



*Down on the Farm*

# Tendon and Ligament Injuries in Athletic Horses

by HEATHER SMITH THOMAS

Horses used in strenuous athletic careers are often injured by stress and strain on leg structures. Soft tissue injuries (tendons and ligaments) are often hardest to heal. Robert Schneider, DVM, MS (Professor of Equine Orthopedic Surgery at Washington State University) says there's a wide spectrum of soft tissue injuries. "The MRI (magnetic resonance imaging) which we currently have here at WSU enables us to find problems that no other current technology can find. We now know there are many tendon and ligament injuries in horses. The common ones in racehorses, for instance, are bowed tendons and suspensory ligament injuries. I also believe (and the MRIs are starting to show) that there are many other ligaments that are injured as well, like the distal sesmoidean ligaments. These are structures that are not covered very well in equine textbooks on surgery, but actually this is a very common cause of lameness in all types of athletic horses," he says.

"Soft tissue injuries comprise a very long list. Modern technology enables us to make much more specific diagnosis than was possible in the past. It used to be a short list!" Veterinary medicine can be a lot more helpful to horses, now that we can make an accurate diagnosis of what is wrong.

"A specific diagnosis in a lame horse is critical for making the right decision on how to address the problem—whether it needs rest, surgery, injections, medication, or what type of physical therapy to do," he explains. It's a lot easier now to get a proper diagnosis on a lameness than it was 20 years ago. Today we have ultrasound, MRI, nuclear scintigraphy (bone scan), thermography and other ways of recognizing the cause of lameness.

The term tendonitis refers to inflammation of flexor tendons that run down the back of the lower leg (below the knee or hock). If the tendon sheath is injured, this is called tendosynovitis. Injury to a ligament is called desmitis (injury to the suspensory ligament is referred to as suspensory ligament desmitis).

## **Tendon Injuries**

One of the most common types of tendon injury is bowed tendon, caused by excessive strain. There are two tendons located behind the cannon bone—the deep digital flexor tendon and the superficial digital flexor tendon, one behind the other. The tendons are covered with a sheath and lubricated with synovial fluid. If the tendons and/or sheath and/or attachments are injured or torn, swelling is

caused by hemorrhage and inflammation. The swollen area is very hot and painful and the horse is quite lame.

If the superficial digital flexor tendon is injured by strain and the condition is not properly treated immediately, it becomes permanently thickened at the site of injury, due to fibrosis (creation of scar tissue) within the tendon and in the surrounding tissues and tendon sheath, and the adhesions that form—often binding the tendons together and/or to the sheath. This creates a "bowed" appearance in the otherwise straight tendon. The bow can be high (just below the knee or hock), in the middle area, or low (just above the fetlock joint). The middle area is most often injured—where the tendon has the smallest diameter. Severe injury may involve the whole length of the tendon.

Bowed tendon injuries are common in front legs of racehorses and hunter/jumpers (and only rarely occur in hind legs) and can occur in other equine athletes doing strenuous work. Common causes are inadequate fitness conditioning, and muscle fatigue at the end of a long race. When the muscles become tired they cease to contract in perfect synchronization and some of the strain (that is usually taken up by the more elastic muscles) falls upon the less elastic tendons, which can injure or rupture them.

Horses who seem most likely to bow a tendon during strenuous exertion are horses with long, weak pasterns and long toes; horses who are too soft or out of condition for the work; horses in rigorous training or doing strenuous exertion; or horses who are too heavy for their tendon structure. The horse may bow a tendon while running hard, galloping uphill, turning quickly, bucking, or suddenly accelerating to full speed. A horse working on uneven or slippery ground may suddenly put too much strain on one side of the tendon than the other, causing a tear. A severe blow to the tendon (such as the horse striking it with another foot) may also create enough damage to result in a bow.

## **Suspensory Injuries**

Athletic horses often suffer strain and stress on the suspensory ligaments that extend down from the knee (or hock) to the fetlock joint. The suspensory ligament lies between the back tendons and cannon bone and is a broad elastic band that keeps the fetlock joint from dropping to the ground. The extensor branch of this ligament (going from the fetlock joint to the front of the pastern) keeps the pastern joint from buckling forward. The leg is supported by

a combination of these ligaments, the sesamoid bones at the back of the fetlock joint, the ligaments connecting these bones to each other and to the pastern bone, and by the flexor tendons at the back of the leg that keep the fetlock joint from bending too much when weight is placed on the leg.

As the horse starts to put weight on a leg, the suspensory ligament is the main support. Then, as full weight is applied, the superficial and then the deep digital tendons take part of the load. After the leg passes vertical, the deep flexor tendon is the primary lifter of the pastern and foot, assisted by the suspensory ligament and superficial digital flexor tendon. If deep digital flexor tendon support is delayed or diminished after full weight bearing (such as by improper support under the foot or on uneven ground or as ground gives way or the horse steps in a hole) the superficial tendon and/or the suspensory ligament will suffer extra strain and may be injured. Injury may also occur in a long race when the suspensory apparatus is compromised by tired muscles.

A study at Ohio State University in 1990, showed that well conditioned horses do not suffer suspensory injuries as often as horses who are not perfectly fit; the suspensory apparatus can be strengthened by proper conditioning. Fatigue is a frequent factor in injury. If the horse has been running hard and the forearm muscles become tired, the muscles are no longer contracting and relaxing in perfect rhythm and their role in the support of the leg is disrupted. The elastic muscles help keep the fetlock joint from descending too low, by preventing overstretch of the tendons. If the muscles become tired, the fetlock joints may descend lower than normal and may touch the ground when the horse is galloping. One or both sesamoid bones may fracture from this type of stress or from a misstep, and the tendons and/or ligaments may tear. Any exertion in which the work stress is too much for the support structure may weaken the ligament and cause strain (simple inflammation) or a sprain (actual damage).

In a mild sprain, only a few of the ligament fibers are torn and there is inflammation, but no real loss of support to the leg. This kind of injury heals fairly quickly with no other treatment than rest. If there is moderate sprain, a portion of the ligament is torn and useless. It is slower to heal and there will be some scarring and thickening. In a severe strain the ligament is torn clear through, resulting in complete loss of support for the fetlock joint.

Van Snow, DVM (Santa Lucia Farm, Santa Ynez, California) sees a lot of suspensory injuries in all types of performance horses and racehorses. "The causes are variable, depending on the type of horse. One thing that predisposes a horse toward suspensory injury is poor hoof balance, with more stress on certain parts of the leg. Hoofs that are too high on the outside wall will land on the outside first, setting up a torque in the foot. The foot starts twisting around the point of contact then finally the inside of the foot hits the ground and stops the torque, but the twist comes up the leg and pulls the soft tissue structures. If a horse has a suspensory ligament problem, it's important to check hoof balance."

Another issue is footing. "I see less injuries in horses running on firm footing than in deep footing. You want a predictable, unyielding surface underneath. Two to four inches of sand or loose dirt on top gives a nice cushion that the foot can dig into, but there is an end to it—so the horse does not extend the soft tissue structures like he would in five to six inches of sand or loose dirt," says Snow.

### Diagnosis

In a tendon or ligament injury there is usually heat, pain and swelling over the area, very soon after the injury occurs. With a bowed tendon injury, there may be severe lameness, and the leg is held in a flexed position since the horse is reluctant to put any weight on it. If the tendon is severely torn or stretched, the fetlock joint will drop down. If the injury is not fresh and has become chronic (fibrous tissue has already formed) there will be a hard swelling at the back of the leg. In a horse with a mild, fresh injury that is not showing the classic signs of heat and swelling, thermography or ultrasound can be useful to diagnose early inflammation. Ultrasound is useful to define the degree of damage in a tendon and show the amount of adhesion formation.

Flexion tests can be helpful in detecting soreness—sometimes picking up the start of a problem before the horse actually tears a ligament. Snow says that flexing the fetlock joint is a test the horse can do if the horse is "off" or not working well. "If you put a certain amount of pressure on the fetlock joint in a flexion test for 30 to 60 seconds and on one side he goes off lame afterward (and the other side not lame), this is a clue. Or you can flex the knee—which can detect high suspensory injury. If you hold the knee up tightly for 60 seconds, with the fetlock joint out to the side of the forearm or even up above the forearm, you can then jog the horse to see if he nods his head or not," he says.

"A horse will tend to have a similar flexion test month after month and it should stay the same. Get to know the horse, to recognize what is normal or not, for them (for instance, a horse might not flex so well in the right knee, but is not lame). The same with hind leg flexions—though they need to be held up longer, for at least 90 seconds. If a person flexes all the horse's legs periodically, it gives a clue on any changes. You can often catch a problem before it gets to be a really big one," says Snow.

Thermography can also be used to detect heat in the leg, even before heat, pain or swelling become obvious by palpation. Thermal imaging is being used by many veterinarians to pick up hot spots, indicating inflammation (more blood flow to the area of stress). Early experiments with thermography on horses showed that heat is often created by a stressed area before the actual injury appears. Researchers at the University of Michigan spent two years at a local race track imaging horses and predicting problems—95 percent of the time picking up injuries a little more than two weeks before they became obvious. This kind of diagnosis can enable a trainer to change some things and possibly head off an injury.