EQUINE REHABILITATION

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Abstract

This presentation details the different modalities used in equine physical therapy. The objectives are to acquaint the participant with the different therapeutic modalities commonly used in equine physical therapy; to aid the participant in the formulation of a physical therapy plan and to acquaint the participant with conditions that occur in the equine athlete that are amenable to physical therapy

Key Words

Rehabilitation; Manual Therapies; thermal Therapies; Electrical Therapies; Therapeutic Exercise

Therapeutic Modalities

Physiotherapy interventions that are commonly used in the horse include, but are not limited to, manual therapy, thermal agents, electrotherapeutic techniques, mechanical agents, therapeutic exercise, and acupuncture.

Manual Therapies

Manual therapies include massage, stretches, joint and soft tissue mobilization, and/or manipulation. These are used to restore optimum joint movement by reducing adhesions, mobilizing tight joint structures, and providing enhanced joint lubrication and joint nutrition.

Massage can promote circulation, decrease muscle spasm, mobilize adhesions and scar tissue, and aid lymphatic drainage.

Myofascial release is the use of the hands and fingers to apply pressure to cause a release of tension in muscle or fascia.

Stretching can provide pain relief from tight muscles and connective tissue that are responsible for pressure or tension on nerve pathways, restore normal muscle length after injury as well as maintain normal muscle length, avoid stiffness related to age or inactivity, and protect from stresses and strains.

Acupressure is the use of the hands and fingers to apply pressure to acupuncture points.

Manipulations/Mobilizations – manipulation or mobilizations are aimed at reducing the irritation of the spinal nerve root bringing about: pain relief, restoration of normal joint biomechanics and nerve function, improved muscle function, and promotion of healing.

Thermal Agents

These include hot and cold applications.

Heat can be applied via dry, moist, radiofrequency, therapeutic ultrasound or infrared applications. Heat affects circulation and metabolism, and relaxes muscles spasms. Heating decreases the thickness of synovial fluid and allows muscles to relax, become more pliant, and thus more easily stretched.

Cold, applied as a cold bath, ice, or ice packs, is used for acute injuries as it constricts the capillaries, thus reducing swelling, inflammation, and pain transmission. The first 48 hours are critical to slow down the inflammatory process.

Electrical Therapeutic Techniques

These techniques include laser, muscle, and nerve stimulation, H-Wave, interferential, and magnetic field therapy.

Electrical muscle stimulation (EMS) works by making the muscle contract through motor nerve stimulation using an interrupted direct current. Electrical muscle stimulation improves venous and lymphatic drainage, prevents muscle atrophy, prevents the formation of unwanted adhesions, reduces scar tissue formation, builds and re-educates damaged or weakened muscle, and encourages nutrition into the affected area.

Transcutaneous electrical nerve stimulation (TENS) reduces swelling and assists wound healing by stimulating the top layer of the skin, by attracting white blood cells (which fight infection), and stimulating nerve function. Electrical nerve stimulation elevates blood cortisol, releases endorphins, relaxes spasms, and causes muscle contractions to maintain strength on injured or surgical muscles.

Pulsed electromagnetic units are useful for decreasing or minimizing inflammation. Pulsed electromagnetic units have been shown to increase circulation, improve fracture healing, reduce pain, and promote healing.

Laser therapy, which uses an intense beam of light, stimulates the body's processes, activates waste removal, increases repair activity, relieves swelling, heals surface wounds, and stimulates blood and lymphatic systems. It also increases serotonin, thereby achieving a calming response. It has been reported that laser stimulation has certain biostimulating effects such as: accelerates cell division; increases leucocytic phagocytosis; stimulates fibroblastic activity, enhances regeneration of lymph and blood vessels. Studies have shown that it also can cause vasodilatation. These effects can assist wound healing and relieve chronic pain when properly applied.

Radiofrequency therapy, otherwise known as diathermy is a technique that is used to diminish inflammation and swelling, stimulates the circulation and reduces pain. It does this by increasing temperature in tissue, increasing circulation and increasing lymph flow.

Mechanical Agents

These agents include ultrasound and devices such as mechanical massagers.

Ultrasound is a form of acoustic energy used to treat musculoskeletal injuries, including inflammation and wounds. It offers heating of tendon and ligaments without excessive heating of the skin. Ultrasound can also be used to decrease pain and muscle spasm, promote wound healing, aid re-absorption of hematoma, reduce swelling, and reduce scar tissue. It increases blood flow in the area treated. It increases cell membrane permeability to ions and other substances. It blocks signal transmission in nerves. It decreases muscle spasms. It has been shown in clinical and scientific trials to increase collagen extensibility, enhance collagen remodeling, enhance collagen production, increase heat in deep tissues, increase blood flow, increase range of motion, reduce pain and muscle spasm, and accelerate wound healing.

Acupuncture stimulates specific points on the body to achieve therapeutic effects and to repair abnormally functioning tissues and organs by affecting the neurological and endocrine systems.

Extracorporeal Shockwave Therapy is another type of acoustic wave that is generated by either piezoelectric or mechanical means. Primary action is thought to be related to analgesia produced by direct effect on sensory nerves. May also break down calcium deposits.

Other

Hyperbaric Oxygen Therapy is a modality to increase oxygen concentration and a corresponding blood flow increase to damaged tissue. The horse is placed in a hyperbaric chamber

and oxygen is added. While the percent of oxygen increases within the chamber, the pressure within the chamber also increases. This increases the level of oxygen within the circulating blood and the increased pressure may also aid in driving oxygen into the tissue. Treatment times and pressures vary depending on the condition being treated. Conditions that are amenable to treatment include anaerobic infections, tendonitis, chronic wounds, osteomyelitis, laminitis and pleuritis.

Therapeutic Exercise is often used during the rehabilitation program. The amount and intensity is dependent upon the condition being treated, the extent of the damage, the time of healing and facilities available. Types of exercise include hand walking, riding, ponying (leading a horse while riding another), mechanical walker, underwater treadmill, swimming pool and turnout to paddock or pasture. Each exercise program is tailored to the individual and may need to be adapted several times during the rehabilitation program. Also, ground obstacles (ground poles, cavaletti's) may be incorporated to increase coordination and agility. Additionally, change in terrain may be included to target specific areas (i.e. inclines to strengthen rear limbs). The goal of therapeutic exercise to provide a gradual return to function, improve strength and coordination and provide mental stimulation.

Formulation of a Treatment Plan

It is important to realize that this is a team approach. The team consists of the veterinarian, physical therapist, owner, as well as other professionals (trainers, farriers, etc.). All members of the team should be involved is all aspects of the treatment to insure the best possible outcome.

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There are several things one must look at while developing a rehabilitation program for an individual. The first is to have an idea as to what your success has been with patients with a similar condition and how have they progressed during the treatment period? The second is to establish outcome goals. Where should this patient be at during a certain time in the rehabilitation process? Third, you should determine your capabilities and the resources or facilities you have available. If a specific modality is indicated that you do not have it then the patient should be referred. Fourth, you should assess the patient. What is the nature of the injury? What type of therapy or surgery has been done? How amenable is the patient to therapy? What are the owner's expectations? Lastly you should develop a plan specifically for that patient based on the answers to the above questions.

Any plan that you develop will depend on the stage of the injury. The initial stage is from the time of injury or surgery until all inflammation has resolved. This may be as short as a few days to as long as 3-4 weeks. The goal being decreasing inflammation, preserve range of motion and to prevent muscle atrophy. Typically, cold therapy, supportive wraps and passive motion is utilized in this period.

The second stage begins as inflammation is resolving. The goal of this stage is to gradually increase the stress being placed on the healing tissues. This aids in preventing or revising scar tissue. Therapies that could be considered include therapeutic exercise, therapeutic ultrasound, shockwave, as well as electrical modalities.

The choice of which modality to use in which stage is dependent upon one's experience and what you are trying to accomplish. For instance, laser therapy may be used in Stage 1 to help relieve tissue edema and in stage 2 to help in epithelial migration during wound healing.

Many times we focus on the injury and neglect the rest of the patient. We often have success in treating the injury, but lose use of the horse to contra-lateral limb problems such as laminitis; break

down of supporting structures and angular limb problems (in the case of foals and weanlings). Providing a high plane of nutrition, a good environment and support to the other limbs are as important as the treatment of the injury. One should also not neglect the mental status of the horse. Having a companion in the barn (pony, another horse or goat), as well as play toys will go a long way in keeping the patient happy.

It is no longer appropriate to make a blanket recommendation of 30 days in a stall, 30 days in a paddock and 30 – 60 days turned out to pasture. Physiotherapy in human is common place and in most cases is part of the standard of care. Many of the same modalities used in humans can be applied to the horse. Utilization of the appropriate modality will aid in achieving a more successful outcome over rest alone.

The Whole Picture

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Therapeutic Monitoring

During rehabilitation it is important to develop an objective monitoring program. One must evaluate the progression in order to document changes and determine if changes are needed. There are many different ways to obtain objective measurements. Simple methods include measuring limb circumference with a tape measure or degree of joint flexion with a goniometer. More

sophisticated methods include ultrasonography, thermography, digital gait analysis or Equinosis Q®.

Selected References

Adair HS, Marcellin-Little DJ, Levine D. Validity and repeatability of goniometry in normal horses. Vet Comp Orthop Traumatol 2016;29:314–9.

Bélanger A, Bélanger A. Therapeutic electrophysical agents: evidence behind practice. 2nd ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2010.

Buchner HHF, Schildboeck U. Physiotherapy applied to the horse: a review. Equine Vet J. 2006;38(6):574–580.

Goff L, Crook T. Physiotherapy assessment for animals. Animal physiotherapy: assessment, treatment and rehabilitation of animals. 2007:136.

Haussler KK. The Role of Manual Therapies in Equine Pain Management. Veterinary Clinics of North America: Equine Practice. 2010;26:579–601.

Kaneps AJ. Practical Rehabilitation and Physical Therapy for the General Practitioner. Vet Clin North Am Equine Pr 2016.

King M. Principles and Application of Hydrotherapy for Equine Athletes. Vet Clin North Am Equine Pr 2016

McGowan CM, Stubbs N, Goff L. Animal physiotherapy: assessment, treatment and rehabilitation of animals. Blackwell Pub; 2007.

McGowan CM, Stubbs NC, Jull GA. Equine physiotherapy: a comparative view of the science underlying the profession. Equine Vet J. 2007;39(1):90–94.

Monk M. Principles of hydrotherapy in veterinary physiotherapy. In: Animal physiotherapy: assessment, treatment and rehabilitation of animals. Ames, IA: Blackwell Publishing; 2007:187–198.

Paulekas R, Haussler KK. Principles and Practice of Therapeutic Exercise for Horses. Journal of Equine Vet Sci. 2009;29(12):870–893

Quintanar MN, Millar TP, Burd MA. Thermodynamic effects of commercially available ice boots. Open Vet J 2018;8:5–8.

Riegel RJ. Laser therapy in veterinary medicine : photobiomodulation. Chichester, West Sussex ; Hoboken, N.J. : John Wiley & Sons Inc.; 2018.

Schlachter C, Lewis C. Electrophysical Therapies for the Equine Athlete. Vet Clin North Am Equine Pr 2016;32:127–47.