Tips for skanning av
Skulder
Kne
Finger

Clinical Application Specialist Team

ALPINION
MEDICAL SYSTEMS

Diagnostic Acumen

- Fracture, dislocation and subluxations
- Osteschondromatosis
- Bursitis
- Rotator cuff tears
- Tendinosis
- Subacromial impingement
- Biceps tendon (ruptures)
- Paralabral cysts
- Adhesive capsulitis
- Shoulder injections and aspirations

Benefits – MSK US

- Easy accessible / in-office use

  - Assessment of a joint or anatomic region, specific structure of interest

- Dynamic /Real- time

  -tendons are moving in real-time, functionality of structures, range of motion

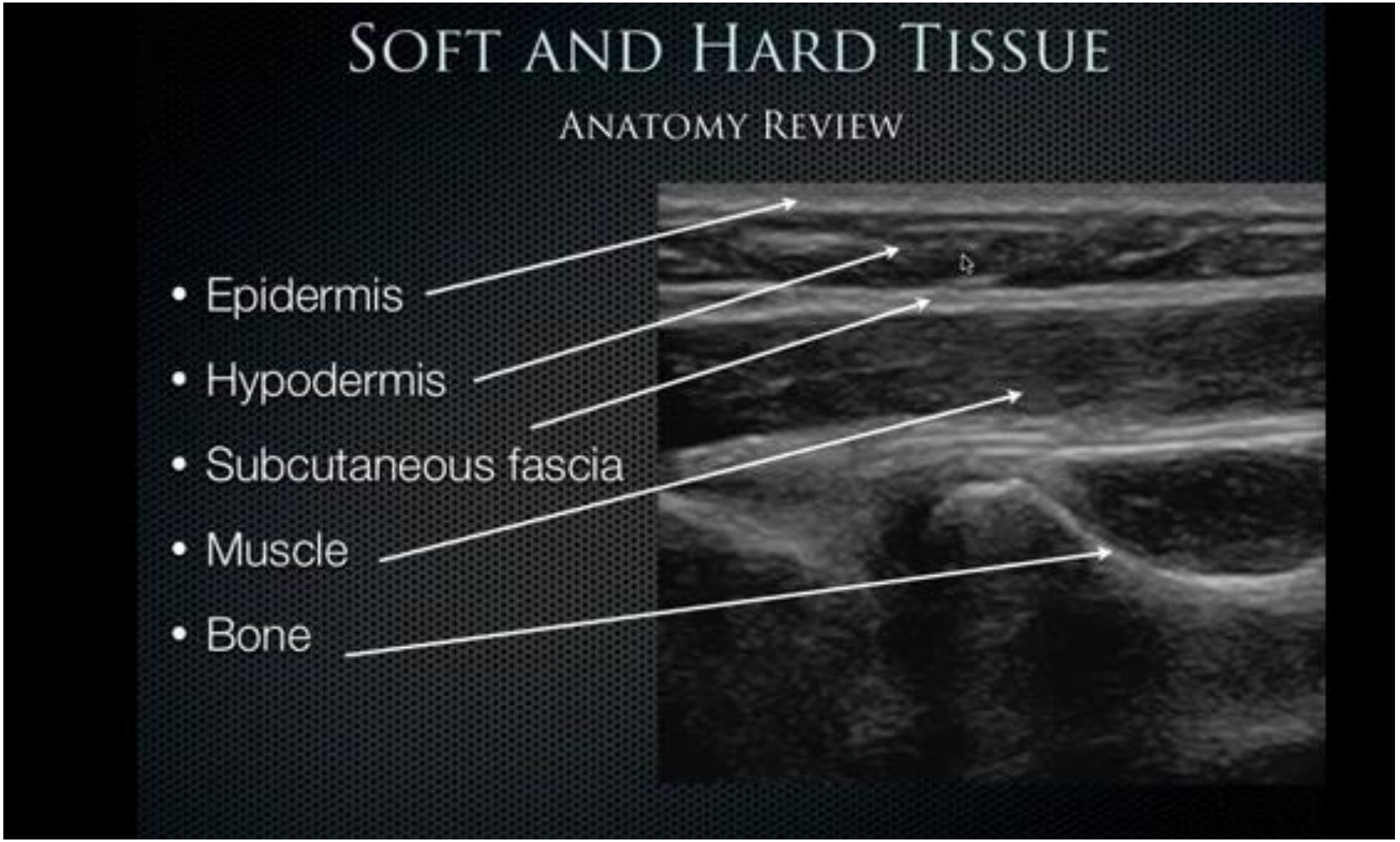
- Comparative

  - look at the other side for comparison , contra lateral , unaffected area

- No radiation exposure, safe

Soft and Hard Tissue

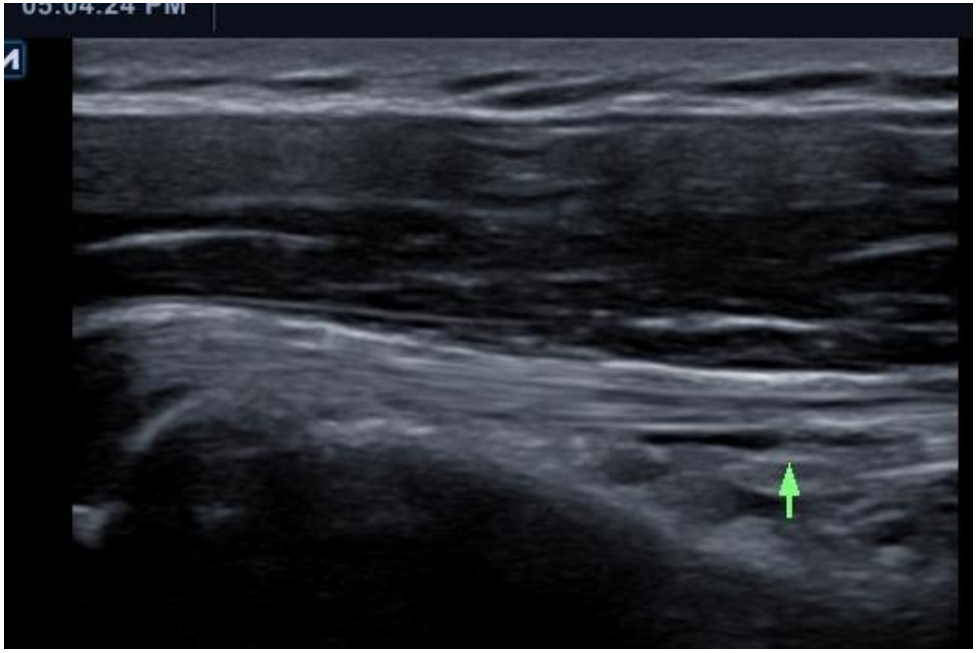
Anatomy Review



Tendons

Anatomy Review

- Identifiable ultrasound - dense connective tissue is more hyperechoic (homogenous) than muscle
- Fibrillar pattern
- Can be evaluated throughout range of motion

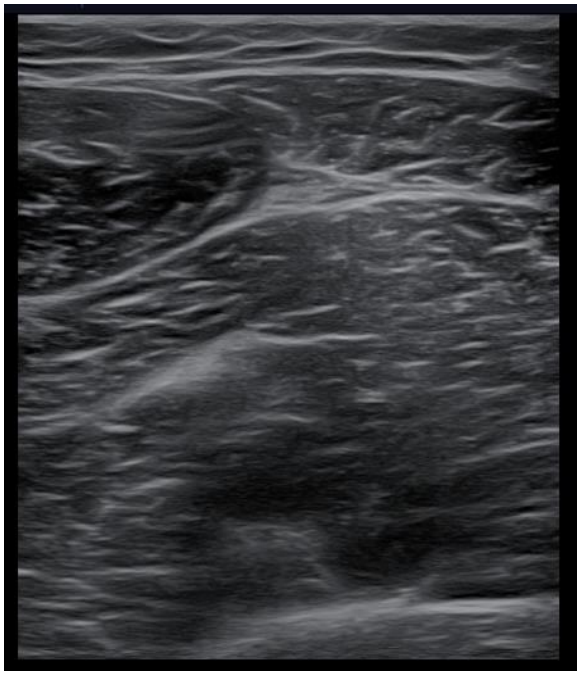


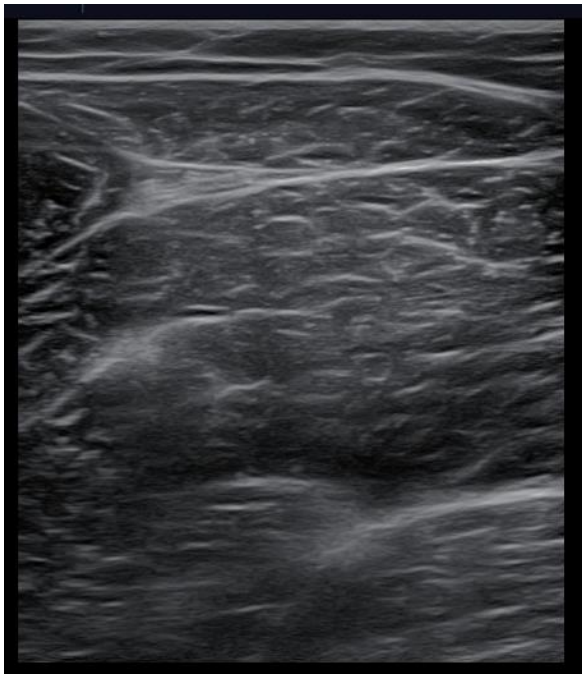
Muscle

Anatomy Review

- appears hypoechoic
- Hypoechoic linear fibrillar striae seen within muscle
- Hypoechoic connective tissue surround muscle bundles

long & short axis view

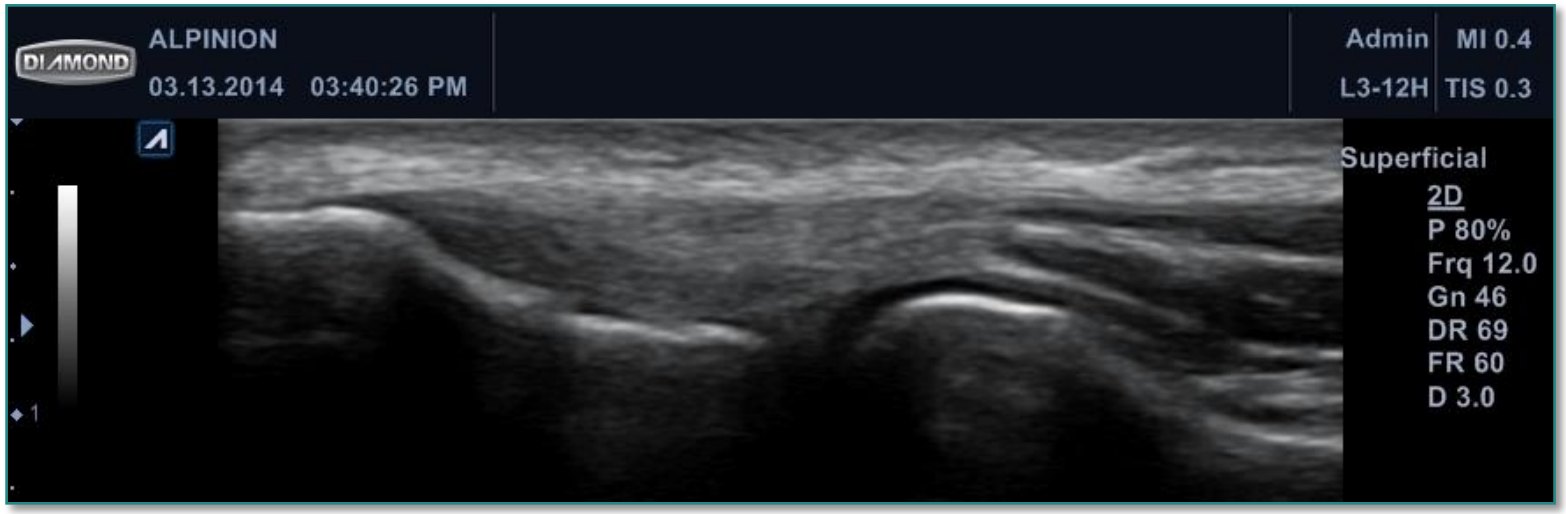




Joint

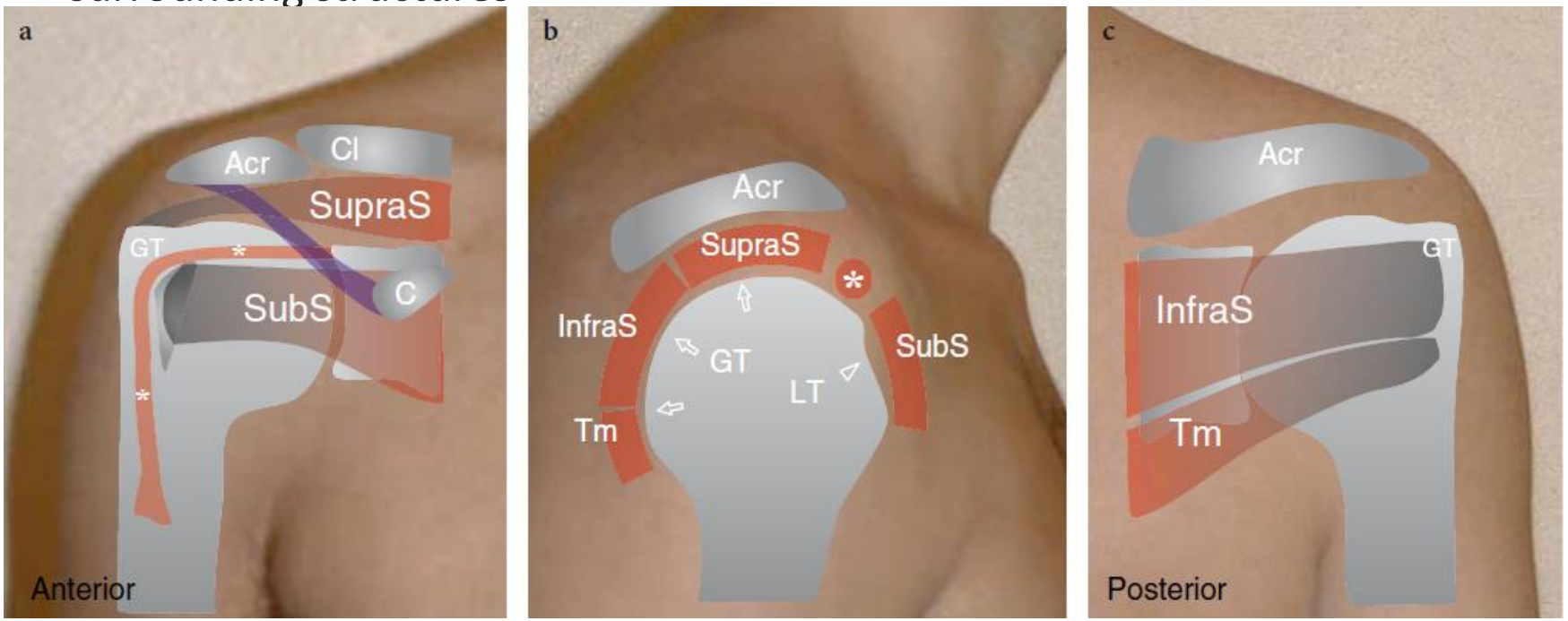
Anatomy Review

- “Seagull sign” seen at joint spaces
- Joints are potential space
- Joints effusions (fluid) will be compressible



Shoulder

- Mostly performed MSK application
- Anatomy is easy to see
  - Biceps tendon
  - Subscapularis
  - Supraspinatus
  - Gleno-Hemeral joint
  - Greater Tuberocity
  - Lesser Tuberocity
  - Biciptal groove
  - Deltoid muscle
- Color & PD maybe useful in detecting hyperemia within the joint or surrounding structures



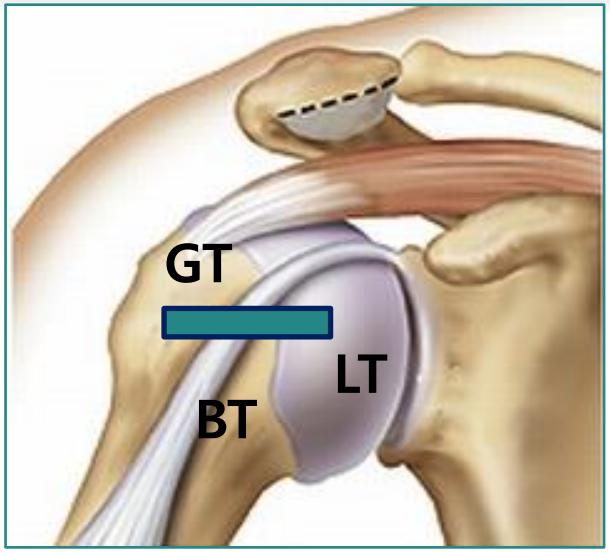
Shoulder

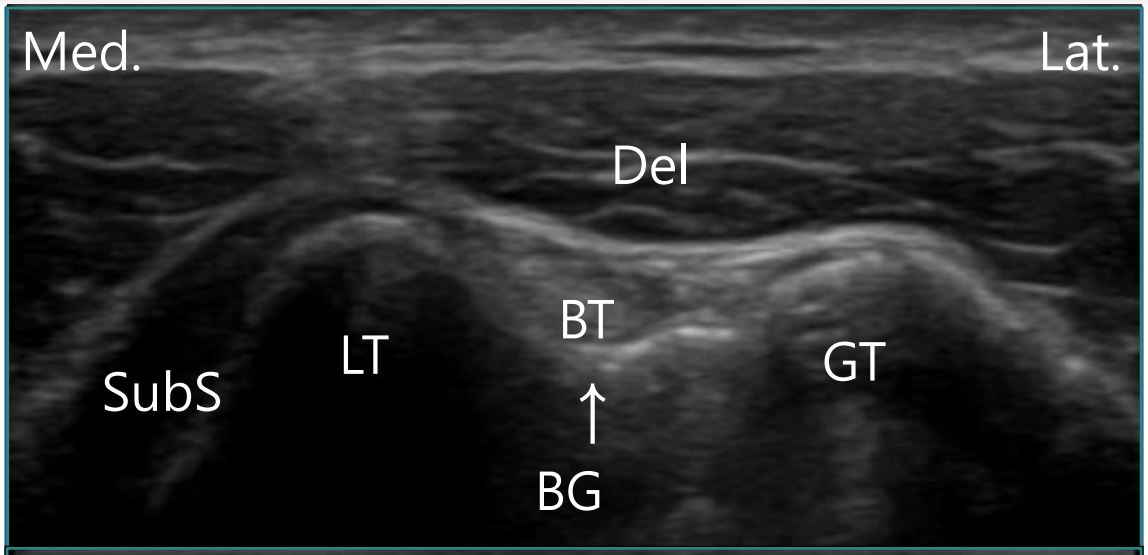
Biceps Tendon: Scan tip

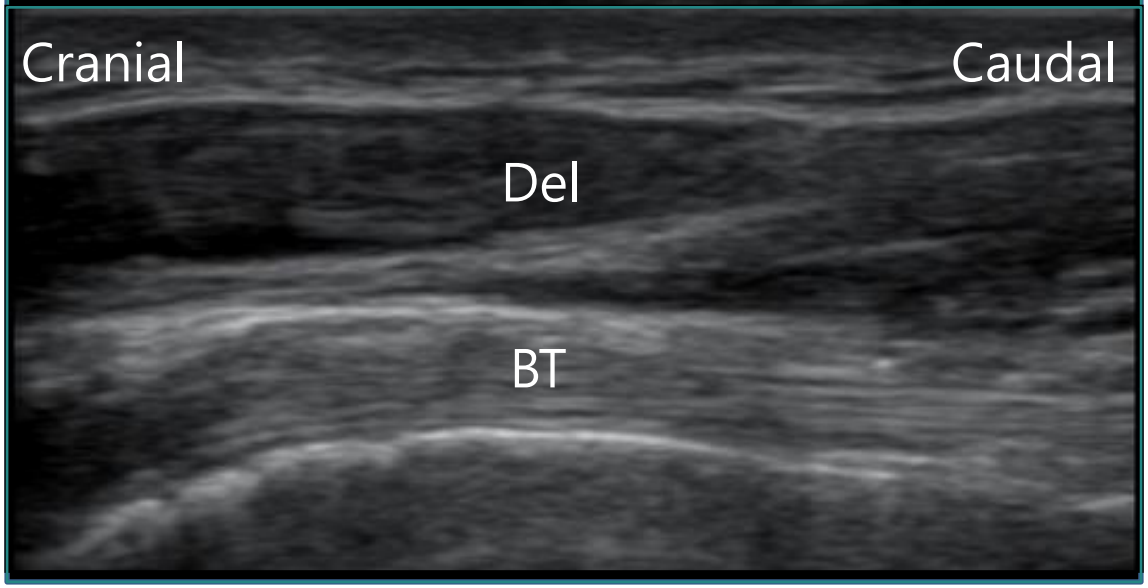
- Neutral position - forearm in supination and resting on the thigh or with the arm in slight external position
- Biceps tendon looks oval shape at short axis view , it merges from under the acromion, to the musculotendinous junction distally
- Press caudal end of the transducer at longitudinal scan with fibrillar
  - used to detect fluid or
  - intra-articular loose bodies
  - tendon properly positioned within the bicipital groove, dislocated, or torn

Neutral Position

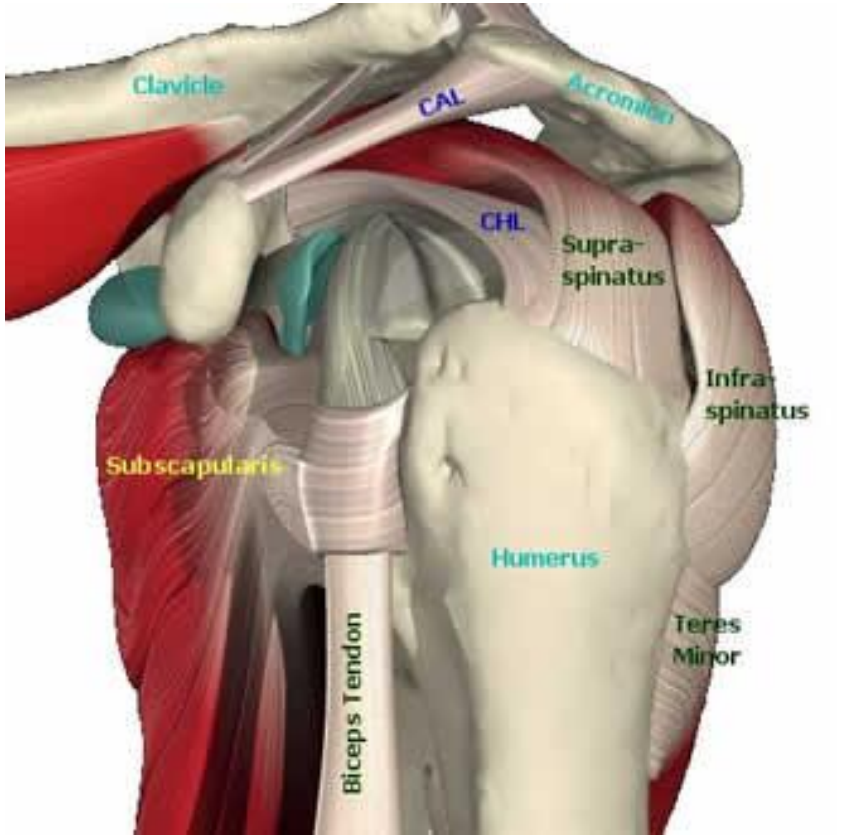
Biceps Tendon







Rotator cuff



Anatomy

- Subscapularis
- Supraspinatus
- Infraspinatus
- Teres minor
- Biceps
- A-C joint
- Labrum

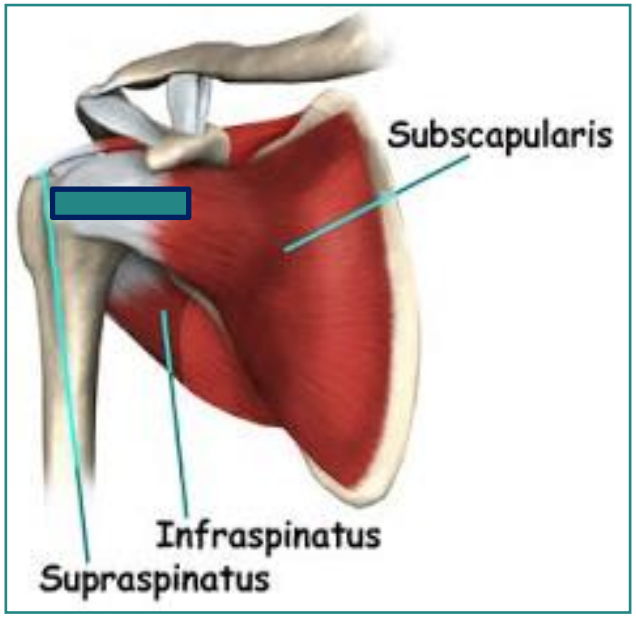
Rotator cuff

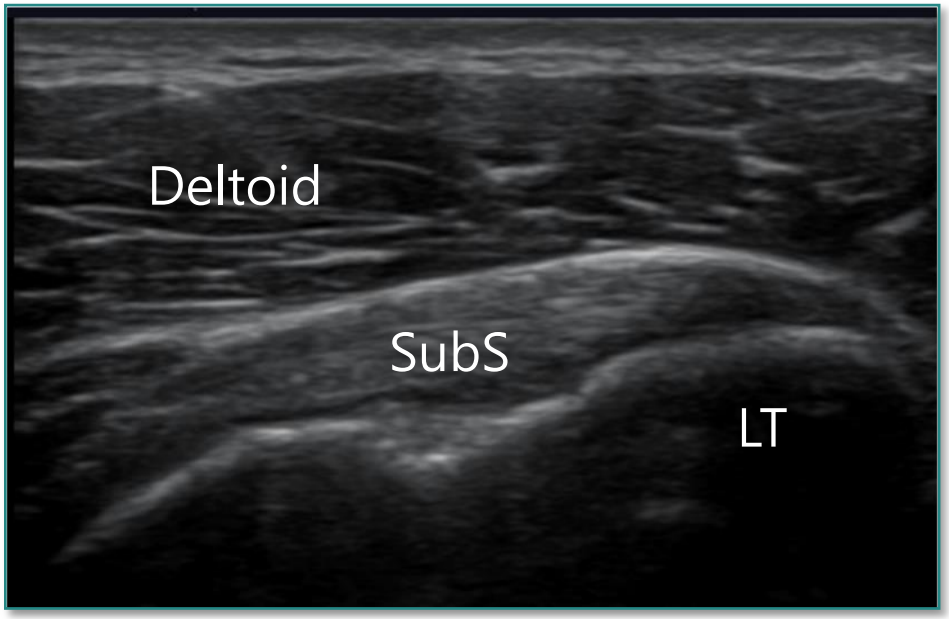
Shoulder – Rotator cuff

Subscapularis tendon

- should be examined for signs of a tear, tendinosis, and or calcification
- position – the elbow remain at the side, while the arm is placed in extenal rotation
  - The subsscapularis is imaged from the musculotendinous junction to the insertion on the lesser tuberocity of the humerus
  - Dynamic evaluation as the patient moves from internal to external rotation

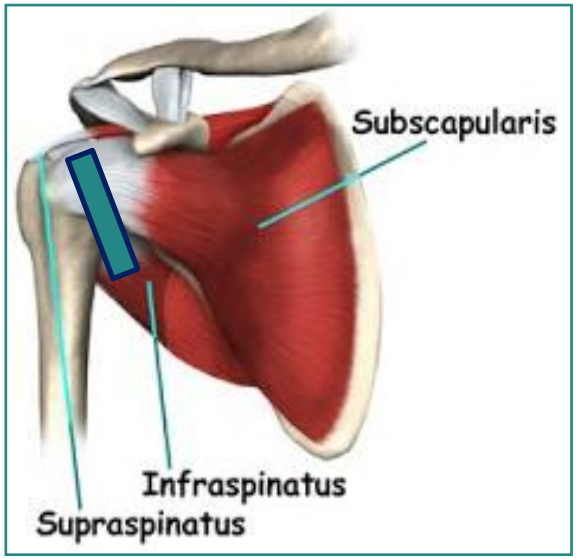
Subscapularis Tendon - longitudinal





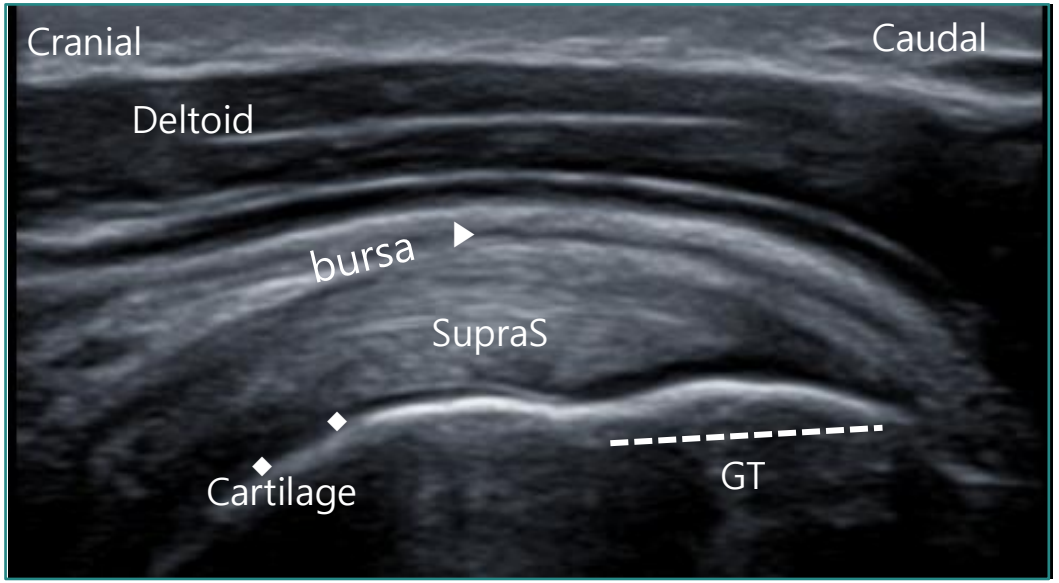
- Subscapularis tendon, multi penetrated structures, arise anterior along the inferior aspect of scapular insert into lessor tuberocity
- Bursa anterior to tendon, when you externally rotate the arm, you can make it show better

Subscapularis Tendon - transverse



- Subscapularis tendon at transverse view, contour dot like formation
- The cuff should be compressed with the transducer to detect tears
- Dynamic evaluation of the rotator cuff also is useful
  - evaluate rotator cuff for impingement or to assess the cuff tear extent

Suprasupinatus Tendon - Longitudinal

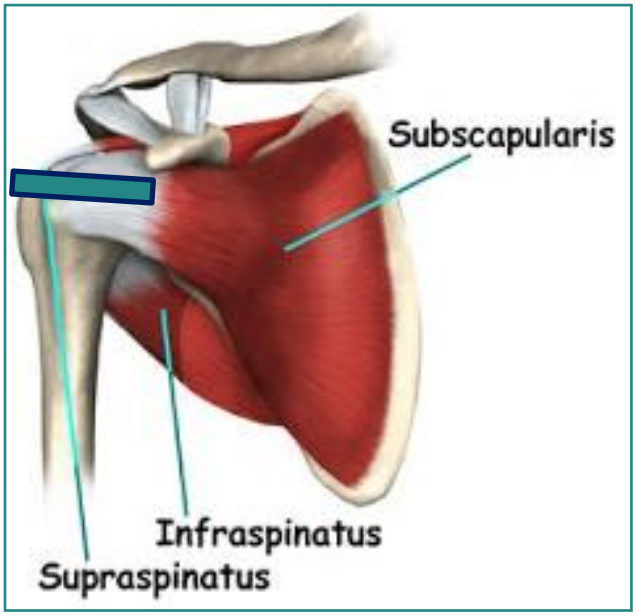


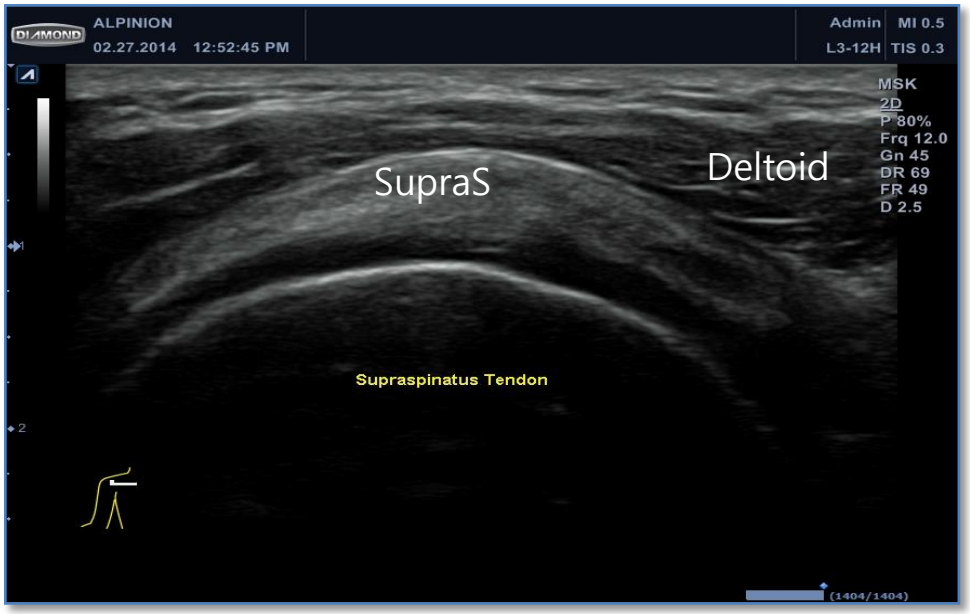
- transducer approximately 45^{o} between the sagittal and coronal planes to obtain a longitudinal view
- Then move anteriorly and posteriorly to completely visualize the tendons

★ **Check point**

- Supraspinatus tendon; obvious fibrillar structured beak shape
- bursal thicking or fluid of the subacromial-subdeltoid should be examined

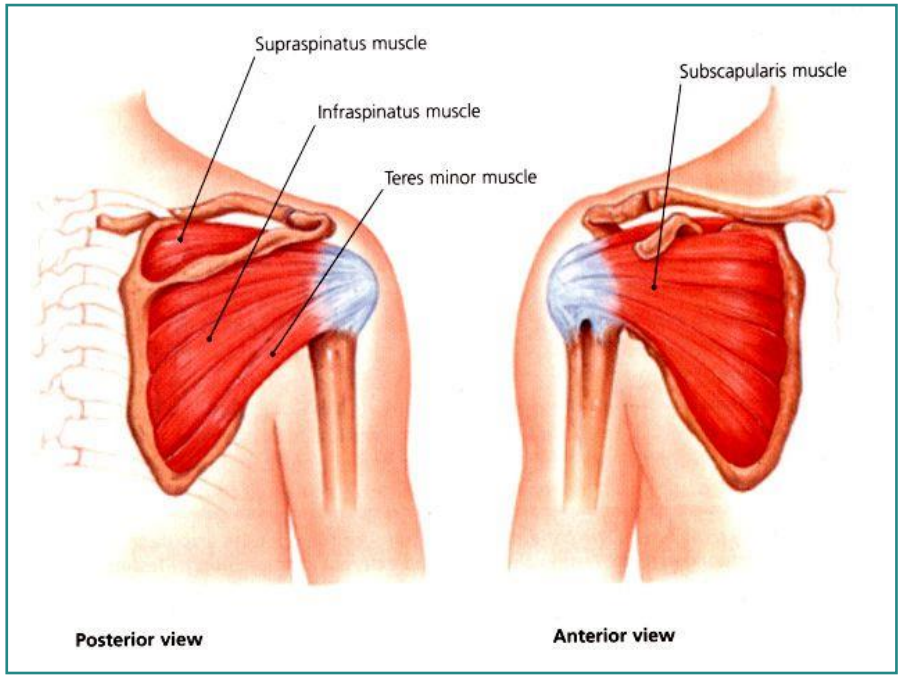
Supraspinatus Tendon - Transverse

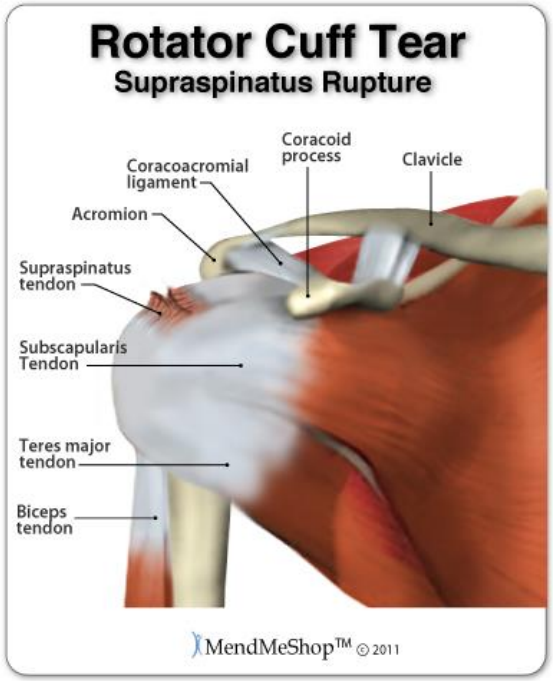




- The arm can be extended postriorly, and the palmar aspect of the hand can be placed against the superior aspect of the ileac wing with the elbow flexed and directed toward the midline
- Supraspinatus tendons are visualized by sweeping medially to the acromion and laterally to their insertion on the greater tuberocity of the humeral head

Suprasupinatus Tendon - Transverse



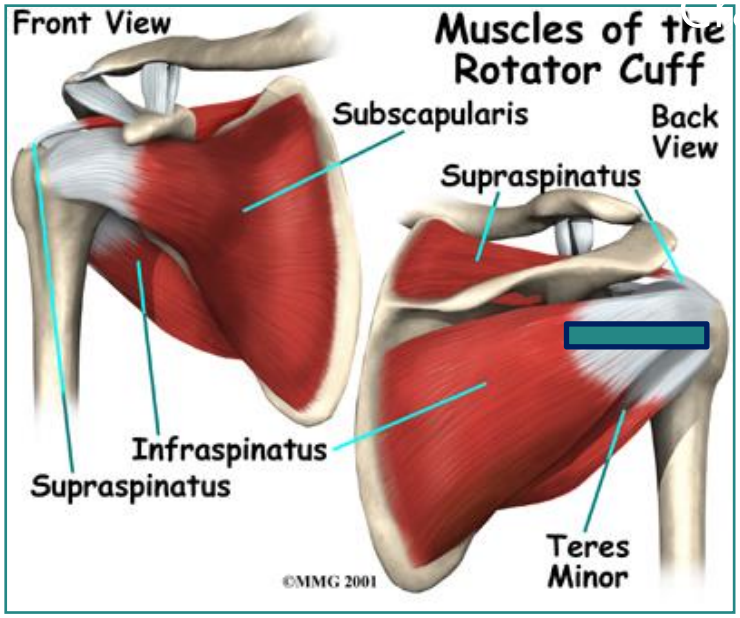


★ **Check point**

normal thickness 6mm~10mm

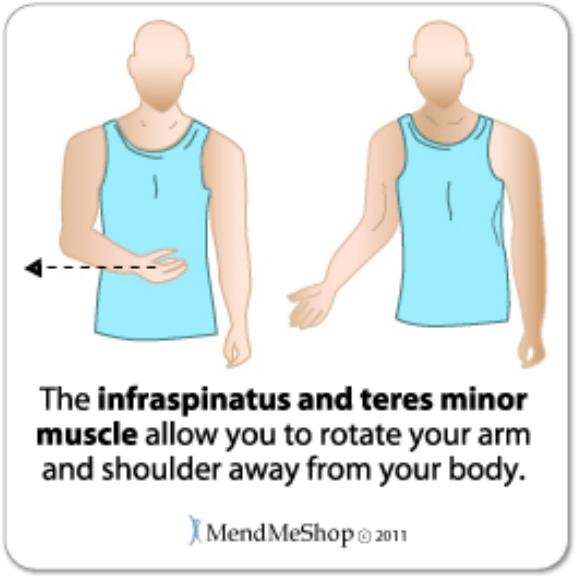
- Supraspinatus tendon insert anterior mid facet of the greater tuberocity

Infrasupinatus Tendon

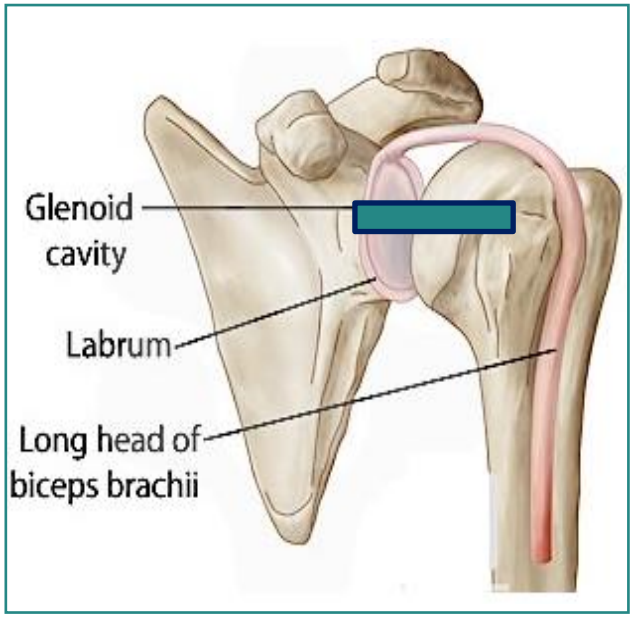


- Transducer is placed at the level of the glenohumeral joint below the scapular spine while the forarm rests on the thigh with the hand supinated
- The more posterior aspect of the infraspinatus and teres minor tendons should be examined
- Internal and external rotation may be helpful identifying the infraspinatusmuscle and tendon – detecting small joint effusions
- To visualize the teres minor tendon, the medial edge of the probe should be angled slightly inferiorly

Infrasupinatus Tendon

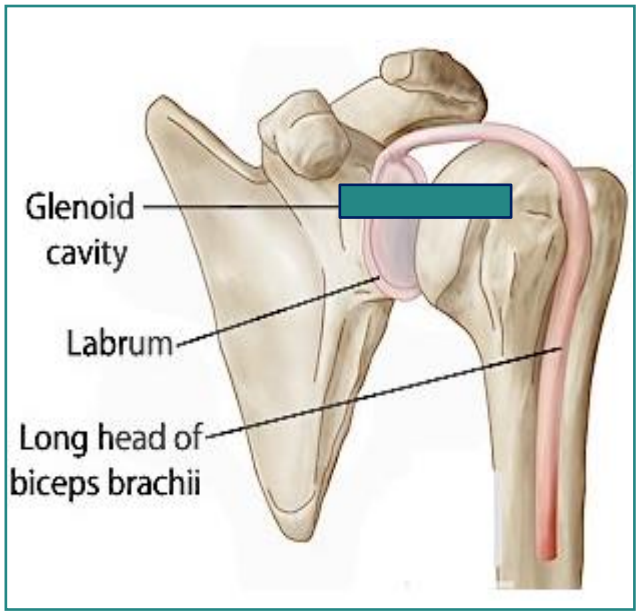


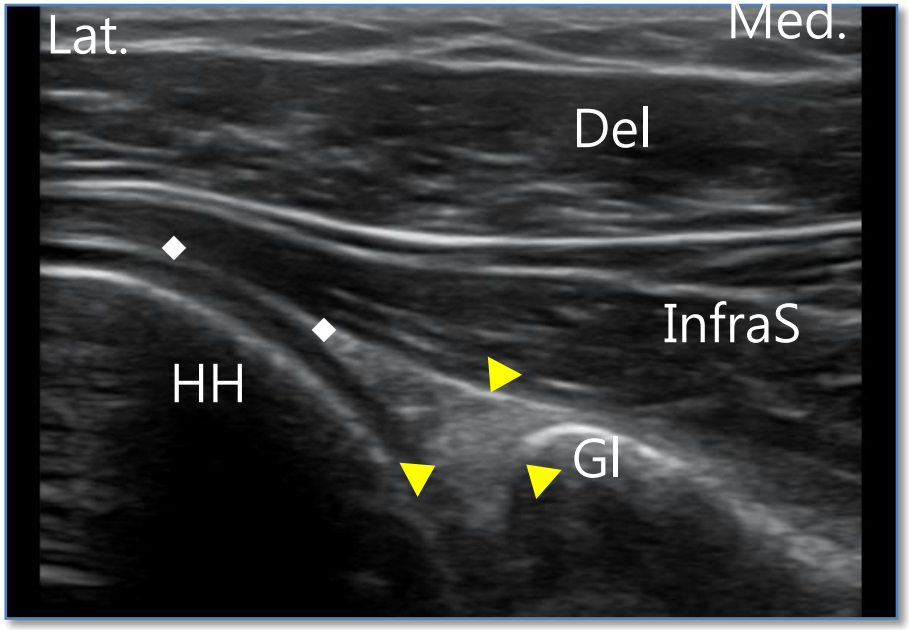
Posterior Labrum



- Transducer put the back of the posterior shoulder
- Gleno-humeral joint ; glenoid of scapular interact the humerus
- Posterior Labrum ; space between 2 structures, and triangular shape
- Start from lateral to medial, then external rotate the arm

Posterior Labrum





- **Posterior labrum → Triangular homogenous structure**

★ **Check point**

- Hyperechoic
- Keep penetration throughout to the posterior labrum
- Needs this image for articular inject to patient having frozen shoulder

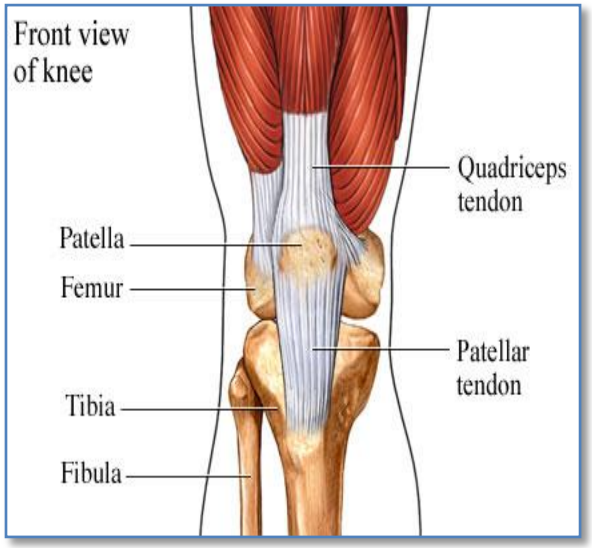
Knee Scan

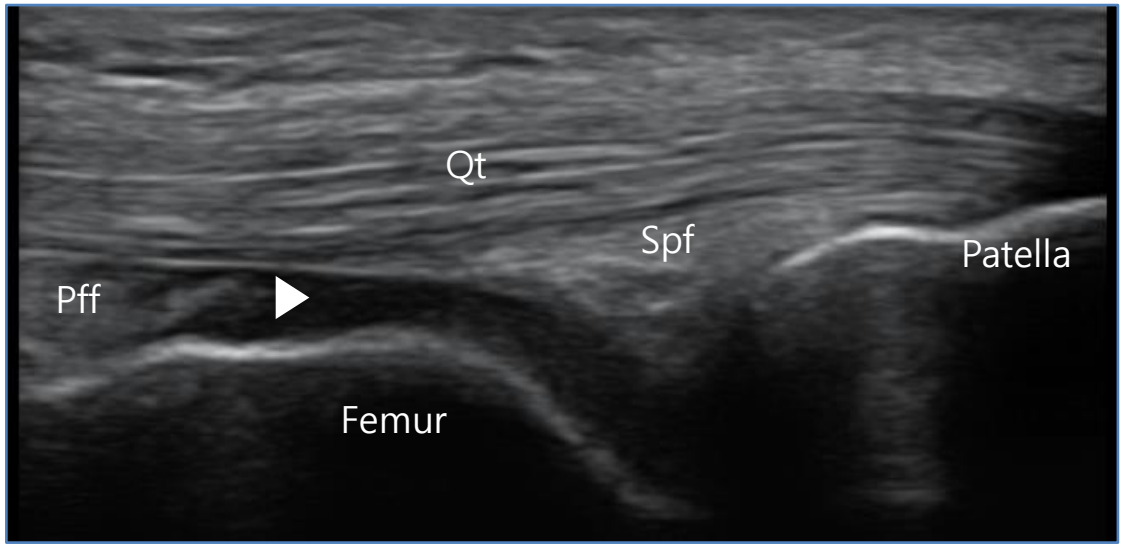
ALPINION
MEDICAL SYSTEMS

Diagnostic Acumen - Knee

- Quadriceps tendinosis
- Quadriceps tendon tear
- Quadriceps muscle tear
- Tear of patella tendon
- Patella tendonitis
- Knee effusion
- Pannus in rheumatoid arthritis
- Patella bursitis
- MCL tears
- Baker's cyst

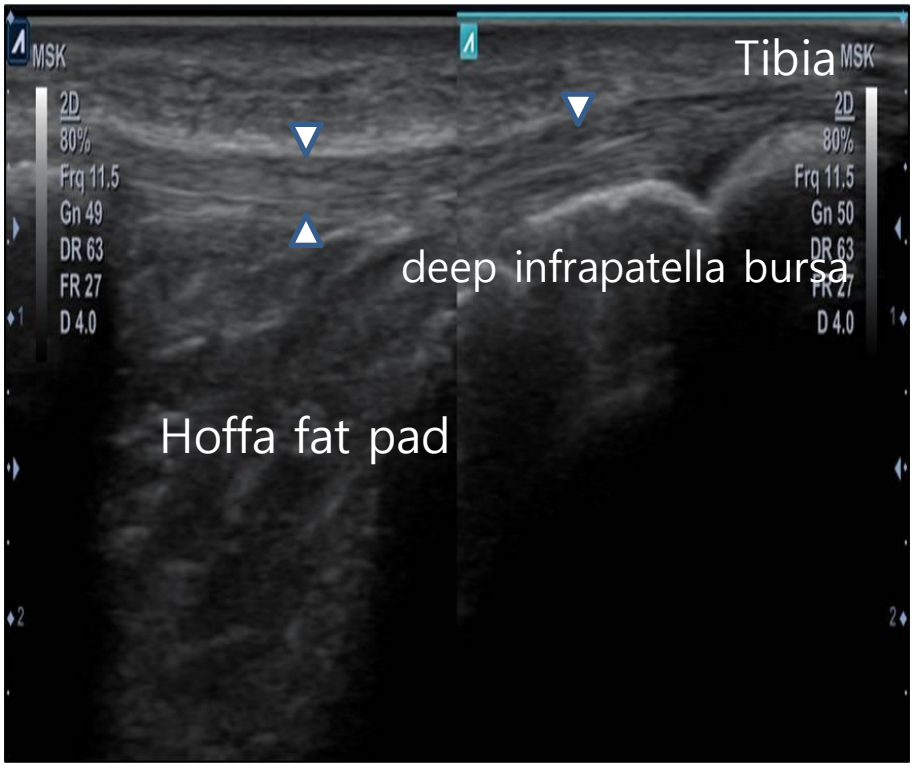
Anterior Knee - Quadriceps tendon





- Qt ; Quadriceps tendon or Suprapatellar tendon
- Pff ; Prefemoral fat pad
- Spf ; Suprapatellar fat pad
- ▶ ; Suprapatellar synovial recess

Anterior Knee – patella tendon

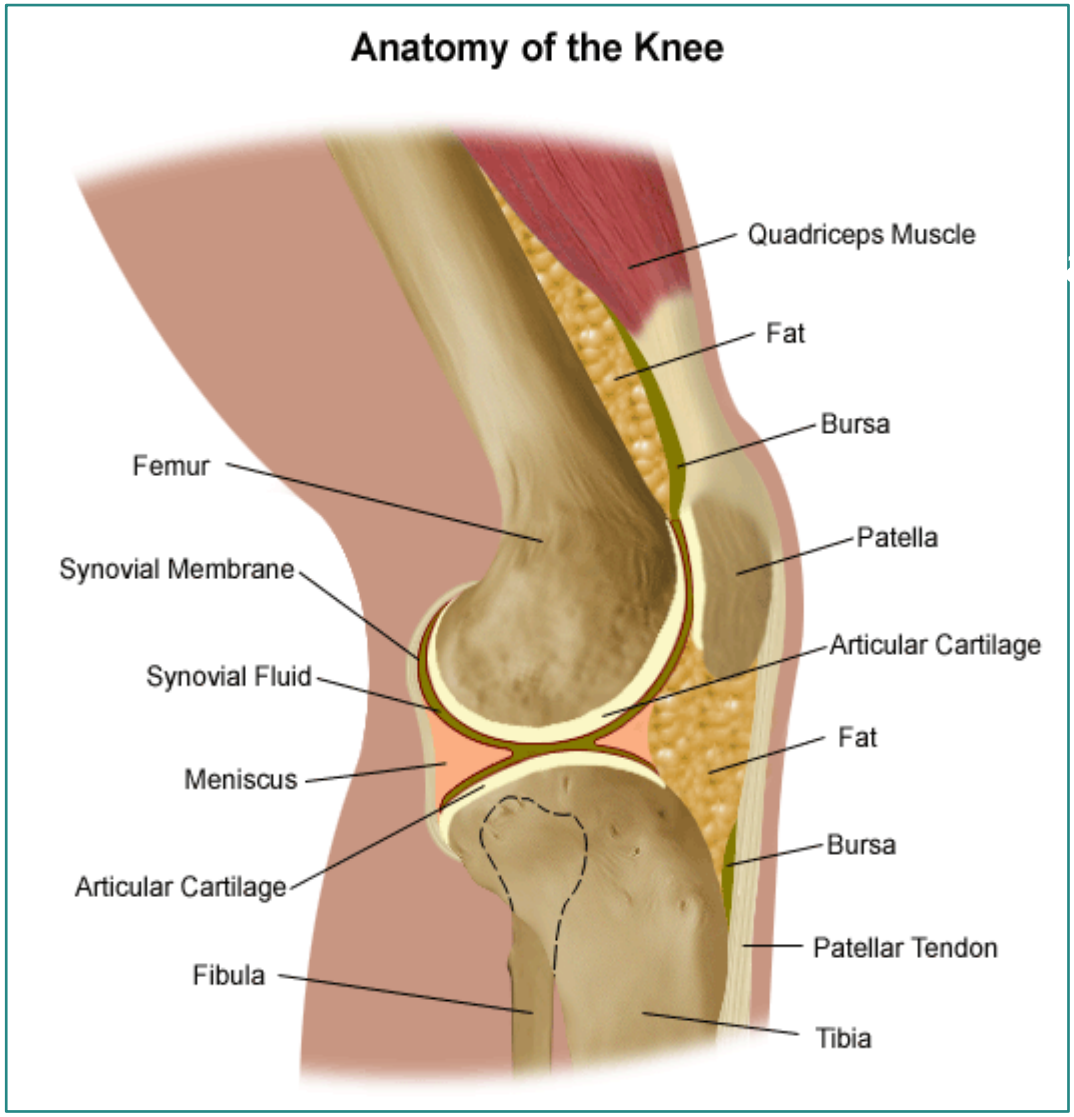


★ **Check point**

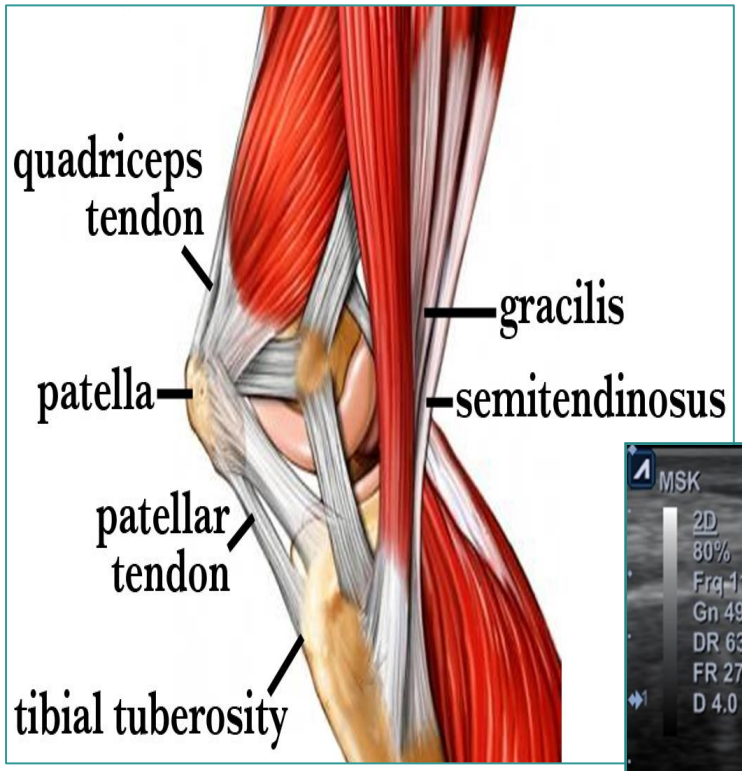
- patella tendon
- Hoffa fat pad: hypoechoic

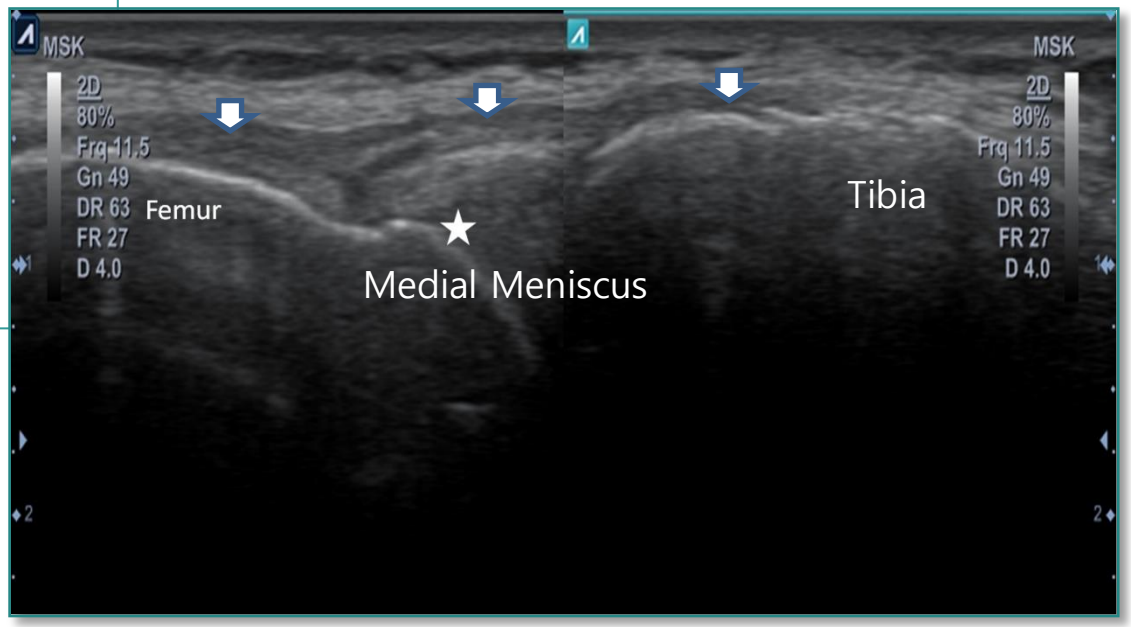
Medial Knee – Medial Collateral Ligament

★ **Check point**
- Medial collateral ligament
- Meniscus
- Tendon and bursa



Medial Knee – Medial Collateral Ligament





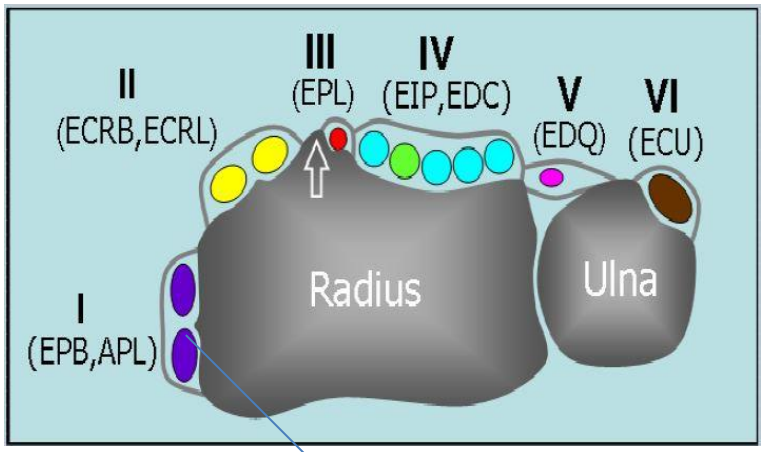
Wrist/Finger Scan

ALPINION
MEDICAL SYSTEMS

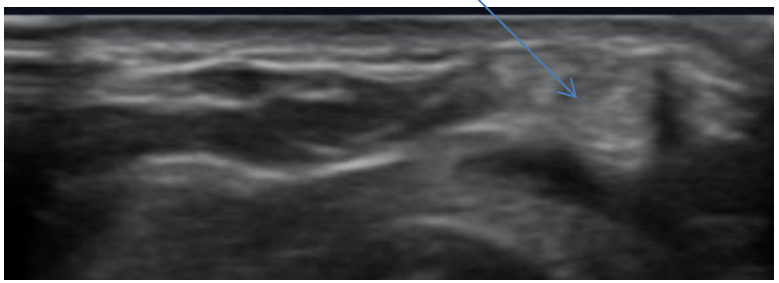
Diagnostic Acumen - Wrist

- Joint effusion and synovitis
- Rheumatoid arthritis erosions
- Psoriatic arthritis
- Tenosynovitis (de Quervain's)
- Tendon tears of wrist and fingers
- Nerve entrapment (carpal tunnel syndrome)
- Ligamentous injuries (Gamekeeper's thumb)
- Scaphoid fractures
- Cysts and masses (ganglions)

Wrist



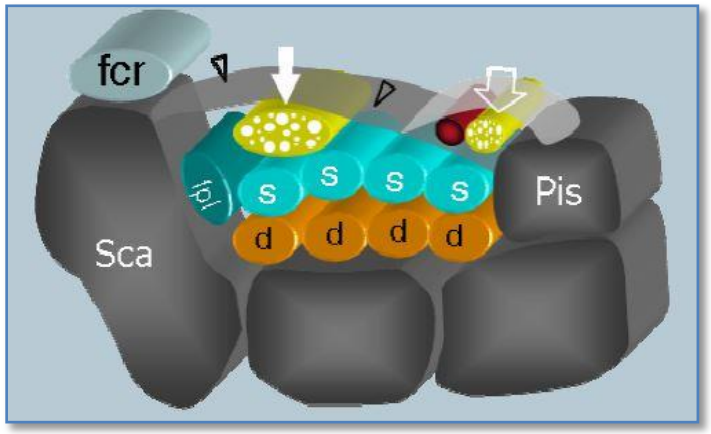
APL: abductor pollocis longus
EPB: extensor pollicis brevis
EPCB: extensor carpi radialis brevis
ECRL: extensor carpi radialis longus
EIP: extensor indicis proprius
EDC: extensor digitorum longus
EDQ: extensor digiti quinti proprius
ECU: extensor carpi ulnaris
↑ : Lister'stubercle (sonographic landmark)



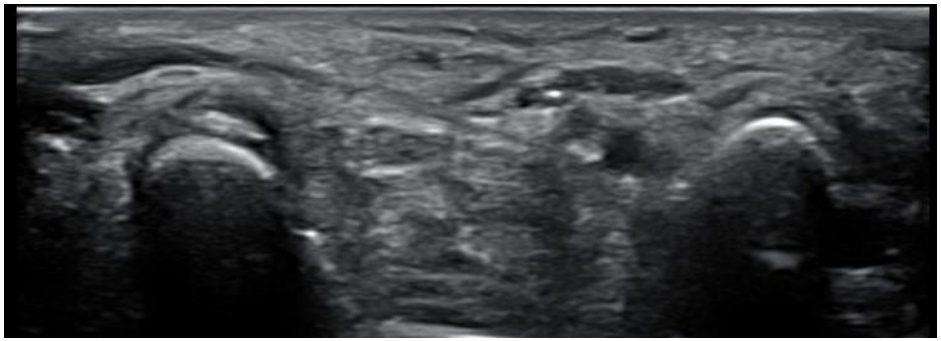
- In general, one should first recognize a given tendon and then follow it on short-axis planes down to the distal insertion

- Dynamic scanning of the extensor tendons cam be performed with the fingers hanging outside its edge to allow easy fingers movements

Wrist – carpal tunnel



- fcr : flexor carpi radialis
- Sca : scaphoid (radial side)
- Arrow head : flexor retinaculum
- fpl : flexor pollicis longus
- Pis : pisiform (ulna side)
- s : Flexor digitorum superficialis (4 tendons)
- p : Flexor digitorum profundus (4 tendons)



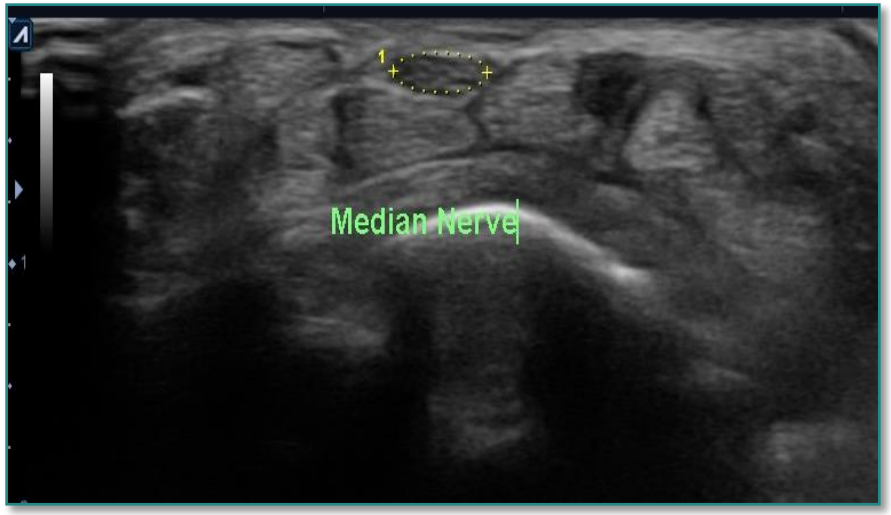
- Tilting the probe back and forth may help to optimize depiction
- dynamic scanning during passive flexion and extension of the respective finger

★ **Check point**

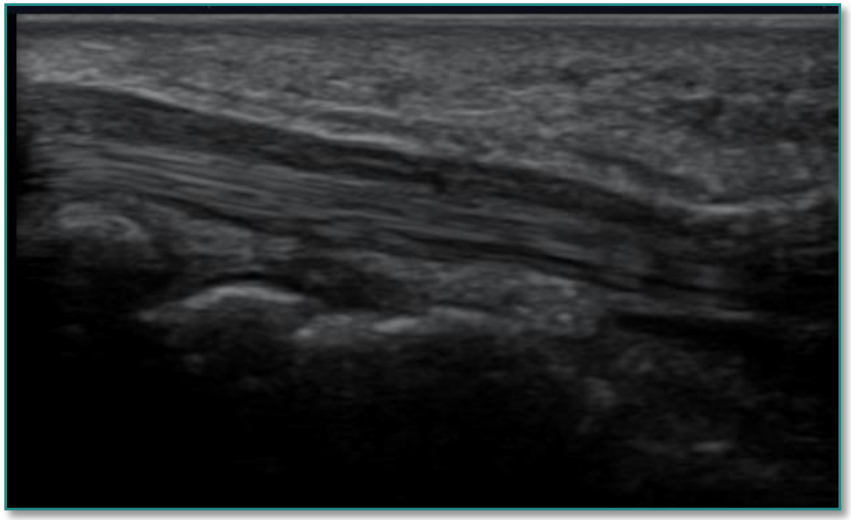
- discriminate Tendon from Nerve
  → Clear honeycomb sign

Carpal Tunnel

Ultrasound Image



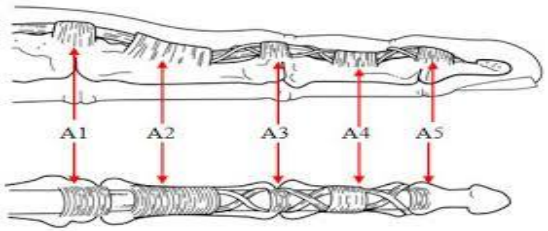
Trans

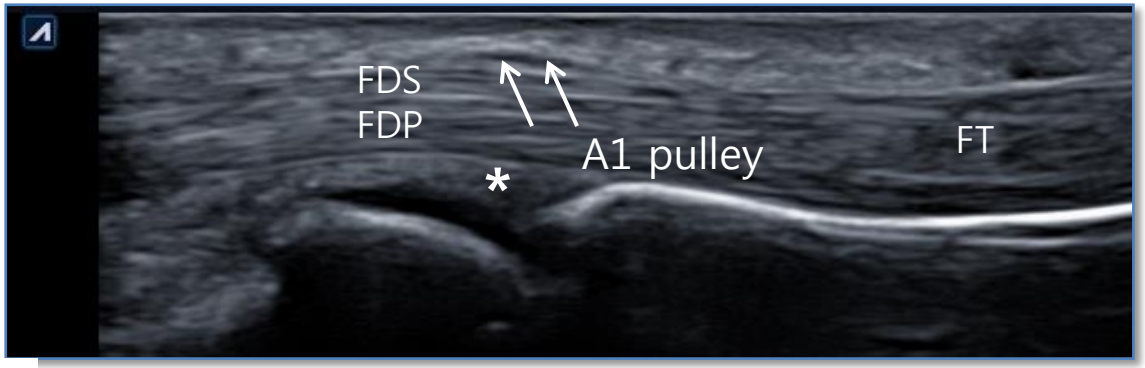


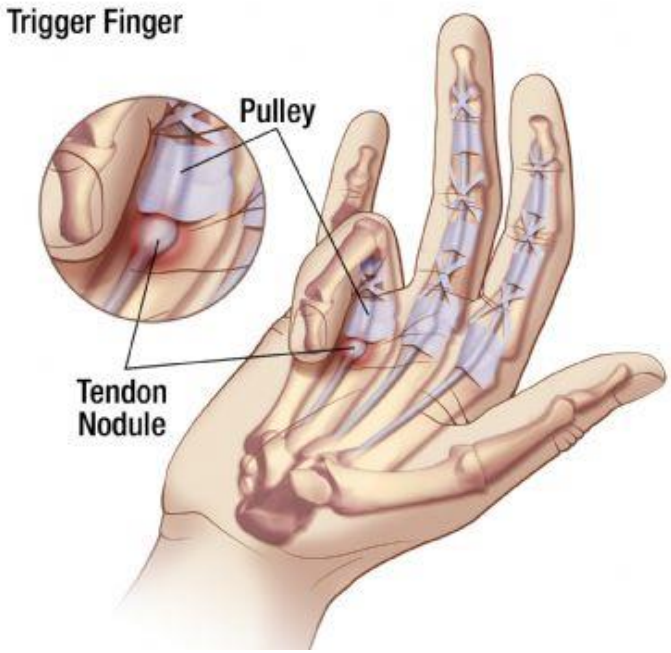
Long

Trigger Finger - Pulley system

Anatomy







- FDS : Flexor digitorum superficialis
- FDP : Flexor disitorum profundus
- * : Palmar plate
- FT : Flexor tendon

★ **Check point**

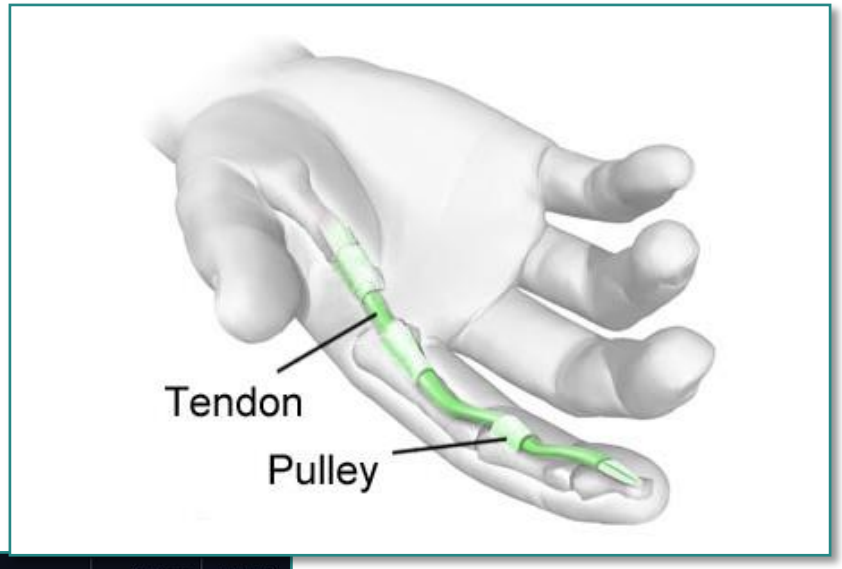
- Good distnction of A1 pulley

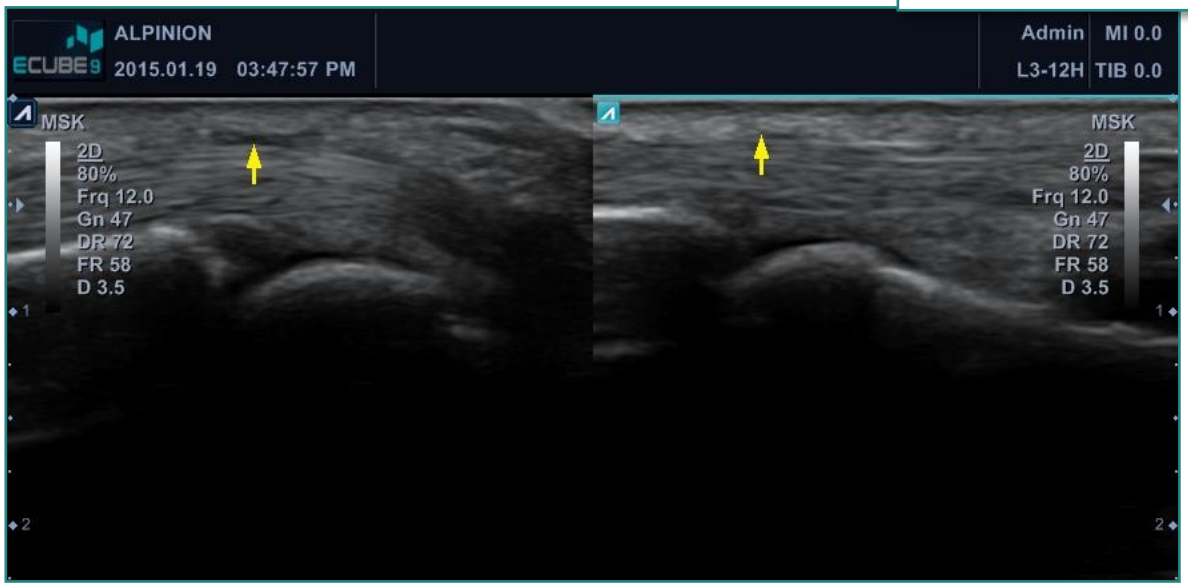
→ superficial resolution for thready flexor tendon

-→can show the tendon by finger movement

(flexion and extension)

Trigger Finger – Pulley system





Trigger Finger - Pulley system

- PIP : Flexor digitorum superficialis
- DIP :