In-Depth: Integrative Medicine

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Acupuncture and Pain Management

Using acupuncture to manage severe pain in horses and other animals is not a novel concept, but veterinarians have been hard at work lately combing research studies to better understand this complementary therapy's usefulness, efficacy, and safety. James Kenney, DVM, an equine practitioner from Clarksburg, N.J., presented an overview of acupuncture and equine pain.

"Currently, much of the practice of acupuncture in animals is based on the results of pilot research studies, case reports, and clinical experiences," he explained. "Compared with human acupuncture, the clinical application of veterinary acupuncture is in the early stages of development as a science."

Based on the findings of a 2006 systematic research review, he noted, there's "no compelling evidence to recommend or reject acupuncture for any condition in domestic animals." Clinical trials are still yielding a mixed bag of results for acupuncture's efficacy for treating a variety of ailments in horses:

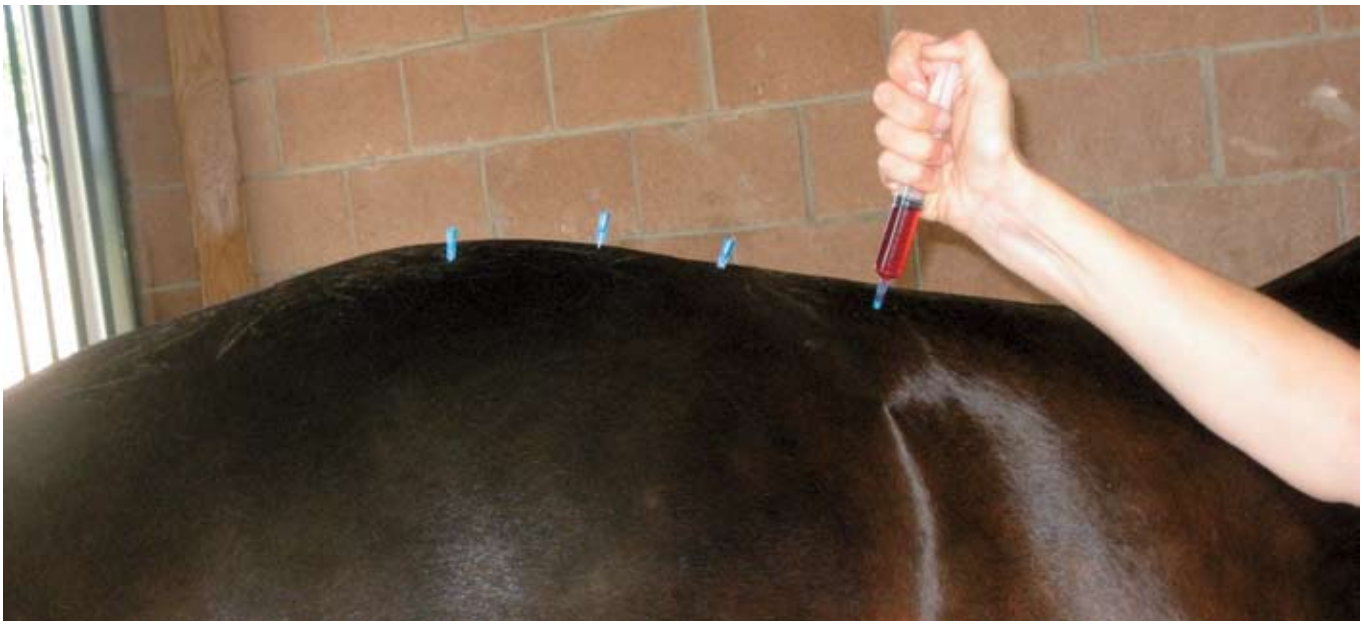
Thoracolumbar Pain "Controlled clinical trials have shown significant improvement of thoracolumbar pain (i.e., back pain located between the withers and the pelvis) in horses using objective methods of pain evaluation," he explained. In one such study, he said, 15 horses in three research groups were treated with electroacupuncture (EA), phenylbutazone (Bute), or saline (controls). Using thoracolumbar pain scores, a blinded independent researcher concluded that the horses treated with EA had lower pain scores than horses treated with Bute or saline.

Another team of researchers conducted a randomized, double-blinded study on 23 sport horses with back pain. Kenney said the investigators identified each horse's painful points using pressure algometry before employing EA at specific locations corresponding with those painful areas. "After five treatments, pressure-induced pain was significantly reduced at (painful points) in the treatment group compared with the control group," he noted.

Hoof Sole Pain Kenney discussed one study in which two independent evaluators assigned lameness scores to horses with artificially induced sole pain. The same evaluators examined the horses after they were treated with EA, a bupivacaine nerve block, or a saline nerve block. They found that EA reduced lameness scores significantly as compared to horses treated with the saline nerve block.

Visceral Pain While EA has been shown to help reduce visceral (internal organ) pain, regulate gastrointestinal motility, and improve regional blood flow, a study indicated that it was not quite as effective as butorphanol (a morphine-derived analgesic) for relieving pain elicited by rectal distension in one study.

In another study in which investigators assessed acupuncture's potential for relieving pain caused by small intestine distension, Kenney noted that EA was ineffective in reducing the acute clinical signs. "These results indicate that acupuncture does not have a strong enough analgesic effect to block severe gastrointestinal pain."



COURTESY DR. RHONDA RATHGEBER

Some practitioners use acupuncture to treat a variety of conditions, including reproductive and fertility problems as well as back and gastrointestinal pain.

Adverse Effects "As is the case for humans, few adverse side effects have been associated with acupuncture in animals," Kenney explained. "In a review of 1,292 acupuncture treatments that were performed on 221 animals (cats, dogs, cattle, and horses), adverse reactions to acupuncture needles totaled four of 12,274 needles, or approximately one per 3,000 needles.

"Two of these reactions consisted of transient superficial edema (temporary fluid swelling) of the skin, and as they neither required treatment nor appeared to be painful nor were other more serious signs present, they were considered to be clinically trivial," he said. "There was one abscess, which resolved with antibiotic treatment, and one seizure event in a 7-year-old spayed female Beagle that resolved without treatment and did not reoccur within a seven-month follow-up period."

Specifically in horses, 377 treatments performed on 74 horses yielded similar results. Kenney reported that a 10-year-old Hanoverian gelding being treated for heel pain, among other ailments, experienced mild swelling on the bulbs of his heels at the treatment site. Kenney reported the swelling subsided after one week.

"There is a well-researched scientific basis for the mechanism of acupuncture analgesia, the extent and depth of which continue to expand," Kenney concluded. "Although there is research to support EA as an evidence-based practice for the management of back pain in horses, additional studies are needed in other clinical situations where analgesia may be required."

Acupuncture Use in Reproduction

Breeding season can mean a growth in acupuncture needle inventory for many horse reproduction specialists. Such veterinarians combine strategic insertion of tiny needles with Western veterinary techniques to address subfertility issues in mares—and even stallions. Rhonda Rathgeber, DVM, PhD, a partner at Hagyard Equine Medical Institute, in Lexington, Ky., discussed using acupuncture to improve mare and stallion fertility.

Mare Infertility "Acupuncture stimulates increased blood supply, relieves local pain, and relaxes muscles," Rathgeber explained. "Acupuncture also increases the immunity of local tissue by stimulating the large number of mast cells (resident cells of connective tissue) at each acupoint.

"All of these factors should facilitate the uterus to be healthier, reduce inflammation, and be more suitable for implantation (of an embryo as occurs in pregnancy)," she continued. "They should also help the uterus clear any post-breeding inflammation more readily."

Rathgeber explained that she has used acupuncture to treat a variety of reproductive issues in the mare including:

- Anestrus (mares that aren't cycling);
- Cystic ovaries;
- Retained or cystic corpus luteum (which forms from the tissues remaining after a follicle ruptures at ovulation);
- Silent heat;
- Pseudopregnancy (when a mare is not pregnant, but her body tells her that she is and all of her reproductive systems

react accordingly);
- Inflammation of the reproductive tract;
- Retained placenta (after foaling);
- Uterine prolapse (when the uterus displaces, often times emerging out of the body through the vagina);
- Uterine fluid accumulation; and
- Uterine infections.

She has also used acupuncture to prevent abortion and, on the other hand, to induce birth.

Rathgeber described a German study of women treated with acupuncture before and after embryo transfer: The investigators showed higher pregnancy rates in those that received treatment before and after embryo transfer than in those untreated (42% and 26% respectively).

Researchers on another study, she noted, found that treating women with acupuncture or hormone therapy yielded similar pregnancy rates, but the 131 women in the acupuncture group "had fewer side effects and less subsequent infertility."

"Although the exact mechanism of acupuncture in (mare) fertility remains to be elucidated, there is certainly plenty of evidence supporting its integration into a reproductive practice," Rathgeber summarized.

Stallion Infertility "There is very little information on acupuncture in stallions compared with mares," Rathgeber said. She noted, however, that because acupuncture has been well-documented to relieve equine back pain, stallions experiencing back pain "would be good candidates given the nature of their job."

Rathgeber noted there are reports of success in treating both subfertile or infertile bulls and men with acupuncture, and that there are "increasing numbers of studies in men identifying the effects of acupuncture on fertility."

Researchers on one study she discussed found that 24 of 30 men (80%) receiving acupuncture treatment had increased libido and an easier time sleeping.

In another study she mentioned, investigators revealed that men receiving acupuncture had a significant increase in total sperm function as compared to a control group with no increase.

Finally, she noted, in a recent study scientists demonstrated increased sperm motility and quantity, along with better morphology (structure) in men treated with acupuncture for five weeks.

While there are few studies on acupuncture's effects on horse fertility, studies in human medicine are yielding promising results to support its application in equine reproductive practice. Additionally, Rathgeber reported success in using the modality in her own management of subfertile mares and stallions.

Manual Therapies to Treat Back Pain

With massage, chiropractic care, touch therapy, and other manual therapy approaches, one could say that today's horses are living the high life. But just how effective are these modalities in relieving back pain? According to one researcher, they can be very effective if applied properly.

Kevin Haussler, DVM, DC, PhD, Dipl. ACVSMR (Sports Medicine and Rehabilitation), assistant professor at Colorado State University's Equine Orthopaedic Research Center, described what scientists know about the efficacy of manual therapies for thoracolumbar (the horse's back forward of the pelvis) dysfunction.

> **"The goal of manual therapy is to restore normal joint motion, stimulate neurologic reflexes, and reduce pain and muscle hypertonicity."**
>
> DR. KEVIN HAUSSLER

"The use of touch, massage, or manipulation of painful articulations or tense muscles is arguably one of the oldest and most universally accepted forms of therapy to relieve pain and suffering," Haussler said. "The goal of manual therapy is to restore normal joint motion, stimulate neurologic reflexes, and reduce pain and muscle hypertonicity (increased rigidity, tension, and spasticity)." Simply put, in the case of thoracolumbar pain, the aims are to restore the back to its original functionality prior to injury or insult.

Back Pain Diagnosis and Spinal Examination "Unfortunately, the use of the term 'back problems' is very nonspecific and is comparable with terms like colic, lameness, skin problems, and 'ain't doing right,' " he revealed. "Horses with back problems often present with vague signs of poor performance, lack of impulsion, stiffness, or avoidance of tack."

Before turning to manual therapies, Haussler said it's important for a horse owner to have a veterinarian diagnose any back problems and perform a spinal examination on the animal in question.

"The principle goals of the manual therapy evaluation are to identify if a musculoskeletal problem exists and to localize the injury to either soft tissue, articular, or neurologic structures," he noted. "The spinal examination also helps to identify and differentiate signs of acute and chronic spinal dysfunction and localize pain, stiffness, or muscle hypertonicity to a few vertebral segments or an entire vertebral region.

Haussler explained that historically there has been a "poor correlation between structural changes identified on diagnostic imaging and actual functional capabilities." For this reason, he recommends using a combination of clinical signs, diagnostic imaging, and diagnostic anesthesia (nerve blocks) to confirm back problems.

It's conceivable, Haussler noted, that the cause of a horse's back problems might never be identified: "Even with recent advances in high-tech diagnostic imaging, approximately 80% of human patients have no identifiable cause of the back pain and are subsequently categorized as having nonspecific back pain." Horses likely have similar statistics, he noted.

Next Haussler described manual therapies commonly used to treat back pain in equine practice and explained how each aids in the horse's recovery.

Massage Therapy "Massage therapy is defined as the movement or manipulation of the skin and underlying soft tissues either manually (e.g., rubbing, kneading, or tapping) or with an instrument or machine (e.g., mechanical vibration) for therapeutic purposes," Haussler explained.

He noted that both superficial and deep tissue massage techniques are typically used to treat a variety of back conditions—most of which address the soft tissue.

The goals of massage therapy include promoting relaxation; reducing anxiety; reducing muscle hypertonicity and pain; and increasing venous and lymphatic flow.

Haussler said studies have shown massage therapy can increase stride length, increase mechanical nociceptive thresholds

(i.e., the pressure at which a horse reacts painfully), reduce heart rate, and increase positive behavioral responses.

Mobilization Spinal mobilization involves using cyclic and rhythmic forces to induce selective displacement along the spine; this is achieved by applying and releasing firm downward pressure repetitively along the length of the spine.

The goals of articular and soft tissue mobilization simply are to reduce pain and return range of motion to affected tissue. While few studies exist on the topic, Haussler noted that some research in horses has shown that mobilization can effectively reduce joint stiffness and increase range of motion.

Manipulation Each "manipulation" is achieved with a high-velocity, low-amplitude thrust that pushes a "joint beyond its physiological range of motion without exceeding the anatomical limit of the articulation." Chiropractic care, for example, is considered manipulation.

Goals of manipulation include increasing joint range of motion, reducing pain, and reducing muscle hypertonicity. Haussler relayed that research has shown that spinal manipulation is effective for increasing spinal mobility, reducing pain, increasing muscle strength, and improving athletic performance in horses.

Stretching Haussler also described the effects of stretching on thoracolumbar pain: Through a regular stretching program, muscles become stronger and, thus, able to absorb more energy, which also reduces injury.

Goals of stretching to reduce back pain include reducing myofascial contractures (tender spots in tense bands of skeletal muscle that result in pain and motor dysfunction); increasing joint mobility; increasing flexibility; and reducing pain.

Haussler noted that in some cases stretching has been reported to reduce limb range of motion; however, he added that the correct "dosage" still isn't clear. In other cases range of motion increased, as did multifidus muscle (responsible for rotating the vertebral column) size, indicating an increase in back strength.

Contraindications and Adverse Effects There are few adverse effects associated with any type of manual therapy; most mild unwanted effects last only a day or two and resolve without additional medical treatment, he noted.

It's important to remember that each case of thoracolumbar pain should be diagnosed, treated, and evaluated individually. While massage therapy might work wonders in some horses, others could excel with the aid of chiropractic work. Consult a veterinarian to determine what will work best for each individual situation, keeping in mind that not every back ailment should be treated via manual therapies, Haussler cautioned.

"Manual therapy is not a cure-all for all joint or back problems," he noted. "It's generally contraindicated in the presence of fractures, acute inflammation or infectious joint disease, osteomyelitis, joint ankylosis (fusion), bleeding disorders, progressive neurologic signs, and tumors.

He also added that neither mobilization nor manipulation can reverse "severe degenerative processes or overt pathology."

Haussler also noted it's important to ensure the professional performing the procedures is experienced and qualified to do so, as individuals with "poorly developed manipulative skills" could cause more problems in the long run.

"Additional research is needed to assess the effectiveness of specific manual therapy recommendations or combined treatment for the management of back pain, muscle hypertonicity, stiffness, and select lameness issues," he added.

Further research is needed to evaluate the short- and long-term effects of manual therapy, as well, and if they can in fact enhance athletic performance in horses.

Acupuncture to Reduce General Anesthesia for Horses

After reading about a study in which electroacupuncture reduced dogs' need for general anesthetics for some surgical procedures, a research team wondered if the same might be true for horses.

"Inhalant anesthetics are commonly used to maintain general anesthesia in horses," explained Laura Romanò, DVM, a private practitioner from Italy.

However, compared with other species, horses have a higher risk of cardiac (heart) problems and myopathy (muscle problems) associated with general anesthesia. Thus, reducing the amount of anesthetic required in horses could minimize these undesirable side effects.

Anesthetic delivery to any patient is adjusted continually throughout an anesthetic session to maintain the desired depth of anesthesia and the patient's physiologic parameters (heart/respiratory rates, etc.). Thus, if outside factors such as acupuncture increase the patient's sedation, then less anesthetic drug would be necessary.

To determine whether acupuncture could decrease anesthetic requirements, Romanò and colleagues applied 30 minutes of electroacupuncture at nine acupoints on 10 horses undergoing general anesthesia for magnetic resonance imaging (MRI) exams. They compared these horses' physiologic parameters to those of five horses that did not undergo electroacupuncture for similar exams. They measured or estimated alveolar (in the lung) concentrations of the general anesthetic drug isoflurane, body temperature, heart rate, blood pressure, depth of anesthesia, and quality of recovery for each horse during the examination.

Romanò reported there was no significant difference between groups in duration of anesthesia, physiologic parameters, or recovery quality. However, the electroacupuncture-treated horses exhibited a significantly deeper depth of anesthesia compared to controls. They also had 31.3% lower alveolar concentrations of isoflurane compared to previous research and control groups, indicating that less anesthetic was given to these horses.

"Electroacupuncture decreases the isoflurane requirement in horses undergoing general anesthesia … and (it) could be considered a valid tool as part of a multimodal anesthetic approach," she summarized. "This is a quick application that fits into routine practice for every general anesthesia case (surgical or not). This procedure would also have possible use in horses with hepatic (liver) dysfunction or renal (kidney) failure to reduce the medications they would need to metabolize."

Physical Therapy for Stifle/Hind Limb Problems in Horses

Many horses struggle with stifle dysfunction due to injury, surgery, immobility, or disease. According to Jennifer H. Brooks, PT, MEd (Masters of Education), of Equine Rehabilitation Services, in Brookline, N.H., the stifle joint (comparable to a human's knee) is the largest, most complex joint in the horse, and dysfunction left untreated can lead to additional

joint degradation.

Brooks described her physical therapy approach for restoring strength and coordination to horses with intermittent upward fixation of the patella or other hind-limb weakness issues.

"Treatment of both intermittent upward fixation of the patella (knee cap) in horses and anterior knee pain in humans involves client education, increase in activity level, a stretching program, and an ascending therapeutic strengthening exercise progression," she said. "A thorough veterinary examination should first clear the horse for physical therapy treatment referral. Horses recovering from injuries, surgery, or systemic diseases are appropriate for this program."

Brooks said owners often report that affected horses are clumsy, frequently stumble, trip, get their hind legs stuck behind them, have a hind limb that gives out or collapses, and/or have an audible click or pop when shifting weight on or off of the involved leg(s). She also noted that affected horses tend to be overweight (body condition score 6 or higher on a scale of 1 to 9), have weak abdominal and/or topline muscles, generalized deconditioning, and atrophied (muscle wasting in) hind-end muscles. The patellae might also visibly "jump" when the horse initiates a weight shift or steps forward.

"Horses with stifle dysfunction will show poor hind-end awareness, presenting as if their hind end is not attached to their trunk or seeming to be dragged along by the forehand," Brooks described. "Often, these horses do not step up or track up well at the walk or trot."

Brooks described her three-step physical therapy program:

1) Horse Owner Education Affected horses need more movement, not less (unless your veterinarian prescribes stall rest). Keep horses moving throughout the day, allowing 24-hour turnout (but with access to shelter), ideally in a large pasture with slight hills and a companion animal. Provide multiple separated feed piles to keep horses moving around the paddock. In the meantime, your veterinarian can help manage any pain your horse might have.

"Often, the horse with stifle problems will opt to rest the involved or atrophied limb frequently," Brooks noted. "This rest allows or feeds into the commonly known adage in physical therapy that the weak get weaker, further facilitating the problem of nonuse of the weaker limb."

COURTESY DR. JENNIFER BROOKS

Isometric exercise, a form of strengthening, involves contracting or tightening a muscle without moving the limb, such as with a lateral tail pull.

2) Stretching "Flexibility should be assessed by a professional and instruction of proper stretching techniques should be provided again by a licensed qualified physical therapist," Brooks stressed. She described how to perform these techniques:

- High flexion: Bring the limb up passively into a fully flexed hip and stifle position and hold for 10-30 seconds.
- Protraction: Bring the limb forward under the horse's belly.
- Retraction: Stretch the limb backward past the tail.
- Adduction: Stretch the hind limb toward the midline under the horse's belly.

3) Strengthening Strengthening starts with isometric exercise, which involves contracting or tightening a muscle without moving the limb (as in pushing on a wall or inanimate object). Effective isometric muscle contractions are held for at least six seconds.

- Lateral tail pull: Stand to the side of the horse, grasp the tail at mid-length, and gently pull the horse's pelvis over the involved hind limb. The horse does not need to be standing square.
- Single-leg standing: Pick up the opposite hind limb as if to pick out the hoof. Don't let the horse rest his weight on you; make him stand on his involved limb for 10-30 seconds or more.

After about a week of strengthening, many owners notice improvement of the horse's tolerance of lateral tail pull and stretching, Brooks reported. The next step is isotonic (dynamic) exercise, including the following:

- Hand-walking with impulsion from the hind end so that the hind feet track into the forelimb hoof prints (owner might need training to make the horse walk forward with impulsion). This should be done before passive stretching (in which a handler helps the horse stretch various muscles) exercises to warm up soft tissues. Increase load as tolerated with a rider's weight, walking through water or snow, pulling a carriage, etc.
- If the horse is tolerating the progression, backing in hand comes next. Focus on good stride quality.
- Hand-walking up and down slight inclines.
- Varying the surface the horse walks on (sand, wood chips, gravel, etc.).
- After about two successful weeks, beginning walk-to-trot and trot-to-walk transitions in hand with quality long strides behind.
- Later exercises include turning on the forehand, backing up and down hills, completing long line work, navigating ground poles, and performing these exercises on hills.

If patellar fixation signs have decreased and no lameness is present after about eight weeks of therapy, riding may begin with a slow progression of conditioning through walk, trot, and canter. Maintain strength gains and soundness with a vigorous cross-training program, using a variety of these exercise regimens three to four times a week, Brooks advised.

When owners complied with instruction and carried out the program properly, most horses responded favorably.

"Consider equine physical therapy in conjunction with veterinary medicine approaches for optimal outcomes after injury or during recovery from systemic diseases and surgeries," she concluded.

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