

Optimizing Laminitis Treatment by Understanding the Morphology of the Affected Hoof

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Hoof distortion can be the part of hoof management that is misleading to many farriers and hoof care practitioners. It can keep them from clearly seeing what needs to be done with the foot to properly prepare it for normal shoes, as well as feet with lameness issues. More often, misreading the foot that has become slightly distorted and **shoeing to that distortion** seems to be the cause of many of the more common foot and performance problems. Hoof distortion in non-laminitic feet can be caused by neglect, or by trying to manage mismatched feet and not fully understanding the needs of each foot as an individual, or having a sense of what is normal for each foot. Laminitis offers separate challenges when it comes to hoof distortion. Fortunately, laminitic feet all seem to end up looking similar, which brings up a special focus on mother nature's response to the laminitis disease in trying to provide foot function to save the horse's life. For example, the chronic laminitic foot evolves through the remodeling process by growing taller heels, a very prolific frog, and bars that become straight and more vertical. Occasionally the bars will connect around the apex of the frog to form an inner hoof wall. This remodeling that occurs in the caudal part of the foot is consistent with the way all laminitic feet distort, whether they are feet that rotate or sink. A close look at the structures involved in the remodeling process show that there is something deliberate and constant with the remodeling of the bars to form an inner hoof wall below a sole that conforms to the coffin bone inside its distal border.

Horses that rotate are those that have lamina separation limited to the dorsal lamina, which results in vertical descent of the anterior portion of P3. Lamina in the caudal portion of the foot is usually not as affected in horses that rotate; therefore the lateral cartilage and palmer process of P3 maintain a relatively good relationship to the hoof capsule.

Horses that are viewed as sinkers have lamina damage that involves the dorsal lamina as well as the lamina in the caudal portion of the foot. Frequently, the coffin bone does not rotate, but becomes displaced distally (downwards) as a result of normal weight bearing with complex lamina damage.

It is common to see horses seek out soft sand or deep bedding to cushion the sole during the painful acute phase of the disease. With that, Podiatry foam, Styrofoam, Impression Material, rolls of gauze, and Lilly Pads have become useful in providing cushion and support early in the syndrome. Horses that stand in a camped forward position and load the back part of their foot are generally the ones that are rotating. Two things appear to be happening. They are loading the least painful part of their foot, and unloading the painful area over the sole ahead of the frog apex. And, by tipping the foot forward, they are helping to release tension on the deep digital flexor tendon which seems to be resulting from foot pain. Therefore, a hoof care treatment through the chronic phase **may require mechanical adjustments** to account for the stance needs seen early in the syndrome.

Horses that are sinkers also seek out cushion material to stand on to support the bone column. The stance however is quite often different in that they are commonly seen standing with their legs vertical or behind a vertical line, rather than camped forward like ones that rotate. Generally the lamina in the caudal part of the foot is released very close to the same time as the dorsal lamina, which results in equal pain throughout the whole foot, hence the more vertical stance. In some cases the sole ahead of the frog apex will actually be less painful due to rapid lamina tearing and possible nerve damage, which leaves it more vulnerable to severe damage because of lack of sensation. In these more serious cases, the frog and heel portion are more painful because the lamina is separating at a slower rate because of the availability of support via the use of the frog and digital cushion. Because the lamina is not tearing as rapidly, the nerve supply does not generally become as damaged, hence they are able to feel the real pain in the back part of the foot. This can account for the stance behind a vertical line, which helps to unload this more painful rear portion of the foot. Basically, standing behind a vertical line seems to

indicate the more serious and complex conditions. Frequently, the entire sole is released as well, once the wall has separated. The wall will re-attach in many cases by scar tissue created by the serum secreted at the coronary band from severe vertical displacement. The lamina in the caudal part of the foot will repair first in all cases of sinkers. Because the caudal lamina recovers before the dorsal lamina is adequately healed, mechanical adjustments may be required which are similar to that of cases that rotate. In any event, the cushion, support and protection provided by the use of Styrofoam, Podiatry Pads, etc., properly applied to the bottom of the foot are required.

The reconstruction of the foot will begin with the frog, which is extremely fast to respond when the external sole and frog separate. The bars are next to reform, and the sole above the bars follows closely to rebuild. This caudal segment of the foot that responds rapidly will be the main focus for intricate hoof preparation so that a continued foundation is available for whatever hoof care treatment that is used. A selection of treatment protocols that have been met with success include: backwards shoes, Heart Bars, Steward Clogs, the EDSS, the 5S System, Memphis bar shoes, and leaving the horse barefoot in certain instances. The most important aspect of whatever treatment approach you use is you **MUST** obtain the proper hoof preparation guidelines for that system. I can't stress that enough. The majority of the time any one of these systems has failed it is because the user failed to get the foot prepared correctly and apply the apparatus in the manner in which it was designed.

When treating laminitis, certain mechanical principles must be addressed as we look at most of the treatment systems available. Support to the caudal region of the foot and protection to the fragile border of the P3 are the primary objectives. Providing a way to promote freedom of movement, anterior breakover, and lateral-medial breakover, are issues that must be considered as well. If the treatment we as practitioners provide will compliment the way Mother Nature modifies the foot through the disease process, a higher level of success can be attained regardless of the particular treatment system used.

Protocol for a Dorsal Wall Release

With chronic cases that become troublesome, it may require special attention when they exhibit reluctance to land heel first, or when flexing the foot is painful. In these cases the coffin bone is usually displaced (dropped) more than 5/8" from the coronary band, and the distance from the dorsal surface of P3 is less than 15mm from the marker at the coronary band, or if reoccurring acute laminitis has taken place. A dorsal wall release has proven to be helpful in these cases as well as when the coronary band is shown to have a noticeable inset ridge, seeming to strangle the vasculature of the coronary band. The procedure is a combination of vertical grooving, horizontal grooving, and a dorsal wall resection without removing the released section. The released section is left in place to preserve moisture and flexibility of the dorsal lamina, yet allows the dorsal wall to grow straight down without distortions. *(It is important to note that a dorsal wall release should be done under the supervision of a veterinarian, and if possible should be discussed with an experienced practitioner prior to execution of the procedure. It is equally important to obtain complete instruction on this procedure, as well as any other invasive procedure, prior to execution of the procedure.)*