Tendon & Ligament Injuries

James M. Casey , D.V.M. , M.S.

Tendon & Ligament injuries are seen in many different types of equine athletes

Tendon and Ligament Injuries

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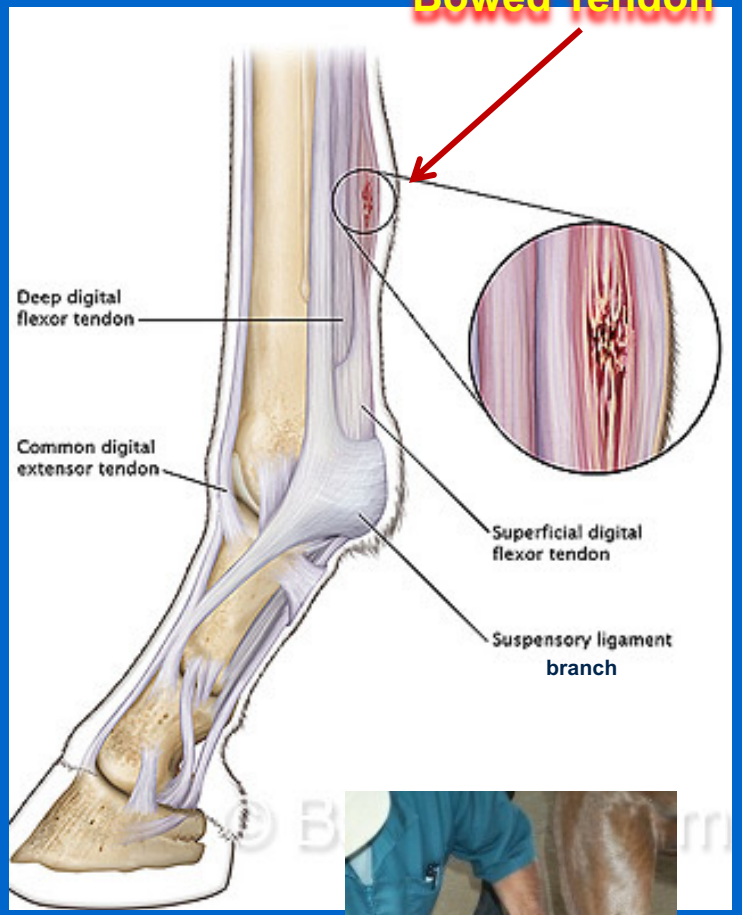
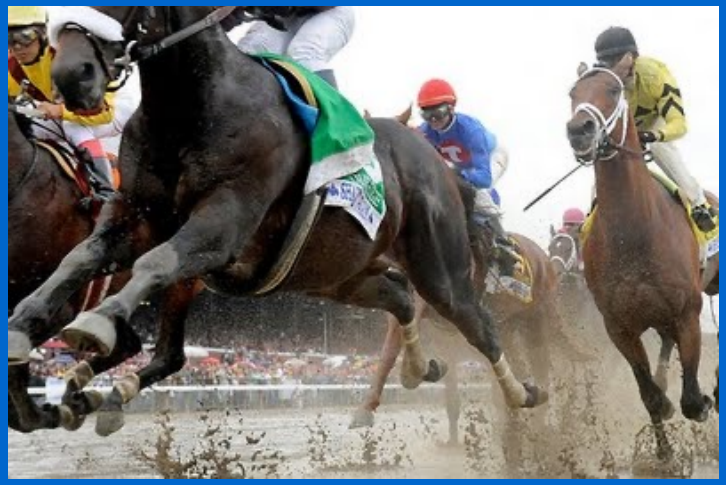
Tendon & Ligament Injuries

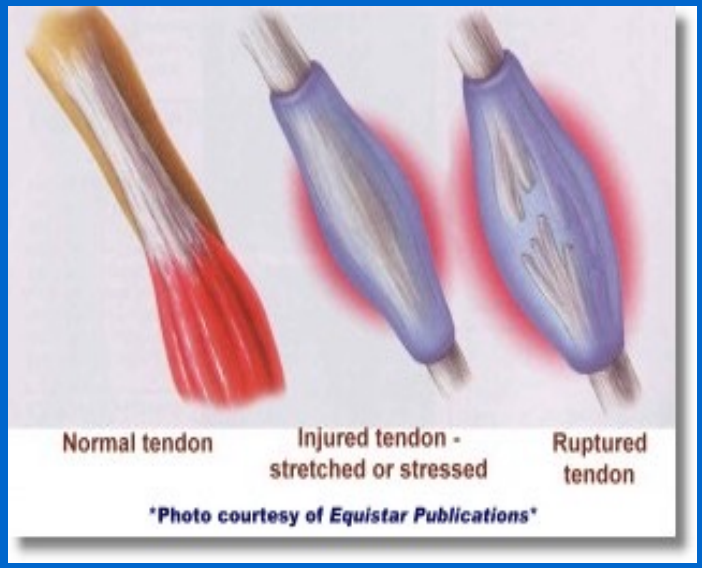


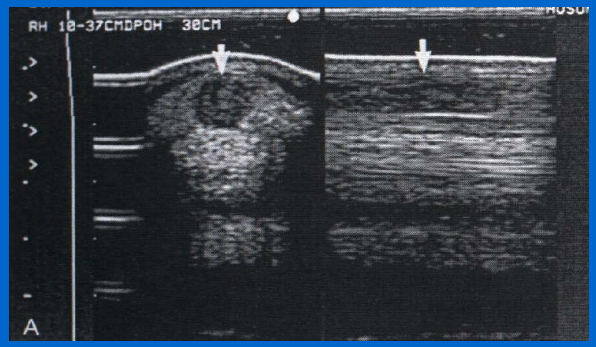


Tendon & Ligament Injuries

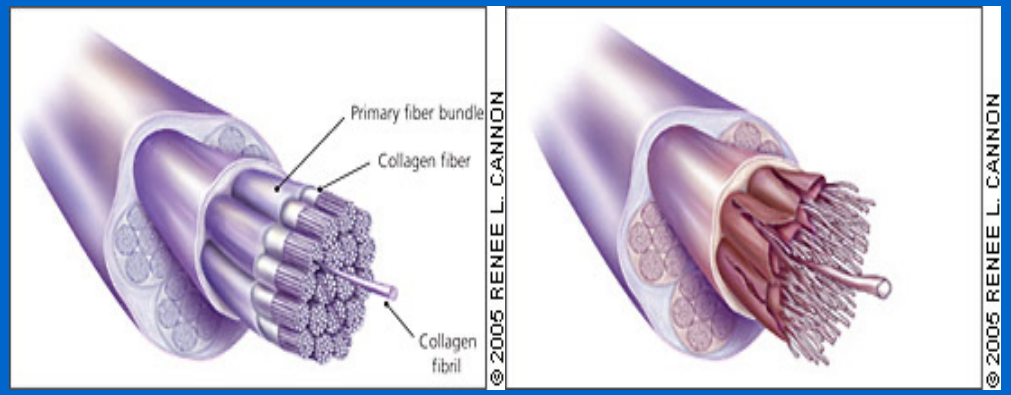
Examining a horse's tendon for signs of injury

Bowed Tendon





Ultra Sound of Damaged Tendon



Normal Tendon

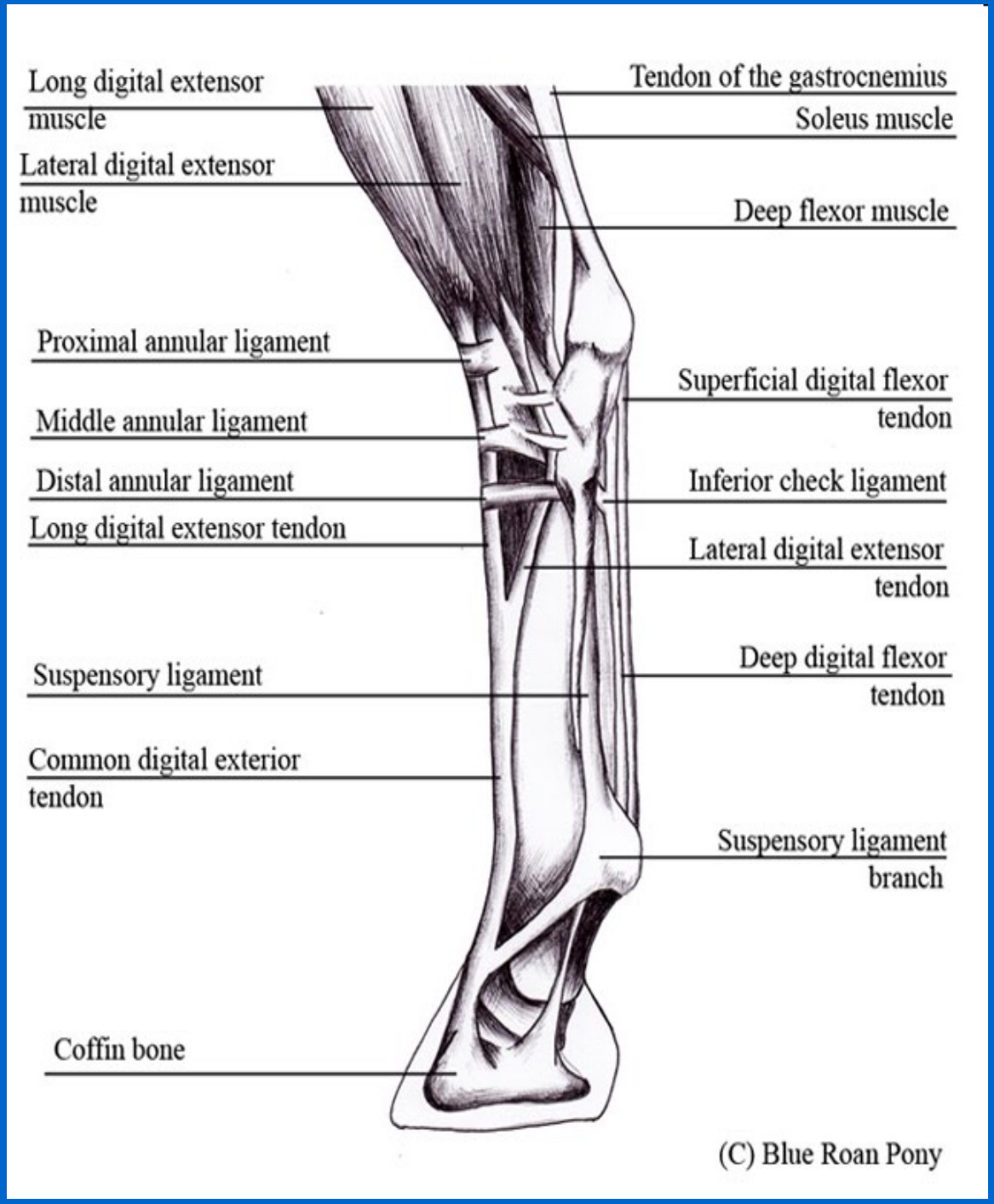
Torn Damaged Tendon
Note: the tendon fibers are disoriented

Tendon & Ligament Injuries

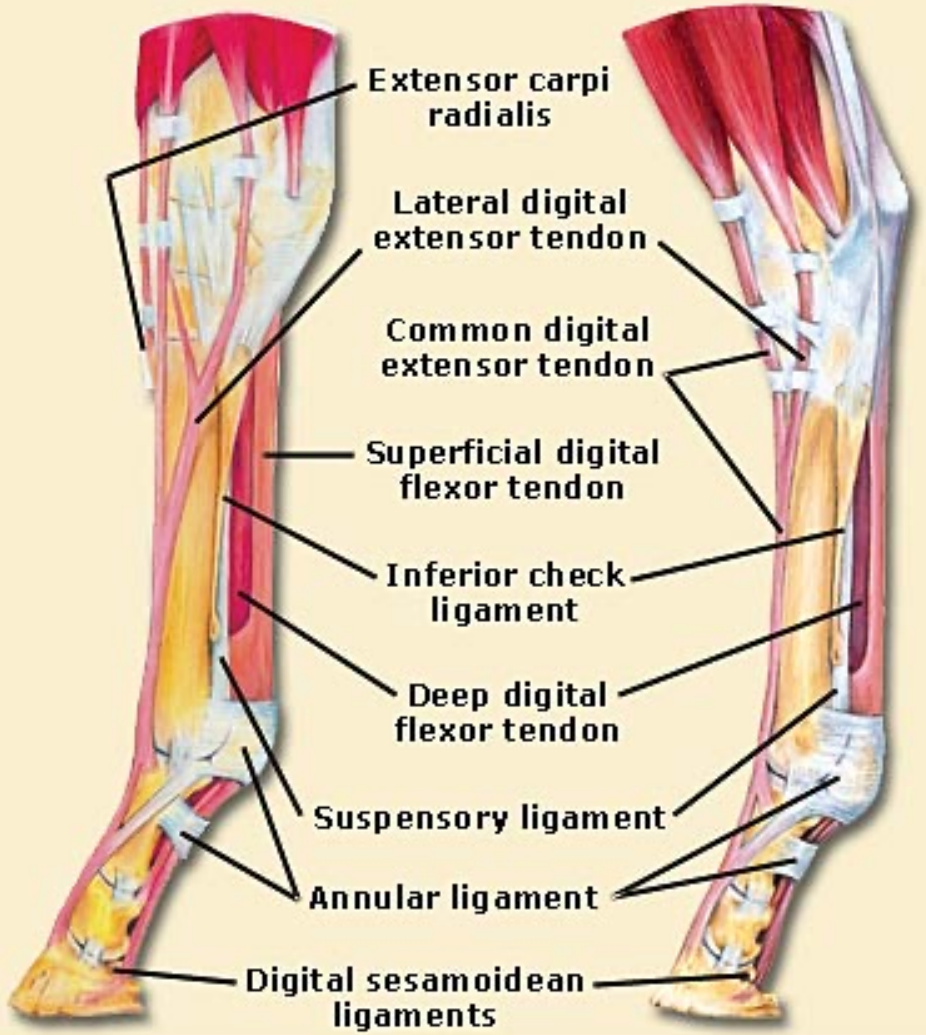
- Can occur in many locations
- Commonly seen in
  - Both Superficial Digital Flexor Tendon (SDFT) & Deep Digital Flexor Tendon (DDFT)
  - The Suspensory Ligament and its Branches
  - The Distal (inferior) Check Ligament also referred to as the Accessory Ligament of the Deep Digital Flexor Tendon (ALDDFT)

- Tendons & Ligaments have slow Ineffective healing
- Tendons & Ligaments can often be more difficult to treat and manage in performance horses & racing horses than some other injuries

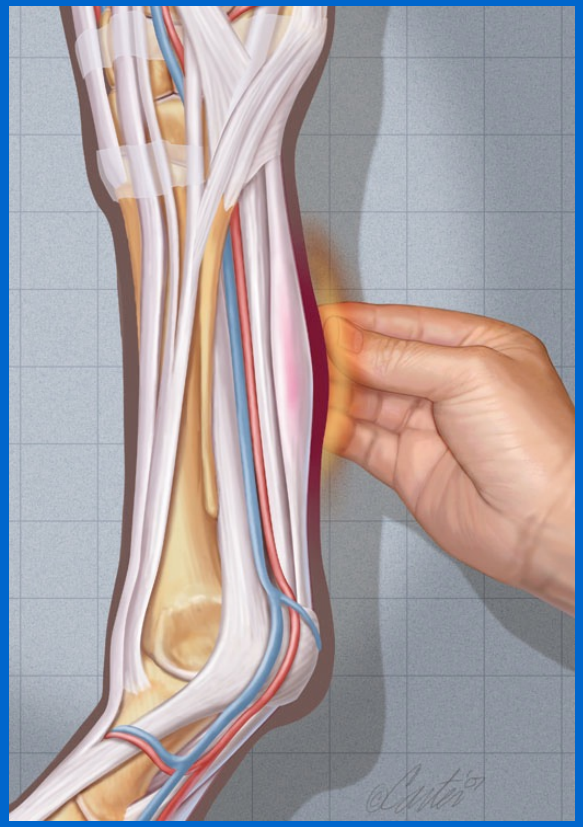
Normal Equine Anatomy



Tendons and Ligaments

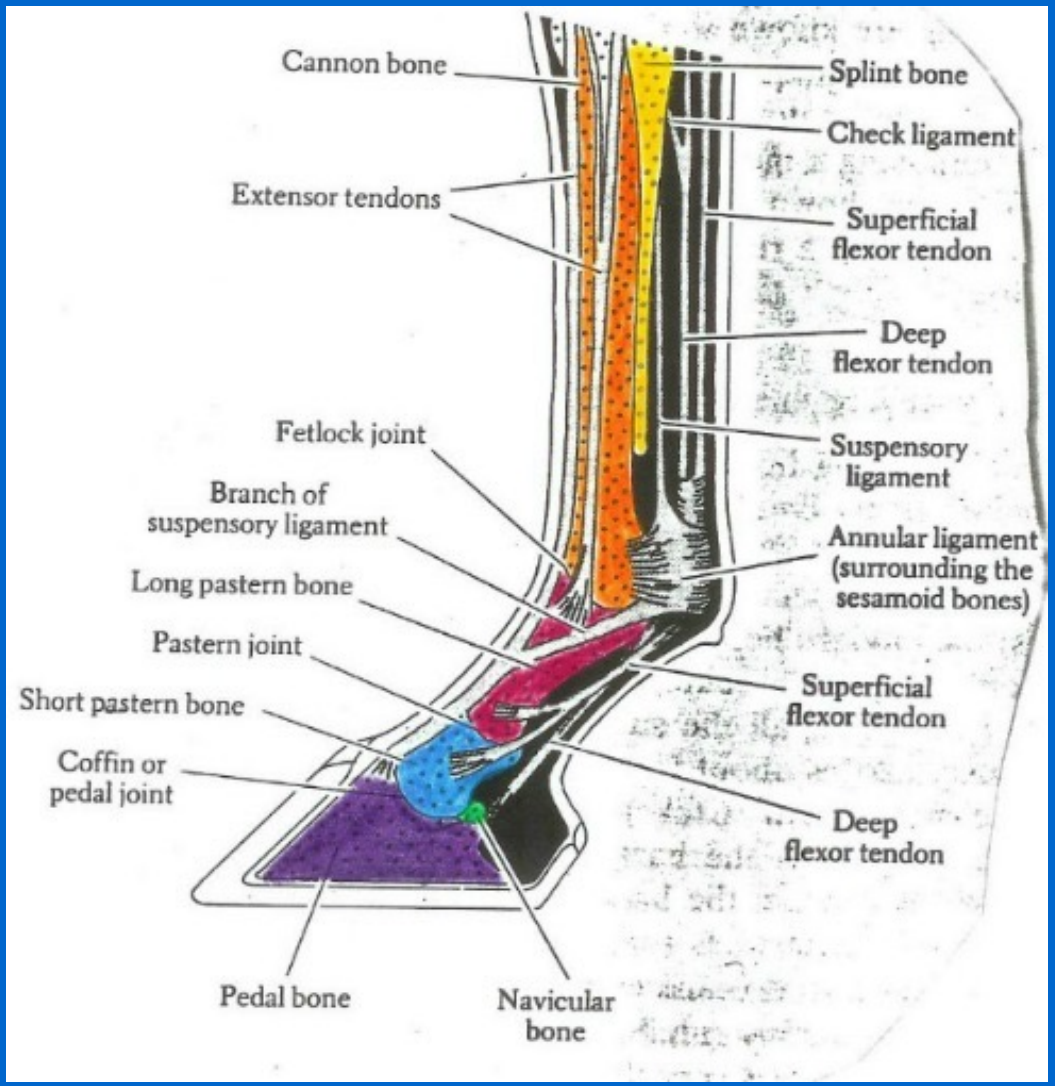


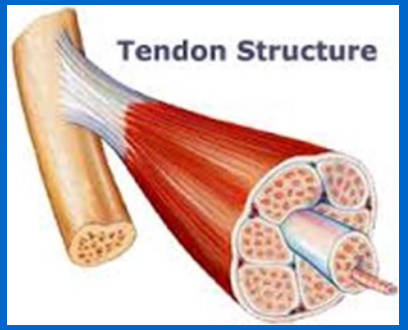
It only takes one bad step. When a critical soft tissue structure is injured, a horse could be fine today, then lame for months or even years to come. In fact, a serious soft tissue injury can be even more devastating than a fracture, especially for a performance horse.



Tendon & Ligament Injuries

Normal Equine Anatomy



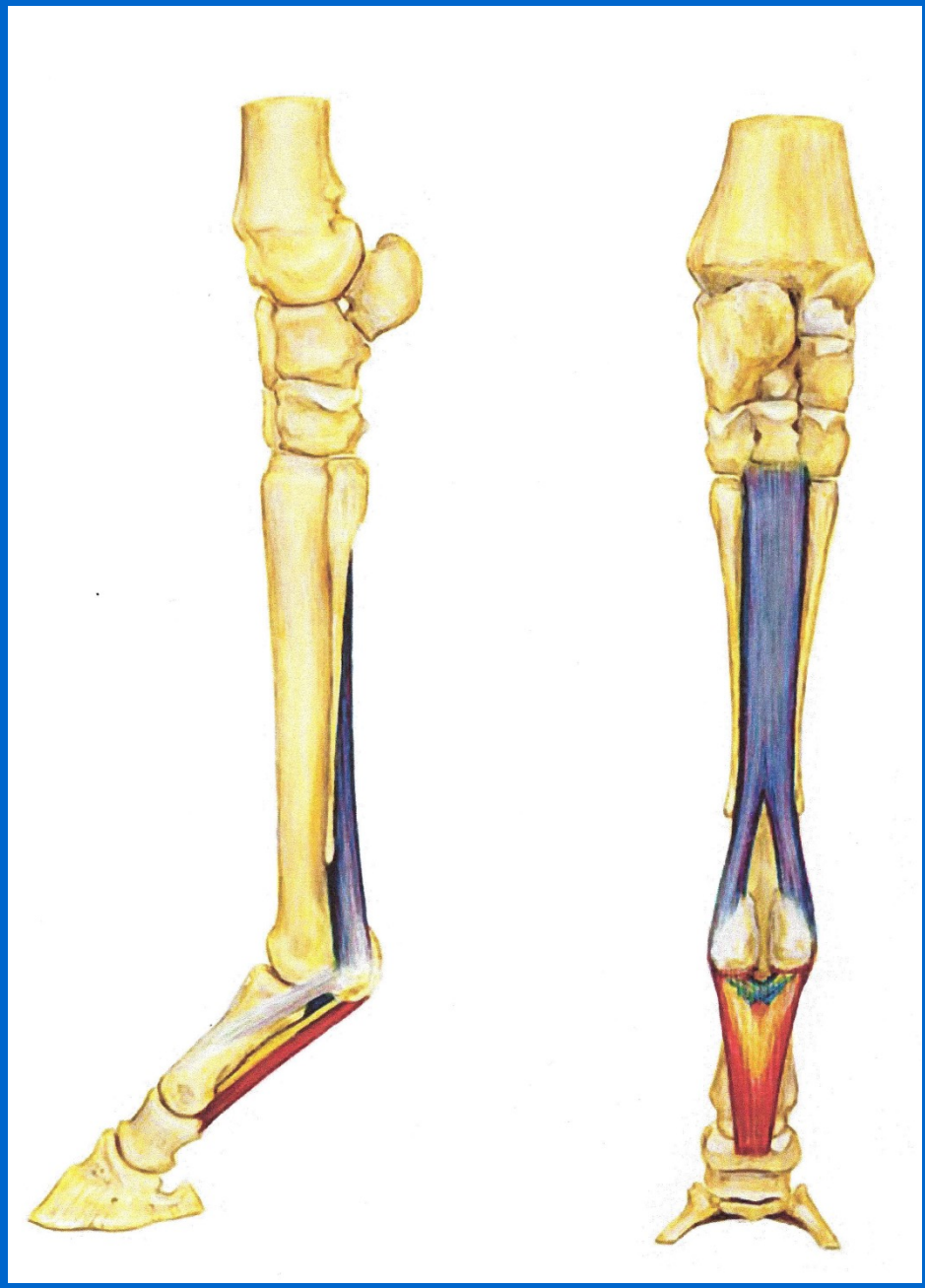


Tendon fibre bundles are surrounded by the interfascicular matrix (IFM), made up of tissue which enables the fibre bundles to slide past each other and stretch independently. In horses, the superficial digital flexor tendon (SDFT), which is used to store energy for propulsion, requires greater stretching of the IFM, than in the common digital extensor tendon (CDET) which aids the positioning of the leg.

The Suspensory Ligament is found underneath the flexor tendons.

The main body of the Suspensory Ligament divides into medial and lateral branches in the distal 3rd area of MCIII (cannon bone)

The suspensory ligament can easily be seen and felt in the mid cannon region (between arrows)



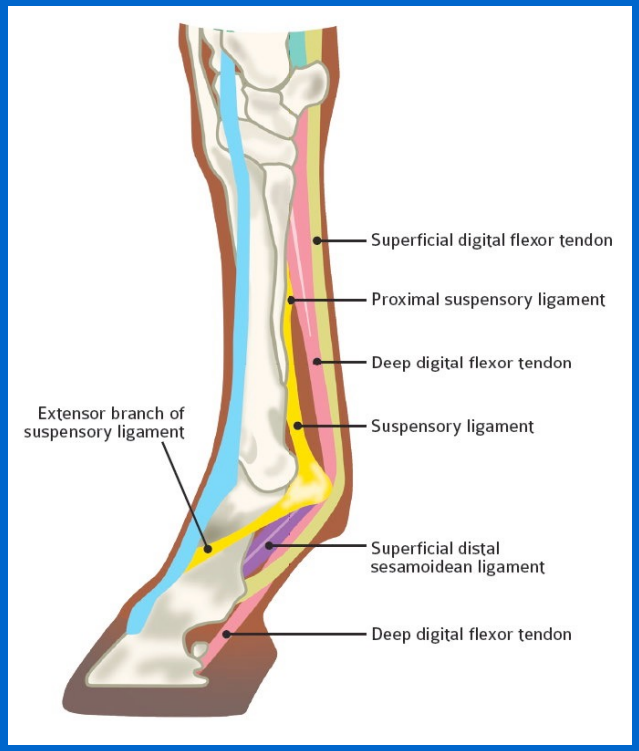
Tendon & Ligament Injuries

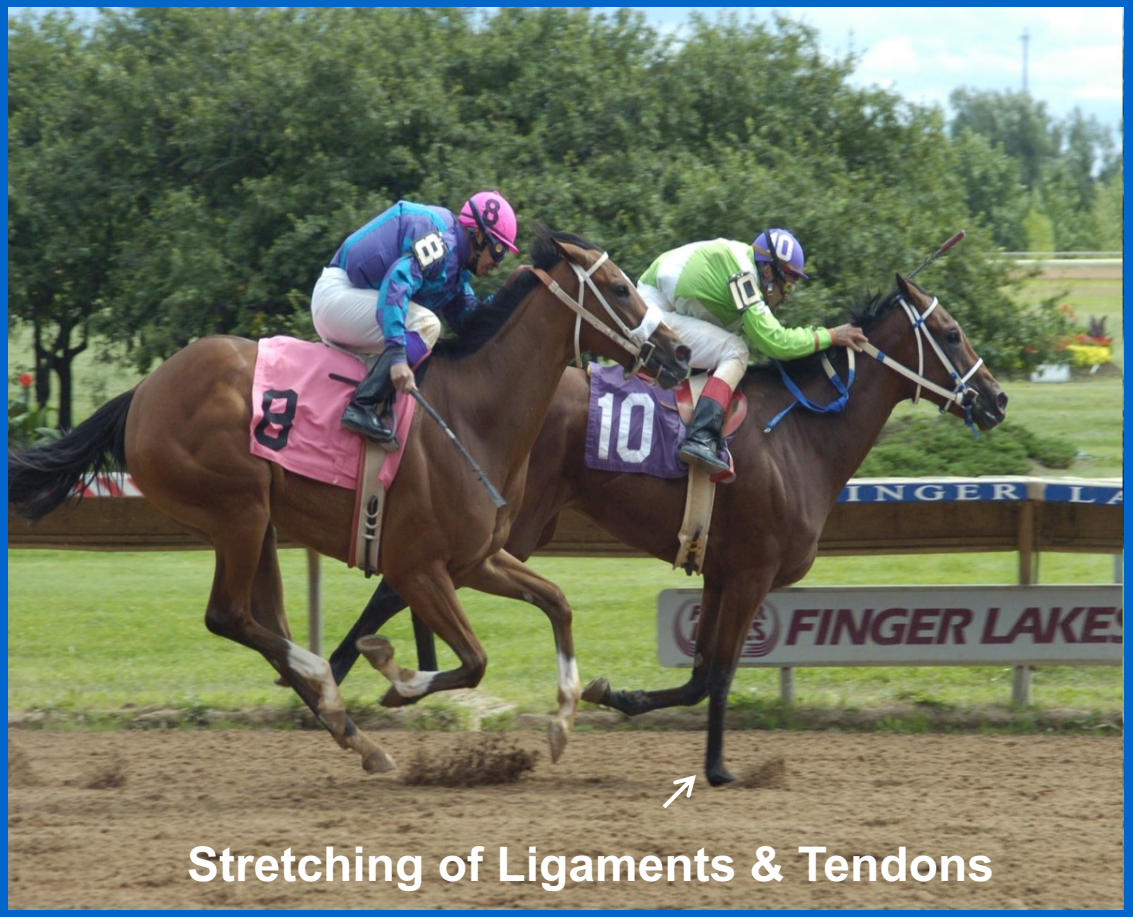
Suspensory ligament and tendon injuries are a common cause of lameness in the horse, particularly athletic horses and those involved in competitive events.

Often these injuries are chronic and have a high probability of reoccurrence, which makes them a significant concern.

Tendon & Ligament Injuries

- Athletic horses are prone to over stretching tendons and ligaments resulting in a tear(s) of these structures



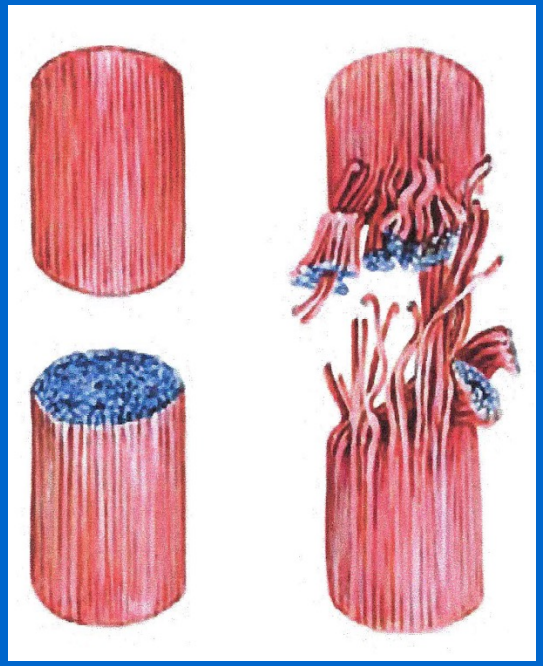


Stretching of Ligaments & Tendons

These injuries occur slightly more often in the front legs. However, they do occur in the hind legs as well.

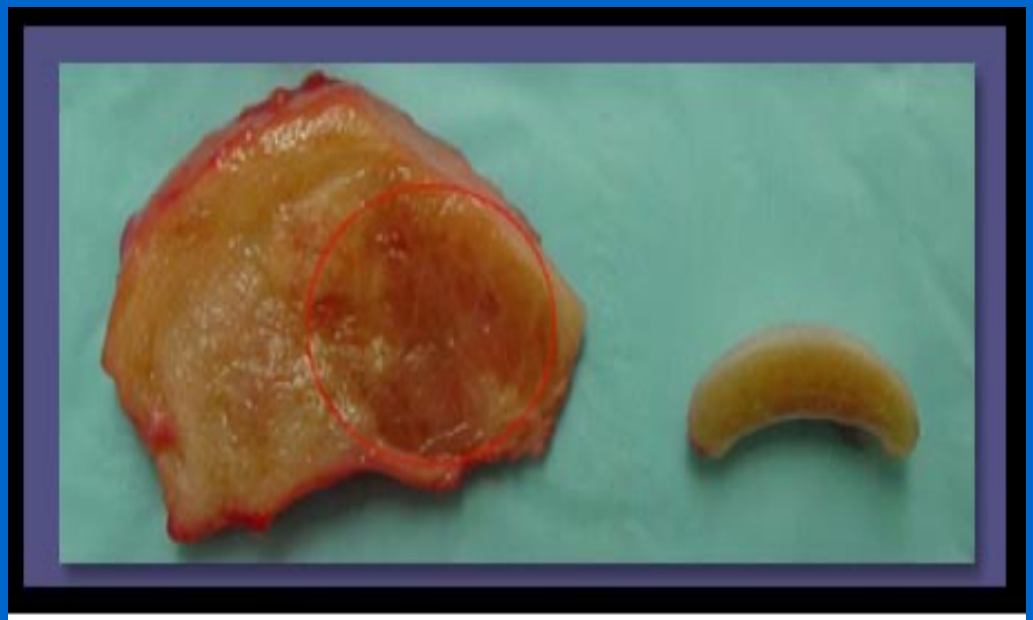
Tendon & Ligament Injuries
are common
Racing surfaces vary in stress
and can contribute to Injuries

Tendon & Ligament Injuries

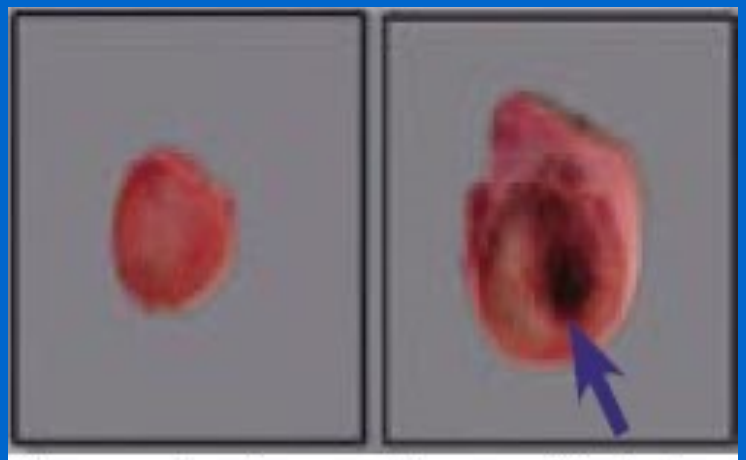


Tendon and Ligament injuries occur in horses of all disciplines

Tendon & Ligament Injuries



A bowed tendon specimen (left) with a core lesion (red circle) compared to the normal tendon (right) from the opposite leg.



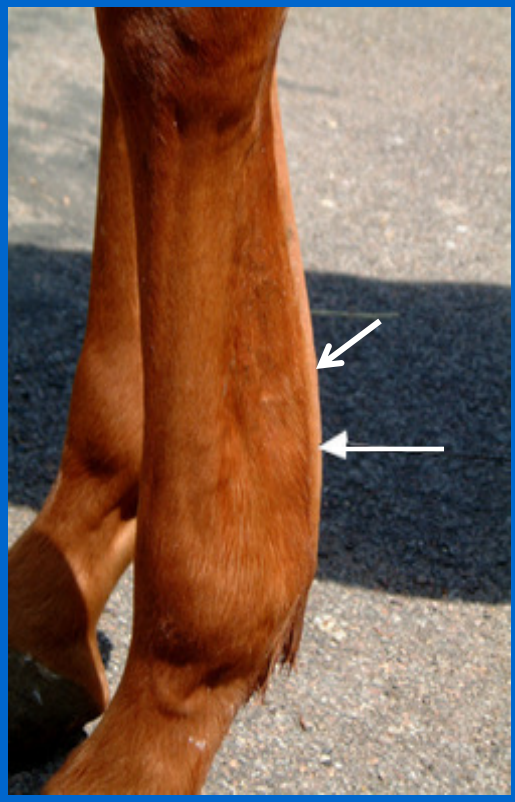
Cross sectional view of a normal suspensory ligament branch.

Cross-sectional view of an injured suspensory ligament branch.

Tendon & Ligament Injuries

Signs of Injury:

- Clinical signs can be quite varied
- Recent injuries ten to be characterized by heat, swelling, and pain on palpation of the affected area
- Lameness can range from mild to severe
- Lameness may last only a few days
- Chronic injuries often result in persistent thickening of the tendon or ligament and an intermittent or persistent lameness

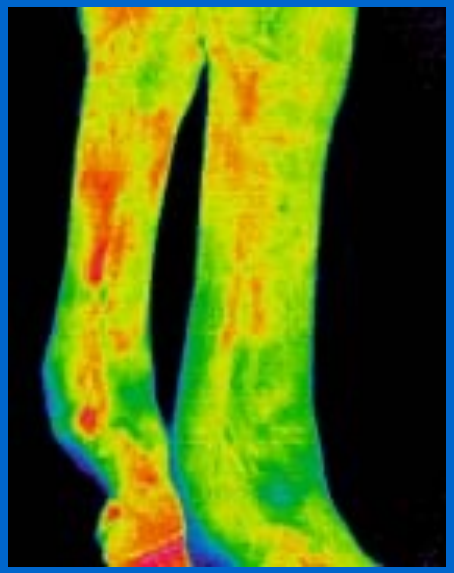


Tendon & Ligament Injuries

Initial examination is done by observing the horse walk and jog (if able) and then palpating the flexor tendons, inferior check ligament, and suspensory ligament.

A soft tissue injury most commonly occurs when the tendon or ligament is stretched beyond its capacity, causing the fibers to tear.

Tendon & Ligament Injuries



Thermography (thermal imaging) is useful as a diagnostic aid

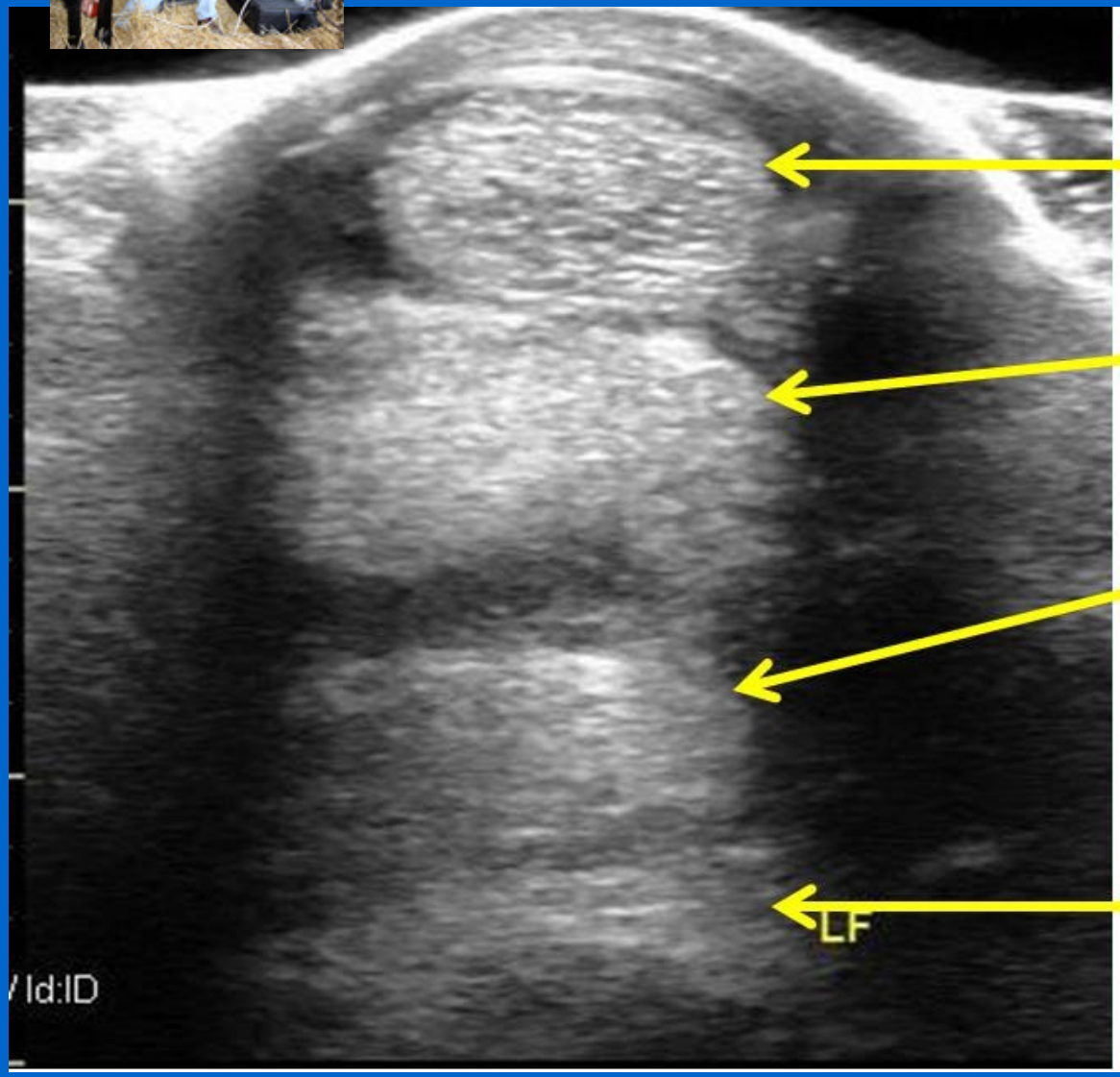
Tendon & Ligament Injuries

Ultrasound is the gold standard to determine the extent of ligament and tendon injuries

Ultrasound evaluation of the equine metacarpal region reveals a recent acute tear of the superficial digital flexor tendon in the upper right image. The lower right image reveals a tear of the proximal suspensory ligament in a Warmblood show horse.

Torn fibers appear dark in an ultrasound image

Ultrasound of Tendons & Ligaments



SDF

DDF

Check Ligament

Suspensory ligament

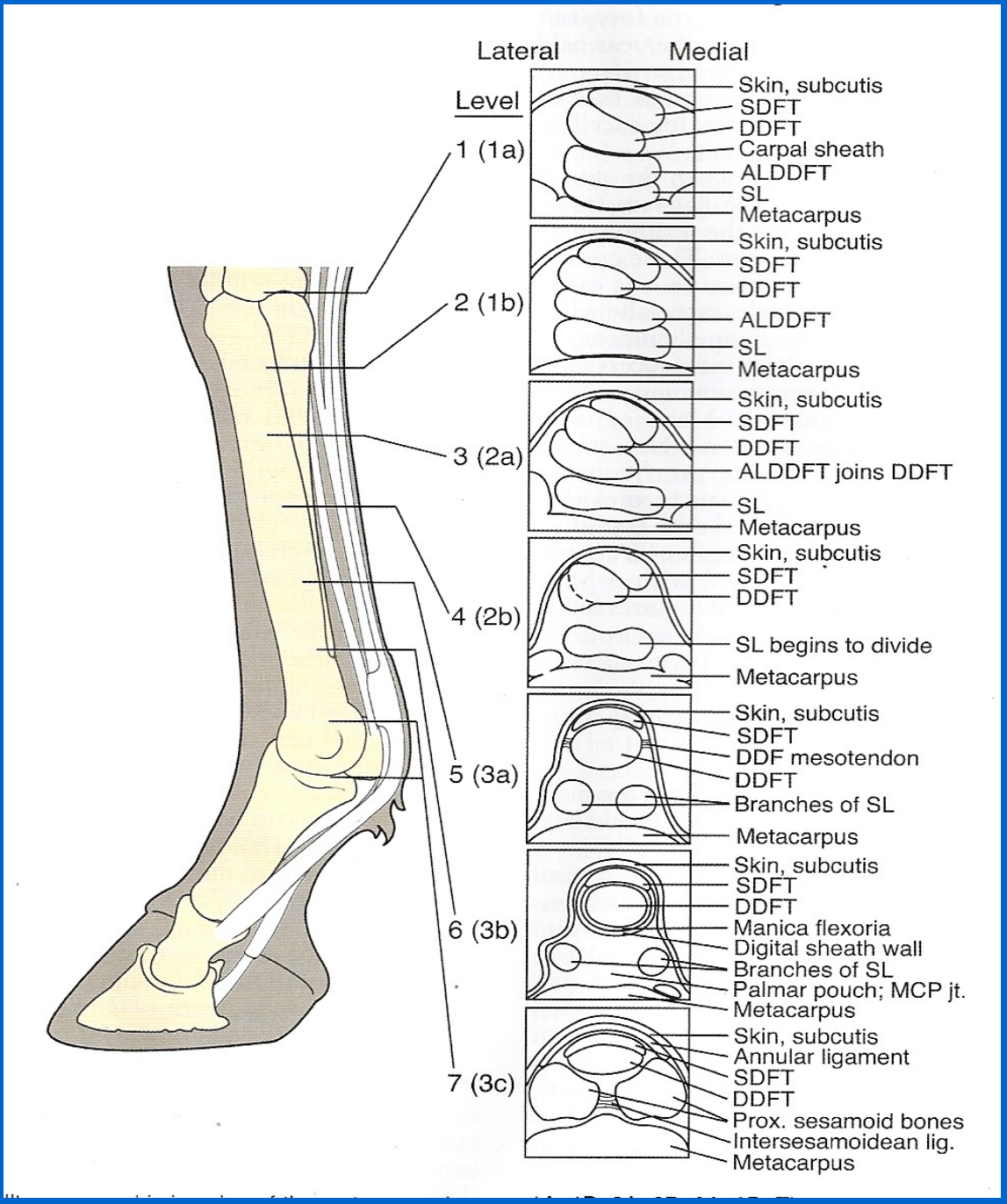
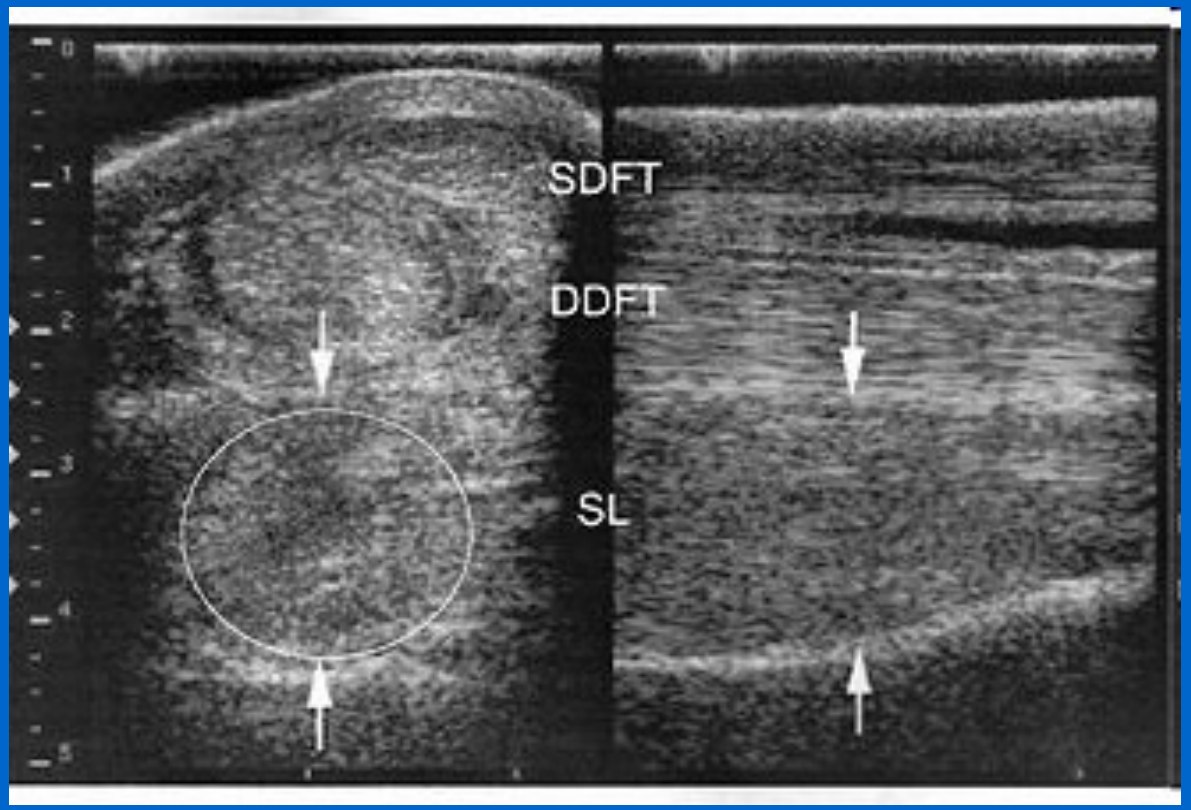


Diagram showing the ultrasound areas of the distal equine limb

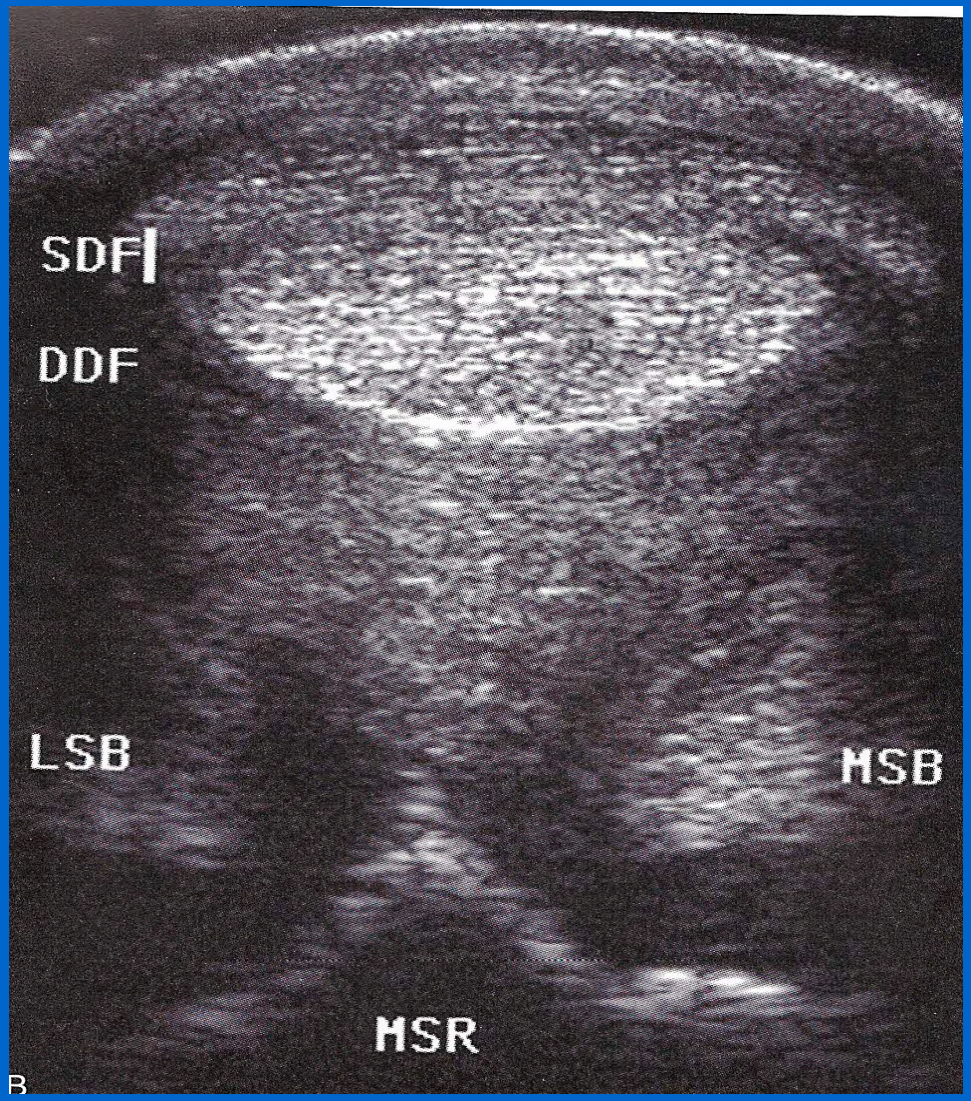
Tendon & Ligament Injuries

Ultrasound Image

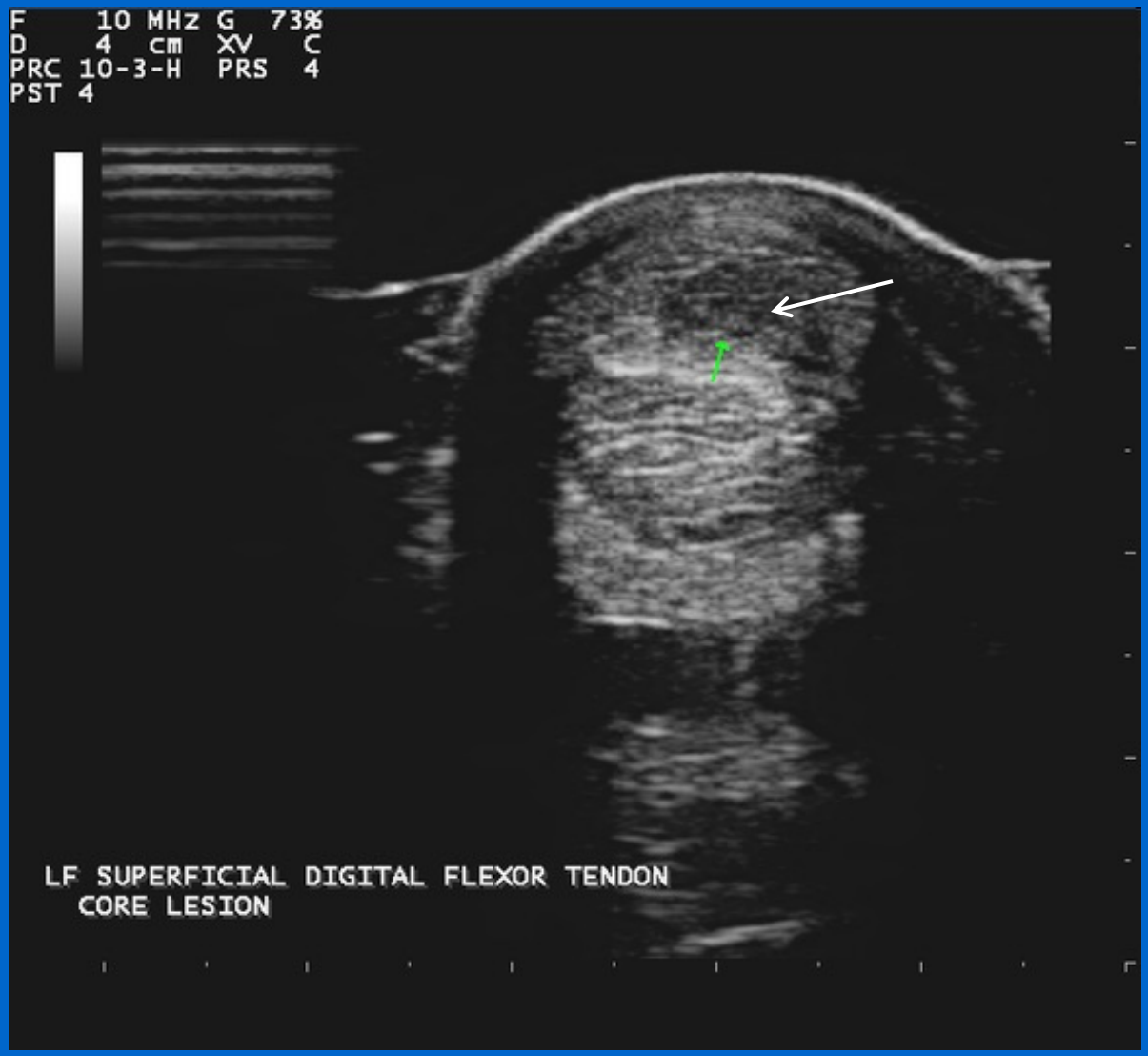
Cross Section Longitudinal



Tendon & Ligament Injuries

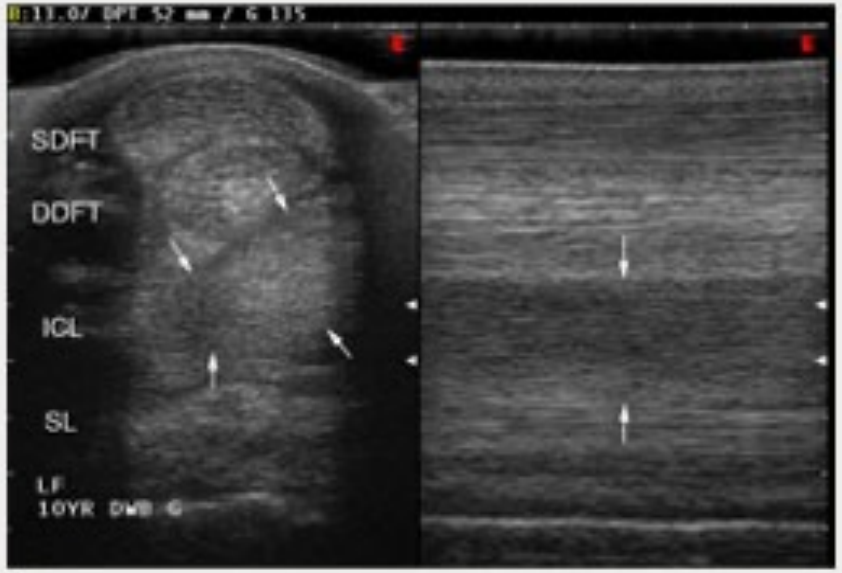


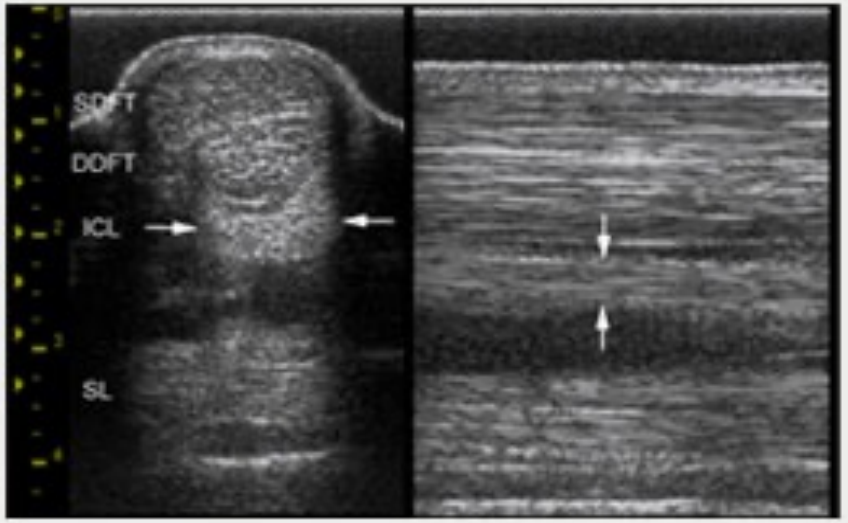
Tendon & Ligament Injuries



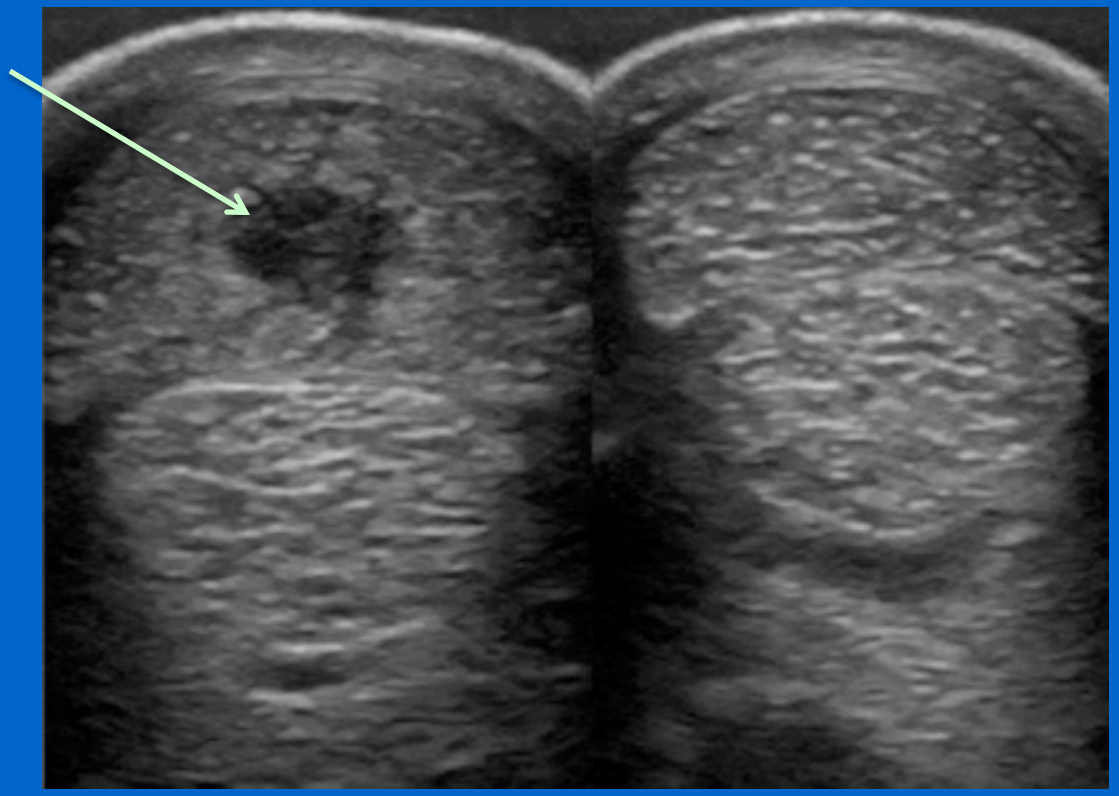
Tendon & Ligament Injuries: Check Ligament

Tear of Accessory Ligament of the Deep Digital Flexor Tendon (Inferior Check Ligament)





Tendon & Ligament Injuries

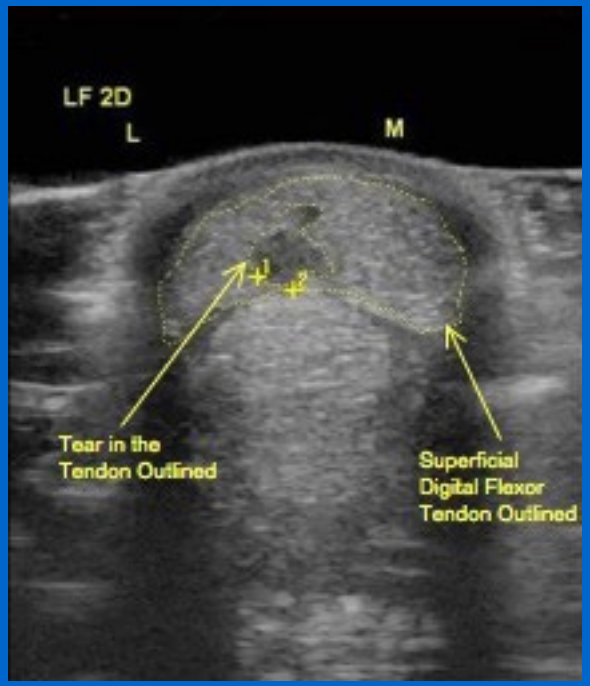


Left front SDFT

Right front SDFT

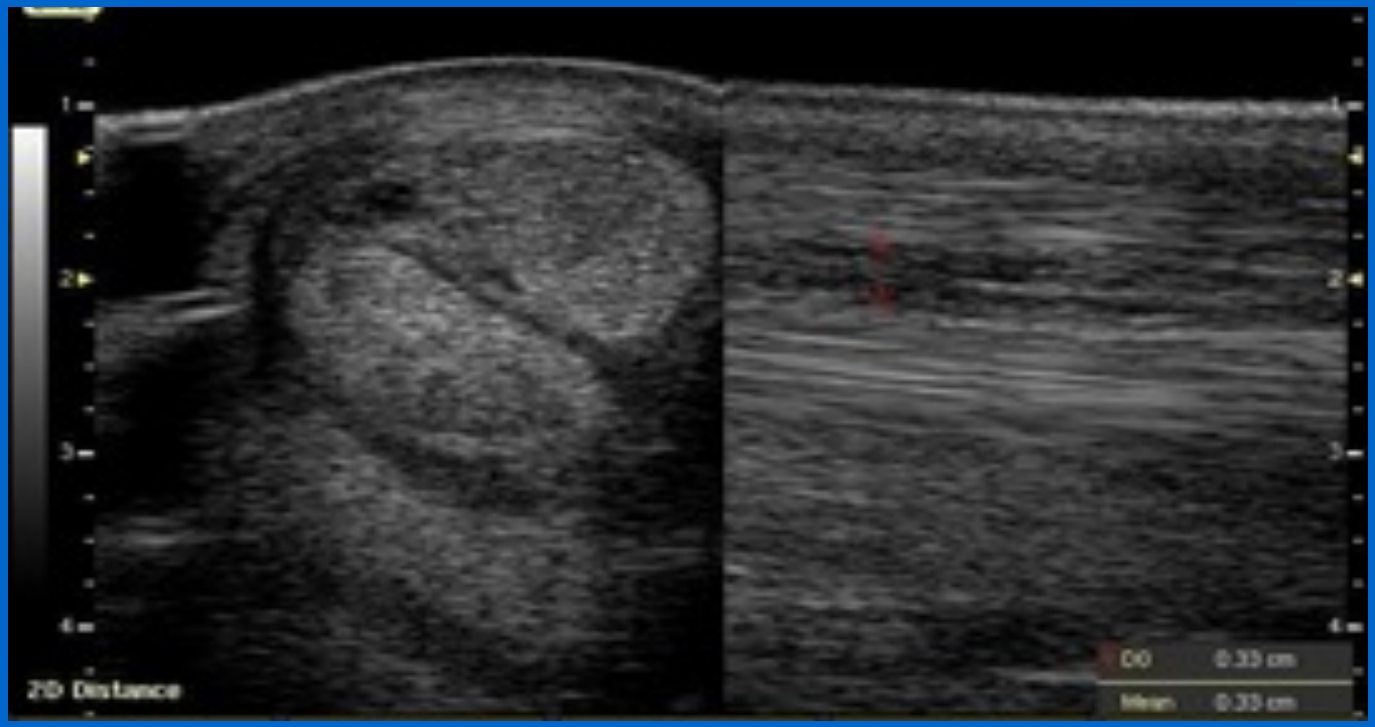
Superficial digital flexor tendon injury; abnormal tendon on the left, normal tendon on the right.

Tendon & Ligament Injuries



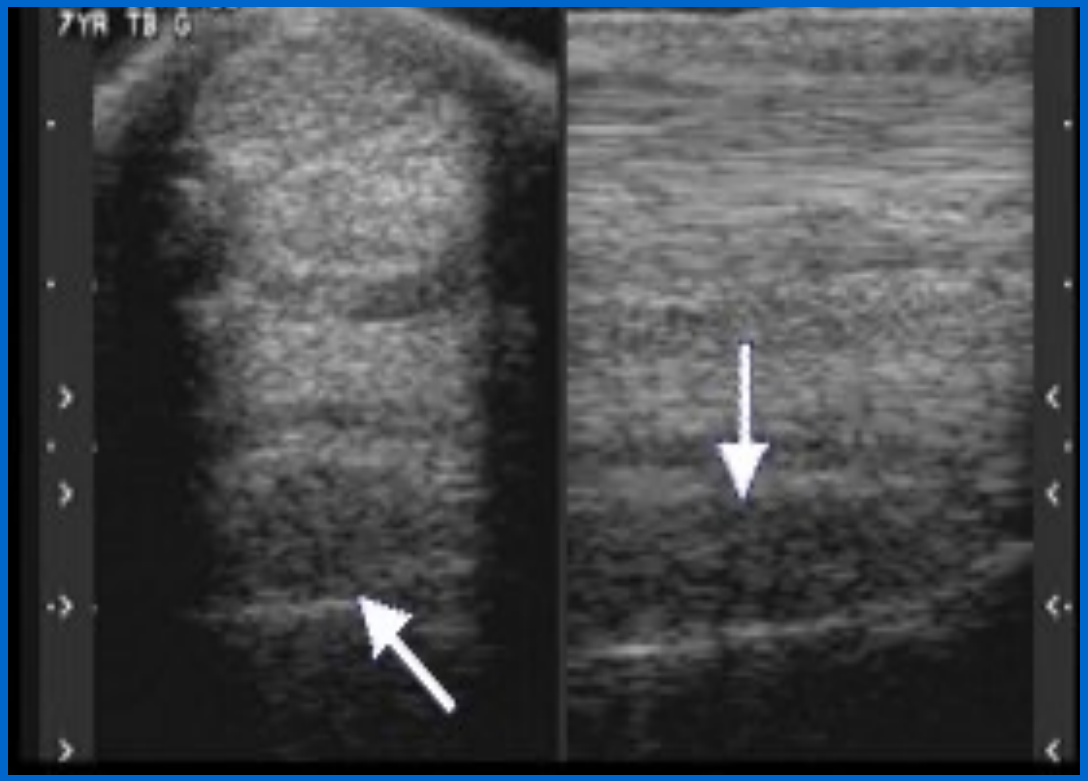
Tendon & Ligament Injuries

Describe the structures below

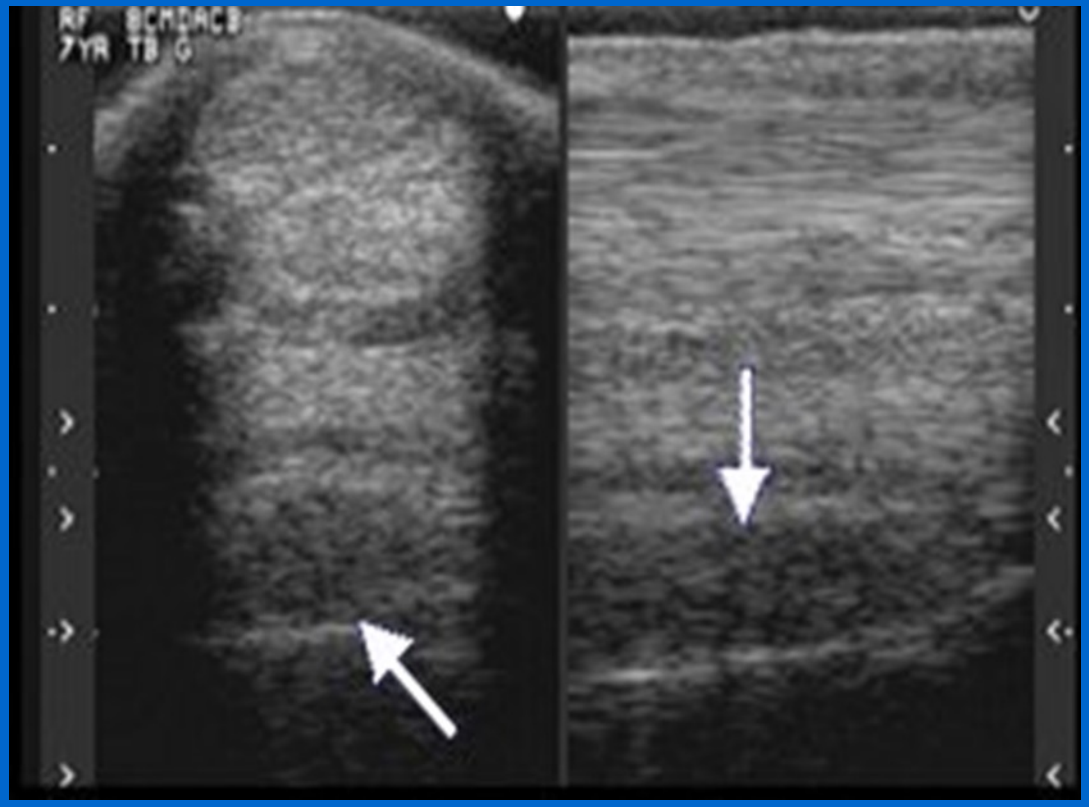


Tendon & Ligament Injuries

What is your diagnosis?

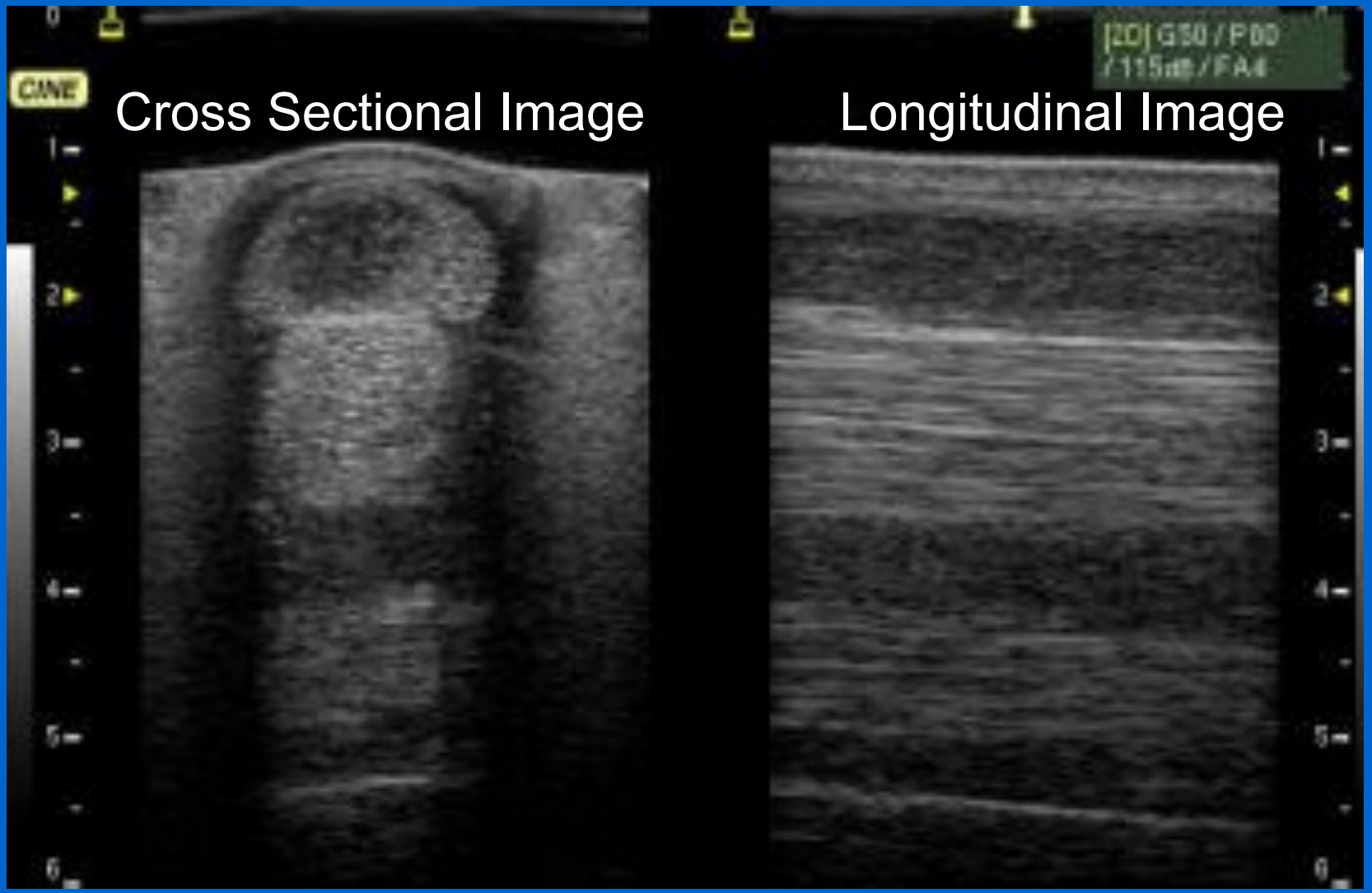


Tendon & Ligament Injuries



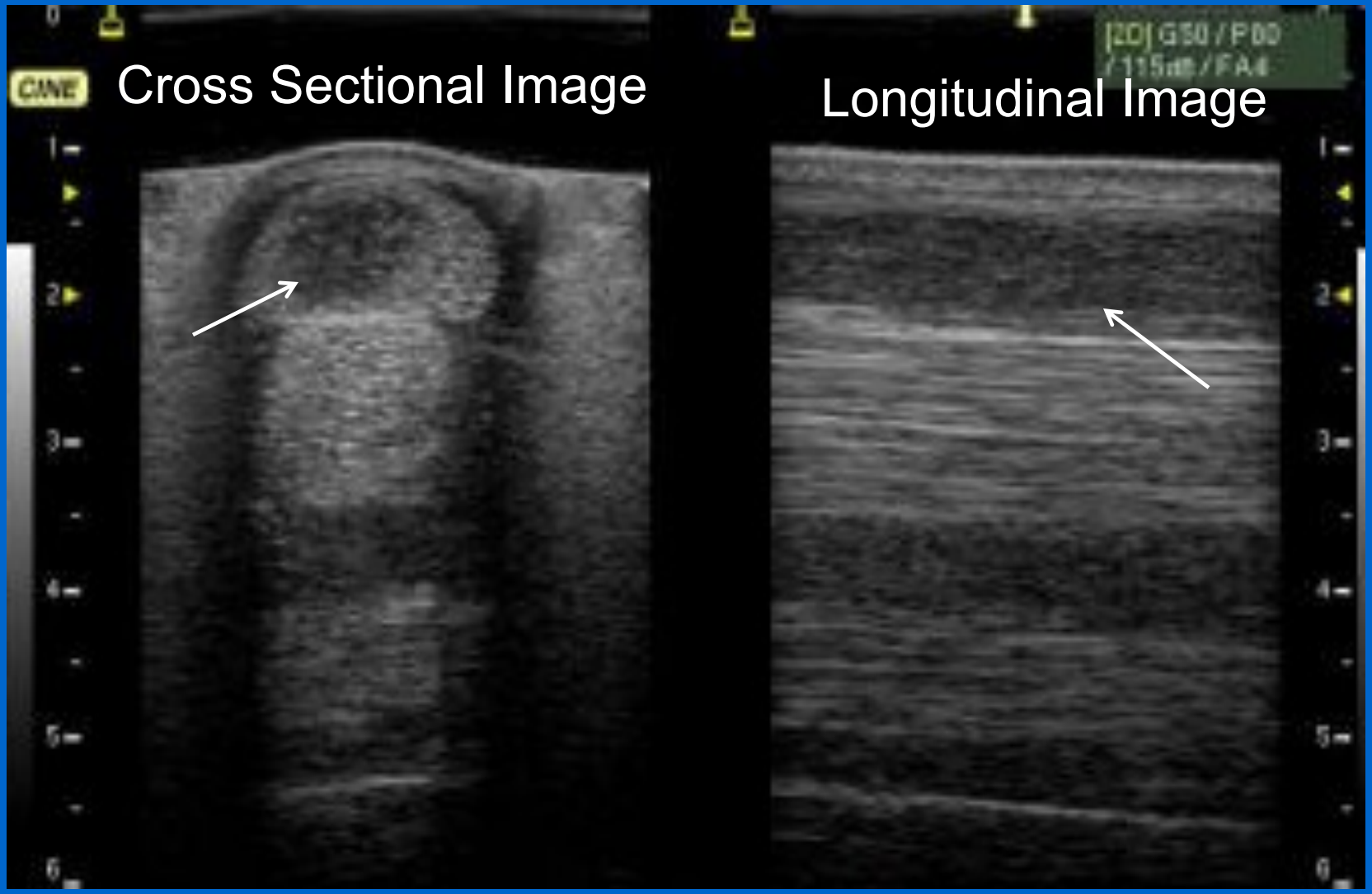
Diagnosis: Tear in main body of the Suspensory Ligament

Tendon & Ligament Injuries



What is your diagnosis?

Tendon & Ligament Injuries

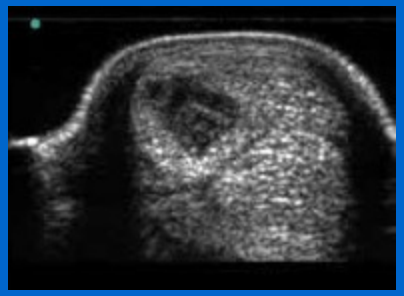


Diagnosis: tear or core lesion

Superficial Digital Flexor Tendon (SDFT)

Tendon & Ligament Injuries Treatments

- The first step in treating is to prevent further damage to the tendon and/or ligament fibers; this usually involves taking the horse out of training or competition for a period of time
- Initial treatment with NSAID & hydrotherapy
- Rest is part of all treatments
- Rest includes turnout in a grass pasture
- Monitor the healing process with ultrasound



Tendon & Ligament Injuries Treatments

- Complete Stall Rest for extended period of time is **NOT** what you want to do
- Limited exercise and ever increasing exercise is necessary for proper healing & the most important part of treating/managing these injuries

Tendon & Ligament Injuries Treatments

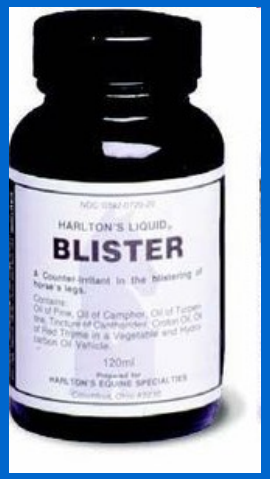
- Freeze firing or cryosurgery has been done and is still done by some
- Questionable if this treatment is of great value for tendon and ligament injuries

Tendon & Ligament Injuries Treatments

- Pin firing (burning tissue), in theory, was thought to increase circulation, cause healing, and toughen the leg
- Pin firing required the horse to have extended periods of rest and this rest is what actually helped with the healing
- This barbaric method is not done much today

Scars from pin firing

Tendon & Ligament Injuries Treatments



- Blistering is the use of caustic chemicals
  - Strong blisters cause the tissue to peal off the horse's leg
  - The counter irritation is/was believed to be beneficial for the healing process
  - Severe blistering is a cruel form of treatment that is not used much today
- The rest (time needed) to get over the blistering is what helps heal tendon and ligament injuries

Tendon & Ligament Injuries Treatments

- Mild counter irritation that increases blood flow may be beneficial
- Mild counter irritants are best used after the acute stage of injury in tendon and ligaments
- A number of iodine based leg paints are used as mild counter irritation treatments
- A few veterinarians have developed mild counter irritant injectable compounds

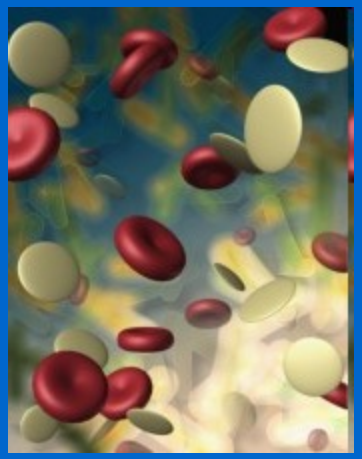
Tendon & Ligament Injuries Treatments

- Shockwave therapy is being used to treat tendon and ligament injuries and it is believed to:
  - cause bruising of the tissue and increases some circulation
  - temporarily deadens some nerve endings

- Shockwave therapies mode of action is not fully understood; many think it works, However many others do not think this works or is an effective treatment

Tendon & Ligament Injuries Treatments

Regenerative Medicine



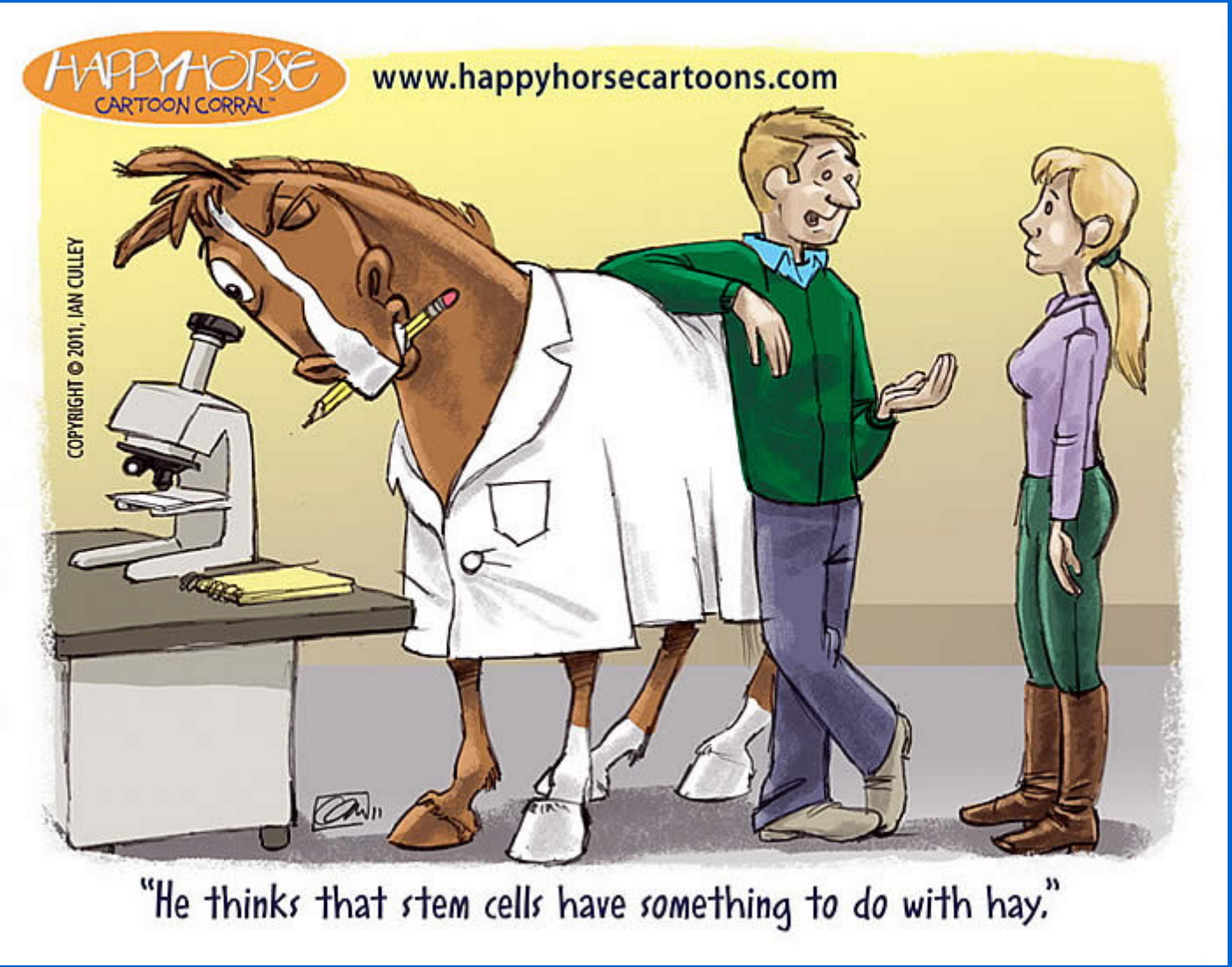
Biological Therapy

- Platelet Rich Plasma (PRP)

Blood is drawn from the horse & the platelet rich plasma containing various growth factors is extracted from the whole blood, then injected into tendon and ligament injuries to help facilitate healing. This is showing great promise.

PRP kit available for use in field

Tendon & Ligament Injuries
Stem Cell Treatments



Biological Therapy

Regenerative Medicine

Tendon & Ligament Injuries Treatments

- Stem Cells – Fat Derived
  - Fat is collected from the rump area
  - Sent to the special lab for processing
  - Fat derived stem cells are then injected into the tendon or ligament injury

Biological Therapy

Regenerative Medicine

Tendon & Ligament Injuries Treatments

- Stem Cells – Bone Marrow
  - Bone Marrow is collected
  - Processed and cultured at a lab
  - Injected into tendon and ligament injuries

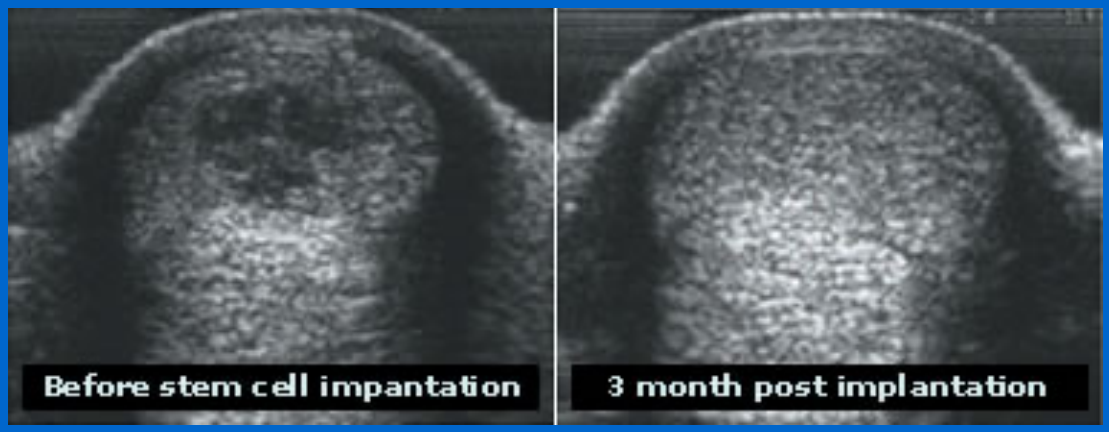
Stem Cell

Injection of bone marrow into a bowed tendon.

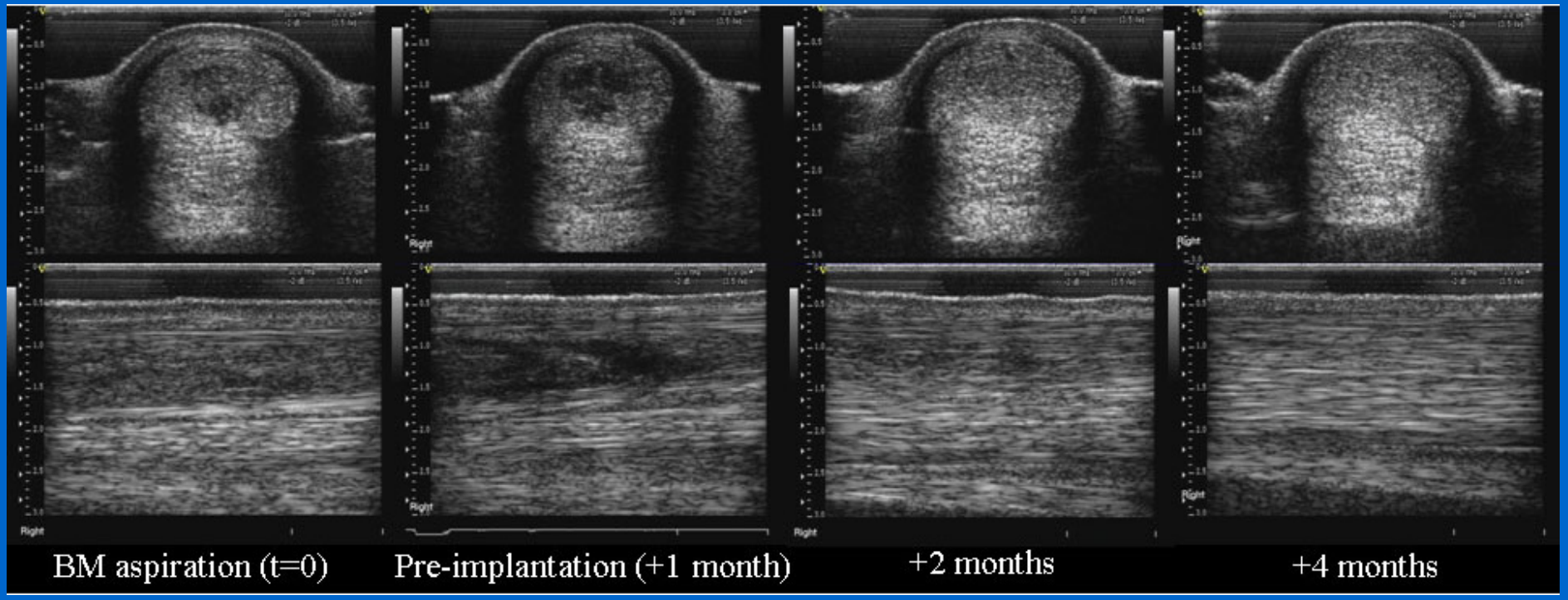
Bone Marrow Collection

Tendon & Ligament Injuries

- The healing process is monitored with ultrasound



Tendon & Ligament Injuries



The healing process is monitored with ultrasound

Tendon & Ligament Injuries Treatments

- Cortical steroids, Hyaluronic acid, & Adequan
  - Useful in the **chronic stage(s)** with tendon and ligament injuries to relieve inflammation
  - Cortical steroids should **NOT** be used in the acute stage, because they may delay healing

- Cortical steroids, Hyaluronic acid, & Adequan are injected into ligaments, tendons, and tendon sheaths in the **chronic stage(s)**

Betamethasone

Tendon & Ligament Injuries Treatments: Corrective and proper shoeing

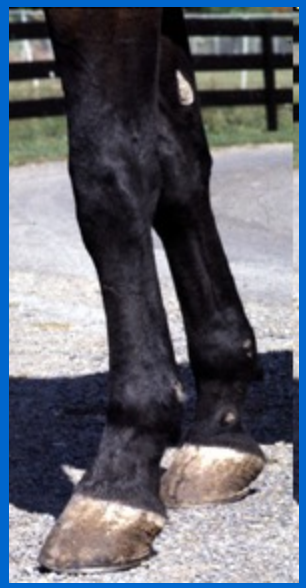
Tendon & Ligament Injuries Treatments

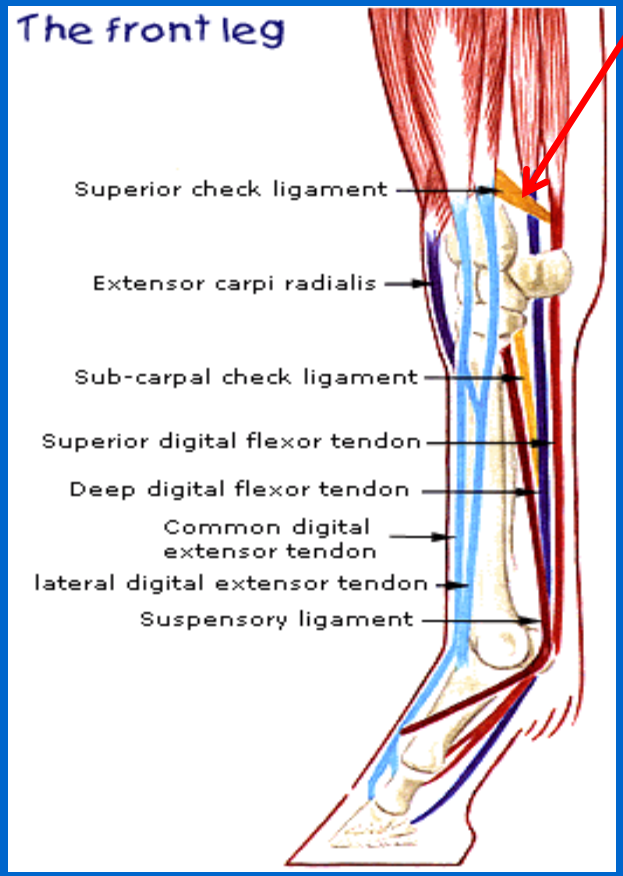
- Corrective shoeing is done mostly in the early stages of injury to reduce stress on the injured tendon or ligament
- During the healing process the elevated heal is slowly reduced back to normal

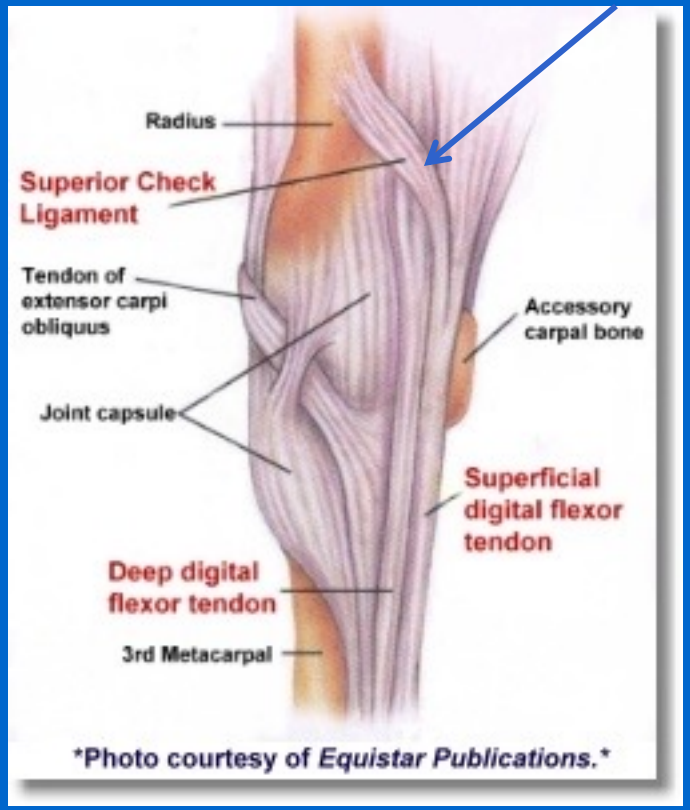
Surgical

Tendon & Ligament Injuries Treatments

Superior Check Ligament Desmotomy is done as an aid for horses that have a bowed superficial digital flexor tendon (SDFT). It is believed to help by taking tension & vibration off the SDFT

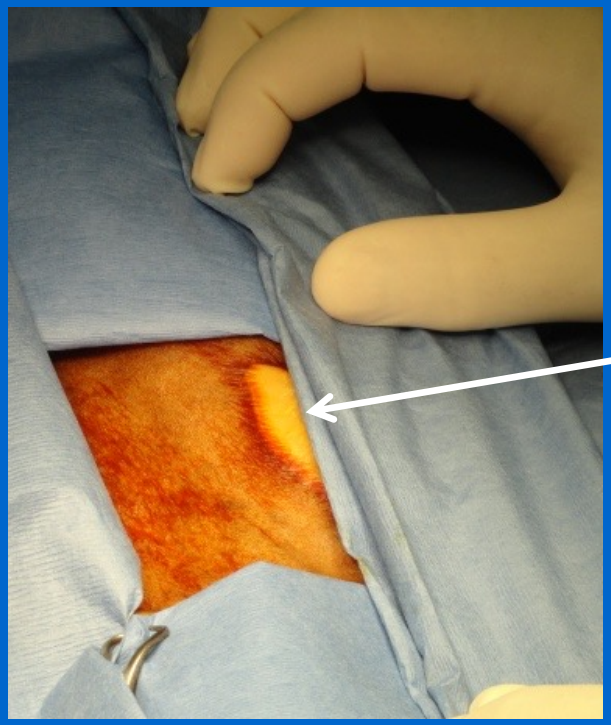






Superior Check Ligament Desmotomy

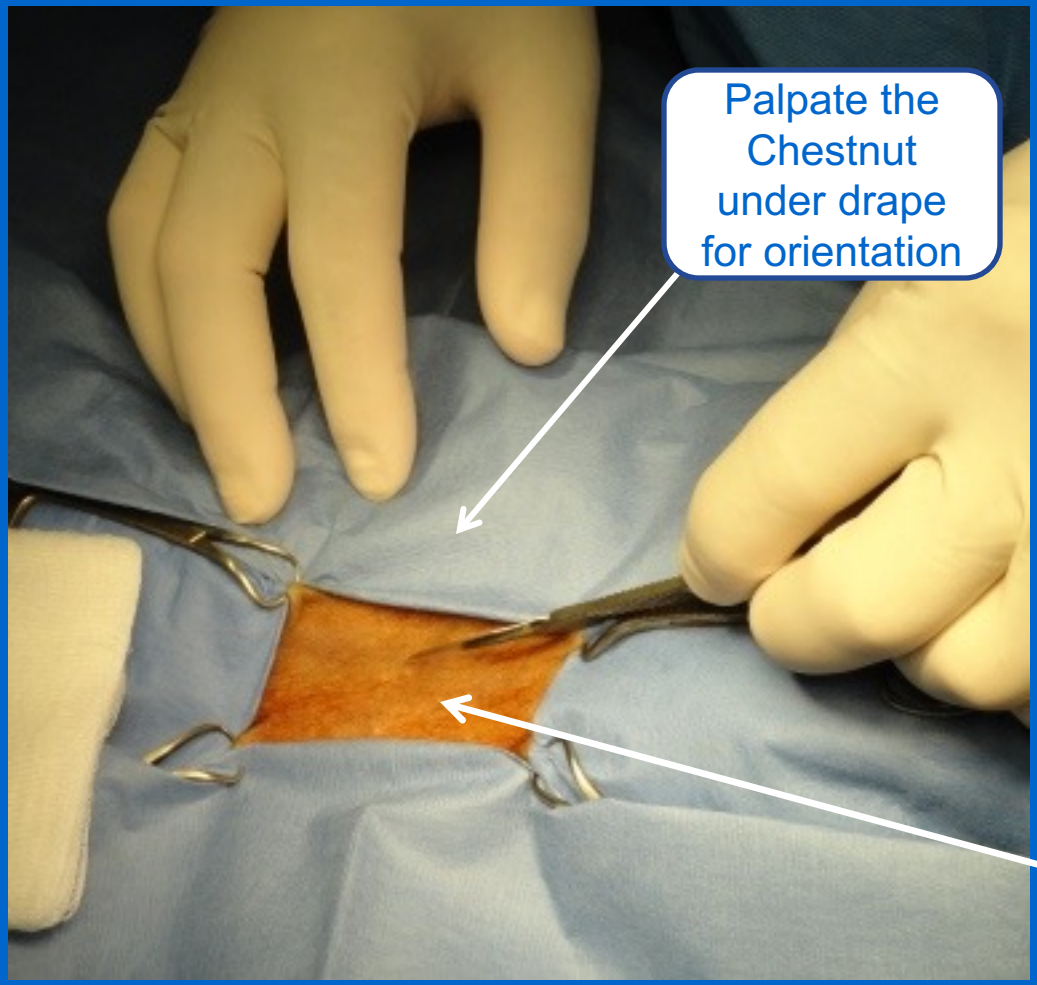
It is believed to help by taking tension & vibration off the SDFT



The Chestnut is your landmark

Superior Check Ligament Desmotomy

It is believed to help by taking tension & vibration off the SDFT



Incision is made close to the caudal Radius

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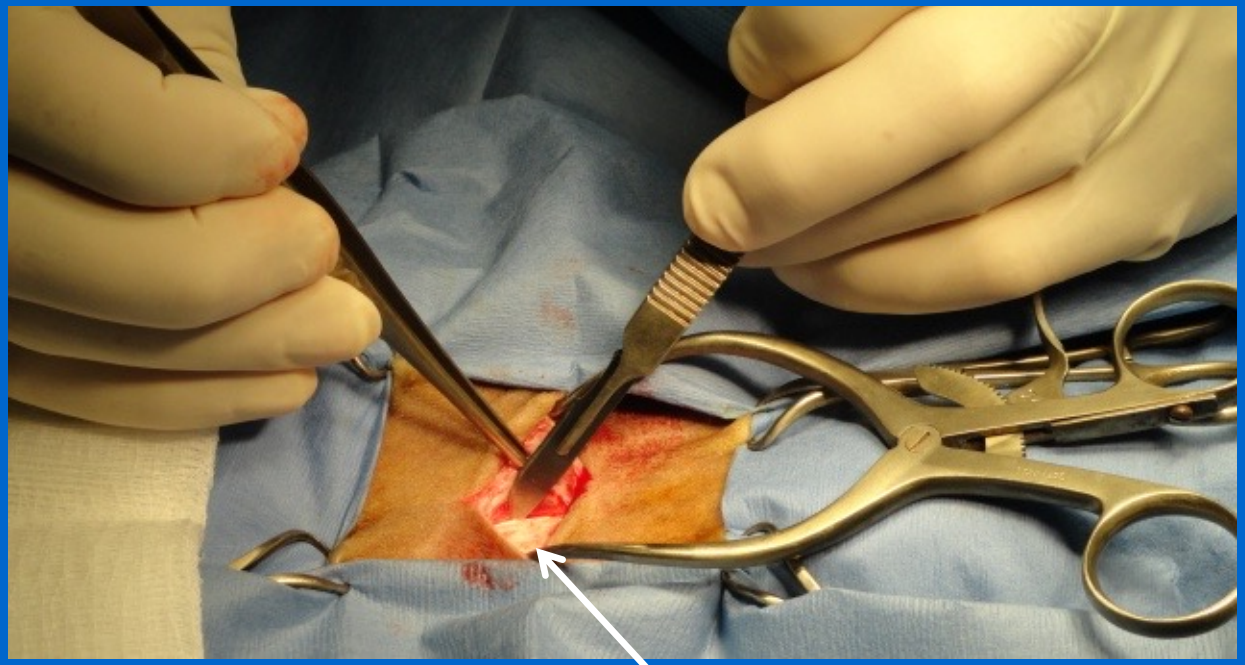
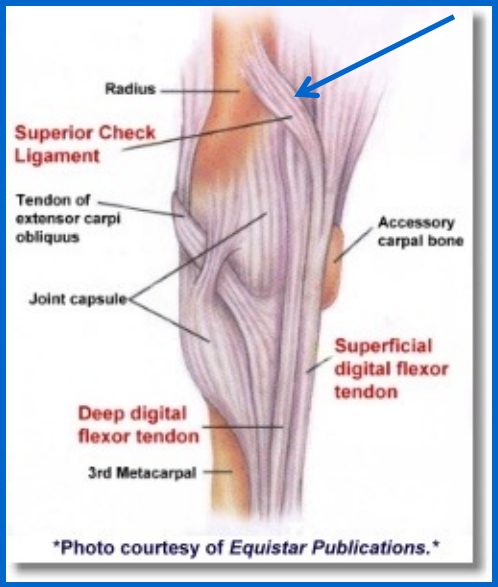




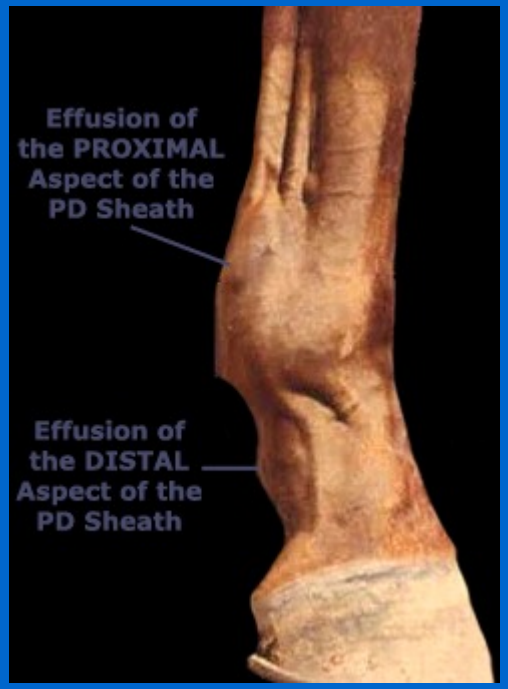
Superior Check Ligament runs obliquely in this area.
The ligament is transected.

Superior Check Ligament Desmotomy

It is believed to help by taking tension & vibration off the SDFT

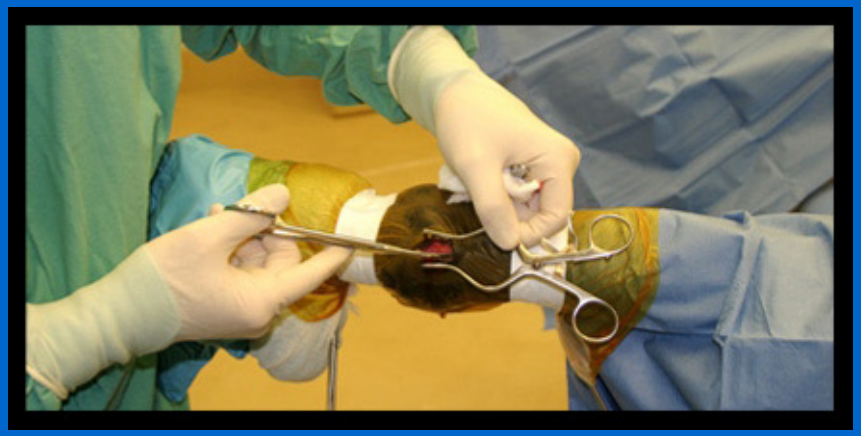
After closure, a pressure bandage is applied

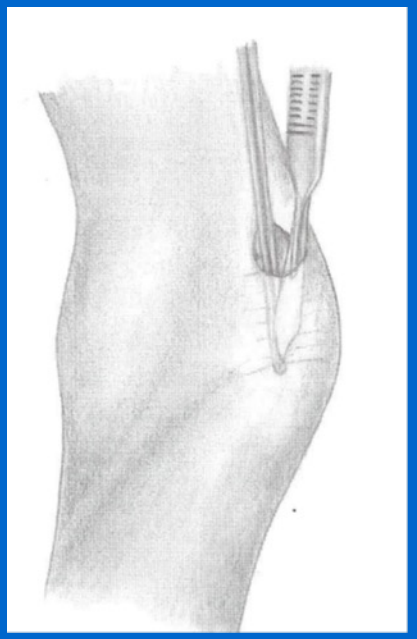
Annular Ligament desmitis and constriction. Can (but not always) cause Chronic Tenosynovitis



Constriction of the Annular ligament(s) is seen in both front and back legs.

Surgery: to relieve constriction of the palmar/plantar annular ligament (PAL) → improved circulation and movement of flexor tendons.





There are 3 commonly used techniques:

- 'Closed' - minimally invasive surgery.
- Open surgery - when adhesions in severe and chronic. tendonitis preclude the easy insertion of instruments.
- Tenoscopy (surgery with an Arthroscope).

Tendon & Ligament Injuries Prognosis

- The prognosis for thoroughbred racing horses and high end performance horses to return to the same level is guarded
- For racing and performance horses to return to a reduced level or be used as a riding or pleasure horse, the prognosis is good

Tendon & Ligament Injuries Prognosis

- The prognosis for standard bred horses is much better as compared to thoroughbreds
- Standard bred horses quite often recover from tendon and ligament injuries and continue to race

Tendon & Ligament Injuries Prognosis

- The prognosis for pleasure riding horses with tendon and ligament injuries is very good

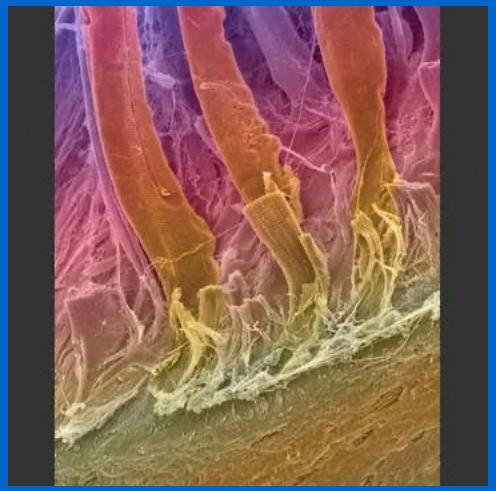
Whiskey Bottom Road & Two Is A Crowd, both Thoroughbreds that had Tendon Injuries at the race track, recovered and have productive lives as pleasure horses.

Bar Room Queen, the Thoroughbred seen below, had a Suspensory Ligament Injury at the race track; recovered and has a productive life as a Show Horse.

High Suspensory Ligament Injuries

- High or proximal suspensory ligament injuries are not uncommon
- High suspensory ligament injuries are difficult to image with ultrasound

Origin of the Suspensory Ligament



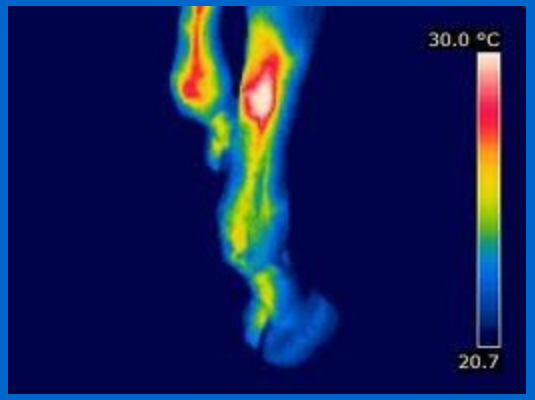
Microscopic image of ligament insertion to bone

High Suspensory Ligament Injuries

- Found in both front and back legs
- Not always seen on ultrasound

Clinical Signs:

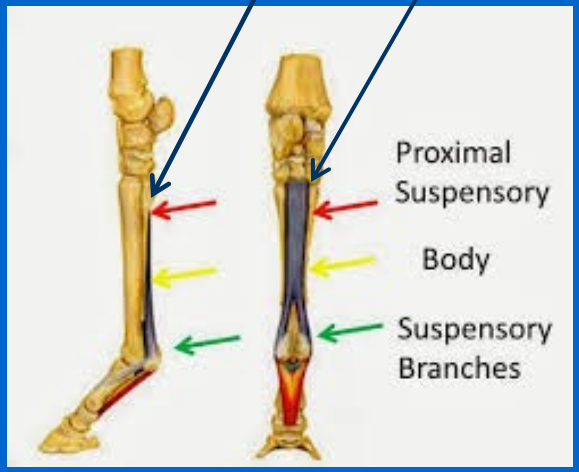
- consistently inconsistent lameness
- lack of swelling
- lameness worse with leg to outside of circle
- lameness worse while going down hill



Thermography of a high suspensory

High Suspensory Ligament Injuries

Compartment Syndrome



Occurs in the proximal area of the Suspensory Ligament

- **Enlargement of Suspensory Ligament, pressure to MT bones, plantar MT nerves**
- **Persistent pain and lameness**
- **Early diagnosis and therapy to reduce size and minimize inflammation**

High Suspensory Ligament Treatments

- Generally the same tendon and ligament injury treatments are utilized
  - Rest
  - Well monitored controlled exercise
  - Regenerative therapy (stem cells & platelet rich plasma
  - Shock wave therapy (???)
  - Hyaluronic acid and cortical steroid injections in chronic cases

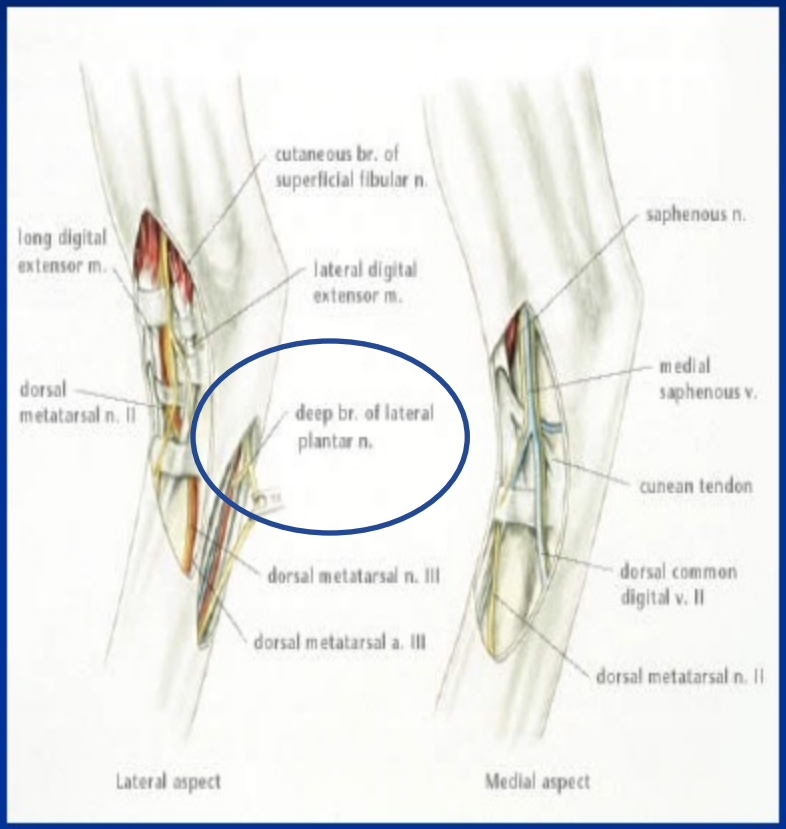
High Suspensory Ligament Treatments

- Surgical options for high suspensory ligament (chronic lameness) in the hind limbs involves a combination of:
  - Fasciotomy – which is an incision in the fascia to treat compartment syndrome
  - Neurectomy of a deep branch of the lateral plantar nerve which innervates the proximal suspensory ligament
- Be aware rules of racing prohibit this procedure

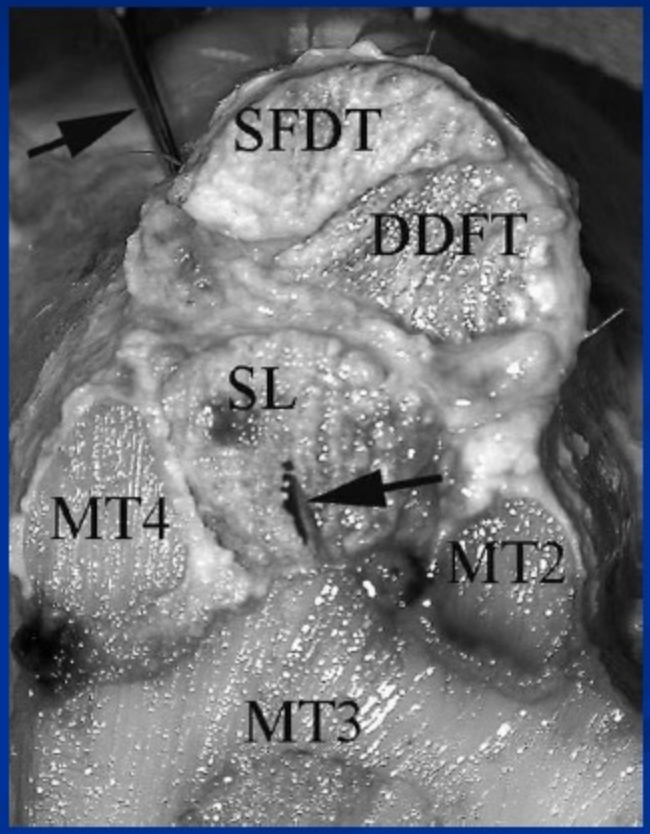
Surgical

High Suspensory Ligament Treatments

Fasciotomy with Neurectomy



Deep br. of lateral plantar nerve



Releases compartment pressure of SL

GOOD
RESOURCE