

FACTSHEET

PODOTROCHLOSIS

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THIS CAREER-THREATENING CONDITION IS MORE THAN JUST A PAIN IN THE FOOT

Historically, navicular disease, defined as degeneration of the navicular bone and its associated structures, was assumed to be pain localized to a horse's foot.^{1,2} Now, veterinarians know navicular disease is more accurately referred to as podotrochlosis because it involves not only the navicular bone but also a large number of structures that make up the podotrochlear apparatus. Throughout this fact sheet, however, we'll use the more commonly accepted term, navicular disease, in reference to the condition.

THE PODOTROCHLEAR APPARATUS

Despite its small size, the navicular bone has a complex structure and function. It is a small, cartilage-covered, boat-shaped bone located at the back of the foot (the palmar/plantar aspect) behind the coffin bone (third or distal phalanx) and under the small pastern bone (the second or middle phalanx). The navicular bone, together with its synovial-fluid-filled bursa (a "sac" containing synovial/joint fluid), provides a fulcrum for the deep digital flexor tendon (DDFT) as it courses down the back of the foot. The tendon changes direction at the navicular bone before attaching to the bottom of the coffin bone.

Other components of the navicular apparatus include (but are not limited to) the following²:

- ◆ Ligaments such as the collateral and distal sesamoidean, distal digital annular, and impar.
- ◆ DDFT.
- ◆ Navicular bursa.
- ◆ Digital cushion and joint capsule.
- ◆ The distal phalanx, lower portion of the middle phalanx, and lateral ungual cartilages.

Together, these structures "enable the internal soft and hard tissues of the foot to withstand impacts of body weight while also permitting various movements."² In essence, the navicular/podotrochlear apparatus is a pulley system that disperses the forces of the DDFT before they reach the coffin bone.

THE FACE OF NAVICULAR DISEASE

Quarter Horse, Thoroughbred, and Warmblood geldings between 4 and 15 years of age appear to be more commonly afflicted.² Affected horses are often lame in both front feet, but the lameness can be asymmetrical (with one limb worse than the other). Lameness typically develops slowly and becomes worse after the horse works hard. Horses with navicular disease often place their weight on the toes while walking, which is thought to minimize pressure on the painful heel area. As a result, a navicular horse's gait is typically rough. When standing, affected horses shift weight from foot to foot in an attempt to relieve pressure and pain in the heels, and they might "point" their forelimb(s). The



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feet of a horse with navicular pain are often imbalanced or have one or more conformation issues. For example, a horse with navicular disease might have a hoof that's smaller than normal and/or contracted heels. A broken-back hoof-pastern axis or underrun heel might also be present.

Although researchers suspect the condition has a genetic component, no studies have confirmed it. Commonly, mechanical stresses or vascular compromise are blamed for causing degeneration of the navicular bone and associated structures.³ For example, hyperextension of the distal limb (like what would happen when the horse lands after a jump) compresses the navicular bone against the DDFT.²

MRI: THE PREFERRED METHOD OF DIAGNOSING NAVICULAR DISEASE

When evaluating lameness, veterinarians rely on the horse's history and complete physical and lameness examinations, including flexion tests, applying hoof testers, diagnostic analgesia (nerve and/or joint blocking), and imaging. Horses with navicular disease become sound after a palmar digital nerve block, which numbs the caudal (back) part of the foot and heel.³

Radiographs (X rays) remain the first-line imaging modality for diagnosing navicular disease. Veterinarians might also perform ultrasonography, nuclear scintigraphy (bone scan), thermography, computed tomography, and navicular bursography (arthroscopic examination of the bursa), but MRI is considered the gold standard technique for achieving a definitive diagnosis.³ In some clinics veterinarians can now perform MRI in standing, sedated horses. While availability and cost might limit some owners' ability to pursue MRI, veterinarians agree it's the best way to characterize the lesions in the foot. An incomplete or inaccurate diagnosis might lead to the prescription of ineffective or even contraindicated therapies.⁴

TREATMENT OPTIONS

No one treatment plan has yet been established to successfully manage this progressive, painful condition. Instead, veterinarians use a combination of conservative care, pharmacologic intervention, and sometimes surgery to keep horses comfortable.

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Conservative care Rest, controlled exercise, and hoof care all fall into this category. Farriery typically includes appropriate trimming of the hoof to balance the foot and support the heel in conjunction with corrective shoeing. Typically, conservative therapy alone is unsuccessful long-term.²

Pharmacologic intervention Non-steroidal anti-inflammatory drugs remain a cornerstone for treating navicular syndrome.³ Veterinarians might recommend a variety of other medications and complementary/alternative therapies, each with various presumed benefits. Examples include (but are not limited to):

- ◆ Injecting corticosteroids, polysulfated glycosaminoglycan (PSGAG), and/or hyaluronic acid into the distal interphalangeal joint or navicular bursa.
- ◆ Orally administering isoxsuprine and/or pentoxifylline (vasodilators designed to improve blood flow).
- ◆ Acupuncture.
- ◆ Extracorporeal shock wave therapy.
- ◆ Oral joint/hoof health supplements.

As with other musculoskeletal conditions, regenerative therapies such as stem cells are potentially beneficial. But at this time, research and described techniques are lacking, making this approach unrealistic in a clinical setting.

Because the navicular bone suffers resorption (breakdown), veterinarians often administer bisphosphonates, two of which have U.S. Food and Drug Administration (FDA) approval: clodronate disodium (Osphos) and tiludronate disodium (Tildren). These two products are believed to block the action of osteoclasts—cells that break down bone. According to the literature, the success rate is 65.4% 180 days after administration for clodronate and 63.87% two months following treatment with tiludronate.

SURGICAL OPTIONS

Surgery is usually reserved for navicular disease cases not responding to conservative and pharmacologic approaches.³ Palmar digital neurectomy that desensitizes one-third to one-half of the heel and sole is one option. Although practitioners have noted good

responses initially, serious complications can follow neurectomy, including the potential for catastrophic breakdown.³

OUTCOMES

Without a cure, the navicular horse's use and conformation typically dictate his prognosis. Veterinarians, farriers, and owners working together, however, might be able to manage or maintain many horses successfully. Aggressive treatment early on might keep a horse with navicular disease comfortable and extend his athletic function as long as possible.

Key References

1. Belknap JK. Navicular disease in horses. *Merck Veterinary Manual*. Navicular disease in horses. 2015. Available at: merckvetmanual.com/musculoskeletal-system/lameness-in-horses/navicular-disease-in-horses.
2. Osborn ML, Cornille JL, Blas-Machado U, et al. The equine navicular apparatus as a premier entheses organ: Functional implications. *Vet Surg* 2021; 50(4):713-28.
3. Fürst AE, Lischer CJ. Other clinical problems of the equine foot. *Vet Clin North Am Equine Pract* 2021;37(3):695-721.
4. Koch DW, Barrett MF, Jackman BR, et al. Comparison of lameness outcomes in horses with acute or chronic digital lameness that underwent magnetic resonance imaging. *N Z Vet J* 2020;68(5):283-8.
5. Oke S. Bisphosphonate use in horses. 2020. TheHorse.com.

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