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*Founder* - Jan 4th, 06

Laminitis and the Information Age A quick Google search at the time of writing produced almost 100,000 links about equine laminitis. This represents an enormous amount of information. It comes from all sorts of sources including veterinarians, farriers and horse owners. Unfortunately, there is no quality control on much of this information, and an enormous amount of it is personal opinion. Anybody reading these reports is likely to come away with many questions as well as answers because often the advice different articles offer appears conflicting. What causes laminitis? Is laminitis the same as founder? What type of emergency is laminitis? Must a horse with acute laminitis be treated with this drug or that drug? Should I take the shoes off of a horse with acute laminitis? Do I have to apply frog supports to a horse with acute laminitis? Should I soak the feet of a horse with acute laminitis? Should a horse with laminitis be stall rested or walked? What does it mean to support the boney column? Must I starve a horse with acute laminitis to make it lose weight and prevent recurrence or exacerbation of its current disease? Are all cases of laminitis the same? Does a horse with laminitis have to be shod in a certain way? Does laminitis always have devastating consequences? Unfortunately, many of these questions do not have definitive answers. However, over the last 25 years much has been learned about this disease, and it is the intent of this article to examine both this progress and some of the controversies that remain. What is Laminitis and What Causes It? Laminitis is a syndrome in which the epidermal and dermal lamellae within the hoof are damaged. If the damage to the lamellae is severe, the epidermal lamellae separates from the dermal lamellae and the distal phalanx displaces within the foot. Founder is a lay term that is considered to be a synonym for laminitis by veterinarians. Laminitis is considered acute when it has been present for less than three days and the distal phalanx has not displaced. Laminitis is considered chronic after the distal phalanx has displaced. If the disease has been present for over three days, but displacement of the distal phalanx has not occurred, it is considered sub-acute. When discussing the causes of the laminitis, it is necessary to differentiate between risk factors associated with the disease and the pathophysiology of the disease. Risk factors are factors that when present in the history of a horse indicate that the development of laminitis is a recognized potential sequel. Examples of such risk factors include colic, colitis, overfeeding on grain or lush grass and metritis. These are conditions that are frequently associated with endotoxemia. Additionally, there are other risk factors such as prolonged work on hard surfaces without adequate foot protection, often called road founder, prolonged weight-bearing on a single limb because of a problem in the contralateral limb, Equine Cushings Syndrome and injection of steroids. The pathophysiology of laminitis that occurs following systemic disease has been the subject of many studies, but is still not clearly defined. Theories over the last 20 years include diminished blood supply to the foot, endotoxemia and inflammation, abnormalities of coagulation and absorption of toxins. Currently, the balance of the evidence points towards a generalized inflammatory response to which the lamellae within the foot are particularly susceptible. It has not been determined whether this is related to the weight-bearing function of the foot or some other factor. How Do I know If My Horse Has Laminitis and What Should I Do? The principle symptom of acute laminitis is the acute onset of lameness. The severity of lameness varies greatly, from barely detectable, to a stiff gait, to being unable to move. The hooves are usually warm, the horse may be reluctant to pick up a limb and the digital pulses are pronounced. The horse may be breathing rapidly from the pain or the effort to walk. The disease most frequently affects both forelimbs, but any combination of limbs may be affected. If you suspect your horse has laminitis based on the sudden development of lameness that is evident at a walk that involves multiple limbs, you should call your veterinarian immediately. A veterinarian makes the diagnosis based on a physical examination. Radiographs at this stage in the disease may show no abnormalities, but are frequently taken to provide a baseline should the condition worsen. Laminitis is not a five minute emergency, nor is it a disease that should wait until the next day to be treated. Treatment in the first few hours can make an enormous difference. Horses with chronic laminitis usually have a prior history of the disease that the owner is aware of, but this is not always the case. Again the principle symptom is lameness, but horses with chronic laminitis usually have changes in the shape of their hoofs that include a dropped sole, concavity of the dorsal hoof wall, excessive heel growth compared to the toes and uneven growth rings. Additionally, radiographs demonstrate changes in the distal phalanx, the hoof capsule and the relationship between the two. Chronic laminitis is not usually an emergency, but an acute exacerbation of chronic disease may require prompt treatment. How Should a Horse With Acute Laminitis Be Treated? Treatment of horses with acute laminitis is divided into treatment of the precipitating disease if present, medical therapy and supportive therapy. Treatment of precipitating disease is beyond the scope of this discussion. Medical therapy is the mainstay of the treatment of acute laminitis. Unfortunately, of all the medications available that have been tried in acute disease, none have unequivocally been proven to be beneficial. Therefore, clinicians treat horses with acute laminitis based on extrapolation of the theories underlying the pathogenesis of the disease, knowledge about how these drugs affect normal horses, from in vivo and in vitro experimental models and their own clinical experience. These drugs are primarily

aimed at providing relief from pain, controlling inflammation, improving blood supply and preventing coagulation in the vessels within the digit. The author primarily uses phenylbutazone to control the pain and limit inflammation, acepromazine to improve the blood supply and DMSO also to limit inflammation. Of these, phenylbutazone is the only one that clinically demonstrates an obvious and immediate effect, but even the use of phenylbutazone is controversial in some quarters because the pain relief it provides encourages a horse to stand and/or move around. A sensible compromise is to use enough phenylbutazone to limit discomfort, but not to promote excessive use of the limbs. Other clinicians use oral isoxsuprine and topical nitroglycerine to increase digital blood flow, systemic aspirin and heparin to reduce coagulation within the digital vasculature, and pentoxifylline for its anti-endotoxic and rheologic effects. Additionally, flunixin (Banamine) or ketoprofen are used instead of or in conjunction with phenylbutazone. Supportive therapy is directed at limiting stresses that cause displacement of the distal phalanx and controlling limb edema. This is best achieved by removing the shoes if present and distributing the weight across the ground surface of the foot by standing on sand or peat, packing the soles of the feet with silicone putty or taping Styrofoam blocks to the bottom of the feet. It should be noted that not all clinicians agree with removing the shoes because of the potential risk for increasing the injury as the shoe is removed. If a horse does not respond favorable to these measures, the heels may be raised and the breakerover moved palmarly which is most easily achieved by applying a commercial cuff and wedge pad combination (Modified Redden Ultimate). Limb edema should be controlled with pressure bandages. Additionally, it appears that cooling the feet, usually by standing the horse in chilled water, limits lamellar pathology. However, soaking the feet per se is not considered desirable. A precipitating condition may dictate how an acutely laminitic horse is fed, but in the absence of such requirements, it is prudent to avoid feeding grain and provide good quality grass hay. Exercise is contra-indicated in horses with acute laminitis. How Should a Horse With Chronic Laminitis Be Treated? The mainstay of the treatment of chronic laminitis, in contrast to the treatment of acute laminitis, is supportive therapy in the form of corrective shoeing. There are many shoeing techniques that have been advanced for the treatment of chronic laminitis, each of which has its own advocates. These include heart-bar shoes, egg-bar shoes in conjunction with silicone putty or one of two commercial shoes, the Aluminum Four Point Rail shoe and the Equine Digit Support System. It is not possible to say one technique is unequivocally better than the others for several reasons. Firstly, there are no good controlled studies in the literature that compare the different techniques. Secondly, not all laminitic horses are the same because the morphological and structural changes in the feet differ between horses, suggesting that they require different treatment. Thirdly, individual clinicians have found different techniques to work for them. So rather than focus on the type of shoe, it is better to focus on the principles that are most likely to lead to recovery. Shoeing the laminitic horse should be done whenever possible with the aid of radiographs because the shoe should be positioned in relation to the distal phalanx, and not the shape of the distorted hoof capsule. The dorsal sole should not be trimmed thinner than normal thickness (about 15 mm). The ground surface of the foot should be realigned to the distal phalanx. The toe and breakover of the shoe should be moved palmarly to decrease stress in the dorsal hoof wall and ease movement. Part or the entire ground surface of the foot between the branches of the shoe is recruited for weight-bearing. If trimming the heels to achieve re-alignment of the distal phalanx increases the lameness, the heels of the shoe may be elevated. Each of the techniques mentioned above meets most or all of these objectives. Limited exercise may well be beneficial to the convalescing horse, but the return to exercise should be gradual and carefully monitored because the degree of comfort exhibited by a horse recovering from laminitis frequently belies the severity of the residual damage to the lamellae. Medical therapy is frequently necessary to control pain, and the most commonly used analgesic is phenylbutazone. For those horses with Equine Cushing Syndrome, treatment with pergolide or cyproheptadine is indicated, and the former appears to be more effective. Good quality grass hay should be provided, but it is recognized that this may not be sufficient so that a balanced complete ration may be added to the diet. There are many food supplements available that are purported to enhance the return of a more normal hoof, but there is no scientific evidence to confirm or refute their use. Surgery is occasionally indicated in the treatment of horses with chronic laminitis. Deep digital flexor tendon transection is indicated in horses that continue to rotate despite other therapeutic measures and in horses that have acquired flexural deformity subsequent to the disease. In horses in which the distal phalanx becomes infected, surgical debridement is indicated. Prognosis for the Laminitic Horse Laminitis is a devastating disease, but not all horses that develop laminitis are devastatingly affected. In fact, the severity of laminitis is highly variable, and the course of the disease equally unpredictable. Therefore, accurately predicting the outcome is difficult, but some generalizations can be made. The severity of the clinical signs in the acute stages of the disease reflects the severity of the lamellar injury, and therefore, at this stage of the disease the prognosis is inversely related to the clinical signs. However, some horses that exhibit severe lameness that do not develop displacement of the distal phalanx have successful outcomes. In horses with chronic laminitis the prognosis for both future athletic performance and survival has been correlated with the degree of rotation. However, in the author's experience the severity of the lameness, the angle of the solar margin the distal phalanx forms with the ground and the thickness of the sole are better guides for survival, but the degree of rotation that persists despite treatment is a fair guide for the return to athletic performance and the necessity for long term corrective shoeing. There are many reasons that the treatment for laminitis fails, and the greatest of these is the initial severity of the disease. However, inappropriate application of corrective shoes, premature return to exercise and not holding to regular shoeing intervals will all negatively impact the success of treatment. Additionally, the occurrence of complications such as sepsis of the distal phalanx and secondary flexural deformities of the distal interphalangeal joint worsen the prognosis. Summary Most of the research over the last 25 years is related to the pathophysiology of laminitis, and while the picture is incomplete, our understanding has been greatly advanced. Research into the treatment lags behind our understanding of the pathophysiology of the disease, but the latter is necessary to lay the groundwork for the former. However, collective clinical experience for the treatment of laminitis as a whole has increased, and there are many products, particularly shoeing or supportive devices, on the market that were not available 25 years ago. In the case of any individual horse, it is still necessary for the clinician to interpret each horse separately and incorporate personal

experience in the treatment.

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