Remedial Farriery Part 2: Managing acute laminitis

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ABSTRACT: One of the key aims when managing the acute laminitic is to provide digital support. This can help prevent further damage occurring within the hoof as well as assisting in pain relief. This article describes options available when dealing with an acute laminitis case and the theories and applications behind them. The farriery management of the chronic laminitic will form a separate article in this series.

INTRODUCTION
Laminitis is a devastating condition affecting Equids worldwide. There are a number of causes of laminitis but the most common seen in the UK is pasture-associated laminitis. Laminitis can occur in all four digits as it is usually an orthopaedic manifestation of a systemic disease. Most often the clinical signs are seen predominantly but not exclusively in the forelimbs, however, clinicians should be vigilant for those rarer cases in which the hindlimbs are the most severely affected. In the acute stage, laminitis is characterised by inflammation and separation of the epidermo-dermal junction within the hoof leading to biomechanical weakness, vascular compression and acute pain (Fig. 1). With loss of support of the dermis within the hoof capsule, rotation, or in more severe cases, dropping of the distal phalanx can occur, further exacerbating the problem and contributing to severe pain.

Classical clinical signs include increased digital pulses to the feet, rocking back stance, stiffness, pottery gait and, in severe cases, recumbency. Examination of the hoof may reveal increased heat, bruising/hæmorrhage around the dorsal toe and pain in that region using hoof testers, and in some cases, prolapse of the dorsodistal aspect of the distal phalanx through the sole (Fig. 2).

In many acute cases there may be no visible sign of physical changes in the hoof or sole but the horse or pony may be very painful. Palpation above the coronary band may reveal an abnormal gap immediately proximal to the coronary band in cases where the distal phalanx has dropped in the hoof capsule. Radiography is important to assess the

Fig. 1: Sagittal section of the equine digit of a horse with laminitis. Separation and rotation of the dorsal aspect of the distal phalanx from the dorsal hoof wall is visible. Note the compression of the proximal aspect of the hoof in the region of the coronary papillae (white arrow) just below the coronary band.

Fig. 2: Lateromedial radiograph of a 7 year old horse with acute laminitis of the right fore showing both rotation and sinking. Note that the dorsodistal aspect of the distal phalanx is prolapsing through the solar margin.
relative position of the distal phalanx in the hoof capsule and all four feet should be imaged if possible (Figs. 3a and 3b), but occasionally no rotation or sinking may be present despite the presence of acute laminitic pain. Further diagnostic information may be obtained by repeat radiography over a 14 - 21 day time frame to ascertain if changes are taking place or alternatively if the distal phalanx is stable.

The key aims for managing the acute laminitis case are early identification, treating the primary cause, providing adequate pain relief and suitable digital support. This article primarily deals with the latter although by providing suitable digital support this in itself will often assist with pain relief. It should however be emphasised that underlying causal management factors, in particular obesity, must be addressed as the chief part of any treatment protocol if a successful outcome is to be achieved.

Fig. 4 is a schematic diagram highlighting the forces acting on the equine digit and consideration of these is important in providing the most effective digital support.

Fig. 5: Lateromedial radiograph of a 12 year old pony with acute severe signs of laminitis. There is marked rotation of the distal phalanx in relation to the dorsal hoof wall. Modelling of the dorsodistal margin of the distal phalanx suggests previous episodes of laminitis. In this case a shoe is present and it was decided that removal of the shoe would lead to further deterioration of the clinical signs.

**OPTIONS FOR DIGITAL SUPPORT IN THE ACUTE LAMINITIC**

**Shoe removal**

One of the first decisions to make with regard to digital support is whether to remove or leave the shoe on. In a number of cases the animal is unshod but when a shoe is present, the aims of providing digital support in the acute laminitic may indicate removal of the shoe and placing alternative support to achieve that goal. However, in many cases where the horse or pony is acutely painful it may be inappropriate to remove the current shoe, since trauma and pain associated with the act of removing it may worsen the clinical signs (Fig. 5). Additionally the shoe itself may be acting in a supportive fashion through the hoof as well as reducing ground pressure through the sole. In these cases it may be appropriate leave the shoe in place and to provide alternative digital support (e.g. deep
bedding, frog support/impression material) until the horse becomes more comfortable before deciding on other options for digital support.

Raising the heels
Although potentially appearing counter-intuitive, raising the heels can provide pain relief and reduce the tension from the deep digital flexor tendon in acute laminitis. Placement of a heel wedge or pad over the caudal half of the foot, securely fastened, although it may not initially assist in supporting the digit per se, may provide pain relief and reduce the risk of further separation at the epidermo-dermal junction from tension in the deep digital flexor tendon in the very acute stage. It is important, to ensure that the toe is well protected to avoid excessive force through this region.

Bevelling the toe
Judicious use of a hoof rasp to gently remove the dorsal toe, if it is excessively long, will reduce the lever arm acting through the dorsal hoof wall and thereby potentially reduce the result of tension on the epidermo-dermal junction. Care has to be taken to prevent excessive removal of the dorsal toe/wall as this may lead to instability and should always be performed in conjunction with other methods of digital support described in this article.

Lily pads
Lily pads (Therapeutic Equine Products, Kentucky, USA) are made from urethane rubber material and serve as a caudal extension and provide a mild heel wedge effect (Fig. 6). They can be easily taped in position and should not extend beyond the apex of the frog. Their design, however, may only result in mild digital support being achieved and have been, by and large, superseded by other forms of digital support.

Styrofoam pads
Styrofoam pads (Total Foot Protection Ltd, West Sussex, UK) are a popular choice in providing digital support in the acute laminitic (Figs. 7a and 7b). The principle behind the use of foam pads is that the first pad placed (ideally) will compress and conform to the shape of the sole under the weight of the horse or pony. The first pad is then removed and the dorsal third taken away (cut or rasped) such that the pad is replaced so that it is in contact with the caudal two-thirds of the foot. A second pad is then placed resulting in the weight bearing surface being transferred to the caudal sole, the frog and bars and away from the dorsal wall and toe regions. They are relatively easy to use and inexpensive and are available in a number of sizes. However, occasionally they can be difficult to maintain in position and may not result in the desired effect in some cases, usually small ponies (insufficient weight to compress) or large horses (pads not large enough or collapse too quickly). Care, however, must be taken in selecting appropriate cases for treatment with Styrofoam pads – those with dropped soles or imminent distal phalanx penetration are not suitable for this form of digital support.

Impression material
The use of silicone putty in the sole (e.g. Newmarket sole support: Newmarket Premixes Ltd, Essex, UK) has become increasingly popular in recent years (Figs. 8a and 8b). These were initially developed from using dental impression material, and this is still used today. The principle behind its
use is again to result in increased caudal support of the foot and hence increased weight bearing at the caudal sole, frog and bars. An activator (e.g. polysiloxane) is added to the putty and then the material is applied to the region (with or without the presence of shoes) and once cured, can be taped in place. Its use can therefore provide good support if the decision is made to leave the shoe in situ. A variation on this is the use of impression material combined with pads (e.g. Stable Support System: Total Foot Protection Ltd, West Sussex, UK).

**Glue-on shoes**

With the advent of stronger and advanced glues, the use of glue-on shoes has become manageable in horses where traditional securing of the shoe with nails was not appropriate (Fig. 9a). In the acute laminitic it affords a way ofatraumatically attaching a shoe to the foot. The Imprint shoes (Imprint Equine Footcare, Wiltshire, UK) have been developed for laminitis treatment, are available in a range of sizes and can be moulded directly to the hoof using polymethyl methacrylate and urethane glues. In-filler material, (for example Equithane: Vettec Hoof Care Products, Utrecht, NL) can also be applied to the caudal two-thirds of the sole in conjunction with the shoe (Fig. 9b) to increase caudal support.

**Foot casts**

The use of casting material around the foot to stabilise the hoof and create a wedge has been described in providing support in the acute laminitic. This method has been shown to transfer load to the quarters and reduce the strain on the deep digital flexor tendon.

**ADDITIONAL COMMENTS**

This article describes options available to the veterinary surgeon and farrier when treating a case of acute laminitis. Each case should be fully assessed and treated on its own merits since the use of some options may be more relevant than others. Additionally, monitoring the case in response to the digital support method chosen is important and changing to different techniques when appropriate to do so is also important. The overall aims in the acute laminitic are to stop further mechanical damage and provide support during the acute phases. By using sound biomechanical principles based on the particulars of the clinical case and applying that support in the correct fashion should achieve these goals.