

Edmonton Equine Veterinary Services Inc. **NewsWire**

News for Edmonton Equine Vet. Customers

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September 2006

White Line Disease

by: Chad Mendell

The white line of the foot can be seen by looking at the sole of your horse's hoof. The area (that looks whitish) between the outside hoof wall and where it meets the sole is the white line. When this becomes damaged, it allows fungus and/or bacteria to invade and separate the layers of the hoof wall. When that happens, the infection can spread around the hoof and up the inside of the wall to gradually "eat away" at the hoof, making a horse very lame.

White line disease is actually a misnomer, as the white line is not actually involved, but rather the deepest layer of the non-pigmented stratum medium (see diagram on page 84). White line disease has many other names: stall rot, hollow foot, wall thrush, and seedy toe. For ease of our discussion in this article, we'll refer to this problem as white line disease.

What You See

White line disease is characterized by progressive hoof wall separation that occurs in the non-pigmented horn of the hoof at the junction between the stratum medium (middle layer of the hoof capsule) and laminar horn. The separation is usually progressive, and it typically involves the toe and quarters of the hoof.

"Back 10-15 years ago, every time you would open a magazine, you would see an ad for a topical treatment that said it would kill white line disease," says Rob Spencer, farrier and co-owner of the Equine Podiatry Center located near Lexington, Ky. "You won't find that anywhere now, and the reason is someone finally took the time to identify the (fungal) spores common in white line disease."

Burney Chapman, a certified journeyman farrier and Susan Sharp, PhD, director of clinical microbiology at Mt. Sinai Medical Center, were the first to extensively study what caused the horn wall to deteriorate to the soft, white, chalky state associated with white line disease.

"He identified 22 spores associated with white line disease, but there were six of them they couldn't kill in the lab," Spencer said. "They could knock them back, but they couldn't eradicate them for whatever reason. Companies had to back off that statement and say that they treated white line disease instead."

Hoof Review

To understand how this pathogen invades the hoof, it's important to understand the hoof structure. A hoof is layered from the outside in (hoof wall, hoof horn, laminae). The hoof wall supports the brunt of the horse's weight rather than the sole of the foot. The hoof wall is similar to your finger nail in that it's made of dead cells that are unable to heal; they must be regrown when damaged, such is the case with horses affected with white line disease.

Beneath the hoof wall is the hoof horn, which is attached to the laminae, which are attached to the third phalanx (P3 or coffin bone). At the top of the hoof is the coronary band, the source of nutrition for the hoof wall, which is similar to the cuticle of your fingernail.

The front of the hoof is called the toe, the sides are called the quarters, and the back of the hoof is called the heel. The hoof wall and hoof horn meet the sole at the bottom of the hoof. The rubbery, V-shaped tissue that protrudes from the middle of the sole to the back of the hoof is the frog, which acts like a shock absorber. The frog also helps promote blood circulation in the hoof through a pumping action as the hoof hits the ground.

How It Starts

White line disease is an opportunistic disease, meaning the pathogens take advantage of a weakened or compromised hoof wall, such as hoof wall separation caused by an improperly balanced hoof (i.e., too much toe, which can cause mechanical separation of the hoof wall).

"Everything that I have been taught about white line disease is that it is opportunistic, and there is a mix of fungi in there," Spencer explains. "It eats the stratum which is the non-pigmented (middle) section of the horn wall."

Spencer says that a decade ago, he used to shoe horses with white line disease in a regular flat shoe, but he has evolved to using more advanced techniques that involve adding bevel or "rocker" to the shoe. This, he says, creates a breakover for the hoof to match the angle of the boney column of the leg, reducing the amount of stress on the toe of the hoof wall.

Being able to manipulate the hoof's breakover point also lets farriers reduce stress on the compromised area.

"According to our beliefs, there is a mechanical tearing that occurs when you have a flat shod horse," Spencer says of the renowned veterinarian. "In a flat shod horse, the bone wants to break over before the hoof. You have a mechanical lever with the toe that literally tears the hoof wall. Then you have an opportunistic 'bug' that can invade that cavity, causing white line disease."

Because white line disease deteriorates portions of the hoof wall, and the hoof wall is further compromised by treatment that requires debridement (removal of the infected hoof wall), secondary problems can occur.

"Once you start taking the hoof wall away and you don't support the bony column, you can have laminitis secondary to the wall becoming detached because of white line disease," explains Spencer.

Treatment Options

Morrison says treatment options for white line disease will depend on the severity of the damage to the hoof. If caught early, white line disease is very manageable. The horse can return to work without a layoff. However, if the fungi and bacteria are allowed to make headway in the hoof wall, treatment can become much more problematic, requiring special shoes, boots, or even a cast, not to mention several months to grow out the hoof.

"Most of the cases that we get in here are pretty well advanced," says Morrison. "There's a lot of damage to the hoof wall."

When the hoof wall is severely damaged, Morrison says the best method of treatment is to remove (debride) the affected hoof wall.

"If you were to come in here with a horse that had a radiographic lesion that wasn't huge, we'd clean it all out and trim the foot," Spencer explained. "We'd measure the lesion and make a note of it. So, say that lesion was 3 centimeters. When you come back in four to five weeks, I take the shoes off, trim the hoof, and I measure again. If they come back and that lesion is 2.5 centimeters, that means that we are getting ahead of the wall's tearing."

If that is the case, soaking the hoof in a chlorine-based agent once or twice a week and keeping the hoof as clean as possible is recommended.

However, Spencer says, "If the measurement is at 3.5 centimeters, guess what--the wall is tearing quicker than the horse is growing foot. So if you are growing maximum amount of foot, and the lesion is still getting bigger, you have no other option but to resect it."

Morrison adds, "When horses come in here with advanced wall disease, and they are really compromised to the point where we can't get a boot on them, they need to be put in a special type of foot cast, special shoes, or special boot and soaked twice a week. You don't want to cover it up. You want to leave it open."

He recommends using either CleanTrax or White Lightning, which are two commercially available products for treating white line disease.

Spencer explains that the fungi and bacteria that are present in these situations are sensitive to light and air, so covering the area with glue will actually help the fungi grow. In other words, avoid gluing on a shoe.

To reduce the amount of pressure on the toe of the hoof, Spencer says, "We've gone to shoeing those things with just mild rocker in them to try to balance the hoof wall breakover to the digital breakover to eliminate the mechanical tearing."

To avoid causing secondary laminitis, Spencer and Morrison agree that the frog and bars of the hoof need to be supported.

"Even if we use a 3 degree wedge aluminum shoe, rocker that a little bit, and bevel the toe off real hard to bring that break over back--I always weld a frog support bar, or I fill (that area of the hoof) with some type of pour-in pad—once you lose a certain amount of integrity in the wall, your sole starts to prolapse and produces a mechanical laminitic episode that's caused by failure of the attachment. You've got to support that digit," Spencer explains.

"For a short time, several years ago, we tried Sporanox, which is a drug people take for onychomycosis," says Spencer "However, a drug company's study several years ago had about a 54% success rate with it. The problem is the treatment for a horse is about \$6,500, and the instructions say that if this doesn't work, you should debride it."

Economically, this is not a viable option for many people, especially since the success rate is relatively low. Instead, Spencer says if the white line disease is not under control on its own, he goes straight to debridement.

Additionally, Morrison says he will have the owners put the horse on some type of hoof supplement that contains biotin to promote hoof growth.

Movement will also promote blood circulation that can increase hoof growth. If the horse is comfortable moving around and is not in pain, it's recommended that he be put on some kind of exercise program, turnout, hand walking, or light riding.

"By far the best thing to do is to catch it early," Morrison says. "Farriers that are knowledgeable can catch early signs of white line disease. Little cavities in the white line, or a seedy-looking toe, are signs of the onset of white line disease."

Prevention

Keeping horses' hooves well-balanced and trimmed regularly will prevent tearing of the hoof wall, which can create cavities for fungi and bacteria to invade.

"We tend to see it in horses that are stalled a lot," Morrison explains. "We see it in a lot of Saddlebreds, Quarter Horses, and halter-type horses. I don't see it a lot in those horses that are out in their natural environments."

White line disease can often be a secondary complication to another hoof disorder. "White line disease is an opportunistic pathogen," Morrison explains. "It usually only invades weakened areas of the hoof wall, whether it's old nail tracks or areas of hoof wall separation. It's common to get white line disease in horses with club feet, where the hoof dishes or flares, old abscess tracks, old quarter cracks. It's really common for foundered horses to get secondary white line disease."

He added, "We had a jumper in here that was really foot sore that had white line disease on one quarter that caused that coffin bone to tip to that quarter. It was a mechanical and structural failure of the foot."

There has been a lot of debate about whether white line disease is a fungal or bacterial infection. Though bacteria is sometimes present in white line disease, the majority of the pathogens are fungal. These fungi are resistant to fungicides for the most part, so treating the horse's environment would be a waste of time, says Morrison.

One of the best ways to help your horse avoid contracting white line disease is by practicing proper hoof hygiene. Simple steps such as picking your horse's feet daily can help reduce the risk of contracting this potentially debilitating disease.

Extreme weather conditions are thought to increase the hoof's uptake of these fungi. So during overly wet or drought conditions, greater care should be taken to ensure proper hoof hygiene.

Take-Home Message

White line disease, if caught early, can be managed. Good hoof hygiene and recognizing early signs of the disease are essential to controlling the problem. Treatment for white line disease is generally successful, but it can be very time consuming since the hoof wall must grow out and replace the damaged area. If you suspect your horse might have white line disease, consult your veterinarian or farrier.

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