

Laminitis Case Report

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Case History

A 10 year old female Tennessee Walking Horse presented to the North Carolina State University Podiatry and Rehabilitation Service in the Veterinary Teaching Hospital with a history of chronic laminitis of 6 years duration. The first episode of laminitis that the mare had was at the age of 4 years old. After 2 years, she returned to training in Florida. The current owner bought the horse at the age of 7 years old. Over the course of the previous year, the mare after shoeing had become lame. Three months previous to presentation at the Teaching Hospital, the owner moved the horse to North Carolina, and she had been chronically sore on her front feet being worse on the RF.

Clinical Presentation

On presentation to the Large Animal Teaching Hospital, the mare had a lameness of 2 out of 5 in the right front foot on the turn at a walk on asphalt. The left front foot showed a marked dishing of the dorsal hoof wall when observed from the side. The right front foot looked relatively normal. Heart bar shoes with no pads were present on both front feet. No shoes were present on the hind hooves. When walked on the grass in a straight line and turning, the mare appeared more comfortable. No back pain or other areas of soreness were noted on physical examination.

Diagnostics

Lateral and dorso palmar radiographs were taken of the left and right front feet. When evaluating radiographs for laminitis, several measurements are important for evaluating the degree of laminitis. In this mare, the left front foot had a rotation angle of 12 degree. The sole depth of the left front foot was 15 mm and 9 mm, which are measurements that were taken at two locations at the bottom of the coffin bone to the sole (Potential ideal sole depth is 15mm). The right hoof had 18 degrees of rotation of the coffin bone away from the thickened dorsal wall and the sole plane of her coffin bone was 20 degrees. Due to this significant rotation her sole depth was 3 mm at the tip of the coffin bone. (Figure 1.)



Figure 1: In her initial radiograph, besides the significant angles related to the rotation and thin sole, the breakover distance from the tip of the coffin bone to the rolled portion of the shoe was 34mm. In spite of the rolling of the shoe there still was potentially a significant levering affect occurring on the tip of the coffin bone when she moved.

Diagnosis

1. Chronic unstable laminitis of the right and left front feet, more significant in the RF

Treatment

The hoof was trimmed to realign the coffin bone with the ground in order to correct the weight bearing surface of the bone thereby returning it to a more normal orientation. Using the guidance of the radiographs, the heel was trimmed creating a 2 plane trim in order to achieve a 20 mm depth from the coffin bone to the new bottom of the foot. No sole or wall was removed from the front area of the foot. (Figure 2) A perpendicular line was drawn from the most dorsal edge of the coronet band straight down through the foot, which determines where the point of breakover of the foot should fall. Ideally one would like the breakover to be behind the tip of the coffin bone to reduce as much levering as possible. A Grand Circuit "T" shoe (www.grandcircuitinc.com) was placed on the right front foot. The dental impression material (*Advanced Cushion Support, www.nanric.com) was packed into the entire heel area of the shoe and also filled in the area between the toe half of the foot and the shoe. The shoe was tacked on and a lateral radiograph taken to observe the coffin bone position. (Figure 3) Once the shoe was applied the additional toe (dead excessive laminar wedge) was rasped down to create a more normal hoof shape. It is important to note that this trimming for de-rotation of the coffin bone technique should always be done with the use of radiographs to prevent causing more damage to the hoof by improper trimming. The goal of the re-aligning shoeing is that if there is some reasonable circulation around the distal border of the coffin bone remaining then re-positioning the coffin bone will allow the circulation to return to normal. Thus blood flow and the nutrients can access the area more normally to regrow the sole. The longer the coffin bone remains in the tipped position the more the circulation is destroyed.

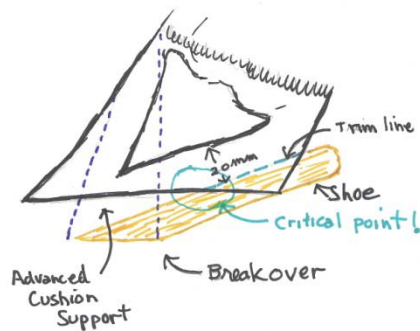


Figure 2: This schematic depicts the trimming technique used on this mare's hoof in order to realign the coffin bone and the weight bearing surface of the sole (de-rotation shoeing)



Figure 3: Mid shoeing radiographs taken to evaluate de-rotation.

Rehabilitation Plan

The goal of the rehabilitation plan is to grow a more appropriate amount of sole under the tip of the coffin bone on the right front foot. Increased sole depth will help tremendously with providing for the comfort of laminitic horses because of the cushioned support that the sole provide as well as protection of the bone. Additionally with corrective shoeing the hope would be that the growth of the heels and toes would become equal. This can be evaluated by the coffin bone sole plane angle minimally changing. **All laminitis horse need to be confined, preferably to a deeply bedded stall for at least 6 weeks.** Because of the very thin sole depth present in the mare's right front foot, it was recommended that she remain on stall rest in order to decrease movement as much as possible. Additionally, the breakover distance needs to be re-evaluated at each shoeing to reduce the strain on coffin bone. She was to remain on phenylbutazone at one gram twice a day for about 2 weeks to reduce inflammation and to keep her comfortable in the stall. Her feeding ration was also reduced to ad libitum hay and one handful of grain per day to try and help her mental attitude on stall rest. The mare was kept on a five

week shoeing schedule with radiographs re-checked at each shoeing (Figure 4) to evaluate the progress of the de-rotation of the coffin bone.



Figure 4: One month after initial presentation. Notice the increase in sole depth from 3mm to 10 mm. The growth of the heel and toe has become more equal since the coffin bone is not moving. Improvement in the horse's pain level and radiographs should be noted by 5 weeks. If not, the horse needs re-evaluation.

About 2 weeks into her second shoeing (about 7 weeks after initial examination and shoeing), we recommended light hand walking. Between her 3rd and 4th shoeing since she had remained sound we recommended that she could begin a light riding program.



Figure 5: 8 months after initial presentation for laminitis.

Discussion

Laminitis is a very complex and poorly understood disease process of the equine hoof that can result in debilitating pain and even in many cases can be life ending. To try to understand laminitis, let's begin with some basic facts about the anatomy of the hoof. The coffin bone is suspended within the hoof by

the laminae. These laminae are like interlocking pieces of Velcro that hold the coffin bone to the hoof wall. The blood supply of the laminae comes from little blood vessels that are distributed between the coffin bone and the hoof wall. The coffin bone also serves as the end attachment for the deep digital flexor tendon, which becomes an important force when addressing laminitis.

Laminitis can be a secondary complication to disease processes in other parts of the horse's body or mechanically initiated in instances of increased weight bearing (such as standing limb laminitis in horses with injured legs). Based on current research, no single event has been identified as a trigger for the disease process of laminitis. Any initiation of systemic inflammation can induce laminitis because the alteration in blood flow creates a lack of blood perfusion (ischemia) to the lamellae. The lamellae become weakened as a result and the junction holding the coffin bone to the hoof wall is no longer able to support the same amount of force. Due to the weight of the horse, the tension of the deep digital flexor tendon and the weakened structural integrity of the hoof, the coffin bone will begin to rotate and/or sink distally towards the sole of the hoof. The frustrating part of evaluating and treating laminitis is that the damage caused to the lamellae is impossible to predict at its onset. Thus time after onset, how the horse responds to treatment and possibly sole depth as observed on radiographs are used as potential evaluation of outcome. The primary option left for improving the structural integrity of the horse's hoof with rotation of the coffin bone is corrective shoeing. It truly is a situation where the veterinarian and the farrier need to work together. The veterinarian provides diagnosis, medication and good lateral radiographs with the central beam aimed at the junction between the distal border of the coffin bone and the shoe or ground. The farrier using those films, provides the mechanical portion of the treatment plan.

Additional Resources

For additional detailed explanations and pathology of the laminitis disease processes, we recommend Dr. Steve O'Grady's website: <http://www.equipodiatry.com/podiatry.html>

Floyd, AE and Mansmann, RA Equine Podiatry. Saunders (Elsevier). Saint Louis, Mo. 2007 pp.313-377.

Redden, R Understanding Laminitis. The Blood Horse Inc., Lexington, KY. 1998