

Brain Injuries and Therapeutic Riding

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Traumatic brain injury (TBI) is defined as an insult to the brain caused by an external physical force that may produce a diminished or altered state of consciousness. This results in an impairment of cognitive abilities and/or physical functioning. The term TBI does not apply to brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma.

The cognitive effects of TBI may include: short and long term memory loss; difficulties with concentration, judgment, communication and planning; and spatial disorientation. Physical effects may include: seizures; muscle spasticity; vision, hearing, smell and taste loss; speech impairment; headaches; and reduced endurance. Psychosocial, behavioral and emotional effects may include: anxiety and depression; mood swings; denial; sexual difficulties; unstable emotions; egocentricity; impulsivity; agitation; and isolation.

TBI is responsible for the majority of injury-related deaths of Americans under 45 years of age. It is estimated that TBI claims more than 56,000 American lives annually. Each year, approximately 373,000 Americans are hospitalized as a result of TBI. Of these, 99,000 individuals sustain moderate to severe brain injuries resulting in lifelong disabling conditions. Vehicle crashes are the leading cause of TBI (50% of all injuries), followed by falls (21%), firearms (12%), and sports/recreation (10%).

After one traumatic brain injury, the risk for a second injury is three times greater; and after a second TBI, the risk for a third injury is eight times greater.

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Medical Considerations for Therapeutic Riding

By Liz Baker, PT, NARHA Medical Committee Chairman

For therapeutic riding programs, the opportunity to serve a person who has had a traumatic brain injury is a tremendously rewarding challenge. A team approach to evaluation and program planning is essential. The rider's impairments help determine which health professionals and inputs are needed. As always, the riding instructor is the key member, often the leader, of the team.

Besides those listed above, people with TBI may also have the following conditions:

- Physical problems, including lack of automatic and volitional, spontaneous movement; difficulty with balance and coordination; diminished, altered or slow response to sensory input.
- Other communication problems include difficulty retrieving words from memory (anomia); poor understanding of sequential information; difficulty processing auditory input; expressive aphasia (using sentences with complete appropriate grammar and vocabulary); good social language but poor comprehension of the content; and poor articulation and voice quality.

Difficulty with communication can have physical, cognitive or mental health causes. Age is also an issue; pediatric head injuries are the leading cause of disability in children, with 5-10% of those injured having temporary or permanent problems afterwards.

Prolonged lack of exercise after TBI contributes to poor endurance, deconditioning and easy fatigue. The person may have had other injuries such as broken bones in the extremities or spine, or internal injuries. Vision is also often affected, causing blurred or double vision, poor depth

perception, poor visual tracking and poor recognition of body parts by vision. therapeutic riding programs often see a change in behavior -- at times inappropriate behavior -- in the person. Most people progress along a continuum of behavior as they recover, but may have varying degrees of confusion, agitation, aggression and difficulty with stress. Lack of internal motivation is also common. The riding program needs to know what is normal behavior for that person at this time, and how to best respond.

Initially after the injury, the person with TBI is stabilized in the hospital and transferred to a rehabilitation facility to continue recovery. There, the focus is to become as independent as possible and to return to home as soon as possible. Some rehab facilities have their own therapeutic riding programs or refer to one nearby; thus the patient may start therapeutic riding quite soon. However, most people with TBI contact a therapeutic riding center after they are discharged from rehab. At that point, due to the TBI, major changes have occurred in the person's life. The person may be quite physically/cognitively/communicatively impaired and no longer able to live independently. Persons with TBI and their families will still be adjusting to these significant changes. The therapeutic riding center will need to be sensitive and supportive while planning a program.

Since recovery can continue for years, and since the horse can promote improvement in many impaired skill areas, therapeutic riding can be of tremendous help to the person with TBI. It can be a lifelong activity for enjoyment, recreation and sport, with ongoing therapeutic benefits to the body and mind. Initially, the instructor should evaluate the rider with a physical, occupational or speech therapist, as well as with a mental health professional (this depends on the person's abilities and impairments). The riding team's evaluation should include on- and off-horse components; a decision to accept the rider should not be made until the evaluation is done. By visiting the center before the evaluation, the prospective rider will adjust to the setting, which may make the evaluation easier for all concerned.

The PT will assess the person's joint mobility (ROM), head and trunk control, balance, functional mobility, adapted equipment and ambulation abilities if appropriate. The OT will add a focus on the client's upper extremity control, sensory processing, sensation, perception and any upper extremity splint or adapted equipment use. There is an overlap of skills between PT's and OT's; both will recommend the type of therapy or therapeutic program, equipment and horse. A speech-language pathologist is invaluable when the prospective rider has difficulty with speech, communication and/or oral control. The SLP can evaluate the rider in these areas, as well as swallowing/drooling and language. The rider may already have an adapted method of communication such as sign language or an electronic communication device. An immediate concern is to have a way to communicate simple concepts with the rider such as "yes," "no," "halt," "walk on," and discomfort and fatigue. This will prevent frustration for the client and staff. Since the riding session is excellent for working on communication goals of all kinds, the SLP should recommend strategies for a) communicating with the rider, and b) activities for the instructor, other therapists and staff to use to improve the rider's communication skills.

A health professional specializing in psychology and behavior may be needed. People post-TBI can have trouble controlling their behavior; they may have injury-related changes in their emotional state, difficulty dealing with frustration and stress or be depressed. The sensory input to the brain experienced during riding may trigger the brain's limbic system, causing emotional responses such as inappropriate laughing, crying or anger. The amount of stimulation from the horse may need to be graded to avoid or diminish these outbursts. Riders may also have a specific behavioral management plan that all staff need to know. Psychologists, psychiatrists, psychotherapists, psychiatric social workers, psychiatric nurses or the OT specializing in this area can provide direct treatment or consultation; efforts may include training staff and tailoring the program to help improve appropriate behavioral responses.

Other concerns include the following. The rider should be at least at the Ranchos Los Amigos Scale of Cognitive Functioning Level Six; that is, the rider may be confused but appropriate; with

good directed behavior, but needing cueing; able to relearn old skills such as activities of daily living; may have serious memory problems; some awareness of self and others. Medical problems that may need assessment and further investigation (see NARHA Precautions and Contraindications) include seizures, presence of a shunt, abnormal bone structure or missing bone in the head s/p surgery; and problems with the regulation of autonomic nervous system functions such as blood pressure, sweating/body temperature regulation, and abnormal bone formation (myositis). A ventilated helmet helps with excessive sweating of the head; also, avoiding fatigue is helpful.

Immediately following the session, have a chair available for the rider to rest. This concept of resting after riding does not just rest muscles; while riding, the rider with TBI takes in large quantities of sensory input in all the sensory systems, and the brain is constantly trying to process that input and create a functional outcome, such as maintaining an upright posture and turning the horse. For a person with TBI, this is fatiguing even while it is therapeutic. A rest period after riding decreases stress, allows a recovery and may help the person retain the beneficial effects of the riding session.

TBI can cause problems with alignment, posture, mobility and balance. It is not unusual for a person with TBI to have a sacral-sitting posture on the horse, with pelvis tilted back and the legs extended, feet out in front of the knees. In this posture, or any abnormal alignment, teaching specific riding skills without correcting alignment will only reinforce poor alignment. Before teaching riding skills, the instructor and therapist should search to find the horse and saddle or surcingle combination, coupled with program activities that achieve a more normal riding posture. In a correct alignment, if it is possible, the horse's movement can begin to mobilize and activate the rider's trunk and postural control, which may have become compromised due to the effects of the TBI. Slow and patient work here will pay off in the long run; working toward good posture and balance control on the horse before superimposing riding skills on that control, will result in a safer, more physically competent rider. Balance skills should be "background" skills; one should not have to think about balancing oneself, but should be able to maintain upright posture and good balance while doing something else, such as using reins. However, it is exactly these skills that are the most difficult for the rider post-TBI.

Vision is also an important component of balance; the person may seem more unstable in a crowded, busy environment with other riders present because the visual component of balance is over stressed. In essence, the rider's posture, alignment and balance should be of first concern, with riding skills gradually taught at the rider's rate of progression. Consideration should be given to overall amount of stimulation, particularly visual, in the riding environment. Also, careful task analysis of each new skill will be helpful.

The rider with TBI might be described as an individual who can often perform individual tasks, but when those tasks must be integrated together, the brain does not perform as efficiently. Although therapeutic riding tasks must be structured and broken down so as not to overload, the activity of riding actually provides an excellent means of slowly re-integrating the brain's abilities in "system processing" (somewhat similar to computer multitasking). Slowly progressing the rider, adjusting the stimulation to challenge but not overwhelm, allowing ample time to safely make mistakes and correct them, in (at least initially) a quiet low-stress environment, is a helpful approach.

Given all these considerations, what is it about therapeutic riding that is so helpful to people with TBI? As always in therapeutic riding, it is the unique problems faced by the person post-TBI, not the diagnosis itself, which may be improved through the use of the horse. In spite of their balance, movement, posture, communication and behavioral problems, horses can provide a strong motivating, consistent, multisensory input that appears to help the rider's brain organize itself. Gradual recovery from TBI can continue for years, making therapeutic riding a source of stimulation to continue that recovery over a long period of time. A well-planned, carefully implemented riding program can not only facilitate the rider's recovery from TBI, but also provide a much-needed source of pleasure, risk and self-esteem to a person who really needs it. The

attraction of and bonding with the horse can be a positive and stabilizing experience in that person's life; it also can be an activity in which the whole family can participate. Helping people with TBI to help themselves, through the unique qualities of the horse, is rewarding for everyone.

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Westline Industrial Dr., St. Louis, MO 63146*

Contributor: Ruth Dismuke-Blakely, CCC-SLP, NARHA Medical Committee

A Review of Relevant Literature

Dr. J. Warren Evans, Research Committee Chairman

Since about 1975, a number of papers have been published about horseback riding or equestrian events and related injuries. Conclusions by some of the authors or their findings are as follows:

Dr. Bixby-Hammett reported that there were 42,000 horse-related accidents in the U.S. from 1979-1982 resulting in hospital emergency room treatment. Accidents resulting in death, no treatment, treatment at site of accident or treatment in a physician's office were not included. During this time period, 62% of horse-related deaths resulted from head injury. (Reference: Horseback Riding in North Carolina. North Carolina Medical Journal 47 (11):530-533, 1986.)

In 1987, Dr. Bixby-Hammett reported additional data from the United States Pony Club, Inc. From 1982-1986, there were 130 accidents while horses were being ridden and 30 other horse-related accidents in a membership of 46,351. The most frequently injured area of the body was the head and face (22% of the injuries). Bruises and abrasions (29%) and closed fracture (22%) were the most common type of injury. In 76% of the accidents, the horse threw the rider, failed to take a jump or slipped and fell. One very interesting statistic was that within three months of the first horse-related injury, 10% are injured in a second horse-related accident. (Reference: Accidents in Equestrian Sports. American Family Practitioner 36(3):209-214, 1987.)

In 1990, Bixby-Hammett wrote an excellent review of the subject with additional data regarding mortality. Head injuries caused 60 and 78% of the deaths respectively in the U.S. and Australia and chest injuries were responsible for 9%. (Reference: Common Injuries in Horseback Riding - A Review. Sports Medicine 9(1):36-47, 1990.) Her papers are an excellent source of references for other papers on the subject.

In the Journal of Family Practice 39(2):148-152, 1994, horseback riding injuries were reported for New Zealand. Their findings from a large survey were: 6% of riders had been hospitalized at least once; 27.5% of those riders had been treated by a physician within previous two years of last injury; an injury occurred about every 2,000 riding hours; 42% of the injured had sprains or strains; 40% had lacerations or bruises; 33% had fractures or dislocations; and 27.5% had sustained concussions or other head injuries.