

# Cerebral Palsy and Therapeutic Riding

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Cerebral palsy is a condition caused by damage to the brain, usually occurring before, during or shortly following birth. "Cerebral" refers to the brain and "palsy" refers to a disorder of movement or posture. Cerebral palsy is neither progressive or communicable. It is also not curable, although education, therapy and applied technology can help people with cerebral palsy lead productive lives.

The causes of cerebral palsy include illness during pregnancy, premature delivery or lack of oxygen to the baby. Head injuries can also lead to the less common acquired cerebral palsy. Between 500,000 and 700,000 Americans have some degree of cerebral palsy. There are three main types of cerebral palsy: spastic-stiff and difficult movement, athetoid-involuntary and uncontrolled movement, and ataxic-disturbed sense of balance and depth perception.

Cerebral palsy is characterized by an inability to fully control motor function. Depending on which part of the brain has been damaged and the degree of involvement of the central nervous system, one or more of the following may occur: spasms; tonal problems; involuntary movement; disturbance in gait and mobility; seizures; abnormal sensation and perception; impairment of sight, hearing or speech; and mental retardation.

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## **Medical Considerations for Therapeutic Riding**

People with cerebral palsy have difficulty coordinating and producing purposeful, functional movements. Some people have too much muscle tone, such as those with spasticity. Their muscles hold their limbs in rather stiff postures and it is difficult to relax these muscles. Thus, the rider cannot move his limbs easily except in the direction the spastic muscles pull. Other types of tone abnormalities include fluctuating tone, as seen in athetoid cerebral palsy and hypotonia, or too little tone.

Tone is an elusive thing to quantify. Using treatment techniques to temporarily make tone more normal does not suddenly result in normal, coordinated movement patterns. In fact, increased tone may be the result of pathologic weaknesses in other muscle groups coupled with the normal human desire to move. Muscle fibers are known to change over time, resulting in increasing, age-related difficulty in maintaining posture. It may be true that abnormal tone, especially spasticity, is an abnormal response to normal sensation, such as touch and movement sensation.

Orthopedic problems occur in people with cerebral palsy, perhaps partly because of the interaction of the abnormal neurologic system with the muscles, joints and soft tissues. The abnormal, usually asymmetrical pull of spastic muscles coupled with lack of normal movement and weightbearing can result in progressive scoliosis and dislocating hips. Other joints, such as wrists, elbows, knees and ankles, can lose flexibility and range of motion.

Despite these factors, the rhythmic motion, shape, warmth and inherently motivating quality of the horse can be helpful to people with cerebral palsy throughout their lives. Therapeutic riding can facilitate cognitive and sensorimotor development in childhood, help develop a sense of responsibility, self-confidence and fair play in adolescence and provide life-long recreation and sport. It can do all this while stimulating the good posture, balance and flexibility needed for functional independence off the horse.

Riding works best for maintaining range of motion and joint flexibility if a well-aligned, correct posture on the horse is always a goal. There is no substitute for a horse with good, symmetric

movement. Many riders with cerebral palsy can achieve normal balance, posture and movement on a horse if the instructor takes a long, slow approach, focusing on posture and alignment. These are not "therapy" goals. Good posture, hands-free balance and a "following seat" are prerequisites to riding with ease and comfort for the rider and the horse.

Riding sessions for people with cerebral palsy should never result in increased tone and discomfort. Ask the rider (family member or personal care assistant) how he feels after the session, when he's at home. Are the muscles relaxed or tight? If spasticity is worse after the session, decrease the amount of stimulation. Focus on less impulsion, more stretching and relaxation, more straight-line work and fewer circles. Use a horse with a wider base and a smoother walk. Offer an opportunity to sit and rest after dismounting. Try a saddle with a suede or synthetic cover so the rider's seat and legs will stick to the saddle better, which will increase his stability and decrease stress.

Recent articles by Ruth DismukeBlakely, SLP/CCC, in *AHA News* and *NARHA News*, indicate that the movement of the horse in hippotherapy sessions can increase the quantity, quality and volume of vocalization in the rider. For children with cerebral palsy, the horse is a wonderful motivation for speech, while the horse's movement can improve the coordination of breathing, swallowing and sound production. The horse naturally motivates children with cerebral palsy to move, explore and touch. Using the horse as a large, gentle, rhythmic and predictably moving gross-motor platform, where the child is invited and assisted to explore, can be even more useful than learning to ride. Instructors can encourage movement and hopefully "disconnect" it from the fear of failure. The result is self-confidence and courage on and off the horse.

The rider with cerebral palsy benefits from advance preparation in many areas. Stretching before getting on the horse, as recommended by a physical therapist, can reduce the warm-up time on the horse. When practicing walk-halt transitions, the instructor or therapist can use: "Prepare to walk", "Prepare to halt", "Get ready to whoa." These preparatory phrases allow the rider to prepare or "set" the posture needed to accomplish the task.

If the rider has decreased or asymmetric range of motion at the hips and knees, select the horse that accommodates the problem so the rider can sit easily in good alignment without being pulled to one side. If the hip is partially dislocated (subluxed), the type of horse is essential. The lack of range of motion, spasticity, the horse's natural shape and movement can all potentially worsen the subluxation. In general, the rider with cerebral palsy who has orthopedic problems at the hips or spine may benefit greatly from consultation with a physical therapist who can assist the instructor in creating an appropriate riding program.

*-Liz Baker, PT, NARHA Medical Committee Chairman*

### **A Review of Relevant Literature**

Information on the use of the horse as a treatment modality for patients with neurological disorders was first published in a 1870 thesis by Chassaine, who was studying at the University of Paris. It was not until the 1970s that articles related to therapy for cerebral palsy using therapeutic riding started to appear in scientific literature on a regular basis. These early publications (in German) lacked many of the details that are necessary to evaluate the effects of treatment or they were general reviews of observed effects (subjective evaluation). Horster et al (1976) gave a general review of hippotherapy and riding therapy and their use. The study concluded that the psychological benefit was important because patients maintained their motivation. Improvements were noted in coordination, muscle tone and reactions.

A similar report was used to report results of an opinion survey on the possibilities of improving motor functions of children with cerebral palsy with the help of therapeutic riding (Feldkamp, 1979). The consensus was that some difficulties could be helped with therapeutic riding but some key problems, such as spasticity, would not be helped. Again the psychological benefits (motivation) were reported.

Satter (1978) reported the general observations of children in Austria who were treated for five years. Contrary to the opinions expressed in Feldkamp's article, Satter reported the ability to normalize muscle tone and an improvement in body control, coordination of movements, rotation and orientation in space. Equilibrium and righting reactions, symmetry, head and postural control and spasticity of adductor groups could be helped by the three-dimensional movements of the horse. He also noted the positive effect on motivation.

The report by Tauffkirchen (1977) is more specific in treatment methods. The various positions and duration of each treatment (maximum 15-20 minutes) were given. An improvement in posture, tone, inhibition of pathological movement patterns, facilitation of normal automatic reactions and promotion of sensimotor perceptions was achieved. Also, the author commented on the positive motivation factor.

Bertoti's report (1988) is the most complete report reviewed and is objective. In this study on posture, 27 children (spastic diplegia or quadraplegia) were followed in a repeated-measures design: pretest, 10-week period of no riding, pretest 2, 10 weeks of riding and post-test. Thus, each child served as his own control. They rode twice weekly for one-hour sessions. A specific protocol was followed for each session and for posture evaluation. The sessions resulted in decreased spasticity, improved weight shift, improved balance and rotational skills and improved postural control. In addition to the objective measurements, other subjective improvements were noted, such as improved self-confidence; less fear of movement and position change; decreased extensor muscle hypertonus and hip adductor muscle spasticity; improved movements for sitting, walking and stance; and improved weight-bearing. The study demonstrated that therapeutic riding can be a valuable treatment modality for children with cerebral palsy.

This report was supported by Campbell's 1990 report. In contrast, Lacey (1993) reported no beneficial effect on posture for three and four-year-olds receiving therapy for six weeks.

In summary, additional studies need to be conducted that will address the interactions of intensity of the physical therapy, the duration of each therapy session, the frequency of therapy and the duration of the treatment program. Currently, it appears that twice weekly sessions of at least 30 minutes for a minimum of 10 weeks might be the best therapy protocol.

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