

## Natural Relief for Navicular

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### What is Navicular?

Navicular is a degenerative disease that describes horses with chronic lameness, primarily of the forelimb, caused by pain stemming from the navicular bone<sup>14</sup>; the small bone in the back of the foot, and other related structures; the coffin joint, the impar ligament, suspensory ligament of the navicular bone, the navicular bursa, and the deep flexor tendon<sup>19</sup>. There are two popular explanations of how navicular disease develops; the vascular and biomechanical theories. The vascular theory describes a profound decrease in blood flow to the foot which causes pain and degeneration of the navicular bone due to the thickening of the inner lining of the blood vessels, which cuts off the blood supply causing tissues damage and death due to lack of blood flow. The biomechanical theory is defined as a chronic, sustained pressure on the navicular bone by the deep digital flexor tendon, secondary to abnormal forces placed on the tendon resulting in abnormal remodeling of the navicular bone. In response, the bone begins to degenerate and becomes fluid-filled and painful<sup>19</sup>.

### Causes of Navicular

Despite extensive research in this field, the exact cause of navicular disease is unknown. According to experts, this is because navicular is not a single disease; it's a number of different clinical conditions that cause the foot pain.

**Obesity & Poor Foot Care**- A horse's diet should be regimented and their weight monitored as horses that become overweight have a higher chance of exhibiting symptoms of navicular due to the increased weight bearing on the feet. Poor trimming, shoe selection or inappropriate shoe attachments are also causes of lameness. In nature, a horse's hoof is designed to expand and contract as the horse moves. Expanding and contracting movement of the hoof acts as an auxiliary pump and aids in the circulation of blood to the lower extremities. Thus when an inflexible metal shoe is attached to the hoof, the hoof can no longer work as designed and blood flow is inhibited<sup>16</sup>.

**Excessive Exercise** - Galloping, jumping, extended trotting on hard surfaces and riding on the forehand, especially in tight turns and limited spaces of arenas, are the leading causes of navicular injury in the working and riding horses. Concussion sports such as jumping, eventing, steeplechase and distance riding travel can impact very heavily and improperly on the forehand, thus unnaturally overstressing the deep flexor tendon and often causing lameness<sup>11</sup>. Horses that spend a majority of the day standing and confined to a stall have an increased chance of developing navicular disease because blood flow to the hoof decreases when the horse is not mobile.

### Anatomical Structure & Function with Relevance to Navicular

When considering navicular disease, there are two main areas of focus, the involvement of navicular bone, navicular bursa and the deep digital flexor tendon as well as the blood supply to the bone. The navicular bone is a sesamoid (small, shuttle-shaped) bone located at the back of the foot. It is



wedged between the coffin bone and the deep digital flexor tendon. The flexor tendon passes behind the navicular bone, attaching to the back of the coffin bone. Between the navicular bone and the tendons is the navicular bursa that provides a smooth gliding surface for the tendon<sup>8</sup>. The navicular bone and its synovial fluid-filled, navicular bursa, cushion protect the deep digital flexor tendon as it courses down the back of the foot, changing direction and attaching to the coffin bone. Several ligaments such as the impar (distal sesamoid) and collateral sesamoid ligaments support the navicular bone and, if injured, can also be a source of palmar foot pain<sup>14</sup>. The navicular bone helps protect the joint and tendons from pressure and concussion, acting like a pulley on the deep digital flexor tendon, taking some of the stress off the coffin bone. It also acts as a valve for blood flow to the coffin bone and hoof. Some experts believe that inflammation from strain of the impar ligament can decrease blood flow to and from the navicular bone, as the major blood vessels supplying the bone run up and down this area<sup>2</sup>.

### Treatment Options

Developing a logical approach to the treatment of navicular is to accurately assess the pain and carefully evaluate the hoof structure that may cause the condition or the pain. Treatment then should be based on the type of and location of the disease<sup>19</sup>.

Shoeing should be the basis of all treatment and any medicinal or surgical therapy should be as an adjunct to shoeing<sup>19</sup>. The goal is to reduce the forces on the navicular region by correcting hoof balance and the hoof-pastern axis, allowing the use of all weight bearing structures of the hoof by maintaining the heel mass and protecting the palmar aspect of the foot from concussion and lastly, decreasing the work of the moving foot by either shortening the toe length of the foot to permit an easier break over or rolling the toe of the shoe<sup>20</sup>. Specialty boots and shoes help to support the heels and move the weight bearing axis to assist horses heal is a beneficial treatment option.

One of the most overlooked treatments for horses suffering from navicular disease is confinement and rest. Continued stress on the navicular region leads to structural failure and eventually breakdown. Time allows for soft tissues inflammation to subside and bone remodeling to occur<sup>20</sup>. The amount of rest time required by a horse depends on their individual need and the severity of the issue diagnosed by a veterinarian.

A treating veterinarian might consider additional medical and surgical therapies including administration of non-steroidal anti-inflammatory (NSAID) drugs such as phenylbutazone, flunixin, meglumine or ketoprofen, oral administration of isoxsuprine hydrochloride and pentoxifylline, to dilate the blood vessels to the foot, acupuncture, and oral joint health supplements like polysulfated glycosaminoglycans or hyaluronic acid<sup>8,14</sup>. Surgical treatments include palmar digital neurectomy (cutting the palmar digital nerve) to desensitize the foot, navicular suspensory desmotomy (cutting the ligament), and carpal (inferior) check ligament desmotomy<sup>8,20</sup>.

### Relationship Between Use & Management of the Horse with Navicular

The horses' fitness can be maintained on a regular basis with slow, long activities or even swimming in comparison to being worked at high speeds, on inclines, hard surfaces and irregular terrain or deep footing. Regular exercise on hard or irregular surfaces increases concussion on the hoof, thus increasing the risk of navicular. Disciplines such as jumping, eventing, steeplechase and distance riding are considered concussion sports as they travel very heavily and improperly on the forehand, thus unnaturally overstressing the deep flexor tendon and often causing the lameness<sup>11</sup>. Naturally, the horses hoof expands and contracts as the horse moves which creates an auxiliary pump like action in the hoof and aids in the circulation of blood to the lower extremities. Thus when a metal shoe is applied to a hoof, they become inflexible and in turn inhibits blood flow<sup>16</sup>. Flat feet, small hooves relative to body size, hard footing and unbalanced hooves could increase concussion on the hoof as well as irregular scheduled farrier care<sup>21</sup>, poor trimming, shoe selection or inappropriate shoe attachments<sup>16</sup>. Horses who exhibit a high weight-to-foot size ratio may have an increased chance of developing symptoms of navicular disease as the body weight adds strain to the lower limbs and thus relative weight load on the foot.

### Management Techniques In Preventing Navicular

**Routine Foot Care** - Foot care is by far the most important and effective prevention method when it comes to decreasing the chance of a horse developing navicular disease. Consistent and regular care from a reliable and educated farrier is necessary to keep the hoof in good condition and to address issues of imbalance as they arise<sup>19</sup>.

**Exercise & Weight Control** - Exercise and turnout are important to maintain lubrication and nutrition of cartilage within the joints and navicular structures as well as a healthy body condition. Blood flow is improved within the hooves when horses are mobile and regular movement minimizes formation of adhesions between the navicular bone and flexor tendon<sup>8</sup>. Reducing the frequency of impaction stress to the hooves (ex. Jumping) is also an important factor at keeping navicular from occurring. The more stress and weight a horse possesses, the harder the strain on the lower limbs and more so on their feet. There is little you can do about the size of a horse's feet but you can control their weight by providing nutritional management choices and monitoring of their weight and overall body condition.

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