U of M Horse Newsletter

Providing research-based information to Minnesota Horse Owners

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The Importance of Water During Cold Weather

When horses consume winter feeds, water requirements may increase. Hay and grain typically contain less than 15% moisture, while in contrast, pastures possess 60 to 80% moisture. There are two common complications resulting from inadequate water consumption during cold weather: decreased feed intake and impaction colic. Even if quality feed is offered, horses will consume less if not drinking enough water. If less feed is consumed, horses might not have enough energy to tolerate the cold. Fecal contents must maintain adequate moisture levels. If fecal material becomes too dry, intestinal blockage or impaction may occur. This will not likely develop in one day, but can over time if inadequate water consumption occurs.

Most adult horses weighing 1,000 pounds require a minimum of 10 to 12 gallons of water each day for their basic physiological needs. During winter months, water should be kept between 45 to 65°F to maximize consumption. Research found that ponies increased their water consumption by 40% each day when the water was warmed above freezing during cold weather. Increasing salt intake will also stimulate a horse to drink more; adult horses should consume one to two ounces of salt per day. Loose salt is preferred as many horses do not prefer to lick salt blocks during cold weather. However, under humid conditions, loose salt may crystalize and become rough.

Waterers should be cleaned regularly, and clean, fresh water should always be available, regardless of outside temperature. If using a tank heater to warm water, inspect it carefully for worn wires or other damage, and check the water for electrical sensations or shocks. Snow or ice is not an adequate water source for horses. *Authors: K. Martinson, PhD, and M. Hathaway, PhD, Univ. of Minn.*

Research Update: Glucosamine Supplementation

A recent study conducted at Texas A&M University investigated the effects of oral glucosamine supplementation in young horses. The purpose of the study was to determine whether glucosamine HCl could influence joint inflammation and cartilage metabolism after an inflammatory insult.

In this 98-day experiment, 14 yearling Quarter horses were fed 1% body weight (BW) of grass hay and 1% BW of concentrate per day. Half of the horses also received 30mg/kg BW of glucosamine HCl top-dressed over their concentrate.

After 84 days, all horses received carpal joint injections with a solution containing lipopolysaccharide (LPS) from *E. coli* to elicit inflammation. Synovial fluid was collected for analysis from each joint pre-injection and at 6, 12, 24, 168, and 336 hours post-injection.

LPS Injections increased levels of the inflammatory mediator prostaglandin E_2 (PGE2) and proteins involved in collagen metabolism in the synovial fluid of all horses involved in the study. However, horses receiving the glucosamine supplement showed significantly reduced PGE2 and less evidence of collagen breakdown as well as increased signs of collagen growth when compared to those that did not receive the supplement. These results suggest that there is potential for dietary glucosamine HCl supplementation to have a positive effect on joint inflammation and cartilage turnover in young growing horses.

Summarized by Sam Beeson, Univ. of Minnesota Veterinary Student

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Upcoming Events

Fall Regional Horse Owner Program
Tuesday, November 19th
Carver County Public Works
11360 Highway 212
Cologne, MN 55322
Conference Room 1
6:00 to 8:30 pm
$10 per person
Registration required at
www.regonline.com/HorseCologne

U of M Releases 2 Apps for iPhones and iPads
"Hay Price Calculator" converts price per bale to price per ton. "Healthy Horse" estimates a horses body weight, ideal body weight, and a body weight score based using new research-based equations. Both apps are available in iTunes for a small fee.

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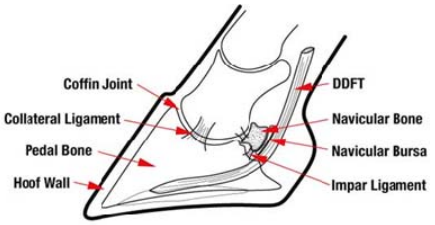
Navicular Syndrome

By: Megan Eick, DVM, Former University of Minnesota Veterinary Student

Navicular syndrome is one of the most common causes of front limb lameness in horses. Navicular syndrome is defined as a forelimb lameness caused by pain arising from the navicular bone and/or related structures. It is usually associated with degenerative changes to the podotrochlear apparatus.



The podotrochlear apparatus includes the navicular bone, impar ligament, collateral sesamoidean ligament, navicular bursa, and deep digital flexor tendon (DDFT). One or all of these structures may be involved when a horse has navicular syndrome. The navicular bone resides palmar to (in back of) the coffin joint in the back 1/3 of the foot. The navicular bone acts as a fulcrum for the DDFT. The navicular bursa is a synovial sac between the navicular bone and the deep digital flexor tendon and provides a cushion for the tendon as it glides over the bone.

Navicular syndrome can affect horses of all ages and all breeds; however, it is most commonly seen in Quarter Horses, Thoroughbreds, and Warmbloods 4-15 years of age. The horses' size, type of work, frequency of activity, intensity of work, and conformation may all play a role in the development of navicular syndrome.

Clinical signs include loss of performance, stiffness or shortening of stride, intermittent shifting bilateral forelimb lameness, lameness that worsens on hard ground or in a circle, landing toe first in motion, tendency to stumble, toe pointing when standing, and pain when standing.

Poor foot conformation and poor trimming/shoeing are predisposing factors to breakdown of the podotrochlear apparatus. Inflammation in the back of the foot often develops as a result of excessive tension on the deep digital flexor tendon which in turn causes excessive pressure on the navicular region.

Broken-back Hoof Pastern Angle. This conformation results in an increased distance between the DDFT origin in the deep digital flexor (DDF) muscle along the back of the radius and its insertion on the palmar aspect of the third phalanx. Since this tendon stretches very little, increasing its traveling distance increases its tension. Increased DDFT tension results in increased pressure across the navicular bone.

Low Heels/Long Toes. This conformation delays the breakover of the limb. The more delayed the breakover, the greater the DDFT tension prior to advancing the limb. The more DDFT tension, the more pressure on the navicular bone.

Underrun Heels. Due to the anatomy of the fetlock joint, a horse's center of gravity is actually behind where the foot rests on the ground surface. Weight bearing force is therefore greatest on the palmar aspect of the foot closest to the limb's center of gravity. The greater the distance between the foot and the center of gravity, the greater the weight bearing force on the back of the foot. Underrun heels are farther from the center of gravity of the limb, and are therefore subject to greater weight bearing or concussive forces. Frequently, the navicular bone lies just above the point where the heel meets the ground and the force is the greatest. Underrun heels, therefore, result in increased concussive pressure on the navicular bone.

To diagnose navicular syndrome, lameness exams and nerve blocks, radiographs, and MRI can be done.

On lameness exam, affected horses can have a mild to severe bilateral forelimb lameness and may or may not be positive in the heel region with hoof testers. Affected horses will usually block to a palmar digital (PD) nerve block and performing this block can cause them to become lame in the contralateral limb until the other PD block is performed. Radiographs of the navicular bone can help determine a diagnosis of navicular syndrome, however, it is only accurate in assessing the bony structures. Magnetic resonance imaging (MRI) is the diagnostic test of choice and a superior diagnostic modality for evaluating the soft tissue structures surrounding the navicular bone.

Although there is no cure, proper management can help relieve pain and slow progression of the disease, including:

- Trimming and shoeing to restore the proper hoof-pastern angle, balance, and to ease break over
- NSAIDS (phenylbutazone)
- Stall rest (in some cases)
- Coffin joint injections
- Navicular bursal injections
- Neurectomy

There is no cure for navicular syndrome and the goal of treatment is to slow the disease process. The degree of soundness that can be achieved after treatment depends on the severity of the disease. Many horses can return to previous work activity with proper shoeing, NSAIDs and/or corticosteroid injections.