

BY STACEY OKE, DVM, MS; REVIEWED BY SCOTT MORRISON, DVM, CJF

White Line Disease in Horses

DON'T OVERLOOK THIS IMPORTANT PART OF THE FOOT

WHITE LINE DISEASE (WLD) is a condition of the equine foot that causes the hoof wall's layers to separate. That separation starts at the solar surface of the foot and works its way dorsally (upward) toward the coronary band.^{1,2} Luckily, WLD is manageable with appropriate hoof care.

WHAT/WHERE IS THE WHITE LINE?

If you pick up one of your horse's feet and clean off the solar surface (bottom of the foot), you'll note a yellowish "line" located a few centimeters inside the contours of the hoof wall and running parallel to the wall. In healthy horses, this line (which is also called the zona alba) has a plastic consistency when compared to the hard wall of the hoof.

Microscopically, the hoof wall includes three layers, each called a stratum. They include:

1. A thin stratum externum;
2. A thicker stratum medium that forms the bulk of the hoof wall; and
3. A thinner stratum internum.

The white line is the junction between the inner hoof wall and the sole, which is made of nonpigmented stratum internum and horn produced by the terminal papillae.

If you looked at an X ray of your horse's foot, you would see that the next major structure after the stratum internum (toward the middle) is the coffin bone (third phalanx or P3), which is joined to the stratum internum by millions of lamellae—interconnecting "fingers"—that help suspend the coffin bone within the hoof.

WLD vs. Laminitis: Hallmark Features

WLD	LAMINITIS
Usually not painful	Extremely painful
Causes separation of the hoof wall between the middle and inner layers of the hoof wall	Separation between the inner layer of the hoof wall and the coffin bone
Treatable with appropriate farriery	Life-threatening, acute cases require aggressive treatment
Causes remain unknown but likely involve mechanical stresses, nutritional and metabolic factors	Multiple causes, including grain overload, mechanical stresses, systemic infections

SIGNS OF WLD

In the early stages of disease, WLD does not usually cause lameness issues.¹⁻⁶ Instead, WLD is generally perceived as a nonpainful condition; however, some reports of severe lameness (grade IV/V) associated with WLD do exist.³ Overall,

White line disease is also known as:

- ◆ Seedy toe
- ◆ Hoof wall disease
- ◆ Yeast infection
- ◆ Onychomycosis
- ◆ Hollow hoof syndrome

the bulk of the literature on WLD suggests that affected horses have no soundness issues until damage is sufficient to allow mechanical loss of the attachment between the middle and inner

layers of the hoof wall. At that point, WLD more closely resembles laminitis, because the hoof wall is no longer able to suspend the coffin bone and sinking/rotation of the coffin bone ensues.

In the early/mild stages of WLD, the white line takes on a "powdery" or chalky appearance when looking at the sole of the foot. The condition usually starts at the toe. Even an observant horse owner might easily miss the very early stages of WLD, especially when the separation occurs in a small area and lameness is infrequent.

As WLD progresses, the powdery white line engulfs the healthy white line, which becomes wider than normal. If examining the horse's foot from the front, you can see a slight dish (concavity) near the coronary band on the unaffected side and a bulge is noted on the affected side. This only occurs in cases with extensive separation of the hoof wall. In addition, the hoof wall might be in poor health, growing at a slower than normal rate, and if one gently strikes the hoof wall with a hammer over the affected area, a hollow sound is noted.

Only with extensive separation



White line disease is a serious hoof condition that requires veterinarian and farrier intervention.

does lameness occur, and only in extreme cases do horses experience the level of lameness characteristic of laminitic horses.^{1,2} Once separation begins, micro-organisms begin to invade the space, which is why an odor or black liquid is sometimes observed in the space between hoof wall layers. Fungi and fungal spores are commonly found, as well as other opportunistic microbes, such as yeast and bacteria.

ACHIEVING A DIAGNOSIS: EXAMINATION AND RADIOGRAPHY

In addition to a comprehensive physical and lameness examination, X rays help confirm a WLD diagnosis, establish the severity of disease (i.e., how extensive the separation is, if the coffin bone has begun to rotate), and monitor response to treatment. X rays also help distinguish between laminitis and WLD when necessary.^{1,2,4,5}

TREATMENT

Unlike laminitis, aggressive systemic therapy and hospitalization is rarely necessary once the affected tissues have been removed. To do this, the farrier and veterinarian remove both the separated hoof wall and underlying diseased tissue. The hoof is then trimmed and balanced to correct any conformation issues and to ensure the remaining hoof wall can bear the horse's body weight.

Choice of shoeing or use of "composites" to serve as a "band aid" while the hoof is growing is made on a case-by-case basis and takes into consideration several factors (such as amount of hoof wall resected and coffin bone involvement). Note that the horse might require extensive aftercare, because the area needs to remain clean and dry. The hoof wall grows from the coronary band down to the ground, which means it can take up to 12 months or more for complete regrowth to occur.

PROGNOSIS/PREVENTION

Unlike laminitis, the outcomes associated with WLD are typically very good. In terms of prevention, regular exercise to promote blood flow, appropriate diet, and routine farriery are recommended for optimal hoof health. Although cleanliness does not technically contribute to WLD because even very well managed stables have horses with WLD, horses should not be housed in soiled environments. Without a clear idea of the cause(s) of WLD, prevention is challenging.

WLD CAUSES

One of the biggest unanswered questions regarding this condition is, "What causes WLD?" According to experts, there isn't a single "cause," but rather a myriad of potential contributors, including the following:¹⁻⁶

Environment. Horses residing in wet, humid areas are thought to be at risk for WLD; however, even horses residing in hot, dry conditions can develop WLD. That said, excessive moisture is thought to soften the foot, making the foot more amenable for dirt and debris to enter any existing separa-

tion. Excessive bathing during warmer months is believed to contribute, but excessively dry hooves could be prone to cracks and separation of the hoof wall.

Mechanical stresses. Stresses caused by physical factors such as excessive toe length, poor hoof conformation, under-run heels, club foot, etc. During ambulation, stresses put on the separating hoof can cause additional damage, promoting further separation and potentially rotation/sinking of the coffin bone.

Vascular changes. Chronic laminitis promoting changes to the blood flow to the laminae in the foot, potentially contributing to WLD.

Endocrine factors. Horses with insulin resistance/equine metabolic syndromes are thought to be more likely to develop WLD.

Diet. Selenium toxicity is believed to play a role in development of WLD, a diet contributing to insulin resistance/equine metabolic syndrome in at-risk horses should be avoided.

Abscess. Extensive abscesses of the foot might also contribute to hoof wall separation.

TAKE-HOME MESSAGE

Any foot of any breed of horse at any age can develop WLD. Hygiene is not thought to play a role, but many factors, such as diet, environment, stresses, concurrent disease processes, and history of laminitis, must be considered in an attempt to avoid either onset or recurrence of WLD.

KEY REFERENCES

1. Redding WR, O'Grady SE. Nonseptic diseases associated with the hoof complex. *Vet Clin North Am Equine Pract* 2012;28:407-21.
2. O'Grady SE. How to manage white line disease. In: *Proceedings of the 52 Annual Convention of the American Association of Equine Practitioners*. 2006.
3. Oke R. Unilateral white line disease and laminitis in a quarter horse mare. *Can Vet J* 2003;44:145-6.
4. Hickman P. Fighting white line disease. Available at: <http://www.thehorse.com/articles/33828/fighting-white-line-disease>.
5. O'Grady SE. Managing white line disease. In: *10th Geneva Congress of Equine Medicine and Surgery*. 2007.
6. White line disease in horses. *Merck veterinary manual*. Available at: http://www.merckvetmanual.com/mvm/musculoskeletal_system/lameness_in_horses/white_line_disease_in_horses.html.

This Fact Sheet may be reprinted and distributed in this exact form for educational purposes only in print or electronically. It may not be used for commercial purposes in print or electronically or republished on a Web site, forum, or blog. For more horse health information on this and other topics visit TheHorse.com. Published by The Horse: Your Guide To Equine Health Care, © Copyright 2015 Blood-Horse Publications. Contact editorial@TheHorse.com. Navicular Syndrome Fact Sheet Sponsored by Dechra.

theHORSE.com
YOUR GUIDE TO EQUINE HEALTH CARE

Soundness & Lameness Newsletter

Tips for
keeping
your horse
sound...



... And info for when he
figures out how to go lame
in spite of your hard work.



Sign up now for **FREE** at TheHorse.com/SoundnessAndLameness