

Hoof Abscesses

by Stephen E. O'Grady, DVM, MRCVS

Hoof abscesses are probably the most common cause of acute severe lameness in horses. Often the first person to see a foot abscess is a farrier. There is still much debate between the veterinary and farrier professions as to who is qualified to treat a hoof abscess and the best method in which to resolve the abscess. Considering a walled off hoof abscess is an extension of the epidermis (hoof capsule), it is the author's opinion the infection could be treated by either clinician.

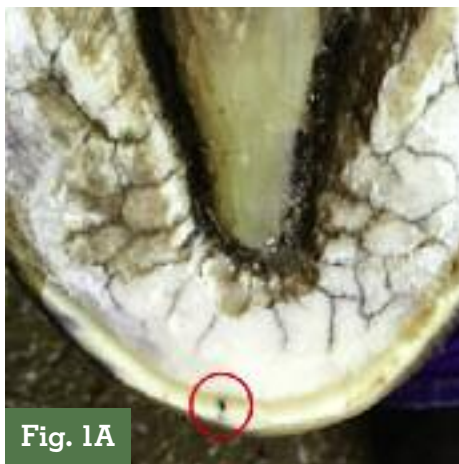
Definition

A hoof abscess can be defined as a localized accumulation of purulent exudate (pus) located between the subsolar (beneath the sole) or submural (beneath the wall) horn. The origin of the organisms responsible for a hoof abscess gain entry through the hoof capsule into the inner subsolar/submural tissue where organisms spread and initiate the formation of an abscess. Foreign matter (such as gravel, dirt, sand and manure coupled with bacteria or fungal elements) generally gain entry into the hoof through a break or fissure in the sole-wall junction (white line) somewhere on the solar surface of the foot.

Mechanism

It may be easier to understand how to treat an abscess by looking at how it forms. Foreign debris gains entry and accumulates in a small separation or fissure located in the sole-wall junction anywhere around the perimeter of the foot including the surface of the bars adjacent to the sole (Figure 1A &

1B). As the animal bears weight, pressure causes the foreign matter to migrate through the fissure, creating a tract, until it gains entry into the subsolar or submural tissue (dermis). Once it reaches the dermis inside the hoof capsule, the foreign material activates the host's immune system initiating an inflammatory response within the dermal tissue. The bacterium within the debris invades the dermal tissue, further accentuating the inflammatory response. As the bacteria divides, inflammatory cells (white cells) from the circulatory system are drawn to the area. Enzymes released from the bacteria and from the invading white cells lead to liquefaction tissue necrosis and the development of pus. The infection is quickly walled off with a thin layer of fibrous tissue to form an abscess. The inflammation and the pressure from the accumulation of the pus exerted on the surrounding dermal tissue leads to the pain associated with a hoof abscess.



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Clinical Signs

Most affected horses show sudden severe lameness. The degree of lameness varies from being subtle in the early stages to non-weight bearing. The digital pulse felt at the level of the fetlock is typically increased and the involved foot will be warmer than the opposite foot. With careful observation, unless the abscess is in the middle of the toe, the intensity of the digital pulse will be much stronger on the side of the foot where the infection is located. If the abscess is long standing, there may be soft tissue swelling in the pastern up to or even above the fetlock on the side of the limb corresponding to the side of the foot where the abscess is located. The site of pain can be localized to a small focal area through the careful use of hoof testers. Sometimes with acute lameness, the pain will be noted over the entire foot with hoof testers and, in this case, veterinary assistance should be sought to rule out laminitis, a severe bruise or even a possible fracture of the distal phalanx (P3).

Treatment

The most important aspect of treating a subsolar/submural hoof abscess is to establish drainage. The opening should be of sufficient size to allow drainage but not so extensive as to create further damage. When pain is localized with hoof testers, a small tract or fissure will commonly be found in the sole wall junction. The fissure or point of entry may not always be visible as some areas of the foot, such as the



Fig. 2A

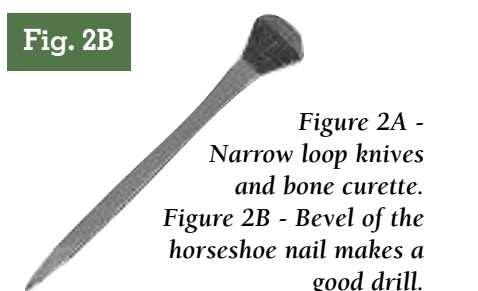


Fig. 2B

Figure 2A - Narrow loop knives and bone curette.
Figure 2B - Bevel of the horseshoe nail makes a good drill.

sole-wall junction, are somewhat elastic and tracts in this area tend to close. In this case, a poultice should be applied to the foot daily in an attempt to soften the affected area and eventually a tract will become obvious.

When a tract or fissure is found, it can be explored within the white line using a small thin loop knife or a 2mm bone curette until the tract is narrowed down to a small opening (Figure 2A & 2B). The tract is then followed using a horseshoe nail as a drill until pus is released and the nail enters the 'belly' of the abscess. At this point, the tract is open into the cavity of the abscess. A small opening is all that is necessary to obtain proper drainage (Figure 3A & 3B). This can be determined by placing thumb pressure or hoof



Fig. 3A



Fig. 3B

Figure 3A & 3B - Nail inserted in 'belly' of abscess.



Fig. 4

Figure 4 - Thumb pressure promotes drainage.

testers on the solar side of the tract and observing more exudates being expressed or a bubble forming at the opening of the track when pressure is applied (Figure 4). Care should be taken to avoid exposing any dermis, as it will invariably prolapse through the opening, preventing closure of the tract and possibly creating an

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ongoing source of pain. Under no circumstances should an abscess be approached through the sole. It has to be remembered that organisms gain entry through the sole-wall junction not the sole. The difference is that a puncture wound through the sole leads to an infection under the sole rather than an abscess migrating under the sole from the sole-wall junction.

The draining tract can be kept soft and drainage promoted in several ways. A poultice does not 'draw' out an infection as often described; rather a poultice will encourage drainage once it is established. The author will generally apply a medicated poultice^a for the first 24-48 hours. The poultice is immersed in hot water, placed on the foot and attached with a roll of wide brown gauze, a cohesive bandage and waterproof tape. The sheet version of this poultice is preferred rather than a poultice pad which just covers the solar surface of the foot. The whole foot including the coronet should be enveloped in the poultice. Another method to encourage drainage is to apply a soak bandage, where layers of practical (pound) cotton are stacked together, enveloping the foot and forming a heavy bandage. Epsom Salts (MgSO₄) is placed on the inner foot surface of the bandage and the bandage is attached to the foot as described above. The bandage is now saturated with hot water and saturated periodically over the next 24-48 hours. Using either of these methods eliminates the need for foot soaking.

There are numerous commercial products marketed to treat foot abscesses but these products will only be helpful if they compliment the principles of drainage described above.

Aftercare

Once drainage is established the horse should show marked improvement within 24 hours. Once drainage has ceased, the hoof is kept bandaged with an antiseptic solution / ointment or 2% iodine applied over the tract until the wound is dry and sealed. When dry and sealed, the opening of the tract is filled with a medicated hoof putty^b which keeps the affected area clean and prevents the accumulation of debris within the tract or wound. The shoe is replaced when the horse is completely sound.

A persistent hoof abscess

Often, a painful tract can be located but drainage cannot be established at the sole-wall junction. In this case, the infection is deep and may have migrated under the sole or wall away from the sole-wall junction or white line. Again, under no circumstances should an opening be created in the adjacent sole. Invading the sole seldom leads to the abscess and often leads to hemorrhage and may create a persistent, non-healing wound with potential for osteomyelitis of the distal phalanx (P3). Instead, a small

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channel can be created on the hoof wall side of the sole-wall junction using a small pair of half round nippers. The channel is made in a vertical direction following the tract to the point where it courses inward. Drainage can usually be established using a small probe or horseshoe nail in a horizontal plane. Preferably, this is done at an early stage of the lameness before the infection ruptures at the coronet.

If left untreated, a hoof abscess will follow the path of least resistance along the outer margin of the dermal tissue and eventually rupture at the coronet forming a draining tract. Many horse owners actually consider this to be an acceptable practice and elect to wait for this to take place. This practice often extends the time the animal experiences severe pain. Rupture at the coronet leads to a permanent scar under the hoof wall. The tract leading to the coronet may also result in a prolonged recovery from the abscess, a chronic draining tract, repeated abscesses and eventually a full thickness hoof wall crack. Effort should be made to establish drainage on the solar surface of the foot prior to a rupture at the coronet.

Infection from a misplaced horseshoe nail

Dermal tissue can be inoculated by bacteria from a misplaced nail or so called 'hot nail' in two ways. The nail can be driven directly into the laminar corium. When the nail enters dermal tissue, the horse will generally show discomfort and there will be hemorrhage present where the nail exits the outer hoof wall. Blood observed at the exit of the offending nail will alert the farrier of the misplaced nail. The blood also acts as a "physiologic rinse" to dilute or eliminate bacterial contamination. Removal of the nail and application of an antiseptic will usually prevent infection and is generally all that is necessary. Another scenario that occurs frequently is while the farrier is driving a nail, the horse shows discomfort indicating the nail is invading dermal tissue. Often the farrier will remove the nail, place it in another spot/direction and again drive it into the foot. However, when this scenario occurs, the farrier should remove the shoe and examine the spot where the nail entered the foot. If a nail enters dermal tissue

(even if removed), it causes trauma to the dermal tissue and can seed the area with organisms which may lead to abscess formation. If the nail has entered the foot inside the sole-wall junction, the owner/trainer should be alerted to the potential problems and the horse could be placed on an oral broad spectrum antibiotic for 3-5 days as a prophylactic measure.

Lastly, we have the condition described as a "close nail" where the nail is placed such that it lies against the border of the dermal tissue just inside the hoof wall. Pressure against the corium combined with constant movement of the nail against the dermis as the horse bears weight may cause an inflammatory response and allow any bacteria that were introduced with the nail to divide and form an abscess as described above. There is a lag period of 7-14 days or even longer before clinical symptoms or discomfort is observed following the placement of a "close nail." Treatment again would be to establish and promote drainage. ■

Dr. Steve O'Grady is a veterinarian and a farrier. He operates Virginia Therapeutic Farriery which is a referral practice devoted to therapeutic farriery located in Keswick, VA.

Disclaimer: Dr. O'Grady has no financial interest in Farrier Products Distribution (FPD) or any products described in this article.

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FOOTNOTES

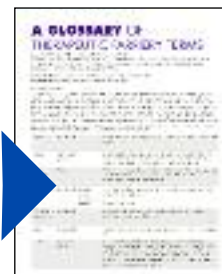
- a. Animalintex poultice, 3M Company
- b. Keratex Medicated hoof putty

GLOSSARY

Epidermis – the outer most and nonvascular layer of the hoof capsule

Dermis – layer of tissue that lies beneath the epidermis ... contains nerves and blood vessels

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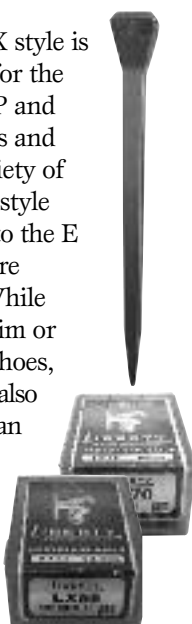
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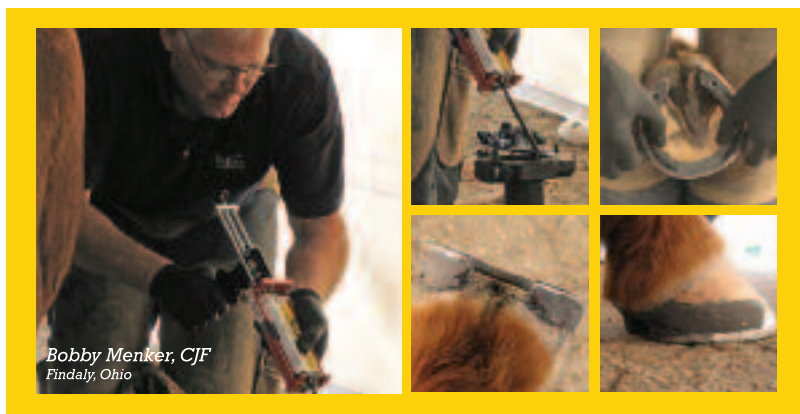
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