

AABP FACT SHEET

VERTICAL WALL CRACKS



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Vertical wall cracks (sand cracks, quarter cracks) can be a significant cause of lameness in the cow-calf herd and they also occur occasionally in dairy cattle. Types of cracks (I-IV) are detailed in the box below, based on their location on the hoof wall.

Studies on the prevalence in Canadian beef herds have reported that 16.8-37% of cows have evidence of vertical wall cracks. With a prevalence this high, losses due to decreased production, cost of treating lameness, and premature culling could certainly become a significant factor in the health and viability of the cow-calf enterprise.

Hoof Cracks by Type

- **Type I** Usually not identified, associated with coronary band
- **Type II** Often associated with horizontal (hardship) groove, extend from coronary band to 1/3–1/2 way down the hoof wall
- **Type III** Involve the entire dorsal surface of the hoof, may be unable to identify origin (**Figure 1**)
- **Type IV** Extend from mid-hoof wall to level of sole, likely in healing stages, may have originated from level of sole
- **Type V** Central defect secondary to undermined stresses

Pathogenesis

There is no single known cause of vertical wall cracks in cattle, but there is an extensive list of contributing factors that may predispose an animal to developing cracks.



Figure 1. A Type III vertical wall crack. Note the extension of the crack and the associated horizontal defect.

A significant factor contributing to risk is the conformation and strength of the foot itself. The size and shape of the foot contributes to its volume and, subsequently, its strength. Any deviation of the claw from what we might consider "normal" will predispose the claw to abnormal forces and stresses. These stresses act on aspects of the hoof that are most susceptible or weakened due to other illness or defect. For instance, a horizontal groove associated with grass founder provides a potential area of weakness from which a vertical wall crack could originate. The importance of conformation and hoof quality are certainly supported by the observation that some animals will have numerous cracks and chronic crack problems despite other animals in the herd with similar environmental exposure having little or no problems with hoof cracks.

Nutrition also plays an important role in the development of vertical wall cracks. Minerals such as copper, zinc, selenium, and molybdenum and vitamins such as Vitamin E and biotin have been shown

to be integral in the development of quality hoof. Deficiencies in copper or zinc, potentially exacerbated by excess molybdenum or sulfur in the diet, can lead to horn of inferior quality. Selenium toxicosis can contribute to poor quality horn that is predisposed to stress related injury and defect. Biotin has been shown to be somewhat protective in reducing incidence of vertical wall cracks. Nutrition can also be considered a risk factor as it is related to body condition score (BCS). Heavier animals are more likely to develop vertical wall cracks than lighter animals. With this in mind, monitoring BCS and adjusting nutritional plane appropriately, particularly in the pre-partum period, will be important in reducing incidence of cracks.

Other Predisposing Factors

Probably the most extensively studied and most controversial aspect of vertical wall cracks is the inciting cause. As we mentioned, there are many risk factors, but what is the trigger? Some have

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Vertical Wall Cracks *continued*

argued that excessively dry environmental conditions serve as an inciting cause and/or risk factor. Perhaps the most likely trigger is acute or chronic subclinical laminitis. These events provide an opportunity at the level of the laminae for focal points of weakness in the hoof. These syndromes are often precipitated by an abrupt change in feeding patterns or diet. This is particularly true of changes in protein, fiber, and rapidly fermented starches. This condition can be common in early spring when cows are turned out to lush pastures after calving. It is not surprising to note that vertical wall cracks are often associated temporally with these pasture and feeding conditions.

Treatment

Treatment of vertical wall cracks can be challenging and must be considered carefully. It is important to note that the use of hoof testers to verify that the crack is the cause of the lameness is imperative.

Once the crack has been confirmed as the cause, the crack should be carefully explored. Care should be taken not to extend the crack more than necessary, particularly in depth as it is contraindicated to expose the sensitive laminae if not already exposed.

The keys to exploring and debriding the crack are preventing continued extension of the crack, providing appropriate exposure to the environment to allow it to dry, and preventing the lesion from being packed with foreign material. If granulation tissue is present extending from the sensitive laminae, the use of a drying agent may be employed to prevent exuberant granulation tissue from developing. Often a Dremel tool can be useful in cleaning out cracks.

After the crack has been appropriately debrided, hoof acrylic may be used to

provide stability to the crack. This is often challenging due to the shape and extent of the defect. Use of hoof acrylic is contraindicated if exposure of the sensitive laminae or granulation tissue is present. Attempts to wire across the defect to provide stability are similarly challenging. Lacing wire across the defect provides a scaffold for the acrylic, not a tension band to prevent widening of the crack. Cattle with smaller hoof mass may be difficult to wire due to decreased thickness of the hoof wall.

An alternative to filling the defect with acrylic may be to blend the margins of the crack with the adjacent hoof wall (Figure 2). This can reduce forces at the crack margin that contribute to extension of the defect. Providing appropriate balance to the weight bearing surface of the claw is also important in mitigating these forces.

A block should be applied to the unaffected claw to reduce stress and provide relief from discomfort. Additionally, an NSAID may be administered to reduce pain and discomfort associated with the hoof defect.

After-care

Routine follow-up should be employed to monitor progress of the crack and hoof growth. Remember, the average



Figure 2. A crack on the dorsal aspect of the hoof that has been debrided and trimmed

hoof grows at 5mm per month, so healing time is prolonged.

Prevention

Appropriate monitoring of nutrient intake, BCS, vitamins, and minerals is essential. Balancing these risk factors is likely to show benefits in other areas of herd health as well. Selection of replacement animals and herd sires with good conformation and hoof health can also be useful in reducing the incidence of this condition. **AABP**

Important Things to Know About Vertical Wall Cracks

- Vertical wall cracks are common in beef cattle and contributing factors appear to include conformation of the foot, hoof horn quality, and sub-clinical laminitis
- Not all wall cracks result in lameness
- Treatment involves preventing extension and packing of the lesion, and providing exposure
- Good nutrition and improved conformation through sire selection are important components of prevention