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Laminitis

Introductions

Laminitis is a life threatening condition that is a clinical emergency for the equine. It causes extreme pain through inflammation and can be followed by the degeneration of the interlaminar bond. Although it is the feet that are affected laminitis is a systemic disease of the whole horse.

Definition

Laminitis is the inflammation of the sensitive laminae. This can be caused by ischaemia or by pure mechanical forces.

Disease Stages of laminitis

The Disease Stages of laminitis are

1. Developmental

The equine has been exposed to the trigger but is showing no signs of laminitis or lameness

2. Acute

The laminae are inflamed and the horse is lame but there has been no movement of the Distal Phalanx.

3. Acute Founder

The laminae bone starts to fail and the Distal Phalanx begins to rotate, sink or both, this also displaces the papillae on the coronary band.

4. Sinker

The laminae bond has completely failed and the Distal Phalanx is now completely detached within the foot

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5. Chronic Founder

Type 1

Movement of the distal phalanx has stopped and an abnormal hoof can be present. There can be a laminal wedge and abnormal heel growth, on X-Rays the Distal Phalanx shows rotation but no change in shape.

Type 2

Reorientation of Distal Phalanx can be seen and there is remodelling to the distal tip of the bone.

Types & Theory's of laminitis

There are 4 theory of laminitis that all fit into 2 types

The 2 Types are

- Systemic - This type is caused by ischaemia to the laminae corium
- Mechanical - via trauma and stress to the laminae.

The 4 Theory's are

- Vascular
- Toxic
- Metabolic
- Mechanical

Anatomy

The anatomical structures involved with laminitis are;

- Sensitive Laminae (Dermal Laminae)
- Insensitive Laminae (Epidermal Laminae)
- Distal Phalanx
- Pipillae
- Capillary Beds
- AVA's
- DDFT

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Causes

There are many causes of laminitis including

Over eating of grain (Carbohydrate overload)

The Over eating of grains such as Wheat, Corn & Barley can cause laminitis in horses, however different horses will have different tolerance levels. The over eating of grain causes an increase in lactic acid producing bacteria and a reduction in PH levels. this results in the release of Endotoxins.

Ingestion of cold water

It is thought that if an overheated horse drinks a larger amount of cold water then it irritates the stomach and intestines.

Severe systemic infection

Sever systemic infection can be caused by a mare that has just given birth retaining the placenta. (Laminitis in these cases is usually more serious).

Obesity and ingestion of lush grass

Horses that are affected are usually over weight and have a large crest. Welsh ponies, Shetlands and generally Fat horses of all breeds can be susceptible to the disease. It is also said that lush grass in spring and frozen grass release toxins when eaten triggering laminitis.

Drug related

Laminitis can be triggered by injections such as corticosteroids because they cause the blood vessel in the foot to contract.

Stress

Long journeys or placing an animal under high stress from competition, however it is more commonly due to an inappropriate feeding and management.

Pituitary Cancer (Cushing's Disease)

This type of cancer is more commonly found in old ponies and may lead to laminitis.

Concussion

Concussion can cause mechanical laminitis by the repeated uses of a horse on hard surfaces, this happens because the laminae are pushed beyond their structural capabilities and fail.

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Poor or irregular farriery

If a horse is left badly trimmed with an incorrect Medial/Lateral balance or the hoof wall is excessively trimmed away, then mechanical laminitis can result. Also if a horse is left with long toes a overlong leaver arm can also cause mechanical laminitis.

Alteriovenous Anatomosis (AVA Shunts)

An AVA is a vessel that connects an Artery to a Vein. during laminitis more blood is pumped to the foot but is bypassed away from the capillary beds by the AVA's starving them from oxygen. this is due to hormones in the blood causing them to contract.

* Laminitis may also be triggered by other health factors/diseases such as:

- Toximia-pneumonia
- Diarrhoea
- Colic
- Endometritis

Clinical Signs

Acute laminitis can be seen by.

- A laminitis stance
- Lameness
- Heat & swelling
- A bounding digital pulse
- Dip in the Coronary Band (if foundered)
- Reluctant to move
- Fast Rate of respiration and pulse

Chronic laminitis can be seen by

- Brushing on the sole from the tip of P3
- radio graphical Changes within the foot
- reorientation of the Distal Phalanx
- Diverging Growth rings
- Laminal Wedge

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Diagnosis

The Diagnosis of Laminitis can be done by observing the clinical signs above along with X-Rays of the foot.

X-Rays

X-Rays are normally taken 48-72 Hours after the acute onset on laminitis, X-rays allow for the vet/farrier to view and measure the orientation of the Distal phalanx within the foot. With correctly marked radiographs a comparison between the angle of the hoof wall and the angle of the distal phalanx measured along with any sinker distance that may have occurred.

Markers needed for an accurate diagnosis are

- A wire marker on the Dorsal Wall starting at the coronary band and travelling distally and of a known length
- a pin 1cm palmar/planter from the point of the frog

These 2 markers allow for the sinker distance to be measured as well as the angle of rotation,

Sinker Distance

The sinker distance is measured by measuring the distance from the top of the wire marker to the tip of the Distal phalanx. A normal measurement would be between 0cm-10cm, anything over this distance is classed as a sinker.

Rotation Angle

The rotation angle is measured by taking an angle measurement of the wire marker on the dorsal wall against the angle of the Distal Phalanx within the foot.

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Chronic X-Rays

The Chronic laminitis foot can also be x-rayed to measure rotation and to assess what type of chronic founder stage the horse is at.

Type 1 - **Reorientation of the Distal Phalanx**

Type 2 - **Reorientation & remodelling of Distal Phalanx**

Treatment

Laminitis is a life threatening condition that is a clinical emergency for the equine and a veterinarian must be called.

As laminitis is most commonly a systemic condition it is vital to treat the medical cause of laminitis before the horse lameness will improve, Depending on what stage of laminitis the horse is at will change the treatment plan for both vet and Farrier.

Farrier Acute Treatment

As the horse is undergoing a very painful inflammation of the laminal bond and the pull of the deep digital flexor tendon is trying to rip the laminal boned apart the first aim is to try and support the distal phalanx.

The steps to be taken are for Acute Fonder

First 12h-48h Non traumatic frog support shoe

This is done by not removing the shoes within the first 24h and placing a Lilly pad or a role of vet rap under the frog to mechanically oppose the rotation of the distal phalanx, if the feet are overdue for trimming then it may not be possible to nail a shoe on, the use of a glue on heart bar is the best course of action . (a nail on shoe is not used because it is too painful for the horse.)

The Owner can also be advised to reduce the feed to just hay and water and provide a clean soft bed for the horse

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Founder Treatment (after 48h)

Once the Distal Phalanx had stopped rotating then the mechanical support can be readdressed, it is most likely that the horse will require a full support shoe (heart bar) to take as much weight off the wall as possible.

Some key point of fitting a heat bar are

- ⊕ Well marked Radiographs must be used
- ⊕ The tang of the Heart bar must end 1/8" behind the centre of rotation
- ⊕ The tang of the heart bar must not apply positive pressure to the frog
- ⊕ The tang must not be point loading the frog.
- ⊕ The tang must be past the centre of rotation so not to restrict the arterial supply

Veterinarian Treatment (12h-48h)

The veterinarian can prescribe pain relief drugs and advise on changes in diet. the veterinarian can also investigate the cause of the laminitis attack and aid in the removal and treatment of the cause.

Chronic Founder

Once the foot is stabilised within the foot and there is no more risk of rotation of the distal phalanx then the restoration of the foot can begin,

The Key points for showing Chronic fonder are

- ⊕ Restore the mechanical function of the foot
- ⊕ Restore the Hoof Pastern Axis (HPA)
- ⊕ Prevent Pressure Build up

The Chronic Founder foot normally has a large laminal wedge caused by the pipillae at the coronary band

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Prognosis

The Prognosis for laminitis is guarded to poor. This is due to the complexity of the internal structures and how the rotation or displacement of the distal phalanx effects the mechanical functions of the hoof causal.



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