Shoeing the Laminitic Horse

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The successful treatment of most laminitic horses can be accomplished with therapeutic shoeing, which includes carefully assessing the damage as well as reading the particular needs of the horse. Author's address: P.O. Box 507, Versailles, KY 40383.

1. Introduction

Laminitis is a complex disease syndrome that is often seen subsequent to a variety of primary diseases. The prognosis ranges from good to grave and is dependent on the degree of damage to the vital supporting structures and mechanical stability of forces perpetuating the displacement of PIII. This syndrome demands the expertise of professional farriers as well as veterinarians, because therapeutic shoeing plays a major role in the successful treatment of the majority of laminitic horses.

Treatment length can vary from a few weeks to years, requiring commitment and dedication for seemingly endless maintenance regimes. Establishing an effective protocol to treat laminitis will improve the treatment regime and help farriers and veterinarians gain good experience.

Success rates vary from horse to horse and are greatly influenced by the ability of veterinarians and farriers to assess the damage, read the horse's particular needs, and treat the syndrome with a progressive attitude, which is built on knowledge of the subject and professional camaraderie.

2. Initial Examination

Obtain a good history and carry out a thorough physical examination, including radiographs, on the first visit. Laminitis often follows other primary disease maladies, such as colitis, pneumonia, pleuritis, retained placenta, dystocia, potomac fever, blister beetle ingestion, protracted diarrhea, salmonella, selenium toxicity, fescue poisoning, injudicious use of corticosteroids, stress, contralimb acute lameness, and others. Be alert to the hoof characteristics that vary from normal, both grossly and radiographically (see Figs. 1 and 2). Being focused on details will help rule out other acute foot problems that closely mimic the signs of laminitis.

3. Taking Radiographs

A methodical, disciplined technique ensures a consistent, good quality, pure lateral projection. Soft-tissue detail images reveal anterior–posterior balance and the relationship of PIII to horn and horn to load. These parameters must be clearly demonstrable, as they become an essential guideline for pathological shoeing. Most professional farriers have become quite proficient at reading good quality, soft-tissue detail film, as it relates to their task of re-establishing a meaningful equilibrium. Films taken before and after each shoeing session tremendously increase the knowledge bank and efficiency of both farrier and veterinarian and consequently improve their prognosis.

Practice tips that have improved my technique are as follows: (1) a pure lateral, primary beam strikes

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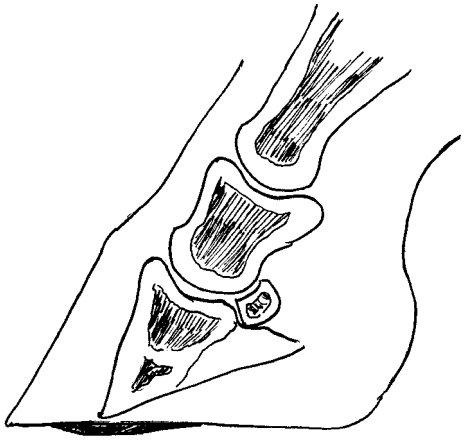

Fig. 1. Diagram showing excessive rotation, sole prolapse, and penetration.

the foot in a horizontal plane, just above the ground surface; (2) the use of zero film, subject distance; (3) the use of an opaque marker, detailing the face of the horn wall, as well as the ground surface; and (4) a positioning block, 3 × 5 × 7 in. (~7.5 × 13 × 18 cm) with a wire running through the long axis, is compatible with most x-ray machines.

4. Radiographic Interpretation

The distance from the face of PIII to the outer horn wall is referred to as the horn-lamellar space. Become familiar with normal parameters. Most light breeds will measure 15–17 mm; heavy, older broodmares, stallions, and most Standardbreds will measure 20–22 mm. Baseline views become most valuable, because they establish a starting point. The depth of the sole and cup directly beneath the apex of PIII is quite easy to monitor with pure lateral films. The extensor process relationship to coronary band varies from horse to horse and foot to foot. Rely on the baseline film to assess the starting location.

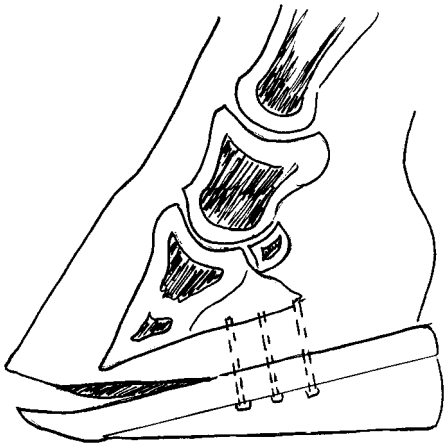

Fig. 2. Diagram showing derotation.

5. Classify the Damage

Rotation is significant with acute cases but is very misleading with chronic cases because of abnormal horn growth.

Classify the damage before establishing protocol. A scale of 1–1000 offers a realistic classification system for all laminitic cases. Classify each horse at the onset, based on history and physical and radiographic examinations. Design a therapy to reverse forces at play and meet the needs of the patient.

This system enables me to treat not only each case but each foot as a separate entity and to better explain the seriousness of the syndrome to my clients. The scale and description follow.

0–250: The initial clinical response can be very painful. The initial treatment normally produces very favorable results. Mechanical aids to reduce tendon pull are an adjunct to therapy. With no displacement, the horse appears clinically normal in a matter of days and has an uneventful recovery (30–45 days minimum; 6-month maximum). Most horses retain athletic performance.

250–500: There is 5°–8° of rotation within the capsule or less than 1 cm of sinking. There is normally 8–9 months of full recovery. Most horses remain athletic but drop in class or retire to slower sports. Therapeutic shoeing is required.

500–700: There is greater than 8° of rotation and greater than 1 cm of sinking. The horse may require deep flexor tenotomy as an adjunct to therapeutic shoeing. Recovery is 8 months to 1 year. Most horses can become low maintenance, pasture sound animals; a small percentage will become sound enough for occasional, easy pleasure riding.

750–1000: In a salvage case, there is 2 cm of sinking, excessive rotation, and maximum solar compression; many times there is penetration. Timely decompression, derotation, therapeutic shoes and bilateral deep flexor tenotomies often move these horses to a lower scale. Those that remain in this category following initial treatment have a grave prognosis, and at best end up chronic cripples. This class requires the use of practitioners and farriers with good experience with complicated laminitic cases. Expectations and goals should be discussed with all concerned parties at the onset and updated periodically. This is a devastating syndrome for the horse, as well as the owner. Being compassionate makes a profound statement.

6. Treatment

Acute laminitis should be considered an emergency because the window of maximum response closes rapidly. Sound mechanical therapy applied in a timely fashion can be very effective against secondary compressive damage seen subsequent to the displacement of PIII. Preventing or minimizing displacement in the face of this syndrome can alter the course of the disease.

7. Therapeutic

Treat the whole animal; address primary problems when they are known. Use anti-inflammatories with discretion. Phenybutazone remains the drug of choice. Many other drugs have good to excellent anti-inflammatory properties and can be useful. Nitroglycerin creams and patches have been advocated recently and may have potential, although these must be used with discretion. Teach the proper use and handling of these products, as they have precautions and contraindications.

Apply emergency aid designed to significantly reduce deep flexor pull.[a] The clinical response will aid in assessing soft-tissue damage. Before applying any therapeutic device, become familiar with the specific conformation characteristics of each foot. Learn to read the positioning of PIII within the capsule, with the aid of radiographs as well as without.

Three basic principles are very effective against deep flexor pull, as it opposes diseased laminae: (1) raising the heel 10°–18° significantly reduces pull on the tendon; (2) placing breakover directly beneath the apex of PIII (phalangeal point of rotation) eliminates the opposing lever arm and significantly reduces lamellar stress and subsolar compressive forces; and (3) utilizing sole, frog, bars, and sulci as uniformly loaded support zones. Success with mechanics lies in applying a device that meets the specific needs of each foot. Years of experience are required of veterinarians and farriers to read feet properly. A common error is to lump all feet and all cases into a basic category. This philosophy fails to produce favorable results the majority of the time.

Very basic guidelines to help load the heel and unload the apex and laminae are as follows.

1. When rotation is present, the hoof capsule must be trimmed in a fashion that realigns PIII with the natural load surface; otherwise, the apex of PIII continues to compress the sole corium, further compromising circulation. Trim the heel parallel to the freshly trimmed frog, starting at a point just behind the apex of the frog. Rasp the heel down at the base until good, sound horn tubules are evident at the widest point of the frog. Use discretion, as overtrimming can produce harmful results. The horn capsule forward of the apex of the frog will not make contact with the shoe; therefore we are shoeing to the heel, not the toe. All nails must go behind the widest point of the hoof in order to secure the shoe to the heel. Realignment normally increases deep flexor pull, depending on the severity of the displacement, hoof angle, heel angle, and breakover placement. Raising the heel once it is properly derotated increases the load to the heel area and reduces tendon pull, influencing sole corium and lamellar perfusion. Leave as much sole and foot mass as possible, as it is natural protection and is desperately needed.

2. Design the shoe so breakover is ¾ in. (~2 cm) forward of the true apex of the frog. Note that many times the frog will lay on top of the sole, giving a false impression of the true location. Trim the toe at a 45° angle with the ground surface to avoid breakover contact. Stay well forward of the natural sole.

3. A resilient, custom-fit arch support offers a broad spectrum, evenly distributed support surface that reduces the load on the diseased laminae.[b]

4. Strict stall rest throughout the recovery period reduces unwarranted stress on the healing laminae. Note that the recovery period is dependent on damage. Cases with significant rotation or sinking must re-establish lamellar integrity or relatively normal horn growth pattern and a dense sole to reach optimum recovery. Six months to 1 year is a normal recovery period.

8. Unfavorable Treatment Response

When faced with an unfavorable response, take lateral radiographs with the shoes on. Routinely take films following every therapeutic shoeing. Focusing on small details improves the end result. Check for proper derotation, mass of heel, sole impingement, and progressive displacement (rotation, sinking, and lamellar thickening). Keeping in mind the normal, evaluate the coronary band and look for sensitivity, discoloration, moisture, and abscessation. Take dorsal–ventral views, and look for pathological solar fractures. A venogram of the digit is a helpful aid for determining circulatory damage.[1,2] Classic sinkers have a stark loss of contrast throughout the laminae, subsolar area, and within the semilunar canal. Subsequent venograms can aid in assessing the progress of cases that show a marginal loss of contrast on the initial examination. When faced with a poor or slow response following proper derotation and shoeing, consider deep flexor tenotomy as an adjunct to therapy. Deep flexor tenotomy should be considered an effective means of treating complicated laminitis. Proper derotation, shoeing, and timely surgery can offer penetrated laminitic cases full recovery.

9. Therapeutic Shoeing

Therapeutic shoeing is indicated for laminitic cases that develop 5° of rotation or greater and for all that have sinking of any degree. Progress in the field of pathological shoeing has accelerated over the past 10 years as a result of the combined efforts of farriers, veterinarians, and research. Currently, I prefer to fabricate a four-point rail shoe, similar to the shoe by Gene Ovnicek.[3] I have modified the concept to increase toe protection and have applied a sole to ground-resilient arch support. There are many ways to make this shoe. Farriers need to know the basic principles of construction and application. First, breakover is at the widest point of the foot, just in front of the apex of the frog. Second, rails reduce tendon pull and enhance medial–lateral breakover.

Third, arch support offers broad-spectrum support to the sole, frog, and bars.

Proper placement of the shoe on a derotated, laminitic foot with an adequate mass of heel can offer a more consistent measure of successful laminitis treatment. The shoe has offered a favorable response for sinkers and cases with penetration. This shoe and technique enhance the effects of deep flexor tenotomies.

10. Conclusions

Ninety-four horses were shod with four-point rail shoes with Advance Cushion Support. Of these horses, 75 had greater than 10° rotation, 38 had greater than 1 cm of sinking, 40 penetrated the sole, and 38 were treated with deep flexor tenotomy.

Twenty-four horses returned to their previous status. Of these 24, there were seven broodmares, one stallion, one Arab show horse, one Quarter Horse, one Paso Fino, five Walking horses, one Saddlebred, one Morgan, one show hunter, and two riding horses. Three were penetrated; there was one Paso Fino, one Walking horse, and one Thoroughbred broodmare.

Thirty-one horses returned to pasture soundness. Of these, 16 were penetrated; there were three Saddlebreds, one Arab, four Thoroughbreds, two Quarter Horses, one Standardbred, four Walking horses, and one Morgan.

Nineteen horses were euthanized. There were nine sinkers with penetration, one penetration, and nine chronic cases with extensive osteomyelitis.

Thirteen horses could not be located for follow-up.

References and Footnotes

1. Redden RF. The use of venograms as a diagnostic tool. Bluegrass Lamin Symp, 1993. International Equine Podiatry Center, P.O. Box 507, Versailles, KY 40383.
2. Pollitt, C. University of Queensland, Saint Lucia, Queensland 4072, Australia (personal communication), 1992.
3. Ovnicek G. 525 Half Moon Rd., Columbia Falls, MO 59912.

[a]Modified Ultimates, Advance Equine, P.O. Box 507, Versailles, KY 40383.

[b]Advance Cushion Support. Advance Equine, P.O. Box 507, Versailles, KY 40383.