, Cerebral Palsy occurs in 2.5 out of a thousand children which are born and they survive. According to this data, in Greece, in a number of 100,000 thousand births per year, 250 children have Cerebral Palsy of varying form and gravity. This frequency is higher in preterm infants and maybe in 15 out of 100 children, depending on the birth weight and also the potential and unavoidable complications brought about by prematurity (Kriger, 2006).

Unfortunately, even modern examinations, such as amniocentesis and prenatal ultrasound, cannot diagnose a significant part of the causes of Cerebral Palsy. By the age of 5, the causes of Cerebral Palsy are distinguished in prenatal and postnatal lesions in various forms. The success rate of determining the causative factor is 50% -75%. It is not easy to pinpoint causes precisely, because they are most often indications and not evidence. Based on the above statistics, there is a big amount where the reasons are not defined. Prenatal lesions are referred to as prenatal obstetric complications (malnutrition, placental precursor, toxemia, etc.), chromosomal abnormalities, congenital infections (rubella, large cell syphilis, toxoplasmosis, herpes etc.), intrauterine stroke, and congenital abnormalities of the central nervous system (CNS) (Dandy-Walker syndrome, congenital hydrocephalus, mesenovian agenesis, etc.). Perinatal lesions are reported as complications during delivery, central nervous system infections, prematurity, hypoglycemia, hypercholesterolemia and labor-induced wounds. Postnatal lesions are referred to as infections, cerebral injury, intracranial hemorrhage, neonatal spasms and acquired encephalopathy.

The diagnosis begins in the first year of life when the first signs appear in the form of kinetic dysfunctions when the infant shows a difficulty in supporting its head and to sit independently, crawl and sit upright. An important precondition for a person's progression is the early diagnosis of Cerebral Palsy because early intervention can reduce the severity of disability. Diagnosis requires a medical history, clinical picture, neurological examination, brain CT and encephalogram (Aggelopoulou-Sakantami, 2004).

Clinically, people with Cerebral Palsy, the common feature is muscle tone disorder closely related to brain injury that occurs before cerebral development is complete. This disorder affect movement, position and posture (Kriger, 2006).

Regarding people with intellectual disability, they lack the ability of perception, correlation, generalization, memory, attention etc. They also cannot acquire social skills, manage social situations and accommodate themselves in the social environment, because they lack social behaviours. They cannot take care of themselves, or protect themselves and they also cannot stand-alone. They present cognitive deviation, problematic behavior, loss of attention concentration, and the most important feature that negatively affects learning, is the inadequacy in cognitive functions (Siska, 2014).

There are also studies which provide us with data for individuals' with Cerebral Palsy sense of coherence. Generally speaking, they seem to be satisfied with their daily lives, they can control their feelings and can deal with unknown situations and usually have pleasant emotions. More specifically, they have difficulty in controlling their feelings of anger and anxiety. They are easily disappointed especially by people who consider important for them (Kontou, et al. 2018).

Early diagnosis and classification is a very important factor in the treatment of cerebral palsy. It is also essential to control the level of the intelligence quotient (IQ). Children with a high intelligence quotient (IQ) have a good prognosis and children with mental retardation do not. If the diagnosis is serious, they have to attend a special school. Everyday work out, in either individual or non-individual team level, is very important. Physiotherapy and kinesitherapy should be done by a physiotherapist with experience, and preferably in a center with specialty in people with cerebral palsy. The main objective of the treatment of children with Cerebral Palsy is to integrate into the social environment and prevent permanent deformities. A relatively new method for the success of all goals is Therapeutic Horse Riding with very good results in children with Cerebral Palsy and other conditions (Eleftheriadou, 2009).

### **Therapeutic Horse Riding**

Therapeutic Horse Riding is defined as the implement of riding to people with disabilities. Its main purpose is the kinetic and social rehabilitation of the individual, as well as the improvement of their life and health. The remedy, in this case, is the horse. The application of Therapeutic Horse Riding is done under specific conditions, which are the specially trained horses, the specially shaped environment, the special equipment and the specialized scientific staff. The term "Therapeutic Horse Riding" has been used for many years to combine the diversity of equestrian activities involving disabled people. Therapeutic Horse Riding as a term includes all the healing horse's activities. When the therapist uses horse movement as a treatment to improve neuromuscular functions, the correct terminology for this procedure is called "Hippotherapy" (Dimitrakopoulou, 2015).

The Strides Therapeutic Horse Riding Coordinators' Guide to Therapeutic Horse Riding Centers of NARHA classifies the benefits of Therapeutic Horse Riding in Physical, Educational, Psychological and Social (Tzilinis 2013).

Therapeutic Horse Riding has a positive effect on the learning and psychology of individuals and acts on the spindle and muscle joints. It affects the central nervous system which is essential for kinetic functions. In particular, it supports maintaining the correct tension of each muscle.

The treatment of cerebral palsy is based on continuous central nervous system irritations that delay the mistaken activity of reflexes and motion patterns. These irritations, as far as possible, restore the muscle tone to normal. Therapeutic Horse Riding supports the normalization of muscle tone. When the horse proceeds, it makes a three-dimensional movement. Specifically, vertically and horizontally as the acceleration and deceleration alternates in each step, right and left, because at each step the crowns lower left and right. All these oscillatory movements are transferred to the rider with a disability through the bowl to the shoulder and the shoulders. The trainer has to influence the rider to leave himself on the swing and to assimilate them. The horse's oscillations during the walk offer the rider the same pattern as we humans do when we walk. Both, the rider and the horse interact with walking and learning new things. In addition, the rider on the back of the horse gains confidence and self- confidence, feelings that create new dimensions in his experience.

Livery contributes greatly to children with Cerebral Palsy and especially to those with mental retardation. The rider of the horse must also be the one who takes care of it. An emotional bond develops between the two and the horse wants to please the caregiver. The ability to care for the horse helps the rider to take care of himself too. Washing the horse encourages a child to learn how to be independent in treating himself, in his personal hygiene. Feeding the horse helps in understanding measurement, quantity and weight (Eleftheriadou, 2015).

## **RESEARCH METHOD**

### **Method**

This research was conducted with the qualitative method because through this method the probe of the research is done in more depth and in detail. The qualitative research explores the subjective experience in arranging the social world (Iosifidis, 2003).

### **Sample - Participants**

The research will involve ten Specialists, two Speech Therapists, two Occupational Therapists and two Physiotherapists, who specialize in Therapeutic Horse Riding.

### **Research Tools**

The semi-structured interview was used in this research. Special Educators, Speech Therapists, Occupational Therapists and Physiotherapists, were interviewed in order to collect data on the effectiveness of the method in developing the kinetic and social skills of children with Cerebral Palsy. The questions are thorough because of the Therapeutic Horse Riding's pattern, of children with Cerebral Palsy. The strategy and the technique which were used in the interview, did not allow the declination from the subject. Consequently, the data gathered in this study is absolutely relevant to the interviewer's goals and questions. The success of this relationship is based on the targeted questions of the interview and the selection of the sample of respondents. The number and purpose of the interview questions, were more than enough and covered every detail of the survey. The questions were organized in groups, specifically questions, about non-verbal social interaction, behavioral organization, teamwork skills, emotional skills, and the therapeutic benefits of Therapeutic Horse Riding of children with Cerebral Palsy. In all the questions, the researcher urged the respondent to indicate, where possible, specific examples for a better understanding of the answer to the question. As mentioned above, the material is expected to be very rich and this comes from the variety and the number of questions that leads to great discussion, something that only with the qualitative research can be analyzed, as opposed to quantitative research that requires minimization and summarizing of the data. During the interview, the researcher used reflective listening. Specifically, he was listening carefully to what the respondents were saying and spoke much less, without expressing personal views (Isari & Purkos, 2015).

### **Reliability and Validity**

For the data's validity, in this specific survey, the data triangulation was mainly used. More specifically, Special Educators' and Therapists' perceptions who participated in the survey were used in order to be implemented data triangulation.

## RESULTS

All the questions of the research were answered in this survey. Subsequently, the answers and the conclusions are presented in the research questions, after the analysis of all interviews' questions.

Therapeutic Horse Riding improves social interest and social attention because, in the engagement with the horse, there is an interaction between the healer and the horse itself. The impulse in a child's everyday life is different. The contact between the child and the horse acquires intimacy and expression in emotions throughout time. There is a mutual interaction since there is cooperation between the child and the horse and reciprocal love. Therapeutic Horse Riding helps the child to learn how to share and develop vicinity. Care relationship develops with physical contact, with petting and feeding. An emotional bond is created between them and the horse shows its love for the child who takes care of it. The child realizes that in order to be close to someone, mutual care must coexist.

The child organizes his behaviour through the way he communicates with the horse and through structured, specific activities, in a specific order. Also, with the methodology and the commands he uses to work with the horse. The structure of activities organizes the behavior of the child because he should understand that he must follow the right order to enjoy Horse Riding. Still, the child learns to choose through the variety of activities, the styles and colors of the horses.

Therapeutic Horse Riding helps the child to develop social timing-switching skills. He waits for his turn to ride a horse or change a horse. He learns to wait for group activities. While horse riding is individual, he realizes that in order to get to the point of riding, he needs a training team and specifically a team of trainers who take care of his safety. Altogether, they compose a team. If you do not follow the instructions of the team, you will not be able to enjoy the riding. The child learns to follow specific behavioral rules, by using the horse as a mean of training. This education works as an aid on how to involve the child in the participation and integration of school activities.

Animals express their feelings in their own way and this extends to all areas. Children receive the animals' feelings stronger than adults and transmit them accordingly. The child, with the help of the trainer, understands how the horse feels by bonding with it. In particular, the horse is a mirror of human emotions. The child with Cerebral Palsy, acquires emotions through

communication and interaction with the horse, giving him care and attention. There is an emotional interaction.

It improves coordination between hand and foot because during galloping the rider must synchronize hands and feet. The three-dimensional healing movement of the horse improves the coordination of movements and improves its balance. Riding is a purely balanced body issue. During childhood, the child reacts instinctively to protect himself and coordinate his movements. The body is placed in a specific position and this contributes to the general correct posture of the body. When riding, the body receives forces on the trunk and the head, which forces the child to tune his body so that he stands in a more correct position. The success of the ride is based on an essential skill of the upper and lower limbs, which improves over time, due to the need to coordinate the movements of all limbs. Coordinated hand and foot pressures are impacted upon the horse.

Gross mobility is developed because the body must be adapted to the three-dimensional and rhythmic movement of the horse, as the child tries to keep his hands and feet off the horse. Coarse mobility develops through simple exercises, such as feeding the horse and holding the trunk. Also, with similar activities and games during horse riding.

Proper positioning of the spine and shoulders for effective galloping, improves the wrong motor and static patterns. It diminishes muscle contractions and weaknesses and helps the reduction of the muscle tone. Vibrations are created, due to the movement of the hip of the horse that are transported from the pelvis to the whole body of the rider. The result is directly evident on the adductor muscles. The sudden changes, in the horse's movement, create the need for faster reflexes to avoid a possible fall and this helps to balance the spasticity, due to a direct reaction to the horse's stimuli. In the case of walking as a spasticity feature, there is improvement, because the movement of the horse's hip resembles the movement of the man. The muscles of the human hips acquire the power they need and the child assimilates more accurately motor walking patterns. As for the symmetry of the movements, the rhythmic movement of the horse improves the symmetry. The range of joints is improved by various Horse Riding positions on the horse and exercises on the horse. The results are not as obvious as the mobility problems, but they are noticeably satisfactory.

Theories referring to physical, educational, psychological and social benefits of Therapeutic Horse Riding were mentioned in the bibliographic review. The Analysis of research is mainly



related to physical and social benefits and, to a lesser extent, to psychological and educational benefits. This is due to research questions based mainly on the social and physical benefits of Therapeutic Horse Riding. The findings of this research are consistent with the results of previous surveys. The improvement in physical problems reported in other studies, is also presented in this research. In particular, muscle tone, balance, head control, movement symmetry, joint motion range, motion coordination, spasticity, limb mobility and walking. Also, the improvement of social problems is presented in this research. In particular, friendships with other people and with the horse are created, experience is increased through activities, socialization is encouraged and the quality of life is improved.

The present research is related to the theory developed in the bibliographic review that the treatment of cerebral palsy is based on continuous central nervous system irritations that delay the mistaken activity of reflexes and motion patterns. These irritations, as far as possible, restore the muscle tone to normal. Therapeutic Horse Riding supports the normalization of muscle tone. When the horse proceeds, it performs certain moves. Up and down. Horizontally as the acceleration and deceleration alternates in each step. Right and left, because at each step the crowns lower left and right. All these oscillatory movements are transferred to the rider with a disability through the pelvis to the neck, the shoulder and the limbs. The trainer has to influence the rider to leave himself on the swing and to assimilate them. The horse's oscillations during the walk offer the rider the same pattern as the human walking. The rider and the horse are a set that interacts with walking and learning new things. Furthermore, the rider on the back of the horse gains self-confidence and emancipation, feelings that create new dimensions in his experience. Livery contributes particularly to children with Cerebral Palsy and especially to those with mental retardation. The rider of the horse must also be the one who takes care of it. An emotional bond develops between the two of them and the horse wants to please the caregiver. The ability of the rider to take care of the horse helps him learn how to take care of himself. Washing the horse encourages a child to learn to be independent in treating himself in his personal hygiene. Feeding the horse helps in understanding the measurement, quantity and weight (Eleftheriadou, 2015).

## **DISCUSSION**

Therapeutic Horse Riding seems to be a huge, promising chapter of improving the problems of Cerebral Palsy. In this research, the research questions are answered, but there are many questions about Therapeutic Horse Riding that still need to be analyzed. In particular, a new

research could be done on the benefits of bibliographic review such as improved cardiorespiratory function and strength, body symmetry development, kinetic cost improvement, reading, mathematics, reflexes, quality and speech improvement, self-testing and much more. All of these benefits in research and theory can trigger and broaden research into the benefits of Therapeutic Horse Riding beyond Cerebral Palsy.

The purpose of this research was to draw conclusions and interpretations. The qualitative method was used, because through this the investigation of the research is done in depth and in detail. Quality research explores the subjective experience in forming the social world (Iosifidis, 2003).

The choice of qualitative research in this work was based on the rich material expected from Therapeutic Horse Riding. This information is inappropriate for generalizations, so this study did not reduce the data. However, when the data from the respondents was the same, the description of the findings is mentioned once. Efforts have been made to gather as much information as possible and have been flexible during the research to lead to the process of comprehensive description and understanding. Qualitative research in this case of Therapeutic Horse Riding in Cerebral Palsy was suitable to create theories.

Ten specialists, two Speech Therapists, two Occupational Therapists and two Physiotherapists, who specialize in Therapeutic Horse Riding, participated in this research.

Two main constraints were presented. One was the difficulty of meeting with the respondents. Although the letters were sent in time, many respondents were late in arranging the meeting. In some cases, there was a limitation for the meeting point, especially when it was at the respondent's residence, where workload was due to delays and postponements. The second most significant restriction comes again from the same source, that is the residence of the respondent, the laconic answers. The researcher tried to get as much data as possible in a limited time. The answers to the questions were relatively similar among the respondents. This limited the data to less rich content as expected, but this limitation contributed to the validity of the data since, according to the theory of triangulation, the data from a source is used to verify the data of the other source.

In a future survey of similar content, it may be preferable for a meeting with respondents to be out-of-work in a more relaxed environment, such as their home or a place where the respondent will not feel time pressure.

Although the results are credible and positive, some practices are suggested to improve future research with a view to a deeper understanding and exploration of the benefits of Therapeutic Horse Riding in Cerebral Palsy. As mentioned above, it seems to be better in future surveys that the interview is done outside the workplace, because the pressure of expectation of the respondents' obligations has shown somewhat slow and hasty responses. However, in the second year, the researcher should be found next to the special educator in the horse arena and see Therapeutic Horse Riding in its full application to real-life incidents. Also, they should listen to children, discuss with them as much as possible, and learn from parents about their treatment. Overall, a more complete survey will be carried out where data from experts, parents and trainees will be collected and the treatment in the arena itself. It is useful to investigate the financial cost of the Therapeutic Horse Riding Sessions and compare it to other types of sessions. It is also suggested to combine qualitative and quantitative research for even greater and in-depth exploration of Therapeutic Horse Riding as a Tool for Empowerment of Motor Function and Social Skills of Children with Cerebral Palsy. Using the quantitative method will also gather data based on a specific standard questionnaire and will approach a larger part of the sample more quickly to test the theory. The research tool of quantitative research, the questionnaire, is completed quickly and pleasantly by the respondents, as opposed to the interview where some people find it unpleasant. The data will be easily standardized and processed by statistical methods of analysis (Kyriazi, 2002). The statistical results will be presented in tables and charts so that research beyond the analysis of interviews will also show percentage results for easier understanding of the answers to the research questions.

## **CONCLUSION**

It is clear from the experts, that Therapeutic Horse Riding is a psychotherapeutic tool for strengthening the kinetic and social skills of people with Cerebral Palsy, because of the horse's own feelings. More important benefits are given to the kinetic skills that are based on the three-dimensional movement of the horse. In particular, it benefits the hefty and delicate mobility, the coordination of movements and the development of the balance and protection reactions, improves torso and head control, compensates for the spasticity characteristics and improves walking. Also, the heat from the animal's body improves blood circulation and contributes directly to the relaxation and reduction of spasticity (Dimitrakopoulou, 2015). The results of Therapeutic Horse Riding in Children with Cerebral Palsy, as well as on

children with other special needs, are directly related to the type of special need and the depth of the child's problem. That is, each person plans what treatment program to follow and adjusts accordingly to meet his or her needs. Surely, Therapeutic Horse Riding has significant benefits but is a complement to existing therapeutic methods. Future research is suggested by combining a qualitative and quantitative method, a combination of expert and parent interviews, and on-the-spot observation of Therapeutic Horse Riding Sessions to explore the issue more deeply.

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