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Laminitis

EMERGENCY FIRST AID and MANAGEMENT

The early intervention and protective effects of ice water can prevent the development and progression of laminitis.

by Dr. Jennifer Stewart

Of the dozens of treatments and medicines recommended for laminitis, the one you can do at home and that was listed in the US Cavalry Manual for Stable Sargeants in 1917, has the biggest impact on outcome — it's cheap, easy to apply and the necessary equipment is probably already in your hands!

The protective effects of ice water can prevent the development and progression of laminitis.

And today (even after over 2000 years of study) the only proven therapy to prevent acute laminitis is the application of cold water from the knees and hocks down to the feet.

DIGITAL HYPOTHERMIA (immersing the legs in an ice slurry) during the developmental phase can help prevent the progression of laminitis and is increasingly being recognised as being protective also for the prevention and treatment of this condition.

The major results of ice therapy are profound anti-inflammatory effects, pain relief (analgesia) and slowing of tissue metabolism – which reduces oxygen consumption by the damaged tissues and protects them from trauma and lack of oxygen. The reduced requirement of cooled cells for oxygen, glucose and other metabolites suppresses inflammation and enhances cell survival.

Laminitis changes are generally seen as irreversible, so prevention in horses at risk and halting the progression of acute laminitis are key areas on which to focus.

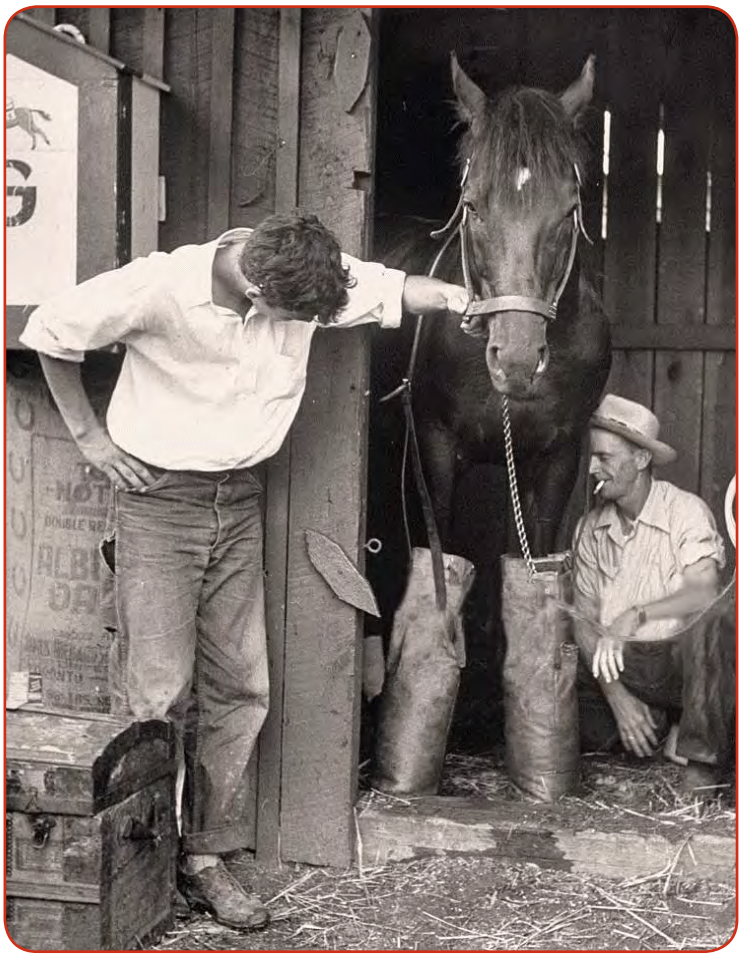
Most cases of laminitis occur due to metabolic disturbances secondary to high carbohydrate feed, hay or pasture. At risk horses and ponies should be watched carefully for a while every day, because the laminitis is often insidiously progressive and episodic, making identification of the developmental period difficult – and it is in this period that the greatest benefits of icing can be used.

ONSET AND PROGRESSION OF LAMINITIS

There are four stages in the onset and progression of laminitis:

- developmental
- acute
- subacute
- chronic - persistent mild to severe lameness, further mechanical collapse of the foot, recurrent abscesses, hoof wall deformation.

This old image shows a racehorse being given the treatment of cold water from the knees to the feet which, even today, research has shown to be the only proven way to prevent the progression of laminitis.



Developmental Stage

In the developmental stage of laminitis, the disease may originate in an area of the body far removed from the feet. Severe acute laminitis is a common sequelae to many diseases, including diarrhoea, foaling, metritis, pneumonia, colitis and tying-up. In these cases, it is easier to anticipate the development of laminitis and so prevention and early intervention are more possible.

The developmental phase usually follows or overlaps the insulting cause and lasts from around 24 to 48 hours. Then follows the acute phase, which generally lasts for one to seven days before resolving – or progressing to chronic laminitis. Subacute and chronic laminitis present differently – subacute laminitis does not involve collapse of the foot, whereas chronic laminitis does.

Acute Stage

The acute stage of the disease emerges with the onset of clinical foot pain. Along with foot pain, there is a bounding digital pulse; heat is present. It is imperative to institute therapy during the developmental stage if possible or at the first sign of clinical foot pain, as the window of opportunity for medical treatment is extremely small.

Continued

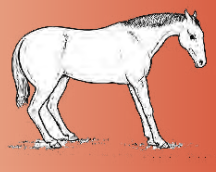
WHAT IS LAMINITIS?

There are several situations with horses that are known to result in the onset of laminitis including nutritional, hormonal and mechanical factors.

Laminitis (also known as founder) is an acutely painful and disabling condition, which occurs where the lamellae (a series of delicate folds of tissue inside the hoof wall) become inflamed and eventually tear apart.

The result is partial or total destruction of the strong, supportive bond that usually holds the inner wall of the hoof to the pedal bone (the furthest extent of the leg).

Degradation of the lamellae causes the pedal bone to become unstable within the hoof capsule (rotation and/ or sinking of this bone may subsequently occur) and as such this painful condition is usually recognised by the distinctive stance the horse adopts (forelegs stretched out in front, hind legs tucked under the body, and the horse's weight thrown back onto the heels to relieve the load placed on the toes).



Characteristic stance of a horse with laminitis in it's front feet.

Laminitist continued...

INTRODUCING DIY ICE THERAPY

However you can make the ice slurry is good. A 5 litre fluid bag secured with duct tape or any bag that will hold an ice slurry around the lower limbs and hooves is enough to cool the legs. The ice-water slurry should be refilled with ice every two hours as needed.

Commercially available wader-style boot modified to include the hoof will do the trick, as will a rubber ice boot to just below the carpus (knee) and hock.

Cold gel-wraps (4° C) for 30 minutes reduces surface temperature over the cannon bone for 3 hours – but the profound and sustained reduction in deep tissue temperature with iced-water immersion is far superior to cold-packs and wraps. Commercially available ice packs and cold-gel applications don't usually drop hoof temperature below 20° C. Although the pathophysiology of acute laminitis remains unclear, inflammatory and enzyme processes contribute to lamellar separation. Hoof wall surface temperature is usually 2-3 ° C lower than inside the hoof capsule. Based on current information, icing reduces hoof wall temperatures to less than 10° C. To achieve this, the hoof must be cooled as well as the limb – which cools the blood entering the hoof. Immersion of the

Commercial cold-gel boots reduce surface temperature to around 20° C however the hoof temperatures need to be less than 10° C to achieve benefits for laminitis.

The critical temperature for laminitis prevention has not been established, but even mild lowering of the temperature INSIDE THE HOOF should have some beneficial effect.

limb from just below the knees and hocks in ice + ice water achieves this – although it's labour-intensive, the benefits are worth it.

Profound continuous digital hypothermia (immersing the legs in an ice slurry) stops the progress of (ameliorates) laminitis when applied throughout the developmental period – and for a further 24-48 hours after the resolution of clinical signs of laminitis. In acute cases, continuous cryotherapy can be applied for seven days after the first signs of laminitis. Rewarming should be gradual – done over 12-24 hours.

Accurate measurement of the temperature of the lamellar in the foot is difficult.

CONCERNS WITH COOLING

The primary concern associated with profound cooling is the potential for damage to the ligaments and tendons – but studies have shown that even when the core temperature of the tendons is reduced to 10° C (22° C below the normal temperature), no detrimental effects were found. Continuous cryotherapy for 48 to 72 hours reduces hoof temperature to 5° C and no adverse effects have been demonstrated. Horses legs are very resistant to damage from continuous hypothermia – similarly, horses show no adverse effects in arctic environments when their legs are continuously immersed in snow. The cold-induced pain we feel when cryotherapy of >5° C is applied to our digits, has not been seen in horses.

If infection in the hoof is suspected (subsolar abcess, septic arthritis or seedy toe) cryotherapy should not be used because it will reduce the natural inflammatory response needed to fight infection.

BEDDING, TRIMMING AND SOLE SUPPORT

In the acute phase (lasting up to 1 week) it is essential to ensure the foot is appropriately trimmed. The toe should not be excessively long or the heels low — both of which can increase the forces that result in rotation. A bedding of deep sand will support the foot, as will packing the foot with a rubberised compound (plasticine etc.) that moulds to the shape of the foot and provides even pressure across the entire sole and frog. Anti-inflammatory selection should be made in conjunction with your veterinarian as no two cases of laminitis are the same. The horse should not be forced to move, but encouraged to lie down as much as possible to prevent overloading of the inflamed and fragile laminae – which connect the hoof to the pedal bone and support the entire weight of the horse. Providing cushioning for the damaged sensitive sole may require a shoe, glue-on pad, pour-in support or a hoof-boot – depending on the case, the shape of the sole (concave or flat) and the stage of laminitis. No boot fits every horse perfectly and daily monitoring for rubbing is essential.

Continued

In the acute phase of laminitis bedding of deep sand will support the hoof, and the horse should be encouraged to lie down.

Laminitis continued...

A diet for early-stage laminitic horses can include grass hay, beet pulp without molasses, magnesium oxide, vitamin E, linseed and Iodised salt, and this is divided into three feeds.

EMERGENCY DIET

Diet is also critically important in the early stages. Feeding laminitic horses can be a challenge, but there are some excellent resources that provide sound advice and shared knowledge by leading veterinarians and farriers. www.hoofrehab.com/HoofRehabProtocol.html or www.ecirhorse.org/

Dr Kellon, a veterinarian dedicated to equine nutrition and educating owners about equine health and the role of diet in the prevention and management of diseases, has developed an emergency diet for horses affected by laminitis. The diet provides short-term guidelines for people dealing with a horse that has suddenly developed signs of laminitis.

Emergency diet (total daily amount):

Grass hay : 1.5 – 2% of current body weight (soaked to remove sugars)
Beet pulp (unmolassed) : 0.5 – 1kg (rinsed); Iodised salt : 30 – 60g
Magnesium oxide : 10 – 15g; Vitamin E : 1000mg (iu); Linseed :100g
The total daily amount should be divided into at least three feeds per day.

NURSING CARE

Nursing care for horses that spend most of their time lying down requires tending loving care for mental health and daily activity when safe to do so.

Pain management is critical and your veterinarian can provide you with the best options for your horse. The thing about laminitis is that no two cases are the same so team work and good communication are essential. Working closely with your vet and farrier is

Continued

Laminitist continued...

important to assess current needs and monitor progress – both of which will need your observations on your horse's behavior and demeanor.

EXERCISE AND PHYSICAL THERAPY

Treatment is directed towards eliminating or minimising any predisposing factors, the judicious use of non-steroidal anti-inflammatory medications (NSAID), strict stall confinement and foot support that provides a biomechanical advantage.

Once the acute phase has passed, movement is necessary for physical and psychological health and is crucial for recovery from laminitis. As soon as the horse can be walked safely and comfortably without causing further damage to the foot, some form of exercise should begin. For horses that are sore and stiff, a few minutes of slow walking on a forgiving surface is enough to begin with. The goal is to gradually increase the duration and intensity as comfort and mobility improve.

Tension in the shoulders leads to tension in the back and in the flexor tendons down the back of the leg. Pain and stiffness can also be due to soreness throughout the body – especially the muscles and soft tissues of the shoulders, back and hindquarters – due to the horse's attempts to keep the load off their feet. As well as some gentle hand-walking, these horses benefit from some exercises and physical therapy. Gently lifting the forelimb and slowly, softly drawing it forward to extend all the joints in the limb is particularly helpful for relieving chronic tension all the way from the hoof to the back. This stretch can be performed 3 to 5 times with each leg, twice a day. The important points are to make the movement slow and fluid, stay within the horses comfort limits, keep the hoof close to the ground and in line with the shoulder – ie not to the right or left. Avoid being forceful or pushing the limits of the stretch as this can lead to muscle tearing and further pain.

Once the acute stage has passed the horse can benefit from some exercises and physical therapy for stiff and sore muscles. One exercise is to lean against the horse and gently shift its weight from side-to-side, front-to-back without moving its feet.

Another exercise is to lean lightly against the horses body and gently shift their weight from side-to-side, front-to-back, back-to-front and diagonally. The horse should sway ever-so-gently and slowly, without moving their feet. The movement should be a slow rhythmic rocking. It works with the elastic recoil of the tissues and has a massaging effect, reducing chronic myofascial tension and bringing relief after even one session. Play can also be beneficial not just for mental health but also for physical rehabilitation. If playing with other horses is not possible or advisable, you can bring a playful approach to the physical therapy and other daily interactions.

CONCURRENT MEDICAL ISSUE

Any medical conditions that may have caused or contributed to the laminitis event should now be addressed. The most common endocrine disorders are Cushings disease and equine metabolic syndrome (EMS). Enlargement of the neck crest is a physical characteristic of EMS because neck circumference and neck crests scores are negatively correlated with insulin sensitivity in horses and ponies. Horses with obesity and regional adiposity; prominent fat pads along the crest of the neck, above the tail head or in the sheath/ mammary region; are often described as 'easy keepers'. Increased load bearing by the feet increases the risk of laminitis in overweight/obese animals.

Horses with cresty necks and laminitis may also have thyroid problems. Poor thyroid function can also be secondary to a selenium deficiency. Selenium is necessary for the liver to activate thyroid hormone. Your veterinarian may advise testing for thyroid and selenium levels, and recommend a magnesium supplement. Cresty neck, laminitis and low thyroid function can also occur with Cushings disease and your vet may request blood insulin, glucose and cortisol testing.

Achieving a good outcome for the laminitic horse requires a dedicated team of veterinarian, farrier, and horse owner. working together.

Once the acute emergency is over and the laminitis stabilised, a correctly balanced diet should be fed – with provision for weight loss if required. Many horses with laminitis are especially sensitive to starch and sugars and care must be taken to feed a diet that meets energy requirements while keeping starch, sugars and non-structural carbohydrates (NSC) low. A NSC content of 10% or less is recommended. Information on safe hay and pasture can be found at http://www.safergrass.org

Dietary management, including a decision on whether or not affected animals should be allowed to return to pasture, is another important consideration. Obese, insulin resistant animals should be held off pasture for 2–3 months, allowing time for implementation of dietary restriction and increased physical activity that result in weight loss and improved insulin sensitivity. Hay with low NSC content (<10–12%) should be fed at 1.5% to 2% of body weight. An appropriate low starch supplement, fed at 0.2-1.0kg/day and fortified with biotin, anti-oxidants (vitamins C, E and K) vitamins, minerals (especially zinc, calcium, copper, iodine and selenium) and amino acids should be fed to support health and healing. One half to one cup of flaxseed or canola oil should be fed – introducing at around 50ml per day and gradually increasing over 7-10days. If the supplement does not contain adequate vitamin E, add 1-2iu of vitamin E per 1ml of oil.

Almost all our knowledge of laminitis and its treatment have been gleaned from experience and the accumulated findings and observations that describe the medical, ethical, financial and emotional challenges this terrible equine disease presents. A good outcome requires a dedicated team of vets, farriers and owners – who are usually the main care-givers for horses managed at home – and upon who's constant care, a good outcome is possible. In 1586 the recommended treatment for laminitis was *'…the skin of a weasel cut into small pieces and mixed with butter, a rotten egg and vinegar…'*. Fortunately today we have more scientific understanding which can be applied in the feedbin.

Dr Jennifer Stewart

BVSc BSc PhD MRCVS Dip BEP AAIM
Equine Veterinarian and Consultant Nutritionist

An equine veterinarian with over thirty five years' experience, Jennifer is also a consultant nutritionist and has formulated feeds, custom mixes and supplements for leading international horse feed manufacturers in Australia, India, Ireland, Japan, New Zealand, Philippines, South Africa, Thailand, Turkey and the UAE. Dr Stewart is passionate about equine nutrition and its role in the management, treatment and prevention of many equine disease and she is committed to bringing 'science to the feed bin'.
For more information visit **web: www.jenquine.com**