Chapter 1

Diagnosing Tendon and Ligament Injuries

If you're reading this book, you either have a lame horse who's been diagnosed with a tendon or ligament injury, or a knowledgeable stablemate, trainer or other "horse person" has told you that your horse has a tendon or ligament problem. Regardless of your level of expertise, this book will help you fill in the gaps, understand your horse's condition and help you through the phases of healing. Whether you have pleasure horses, racehorses, hunters, jumpers, dressage horses or trail horses, you will understand more about their legs and how they work once you've consulted this book. You need to be as informed as possible about your animal's health care, especially in conditions that can be as severe and career-ending as tendon and ligament disorders.

Most common tendon and ligament injuries can be quite serious. Many racehorses who injure a tendon or ligament will not race again. Other athletes may not return to their previous level of performance. However, the same horse may make a nice hunter or trail horse. Most injuries occur in the foreleg because the horse bears almost 70 percent of his weight there. The most common injury occurs to the superficial digital flexor tendon (SDF; one of the major tendons on the back of the foreleg—more on this in Chapter 2,

"Functional Anatomy of the Equine Foreleg and Hind Leg"), followed by injury to the deep digital flexor tendon (DDF) and suspensory ligament. Each has similar findings at the cellular level and requires almost identical treatment regimes. When you understand what happens inside the tendon you'll understand why your veterinarian has prescribed certain therapies. Working with your vet is very important to a successful recovery from this or any injury.

Working with Your Veterinarian

Good communication with your vet is important when treating your horse, even if you have a trainer working with the veterinarian. Your information may be secondhand and may be garbled. Ask your vet any questions you might have and clarify the diagnosis and treatment.

Your vet should be happy to answer your questions. In fact, most vets prefer to talk more about the condition because your interest shows you are a conscientious owner. If your vet doesn't want to discuss your horse's condition, you should ask why and perhaps look for another vet. A good vet is patient and willing to discuss information on the level you're comfortable with.

Tendon Injury at the Cellular Level

Tendon injuries come in all sizes and degrees. They may be subclinical—so small that they cannot be detected without ultrasound—or they may be a complete tendon rupture. Inflammation, a complex process involving the immune system, occurs after an injury and is the first step to healing. Blood vessel dilation and leakiness, swelling, heat, pain and an increase of inflammatory blood cells are all signs of beginning inflammation. The goal of therapy, as we'll see soon, is to aggressively decrease inflammation. We'll discuss more about this later in this chapter and in Chapter 4.

A horse that limps from the track or arena with a tendon injury usually has swelling, hemorrhage (bleeding) into the lesion and tendon edema (internal swelling of the tendon) from inflammation. Fluid leaks into the tendon and, along with the blood, separates and weakens the remaining normal fibers. The body tries to clean up the damaged tissue by releasing enzymes, called *hydrolytic enzymes,* that would normally chew up damaged tissue into smaller sizes that can be carried away by the circulation. In excess, they can cause further damage to the collagen fibers and the glue that holds the fibers together, the interfibrillar matrix. In the process of the injury, the horse may have damaged the blood vessels, which may lead to *necrosis* (cell death).

Recognizing Tendon or Ligament Injury

Although you should have your veterinarian diagnose any suspected tendon or ligament injuries, these injuries are not difficult to spot. There are characteristic clues that with some help and practice you will be able observe.

Visually Examining Your Horse

You don't have to be a vet to detect injuries. Most animals with even a moderate tendon or ligament injury will be obviously lame. It's the more subtle injuries, the ones that might happen before the "big" one that you can train yourself to look for in your horse. A daily examination should be a routine every time you train or ride your horse.

Look at your horse's legs every day while he's uninjured both before and after you ride or train. By learning what normal looks like, you might be able to detect what looks abnormal. If your horse wears boots, use the moment before applying them to scan his lower limb for any sign of swelling, heat or thickening. Being familiar with your horse's legs will help you identify problems before they have a chance to worsen.

Signs of Tendon or Ligament Injury

- Lameness
- Heat
- Swelling
- Pain on touch

You won't be able to detect all injuries, but you'll have a good chance at recognizing severe, moderate and maybe even mild tendon and ligament injuries when you examine your horse every day.

Lameness

Horses with mild injuries may not be noticeably limping, or lame. But most horses with at least moderate tendon or ligament injuries will be lame. In the case of a severe injury, you'll see that the horse is not bearing weight on a leg or is severely bobbing his head while walking.

Even though not all horses with tendon or ligament injuries are lame, there may be other signs present that the owner may or may not recognize. Talk with your vet if you suspect something is wrong with your horse's gait. Your vet can examine your horse for lameness. Diagnosing the cause of lameness, especially mild lameness, requires the experience and training of a veterinarian.

A horse who is intermittently lame can be frustrating. One day you ride and he is "off"; the next he's fine. Another day, you ride in deep sand and he's lame. The next day he seems off going one direction but not the other. What's important is that he is lame and your vet should examine him. There is no other answer for this problem. Mild tendon or ligament injuries that cause intermittent lameness will eventually become a big problem. The time, effort and money spent to correctly diagnose the problem are well worth it.

Swelling

Swelling is a common sign of acute tendon and ligament injuries. Inflammation causes blood vessels to dilate (enlarge). The blood vessel leaks fluid into the surrounding tissue and causes swelling. Hemorrhage (bleeding) into the tissue can also cause swelling. Swelling of the SDF tendon causes the "bowed" appearance of a horse's lower leg in a "bowed" tendon (see Figure 1).

Although swelling is a common sign of tendon or ligament injury, not all injuries will result in swelling or it may be slight. Being familiar with what looks normal for your horse's legs is important in detecting slight swelling.

Fig. 1. A bowed tendon.

Pain on Touch (Palpation)

Tendon and ligament injuries hurt. The inflammatory process following an injury causes heat and pain. You can detect the pain through *palpation* (feeling your horse's injured leg with your fingers). Veterinarians and horse owners can gently palpate a horse's tendons and ligaments to determine his pain level. This takes practice and knowledge of anatomy, which is covered in the next chapter.

Many horses don't like their tendons or ligaments palpated (especially their suspensory ligament) while standing. Palpating an injured leg while the horse is standing on it can be inconclusive. You may have anything from no reaction to rearing up, depending on the horse and the injury. But an injured horse will usually react to palpation if the leg isn't bearing weight.

How to Palpate Your Horse's Tendons

Hold your horse's hoof in one hand while palpating the tendons with the other. Start at the top, just below the knee, and gently work your fingers inch by inch down one tendon, say the SDF tendon. Then do the same for the DDF tendon and then the suspensory ligament. It is not only a good way to feel for pain, but also deep swelling, thickening and heat. If your horse reacts to palpation, it doesn't necessarily mean he has pain.

Although palpation is valuable, it requires palpating hundreds of injured and noninjured horses to really get a feel for this. One key is to palpate the opposite leg for a comparison. Comparing the legs can give you a much better reading on your horse's pain level. If you get the same reaction on the other side, either you have two problems (unlikely) or none at all. Another key is knowing your horse's anatomy (see Chapter 2).

Heat

Inflammation often causes heat because of blood vessel dilation. The inflammation causes more blood to circulate through the region and causes the area to be warmer. Studies show that only about 20 percent of horses with tendon or ligament injury have increased heat in the affected leg. Therefore, heat is used moderately to assess tendon and ligament injuries.

But heat isn't something that you should ignore. If you feel heat in your horse's tendons, have your vet evaluate him for injury.

Diagnosis

Diagnosing a tendon or ligament injury requires a trained veterinarian. However, you can assist your vet with the proper diagnosis. One way is to provide the vet with a detailed and accurate history. Your vet will want to know your horse's age and training competition level. Your vet will also need to know when your horse was injured, what activity precluded the injury, the horse's conditioning schedule, all medications (if any) administered to the horse prior to his examination and all therapies administered such as cold water hosing, bandaging, poultices applied or ice baths. He or she will also want to know if the horse was on stall rest or in a paddock. Your vet will then begin the lameness exam.

Lameness Exam

Depending on your horse's injury, the lameness exam can be very short or quite extensive. A horse who has an obvious injury such as a bowed tendon will require less exam time than a horse with a mild high suspensory ligament injury, which requires more time to diagnose. The veterinarian notes the horse's conformation, noting hoof wear and shoeing; observing all joints, tendons and ligaments of the

lower leg; and visually inspecting back, rump and leg muscles for swelling or atrophy (degeneration). The vet should examine each hoof and should apply hoof testers to rule out any foot abnormalities.

Your vet should rule out each abnormality found during this initial exam as a cause of lameness during the exercise and palpation part of the exam.

After the initial exam, your veterinarian will ask you or an assistant to walk and trot your horse in a straight line and in circles in both directions. The handler's role is critical here. Hold the horse loosely so that his head is centered in line with his body. If you hold his head too tightly, your vet may not catch any subtle head nodding. If your horse is lame in one of the forelegs, your horse will drop his head (nod or bob) when he steps with the sound foot and raise his head when he steps with the unsound foot. This can be tricky, but if you think about when you stub a toe or step barefoot on a stone, you tend to lift your body when your sore foot hits the ground to get as much weight as possible off that foot. A horse will do the same thing. Therefore, his head will move up in an exaggerated manner when his sore foot hits the ground. If your vet can't detect lameness while the horse walks, then you must trot your horse. Your vet can detect lameness more easily when the horse is trotting because at any one time the horse only has two feet on the ground, which will distribute more of his body weight to the injured leg, making the lameness more apparent.

Hoof Testers

A hoof tester is a large instrument that looks like an unusual set of pliers. Veterinarians use hoof testers to apply pressure in a systematic manner to the entire sole and frog region of the hoof to identify any region of sensitivity that might be cause for lameness.

Determining subtle lameness in the hind legs is more complicated. Your vet will tell you how to move your horse so he can detect the lameness.

A horse with a bowed tendon will be noticeably lame at a walk and the "bow" will be obvious. A horse with a less severe injury might only be lame at a trot on concrete in circles to the right. Depending on the severity of the injury, it may require more time to diagnose.

Lameness is graded on a scale of Grade 1 (least lame) to Grade 4 (most lame). The vet grades the lameness so that he or she has a reference point at each visit. This grading is useful to other vets if they treat your horse. This grading is also important to determine if there's improvement or worsening.

Once your vet identifies the unsound leg, he or she will palpate the lower leg to isolate the problem. Your vet should palpate all joints, tendons and ligaments and note abnormalities. The problem may be obvious or perplexing. In less obvious injuries, the vet may wish to conduct other tests.

Diagnostic Tests

Most times, your veterinarian will need to perform one or more diagnostic tests to accurately diagnose your horse's lameness. Some tests are part of the lameness examination and some are in addition to the exam and will be an additional expense. However, it is worth knowing exactly what is wrong with your horse so that you can get on the road to recovery.

Flexion Tests

Flexion tests assist your vet in identifying joint problems and may be useful in diagnosing tendon or ligament injuries as well. In a flexion test of the fetlock joint, the vet bends and holds the joint with moderate pressure for at least one minute. Then you trot the

horse. If the horse is lame in the fetlock joint, he will be noticeably lamer following this test. However, the flexor tendons are also crimped together, which may worsen the lameness along with any fetlock joint problems. This is especially true for horses with injured DDF tendons (see Figure 2).

A positive flexion test may still mean the tendons or ligaments are involved. Your veterinarian may rule out fetlock joint problems by using a local anesthetic to block nerves in the lower leg, called a *local anesthetic nerve block*.

Fig. 2. Flexion test of the hock joint. Horses with high suspensory ligament desmitis, such as occurs often in Standardbred racehorses, will have positive hock flexion tests in 85 percent of hind-limb cases.

Local Anesthetic Nerve Blocks

Vets use nerve blocks to eliminate feeling in a region of the horse's leg so that they can locate the lameness. For example, if you have a horse with swollen tendons who is positive to hoof testers in the same leg, you may not be able to determine whether his pain is coming from his foot or his tendons. In this case, the nerves that serve the foot can be isolated and blocked with a local anesthetic. If the horse trots off sound, you know the lameness is coming from his foot and not his swollen tendons. The tendons may need care as well, but this test can isolate the cause of lameness. If he trots off noticeably improved but is still lame, you know that part of his lameness may be coming from his tendons.

Diagnosis is a little more complicated than that, but this is what your veterinarian is doing when he "blocks" your horse.

Thermography

Thermography is used to measure and record temperatures in a horse's leg. Vets and researchers thought it was useful in subclinical cases where the animal showed no lameness. Although it was popular in the mid- to late 1990s, it is seldom used today.

Thermography is very sensitive to changes in surface temperatures, but not very specific. For example, a leg under a bandage may appear "hot" on a thermographic study. A horse standing in a barn aisle with one side to an open door could have different thermographic studies between the two sides. There is a lot of potential for artifact interpretation with thermography and it most likely only measures what is going on at the surface and not what's happening in deeper tissues. Therefore, thermography has limited value in diagnosing a tendon or ligament injury.

Ultrasound

Diagnostic ultrasound has truly revolutionized the diagnosing and monitoring of tendon and ligament injuries in the horse. In fact, a vet can't fully or accurately diagnose a tendon or ligament injury without an ultrasound exam (see Figure 3).

An ultrasound image is formed when ultrasound waves (sound waves) applied to the tendon reflect back from the tissues. The

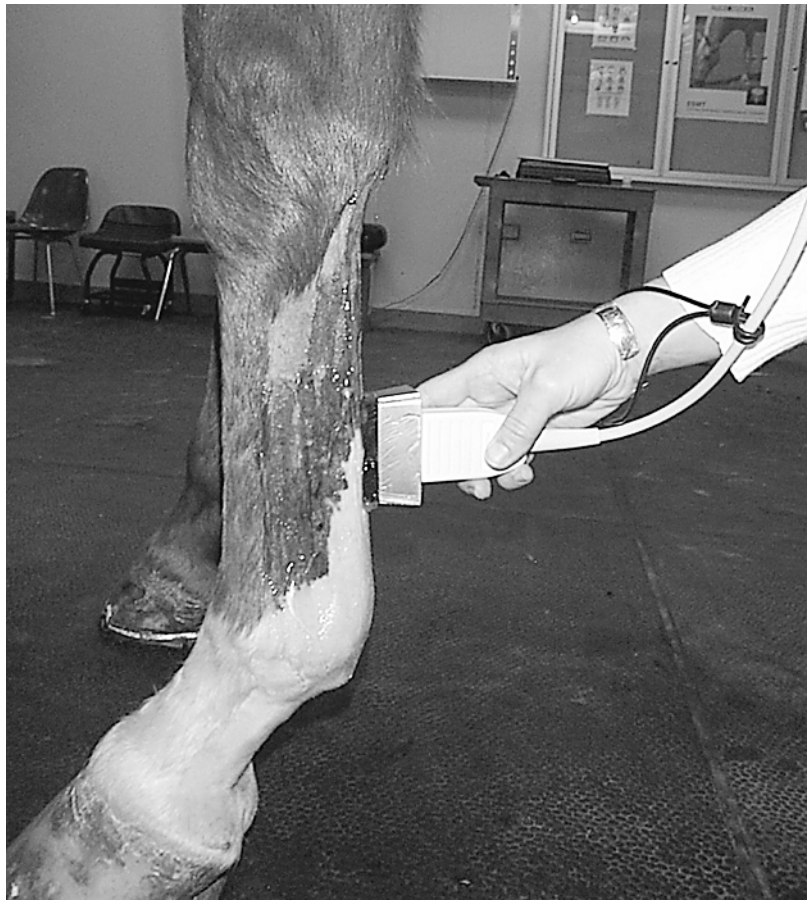

Fig. 3. An ultrasound examination of the tendons of the forelimb. This picture shows the ultrasound probe.

reflected waves are converted to an electrical impulse that is displayed on a small screen. The image is caused by differences in the tissues' ability to reflect the wave. Because there aren't many structures in the horse's leg, it's easy for a trained eye to read the ultrasound.

Tissues of different densities will cause the image to appear either darker (almost black) or lighter (white). For example, bone, the most dense, appears white on ultrasound. The tendons appear gray and fluid such as blood or water appears black. A lesion in a tendon will appear darker than the surrounding tendon because the injury makes the region less dense and there is fluid or blood (see Figure 4).

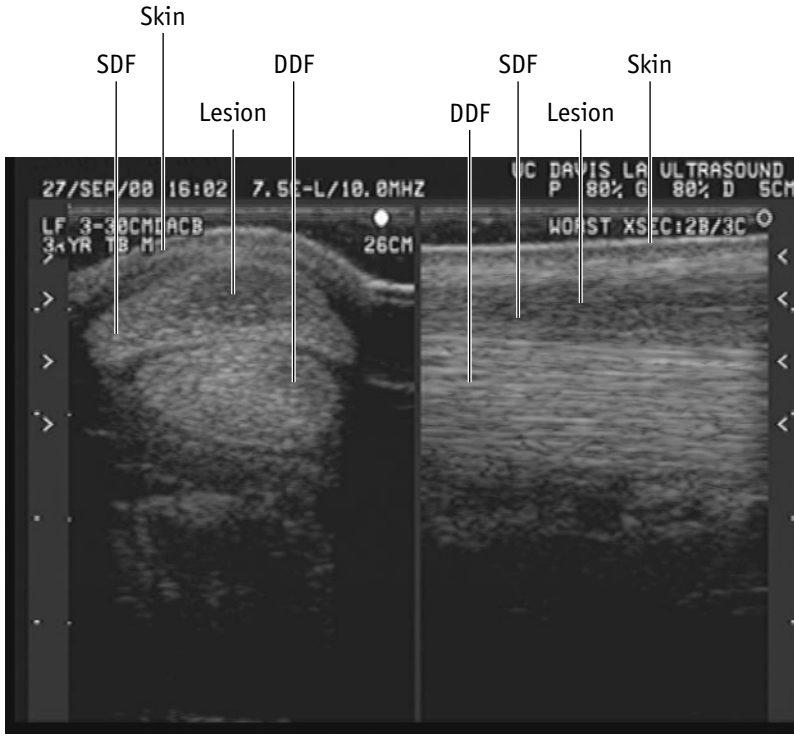

Fig. 4. A moderate tear of the SDF tendon in a cross section and longitudinally.

Note that an ultrasonigraphic assessment performed on the first day after the injury may not show the full severity of the injury. Ideally, performing an ultrasound examination four or five days after the injury will show the full extent of the damage. Ultrasound is also invaluable for monitoring the progress of healing before moving the horse to the next level of work. We'll discuss using ultrasound for rehabilitation in Chapter 4.

Radiographs (X-rays)

Radiographs (X-rays) are most useful for diagnosing bony conditions that could lead to lameness. Tissues such as tendons and ligaments do not readily appear on radiographs, making their use in diagnosing tendon and ligament injuries minimal. However, they're helpful in avulsion fractures in which a tendon or ligament has pulled away from the bone and pulled some of the bone with it. The vet can see the bone chips on an X-ray. Avulsion fractures can occur at the suspensory ligament's point of origin in the back and base of the horse's knee or at the paired sesamoid bones where the branch of the suspensory ligament lies. Fractures of the paired splint bones that heal inadequately can also cause problems with the suspensory ligament.

In Summary

- Make sure you are comfortable with your veterinarian and feel at ease to ask questions.
- Tendon and ligament injury results in inflammation, which includes blood vessel dilation and leaking, swelling, heat and pain.
- Not all horses who have a tendon or ligament injury are lame.
- Diagnostic ultrasound is the gold standard of diagnostic tests.
- Proper diagnosis requires your veterinarian so that the nature and extent of the injuries are fully evaluated.