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Extracorporeal Shock Wave Therapy Applications in Horses

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April 01 2011 Article # 18033

Extracorporeal shock wave therapy is an increasingly popular treatment method for equine injuries. During a presentation at the 2011 Western Veterinary Conference, held Feb. 20-24 in Las Vegas, Nev., Scott McClure, DVM, PhD, Dipl. ACVS, of Iowa State University College of Veterinary Medicine, discussed the basics of extracorporeal shock wave therapy and a few its common uses.

The Basics of Shock Wave Therapy

Before discussing the applications of shock wave therapy, McClure described the two types of devices used in the treatment: ones that emit true shock waves, and those that produce radial pressure waves.

McClure describe true shock waves (SWs) as "pressure waves that meet specific physical parameters including a rapid rise time (within nanoseconds), high peak pressure, and a more gradual decrease in pressure of a few milliseconds, often with a negative pressure component." Simply put, shock wave therapy aims a highly concentrated, powerful acoustical (sound) energy source to a focal area. He explained that the waves promote increased activity in bone-producing cells and might also boost circulation in the focal region. As a result, the focal area should heal more rapidly than if left untreated.

Alternatively, unfocused units emit radial pressure waves (RPWs), which provides significantly less energy, and it dissipates as it travels through the tissue, McClure explained.

"These devices tend to get melded together, but they've very different, so we try to use the correct terminology," McClure said, adding that it's important to understand the differences between SWs and RPWs, McClure added, as the two types of waves might affect the injured area differently.

McClure also explained that the exact mechanism by which shock wave therapy works is unknown.

Applications

McClure explained that some of the most common uses of shock wave therapies involve healing tendon and ligament injuries. He reviewed several studies in which researchers examined shock wave therapy use in several areas in the horse.

Suspensory Ligaments: McClure discussed two separate studies in which investigators reviewed the result of treating equine suspensory ligament lesions with shock wave therapy. In both studies, he noted, the injuries healed significantly faster in the test groups than the untreated control groups who that received stall rest with bandages.

He also noted that there was a better tendon fiber alignment in the treated group than the control group, and that lesion size was reduced more quickly in the treated group than the control group.

He explained that the suspensories in the forelimbs tended to heal better than those in the hindlimbs as, irrespective of treatment, hindlimb suspensory ligaments do not heal as well as those in the forelimbs.

Superficial Digital Flexor Tendonitis: McClure discussed a study that focused on the effects of shock wave therapy on superficial digital flexor tendonitis. Ultrasonographic exams of the control groups and case groups revealed that the affected tendon tissue appeared similar throughout the course of the study. However he noted that the horses treated with SWs showed a decrease in inflammation at the beginning of their treatment, and that

the treated horses' tendons "were more mature," which suggests that they were healing faster than the control group.

He also noted that appearance of a bowed tendon diminished quickly in the case group, but he cautioned that this should not be taken as a sign that the tendon is fully healed.

He also noted that neither study evaluated how strong tendons (of both injured and uninjured animals) were after treatment: "We need to do a long-term study to follow up on the long-term strength of the tendons."

Bone: McClure discussed several studies in which veterinarians used RPWs to treat Thoroughbred racehorses with dorsal metacarpal disease (commonly referred to as bucked shins) that had not responded to conventional therapy. After undergoing a treatment regimen which included shock wave therapy, rest, and controlled exercise, the horses returned to racing sound. He also discussed a similar study in which SWs were used; again, most of the horses were able to return to training.

"There is not a lot of shock wave therapy data to show how it affects fracture healing in the horse," he said. "But clinically it seems to work in bucked shins and stress fractures."

Finally, McClure said that coffin bone fractures can be treated through the horse's frog using shock wave therapy. The waves will not travel through the hoof wall or the sole, he noted, so accurate placement of the focused shock waves on the frog is crucial.

Osteoarthritis: The treatment of osteoarthritis (specifically in the hock) was one of the first uses of shock wave therapy in the United States, McClure explained. Results, however, were mixed. He indicated that some horses remained the same before and after treatment, while others were markedly improved.

McClure stressed that the reasoning behind the difference in results is still unknown.

Burn Wounds: A relatively new technique McClure discussed was using shock wave therapy to help heal burns in horses. There is only one case study published on this topic, he explained, but he noted that itchiness, odor, and discharge decreased after each treatment.

"Again, this is just one case," he said. "But this horse responded very nicely."

Wound Management: McClure also shock wave therapy's potential for aiding wound healing. Researchers on one study he reviewed revealed that treated wounds began decreasing in size faster and improved more quickly, epithelialized (regrew skin) and contracted more rapidly, and healed 14 days faster than their control group counterparts treated with conventional methods.

After the control wounds healed, there was no difference in limb circumference (the wounds were located on the lower legs), amount of proud flesh that formed, amount of bone lysis (decomposition) or proliferation (growth), and immunochemistry test results.

Analgesic Effects of Shock Wave Therapy

McClure noted that the analgesic (pain-killing) effects of SWs have been a concern since shock wave therapy first came into play. The Fédération Equestre Internationale, he explained, requires five days lapse between a shock wave treatment session and competition, McClure noted, and some American racing organizations require 10 days between treatment and a race.

He discussed a study in which researchers found that shock wave treatment has an approximately 48-hour analgesic effect on horse's treatment area. He noted that the researchers found that the analgesic effect of the shock waves was similar to that of a local anesthetic.

"The concern ... is that (the analgesic effect) wasn't significantly different from administering a local anesthetic," he said, explaining that the main concern is for an injury to be worsened due to the horse working under the analgesic effect.

"We don't know why we get the analgesic effect," he added.

**Readers are cautioned to seek the advice of a qualified veterinarian
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