How to Use Manipulative Tests to Diagnose and Manage Equine Foot Pain

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A thorough examination and assessment of the equine foot forms an essential part of any lameness examination. Manipulative tests can give the examiner incredible insight into the pain the horse is feeling. This provides the examiner with the critical information necessary for the next diagnostic step, not only diagnostic but therapeutic information for relief of pain. Author’s address: 16445 70th Street, NE Elk River, MN 55330; e-mail: turner@anokaequine.com. © 2014 AAEP.

1. Introduction

The equine foot is the most common site for lameness to develop. It is therefore of utmost importance to perform a thorough examination of the foot in order to identify problems or predisposing factors that may lead to lameness. The recent use of magnetic resonance imaging (MRI) in equine lameness diagnostics has markedly improved our understanding of foot-related lameness. Unfortunately, MRI examinations frequently reveal more than one area of pathology. It is then imperative to rely on the clinical examination to determine a hierarchy of importance of the MRI identified lesions.

There are numerous causes of foot pain in the horse. These causes can be categorized as (1) conditions of the hoof wall and horn producing tissues, (2) conditions of the third phalanx, and (3) conditions of the podotrochlear region. Hoof problems would include: hoof wall defects, such as cracks that involve the sensitive tissue; laminitis, laminar tearing (local, due to hoof imbalance), separation or inflammation of the sensitive laminae from the insensitive laminae; abscess formation; contusions of the hoof causing bruising or corn formation; neoplasia, and pododermatitis (thrust or canker). Third phalanx problems include: fractures of the coffin bone (types I–VII), deep digital flexor insertional tenopathy, pedal osteitis (generalized or localized inflammation of the bone), desmopathy of the collateral ligaments, cyst-like lesion formation, and remodeling disease. Conditions of the podotrochlear region have been reported to include distal interphalangeal synovitis/capsulitis, deep digital flexor tendinitis, desmitis of the impar (distal navicular ligament) or collateral sesamoidean ligaments, navicular osteitis or osteopathy, vascular disease of the navicular arteries, and navicular fractures. The common denominator of all of these conditions is that they are characterized by pain that can be localized to the foot.

The examination requires comprehensive evaluation of the external hoof, evaluation for deep pain, evaluation of “hoof balance,” and evaluation of radiographs or other imaging modalities. The evaluation of the horse’s foot, like all examinations, requires a thorough medical, performance, and shoeing history. The purpose of this paper is to describe the value of manipulative tests for the diagnosis of
foot problems and to describe how the results of these tests can be used to help manage the foot pain.

2. **Manipulative Tests**

Diagnostic tests that should be performed are hoof tester examination, distal limb flexion, hoof extension wedge test, palmar hoof wedge test, and lateral medial wall wedge tests. Positive response to any of these tests is important but a negative response is equivocal and does not rule out any problem.

Hoof tester examination should be performed systematically; how you perform the exam is unimportant but get used to a routine.\(^1\)\(^2\) I like to begin at the heel on my left side and work around the hoof in a clockwise fashion. Begin with the bar, move to the heel, to quarter and then toe, and then back toward the heel on my right. Space the tester’s progress at approximately one-inch intervals. Be sure to include each exit point of the shoeing nails. Next, place the testers in each of the collateral sulci and across the hoof to the opposite hoof wall (I like progressively move the hoof tester along the hoof wall caudal to cranial to check for alterations in the pain response; then place the testers in the central sulcus to the hoof wall at the toe and then across the heels). Remember that the closer the ends of the hoof testers are, the more accurate the exam is in localizing pain. A positive response should be repeatable and, in the frog region, the pain response should be uniform over those areas and must be evaluated in relation to examination of the remaining foot.\(^1\) That is, a positive response in the heels and quarters of the sole would also be expected to cause a positive response across the distal sesamoidean region in the same area of the foot. Pain is noted as a distinct withdrawal of the foot at the time pressure is applied.

A distal limb flexion test may exacerbate lameness if any of the three distal joints of the leg are affected by synovitis or osteoarthritis.\(^1\)\(^8\) A positive response could also be expected by any condition that causes induration of the tissues of the distal limb. The distal limb flexion test is performed by flexing the distal limb, holding the limb in that position, and trotting the horse away after 30 seconds. In the author’s opinion, the time is not critical but the examiner should always be consistent so as to develop a feel for the effect of the test. A positive test is noted if the manipulation causes lameness or lameness is exacerbated.

The hoof extension test is performed by elevating the toe with a block, holding up the opposite limb, and trotting the horse away after 60 seconds.\(^1\) The block the author uses is an old hoof knife wrapped in tape as protection from the blade. The palmar hoof wedge test is performed in a similar fashion except that the block is placed under the palmar two-thirds of the frog and forces the horse to stand on that foot. The opposite limb is held up for 60 seconds and the horse is trotted off. The test can be further modified so that the wedge can be placed under either the medial or lateral wall to determine if the pressure or hoof imbalance caused by the wedge exacerbates the lameness. As before, the opposite limb is held up for 60 seconds before the horse is trotted in hand. A positive test is once again noted if the manipulation causes lameness or lameness is exacerbated.

3. **Diagnostic Significance**

The significance of the hoof tester examination is obvious; it is a simple assessment of pain, with the painful area between the tips of the testers. Abscesses or fractures usually show the most reaction when using hoof testers. This is important so that further diagnostics, specifically radiography, can be centered on the exact point of pain. This improves the likelihood of finding a lesion. Less painful injuries would show less pain. Traditionally, pain over the frog upon hoof tester examination was indicative of navicular bone pain; however, one study showed that hoof testers only had a 50% predictive value for navicular pain.\(^3\) The author believes hoof testers are very accurate for assessment of pain in the sole or hoof wall but over the frog hoof tester pain only represents nonspecific deep pain in the foot.

Flexion tests have been shown to exacerbate 90% of foot lameness.\(^4\) However, there has not been shown to be any specificity. One lameness diagnostician suggests that if the limb is flexed under the torso pain is more likely from the fetlock; whereas if the limb is flexed by pulling it forward, this is more likely to exacerbate coffin joint lameness.\(^5\) This has not been confirmed but the author always flexes the limb by pulling the leg forward. If the test is positive the author will follow this test with medial lateral wedge tests.

The medial to lateral wedge will apply pressure to the wall under the wedge and stretch the capsule and collateral ligaments of the coffin joint opposite the wedge.\(^6\)\(^7\) The test appears to be more specific for collateral ligaments.\(^7\) The author reviewed their last 50 cases where the wedge test was positive; over 90% were positive with the wedge placed laterally, and 33 of the 50 showed a distal interphalangeal collateral ligament lesion upon ultrasonographic examination.

The frog wedge test has an 85% positive predictive value for navicular pain.\(^3\) This makes it the best single test for that condition. Whenever this test is positive, the author recommends a navicular bursecto-gram as part of the imaging assessment. The toe wedge test is the most commonly recommended test after flexion and hoof tester examination.\(^7\) However, the test has only a 50% predictive value for navicular pain and is only positive in about 50% of the cases.\(^3\) Despite those poor predictive values, the author uses a positive response as an indicator of deep flexor pain and performs sonography of the deep flexor in the pastern and foot. However, only a small percentage have had a deep flexor lesion.
4. Treatment Significance

Hoof tester examination pinpoints the region where, in the case of an abscess, decompression needs to be performed. Furthermore, the information can indicate the areas of the foot that need to be protected.

Flexion tests indicate to the author potential joint injection as part of the therapeutic options. Which joint depends on the response to diagnostic analgesics and radiography. An exception is a positive medial/lateral wedge test or sonographic finding of distal interphalageal (DIP) collateral desmopathy. The author believes that the risk of making the injury worse is too great if the DIP joint is injected.

A positive frog wedge test is an indicator for treatment of the navicular bursa. The author uses this single test as a positive indicator for the diagnosis and treatment of navicular pain. A positive toe wedge test, in the author’s opinion, is an indicator to relieve pressure on the navicular bursa. An important point is that a positive frog wedge indicates that any frog pressure applied to the foot may cause more pain. This is important to know when deciding therapeutic options for shoeing. Positive lateral/medial wedge tests indicate DIP collateral ligament or joint capsule stress. These are cases that need rest if there is a lesion in the collateral ligament. In the absence of collateral lesions, the author recommends shoeing the horse with an asymmetric shoe with the wide branch under the opposite wall of the positive test. This prevents that wall from sinking into the ground and helps prevent the stress from being applied to the ligament during normal movement.

5. Conclusions

Manipulative tests of the foot provide unique information to the examiner that is both beneficial in determining further diagnostics but also provides information important in developing treatment strategies for the lameness.

Acknowledgments

Conflict of Interest

The Author declares no conflicts of interest.

References

5. Martinelli M. Personal communication.