

Feeding After Laminitis (Founder)

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Many horse and pony owners often battle for months to restore the hooves and improve the gait following a bout of founder. Horses and ponies that have suffered a single, or recurring episodes of laminitis, or the more serious structural hoof changes associated with pedal rotation as in founder, require careful dietary management to reduce the risk of further episodes of founder, as well as to promote the re-growth of affected hooves as the animal recovers. A prior episode of founder increases the likelihood of further episodes as hoof structure and circulation is often compromised.

The Underlying Cause

Early Spring Founder

Winter grasses that are boosted in growth by warmer, early and wet Spring conditions after rain or irrigation, with cool nights and warm days, often become lush and highly productive. **Lush pasture, especially ryegrass, phalaris and fescue dominant pastures, are considered high risk pastures, as well as succulent, rapidly growing clover in pastures** in early Spring,

Handy Hint

Laminitis is most likely to occur in 'cresty', overweight horses and ponies suffering from underlying Equine Metabolic Syndrome (EMS) and pre-Cushing's Disease with a glucose intolerance and insulin resistance similar to Type II diabetes. It does not take very large amounts, even an overnight 'binge' on high "sugar" pastures, to trigger a laminitic episode in 'cresty' and overweight EMS horses and ponies. Susceptible horses and ponies with underlying EMS are on a virtual 'tight-rope' in balancing NSC intake from grasses during periods of lush pasture growth or when they have unrestricted access to grazing on high risk pastures. Regular daily monitoring for a 'hardening of a 'cresty' neck which heralds glucose intolerance and a surge in insulin, can indicate an impending laminitic episode. Careful grazing management during high risk periods is essential to avoid repeated episodes of laminitis.

These grasses are able to accumulate large amounts of non-structural carbohydrates (NSCs) in the form of fructans and other simple sugars. Under cold overnight and early morning conditions, these sugars are not transferred into the plant stems for growth. Some of these simple sugars in the succulent shoots and leaves are digested in the stomach and small intestine to release glucose, which then triggers an increase in the level of circulating insulin, which is already high in an animal suffering

from Insulin Resistance. **In turn, the elevated insulin acts directly to trigger the onset of laminitis and devitalisation of the hoof lamellae.** Any

excess sugars may also be overloaded into the hindgut, with secondary production of lactic acid, a non-absorbable, non-metabolisable acid, which can accumulate in the hindgut digestive mass. This acts to lower the hindgut pH and suppress normal fermentation,

with the death of large numbers of hindgut microbes and damage to the barrier function of the hindgut lining. A toxin is also produced by the lactic acid producing bacteria and other dying bacteria, which when absorbed into the blood stream, circulates to the hooves to interfere with the blood supply to the lamellae and devitalise the basement membrane attachments. The weakened lamellae attachments can be torn apart by the continuous downward rotational 'pull' of the deep flexor tendon attached under the pedal bone, leading to founder.

Late Spring and Autumn Founder

Pastures which reshoot after rain, grazing or after being slashed under warm, wet conditions, can store large amounts of NSC carbohydrates, which can be digested in part in the small intestine to cause "spring fever" or excitement, as well as trigger an insulin surge, leading to laminitis, especially in animals bordering on Insulin Resistance (IR).

Steps to Avoid Laminitis

The management goals in preventing 'grass' founder should be observed from the start of spring or following late summer rains, when lush, rapidly growing plants with new shoots, are likely to produce high amounts of soluble carbohydrates. Even frost damaged pastures and dried grass in a drought can contain high levels of soluble sugars.

1. **Restrict access to lush spring pastures** to 1 ½ hours in the early to mid-morning to 10 am, and again in the mid to late afternoon, as the peak production of fructan sugars in the leaves of plants synthesised by sunlight photosynthesis occurs over the late morning to mid afternoon period.

Handy Hint

A heavy frost can cause the release of sugars stored in severely 'burnt' pasture grasses in early spring, or when pastures are sprayed to control broadleaf weeds, making the grasses 'sweeter' and more palatable to grazing horses, with a risk of laminitis in EMS affected horses and ponies. Even dried grass dying off under drought conditions without regular rainfall to leach out sugars from the 'standing hay', poses a risk to over-weight and 'cresty' horses and ponies grazing the dried grass.

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Handy Hint

Do not leave susceptible horses and ponies out to graze overnight during cool nights or on lush pasture. Although, the concentration of fructan sugars in the leaves decreases at night as they are transferred to the plant stems, horses and ponies often instinctively graze for 2-3 hours in the early evening and can consume large volumes of high sugar grass. Even if hay is offered in the evening to reduce the desire to graze, many ponies will instinctively graze in the early evening after consuming their hard feeds and hay.

2. **Always soak good quality grass hay**, eg. grass and clover hay grown in early spring which can contain high levels of fructans or soluble carbohydrates, for 60 minutes in double its volume of lukewarm water. Soaking in this way can remove up to 33% of the fructans and NSC sugars from grass hay and 25% from lucerne hay. Remove and air dry to drain away the water, or tease out the hay on a wire netting - soak in the morning, drain during the day for the evening feed, and vice-versa. **Do not add the soaking water to the feed.** Ensure that the hay is free of mould or a “musty” smell. A polywoven chaff bag is a suitable soaking bag to reduce leaf loss and a hay net can be used to air dry the soaked hay. **Note:** If hay (or chaff) is soaked on a regular basis, soluble nutrients such as calcium, trace-minerals, salts and vitamins will be leached out of the hay. These should be replaced in the feed with a salt mix (eg Kohnke’s Own Cell-Salts) and a trace-mineral and vitamin supplement (eg Kohnke’s Own Cell-Provide, Cell-Vital or Aussie Sport).
3. **Offer chaff (avoid large volumes of good quality (high carbohydrate) oaten chaff – soak if necessary) or ‘soaked’ hay before turning out to graze in the early morning or late afternoon** to fill the horse’s stomach and limit the rate of fill when grazing, as well as dilute the intake of fructan grasses.

Handy Hint

When soaking grass hay to leach out the soluble sugars, the soaking will remove other soluble nutrients, including calcium, trace-minerals, salts and vitamins. Do not add the soaking water back into the hard feed. The shortfalls of these nutrients can be made up by supplementing with a well formulated calcium, trace-mineral and vitamin supplement, such as Kohnke’s Own **Cell-Provide®** or **Aussie Sport™** (both contain calcium) or **Cell-Vital®** with an additional calcium source, such as dicalcium phosphate (DCP) at 10g per 100kg body weight daily. The Supplet® pellets in these products do not sift out or sludge in the feed bin.

4. **Consider the daily use of Virginiamycin (Founderguard®)** to suppress D-lactic acid producing bacteria, or EquiShure™ to buffer hindgut acidosis and the cascade of damaging bacterial toxins during high risk periods. Although, these products may not directly help prevent the onset of laminitis in Insulin Resistant animals, they should be supplemented after the initial attack of laminitis, especially if the high sugar feed or pasture intake is reduced which limits NSC ‘food’ for microbial growth, to help minimise the risk of sudden death of large numbers of hindgut bacteria which can cause a secondary, more damaging episode of laminitis about 7-10 days after the

initial onset. A supplement of EquiShure™ may also be helpful to neutralise excess hindgut acidosis during this period. **A grazing mask (founder mask) to reduce the volume of grass that can be consumed is also helpful.**

5. **Ensure regular daily exercise** in ‘cresty’ overweight ponies, especially those which are insulin resistant, to help minimise the risk of laminitis by utilising more glucose during exercise, but do not exercise an animal with laminitis as severe internal hoof damage and further rotation of the pedal bone can occur – consult your vet or farrier for advice.

Handy Hint

Maintain short toes by ensuring the horse’s/pony’s hooves are trimmed every 3-4 weeks to limit the rotational force on the pedal bone resulting from devitalised lamellae which are damaged by the effects of circulating insulin or toxins. Long toes increase the downward rotation of the deep flexor tendon on the pedal bone of standing animals, especially in overweight horses and ponies with low heels as a result of chronic laminitis.

Besides adopting the restricted feeding management program, horses and ponies recovering from laminitis must be provided with a diet that will not only minimise the risk of recurrence, but also allow regrowth of a sound hoof structure.

Dietary Management

Any risk of excess starch intake that could trigger a recurrence must be prevented. Chronically foundered horses and ponies are best managed by restricting grazing and feeding a low starch/NSC ration. The ration base should include low sugar (low glycaemic) feeds to minimise the risk of soluble carbohydrate overload from non-structural carbohydrates (NSCs) in Spring harvested grass hay, or even oaten chaff. Many veterinarians recommend feeding grass hay or oaten chaff or hay, as well as straw, to horses and ponies recovering from laminitis and founder. Unfortunately, grass hays and chaff contain poor quality protein, which does not provide an adequate intake of amino acids (lysine, methionine) for hoof keratin formation after founder. **Lucerne hay has higher protein and a lower level of NSC, but in large amounts in excess of 1kg/100kg, it can overload excess sugar into the hindgut to trigger laminitis – it must be soaked as well.** Although clover hay contributes protein, avoid feeding large amounts as it can also contribute carbohydrate NSC sugars – lucerne has a lower carbohydrate content or is a ‘low glycaemic’ roughage.

Handy Hint

Horses rely on protein uptake from feed during digestion in the small intestine and have a limited ability to utilise bacterial protein produced during hindgut digestion. Therefore, good quality protein, containing adequate methionine for hoof regeneration, should be given, such as full fat soyabean meal, canola meal or cracked lupins (1 cup/200 kg body weight) and lucerne chaff/hay (1 kg per 200kg bwt) in limited amounts.

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Low Starch Foods

These include a multitude of low GI feeds and low sugar fibrous feeds. Check the label for ingredients – avoid cereal grain based feeds. Do not feed more than the recommended daily amount - even these feeds if fed in excess to a 'cresty', EMS affected animal, can trigger a laminitic episode.

Remember: Soak good quality spring hay to remove soluble sugars, see point 3 above.

Hoof Growth Aids

Protein supplements containing methionine, as well as calcium, zinc, Vitamin A and Biotin (also known as Vitamin H) supplements are useful to promote hoof regrowth (eg a Biotin supplement combined with a well formulated trace-mineral

and vitamin supplement, such as Kohnke's Own **Cell-Provide, Cell-Vital or Aussie Sport**). A supplement of calcium, such as dicalcium phosphate (10g/100kg bodyweight) is recommended. Dolomite is not a suitable source of calcium as it is poorly absorbed in horses. Shortfalls of salts which are leached out can be made up by adding Kohnke's Own **Cell-Salts or Troppo-Salts** (also contains vitamin C which may be beneficial in EMS and Cushing's affected horses and ponies).

Remember: dietary management, regular exercise and hoof trimming to maintain short toes is paramount to preventing repeat episodes of founder.

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