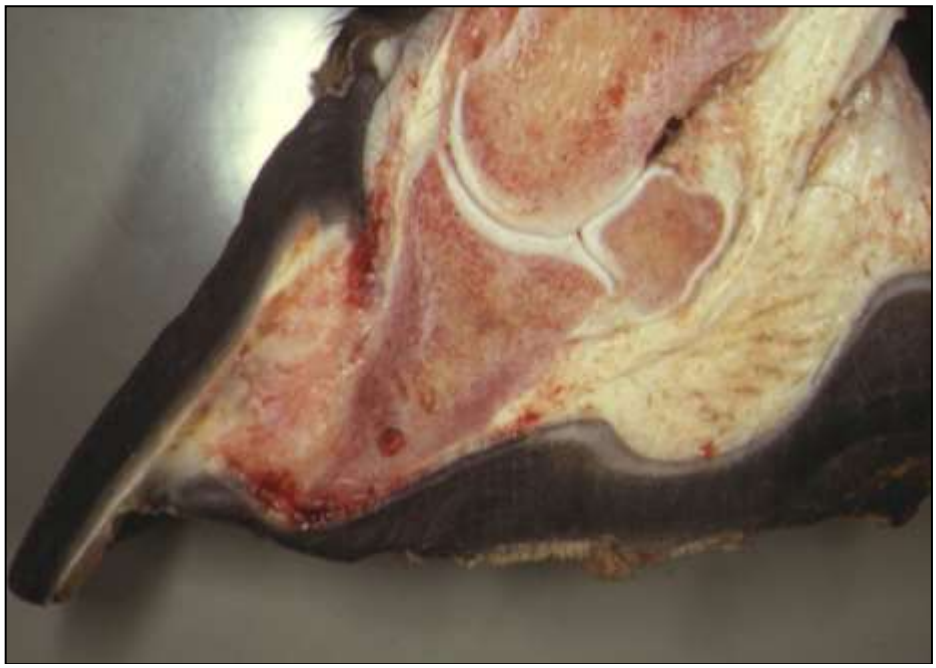
HOW TO PREVENT EQUINE LAMINITIS/FOUNDER DISEASE

WHAT IS LAMINITIS/FOUNDER DISEASE?

Laminitis/Founder is a very painful condition of horses and ponies that is the result of the bone inside of the hoof separating from its attachment to the hoof wall. It can cause the animal to develop a sudden lameness in all four feet.

Normal foot sectioned on the midline; bone in proper position.



Midline section of a foundered foot showing separation of the bone from the hoof wall and descending into the sole of the foot.

The typical stance of a horse that has Laminitis/Founder is to extend the front feet forward to attempt to decrease the weight bearing and moving the rear feet under themselves to support their weight. The disease is typically worse in the front feet, but usually involves all four feet.

A horse trying to walk that is affected by Laminitis/Founder disease.

There are presently three known main pathways for a horse or pony to develop laminitis:

1) Inflammation

This form of the disease is seen as the animal develops inflammation in the foot which is secondary to some other condition occurring in the horse's body such as diarrhea, retained placenta in foaling mares, or overeating grain (particularly corn, wheat, and barley). Any condition which results in a high fever in the animal can be responsible for an attack. This form also can be the result of direct inflammation of the foot from excess concussion from exercise on hard surfaces, poor quality shoeing, or excessive trimming of the foot.

The inflammatory form is rapid in onset, causing severe acute pain in the feet which is the result of activation of protease enzymes inside the foot. The enzymes are present in the foot to allow controlled growth of the hoof wall downward. When they are all activated at once the bone loses its normal attachment and the force of weight bearing causes the bone to descend (founder). The term founder is derived from an old mariner's term for a ship going down at sea, describing the event in the foot of the bone descending downward into the sole.

2) Severe injury to one limb results in Laminitis/Founder in the opposite foot.

This form of Laminitis/Founder occurs when an animal has had such a severe injury to one leg that weight cannot be borne on the injured leg. This results in the horse putting all of its weight on the opposite limb. After a prolonged time Laminitis/Founder may develop in the foot. Encouraging the horse to lay down or being supporting in a sling can prevent the disease from occurring.

3) Hormone (Grass-related) laminitis.

This is the most common form of laminitis seen today and is related to eating grass in the spring and the fall of the year, or ingesting any high carbohydrate diet. This form of Laminitis/Founder is seen in a genetically-prone group of animals which have often been referred to as "easy keepers". These types of horses and ponies require very little to eat and always seem to be overweight. They have a very characteristic appearance of having a "cresty neck" from fat deposits. They also have excess fat deposits around the withers and the tail head

A pony with hormone-related laminitis/founder. Note the "cresty neck" and fat deposits.

These individuals have an excess of the hormone insulin in their blood stream which affects the junction of the bone in the foot to the hoof wall. The high levels of insulin cause the cells in the foot to multiply and grow quickly which allows the laminar tissue to stretch; this weakens the bond between the bone and the hoof wall. The result is a slower form of the disease that occurs over a prolonged period

of time until finally the bone cannot support the animal's weight and it descends, causing the painful condition.

Horses and ponies being over-weight is a common problem today and is often a prelude to the hormone-related form of the disease. Over-weight is associated with insulin resistance which results in higher levels of insulin in the blood stream. These higher levels of insulin cause changes in the growth pattern of the horse's foot which the owner can observe as rings on the exterior of the hoof wall; often these rings are wider at the heel than at the toe.

A hoof exhibiting abnormal growth rings from elevated insulin levels.

Changes also can be observed in the bottom of the foot during trimming. After the foot is dressed and cleaned separation of the external wall from sole may be observed in the toe region. Often small hemorrhages can be seen associated with the stretching of the laminar tissue.

Bottom of a foot showing areas of hemorrhage and stretching between the external hoof wall and the sole in the toe as the result of elevated insulin levels.

The exact mechanism of how insulin causes these changes is not presently understood, but ongoing research is trying to solve the problem. More information about this can be found at www.ahf-laminitis.org.

HOW CAN I PREVENT MY HORSE FROM GETTING GRASS LAMINITIS/FOUNDER DISEASE?

Owners can perform an evaluation of their horse's risk of developing the disease by answering some questions:

1. Is my horse/pony overweight?
2. Does my horse have a cresty neck?
3. Are there growth rings on the hoof walls?
4. Does he/she have any abnormalities in the sole of the foot?

If any answers are "yes", you should have your veterinarian check your horse's hormone level of insulin. This is done by fasting the animal for at least three hours before a resting insulin level is tested. The vet may also recommend checking the level of another hormone, ACTH, to test for Cushing's disease which also causes elevated insulin levels resulting in Laminitis/Founder.

The results of the testing will enable your veterinarian to determine if your horse has elevated insulin caused by Equine Metabolic Syndrome or elevated insulin from Cushing's Disease and recommend the proper treatment. Diet and exercise for weight loss are essential, and medications can be prescribed to lower the insulin as well.

It is important to understand that elevated insulin causes changes over a long period of time, and if discovered and corrected can prevent Laminitis/Founder from occurring. When elevated insulin levels have persisted over years, resulting in multiple bouts of Laminitis /Founder, the animal develops permanently crippled and painful feet for the remainder of their lives.

Early detection and proper management to prevent the disease is essential to the successful maintenance of these genetically prone animals.

WHY IS GRASS DANGEROUS TO THESE HORSES?

Grass is high in soluble carbohydrates in the spring and fall of the year. If a horse suffering from an elevated level of insulin eats a large amount of this grass, the insulin levels (already elevated) go higher and stay up longer than a normal horse, resulting in much more damage to its already weakened foot and Laminitis/Founder develops. These animals require limiting their exposure to spring and fall grass by placing them in an overgrazed paddock or by having them wear a grazing muzzle to limit their grass intake. Exercise is such an important part of lowering insulin and for normal hoof health that locking them in confinement is not a good idea in order to prevent grass intake.

Grass intake may be limited with a grazing muzzle.

As spring moves into summer the grass has gone to seed and the carbohydrate levels drop down to safer levels, but caution still needs to be exercised regarding unlimited consumption. In the fall as we start to experience cooler nights and warm days. The grass again increases in carbohydrate levels making it again dangerous for this group of animals to consume large amounts.

WHAT CAN I SAFELY FEED MY HORSE?

If your horse or pony is over-weight it should not be given any grain products as all grains contain large amounts of carbohydrates, even those labeled "Low Carbohydrate". They also contain high levels of calories, which an overweight animal does not need.

The hay you feed should be tested to ensure the carbohydrate level is not excessive. Hays very high in carbohydrates are just as dangerous as spring grass. The term non-structural carbohydrates (NSC) is used to measure carbohydrate levels in hay or forage. NSC = water soluble carbohydrate + starch. Adding these two values will determine the NSC as a percentage of the hay. Ideally, feeding horses and ponies a hay that is less than 10% NSC is the safest diet.

If you are unable to test your hay, soaking hay for 30 minutes will reduce the NSC levels up to 30% and can be done to improve the safety of the hay.

Soaking hay 30 minutes before feeding will reduce the carbohydrate level.

In addition to feeding a tested or soaked hay, they should be fed a vitamin-mineral supplement which also contains omega-3 fatty acids in order to balance the horse's nutritional needs.

Most animals that suffer from elevated insulin levels (Metabolic Syndrome) are affected for life and require that their hormone levels be checked every 6 months to a year to check the effectiveness of the management program. Many of these Metabolic Syndrome horses will also develop with age Cushing's Disease. Cushing's is an abnormal function of the pituitary gland beneath the brain, which also results

in elevated insulin levels, and can cause Laminitis/ Founder. If diagnosed by your veterinarian, a drug called Pergolide can be prescribed to control the disease and normalize the insulin level.

Our understanding of Laminitis/Founder disease has progressed but much of how this happens is still unknown. Good research is needed to understand the disease completely so that we will be able to finally free the horse of this disease. Please consider making a donation towards Laminitis/Founder research to help achieve this goal.

Donald M Walsh DVM
ahf-laminitis.org