

Life after Equine Laminitis

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When laminitis leads to permanent changes in a horse's hoof, veterinarians and farriers team up to preserve his comfort and soundness through targeted treatments.



Farriers use a variety of shoes and pads to help keep a horse comfortable as he recovers from laminitis. Photo © EQUUS Magazine. All Rights Reserved

The more researchers learn about laminitis, the clearer it becomes that it's not a disease just of the hooves. The events that culminate in the inflammation of the soft tissue of the feet usually begin in the digestive tract or even the endocrine system. Horses who are prone to laminitis also typically have characteristic traits evident far from the feet, such as fat pads over the withers or large, cresty necks. Indeed, to understand the causes and earliest physiologic processes of laminitis, you need to look at the entire horse, not just his hooves.

Nonetheless, when a horse is diagnosed with laminitis, it's his feet that require the most attention. That's because by the time a horse begins showing clinical signs of laminitis, the tissues of his hooves may be so damaged that they give way, releasing the coffin bone from its moorings to rotate out of position or "sink" downward to and even through the sole of the hoof. This change in the hoof anatomy, commonly known as founder, can be devastating.

Intensive hoof care, however, can help mitigate the pain associated with these changes as well as halt the damage. No trim or shoe can restore the hoof to its original condition, but a treatment approach devised by a veterinarian and farrier can be the difference between a sound, useful life and eventual euthanasia for a horse. A successful treatment plan will likely combine specialized trims and therapeutic shoes and will need to continue for months as the hooves recover. In some

cases, a horse may require lifelong therapy to remain comfortable and sound. Knowing what's involved with post-founder hoof care can help you be prepared to do all you can to help your horse.

Damage assessment

In the immediate aftermath of a laminitic episode, a farrier or veterinarian will formulate a treatment plan based on how much damage has been done to the hooves. Hoof testers and an experienced eye are helpful, but they are no substitute for radiographs. "I take x-rays to see how much rotation there is," says Tia Nelson, DVM, a veterinarian/farrier in Helena, Montana. "These can be useful to have as a baseline, a starting point. If we need to, we can refer back to those first x-rays to see if we are making progress or are still at ground zero."

In the best-case scenario, an x-ray reveals no movement of the coffin bone, which means the laminitis did not progress to founder. Once the acute inflammation dissipates, a full recovery is possible without any specialized hoof care. Unfortunately, many laminitis cases don't unfold that way, and the radiographs become a tool for determining the extent of the resulting founder.

Radiographs also provide a basic blueprint for shoeing, says Scott Morrison, DVM, a veterinary podiatrist at Rood and Riddle Equine Hospital in Lexington, Kentucky: "Knowing exactly where the bone is will tell you where the breakover needs to be, how much heel to take off, how much wedge you need. Without radiographs you are guessing. Unfortunately, there are circumstances where radiographs won't be possible. Then you are working under compromised conditions. A farrier who has worked on hundreds of chronic founder cases can probably look at a foot and draw a picture of where that coffin bone is in the foot and be pretty close, but even then a person can be fooled occasionally. I still shoot radiographs because it's good insurance---to know exactly how the coffin bone is sitting---and it may also show any other pathology that might be there."

There is no standardized scale for grading founder so the terms individual veterinarians, farriers and horsemen will use can vary. (You may hear the word "chronic" used along with "founder," but that's a redundancy. Chronic, in medical parlance, means long-term and not likely to be resolved. Laminae do not regrow. Damaged tissues may heal to strengthen the attachment of the bone to the hoof wall, but dead laminae are gone forever and a bone moved out of place permanently alters the internal conformation of the hoof. All founder then, by definition, is chronic.)

Morrison puts founder into three categories: "low grade," "stable" and "unstable." The category a horse falls into will depend upon the changes seen in the hoof and provide guidance on how to best manage them.

Low-grade founder: It's all about sole

This insidious type of founder develops slowly over the course of months or even years, usually as a result of metabolic imbalance or neglected hooves. "A low-grade case of founder is sometimes misdiagnosed as just a bad-footed horse," says Morrison. These horses may have never had an acute episode of laminitis to draw the attention of caretakers. They may never even seem lame. Instead, they may simply seem "ouchy" for a few days in the spring or appear to

have a preference for softer footing. Often the problem isn't even suspected until radiographs are taken.

The exterior of the hoof with low-grade founder is likely to appear normal, but a close look at the bottom of the foot and radiography reveal minor but important changes. "Usually the white line is stretched at the toe, making the horse more prone to white line disease," says Morrison. "When you radiograph these feet there may be a degree or two of coffin bone rotation."

Fortunately, he says, hooves with chronic low-grade founder are fairly easy to manage by just improving the condition of the sole, which in turn supports the coffin bone: "If the horse has thin soles that are easily bruised you may just need to thicken up the sole depth. Sometimes just shoeing with a regular keg shoe, a wedge and a rolled toe is all that's required to help the sole become stronger and thicker." Morrison usually uses glue rather than nails to apply the shoes for the first two or three shoeings. Once the sole is thickened, he lets the horse go barefoot and rolls the edge of the hoof walls.

"Where the sole meets the wall it is fairly tough and strong, compared to the inner central part of the sole. The perimeter becomes calloused and strong," Morrison explains. "With this process of letting the sole thicken by first protecting it with shoeing, the feet grow out beautifully. The cracks in the wall grow out and the foot becomes shiny and healthy rather than dull and shelly; the integrity of the wall changes."

Julie Bullock, DVM, of Mount Sidney, Virginia, adds that frequent trimming is paramount in these cases, because it keeps the toe short to ease breakover. "Some of these horses grow very little sole, so they are often sore. Sometimes I put them in boots that can be taken on and off with Velcro. Those boots can be used intermittently, depending on the footing," she says. "Ideally, you want to get the horse to where he can go barefoot. That's easier on the horse and the pocketbook---just doing frequent trimming to keep the feet short and at the proper angle."

Travis Burns, a lecturer and farrier at the Virginia–Maryland Regional College of Veterinary Medicine, says it can be helpful to use sole and frog supports in low-grade cases of founder until the sole naturally thickens. "Chronic laminitic horses that have adequate sole depth do very well, but if they lose their sole depth they become uncomfortable and tender very quickly," he says. "You can create artificial sole depth, using things like packing or silicone pads. If you are lucky, the horse can grow more sole himself, after a while."

Stable founder: Out of rotation

Cases of what Morrison describes as "stable founder" typically have mild rotation or movement of the coffin bone due to persistent low-level inflammation of the tissues. Like low-grade founder, the condition doesn't arise from a single carbohydrate overload after a raid on the feed room, but instead from an underlying physiological problem that continually stresses the structures of the hoof. Nor are these horses likely to have an episode of acute pain, but they are more likely than horses with low-grade founder to be continually tenderfooted and "off." Stable founder is also more likely to produce exterior evidence of the damage being done inside the hooves.

“There is more hoof capsule distortion than in low-grade cases. The heels grow faster than the toe, and there are founder rings around the hoof. There’s more dishing at the front of the foot, and stretching of the white line,” says Morrison. “This is the typical foot you’ll see in a horse with metabolic syndrome.”

Radiographs will reveal rotation of the coffin bone, caused by the pull of the deep flexor tendon. The rotation isn’t typically progressing, hence the term “stable,” but is still the primary consideration in mapping out a shoeing protocol. “One of our major shoeing goals is to decrease the pull of the deep digital flexor tendon and rehabilitate those feet,” says Morrison. “Therefore, the shoe requires some degree of wedge at the rear and also a rolled toe, to take some of the stress off the laminae during breakover.”

Even when an underlying metabolic problem is controlled through management changes, stable founder will persist and require continual care. “Usually those feet can’t get to where they can go barefoot,” says Morrison. “The majority of them need to stay in some type of shoe because the laminae are more compromised. The foot needs more protection and you need to keep the coffin bone at a better angle.”

A common and time-honored shoeing technique in these cases is a standard shoe tacked on backward, says Paul Goodness, a farrier with Forging Ahead in Round Hill, Virginia: “Some people may use a reversed shoe to provide support across the heels without putting pressure on the toes. The toe area is usually painful for about three months and incapable of being a weight-bearing structure. So we concentrate support on the back part of the foot--the frog and the heels--any area that is not painful. This gives the damaged laminae in that area some relief.”

Other styles of shoe perform the same function. “We do this with many different types of shoes, such as an egg bar, heart bar or anything that provides support across the back of the foot,” says Goodness. The exact shoe will depend on the specific situation, but some aspects of the technique are universal: “The ground surface of the shoe must be beveled appropriately, for easy breakover, to relieve some of the stress on the front of the foot when moving forward, or help prevent shearing of the laminae when the horse turns,” he says.

Whether it’s better to use nails or glue to attach the shoes depends on the quality of the horse’s wall, says Morrison: “If the foot is very sore, the horse may not tolerate nailing. Low-grade foundered feet tend to have very thin walls. I often glue the shoes on those. By contrast, many of the stable founder cases are Cushing’s horses or have metabolic issues, and some of these individuals have good, strong walls, especially ponies, Andalusians, Arabians and Morgans. These hardy horses usually have strong, good-quality feet and hoof walls, and you can nail the shoes on when correcting the rotation. But if an individual is painful you should glue the shoe instead--at least for a couple of shoeings until the feet are more comfortable.”

Whatever the approach, horses with stable founder need frequent farriery work to make sure the hoof doesn’t grow too long, which would put more leverage stress on the foot. “Those horses tend to get more out of balance than a normal foot would between each trimming/shoeing,” says Morrison.

You'll know when the shoeing is correct by looking at the growth rings on the foot. Foundered feet typically have wide growth rings at the heel and narrow rings at the front because that hoof horn grows more slowly there. "When you get the shoeing mechanics and hoof angle just right, you start to see the hoof wall growing out more evenly, heel to toe," explains Morrison.

Unstable founder: All hands on deck

In unstable founder, the foot has sustained significant structural damage that will worsen without intensive intervention. These cases typically occur in the aftermath of an acute laminitic episode, such as one brought on by an overload of grain or systemic illness, but they are also seen in horses whose minor founder went untreated and was exacerbated by poor hoof care or metabolic imbalances. In any case, growth centers of the foot are so severely compromised that growth of the sole, wall or both stops.

A horse with unstable founder is likely to be very lame, and radiographs will reveal dramatic rotation of the coffin bone, which may even also drop down to or through the sole ("sinking"). And, because the hoof is so compromised, the damage escalates quickly. "These horses are best treated by a veterinarian and farrier who specialize in these cases, or by an equine podiatrist---a veterinarian who specializes in foot problems," says Morrison. "With such help, the unstable cases often can be stabilized and rehabilitated back to pasture soundness or even low-intensity riding."

Standard treatments of unstable founder incorporate the techniques used in the low-grade and stable cases---including increasing sole depth and supporting the hoof heels while taking pressure off the toe---but with fewer guarantees. "There is a limit to what can be done with shoeing, if the pull of the tendon is overpowering, so we have to try something else," says Goodness.

In unstable cases, it's critical that farriers and veterinarians work together closely, combining skills and techniques to help the horse. For instance, says Goodness: "The veterinarian will often use something like Botox to lessen the pull of the tendon by temporarily paralyzing the muscle/tendon. The Botox is generally injected into one of the deep flexor muscle bellies and it temporarily weakens them, which reduces the pull from that tendon. Effects of the Botox seem to wear off in about six months. This may give the farrier a window of opportunity to correct the rotation and realign the coffin bone so the horse can regrow a new hoof capsule down around it."

A more drastic approach is to cut the deep flexor tendon. "This also gives the farrier quite a bit of time to get things straightened out," says Goodness. "Eventually the tendon heals and reattaches and often, the horse progresses and his feet and tendon heal so he can be turned out or sometimes even used for light riding. A certain percentage, however, develop some scar tissue and adhesions around the surgical site. If that happens, the horse may have limited athletic ability because the tendon doesn't work quite as well anymore."

Research into rehabilitating the hooves of horses with unstable founder continues: "One of the newer things some people have been trying on severe cases is injecting the foot with stem cells," says Goodness. "The jury is still out on that, but the early information indicates that this may be a useful treatment, especially for sinkers. We are still learning about this treatment possibility,

but in the future this may become a good weapon to add to the arsenal for treating chronic founder.”

No matter where it starts within a horse, laminitis that progresses to founder takes the harshest toll on his feet. That’s why hoof care is such an important cornerstone of treating, rehabilitating and maintaining horses who have foundered, and why it continues to be an area of intensive research for both farriers and veterinarians. Until a way to prevent laminitis entirely is found, the best defense against long-term debilitation will remain focused on the feet.