

H O R S E

Therapeutic Ultrasound - It's Role in Range of Motion and Trauma*by Babette Gladstein, VMD, Certified Acupuncturist*

Ultrasound is a physical medicine treatment for tendon and ligament injuries. It helps control pain in sedating nerve endings. Pain is diminished by decreasing local sensory nerve conduction velocity, and inducing the systemic release of endorphins, enkephalins, and serotonin. High serotonin levels help diminish pain sensations all over the body.

Human physical medicine modalities have employed therapeutic ultrasound for some 20 years. Extensive research confirms its benefits. It allows tendon injuries to heal more rapidly, and promotes collagen fiber formation to maximize the long-term tensile strength of the tendon. By restoring the normal resting length of the musculature, range of motion is enhanced and the propensity for future trauma is minimized. Technically, this is accomplished by the rebiasing of the muscle spindles and golgi tendon organs of the gamma motor system.

Ultrasound is acoustic energy, and it stimulates cellular activity by increasing protein synthesis. The sound waves cause mechanical vibrations that micro-massage at a cellular level. Ultrasound waves act on deep tissue as a non-thermal agent in muscular-skeletal injuries. All inflammation causes fibrous retention and limited muscle elongation, which restricts joint motion, limits tendon function, and causes fascial shortening. These treatments help prevent the retention of metabolites by flushing them from the area through stimulated increase in local circulation.

Ultrasound causes vasodilation, which increases blood flow and local circulation. This mechanism process in turn improves membrane permeability, thus allowing for

the timely removal of the interstitial edema (swelling) and retained metabolites (toxins). Therefore, this unique and versatile therapy stimulates physiological change in the tissue. It triggers a normal response from the body's immune system, leading to accelerated healing without scar tissue and cross bridging of the fibrous tissues.

Ultrasound effectively treats joint conditions and soft tissue injuries, both chronic and acute. It promotes healing of sores and surgical wounds by loosening collagen bonding and causing tissue components to stream along the beam, forming the matrix for healing to occur. The stimulation of collagen synthesis insures that the healed tissue is resilient, thus increasing its ultimate range of motion and its return to full and vital use with minimal fibrosis and scar tissue.

Physiologic responses to therapeutic ultrasound include:

- Accelerates and compresses the inflammatory phase of healing
- Increases local circulation
- Decreases edema (increased membrane permeability)
- Mechanical release of endorphins, enkephalins, and serotonin for pain control
- Stimulation of collagen synthesis

***Conditions best treated
by ultrasound:***

- * Reductions of scar tissue
- * Joint pain and arthritic changes (ankles, knees, stifles, hocks)
- * Pain and muscle spasms - muscle tone reduction ("tying up")
- * Swelling & edema
- * Bursitis (shoulders)

All of the above conditions greatly affect the horse's range of motion. We have had very good results even on the racetracks by enhancing horse performance through the use of therapeutic ultrasound. The treatments increase the horse's range of motion, makes them feel good, and reduces injuries.

Ultrasound machines typically offer treatment frequencies of 1MHz and 3MHz for deep and superficial treatments, respectively. Therapeutic ultrasound can be applied in the pulsed mode for purely non-thermal (mechanical) results. In the continuous mode it will produce a combination of thermal and mechanical physiological changes. Multiple studies on the efficacy of therapeutic ultrasound treatments are available upon request.

This article is co-authored by Neal Houghes, human physical therapist, and Babette Gladstein, VMD. It is a melding of knowledge about physical therapy modalities, now available for horses. Dr. Gladstein, a former New York Racing Association veterinarian, is currently practicing in New York, New Jersey, and Connecticut and uses therapeutic ultrasound in her practice on the New York racetracks. She also rents and sells ultrasound equipment and is available to instruct clients on equipment usage. Neal Houghes is now devoted to physical therapy for animals and will be conducting educational programs about this and other physical therapy modalities. For further information you may contact Dr. Gladstein at 877-279-2591 or Mr. Hughes at 888-478-7880.

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