

Ultrasound Examination of the Suspensory Ligament

Patient Preparation

A few minutes of prep work will save frustration and time scanning. The back of the limbs should be carefully clipped with a No. 40 (surgical) blade clipper. The region should then be scrubbed and wiped clean with water and copious ultrasound gel applied. Letting the gel sit for a couple of minutes on the limb can sometimes make a difference in obtaining a good image. In horses with dry skin, thick skin, hosing the area to soak the skin can be quite helpful. Before you start your ultrasound exam, make sure the horse is standing square and is weightbearing on the limb. No weightbearing images can also be taken of the proximal suspensory; however, they are less important in DSLD cases compared to the images of the body of the suspensory and the branches.

For the front suspensory, the palmar area should be clipped from the base of the accessory carpal bone to the sesamoids, and lateral and medially from the mid metacarpal region to the sesamoids, over the palpable area of the branches. For the hind suspensory, the plantar region from the level of the distal hock joints to the sesamoids should be clipped and medially to the level of where the saphenous vein crosses the inside of the metatarsus. Laterally and medial the branches should be clipped from the mid metatarsal region to the sesamoid. The origin of the suspensory on both legs should always be prepared and evaluated.

Technique

A 7.5 MHz or higher linear transducer with a displayed depth of 4 to 6 cm should be appropriate for most front and hind suspensory ligaments. The depth should be just enough to display the bony surface of the metacarpus/tarsus on the bottom of the screen. The focal zones should be set deep to the level of the suspensory body when imaging palmar/plantar and superficial when imaging the branches. A standoff pad is often necessary in the forelimb and sometimes needed in the hind limb. However, we leave this up to the person who is scanning the suspensory ligament. We recommend to ultrasound the entire suspensory ligament (origin to insertion) in all cases and to compare it always to the contralateral limb.

The ligament should be evaluated in both transverse and longitudinal axis (short and long axis) at set distances on the limb, with adjustments to image quality as necessary. We take/save images at set sites on the limb. For the forelimb we take images at 5cm, 10 cm, 15cm and 20cm distal to the accessory carpal bone (DACB) or until the suspensory ligament divides into a medial and lateral branch. At that time, we take images of the different branches and their attachments to the proximal sesamoid bones.

For the hind limb we take images at distances 15cm, 20cm, 25cm and 30 cm, but we measure distal from the point of the hock (DPOH) instead of the accessory carpal bone. Cross-sectional area or thickness measurements should be taken in at least a few locations on all cases. The contralateral limb should then be evaluated for symmetry of size, shape, echogenicity, fiber alignment and bony contour. In the case of DSLD, the contralateral limb might also be affected, but the condition might differ in severity.

Normal Measurements

Front limb suspensory ligament:

Cross sectional area of the front suspensory origin is generally up to 1.2 cm²; the body is reported up to 1.5 cm². Cross sectional area of the branches is 0.6 to 0.8 cm² until their insertion where they may measure up to 1.2 cm².

When measuring in centimeters from the accessory carpal bone (0 cm) the origin is generally seen 6 to 8 cm distal to the accessory carpal bone, the bifurcation 20 cm distal, and the sesamoid insertion 28 to 30 cm distal in a full-sized horse.

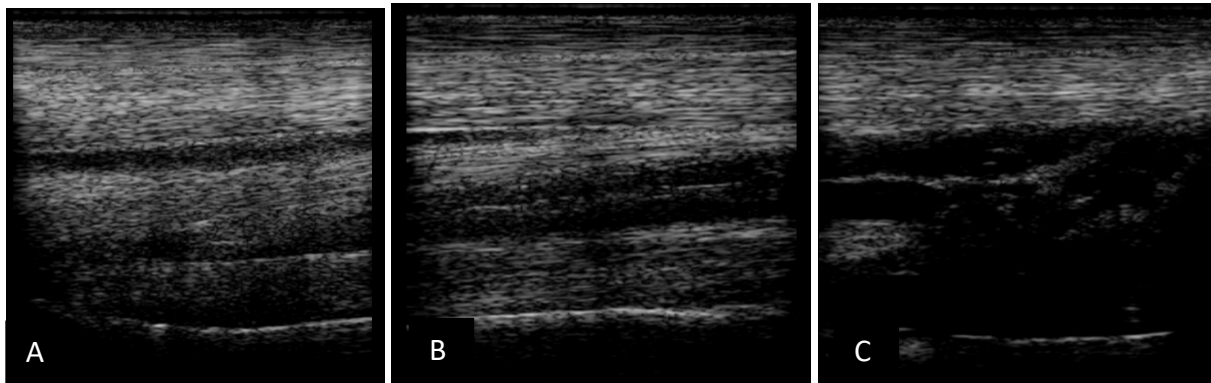
Hind limb suspensory ligament:

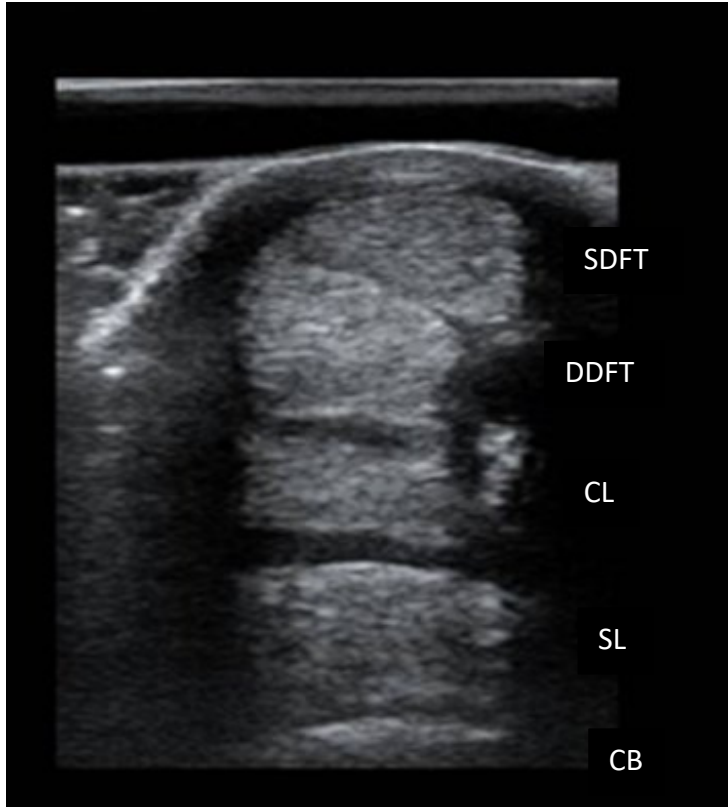
The origin of the hind suspensory is reported to measure 1.2 to 1.75 cm with the body measuring 1.2 to 1.5 cm². In Warmblood breeds this measurement can be up to 2.0 cm² or even slightly larger bilaterally. Branches are the same as in the forelimb.

When measuring from the point of the hock, the origin of the hind suspensory can be seen from 14 to 16 cm distal to the point of the hock, the bifurcation at around 30 cm and the insertion 40 to 42 cm in a full-sized horse.

Example Images of Normal Suspensory Ligament

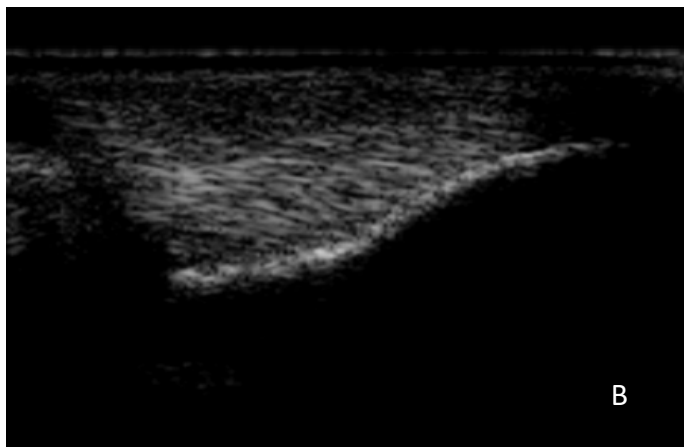
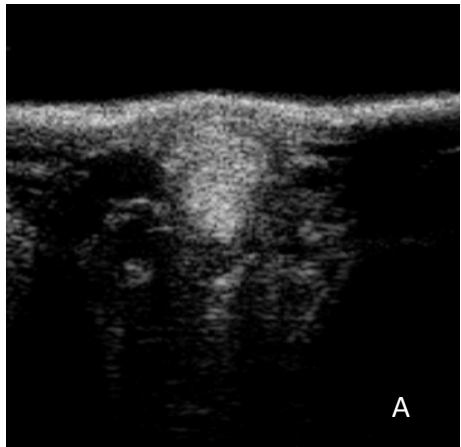
Longitudinal view of normal suspensory ligament from origin (A) to bifurcation into branches (C)





Transverse view of normal tendon structures mid-cannon bone
SDFT: Superficial digital flexor tendon
DDFT Deep digital flexor tendon
CL: Check ligament
SL: Suspensory ligament
CB: Cannon bone

image modified from IMV Imaging UK).



Transverse (A) and longitudinal (B) normal view of suspensory branch