Treating Lameness with RF

Revolutionary Technique Offers New Option

Thank the beauty of the Northwest for drawing Mark Revenaugh DVM from the East Coast to Oregon City. One of the team vets for the U.S. Eventing and Driving Teams, regularly called in to vet international driving and jumping events, Dr. Revenaugh is in demand not just nationwide, but internationally. We are fortunate, in the Northwest, to have such an asset in hand.

Dr. Revenaugh's state of the art lameness diagnostics practice is in the process of adding MRI capability and a beautiful new facility in Mulino, Oregon.

One of the things that makes Dr. Revenaugh unique is his ongoing pursuit of innovative tools and techniques. Among these is his pioneering work in modifying the use of radio frequency (RF) treatment from human to equine patients. RF is a well-established technique in *human* pain management, but Dr. Revenaugh is the only vet worldwide to be adapting the technique to horses.

The approach has required major modifications to the way the hardware is used and the techniques of applying the treatments. Dr. Revenaugh notes that horses' peripheral nerves are different than those in humans—and, as expected, the nerves are larger. The work has taken years and Dr. Revenaugh is the first to admit that there are still things to be learned along the way.

I learned about RF firsthand, when my retired event horse, Napoleon (aka: Poly), developed a chronic lameness. After trying acupuncture, an extensive lay-up, and a variety of traditional Western medical treatments, Napoleon's lameness persisted. Dr. Barbara Crabbe, of Pacific Crest Sporthorse, rated him as a 2 out of 5 on the lameness scale. Not good. I was ready to consider a surgical neurectomy, when Dr. Crabbe suggested a consultation with Dr. Revenaugh to consider RF as an alternative.

A traditional neurectomy involves severing the nerve to the affected foot and is considered an end-of-the-road option. So, I was more than willing to consider a less invasive and less costly therapy.

What is RF? Simply put, RF uses radio frequency to inactivate nerves associated with long-term pain. Since I was considering a neurectomy, Dr. Revenaugh compared and contrasted the two treatments to help me understand my options. While a neurectomy surgically severs the nerve, an RF treatment leaves the nerve intact—maintaining many of the nerve's important functions. Clearly, the advantage of the RF is that it is less invasive. In the procedure, small incisions are made in the areas that will be treated (which can be done as far up the leg as needed). The incisions are so small, that stitches are rarely needed. In a neurectomy, the incision is larger and stitches are a must.

How does RF work? Dr. Revenaugh uses the RF technique to treat specific A Delta C nerve fibers, associated with chronic pain. Because the procedure leaves nerves associated with acute pain (such as burns, breaks, and sprains) intact, a horse who has undergone an RF will still have proprioception (the ability to feel and know where his foot is) and will be able to feel new pain, such as an abscess, cut, or re-injury to the original site. The horse maintains full sensation in his skin and the full ability to contract muscles in the area.

The primary risks of a traditional neurectomy are the loss of proprioception (potentially making the horse more likely to stumble and lose his footing) and the inability of the horse to feel new pain. Horses that have undergone neurectomies can experience abscesses and new injuries without pain—which puts them at risk. For example, a horse who has undergone a neurectomy will not feel a nail in his foot or an abscess—putting him at risk of further, permanent damage.

I also learned that a neurectomy is not a *permanent* solution. The nerve fibers typically grow back together within two to three years. If the fibers grow back incorrectly, the condition can be quite painful and can require additional surgery.

In terms of effectiveness, both the RF and the neurectomy

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offer similar time frames in terms of providing relief to the horse: typically six months to three years. Because it is a non-invasive procedure, an RF can be repeated indefinitely. While Dr. Revenaugh's experience with RF can tell him which horses are the *best* candidates for the treatment, not all horses respond positively to the procedure. Fortunately, since the procedure is relatively non-invasive, negative risks are minimal: keeping the incision sites clean until they are healed is a must, to avoid infection. (While each incision is tiny, because of the proximity to the tendon sheath, *any* infection could have serious consequences.)

The benefits of a neurectomy are typically apparent once the surgical wounds are healed. In contrast, the results of an RF can take up to eight weeks to become apparent. During that eight week period, the horse may experience ups and downs in progress, which owners should be aware of.

Before asking me to make a decision about the RF procedure, Dr. Revenaugh made sure my expectations were realistic. "Some people come here, wanting their horse to be back to 100% of what he once was," he explained "I can't promise that." Indeed, since Napoleon is a senior, my expectations had gone from "I'd like to use him as a trail horse" to "I'd like him to be able to get around the pasture comfortably." With a younger horse I might have greater hopes. Regardless, Dr. Revenaugh is careful to set realistic expectations. Based on what I'd learned, I felt the RF was worth trying and we began the procedure.

The Procedure. Dr. Revenaugh typically uses RF for lameness issues, so a standard lameness check is routine. This may include flexion tests, nerve blocks, and x-rays. (His digital x-ray equipment makes the radiographs dramatically more effective than traditional x-rays as a diagnostic tool. They are downright amazing.)

If the horse is deemed a suitable candidate, he is sedated just enough to ensure he'll stand quietly. (In a traditional neurectomy, the horse is given general anesthesia.) After sterilizing and numbing the area, Dr. Revenaugh makes a stab incision on the leg to gain access to the nerve.

He introduces a fine needle, which attaches to the RF machine. Pulsed radio waves directly "insult" the nerve, which inactivates the A Delta C fibers. Placement of the probe must be exact, and it is only through direct experience that Dr. Revenaugh has identified the placement of critical nerves and the depth needed to make the procedure effective. Each site is pulsed with radio frequency for approximately seven minutes.

The radio pulse reaches a specific temperature very accurately, and pulses the site two to 10 times per second. The selective pulsing modulates the nerve, rather than inactivating it completely. The temperature "insult" impacts the membranes around the nerve cells and alters the electrical "pain" signals. Dr. Revenaugh notes that some horses heal better, once the pain is removed, allowing normal physiology to be restored.

Following treatment, the horse should be kept quiet for one to two weeks and the incision site must be kept clean until it heals. While the incision is minimally invasive, because it is made near the tendon sheath any infection could be a serious matter.

It's important to note that Dr. Revenaugh requires owners to sign a waiver following the procedure which specifies that, in the case of a sale, owners will disclose that the horse has undergone an RF procedure. In short, this isn't a quick-fix for resale horses. "The goal is to relieve pain and give the horse a break," Dr. Revenaugh says, "Quite a few horses have gone on again to compete again successfully—and that's satisfying."

Owners should also be aware that while RF is considerably less expensive than a traditional surgical neurectomy, this is not an inexpensive treatment. The equipment used is extremely expensive and the procedure requires a great deal of precision. Dr. Revenaugh has invested years of research to adapting the technique for equine use. In the past three and a half years he has used the technique on more than 60 horses.

How successful is RF? "That depends on the nature of the initial injury," Dr. Revenaugh explains, "But I've seen what I consider to be dramatic improvement in at least three out of every four cases treated this way.

It is worth noting that the staff at Northwest Equine Performance is efficient, courteous, and professional. I was delighted that my retired pasture pet received the same kind of compassionate treatment that an Olympic athlete would have enjoyed.

So, how did Napoleon do? The stab incision healed quickly without inflammation or infection. As Dr. Revenaugh advised, we experienced nearly eight weeks of ups and downs in Napoleon's condition. That was frustrating.

I'd been turning Napoleon out in a paddock separate from the other horses during this time, to keep him quiet. At just about eight weeks, he began escaping from the hot-wired enclosure on a daily basis. I had intentions of trotting him out on the lunge line, but was too busy with the holidays to get to it. Plus, I had a hidden fear that he'd still be lame—I wasn't sure I wanted to know.

Several days after Christmas, Poly escaped once again and, instead of returning to the barn as usual, trotted down my asphalt driveway—sound. Better yet, he'd ditched his front shoes and protective pads—so his soundness was even more impressive. The following day, I turned him out in the pasture with his friend, Nick. Poly squealed, bucked, and took off at a gallop. It's hard to say who is happier with the results. This was my Merry Christmas and Happy New Year combined.

Is the RF the end to Poly's lameness issues? Probably not, he's not getting any younger. But, because of its non-invasiveness, I'd definitely try RF again, if it's needed down the road. When you're looking at "end of the road" options, RF is a compassionate choice, well worth trying.

Northwest Equine Performance specializes in performance-related issues. This state of the art lameness diagnostics practice is in the process of adding MRI capability and a beautiful new facility in Mulino, Oregon (just south of Portland). For information visit equinepi.com