



# Equine Metacarpal Ultrasonography

This guide shows the normal ultrasonographic anatomy of the metacarpal soft tissues. The superficial (SDFT) and deep digital flexor tendons (DDFT), accessory ligament of the DDFT (ALDDFT) and suspensory ligament are evaluated primarily from the palmar aspect, in longitudinal and transverse sections. The superficial versus deeper structures require different machine settings and so should be evaluated separately.

#### **Machine Factors:**

Use a high frequency linear transducer for optimal image resolution. Use the highest frequency setting that allows sufficient ultrasound penetration to view the areas of interest. Set the focal zone at the level of, or just below, the structure being scrutinised.

#### **Flexor tendons:**

Alter the depth setting so that the tendons being examined fill the screen. The use of a stand-off is beneficial for viewing the palmar aspect of the SDFT and overlying skin. Sliding the probe over the palmaromedial and palmarolateral aspects can aid evaluation of the medial and lateral borders, respectively.

#### **Suspensory ligament:**

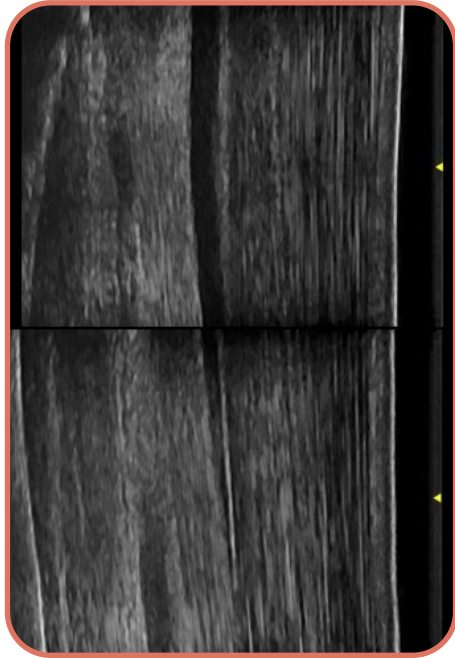
Alter the depth so that the suspensory ligament and palmar cortex of the third metacarpal bone are within the screen. The frequency may need to be reduced to increase penetration of the ultrasound beam. A stand-off is not usually required; it will increase the distance and may decrease image quality. The branches should be evaluated separately, from the medial and lateral aspects, with a standoff.



**Image labelling:**

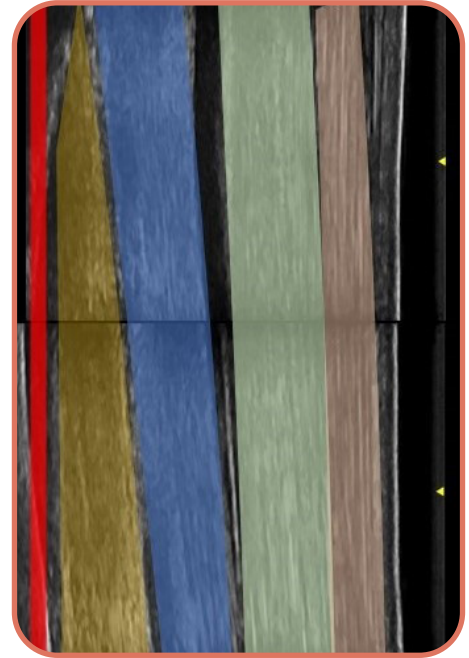
Dividing the metacarpus into zones is a commonly used system for recording the locations of longitudinal images, which is important for future reference (zones 1A-3B). For transverse images, record the distance of the transducer from the accessory carpal bone (ACB) in cm using a ruler. The ACB is readily palpable on the palmar aspect of the carpus (\* on the image below). Levels 1-6 indicate the location of transverse images used in this guide.

# Longitudinal



1A

1B



 SDFT

 DDFT

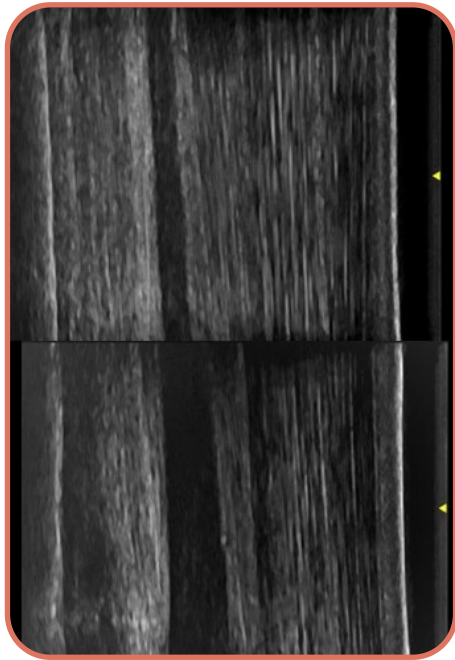
 ALDDFT

 Suspensory Ligament

 Digital Flexor Tendon Sheath

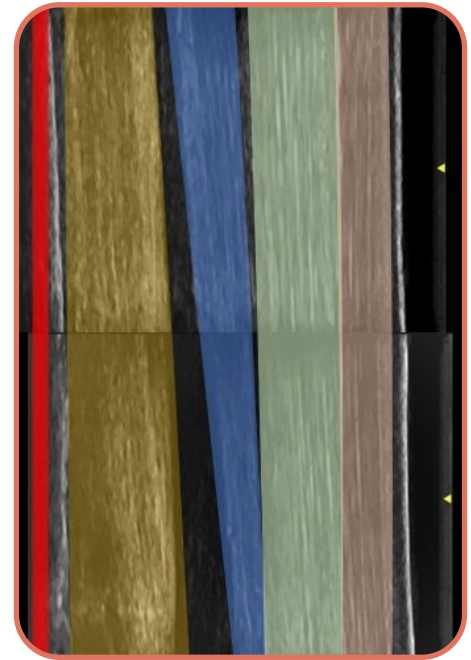
 Palmar surface of the 3<sup>rd</sup> Metacarpal Bone

# Longitudinal



2A

2B



 SDFT

 DDFT

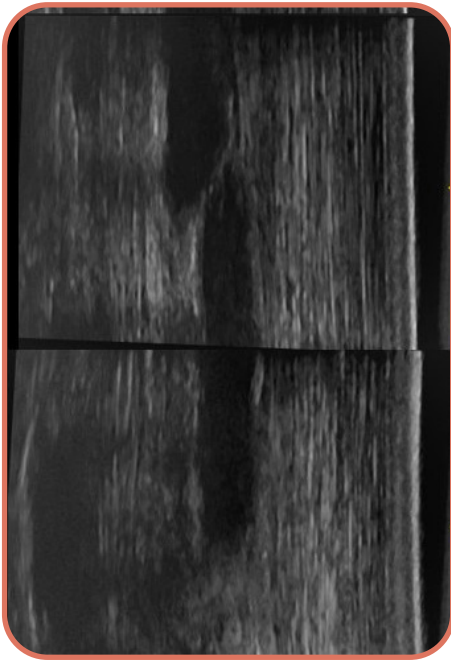
 ALDDFT

 Suspensory Ligament

 Digital Flexor Tendon Sheath

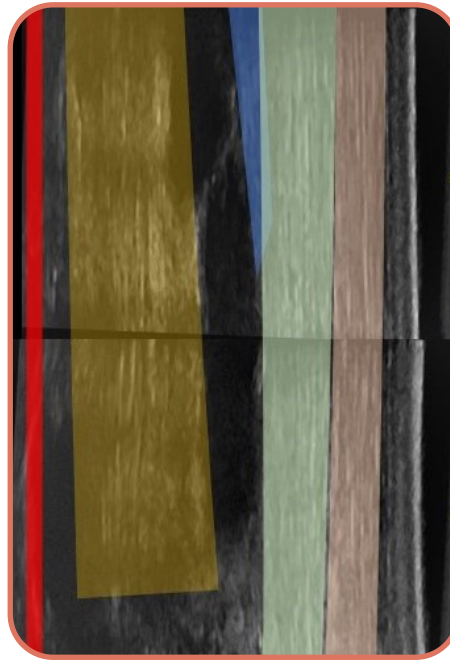
 Palmar surface of the 3<sup>rd</sup> Metacarpal Bone

# Longitudinal



3A\*

3B\*



\* = Images acquired slightly parasagittally; suspensory ligament branches are not visible in true sagittal images. The branches of the suspensory ligament should be evaluated using a lateral or medial approach (see 'Equine Fetlock Ultrasonography').

SDFT

DDFT

ALDDFT

Suspensory Ligament

Digital Flexor Tendon Sheath

Palmar surface of the 3<sup>rd</sup> Metacarpal Bone

# Transverse

(Lateral to left of images)

1



2



SDFT

DDFT

ALDDFT

Suspensory Ligament

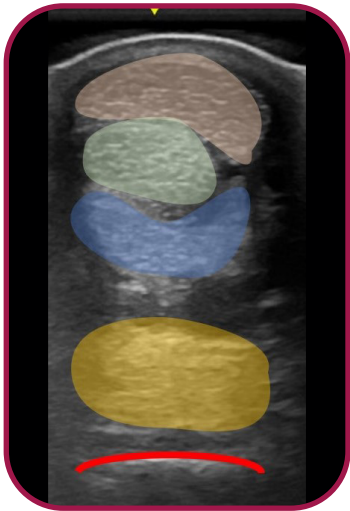
Digital Flexor Tendon Sheath

Palmar surface of the 3<sup>rd</sup> Metacarpal Bone

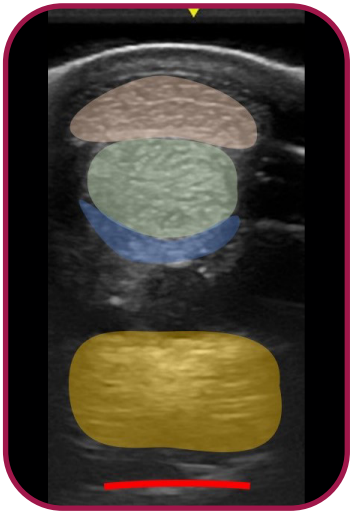
# Transverse

(Lateral to left of images)

3



4



SDFT

DDFT

ALDDFT

Suspensory Ligament

Digital Flexor Tendon Sheath

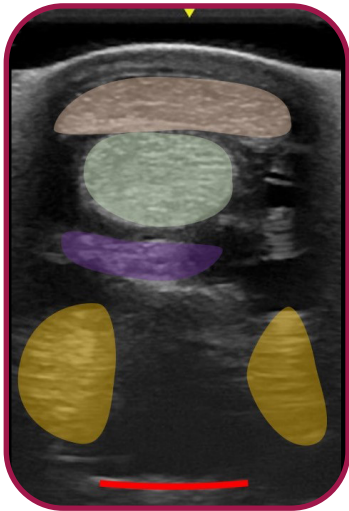
Palmar surface of the 3<sup>rd</sup> Metacarpal Bone



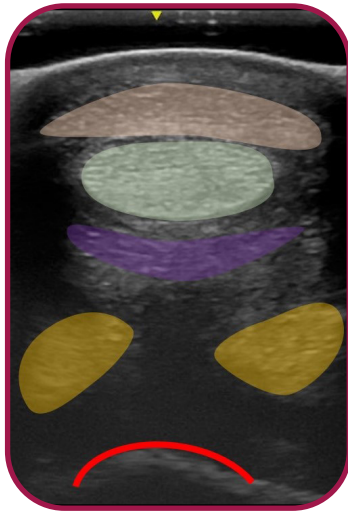
# Transverse

(Lateral to left of images)

5



6



SDFT

DDFT

ALDDFT

Suspensory Ligament

Digital Flexor Tendon Sheath

Palmar surface of the 3<sup>rd</sup> Metacarpal Bone



# Equine Stifle Ultrasonography

**This guide shows the gross ultrasonographic anatomy of the equine stifle. The stifle joint is anatomically complex, therefore evaluation is divided into three discrete regions; cranial, medial and lateral.**

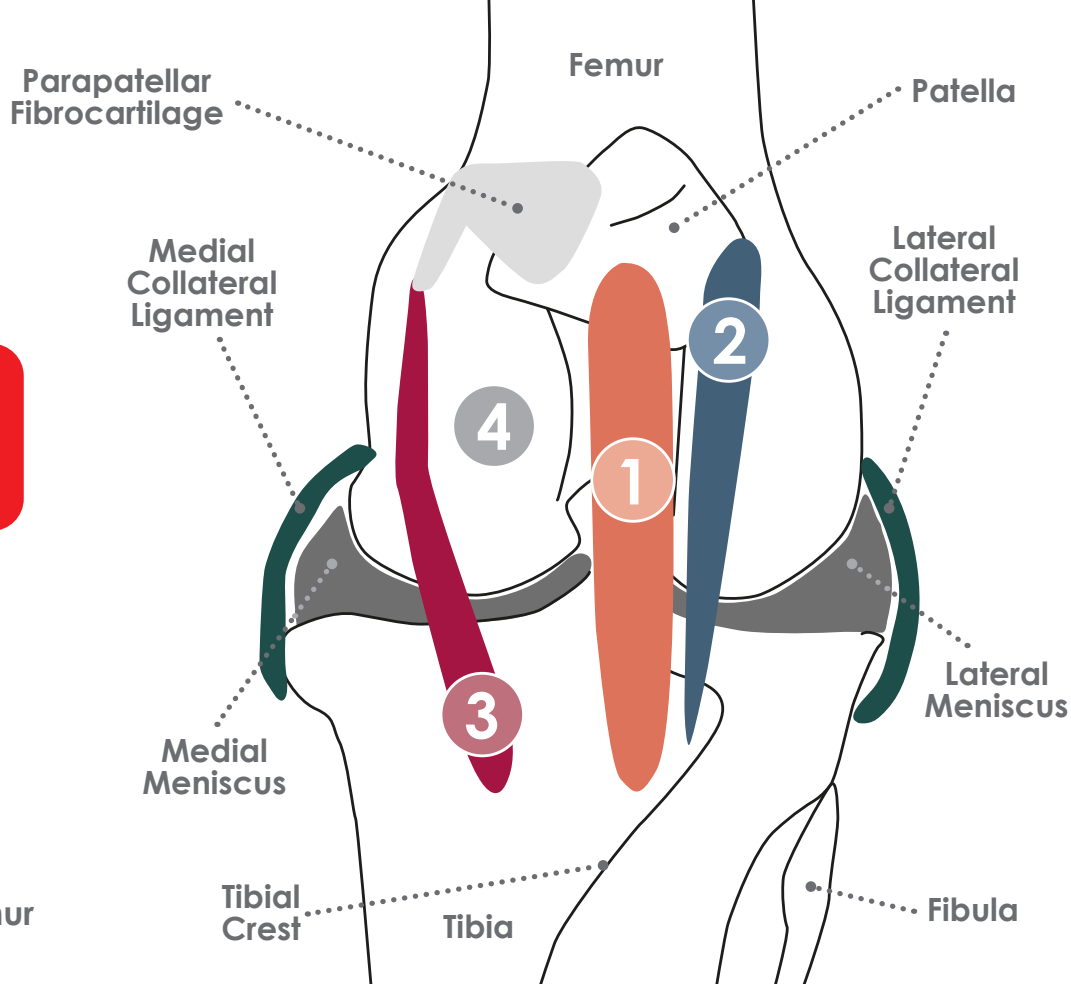
**Caudal and flexed cranial approaches are more technically challenging and provide limited additional information.**

**A linear probe is ideal, and a standoff can be useful for assessing superficial structures when there is minimal or no swelling.**

**A microconvex probe can aid visualisation of the lateral meniscus, and would be necessary for a caudal approach.**

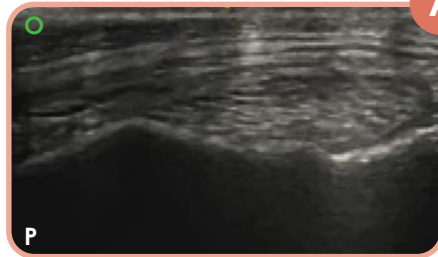
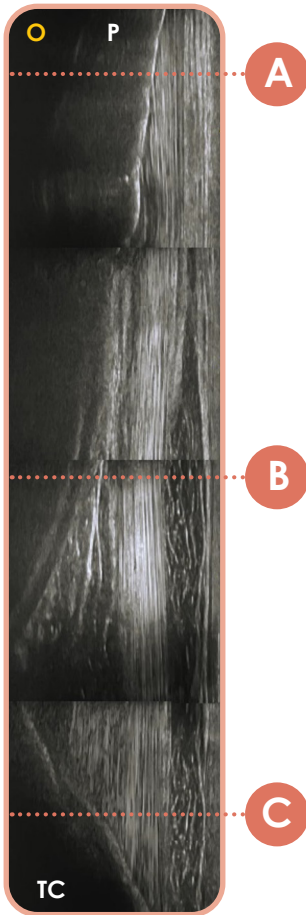
# Cranial Approach

- 1 Middle Patellar ligament
- 2 Lateral Patellar ligament
- 3 Medial Patellar ligament
- 4 Cranial articular surface of the femur

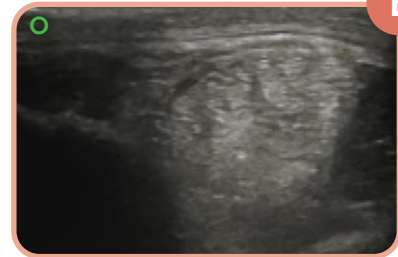


# Middle Patellar ligament

# 1



Originates from a depression on the distal aspect of the **patella (P)**. Flat and homogeneous



Round, becoming more triangular in shape distally. Surrounded by infrapatellar fat which can make the ligament indistinct. Off-incidence scanning can aid identification of the margins



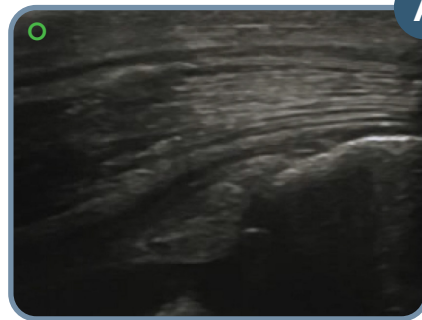
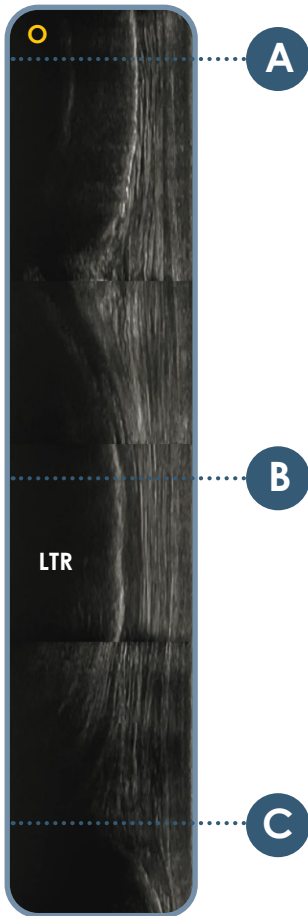
Well defined hypoechoic striations can be seen in the distal one third in clinically normal horses. Inserts onto the **tibial crest (TC)**

## Key

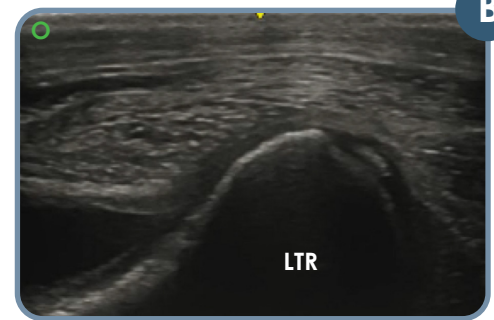
- = proximal, rotated composite longitudinal image
- = lateral, transverse image

# Lateral Patellar ligament

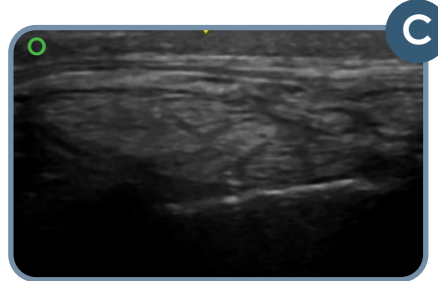
# 2



Can appear ill-defined and heterogeneous proximally



Well-defined crescent shape. Overlies the **lateral trochlear ridge (LTR)**



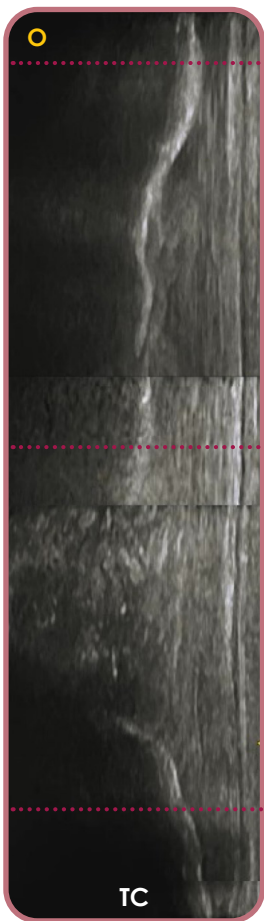
Oval/triangular shape distally. May have a striated pattern

## Key

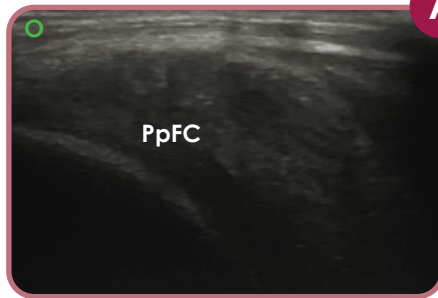
- = proximal, rotated composite longitudinal image
- = lateral, transverse image

# Medial Patellar ligament

# 3



A



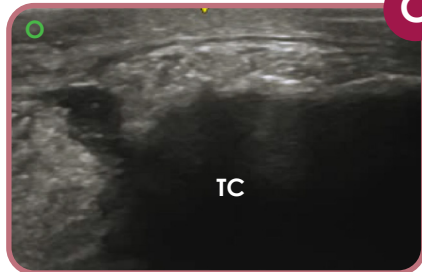
A

Originates from the **parapatellar fibrocartilage (PpFC)**



B

Round to triangular in shape.  
Homogeneous



C

Inserts onto the medial aspect of the **tibial crest (TC)**

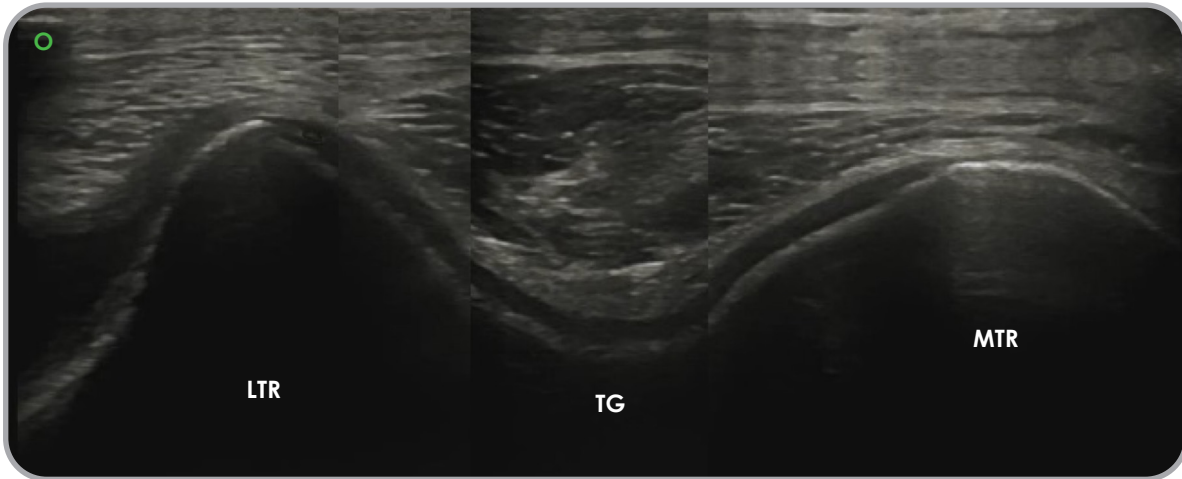
C

## Key

- = proximal, rotated composite longitudinal image
- = lateral, transverse image

# Cranial articular surface of the femur

4



**LTR – lateral trochlear ridge.** Narrower and covered by a thick layer of anechoic (black) cartilage. **TG – trochlear groove.** **MTR – medial trochlear ridge.** Wider and covered by a relatively thin layer of cartilage

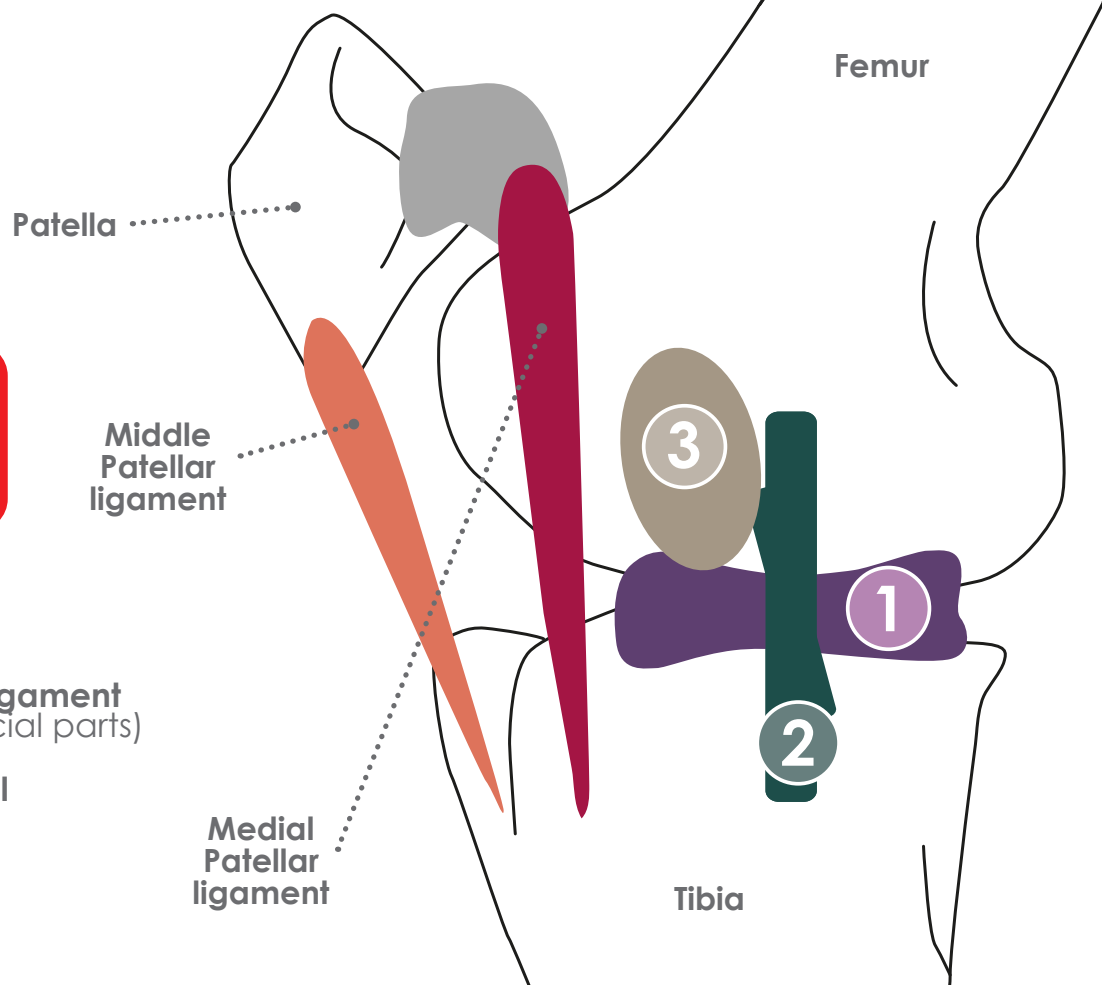
## Key

○ = lateral, composite transverse image

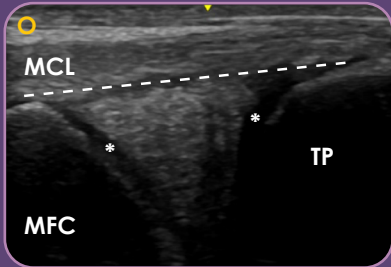


# Medial Approach

- 1 Medial Meniscus
- 2 Medial collateral ligament (deep and superficial parts)
- 3 Medial femorotibial joint pouch

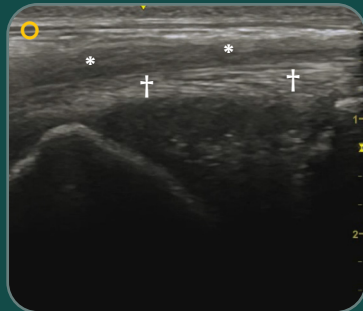


# 1 Medial Meniscus



Located between the **medial femoral condyle (MFC)** proximally and the **tibial plateau (TP)** distally, deep to the **medial collateral ligaments (MCL)**. Does not extend beyond an imaginary line between the most medial margins of the MFC and TP (dotted line), indicating normality of size and position. \*= cartilage, anechoic

# 2 Medial collateral ligament (deep and superficial parts)



The long or superficial portion is vertically orientated (\*); the short or deep portion is oblique in orientation (†) and so only one can be on-incidence when viewed longitudinally (in this example, the deep portion)

# 3 Medial femorotibial joint pouch (\*)



Located proximal and cranial to the medial collateral ligaments

## Key

○ = proximal, longitudinal image

# Lateral Approach

Patella

Femur

Lateral Patellar ligament

Middle Patellar ligament

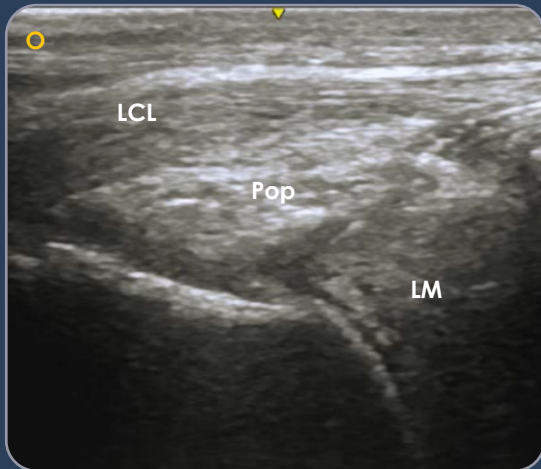
- 1 Popliteus tendon
- 2 Lateral Meniscus
- 3 Lateral collateral ligament
- 4 Tendon of the long digital extensor/peroneus tertius muscles

Fibula

Tibia

# 1

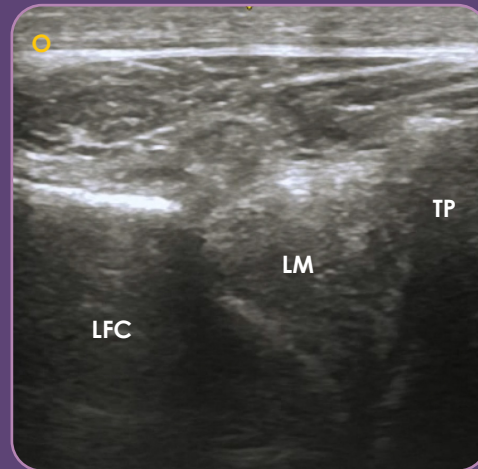
## Popliteus tendon (Pop)



Elongated, triangular echogenic structure which runs obliquely, in a cranioproximal to caudodistal direction. Deep to the **lateral collateral ligament (LCL)** and immediately superficial to the **lateral meniscus (LM)**

# 2

## Lateral Meniscus (LM)



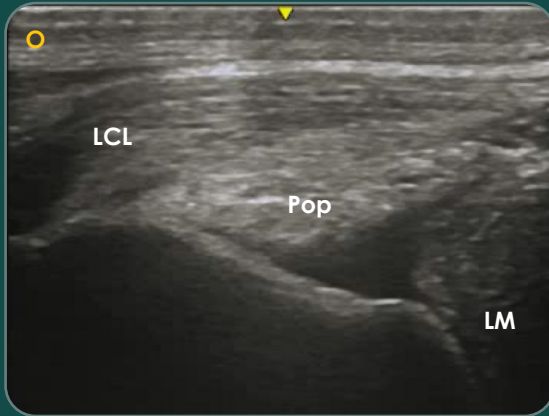
Located between the lateral **femoral condyle (LFC)** and **tibial plateau (TP)**

**Key**

○ = proximal, longitudinal image

3

## Lateral collateral ligament (LCL)

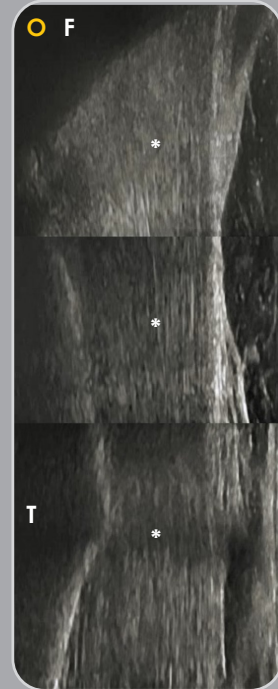


Originates from the lateral femoral epicondyle and inserts (mostly) onto the head of the vestigial fibula. Formed of deep and superficial portions as for the medial collateral ligament. **Pop= popliteus tendon, LM= lateral meniscus**

4

## Tendon of the long digital extensor/ peroneus tertius muscles(\*)

Originates from the cranio-lateral aspect of the **femur (F)**, on the lateral epicondyle, and courses distally in the extensor groove of the **tibia (T)**





Key

O = proximal, longitudinal image



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