

Laminitis

What is laminitis ? What are the causes and clinical symptoms ? How to treat and also prevent it ?

Laminitis is an inflammation and congestion of the hoof in horses. It is a prevalent disease, and represents the 2nd cause of mortality in horses. As with colic it is considered a veterinary emergency : implementing treatment quickly is necessary to prevent complications and debilitating after effects.

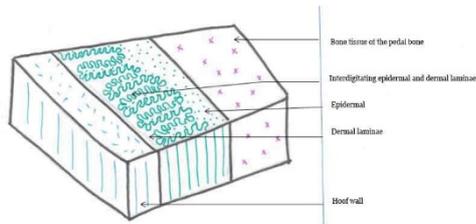
By **Marie Delerue** | 01.08.2016 |

Technical level   



Laminitic horse

What is laminitis ?



The hoof is composed of the pedal or coffin bone, surrounded by two interdigitating layers :

- **An external layer** : epidermal layer
- **An internal layer** : dermal (podophyllous) layer, which surrounds the pedal bone.

The two layers of **laminae** mesh together, like a velcro strip.

This meshing together of both layers ensures that the internal structure of the hoof and the outer wall bond together, thus supporting the pedal bone within the hoof.

During a bout of **laminitis**, an **inflammation**, and a **disturbance of the blood vessel network in the hoof** generate a **deterioration of the laminae**. The pedal bone is no longer supported by the laminae, and is no longer bonded to the rear wall of the hoof, it then rotates downwards due to tension from the deep digital flexor tendon. If the damage to the lamellae is severe, the 3rd phalanx (pedal bone) can sink in the hoof : this is known as **founder**. In the most severecases, it can result in perforation of the sole. In some extreme cases, the horse can lose the hoof.

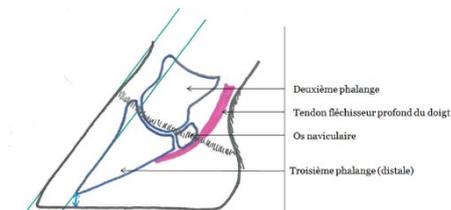


Diagram of a normal hoof :
Rear wall and distal phalanx (pedal bone) are parallel

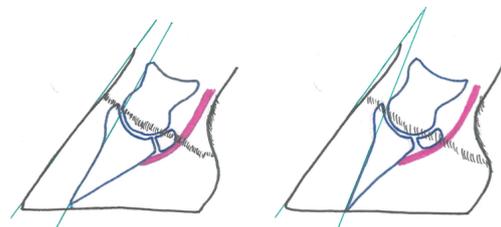


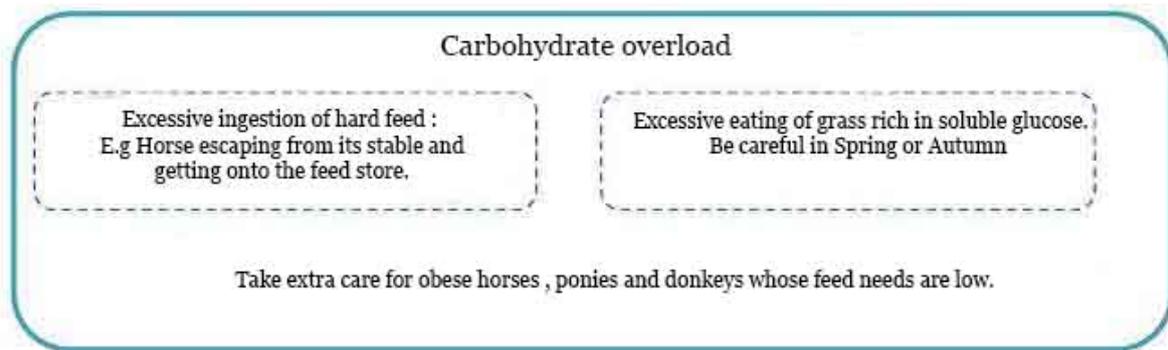
Diagram of hooves with laminitis :
The pedal bone is no longer parallel to the rear wall of the hoof.

Analysing the risk factors

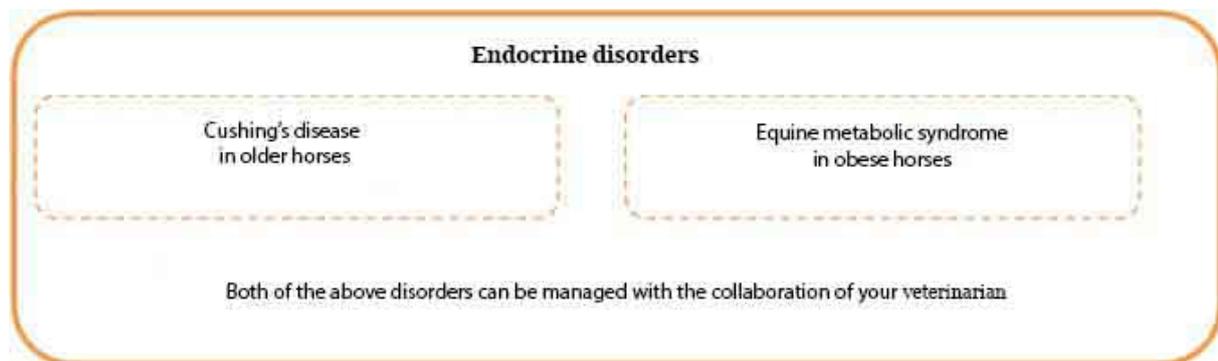
Laminitis is always a consequence of other disorders. Since the causes are multiple we will only discuss the main causes in this fact sheet.

Feed causes

Laminitis due to overfeeding is the **most frequent**. Over half the cases laminitis are observed when horses are turned out to graze. Overloading in grain and cereals is responsible for 10 % of cases.



Endocrinal disorders



Insulin resistance in horses with **Cushing's disease (PPID= Pituitary pars intermedia dysfunction)** and **EMS (Equine metabolic syndrome)**, gives rise to increased risk factors in horses. According to several studies, laminitis is prevalent (between 50 % and 80%) in horses affected by PPID (Cushing's disease).

Mechanical causes

Horses can also develop laminitis after **intense exercise**, especially on hard ground : this is termed **exercise laminitis**. It is especially noted in endurance horses.

When a horse is lame through injury, e.g in the case of a fracture, the other front hoof becomes the main weight bearing limb, and laminitis can develop in this hoof. This is termed **static laminitis**. In this case it occurs only in one hoof.

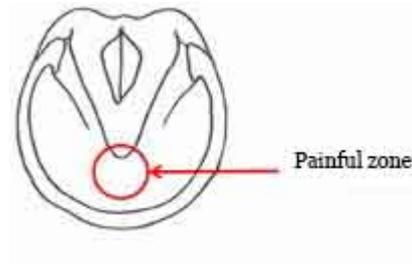
Colic and infections

Laminitis can also occur after **a serious bout of colic, severe diarrhea, or following infectious diseases**, such as postpartum metritis (infection of the uterus after foaling), pneumonia...Toxins are produced and create vascular damage in the hooves. It is therefore important to check the hooves (digital pulses, excessive heat)

Recognizing the clinical signs of laminitis

Laminitis is more often than not located in the front feet. It can also be present in all four hooves, in the hind feet, or in just one foot.

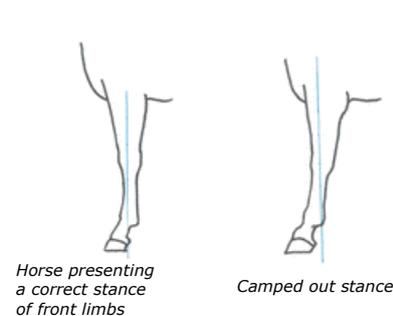
Signs of acute laminitis



Clinical signs of laminitis are those of **inflammation and intense pain** in the feet. The pain is specifically **located in the toe, at the toe extremity of the frog.**

Clinical signs are more or less severe depending on the seriousness of the laminitis. Donkeys have a more stoical nature than horses and may not show any clinical symptoms.

An pain-relieving posture



A horse whose front feet are affected, will adopt a characteristic stance when resting : the horse is **camped out in front** (front legs placed in front of a vertical line) and bring its **hind legs underneath** (hind legs also in front of a vertical line).

This position relieves pain : the weight is displaced towards the heels. It is an **analgesic position**. At rest the horse will also shift its weight from one foot to the other.

Difficulty moving

- The horse shows signs of a stilted gait
- The horse walks very tenderly as if on egg shells, and resists when asked to lift a front foot ;
- Moves reluctantly, and refuses to lift a foot when asked
- The horse is recumbent.

Take care ! A horse who remains recumbent for too long, may tie-up, develop colic or pressure sores.

Other general signs of pain

Other non-specific signs of pain may also be noted :

- Horse standing away from the herd
- Loss of appetite
- Signs of anxiety,

- Visible trembling,
- Increased breathing rhythm,
- High temperature ($T > 38.5^{\circ}\text{C}$).

Inflamed feet



Observing a digital pulse



Observing a digital pulse



The feet are hot

When in doubt, there are two signs to look for in the feet :

- An elevated digital pulse (this factor can only be assessed if the pulse is measured regularly, in order to ascertain a normal pulse)
- The walls of the hoof are hot (the heat should be compared to the heat in a healthy foot).

Signs of chronic laminitis



Presence of founder rings on a hoof in a case of chronic laminitis

The chronic phase of laminitis prolongs the acute phase. There is sometimes a **depression on the ridge of the coronet**, which indicates a **sinking or rotation of the pedal bone** (distal phalanx).

Because of the rotation or sinking of the pedal bone, the coronet ridge is stuck behind the wall of the hoof. Hoof growth is disrupted, it grows faster around the heel, and grows more slowly, and abnormally on the toe and sides.

The **hoof appears deformed** with **characteristic horizontal rings**

Laminitis : a veterinary emergency !

Call your treating veterinary surgeon

Laminitis is a **major medical emergency** which can lead to euthanasing the horse in the most serious cases. It is therefore important to call the veterinarian immediately.

While waiting for the vet, it is recommended **not to move the horse** to avoid worsening the damage. The more pain the horse is in, the more the tendons will retract, especially the deep digital flexor tendon, which then pulls the distal phalanx, and provokes its displacement.

If there is a **suspicion that the laminitis is due to feed**, the horse should be put on a **strict diet**, if necessary by using a grazing mask. **Cryotherapy** can help to limit the consequences of a bout of laminitis, and can be undertaken while waiting for the vet (see below). The efficiency of cryotherapy will be greater when implemented quickly. The horse can also be placed in a **sandy area** or a **thick comfortable bedding** so as to improve comfort.

How does the vet establish a laminitis diagnosis ?

Clinical signs are characteristic and will quickly direct the vet towards a diagnosis. **Testing the hoof around the toe area with hoof testers** shows soreness in this area.

An X-ray examination (front and side X-rays) enables :

- Confirmation of the laminitis suspicion, and indicates the position of the pedal bone in relation to the hoof wall. There can sometimes be transparent X-ray areas (black) which indicate a separation between the epidermal (keraphyll) and dermal (podophyllous) layers.
- Fine tune the prognosis : sinking of the pedal bone (drop of the bone in the foot) always gives a poor prognosis.
- Follow the evolution of the disease in the case of chronic laminitis.

A **venogram** shows the vascular network in the hoof, this is carried out with an X-ray taken after injecting a contrasting agent. This method is rarely used in the field.

What treatment for acute laminitis ?

Look for and treat the cause.

Laminitis is always the consequence of another affliction, therefore the cause should be treated first. For example : an obese pony with laminitis should be put on a strict low carbohydrate diet.

Pain management and prevent any worsening of the damage.

There is no miracle cure for laminitis. The purpose of any treatment is to relieve pain and keep the consequences to a minimum.

- The use of **NSAIDs (non steroid anti-inflammatory drugs)** or **aspirine** (which has an effect on the vascularisation of the hoof) are necessary to relieve pain.
- **Prolonged cryotherapy**, consists in cooling the hooves to fight inflammation in the lamellae, thus avoiding worsening of damage to the foot. It should be implemented as soon as the symptoms appear. Several techniques can be used :
 - Using **boots** (available in tack shops) with a system of continuous cooling by circulating a cold gel, this cools the leg and foot without direct contact
 - A more low-tech method, consists in placing the horse's hooves in a bag filled with 5 litres of crushed ice, and taping the bag around the pastern.

This technique is effective, but time and labour consuming, as the bags need replenishing with ice every two hours, and treatment should be continued until 24 hours after the disappearance of the symptoms. The temperature of the hoof should be maintained at -5° to -7° horses tolerate this temperature easily. (No cold burns).

- During an acute phase of laminitis, **the horse should not be shod or unshod**, this is to avoid any mechanical stress to the interdigitating epidermal and dermal layers. However, **support can be given in the heel area**, so as to reduce muscular tension, and the tension in the deep digital flexor tendon. This can be given by using plaster or resin heel-lifts.
- The horse is **immobilised and strictly confined**, ideally in a loose box, with deep comfortable bedding for a minimum of two months. If the horse needs to be transported for intensive care, then the use of a plaster cast for transport will reduce mechanical stress on the hoof.
- **Massaging the flexor and extensor muscles of the forelimb**, can reduce swelling of the leg and increase blood circulation to the hoof, without walking. An analgesic effect has been noted.

Farriery in the chronic phase



M shaped horse-shoe



M shaped horse-shoe

Farriery can be implemented once the laminitis has been stabilised, but the horse is still in some discomfort. An **X-ray examination** is necessary : collaboration between the vet and the farrier is essential for the success of laminitis treatment.

The role of the farrier is to **improve the horse's comfort**.

- In serious cases of laminitis, the coronet lip is stuck behind the hoof wall, which is very painful for the horse. In some cases drastically thinning the wall of the hoof in the toe area may relieve the pressure and the pain for the horse.
- The distal phalanx (pedal bone) needs to be supported at the rear of the hoof (through the frog and digital cushion). On the contrary, pressure in the toe should be reduced, and the shoe should help the overbreak : **M shaped shoes** are particularly well adapted. When resuming work **heart bar shoes** may be used.
- Using **polyurethane pads** protects the front part of the sole, which is extremely sensitive, and can help in promoting horn growth.
- Shoes with embossed design on the lower side, have been specially designed to promote continuous small movement of the foot, and have a beneficial massaging effect : they improve blood circulation in the hoof. An example of this type of shoe is the « **Rock and Roll rail shoe** ».
- It is also necessary to **ensure horn growth** in laminitic horses. A recent study has shown the effectiveness of supplementing with biotin for hoof growth in healthy horses. (Equ'idées article, March 2016).

Preventing recurrences

Endocrinal disorders should be addressed with the collaboration of the treating vet.

For horses prone to obesity, it is important to implement an appropriate low calorie, low starch diet : Here are a few major guidelines :

- Isolate from the grain store to avoid accidental binging ;
- Restrict access to grazing during the critical periods (Spring and Autumn)
- Restrict high energy feeds : the ration can essentially consist of hay with a poor energy level, e.g hay that has been harvested late in the season. Avoid hard feeds as much as possible. If energy needs are high, the horse can be supplemented with oil.

- Fence off fruit trees during the fruit production period ;

Remember

- Laminitis is a frequent and very serious disease, which can be debilitating for the horse.
- Laminitis is a veterinary emergency : quick action is vital to limit the onset of consequences.
- The main cause of laminitis is feeding too much soluble starch.
- Preventing laminitis needs a low calorie diet to be implemented for animals prone to obesity, and implementing treatment for horses with Cushings syndrome (PPID)

About our writers

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