

<http://dairyhoofhealth.info>

# Dairy Cattle Hoof Health

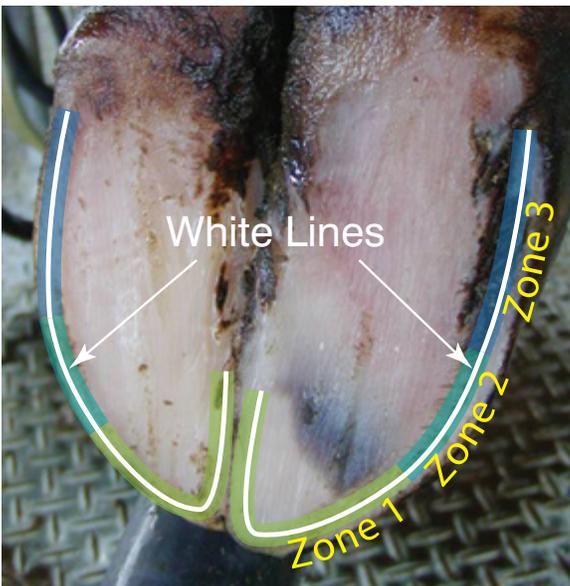
## WHITE LINE LESION

### Causes, Prevention and Treatment

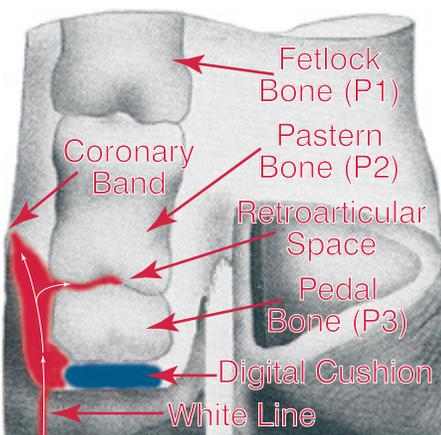
White line lesion refers to disintegration of the junction between the outer hoof wall and the sole (the white line) in zones 1, 2 or 3, together with any purulent exudate (abscess) due to infection. In a Canadian 3-province study, 62% of these lesions recorded by hoof trimmers were found on the outside claws of the rear feet; 74% of the lesions occurred in zone 3, 19% in zone 2 and 7% in zone 1.

Separation of the white line without complications is often seen at claw trimming. It is only when an abscess develops in this space that the animal will become lame. Although neither lameness nor an abscess may be observed, other evidence of an internal infection may be present:

- Pus may be found oozing from the skin/horn junction on the outer side of the coronary band. If a black mark is observed somewhere in the white line in zone 3, there will be a strong possibility of a track running under the hoof wall from the white line to the coronary band. This probability can be confirmed by removing a small amount of wall at the bearing surface adjacent to the lesion.
- The skin above the coronary band may be tender, puffy and inflamed. This strongly indicates that the pedal-pastern joint is infected. X-ray or ultrasound is usually required to confirm this diagnosis.
- Involvement of the region behind the pedal-pastern joint (retroarticular space) should also be suspected if there is marked tenderness, swelling and skin redness in the area above the coronary band at the heel bulb. This may cause a sudden increase in the severity of lameness. Infection of the pedal-pastern joint itself is more likely to cause swelling of the skin above the coronary band and an increase in the size of the heel bulb.



Zones where white line lesions are found.

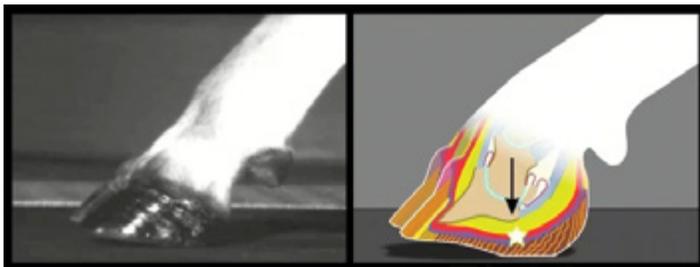


Infection can spread from the white line up the inside of the wall and into the retroarticular space.

a sudden increase in the severity of lameness. Infection of the pedal-pastern joint itself is more likely to cause swelling of the skin above the coronary band and an increase in the size of the heel bulb.

## Cause

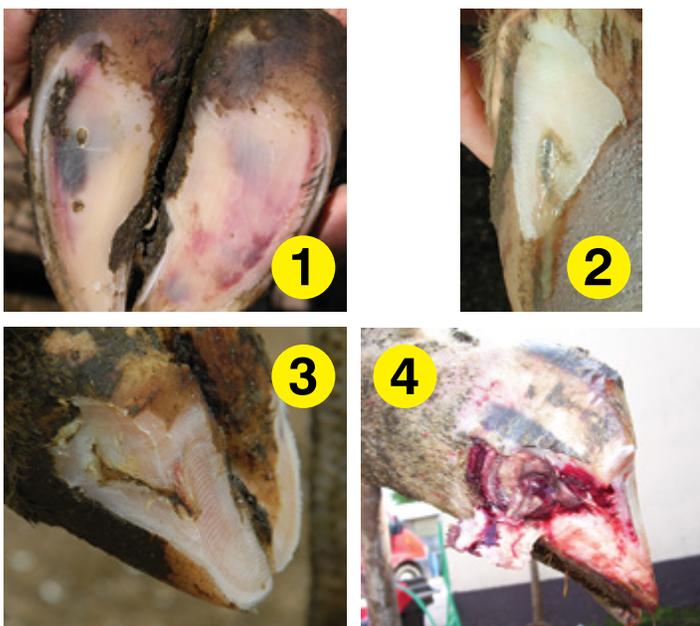
The pedal bone is suspended inside the claw capsule by suspensory ligaments and by interlocking 'fingers' of tissue projecting from the inside of the claw wall (lamellae) and from the connective tissue inside the claw (laminae). The white line is an extension of the lamellae, composed of soft horn joining the wall to the sole. White line lesions are believed to be caused by inflammation of these tissues (laminitis) which, in turn, is usually attributed to ruminal acidosis, although there is little conclusive evidence of this link. It is suggested that laminitis results in sinking of the pedal bone leading to the hemorrhage into the white line that is commonly observed. Relaxation of the suspensory ligaments (e.g., at calving) has also been implicated.



The first impact of each stride is at the heel/sole junction where the white line ends in zone 3.

As illustrated in the photo and diagram above, the first impact of each stride is at the heel/sole junction. The digital cushion (fat pad) expands sideways when it is compressed under weight, causing pressure to be exerted on the hoof wall above zone 3. Weakening of the bond between claw wall and sole due to laminitis or disruption of nutrient supply required for new horn formation may increase susceptibility to white line separation. Zone 3 also encompasses the broadest part and the softest and fastest growing horn of all areas of the white line.

Solid foreign bodies may lodge in the softened, widened zone. They can push through to the corium beneath and introduce infection; however, the presence of a foreign body is not essential for a lesion to develop.



Four typical levels of severity for white line lesions.

## Treatment

Treatment of a white line lesion should only be attempted by either a qualified veterinarian or professional hoof trimmer. The course of treatment depends on the stage of severity to which the lesion has progressed:

- *An uncomplicated black mark anywhere along the white line in zone 3.* An elliptical slice of adjacent wall should be removed to establish a self-cleansing surface.
- *A local abscess extending from a black mark in the white line.* Removal of an elliptical slice of wall must be made of a size adequate to ensure drainage. Once opened and drained, a cavity caused by the abscess will be revealed. It may be helpful to inject a liquid antibiotic into the cavity and then cover the opening with a waterproof adhesive bandage. The opening to the cavity needs only to be covered for a few hours as the space inside fills very rapidly.
- *A track extending upwards and backwards from the white line.* For the first 2.5 cm (1 in), the track may be followed by removing overlying wall. Beyond this distance, destruction of the wall can be reduced by cutting a channel with a 'Dremmel Tool.' This is the method of choice if pus is being discharged from around the coronary band.
- *An increase in the size of one heel bulb compared with the other suggests formation of an abscess in the retroarticular space.* The build-up of pus can be confirmed by inserting a hypodermic needle and drawing the material into a syringe.

If treatment of the lesion requires any of the surgical procedures described above, it will be necessary to glue a 'lift' to the other (usually inside) claw, in the form of a wooden or synthetic block, of either uniform thickness or wedge-shaped. Various shoes and slippers, designed specifically for this purpose are also available. In any case, the lift should wear or fall off or be removed within 3 to 4 weeks of being applied. There will be little further healing after this time and problems can arise due to loss of the lift's initial shape and structure.

portions of text adapted from: Paul R. Greenough, Bovine Laminitis and Lameness: A hands-on approach, Saunders Elsevier 2007 and Merck Veterinary Manual.