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Managing the Critical and Complicated Laminitis Case From a Podiatry Perspective

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Take Home Message—Critical and complicated laminitis cases carry a poor prognosis and are very costly to treat. Many of these cases will have secondary complications and will require extensive nursing care. Client communication and education is extremely important.

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I. INTRODUCTION

MANAGING the critical and complicated laminitis case is one of the most challenging aspects of working in equine practice. Caring for the horse and its wellbeing is the primary goal of the veterinarian. However, clinicians have to also weigh the client's needs and abilities when providing care for these cases. As veterinarians, we should always offer the best level of medical care to the clients. It is also the veterinarian's responsibility to educate the client on what will be involved with dealing with critical laminitis cases. This includes financial obligations, nursing care, recovery time, and the prognosis of the patient. Ultimately, it is the client's decision as to how and what treatment options are chosen. This paper will discuss aspects of managing critical laminitis cases from a podiatry standpoint.

II. DISCUSSION

Diagnosing and treating the underlying cause of laminitis while providing supportive care to the patient is paramount. The initiation of laminitis may be due to a multitude of causes but the exact pathophysiology is still not fully understood.¹ A laminitis case becomes a critical case when one or more limbs are severely compromised and has radiographically evident displacement of the coffin bone within the capsule. This may be distal rotation of the coffin bone, distal displacement (uniform or uniaxial), or a combination.^{2,3} Oftentimes, these cases develop secondary complications such as shear lesions of the coronary band, sub-solar seromas, abscesses, and pedal osteitis/sepsis. The unstable chronic laminitis case is characterized by continual displacement of the pedal bone with compression of growth centers and is most at risk.²

Some type of therapeutic farriery almost always accompanies initial treatment of laminitis.⁴ This may be as simple as taping foam blocks to the bottom of the foot. In cases of laminitis in which there is distal rotation of the coffin bone, a wedged shoe and heavy rolled toe are beneficial to reduce the tension of the deep digital flexor tendon.^{5,6} In cases of severe coffin bone rotation in which the sole is prolapsed below the solar surface or the coffin bone has penetrated the sole; much care should be taken to protect and unload the compromised solar region. Applying a wedged shoe and aggressively rolled/rockered toe and loading the caudal aspect of the foot while preventing focal pressure over the compromised solar region can help manage these cases.⁶ If the solar region is overloaded in the compromised horse, avascular necrosis is likely to result. In the author's opinion, a treatment plate or access point to the solar region is very helpful due to the many complications that occur in that region. When the coffin bone has penetrated the solar surface there is grave concern of the exposed portion of the pedal bone becoming septic; therefore, it is necessary to protect and medicate the compromised area. Sterile larval debridement therapy has been successfully used in these cases as an adjunctive treatment.⁷ Additionally, distal regional limb perfusion with antibiotics has been shown to be beneficial in resolving sepsis of the third phalanx.⁸ Ultimately, the goal is to allow the tissue to heal, cornification to occur, and new sole to grow. Unfortunately, therapeutic shoeing and supportive medical management does not always help these cases and the decision has to be made to end treatment or perform a deep digital flexor tenotomy. This is considered a salvage procedure and the client must be made aware that the horse may be, at best, sound for pasture/breeding or very light use. The decision to perform the DDF-tenotomy is usually made following failed attempts to stabilize and improve comfort for the patient through therapeutic farriery.⁹ However, personal experience has proven earlier execution of this procedure to favor a successful outcome. Although it is possible to salvage a horse with severe coffin bone rotation that has penetrated the sole through therapeutic farriery alone, the author's opinion is that a DDF-tenotomy should be performed immediately to facilitate the healing process before the pedal bone and capsular structures are further compromised. Case selection for this procedure is extremely important and the practitioner must consider things like solar penetration, chronicity/severity of pedal bone disease, sinker syndrome, and number of limbs

affected when making the decision. Shoeing protocol of the affected limb for DDF-tenotomy is, in the author's opinion, equally important as transecting the deep flexor tendon itself. Realignment of the solar margins of the coffin bone back to zero or slightly positive palmar/plantar angle while allowing ample caudal extension of the shoe are two necessary principles of the shoeing that accompanies the DDF-tenotomy.⁹

Sinker syndrome can manifest in several forms. Possibly the most common form is unilateral displacement to the medial side and is often seen in the forelimbs. This may be associated with the normal center of force loading being slightly medial to midline. This results in more tearing of the medial compared to the lateral lamellar connections.¹⁰ Lateral unilateral displacement is more often seen in the hind limbs if laminitis is caused by an overload situation or support limb laminitis. Similarly, this may be due to the way horses load the hind limb with the center of force just to lateral of midline. Also, when non-weight bearing hind limb injuries occur, the horse will bear all weight on the contralateral limb and position that limb directly under the center of the pelvis. This creates an overloading effect on the lateral aspect of the hoof capsule of the supporting limb. Therefore, when the hind supporting limb becomes laminitic, it is more likely to displace laterally.¹¹ Complete distal displacement of the digit is also a manifestation of laminitis referred to as "sinking".^{2,3} In the author's opinion, true sinkers are more often seen in situations of systemic disease such as Potomac Horse Fever and endotoxemia. In these situations, it is not uncommon for all four limbs to displace distally. The presence of a distinct palpable ridge at the coronary band-hoof wall junction is characteristic of sinking.¹² Radiographs are very helpful in assessing displacement of the digit. Routine standing medial to lateral views along with standing horizontal dorsal palmar/plantar views are necessary. Often, there is a component of distal rotation of the coffin bone along with sinking.³ These cases are very complicated and carry a poor prognosis. The author has had the most success applying a foot cast as described by Bras¹³ to the affected limb/s, then transitioning to a wooden clog or similar shoeing mechanics once the compromised lamina have grown down 50% of the vertical distance of the hoof wall. The foot cast provides two very important elements necessary for the sinker to recover: 1. The cast reduces unilateral loading and reduces shearing forces by eliminating collateral movement of the hoof capsule. 2. The doming effect applied to the bottom of the cast reduces torsional forces and allows the patient to choose the most comfortable position to stand.¹³ The foot casts are changed at 3-5 week intervals. However, this is primarily dependant on how well the patient wears the cast and if complications arise between resets. One of the most common complications with these cases is shear lesions of the coronary band due to the cessation of wall growth from the germinal center in the affected area. This devitalized area of wall then acts as a tourniquet and compresses the submural corium and causes inflammation of the coronary band and surrounding soft tissue. These areas often drain serosanguinous or purulent fluid and can be mistaken for submural abscesses that have vented at the coronary band. Maintaining coronary band

health is necessary to prevent further damage to future wall growth. A proximal hoof wall resection of the affected area is recommended when shear lesions develop. Using a Dremel or rasp, an elliptical groove can be made 1cm distal to the separated wall. This groove should extend through the wall and into the lamina. Then using a sharp sterile hoof knife and forceps the separated wall can be teased away from the capsule. A compression bandage with betadine-soaked gauze sponges is helpful to initiate the cornifying process of the prolapsed coronary band and submural corium.

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