From Hoof Testers to MRI: The Evolution of Distal Limb Lameness in Sporthorse Practice

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1. Introduction
The art of lameness diagnosis has undergone an exciting evolution during the time that I have been involved in sporthorse medicine. The driving forces behind the progression can be grouped into two main categories. First are the scientific and technological advancements in the field of diagnostic imaging, and second, the breeds and uses of the horses that are present in the equine world today.

Back in the 1970s and prior, the majority of large animal practitioners were faced with a completely different horse demographic. Warmbloods were not on the horizon yet, and performance horses and “sports medicine” were only in the embryonic stages. A farm call would present the equine veterinarian with racehorses (Standardbreds or Thoroughbreds), broodmares (Standardbreds or Thoroughbreds), Quarter horses, or riding horses, which were usually some sort of light-boned type. Horse shows at that time did not place the same demands on the horses as the shows of today; there was no year-round show schedule. There were no Winter Equestrian Festival and summer Horse Shows in the Sun (HITS) circuits, and therefore the needs of the owners, riders, and trainers were very different. As the nature of the horse shows evolved, along with the horse pedigree, so did the need for better diagnostics in the field of musculoskeletal injury.

Any individual graduating from veterinary school as late as the 1970s would approach lameness diagnosis in a very straightforward way. Observation of the horse by means of hands, eyes, ears, and manipulations of the limb was the most sensitive means of noting gait abnormality, and this was obviously highly subject to individual experience and skills in this area. Hoof testers, basic nerve blocks, and primitive radiology equipment were also used as adjunctive means to try to better define the horse’s issue, but, again, this was dependent on the clinical examination. Advanced imaging modalities have revolutionized the diagnosis and management of distal limb lameness in sporthorse medicine. The ability to have an accurate anatomic and physiologic diagnosis has allowed for horses to enjoy longer careers at the upper levels and for successful management at the twilight periods of their careers at the lower levels to teach our young riders coming up the competition ranks.

In my 30+ years of experience, the majority of lameness that I encounter is in the forelimbs—roughly 75%—and, of that, 75% is referred to the distal limb. The high numbers of injuries found in this area, especially the foot, coupled with sometimes perplexing and inaccurate peripheral nerve analgesia results in this region, have necessitated the use of advanced imaging modalities in this area.
In our practice, the use of the standing MRI and nuclear scintigraphy has allowed for rapid diagnosis and treatment that were not achievable with traditional means.

In my early practice years, hoof testers were the most popular tool for trying to understand lameness of the foot. If a horse was negative to hoof testers but continued to be foot-sore regardless of treatment, he was turned out until soundness was achieved. Radiographs would be used to try to identify a fracture, arthritis, significant navicular bone changes, or significant degenerative changes at the attachments of the soft tissues (and to surmise injury to those structures). Today, the quality of radiographs is greatly improved but still only lends a small window into the foot. Hoof testers are used to determine the presence of an abscess or hot nail, but a mildly positive or negative response to the testers is not the end of the diagnostic process. Superior-quality ultrasound equipment is available to allow imaging through the frog to visualize the distal aspect of the navicular bone and associated soft tissue structures. However, this technique offers a limited window into the complex anatomy of the foot. In addition, it cannot be used to detect fluid in bone, and, because of the limited window, deep digital flexor tendon injuries that are not on midline or close to midline will not be detected. Ultrasound is also less sensitive than MRI for certain fiber abnormalities and cannot be used to image the distal aspect of the collateral ligaments of the coffin joint.

With increased use of MRI in sporthorse practice, I have been able to identify bone bruising, early soft tissue sprains, and significant injuries to the previously inaccessible areas of the foot (ie, distal aspect of the collateral ligaments of the coffin joints). A horse with a mild injury can have a targeted treatment, and the question of “compete or not” with acute lameness can easily be answered. Recommendation of denerving surgery to the foot for certain patients that have pain referred to the foot can be made more confidently if MRI can confirm healthy soft tissue structures and monitor them after surgery to ensure the health of the foot and therefore the safety of horse and rider as they continue to compete. Hence, many of these upper-level horses can be useful and continue their successful careers. Of course, not every case has a happy ending; it is never easy to explain to an owner that their young sporthorse prospect with intermittent lameness has a flexor surface erosion that was not evident in their pre-purchase examination radiographs. However, having a definitive diagnosis to allow for accurate prognosis in such situations can save time and money in the long run. Resources and time can be allocated toward a new horse or changing the career for the injured horse rather than investing in a case that ultimately carries a poor prognosis for long-term soundness at upper-level work (and disappointment and frustration for the owner/trainer).

Coupled with a good lameness work-up and history, nuclear scintigraphy paired with MRI has also been paramount in advancing the diagnosis of distal limb lameness even above the foot. Horses with confounding blocking patterns are often referred to nuclear scintigraphy, which can direct areas of interest to be explored via MR imaging. Consider a horse with multiple limb lameness that has multiple “hot spots” in his distal limbs: enostosis-like lesions were visualized on standing MRI. Horses that block to palmar digital or abaxial sesamoid analgesia may have increased radiopharmaceutical uptake in the fetlock, and MRI will demonstrate bony cysts, subchondral bone injury, or edema not visible on traditional radiographs. There is also a substantial population of horses that block to a “high suspensory” with negative or questionable radiographic and ultrasound findings—or horses that block lower, but distal limb imaging is negative for pathology. These horses often have increased radiopharmaceutical uptake at the level of the origin of the suspensory ligament, and placing the MR coil at the area directed by the bone scan often identifies regions of proximal suspensory injury with metacarpal/tarsal involvement. These lesions dictate a different treatment and prognosis than those with soft tissue injury only, and, with the use of the results of the advanced imaging modalities, ultrasound can be used with more confidence to monitor these injuries after definitive diagnosis. Indeed, MRI has made us better ultrasonographers.

It is an exciting time to be in the field of sports medicine, with the continual advances of diagnostic imaging and our ability to interpret these images. However, it is prudent to remember the importance of a thorough history and clinical examination and to understand the goals for the horse in question. No image can substitute for good “horse sense” as it applies to making decisions for our equine athletes. It is the author’s opinion that a team approach to complicated lameness that coordinates comprehensive soundness evaluation, judicious application of appropriate imaging modalities, and clear communication between the veterinarians, farrier, owners, riders, and trainers results in the most successful outcome in these cases.