

Too much too soon

Variety of treatments exist to handle true, false, and blind splints

by **Kenneth L. Marcella, D.V.M.**

EVOLUTION is a powerful process. In an effort to become swifter and better able to run away from predators, horses evolved from a very early five-toed animal to a three-toed creature and eventually to the single-toed (hooved) horse that we know today.

Developing a single, strong toe provided support for a larger muscular body and lessened the skeletal weight below the knee. This in turn provided for a longer stride requiring less energy to produce superior speed compared with most multitoed animals. As the early horse began losing its unnecessary digits, the two outer and inner toes (digits one and five) eventually disappeared. Digits two and four, however, became much smaller and remain as thin support structures on the inside and outside of the cannon bone. These toe remnants are known as the splint bones (metacarpal or metatarsal two and four).

The top of the inside, or medial, splint bone is associated closely with the bones of the knee (carpas) and, in fact, the medial splint provides a significant amount of support for the knee.

The outside, or lateral splint, is located farther away from the carpal bones above it and is much less involved with support of the knee. These two bones (metacarpal II and IV) are associated closely with the cannon bone (metacarpal III) and to some degree help support or "splint" that central bone, which is where their name comes from.

Each splint bone is attached to the cannon bone along its edge by a thick, fibrous tissue called the interosseous ligament. As the horse ages, this ligament becomes more ossified or "bone-like" and eventually the splints are fused to the cannon bone. The evolution of the horse's toes and the resultant anatomy is important because problems with the splint bones occur fairly frequently, and owners and trainers should have a good working knowledge of these problems to more easily recognize, treat, and resolve these conditions.

True splints

There are actually three types of splints that can occur in horses.

A true splint involves damage to the interosseous ligament. Tearing or sheer forces can occur anywhere along the attachment between the splint and the cannon bone, and this resultant damage leads to localized inflammation, heat, pain, and swelling.

This initial inflammation will produce soft, fluid (edema) swelling, but as the condition progresses and healing begins, new bone is produced in the area of trauma to restabilize that area. Eventually a firm, non-painful bump or knot is left at the site of the original damage. This is a true splint, and its size is related to the amount of original trauma and the early care that the damage receives. Better care early usually means less swelling and a smaller resulting bump.

True splints typically occur on the



TREATMENT OPTIONS

The DMSO [dimethyl sulphoxide] and steroids approach is one way to treat a large splint that is reactive but not fractured. X-rays (inset) show a large amount of periosteal reaction and bone formation

inside of the front legs because of the additional weight that is borne by the medial splint bone and because conformational problems often overload the inside front leg with weight-bearing pressure when the horse runs and uses that limb.

Base narrow and toed-out horses, horses with uneven hooves (higher laterally), and other conformational problems can lead to true splints. Poor farrier attention causing imbalance, dietary excesses (calories) and deficiencies (minerals), excess weight of horse or rider, and rigorous exercise on hard or uneven footing all can contribute to the formation of true splints.

False splints

False splints are the result of any trauma that occurs to the splint bones from an external source.

Direct kicks, interference, or any other type of blunt trauma to the length of the splint bone will result in a swollen, tender area directly associated with the splint bone.

Eventually these injuries also will become hard knots and will be indistinguishable from any other type of splint. There is, however, no interosseous damage in these cases.

Blind splints

The third type of splint, and usually the least common, is the blind splint, which occurs with damage to the interosseous ligament along the most central or inner area of the splint bone—cannon bone connection.

Because this damage occurs so deeply in the leg, there often is no outward swelling noted. These horses may be lame, and further diagnostics do indeed show that the horse has damaged the interosseous ligament and that a splint problem has occurred.

Most splint bone problems are relatively easy to diagnose because of the swelling, tenderness, and lameness. The exact nature and extent of the problem may be revealed with a radiographic examination. Veterinarians will want to make sure that the splint bone itself is not fractured or otherwise damaged.

Occasionally, ultrasound examination may be necessary to determine if the splint-interosseous irritation has involved the suspensory ligament, which runs deeply between the splint bones on the back of the cannon bone. If a blind splint is suspected, then nerve blocks or regional anesthesia may be needed

for diagnosis. Injecting the suspected area with local anesthetics will resolve the lameness if the splint bone truly is the source of the problem, and then an appropriate treatment course can be determined.

Surgical option

Fractured splint bones usually are treated with surgical removal of the fractured distal or lower segment of the bone. The upper segment typically heals well and continues to contribute to the support of the knee and leg. The segment below the break often pulls away from the cannon bone and loses some blood supply following damage. If not removed, this lower section may slowly degenerate and could cause problems for the horse.

Large periosteal reactions associated with splints that irritate the suspensory ligament or other support structures in the back of the knee also may require surgical repair to lessen their size or remove the offending bone growth.

This type of surgery is difficult because it is not simply a matter of cutting or rasping off the offending bone growth that may be interfering with ligament or tendon function.

Any trauma, including surgical intervention, to the periosteal area tends to irritate that structure and results in even more bone being produced as an attempt to stabilize the area.

The irritating bone may be shaped or smoothed, and in some cases this may be necessary.

Shock-wave therapy has been tried as a way to reduce periosteal reaction associated with splint bone stress and trauma, and some veterinarians use shock-wave therapy to stimulate the horse's own repair systems to create better and faster tissue repair.

The most accepted approach to reducing splint bone size is to aggressively treat an initial splint bone injury so that the interosseous damage is reduced and less swelling occurs.

Horses with splint bone injuries should be rested immediately. Con-

tinuing to exercise a horse with a mildly irritated splint almost always will lead to a horse with a much more serious splint problem. Once allowed to rest, affected horses should receive pain relievers and anti-inflammatory agents.

Simple treatment with the application of cold water, ice wraps, or other means of cooling the area cannot be stressed enough. This low-tech approach to splint bone irritation can be very successful if initiated early and applied frequently during the first 24 to 48 hours.

"Do not overlook the simple solutions," said Julia K. Simonson, D.V.M., a veterinarian based in Dunnellon, Florida. "Many splint problems are the result of imbalanced foot landing and loading."

Simonson urges a complete review of shoeing practices, exercise and turnout routines, nutrition, and supplementation as a means of coming to grips with causes and prevention for splint problems. While individual treatment is important and often necessary, splint bone problems are sometimes management issues, and a general review of care and handling often is beneficial.

DMSO option

When treatment is necessary, dimethyl sulphoxide (DMSO) mixed with a small amount of steroids is frequently used to help reduce the inflammation surrounding splints.

DMSO is an excellent carrier agent and helps the steroids penetrate into the tissue. Steroids reduce the bone's reaction to trauma, and the size and shape of the periosteal or interosseous reaction can be reduced with such products. Occasionally steroids are injected directly into and around the affected periosteal tissue.

There are many products on the market for use on splint bones. Most are some form of ointment or salve that is rubbed on the affected area. This rubbing is often very aggressive, and the resultant irritation caused by this treatment is believed to increase blood flow to the area and to reduce the splint size through the principles of counterirritation.


Although some so-called "old-school" horsemen pass on tales of rubbing the affected splint area with a turkey bone as a means of providing this necessary stimulation, there is little scientific backing for these approaches and yet testimonial evidence often makes these remedies sought after by owners and trainers alike.

Whether a turkey bone, steroids, or shock-wave therapy is used, it is important to understand what the horse's splint bones are and why problems can occur with these structures. The sooner a problem is noticed and the sooner appropriate treatment, rest, and ice are applied, the better the eventual outcome will be. ♣

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THOROUGHBRED TIMES
 P.O. Box 8237
 Lexington, KY 40533-8237
 Fax: (859) 260-9812
 Or e-mail us at:
 letters@thoroughbredtimes.com



Kenneth L. Marcella, D.V.M., is a practicing veterinarian in Canton, Georgia.