

Diagnostic Ultrasound & Musculoskeletal Injuries in Horses



Tendon and ligament injuries are relatively common among equine athletes. Horses engaged in strenuous work such as racing, jumping, endurance or barrel racing are more likely to sustain a tendon or ligament injury. However, injuries can and do occur in horses of all breeds and uses, including the backyard or light use horse.

Diagnostic ultrasound is considered the gold standard in the evaluation of tendons and ligaments in horses. This brochure is designed to help you understand more about tendon and ligament injuries, their diagnosis, management and rehabilitation.

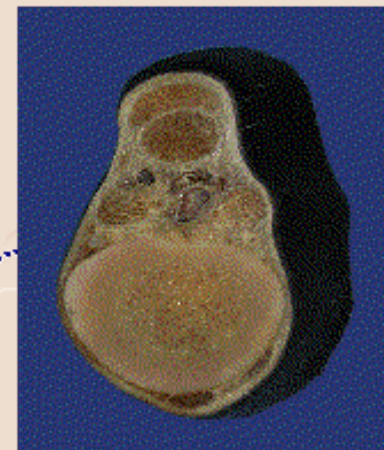
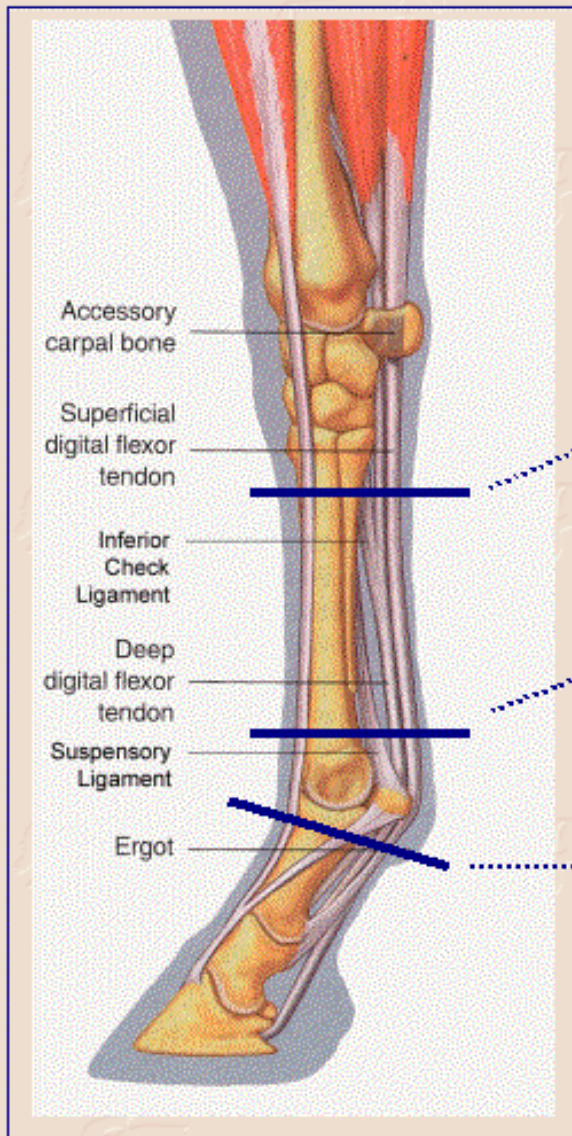


When should an ultrasound examination be performed?

- Swelling, heat, or sensitivity of any tendon or ligament
- Joint swelling without radiographic explanation
- Lameness localized to a specific region
- Monitor tendon and ligament healing throughout rehabilitation

Anatomy of the Forelimb

The majority of equine tendon and ligament injuries occur in the metacarpal (foreleg), metatarsal (hind leg) and pastern regions. The superficial digital flexor tendon (SDFT) and suspensory ligament (SL) are the most commonly affected structures. The SDFT is located just under the skin surface, followed by the deep digital flexor tendon (DDFT), inferior check ligament and suspensory ligament. In the pastern region, the SDF and DDF tendons are also evaluated as well as the distal sesamoidean ligaments (straight and oblique). While this brochure focuses on these regions, the principles are similar for any musculoskeletal injury. Ultrasound can also be utilized to diagnose injuries in other areas such as the shoulder, stifle, fetlock, sacroiliac and pelvic region.



How do I know my horse has a tendon or ligament injury?

The **clinical signs** of a tendon or ligament injury can be quite varied. Acute injuries are often characterized by heat, swelling and pain on palpation of the affected structure. Lameness can range from mild to severe and may be somewhat transient, sometimes lasting only a few days. Chronic injuries often result in persistent thickening of the tendon or ligament and an intermittent or persistent lameness.



Swelling of the Superficial Digital Flexor Tendon

Swelling of the Inferior Check Ligament

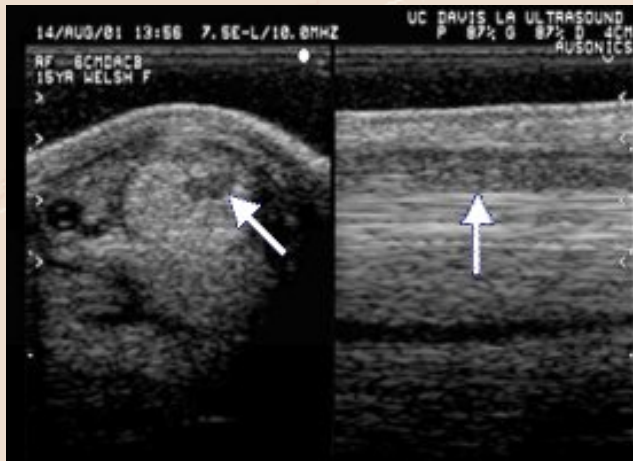
What should you do if you think your horse has a tendon or ligament injury?

Your initial goal is to reduce inflammation. Support bandages, twice daily cold water hosing or ice will help to reduce heat and swelling. Anti-inflammatories should be given under the direction of your veterinarian. Your horse should be confined to a stall until ultrasound confirms the presence of an injury.



What do we evaluate on ultrasound?

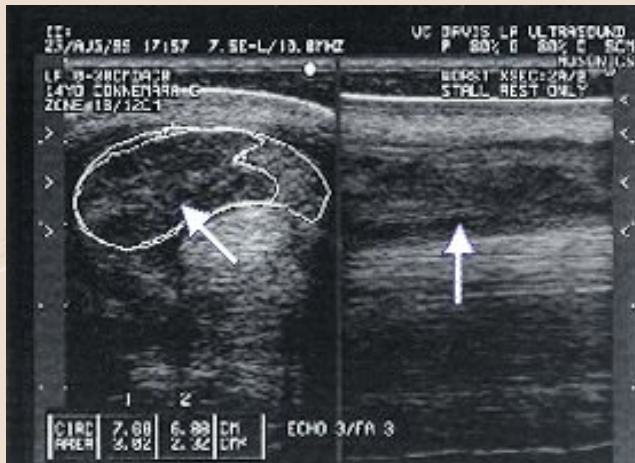
Normal tendons and ligaments demonstrate a homogeneously echogenic (evenly white) appearance on ultrasound when viewed on cross-section. Fiber pattern is evaluated by placing the transducer parallel to the tendon/ligament fibers. Normal tendons/ligaments demonstrate a long linear fiber pattern. Ultrasound machines are equipped with calculation packages so that we can measure the size of the tendon or ligament.



Mild Tear of the Superficial Digital Flexor Tendon



Moderate Tear of the Superficial Digital Flexor Tendon

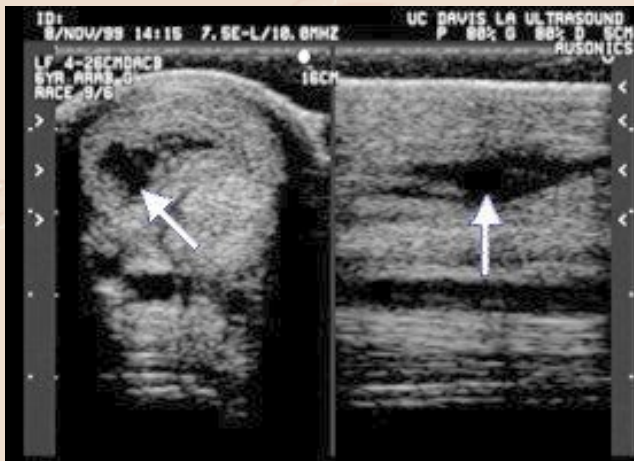


Severe Tear of the Superficial Digital Flexor Tendon

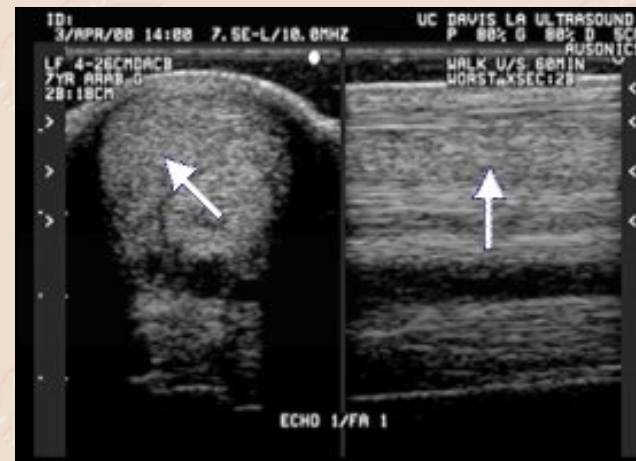
Injured tendons and ligaments demonstrate an increased cross-sectional area (size), decreased echogenicity (a black or gray appearance) and a disrupted fiber pattern. The above images demonstrate the appearance of an acute mild, moderate and severe tear of the superficial digital flexor tendon.

Tendon and Ligament Healing

Most tendon and ligament injuries require 9-12 months for optimal healing. Key to the success of returning your horse to work is regular ultrasound exams to check the progress of healing throughout his or her rehabilitation. Injured tendons/ligaments should demonstrate an improved size, echogenicity and fiber pattern at each recheck exam, as seen in the two images below. This horse sustained a severe tear of his superficial digital flexor tendon as seen on the left image. The image on the right shows significant evidence of healing with an improved echogenicity and fiber pattern.

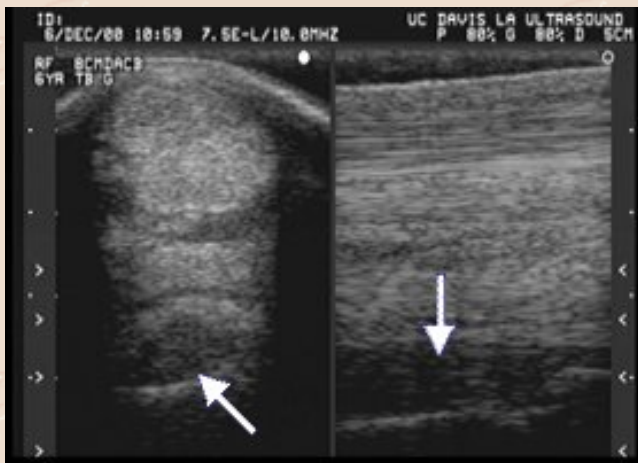


Severe Acute Superficial Digital Flexor Tendon Injury

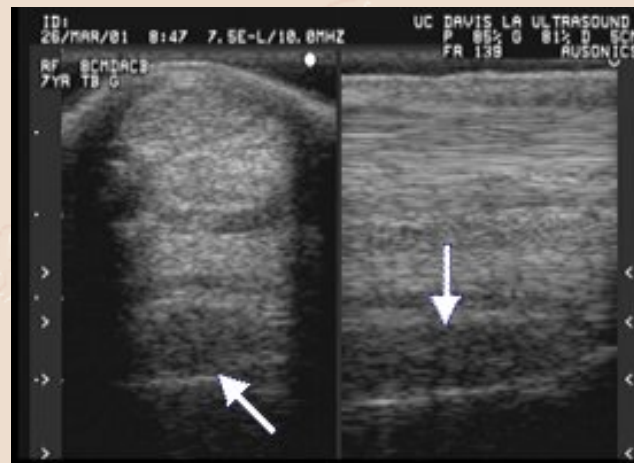


**5 Months Later:
Marked Improvement of the Injury**

However, some injuries are slower to demonstrate evidence of healing on ultrasound. This is often the case with suspensory ligament and deep digital flexor tendon injuries. The images below illustrate a horse with a persistent lesion of his suspensory ligament after four months of layup. In this situation, a horse may be allowed to progress in his rehabilitation as long as there is no evidence of new injury and the horse is not demonstrating any signs of lameness.



Severe Acute Suspensory Ligament Injury



**4 Months Later:
Lesion is Still Easily Visible**

Rehabilitation

Initially, stall rest with handwalking is required. Your horse should not have access to unrestricted exercise such as pasture or arena turnout during the first 4-6 months. The injured tendon or ligament cannot withstand sudden heavy loading during this time and is highly susceptible to reinjury. An example of a **controlled exercise program** is described below. By gradually loading the tendon/ligament in increasing amounts, you are stimulating the tendon/ligament to heal to the best of its ability. It is important to remember that your horse's program may deviate from this program, depending on the structure involved, severity of initial injury and progression of healing.

Controlled Exercise Program

- 0-60 days - handwalking
- 60-90 days - 5 minute trot/jog
- 90-150 days - 10-15 minute trot/jog
- 150-210 days - 20-25 minute trot/jog
- 210-240 days - canter 5 minutes / gallop 1 mile every other day (racehorse)
- 240-270 days - canter 10 minutes / gallop 1 mile every day (racehorse)
- 270-300 days - low jumping / short breeze (racehorse)
- 300-330 days - normal jumping / breezes (racehorse)
- 330-360 days - competition

Recheck ultrasound exams are performed every 60 days to assess healing and to prevent reinjury. Ultrasound can detect evidence of tendon or ligament damage **before** a new injury occurs. In this case, the horse's exercise level is reduced to prevent further injury. It is important to remember that horses should not advance in their exercise program without re-evaluation by a veterinarian.

Prognosis—Will my horse be able to return to his job?



Rehabilitation of tendon and ligament injuries is a long and sometimes frustrating process. However, many horses are able to successfully return to showing, racing, trail riding, etc.

Your horse's prognosis depends on many factors, including the structure involved and the severity and extent of the initial injury. For example, a 20% tear of the deep digital flexor tendon yields a much poorer prognosis than a 20% tear of the superficial digital flexor tendon.

Current and intended use of your horse also plays a role. For example, a Thoroughbred racehorse with a 30% tear of his superficial digital flexor tendon may not return to racing, but could become a successful hunter. On the other hand, a light trail horse with the same injury will likely be able to return to trail riding.





Perhaps the most important factor is **patient and owner compliance**. Some horses and owners tolerate confinement better than others. The rehabilitation program requires patience and commitment. It can be difficult to work with a fit horse that is suddenly not able to exercise. In these cases, it is important to work with your veterinarian to develop a plan that works for you and your situation. In the end, this plan will give you the best chance to have your horse return to his preinjury level of competition or function.

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