

## Hoof Abscesses and Puncture Wounds

**Delve into the causes of and cures for hoof abscesses and puncture wounds.**

*By Janice Posnikoff, DVM*

10-19-2004

Nothing can be more satisfying to us vets than a really good hoof abscess. Right from start to finish, they can make our day. It starts with the call, pretty much always the same, "Horse was fine yesterday; very lame today," and ends with the owner overjoyed that the diagnosis is merely an abscess. Let's not forget the in-between stuff, such as the really great moment when the vet's hoof knife hits the spot, making blackish gray stuff pour out. For those who have never experienced a hoof abscess, the moment of relief is, unbelievably, when the pus pours.

### What a Hoof Abscess Is

A hoof abscess is an infection within the hoof in an area called the lamina. The lamina consists of hard and soft sections, designated the insensitive and sensitive lamina, respectively. The hard lamina is essentially the hoof capsule, and the soft lamina is the tissue that connects the hoof capsule to the bone, also known as the white line. On the bottom of the hoof, called the solar surface, the sole of the hoof connects to the hoof wall at the white line.

Abscesses can develop many different ways. The most common is at the solar surface when an area of the sole becomes compromised, and bacteria are able to get under the surface of the hard lamina. Once under the protective barrier of the hard lamina, the bacteria find themselves in the perfect growing environment—warm and moist (and plenty of food from the blood supply to the hoof). As they grow, bacteria produce toxins that actually eat away healthy tissue, allowing more bacteria to invade additional tissue. This ongoing assault often leads to a "tract" or pocket forming to accommodate the increasing bacteria and pus.

### Covering Up

Once the abscess has been exposed, the opening has to be kept clean and free from dirt, debris and manure in order for it to heal. Also, since the shoe is typically removed to find the abscess, the hoof needs to be covered to protect it and keep it clean.

Packing the abscess hole with gauze or cotton soaked in Betadine solution then taping the entire hoof with duct tape is a common treatment option. Other alternatives include putting on a protective boot such as an Easyboot or Old Mac Boot, or a combination of both duct tape and a boot. A variety of other boots are available commercially that are also very effective. Since the bacterial invasion starts in the insensitive hard lamina, your horse is pain free, and you won't notice the strong bacteria colony forming within the hard hoof capsule. If the bacteria develop enough, however, they can move out of the hard insensitive lamina into the soft sensitive lamina. This is when the horse's body realizes there's a problem.

The body's first reaction to bacteria is to treat them like foreign objects and try to kill them with white blood cells and antibodies. White blood cells latch on to bacteria and release pockets of destructive components, which kill them. Unfortunately the destructive components of these white blood cells can also harm healthy hoof tissue of the sensitive lamina. Another job of white blood cells is to clean up dead tissue: as tissue is being destroyed by bacteria, more white blood cells are being summoned to the site for clean up. This whole process of white blood cell response is called inflammation.

The result of the body's retaliation is a collection of dead, dying and growing bacteria, lots of white blood cells and dead tissue. Most often all of this material is fluid like, creamy or thin in texture and often gray or black in color. In the medical world it's called purulent material, but is most commonly known as pus.

Since the hoof is a rigid structure, as pus develops, it starts to cause pressure within the hoof. This, along with the inflammation occurring in the sensitive lamina, causes pain. Sometimes there is so much pain that the horse will barely put his hoof down. This is when trouble becomes apparent.

### Diagnosing a Hoof Abscess

Most often the signs of an abscess are dramatic and sudden. Sometimes a horse can start out moderately lame and become very lame fast. For someone who has never seen it before, a horse with an abscessed hoof can be in so much pain that it can look like he has a broken leg.

Abscesses have some classic symptoms. Hoof tester sensitivity or pain in the area of the abscess, increased digital pulse to the hoof, decreased ground contact of the heels, swelling of the lower leg, pain to percussion (tapping the hoof with a percussion hammer) and an erupted tract of pus are hallmark symptoms. Any combination of these symptoms is enough to make a tentative diagnosis of an abscess.

A veterinarian's final diagnosis can be made when the area of pain in the hoof is localized and the hoof pared away to reveal a pus pocket or draining tract. If this can be done, the horse generally feels a great sense of relief from the reduced pressure in his hoof. Sometimes when the tract has been opened, the pus runs out, putting on a great show. Other times the pus is very thick and dry and is pushed out with hoof testers or squeezed out as the horse puts his hoof down. If the pus cannot be drained, the hoof is soaked in an Epsom salts and warm water solution to soften the hoof capsule and draw out the infection. Usually in one to two days the abscess opens.

#### Soaking Hooves

Soaking can be really easy or really, really hard. The easy way is warm water and enough Epsom salts to saturate the water. (The water is saturated when no more salt will dissolve.) Epsom salts solution is usually put in a bucket but works best in a flat heavy rubber feed tub. Water level needs to be above the hairline to promote abscess eruption at the coronary band. The hoof is then placed in the bucket or tub and left to soak for 15 to 20 minutes.

However, sometimes the horse won't keep his hoof in the water and/or continuously tips the tub. The Davis Boot, Easy Soaker from Easyboot and SmartBoot from Giddyap Girls are a few of the boots that have been designed specially for soaking hooves and can make the job easier.

Poulticing the hoof is another choice for noncompliant patients. The hoof is poulticed by putting poultice material, magna paste, ichthammol, sugardine or Uptite poultice on the entire sole of the hoof then covering it with duct tape or some sort of boot.

If your horse is willing, soaking and poulticing are optimal: daily soaks followed by a poultice wrap.

#### Causes of Abscesses

The majority of abscesses start at the solar surface at the angle of the bars. As the sole grows out, the bar sometimes folds over some dirt or debris, trapping it under the sole. Once this happens bacteria are trapped under the sole and begin to grow. As they grow the bacteria eat away at the sole and start traveling, usually dissecting under the sole and along the white line, traveling upward toward the coronary band. As the abscess gets deeper and bigger it becomes more painful, sometimes causing the leg to swell as it gets close to the coronary band.

Unsanitary horsekeeping, such as sloppy living conditions that include a footing mixture of mud, manure and urine, soften the sole and make it more susceptible to infection. Hooves that are picked infrequently hold manure-and-urinesoaked bedding in the frog sulcus that can also cause the sole to soften and become infected.

Bruises can turn into abscesses. Bruises occur when the hoof suffers some sort of concussion either from an opposing hoof or object (rock, et cetera) hitting the hoof wall, or by stepping on something, usually stones. A bruise is basically a pocket of blood that develops when some blood vessels are broken. This pocket of blood is a wonderful growing environment for bacteria. As the hoof grows out, the bruise grows out, allowing bacteria to invade the area and develop into an abscess. Sometimes the bruising is severe enough that the body develops a strong inflammatory reaction that causes a "sterile" abscess. This is an abscess with no bacteria, rather only inflammatory cells and debris.

Penetrating foreign objects may also cause abscesses. A farrier's nail hole may become infected and develop into an abscess. More commonly, though, the horse steps on a foreign object, usually a nail, and it drives into the sole, taking dirt and bacteria in with it. When the foreign object is pulled out the sole closes up, sealing itself and the bacteria in the hoof. If the area is not opened up immediately to clean out the bacteria and other debris, an abscess can form.

The most dangerous penetrating wound to the hoof is a puncture to the navicular bursa, most commonly caused by the horse stepping on a nail. With this type of injury, the nail or other foreign object finds its way up and through the back third of the frog and into a small sac of fluid between the navicular bone and deep digital flexor tendon called the navicular

bursa. When this happens, bacteria and debris get into this sac of fluid. Once the object is pulled out the area seals itself, allowing a perfect environment for bacterial growth. If the navicular bursa becomes infected it can be very painful, and since it is located so deep in the hoof it can be very difficult to treat. If the infection spreads from the navicular bursa to the deep digital flexor tendon sheath, the infection can travel up the leg, making it almost impossible to treat and ultimately costing the horse his life.

#### Treatment

Thankfully, abscesses are for the most part easy to treat once they have been diagnosed. The goal of treatment is to expose the infection, flush it out as much as possible and keep the area draining so that another abscess can't form. Once the abscess is exposed, either on the solar surface or at the coronary band, the area is flushed with antiseptic to kill the bacteria and clear all of the pus out of the tract or pocket. The hoof is then usually soaked in a warm Epsom salts solution to help draw out and kill more of the bacteria. Painkillers and anti-inflammatory medicine, such as bute, are given to relieve the pain and to decrease inflammation. Occasionally oral, intramuscular, intravenous or topical (on the abscess itself) antibiotics are used. The average down time for the horse is five to 10 days.

#### Hot Tip!

The number one way to prevent abscesses is to keep the hoof dry, clean and well trimmed. This means picking hooves daily and ensuring that bedding is kept as clean as possible. Regular trimming keeps the sole from trapping debris under itself. Puncture wounds from nails or other objects are in a whole different category and need to be treated much more aggressively. If possible the hoof is radiographed (X-rayed) with the nail or foreign object still embedded so that the direction and depth of the penetration can be determined. The object is removed and a contrast solution is injected into the penetration tract. This contrast solution appears as bright white on a radiograph. If the navicular bursa has been penetrated then the contrast solution easily drops into the bursa, and the entire bursa and penetration tract are bright white on the radiograph.

If the bursa has been infected, then the horse is laid down under general anesthesia, and a section of the frog removed to expose the navicular bursa. At this time the bursa is flushed and treated at the site of infection. The area is kept open and flushed daily. The horse is put on strong antibiotics, and the hoof/open frog area is covered with a hospital plate (special shoe with a full metal plate covering the entire sole that can be removed and put back on). If all goes well, the bursa doesn't become infected, and the hoof fills in with scar and hoof material, which can take two to four months.

#### Differential Diagnosis

Abscesses tend to be very easy to diagnose, but it's not always so. Sometimes the horse is only slightly or moderately lame, and the pus pocket/draining tract can't be found in the solar area. The question then arises, "Is this an abscess or is it something else?"

If an abscess is suspected but can't be found, soaking the hoof in a solution of Epsom salts and warm water helps bring the abscess "to a head," causing the pus to erupt either at the solar margin or more often at the coronary band of the heels. The length of time before this occurs can vary dramatically with atypical cases requiring seven to 10 days soaking and packing with poultice or ichthammol to draw out infection. However, if the abscess hasn't resolved after three days, other sources of the lameness should be explored and ruled in or out.

So what if it's not an abscess? The alternatives are not as easy to fix: fractures of the coffin bone, navicular bone or pastern bone; torn tendons and ligaments; laminitis and a host of other obscure problems.

No one likes to see their horse in pain, and certainly no horse likes to be in pain, but for a veterinarian, horse owner and horse, finding that pus and draining it sends all involved "skipping down the barn aisle happy."

Read more about treating hoof abscesses.

Janice Posnikoff, DVM is a dressage rider and equine practitioner in Southern California.

This article originally appeared in the November 2004 issue of Horse Illustrated. [Click here to subscribe.](#)