2000

**Hippotherapy as a Modality in Rehabilitation**

H. Rebecca Adams

*University of North Dakota*

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HIPPOThERAPY AS A MODALITY IN REHABILITATION

by

H. Rebecca Adams
Bachelor of Science in Physical Therapy
University of North Dakota, 1999

An Independent Study
Submitted to the Graduate Faculty of the
Department of Physical Therapy
School of Medicine
University of North Dakota
in partial fulfillment of the requirements
for the degree of
Master of Physical Therapy

Grand Forks, North Dakota
May
2000
This Independent Study, submitted by H. Rebecca Adams in partial fulfillment of the requirements of the Degree of Master of Physical Therapy from the University of North Dakota, has been read by the Faculty Preceptor, Advisor, and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

(Faculty Preceptor)

(Graduate School Advisor)

(Chairperson, Physical Therapy)
PERMISSION

Title        Hippotherapy as a Modality in Rehabilitation
Department   Physical Therapy
Degree       Master of Physical Therapy

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This study is dedicated to my courageous Oma, who taught me never to give up.

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ABSTRACT

Hippotherapy is fast becoming a treatment option for today’s therapists. Recent efforts in rehabilitation have focused on emphasizing the “multidisciplinary team” approach, involving occupational therapy, physical therapy, speech and language pathologists as well as including members of the family in the clinic’s treatment process. Hippotherapy is the way in which these disciplines can easily be combined, as well as including the family in an educational as well as exciting treatment program for clients. This study will review a wide source of literature addressing the definition and process of hippotherapy and the physiological components of the program. Indications, contraindications and precautions for this activity with regards to specific diagnosis will be discussed. Following this review of the current literature, the reader will be familiar with the process of hippotherapy, its potential benefits, the standards of practice and the governing body for these practices, and become aware of how to access further information regarding certification as well. More importantly, the reader will gain an understanding of the ways in which hippotherapy, used as a modality, can be incorporated into a multidisciplinary treatment program focusing on a number of activities during the same session. By incorporating a host of treatments using one modality into a rehabilitation program, today’s therapists are able to focus on the idea of treating the whole person and provide as complete a service as possible to both the patient and their families.
CHAPTER I

HISTORY AND INDICATIONS FOR HIPPOTERAPY

Hippotherapy is fast becoming a treatment option for today’s therapists. Recent efforts in therapeutics have focused on emphasizing the “multidisciplinary team” approach, involving occupational therapy, physical therapy, speech and language pathologists as well as including members of the family in the clinic’s treatment process. Hippotherapy is the way in which we can easily combine these disciplines as well as including the family in an educational as well as exciting treatment program for our clients.

The word hippotherapy is derived from the Greek term “hippos,” meaning horse, and combined with “therapy,” indicating the treatment of illness or disability. Hippotherapy is then considered to be treatment with the assistance of a horse. This form of treatment provides us with the unique opportunity to “position a patient astride a dynamic surface that cannot be duplicated in a traditional clinic.” The treatment session is performed by a specially trained physical or occupational therapist, who combines her knowledge of equine movement with the functional goals of the patient, such that the movements of the horse influence the patient, rather than the patient controlling the horse. During this form of treatment, the horse is viewed as a therapeutic modality. “The child or adult sits on the horse and accommodates, with automatic reactions, to the
swinging motions of the horse’s back at the walk.\textsuperscript{3} Other aspects of this modality include the warmth generated between the horse and its rider, when using only a saddle pad.\textsuperscript{4} This heat loosens tight muscles, decreasing muscle tone and facilitating normal movement.

Beneficial properties, such as these, were recognized as early as 460 BC and reported by Hippocrates.\textsuperscript{5} Hippotherapy has been used as a form of treatment in Europe since the 1940’s, but it did not become popular until Liz Hartel, a polio survivor, won the silver medal in dressage at the 1952 Olympic games in Helsinki.\textsuperscript{6} During the 1960’s and 1970’s, European therapists progressed in this field and began using hippotherapy widely.\textsuperscript{7} These countries were also the first to publish research on this treatment technique. Therapists in the United States realized the potential of hippotherapy and began to formally organize a program by 1987. In 1993 the North American Riding for the Handicapped Association (NARHA) originally formed in 1969, branched out, and a section called the American Hippotherapy Association (AHA) was formed.\textsuperscript{7} This new section is dedicated to “the promotion of research, education and communication among PT’s and OT’s who use hippotherapy in their practice.”\textsuperscript{7} Research on this topic began in the US with a study by Delores Bertoti\textsuperscript{8} in 1988. Her study examined the effects of therapeutic riding on the posture of children with cerebral palsy. At that time, no objective measure techniques had been created, so Bertoti\textsuperscript{8} designed her own scale and tested it for reliability. More recently in 1996, a study was conducted by Haehl\textsuperscript{2} to examine the influence of hippotherapy on the postural control, postural coordination, and functional performance of two subjects with cerebral palsy using more advanced technology such as kinematic analysis.
For those conducting research, as well as for beginners in this field, it is important to understand the subtle differences between classic hippotherapy, American hippotherapy, and developmental or therapeutic riding. As a rule, hippotherapy focuses on the child’s response to the horse’s movement, and does not try to teach riding skills. Therapeutic riding on the other hand, does focus on developing these riding skills, but “requires that the instructor be knowledgeable in the limitations that the rider might have.”

According to the North American Riding for the Handicapped Association (NARHA), classic hippotherapy should only be carried out by a therapist who is “licensed or registered to practice a nationally recognized health care profession.” This is due to the principles, reflective of the German model of hippotherapy, in which the treatment is based purely on the horse’s movement and the client’s responses. During this style of therapy the patient may be positioned astride the horse facing forward, backward, prone or supine. The therapist is then responsible for analyzing the patient’s movement and adjusting the cadence, direction or velocity of the horse, in order to achieve the anticipated responses in the patient. Although the primary focus of classic hippotherapy is “the rider’s posture and movement responses,” other systems may also be affected such as respiration, cognition and speech.

The American style of hippotherapy also incorporates the use of PT, OT and speech to help their clients achieve functional and personal goals. With the basic premise still rooted in classic hippotherapy, this style focuses on a more dynamic form of riding. While using the movement of the horse to challenge the rider with regard to posture and righting reactions, the individual therapist then adds their specific treatment principles,
such as reaching activities, crossing mid-line and transitions as tolerated by each individual patient. American hippotherapy activities must be "meaningful to the client and specifically address the individual's goals."9

While hippotherapy is a "procedure carried out by licensed health care professionals as part of their treatment session,"2 therapeutic horseback riding is "a general term that may include hippotherapy but usually refers to teaching individuals with physical or cognitive impairments how to ride a horse."2 Jan Spink,11 M.A., refined developmental riding in the late 1980's, in order to address the growing need for a more specific multidisciplinary approach to therapeutic riding. Developmental riding serves as the bridge between hippotherapy and group therapeutic riding techniques. The clients who have met their long-term hippotherapy goals are now able to continue therapy in the "motivating and pleasurable environment of the horse, but are provided with greater challenges through the use of specific riding skills."9 This challenge, combined with the thought process and physical control of the horse is what differentiates therapeutic riding from the application of the hippotherapy which focuses on the non-cognitive or subcortical body movements and righting reactions of the disabled rider.

Although hippotherapy is primarily used to address physical goals, which may be related to posture, movement and function, it also has an effect on cognition, psychology, behavior and communication.1 The active exercises of American hippotherapy strengthen the musculature focusing especially on the trunk. Gottwald,12 a German therapist proposes that hippotherapy deserves special attention "since it has a considerable influence on the removal or at least reduction of segment fixation of the various parts of the spinal column," according to his research with regard to
Scheuermann’s disease and hippotherapy in 1981. He explained that the various types of riding produce a favorable influence on the vertebral column. This therapy mobilizes the pelvis, lumbar spine and lower extremity joints. It has an effect on both high and low tone, making it more efficient for the patient, which then aids in developing appropriate postural control and improves symmetry. During her interview in “Alternative Health Practitioner Magazine”, Delinger, a physical therapist, proposed the theory that sensorimotor integration is improved through this treatment, due to the tactile, proprioceptive and vestibular input associated with the therapy session. She went on to indicate that endurance, strength, body awareness, spatial orientation as well as righting responses and equilibrium may be improved.

Hippotherapy does, however, tend to have an effect on respiration, circulation, neurogenic bladder and intestinal function disorders. German researcher, Emmy Tauffkirchen found in her study of 27 children with Cerebral Palsy, that the normalization of tone associated with hippotherapy also worked to enable oral motor skills, deeper breathing capabilities and fosters coordinated swallowing. During a therapy session, loud commands and speech patterns by the patient are easily built into the program, giving them a feeling of control of their environment. Allowing the patient to vocally command the horse to go and stop gives them a tremendous motivation for oral activity.

More generalized health concerns were also benefited following hippotherapy treatments. In 1994, Exner performed a study focusing on the comprehensive care in paraplegia. Exner's findings indicated that mood was more balanced, sleep was improved, catheterization was easier and the patient’s noted more rhythmical bowel
function. Perhaps the most significant associated effect of this therapy was the increased openness and motivation for participation in the clients interviewed. Please refer to Chapter three, figures one, two and three, for further information regarding this study.

These psychological benefits of improving self esteem, confidence, motivation and attention span have been noted in a variety of studies performed both in the United States and abroad. Delinger, has observed that while traditional therapies in the clinic have a tendency to become repetitious, the novelty of hippotherapy captures the patient's attention, and motivates them into satisfactory cooperation during the therapy session. Tauffkirchen noted these benefits as well. Enjoyment in the process allows for better movement coordination, which is more easily learned through this partnership with the horse.

In light of the multi-faceted treatment benefits, hippotherapy is used to address a number of diagnoses ranging from clients who are deaf or blind, to severely involved patients with both mental and physical limitations. "Commonly treated diagnoses include cerebral palsy, cerebral vascular accident, multiple sclerosis, and traumatic brain injury," and more non-specific diagnoses such as, "reduced gross motor/higher level balance skills, poor motor planning, lack of body awareness, postural insecurity and sensory integration deficits." Treatment for individuals is certainly not limited to these stated conditions however. There has also been some question as to when hippotherapy should begin with the very young child. Delinger commented that age is not as important as the size of the individual. "The pelvis must be large enough for the child to straddle the horse comfortably," Delinger stated. Which generally can be accomplished
by three or four years of age. In addition to this physical requirement, the child must also be able to follow general directions.

As with the use of all therapeutic modalities, there are contraindications for the use of this form of treatment. As mentioned above, the patient must be able to sit astride the horse. Excessive lower extremity spasticity may reduce the amount of hip abduction necessary for this to occur. If the increased tone is accompanied by hip subluxation or dislocation, hippotherapy is contraindicated.

Other contraindications and precautions can be generalized into three main categories. Heine focused on medical, orthopedic and general situations that the patient may present with. The medical group includes: active arthritis, multiple sclerosis during exacerbations, complete quad secondary to spinal injury, open wounds on weight bearing surfaces, cerebral vascular accident secondary to unclipped aneurysm, uncontrolled seizures, severe allergies, and recent surgeries. The orthopedic category includes: acute herniated disc, atlanto-axial instability, severe osteoporosis, spondylolisthesis, structural scoliosis greater than 30 degrees, and recent fractures. The general group is comprised of: severe anxiety, grossly disruptive behavior and abnormal fatigue.

Safety must also be considered when making the decision with regards to treatment techniques. With adults for example, “the inability to sit independently and lack of head control are contraindications” for the American style of hippotherapy. Due to the size and weight of most adults, it is unsafe to fully support them from the ground. A technique called back riding, in which the therapist sits behind the patient to provide trunk and pelvic support, is generally not possible with adults since the combined weight of the therapist and client is often too great for the horse. While back riding is a
treatment technique that is often used with children, they must display the potential for equilibrium and righting reactions, since back riding is used only as a short-term measure to achieve a degree of independence. Once the child is able to maintain their upright posture, the therapist will then support and facilitate them from the ground during the following treatment sessions.
CHAPTER II
THE TREATMENT TEAM

The hippotherapy team of horse, side walkers, therapist and horse expert all work together to provide the most beneficial treatment program for each individual client. Each member has a specific responsibility throughout the treatment session.  

The two side walkers walk on either side of the horse beside the patient. They ensure the safety of the patient and may also assist in positioning or holding depending on the therapist’s treatment plan. Side walkers are generally volunteers. Quite often the parents of the pediatric clients take part in caring for the horses and the therapeutic equipment. In Germany there is a volunteer requirement for young men who do not wish to join the military. These volunteers are often responsible for providing transportation to and from the facility for clients and their families. 

The therapist is the team member who is responsible for evaluating the patient, developing a treatment plan with long-term and short-term goals, providing the instruction to the patient for exercises during the treatment session and for monitoring the progress that has been made during each visit. The therapist must also have a thorough understanding of basic hippotherapy. The main focus is on the horse’s movements, and how they can be utilized to address the needs of each individual client.
Although the therapist must be aware of the horse and client interaction, a horse expert is needed to ensure proper selection and training of each horse that will be utilized during therapy. "Appropriate training includes the complete desensitization of the horse to paraphernalia of the therapy setting and the weight and feel of an unbalanced rider." Because the horse's various gait patterns stimulate the rider in varying ways, the horse must be trained to respond to commands for longer or shorter stride lengths, cadence variations, velocity and direction changes using either lead ropes or long lining equipment. Long lining is a horse handling method that allows for fine grading of the horses movements, by causing the horse to tuck its chin and round its back. This enables the horse to take longer smoother strides. The length of training for each horse, is dependant upon the animal's characteristics, but Delinger stated that she generally trains for 3-4 months before allowing the horse to work with children.

In selecting the horse to use as your modality, there are a number of things to keep in mind. The horse is responsible for providing the "graded, gait specific movement stimulus to the postural muscles of the trunk." Due to this, the characteristics of each animal are important since its movements will determine the effect on the patient. Temperament is key in selecting a horse that must be calm around people. It must be gentle and tolerant especially with regard to positioning of its rider, since the weight may often be off-center and moving regularly. The horse should also be manageable and respond to subtle cues for direction and velocity. Delinger stated that a horse should be able to do "tracking up, which means the hind feet land where the front feet just stepped. Tracking up tells you the horse is getting enough impulsion to give the motion you
want.” At the same time, the horse must be desensitized to any quick movements or loud noises that its rider might engage in.

Biomechanical soundness is also of importance with regard to the horse’s anatomy. The front, middle and back sections of the horse should be well proportioned, and the horse should display a “regular even walk.” The horse may vary in size, but a “medium height of 14.0 to 15.2 hands (140-155 cm) is recommended.” Smaller ponies may work for very small children, but they may not be strong enough or have a broad enough back, especially if the technique of back riding, in which the therapist rides with the patient, is being used. With very tall horses the therapist runs a safety risk, since it is difficult to adequately support or position a patient from the ground in such a case. In addition, patients may often be frightened of a larger animal, which tends to result in an increased muscle tone along with their anxiety.

By combining the talents of each team member properly, the patient is likely to receive enhanced care, with the greatest benefits possible. In addition there is a variety of equipment that can be included in the treatment program to address the goals of each individual patient. Saddles for example can be used if support is needed, but often the saddle blanket is the only article between the patient and the horse. This allows for greater sensory input, as well as challenging the patient and acting as a warm modality as the horse’s body heat is transmitted to its rider. Other equipment such as cones and fencing can be used to set up a variable course through which the horse can be maneuvered to influence the rider’s balance. A number of other toys or bright objects may also be incorporated into reaching activities and other games to stimulate adequate postural reactions. During mounting and dismounting it is often favorable to have a
specially built platform that is wheelchair accessible. This provides a safe area for the support personnel to transfer more involved patients on and off the horse without risk of injury. Other safety equipment such as helmets, boots or shoes with heels, or a hooded boot stirrup, and a safety belt to provide handholds for the two side walkers, are necessary in such an environment.

In conjunction with the hippotherapy session, an area for pre-riding stretching is recommended. Just as with other exercises, the client must first warm-up and stretch any tight muscles, in order to prevent injury during their time on the horse. This area can also be used for evaluations and progress documentation as the patient advances through their treatment program.
CHAPTER III

TREATMENT OPTIONS IN CONJUNCTION WITH SPECIFIC EQUINE MOVEMENTS

In order to see how this treatment program will benefit the patient, it is necessary to understand the gait pattern of the horse. "The horse's walk is a four beat movement, with both hind and front feet on one side moving, followed by hind and front feet on the opposite side. The sequence is left rear/ left fore/ right rear/ right fore." The beginning of the movement comes from the hindquarters and it is their phase and the movement of the pelvis and trunk of the horse that we are then able to compare to the gait of the human. "Studies have shown that there is a distinct similarity in pelvic displacements between the horse and the human."\textsuperscript{1,19}

\begin{table}[h]
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\begin{tabular}{|c|c|c|c|}
\hline
 & Lateral Pelvic Tilt & Lateral Pelvic Displacement & Pelvic Rotation \\
\hline
Horse & 5 cm & 4-5 cm & 8 degrees \\
\hline
Human & 5 degrees & 7-8 cm & 3-4 degrees \\
\hline
\end{tabular}
\caption{Comparison of Pelvic Motion in Human and Horse.}
\end{table}

Adapted from Australian Journal of Physiotherapy. 1997; 43(2):145.\textsuperscript{1}
As the horse pushes off with the left hind leg, thus entering swing phase, the left pelvis will drop. This results in a lateral pelvic tilt, and produces a corresponding lateral pelvic tilt in the rider, lengthening the rider’s trunk on the side of the swinging leg and shortening the rider’s trunk on the horse’s weight bearing side. According to Heine, in order for the swinging leg to clear the ground, the horse must laterally flex its spine, rotating the pelvis forward on the side of the swinging leg, which produces pelvic rotation in the rider. As the horse enters into the swing phase, an acceleration phase is produced resulting from the push off. Heine proposes, this acceleration phase “momentarily displaces the rider’s weight posteriorly, resulting in a posterior pelvic tilt.” Following the swing phase, the horse’s hind leg contacts the ground. This is termed the strike phase. “The horse’s center of gravity is shifted to that side, causing a lateral pelvic displacement in the rider.” When the horse’s rear leg strikes the ground, it produces a deceleration effect which “momentarily displaces the rider anteriorly, resulting in an anterior pelvic tilt,” Heine stated. This cycle is repeated as the next hind leg steps forward.

By noting the motions of the horse’s gait pattern, and their effect on the rider, we can see that we have a modality that amounts to a “walking simulator, producing constant perturbations to the rider’s center of gravity in the sagittal, frontal and transverse planes.” These movements occur in a steady and rhythmical manner and allow the rider to experience the sensation of forward movement through space. As yet, we are unable to duplicate this in the clinic.

Once the basic movements involved with the horse’s gait are understood, other modifications such as tempo and direction may be incorporated. By changing the tempo of the gait, the amount of pelvic displacement may be influenced in the rider, and thereby
the degree of postural challenge. The direction of the horse may be changed using a circular track, walking the horse in figure eights, doing tight turns or wide turns, or alternating turning directions. These all challenge the patient to develop postural strategies to counteract the displacement.

The preference of complicated versus uncomplicated track shapes used in hippotherapy was evaluated in 1974 by the German Association for Therapeutic Riding. A questionnaire among 89 German therapists indicated that 10 therapists used only a circular track with their patients, 54 used a variety of circular, linear and serpentine tracks, and 25 were unclear with their answers. The results from this questionnaire also indicated that 79 of the 89 surveyed used a variety of paces, both faster and slower depending on the patient, while ten stated they used only the walking pace. This indicated a trend at that time towards the use of more challenging and dynamic motions during the treatment session.

The horse has a three-dimensional gait pattern which is proposed to result in the therapeutic benefits of hippotherapy. Spink categorizes these benefits into three components, each occurring in a different plane and for a specific purpose.

The first component is that of static/dynamic control, which works in the sagittal plane, to facilitate forward and backward control by the patient. This is accomplished while the horse is moving in a straight line at a slow pace, with the rider facing forward. As the horse accelerates and decelerates with its gait pattern, the rider will react with a corresponding anterior and posterior pelvic tilt, which will automatically cause a forward and backward movement of the rider. As an anticipated response, “this movement will aid in the forward and backward righting reaction and the trunk control for flexion and
extension. By changing the horse’s stride, the dynamic principles come into effect. For example, if the horse’s stride is increased the patient will react by trying to flex forward. As the horse increases its speed, the relaxed rider is forced backward, and in order to remain upright, the rider must activate their abdominal muscles to compensate for the change in the gait pattern of the horse. When the stride is shortened and the horse slows, the opposite is true. Now the relaxed rider is forced forward and the rider must activate their back extensors in order to remain upright. By alternating short and long strides, with occasional stops the rider is challenged to maintain better postural control in the sagittal plane.

The second component is that of weight shifting, which occurs in the frontal plane, to facilitate an increase in lateral control for the rider. During the horse’s normal gait pattern the pelvis rotates and shifts from side to side, in turn causing the rider to lengthen or shorten his trunk in order to maintain balance. As mentioned above, the rider’s trunk lengthens on the side of the horse’s swinging phase, and shortens on the horse’s weight bearing side. For a more rigorous workout, the horse can be moved in circles of varying sizes, which will increase the amount of control that the rider must use in order to keep his body aligned in the frontal plane.

The third component is rotational, which occurs in the transverse plane, and allows the rider to practice trunk rotation. When the horse laterally flexes its spine in order to clear the leg during the swing phase, the pelvis also rotates forward on that side and results in a corresponding rotation in the rider’s trunk as well.

All of these components take place simultaneously. As the horse walks, the rider’s center of gravity is displaced three dimensionally with back and forth, up and
down, side to side movements.\textsuperscript{11} The horse’s rhythmical movement "transmits symmetrical sensory input to the child who then tries to accommodate".\textsuperscript{3} Research\textsuperscript{23} has shown that a large horse can "transmit 90 to 110 multidimensional impulses per minute to its rider during a walking gait".\textsuperscript{3,23}

Further studies,\textsuperscript{8,15,16,17,18} such as the one performed by Exner,\textsuperscript{15} over an 18-month period, provide us with other useful information about the use of hippotherapy and the effect on the rider. A total of 67 patients, with both paraplegic and quadriplegic injuries, participated in a project to study the effects of hippotherapy relative to spasticity, certain pain syndromes as well as contraction syndromes associated with joint mobility. Of the 45 paraplegics, 24 had complete injuries, while 21 were incomplete. Of the 22 with quadriplegia, seven were complete and 15 were incomplete. Hippotherapy resulted in a decrease in spasticity in 37 of the 67 riders. Seven patients demonstrated a decrease in spasticity that lasted less than two hours, six had results that lasted two hours, 11 patients had a decrease in spasticity for 12 hours, six had decreased spasticity for 24 hours and seven had the highest result with a decrease lasting 36 hours.

\textbf{Figure 1 Length of Decreased Spasticity Following Hippotherapy}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Length of Decreased Spasticity Following Hippotherapy}
\end{figure}
With regard to pain syndromes in the above study, 26 patients had hip and/or back pain due to immobility and muscle cramps. Twenty-five of the 26 experienced a decrease in pain. Four of these patients had relief for a period of one day, 13 experienced a decrease in pain for two days and eight had decreased pain for an entire week.

**Figure 2. Length of Decreased Pain Following Hippotherapy.**

Joint mobility was affected following hippotherapy as well in the 17 patients that displayed decreased range of motion. Twelve of these 17 patients displayed had lower extremity involvement, while five had upper extremity involvement. Two patients had a noticeable increase in movement, which lasted one day. Four sustained results of increased movement for two days and 11 had results, which lasted for, and entire week.

**Figure 3. Length of Increased Motion Following Hippotherapy**
Along with these results, other benefits were also noted, such as smoother transfers, better sitting control, which facilitated better wheelchair positioning, as well as less spasticity during standing and walking training. Patients also noticed fewer sleep disturbances and indicated a positive more motivated attitude overall. These subjective findings were noticed, yet not measured in any way during the study.

The primary goals of hippotherapy are to enhance posture, balance, mobility and function. All activities during the hippotherapy session must work toward the individual goals of the rider and be functionally pertinent to their lives. Treatment will vary depending upon the diagnosis and its severity. In treating patients with cerebral palsy, for example, the focus should be to increase the movement of the pelvis, using “long, straight walks” according to Delinger. The opposite is true when working with patients who have Down’s Syndrome. “These children are too mobile” and therefore need more stopping and starting as well as walking in circles to “enhance the activity in their trunks.” While working with a child who had spinal muscle atrophy, Delinger used the rhythmical motion of the horse to challenge the child’s trunk musculature, and added more difficulty by increasing and decreasing the speed of the horse as the child tolerated.

Other general examples of treatment options include transitional activities on the moving horse, such as changing from forward sitting to side sitting to backward sitting. The initial position on the horse may also be varied, such as placing the rider prone, supine, or in a quadruped position. Remaining in quadruped allows for facilitation of co-contraction of the hip and shoulder girdles. Simple movements like changing the orientation of the patient’s head also allows for added challenge in maintaining proper posture and alignment.
Other aspects of therapy can be included during the hippotherapy session on a regular basis. By asking the rider to close their eyes, they are able to increase the amount of vestibular input during the ride. Touching different textures of the horse, such as the mane, petting the neck, rubbing the saddle blanket etc, allows the therapist to work on any tactile defensiveness. Oral motor function can be included as well by allowing the rider to control a portion of their environment with verbal commands such as telling the horse to “go” or “stop.”

Physical activities including throwing and catching objects while maintaining their balance on the horse are often enjoyable distractions for the rider. These activities incorporate trunk rotation, crossing midline and bilateral integration, similar to some therapy performed in the clinic. While on the horse, however, the patient is constantly reminded of their forward motion through space and is given steady, rhythmical input in all three dimensions.
CHAPTER IV

COMPREHENSIVE TREATMENT PROGRAM AND DOCUMENTATION

The actual treatment session on the horse is not the only aspect of hippotherapy. As with any therapy program, the treatment is comprehensive and serves to incorporate both long and short-term goals that are functionally relevant to each client’s needs, focusing on school, work or home situations. Treatment programs begin with referrals from physicians in order to rule out any possible contraindications that would prevent patients from participating in the program safely. As a rule, when the patient is first seen, an initial evaluation with subjective and objective data is gathered. An assessment is made as to whether hippotherapy would be feasible with this particular patient and a plan including the above mentioned goals is developed. Items such as strength, balance, range of motion and coordination are measured during this evaluation.

Based upon evaluation findings, programs are established and horses are selected that will most benefit patients with their gait pattern, in order to facilitate the desired responses while patients are riding. Appropriate equipment is selected and may vary depending on the goals focused on at each treatment session. The variety of equipment, which horse is used and the advances or changes that occur during the session must be documented in daily progress notes which are recorded after each treatment. Along with
regular progress notes, "it is recommended that re-evaluation of patient’s be carried out at three to six month intervals to ensure that treatment goals remain appropriate."1,9

Before the riding session begins, the patient must "warm-up" as with any other exercise. Stretching and range of motion activities before riding enable the patient to participate more fully in mounting the horse.3 The length of the session varies depending on each client’s abilities, but generally lasts 20-30 minutes on the horse, with an additional 10-20 minutes for the preparation and follow-up.1,3

Many clients and their parents wonder how long the changes that occurred during treatment will last. Delinger3 states that depending on the patient, increased flexibility and range of motion will generally last for several days. Motor skills change within 3-6 months and they are lasting as well. As each client makes progress, "it is the responsibility of the treating therapist to write a discharge summary and to communicate directly with the client and/or the client’s family to recommend further treatment such as PT, OT, speech therapy or a transition into another program."1 Often, following successful completion of a hippotherapy program, patients are transitioned into a therapeutic riding program where they are then able to use their new physical skills in order to ride a horse while now learning how to control it.24 This can add a new and exciting dimension for these clients as they become more independent. As another transition phase, the families often take riding lessons as well, so that they can participate and ride together once the patient is able to enter the therapeutic riding class or recreational riding.3
CHAPTER V
STANDARDS OF PRACTICE AND REIMBURSEMENT

There are two primary organizations in the United States that are associated with therapeutic riding. These are Happy Horsemanship for the Handicapped (HHFTH) and the North American Riding for the Handicapped (NARHA). Both of these associations are non-profit organizations that serve people with disabilities and support therapeutic riding as a physical therapy treatment method. Along with their support, they also set the guidelines for most hippotherapy programs. Below is a list of the guidelines “as to the qualifications, responsibilities and training requirements of therapists wishing to practice hippotherapy”: 1

1. Licensed or registered to practice a nationally recognized health care profession.

2. Maintains current professional liability insurance.

3. Has received training in the principles of classic hippotherapy, equine movement and equine psychology, through attendance at a minimum of one American Hippotherapy Association (AHA) approved “Intro to Classic Hippotherapy” course.

4. Is a NARHA certified instructor (any level) and if not, has a NARHA certified instructor assisting with all treatment sessions.
Dallas-based Equest is one of only two centers in the nation certified to offer the month long “Therapeutic Riding Instructor Training Course” sponsored by the NARHA. This program is known worldwide and a class of 10 will be attending this year from places as far away as Israel, Croatia and Colombia. Generally only two classes are offered per year with a limit of 10 to 15 students each time and all students must be experienced horse riders. The course covers “topics such as human anatomy and physiology, physical disabilities, first aid/CPR, riding equipment for disabled people and what makes a good therapy horse.” These students participate and assist with all classes including hippotherapy while in the course. Along with the actual riding program, a two-day administrative workshop is also offered. This workshop provides information “relating to nonprofit programs, legal issues, board management, fundraising and other requirements involved in setting up such a program.”

Once the educational training is complete, therapists may conduct both individual and group therapy sessions depending on the severity of the disabilities for the individuals involved. Heine states that “legally a therapist must be in direct attendance to the client at all times during a session.” This indicates that if a group session is to take place, the therapist must be actively working with the whole group and will focus on each client whenever appropriate. In this situation it is also vitally important to keep detailed notes as to the progress of each client in the group.

Group and individual riding fees vary from location to location, but a good example is given by Delinger in her recent interview. She stated that hippotherapy is billed as therapy and the patient is charged $95.00 for a 45 minute session plus a $10.00
stable fee. Developmental riding is $35.00 for 30 minutes and therapeutic riding is $15.00 for 30 minutes, or $25.00 for 60 minutes.

Since the cost of hippotherapy is high, many clients are concerned with insurance reimbursement for the services. As with most health care, coverage is dependent upon the policy the client has. Insurance does pay for hippotherapy as it would pay for any other therapy session. Some companies, however, will only approve the work for 60 consecutive days, which generally is not long enough for some cases. Due to this fact, some clients do rely on private payment. According to Heine, "hippotherapy as a modality has been used to achieve functional outcomes in therapy since the late 1970's." Insurance companies have been providing reimbursement for these services since 1982. Since hippotherapy is not considered to be one specific treatment, a variety of therapeutic codes are used to reflect the type of services provided and the specific profession used, be it PT, OT or speech. For example, the regularly used CPT-4 codes for physical therapy treatment are "those for therapeutic exercise, neuromuscular re-education, and kinetic/therapeutic activities." Just as with billing for any other therapy, proper documentation, and referrals are necessary to establish the need for the therapy and to indicate the progress made throughout the treatment. Treated as the ideal modality that it is, hippotherapy should, according to Heine, act as an asset to any therapeutic treatment program.
CHAPTER VI
CRITIQUE OF REFERENCES AND CONCLUSIONS

In order to progress in the field of hippotherapy, it is necessary to constantly re-evaluate the success of meeting each goal associated with this treatment modality. A variety of both subjective and objective benefits have been addressed in the body of literature supporting hippotherapy. In order to continue to receive reimbursement for this treatment, however, it is vital that we produce data that will substantiate these claims. Many of the benefits that are associated with hippotherapy are changes that have been observed by the patient, their family and the therapist, which are often difficult to measure or quantify. These items include areas such as quality of life, motivation, attention span and interest in learning. Research completed by Bertoti\textsuperscript{8} in 1988 addressed this concern. Bertoti\textsuperscript{8} realized the need for objective measures in her study, which assessed posture in children with cerebral palsy, following treatment using hippotherapy. Since no other forms were available, she devised and tested her own scale to assess alignment and symmetry of five body areas: 1) head and neck, 2) shoulder and scapula, 3) trunk, 4) spine, 5) pelvis. The scale's validity was established in the clinic prior to its use in assessing hippotherapy treatment. Inter-rater reliability was determined to be sufficient by a Spearman rank-order correlation. Other researchers\textsuperscript{8, 16, 17, 18, 26, 27, 28, 29} have also reported many of these claims in order to establish the benefits of hippotherapy. The following table presents outcome summaries of research in this area.
Table 2. Research Outcomes Summary of Significant Findings; measured by \((p < 0.05)\) indicated with *.

<table>
<thead>
<tr>
<th>Riding Program</th>
<th>Study Description</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>Length</td>
<td>Frequency</td>
</tr>
<tr>
<td>Children with CP</td>
<td>10 weeks</td>
<td>2x/ wk</td>
</tr>
<tr>
<td>Teens with learning disabilities</td>
<td>39 weeks</td>
<td>2x/ wk</td>
</tr>
<tr>
<td>Children with mental retardation</td>
<td>24 weeks</td>
<td>1x/ wk</td>
</tr>
<tr>
<td>Children with language disorders</td>
<td>12 weeks</td>
<td>30 hrs of riding total</td>
</tr>
<tr>
<td>Adults with MS</td>
<td>9 weeks</td>
<td>2x/ wk</td>
</tr>
<tr>
<td>Adults with varying disabilities</td>
<td>6-30 weeks</td>
<td>2x/ wk</td>
</tr>
<tr>
<td>Adults with physical disabilities</td>
<td>8 weeks</td>
<td>2x/ wk</td>
</tr>
<tr>
<td>Adults with physical disabilities</td>
<td>8 weeks</td>
<td>2x/ wk</td>
</tr>
</tbody>
</table>

Table 3. Research Outcomes Summary of Non-significant Findings. Note: + indicates methods not reported.

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<tr>
<th>Riding Program</th>
<th>Study Description</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td></td>
<td>Sample</td>
<td>Length</td>
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<tr>
<td></td>
<td>Adults with MS</td>
<td>9 weeks</td>
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<td>Adults with varying disabilities</td>
<td>6-30 weeks</td>
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<td></td>
<td>Adults with physical disabilities</td>
<td>8 weeks</td>
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<tr>
<td></td>
<td>Children with brain damage</td>
<td>36 weeks</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Adults with developmental delays</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Adults with MS</td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>Children with Infantile brain syndrome</td>
<td>24 weeks</td>
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In conclusion, recent studies have demonstrated statistically significant changes following hippotherapy treatment in areas including the following: posture, physiological and psychomotor domains, balance, language skills, strength, bilateral motor coordination, left/right discrimination, self-esteem, visual perception, psychological status, gait, and arm and leg coordination. These findings, however were not reported in such a way that the methods can be duplicated to establish the same results. Information was not provided regarding the measurement techniques for these studies as well. Although these findings are positive, it still remains necessary to continually broaden our studies to include more specific tests in every area of hippotherapy. Not only do we need to assess outcomes for a variety of patient populations, but we also need to provide further detailed reports of these studies to enable other researchers to repeat them and obtain the same measurable results. Through this scientific process, treating patients with hippotherapy as a modality will be better understood and accepted by clients, families, physicians, therapists and insurance companies.

Acting as a team, medical professionals can serve to facilitate the transition to a multidisciplinary approach in treating the patient as a whole person and their families, as the most consistent factor in that child’s life. Through this process the rehabilitation community can provide as complete a service as possible, while incorporating the family into the approach by enabling them to participate along with their child in therapeutic and recreational riding. Hippotherapy can serve as an educational and exciting treatment program for clients and their families. As with any modality, further research should
always be explored, and beneficial treatments should be made available to the public. In reviewing the research to this point, it is evident that hippotherapy has certainly earned its place as a rehabilitative treatment modality for a number of objective measures. Yet it remains a concern that future studies be presented to the public in such a way that these positive benefits can be more fully understood, using standards of measurement that can be easily reported.
Bertoti’s Posture Assessment Scale

Rater views child at stance anteriorly, laterally, and posteriorly by walking around the child. One score (0-3) is given for each of the five sections on the scale. Child wears shorts or shorts and a halter top only.

1. Head and Neck
   - **Score 3** if neck is in good symmetrical alignment, head is in midline.
   - **Score 2** if child demonstrates minimal lateral neck flexion, asymmetry, or capital hyperextension.
   - **Score 1** if child demonstrates moderate lateral neck flexion, asymmetry, or capital hyperextension.
   - **Score 0** if child demonstrates severe lateral neck flexion, asymmetry, or capital hyperextension.

2. Shoulder and Scapula
   - **Score 3** if shoulders are symmetrical and not protracted and if scapula show evidence of symmetrical alignment and stability.
   - **Score 2** if child demonstrates minimal asymmetry of shoulders, minimal protraction, or minimal scapular retraction.
   - **Score 1** if child demonstrates moderate asymmetry of shoulders, moderate protraction, or moderate scapular retraction.
   - **Score 0** if child demonstrates severe asymmetry of shoulders or severe scapular retraction.

3. Trunk
   - **Score 3** if child demonstrates evidence of symmetrical trunk control.
   - **Score 2** if child demonstrates evidence of minimal trunk asymmetry or weakness, such as minimal lateral trunk flexion or minimal shortening on one side.
   - **Score 1** if child demonstrates evidence of moderate trunk asymmetry or weakness, such as moderate lateral trunk flexion or moderate shortening on one side.
   - **Score 0** if child demonstrates evidence of severe trunk asymmetry or weakness, such as severe lateral trunk flexion or severe shortening on one side.

4. Spine
   - **Score 3** if child demonstrates evidence of symmetry and normal curvatures of spine.
   - **Score 2** if child demonstrates evidence of minimal asymmetry, lateral curve, or exaggeration of any of three normal curves.
   - **Score 1** if child demonstrates evidence of moderate asymmetry, lateral curve, or exaggeration of any of three normal curves.
   - **Score 0** if child demonstrates evidence of severe asymmetry, lateral curve, or exaggeration of any of three normal curves.

5. Pelvis
   - **Score 3** if child demonstrates an obviously stable, neutral pelvis in symmetry.
   - **Score 2** if child demonstrates evidence of only minimal anterior or posterior pelvic tilt or only minimal asymmetry.
   - **Score 1** if child demonstrates evidence of moderate anterior or posterior pelvic tilt or moderate asymmetry.
   - **Score 0** if child demonstrates evidence of severe anterior or posterior pelvic tilt or severe asymmetry.

   **Total:** ___
REFERENCES


