Tendon Injuries

By Kelli Taylor, DVM

If you have a performance horse, you probably know that tendon and ligament strains and sprains are very common in the lower legs. During a full gallop or when landing a jump, the entire weight of the horse is placed on one or two limbs, putting extreme force on the tendons. But tendon injuries are not limited to high-level performance horses and can occur in our weekend warriors and pasture pets.

What is a tendon?

Tendons are flexible, cable-like bands of fibrous connective tissue that attach muscle to bone, while ligaments attach bone to bone. Normal healthy tendons are mostly composed of thick, closely packed bundles of highly organized collagen fibers. These fibers are what give tendons their strength and elasticity.

Tendons and muscles work together to produce movement. The muscles provide the power while the tendons transmit the power to the bone. Tendons also act as springs by storing energy from the muscle contractions and absorbing minor overloads during exercise. This in turn allows the muscles to generate greater force without exerting extra effort.

Which ones are commonly affected?

The most commonly damaged tendons and ligaments are those that run down the back of the leg from the knee to the foot (the superficial digital flexor tendon, the deep digital flexor tendon, the accessory ligaments and the suspensory ligament). The flexor tendons help flex the fetlock and the digit joints, while the suspensory ligament provides support for the fetlock, preventing extreme over-extension.

Which tendon or ligament is injured usually depends on the type of activity that the horse is asked to perform. Forelimb suspensory ligament injuries are common in horses that have to brake quickly from high speeds and perform quick forehand turns, such as barrel racers and polo ponies. Racehorses, show jumpers, and eventers most commonly injure the superficial digital flexor tendon in the front limbs. Dressage horses are more prone to suspensory ligament strains, especially when working in deep sand arenas.

Strains versus sprains

Most tendon strains are associated with excessive loading and overstretching of the tendon due to excessive physical stress (such as occurs when a horse lands a jump). As the tendon is

stretched beyond its normal capacity, the collagen fibers within it begin to tear and some may rupture. Though the tendon fibers can tear all at once, for example when a horse is galloping and steps in a hole, these injuries are most often caused by repetitive stress during training and events, when minor disruption or tearing of the tendon fibers take place day after day.

This type of acute tendon injury (or tendonitis) is characterized by inflammation with hemorrhage, edema and fibrin accumulation within and around the tendon, causing local swelling. The net result of the inflammation created by the tendon fiber tearing is a series of events that further damage and weaken the surrounding fibers.

Tendon injuries can also be caused by external trauma. Hard blunt trauma can cause significant injury; examples are a leg being caught under a fence plank or a horse brushing one leg with another. Another example would be an improperly applied or slipped bandage.

Why are tendons so susceptible to injury?

As a horse bears weight during movement, stress is applied on each limb. This is accommodated by an equivalent lengthening (strain) of the tendon. Although tendons are elastic in nature, they can only stretch so far before injury occurs. As the maximum strain limit is exceeded, the collagen fibers and blood vessels within the core of the tendon begin to rupture. The end result is the inflammation, pain and swelling characteristic of a 'bowed' tendon.

Tendon tissues have a very poor blood supply, and that makes the healing process long and drawn out. It normally takes six to 12 months for a tendon fiber to be repaired. In addition, the tendon is repaired with a different type of collagen that is not as elastic or as strong and is often laid down haphazardly during the healing process. This results in a tendon that is more prone to injury in the future.

How to recognize a problem:

You probably touch your horse's legs every day when you pick out his hooves, but do you pay attention to the normal feel of his tendons? Starting today, begin to look at and feel your normal horse's legs so that you can identify any abnormal heat or swelling as soon as they occur. If caught early, you can prevent further damage and allow the healing process to begin before lameness occurs. Always check your horse's legs before and immediately after a ride for any heat or swelling.

With a minor injury, heat and mild swelling with no lameness are the first signs that inflammation is present. This often resolves within 24 to 48 hours, but if exercise continues, the

tendon is frequently re-injured. The swelling may then progress resulting in a moderate tendon injury with pain on palpation and overt lameness.

The worst possible scenario is traumatic laceration or rupture of the tendon. The horse will be lame at a walk and often panicked because his leg is not working properly. Try to keep him calm and call your veterinarian immediately. The vet will be able to sedate your horse if needed and prepare the leg for transport to a surgical facility.

Signs of Tendon or Ligament Injury:

- Lameness
- Heat
- Swelling (typical 'bowed' appearance)
- Pain on touch

Diagnosis:

If you notice heat or swelling in your horse's legs, with or without lameness, call your veterinarian immediately. They will recommend that they see your horse for a lameness exam and if they determine that the heat or swelling is associated with a tendon, an ultrasound of the affected leg will be performed.

Ultrasound is an excellent diagnostic tool that allows your veterinarian to view the fiber pattern of the tendon in question and determine exactly where the injury has occurred. They can also determine whether the injury is mild, moderate or severe – this is important information needed to formulate a proper rehabilitation plan for your horse.

A thorough ultrasound that examines the superficial digital flexor, deep digital flexor, suspensory ligament and its associated branches can be a long, painstaking process that causes a great deal of anxiety for most owners. Do not worry if your veterinarian is taking a long time scanning the leg without showing you any results – we just want to be thorough and often need to compare the injured leg to the opposite normal leg so that we do not miss subtle injuries.

How can I prevent injury?

There are many factors to consider when attempting to prevent tendon injuries in your horse:

Conformation: horses with poor conformation are at increased risk. Consult your veterinarian on trimming/shoeing recommendations that can help to relieve abnormal stress on your horse's tendons and ligaments.

Proper hoof care: excessive pastern slope, improper shoeing and toes that are too long may place extra stresses on the tendons.

Arena maintenance: uneven, slippery ground or sudden turns may disproportionately load one side of a tendon, causing excessive physical stress to it. Deep sand should be avoided as it puts extra stress on the tendons and increases their workload.

Proper conditioning: muscle exhaustion/fatigue from long training sessions or hard workouts results in poor muscle response and loss of tendon stabilization. Remember to give your horse a break and do not push them when they are tired.

Chiropractic: vertebral subluxation complexes predispose horses to muscle soreness and fatigue. This results in a loss of tendon stabilization and requires the horse to make compensations with the rest of his body in order to perform the movements asked of him.

Boots and wraps: theses offer protection from hard, blunt trauma, such as striking the tendon with a hoof from the opposite leg, but do not offer much support in preventing hyperextension of the fetlock. And if applied incorrectly, they can actually cause damage to the tendons in the form of bows and excessive heat.

Treatment options are numerous:

The goal of treatment is to reduce inflammation, maintain blood flow, and decrease the formation of scar tissue within the tendon so your horse can return to their current performance level.

The most important treatment in both traditional and integrative approaches is rest. Stall rest with hand walking is normally required for the first one to two months. Gradually increasing the workload provides stimulation to the tendon to continue the healing process. Healing progress should be monitored regularly with ultrasound examination. The decision to increase activity is made based on the progress seen. Advancing too quickly often results in worsening of the lesion.

Initial conventional treatment includes systemic and local anti-inflammatory therapy:

-Ice or cold water is applied for the first seven to ten days, depending on the amount of heat and swelling.

-Phenylbutazone therapy for five to seven days after injury is indicated as a systemic anti-inflammatory.

-Some veterinarians advocate the use of DMSO applied topically for seven to ten days to help reduce local swelling.

- A properly applied bandage with adequate padding is necessary to support the injured tendon and fetlock joint while avoiding further tendon injury from a constricting bandage.

Integrative therapies are numerous and include:

Hyaluronic acid: The injection of hyaluronic acid around the tendon or its administration intravenously can have a beneficial anti-inflammatory effect. How it works is not understood, but similar to its activity in the joint, it is thought to be anti-inflammatory and reduces proteoglycan breakdown in the tendon.

Extracorporeal Shockwave Therapy (ESWT): Involves the application of high intensity acoustic radiation in order to promote healing. It is thought that the microtrauma from the repeated shockwave encourages growth of new blood vessels into the damaged area of tendon, allowing it to heal faster.

Interleukin- 1 Receptor Antagonist Protein Therapy (IRAP): A blood sample is taken from the injured horse and incubated with special glass beads that promote the production of regenerative and anti-inflammatory proteins by the white cells in the blood. The serum containing these proteins is injected into the injured site in order to decrease inflammation and promote faster healing.

Platelet –Rich Plasma (PRP): A blood sample is taken from the injured horse and platelets are concentrated and then injected into the injured area. Platelets are rich in growth factors, which enhance the normal healing process.

Stem cell therapy: A bone marrow sample is taken from the injured horse and stem cells are cultured from it. The isolated stem cells are then injected into the site of injury. These cells can then differentiate into new tenocytes (tendon cells) and work to rebuild the tendon faster and more effectively.

Acupuncture: Blocked energy or Qi is released when needles are placed along the invisible energy pathways of the body, called meridians relieving pain.

Transverse friction massage: A deep massage technique that helps reduce pain, improve blood flow, and prevent the formation of scar tissue and adhesions in the connective tissue.

Reiki: A Japanese technique for stress reduction and relaxation that also promotes healing. The practitioner transfers healing energy by placing her hands on or above the recipient.

It's best to discuss all treatment options with your veterinarian. He or she will help you choose the options that will work best for your horse's individual injury, and optimize his recovery.