

Hippotherapy as a way of improving motor performance in juveniles with infantile cerebral palsy

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Abstract

Animals have accompanied man for thousands of years and their role in human life has seriously evolved. Man had power over domesticated animals and decided about their fate, they were used as a means of transport and helped humans with the farming. There is a group of animals, known as *companion animals*, which are ranked high in human life. Nowadays, animals are more frequently utilized in different animal-assisted therapies. Hippotherapy as a therapeutic intervention exerts serious influence on those participating in its sessions, and it affects all interpenetrating spheres of human life. Therapeutic effects of horse-riding were already known in 400 B.C. Hippocrates claimed that horse-riding exerted positive effect on treating certain health conditions. Equine therapists, over the years, have noticed significant benefits to their clients resulting not only from the nature of a horse but also from its unique ambulation. One can say that a horse during a therapeutic session becomes a precise stimulator of movement.

Thanks to a similar way of ambulation in man and in a horse, during a horse riding session the rider's pelvis, trunk and the shoulder girdle are made to move according to the physiological pattern of human ambulation, so a person with motor disorders has a chance to learn proper human gait pattern without walking.

Keywords

- hippotherapy
- infantile cerebral palsy
- therapy
- movement
- therapeutic intervention

Contribution

- A – the preparation of the research project
- B – the assembly of data for the research undertaken
- C – the conducting of statistical analysis
- D – interpretation of results
- E – manuscript preparation
- F – literature review

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Development of hippotherapy

The term “hippotherapy” is derived from two words in ancient Greek: “hippos”, i.e., a horse and *therapeia* meaning treatment / therapy. Liz Hartel from Denmark exerted fundamental influence on the development of hippotherapy. Not only did she contribute to its development but also to recognizing it as an effective and successful form of therapy. Liz suffered from polio in her childhood but despite serious problems with ambulation and thanks to her perseverance and determination she never resigned from horse-riding. Initially, she rode only at a walk, lying on her stomach across the horse's back, in a position of a *dead Indian*. Her perseverance and therapeutic properties of horse-riding made her fitness and horse-riding skills gradually improve.^{1,2}

Relatively late, i.e., not until 1950s, in Western Europe, Canada and the United States of America some monitoring of and research into various aspects of equine physiotherapy were undertaken and in time it was included in a physiotherapeutic management. In 1965, Joseph J. Bauer and R. E. Renaud utilized horses as a therapeutic aid. Their clients were persons with the following dysfunctions: multiple sclerosis (MS), a closed head trauma, orthopaedic disorders, infantile cerebral palsy (ICP) and behavioural disturbances.³

In 1962, in Konstancin near Warsaw, Poland, professor M. Weiss made first attempts at including hippotherapy in therapeutic management. Due to a lack of a sympathetic response from governmental authorities and a lack of adequate conditions, he showed great courage and at the same time became a pioneer in hippotherapy in Poland. Also, a host of Cracovian physicians including Prof. Stanisław Grochmal, and medical doctors Irena Solecka-Szpejda and Jan Miklasiński commenced organizing hippotherapy sessions in the open area of the Swoszowice health-resort. Juveniles who joined equine physiotherapy were patients of the Rehabilitation Outpatient Clinic for Children and Adolescents of a Specialist Centre for Mother and Child in Krakow. The ground and a horse-riding base were prepared and made available by the “Krakus” horse riding club in Swoszowice. Irena Solecka-Szpejda, MD also commenced training therapeutic riding instructors.³

In Poland, the Polish Hippotherapy Association supervises norms and issues of hippotherapy. It has been active since 1989 and it is the oldest all-Poland non-governmental organization (NGO). It deals with all the issues connected to hippotherapy and rehabilitation on horseback.

Taking into account a literal meaning of hippotherapy, one should emphasize that it refers to a horse-assisted therapy. In Western Europe and in Anglo-Saxon

countries (it is used in a narrow range) hippotherapy refers only to the rehabilitation of persons with motor disorders, i.e. equine physiotherapy.^{4,11,13}

In Poland, the term hippotherapy refers to all the therapeutic activities with horses. The Canons of Polish Hippotherapy worked out by the Polish Hippotherapy Association include a general definition of hippotherapy, describing it as “the whole of the equine-assisted therapeutic treatments”.^{14,15} A. Strumińska defines hippotherapy more precisely as: “an activity targeted at restoring human physical and mental health with the help of horses and horse-riding”.¹³

Hippotherapy is an oriented therapeutic intervention. It serves the improvement of human functioning in the physical, emotional, cognitive and social spheres. During a therapeutic process a properly selected and well-trained horse becomes an integral part of the horse-rider and the therapist team.¹⁵

From such a perspective hippotherapy becomes a composite influence. Equine physiotherapy sessions are conducted by qualified personnel and certified therapeutic riding instructors. If sessions are conducted by persons with primary education, enabling them to carry out therapeutic or rehabilitation sessions with persons with a given type of disabilities or disorders, then the term hippotherapy is not used but rather the expression “activities with horses”.^{1,2}

Hippotherapy sessions are directed to persons who suffer from:

- infantile cerebral palsy (ICP) and other palsies, or a limb-paresis of other ethology;
- postural disorders;
- brachial plexus palsy;
- spina-bifidia with myelocoele;
- post amputation states and with abnormal development of limbs, and
- deficits in the sphere of motor development.¹⁰

Due to its specific character, hippotherapy should be conducted by a qualified physiotherapist. It is recognized as a treatment supporting a fundamental rehabilitation programme and it should rather be included in the general treatment plan by means of motor rehabilitation as quickly as possible. Equine-assisted therapies must be at the same time supported by specific specialist knowledge.²

Infantile cerebral palsy (ICP)

The ICP is also known as Little's disease and it is derived from the surname of William John Little, an English physician. Doctor Little claimed that the damage causing the pathomechanism of ICP resulted from the

cerebral damage which had occurred in the perinatal period. The disease results from a damage to the central nervous system (CNS) during foetal life, at labour or directly after labour. The damage in the foetal period most often occurs between 26 and 34 weeks of pregnancy.^{12,16}

Treatment of ICP

The damage connected with the ICP is in most cases irreparable. However, at employing proper means and methods there is a chance for good therapeutic prognosis. The intervention should commence as quickly as possible from the moment of making a diagnosis. The ICP patients are treated by doctors of many specializations but neurologists play here a key role. They assess changes in the brain and then decide about further interventions. Motor rehabilitation is of fundamental significance in treating the ICP. It aims at activating paralysed nerves and muscles in a given part of the body.^{7,17}

Hippotherapy as a method of treating juveniles with ICP

Hippotherapy:

- a) positively affects the mental state of persons participating in hippotherapy sessions;
- b) improves the coding of proper human gait pattern in their brain;
- c) normalizes their muscle tone (indispensable for learning proper active movements);
- d) improves their balance, coordination, spatial orientation and undisturbed sense of rhythm;
- e) stimulates and normalizes exteroceptive sensation (thanks to touching horse's warm and soft coat).

During a hippotherapy session, the juvenile may arise liking for a horse, they memorize its name and learn how to deal with a living creature. The horses selected for therapeutic sessions are calm, even-tempered, gentle and well-trained which allows a juvenile rider to demonstrate greater courage, dispel their anxiety and gain a feeling of success and self-esteem. Active participation in equine-assisted sessions increases concentration and self-control. It also stimulates initiative, gives better understanding of their skills and needs. Equine-assisted therapy conducted in a proper way is received by a juvenile as a play and fun. A young person does not fully understand that the exercises are conducted in another than a traditional form. For some juveniles it is an extraordinary possibility to stay in the fresh air with their peers and animals.

A contact of a juvenile with a horse positively affects their mental state and a gentle, rocking walk of a horse is good for stress relief and relaxation.

Hippotherapy may be considered an excellent school of life. It expands the juvenile's knowledge about life and helps them find their own look at the world. It teaches self-reliance, responsibility and cooperation. Contacts with an animal stimulate the sense organs and many a time bring a smile to the child's face.¹⁷

Description of juveniles with psychomotor disorders

Young people suffering from the ICP have distorted spatial orientation in real and cognitive space. Disturbances in real space concern one's awareness of personal space (i.e., in the body schema), they are manifested by difficulties with naming parts of the body and locating them. Disturbances in sensory integration (concern interactions with the environment and objects), result in problems with a precise location of objects, difficulties with estimating distance and problems with moving between objects).

Topographic disorientation (i.e., disturbances of spatial visualization in the surrounding environment, finding a way or a loss of direction) belongs to disturbances in cognitive spatial orientation. They are accompanied by disturbances in graphomotor activities where poor body and space awareness prevail. The above issues were described by David Beson. They can be supplemented by disturbances in spatial visualization and awareness of clothes and parts of the body in relation to the clothes. All of them affect the understanding of commands referring to orientation in subspace.

In children and youngsters with the ICP, due to a slower development of their CNS and some damage to the brain, the process of laterization is most often delayed and disturbed. Those disorders are manifested by some deficits in bilateral motor coordination. Moreover, they experience disturbances in crossing the medial line of the body and crossed laterality.

The following belong to the most frequently prevailing issues caused by the above disturbances:

- difficulties in learning to read;
- difficulties in copying the content of the blackboard into a copy book;
- problems with differentiating the sides of the body
- difficulties in writing letters similar in shape but with different spatial orientation;
- general problems with a graphic level.⁷

The effect of hippotherapy in juveniles with mental and motor impairment

A psycho-pedagogical horse-riding encompasses a group of activities undertaken to improve and rehabilitate intellectual, cognitive, emotional and physical functions. Therapeutic sessions are not limited only to riding on horseback but they also contain a number of other activities that involve interactions with horses (e.g.: preparing a horse for a ride, sometimes simple work in stables, grooming or feeding horses). During a session, some elements of educational, pedagogical and logopaedic activities are used. Therapists also implement psychotherapeutic methods and refer to the methods of occupational therapy (OT). A psycho-pedagogical riding on horseback is recommended most of all to persons mentally retarded with emotional and mental disorders. Sessions should be conducted by a psychologist, pedagogist or a special pedagogist.¹¹

The following hippotherapy factors affect juveniles with mental and motor impairment:

- horse's body (body temperature, touching its coat, the smell of its sweat and sounds produced by a horse);
- horse's movement (the rider without doing any exercises experiences the horse's gait when they sit or lie on a horse back and it is at a walk);
- movement with performing exercises (during a calm walk of a horse the rider performs special exercises under a close supervision of a PT and the whole body of the rider is in motion);
- cooperation with a PT (listening to, understanding and carrying out commands; exercises performed with assistance and safety measures observed);
- contact with a horse (creating an emotional bond between the rider and a horse).^{9,10}

Basic therapeutic goals of a hippotherapy centre involve:

- achievement of total relaxation and physical and mental stress relief in the juvenile riding a horse;
- elimination of improper reflexes and reactions;
- development of proper reflexes and reactions.

It is worth mentioning that a hippotherapy centre conducts all the activities according to a plan prepared beforehand which assumes that the next point on the agenda cannot be commenced before the previous one is not fully completed and its results attained. The most important element in the process of treating a juvenile in such a centre is their contact with a horse and the advantages resulting from that assistance.

The first hippotherapy session usually begins with getting acquainted with a horse. The next session is devoted to proper mounting and dismounting a horse, supervised by a PT. It is done depending on individual skills and abilities of each participant. At that stage, the juvenile gets accustomed to the height sitting on a horse and some basic exercises of the upper limbs and the trunk can be introduced. In the next session, exercises in riding at a walk, i.e. in movement, are introduced. Exercises in horse-riding are selected individually for each participant. They should aim at making a juvenile, depending on their skills and abilities, perform the exercises independently and as precisely as possible. The hippotherapy instructor is obliged to help the participant do the exercises, but they should not do them for participants.¹⁷

Principles used by a hippotherapy centre instructors

The principle of individualization

Each participant possesses their own rehabilitation programme. There is no stiff therapy outline in equine-assisted therapies because of various health conditions of each participant. Differences in their personalities are also taken into account. On the one hand, shy juveniles need more time to get acquainted with a horse, and on the other hand, those who are brave do not keep proper distance from horses which may put them in danger. There are also children and youngsters who require breaking barriers and special encouragement and those who from the very beginning willingly and fully cooperate with the instructor. Progress made by participants is greater or smaller. Some of them require a lot of repetitions and a long-lasting consolidation of the element exercised, and some learn considerably fast.

The principle of arousing positive motivation

A tendency to increase motivation to life and struggle with a disease and disability can be considerably early noticed during hippotherapy sessions. A significantly great number of juveniles with motor impairments comes to a hippotherapy centre with a disturbed motivational function. They are not eager to do exercises and many a time are weary of the sessions and even

discouraged. The therapy target seems too distant to them, taking into account their great effort in performing exercises. A long-lasting tiring effort becomes a barrier which cannot be overcome. Bearing in mind a possible and easy to achieve target, there is a chance to conduct an effective therapy. The therapeutic aim should be accomplished in an interesting form and friendly atmosphere. A significant number of participants is eager to try new intervention methods and improve their motivation. The therapist should be aware of and they should prevent any symptoms of boredom or discouragement in their clients and they should try to make sessions interesting and avoid monotony. One should evade such situations in which a therapist demands too much from their clients and the sessions are conducted in unfriendly atmosphere.

Safety issues

Safety issues are of utmost importance during hippotherapy with juveniles. One should foresee the results of their actions and observe the principles of safety while working with horses. Due to a specific character of participants' health complaints, the requirements of safety during hippotherapy sessions are much stricter. They concern a good selection of horses, equipment, ground and a place of work, as well as precautionary measures and even appropriate working clothes. A thorough medical diagnosis of the complaint is sine qua non for safe hippotherapy. A doctor should also take into account specific character of hippotherapy sessions individually prepared for each participant.

The principle of the long-term nature of therapeutic effects

Learning to ride a horse by a disabled juvenile or one with motor disorders aims at significantly permanent improvement of their fitness. The therapist is obliged to strengthen their motivations in a long perspective.¹⁹

Benefits for disabled juveniles with the ICP resulting from hippotherapy

A horse can excellently replace rehabilitation equipment. Hippotherapy is used to relieve spastic muscle tension and atonia which are accompanied by abnormal involuntary movements. Regulation of muscle

tone is a base for the rehabilitation programme. During hippotherapy sessions effects are achieved automatically and almost instantly. While riding on horseback the rider's muscles get warmer as a result of the horse's body temperature which is higher than the temperature of the human body. Participants get calmer and more relaxed thanks to a rhythmic rocking of the horse's walk. Turning of the shoulders and in the hips introduced in a natural way are of extreme importance. The movement and position of lower extremities in abduction and external rotation in the hip joints are easy to obtain during hippotherapy. The mobilization of joints causes increased range of motion (ROM) in joints.^{3,18}

In the psychomotor sphere, hippotherapy develops in juveniles with the ICP their body awareness and awareness of its location in space. It increases certainty and the response time, improves spatial awareness of juveniles, their reflex, the eye and hand coordination and precision of movements. Concentration and attention of juveniles with the ICP increase as a result of participation in hippotherapy sessions. The juvenile achieves considerably improved activity skills and a better physical and mental state. They secrete adrenaline while riding on horseback and performing exercises. The changes activated in the hormone and vegetative systems improve circulation, peristalsis and increase general oxygenation of the human body.

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