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360 sports Medicine



MSK ultrasound in children

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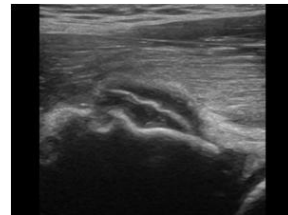
Disclosures

- None



Where is MSK Ultrasound strong

- Growth plate injuries → throwers shoulder
 - Can image side to side with ease, avoiding unnecessary radiation
 - Subtle fractures noted higher sensitivity than plain imaging
- Tendon injuries
 - Rare in children but faster acquisition than MRI
 - Greater resolution with ultrasound vs MRI
- Ligament injuries
 - Can do dynamic scanning and can avoid unnecessary trauma with IA arthrogram
- Apophyseal imaging and cartilage imaging improved over all techniques
 - Side to side comparison



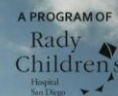
Benefits of Ultrasound

- Improved Diagnosis
 - What hurts → countless times find growth plate?
 - On field assessment
- Direct patient and family education
- Reduced cost
- No radiation
- Faster
- No worries about claustrophobia
- Procedure visualization real time
 - Improved over fluoroscopy



Downside

- Education required is tremendous
- Time consuming in clinic
- Not able to visualize through bone
 - May miss OCD, although often get a hint with effusion
 - Often may be able to move the joint to visualize area
- Harder to store and label full imaging
 - 10-15 min scanning reduced to 5 images?
- Deeper structures lose some resolution
 - Obese children?



Controversy

- Radiologists vs Sports medicine clinicians
 - Imaging equipment
 - Bedside
 - Time

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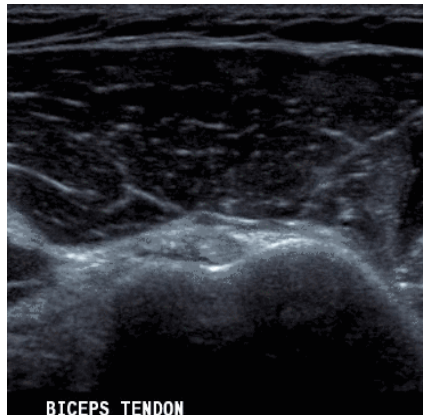
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Ultrasound of Shoulder

Transverse Biceps tendon scan plane





Transverse Long Head Biceps



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Longitudinal Biceps tendon scan plane **BT LS normal**




BICEPS TENDON

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SSC scan plane **Normal subscapularis**



SUBSCAPULARIS

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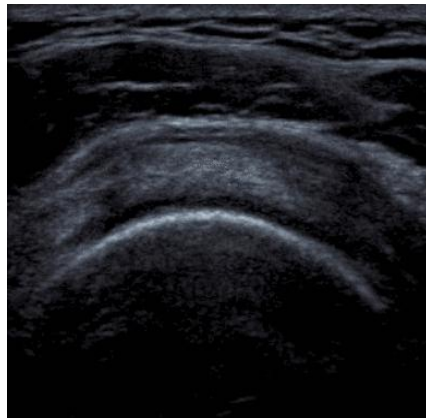
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Patient begins with arm by their side and abducts sideways to 90.
Look for bunching of bursa or tendon against the acromion or coraco-acromial ligament



SSP scan plane 2: Patient's hand behind their back.

Normal supraspinatus TS



ACJ scan plane



AC joint normal

AC JOINT | 4.

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This slide illustrates the ACJ scan plane. On the left, a photograph shows a patient's shoulder being scanned with an ultrasound probe. On the right, the corresponding ultrasound image shows a normal AC joint. The text 'AC JOINT | 4.' is visible at the bottom of the ultrasound image. The slide footer includes the '360 sports medicine' logo and the 'Rady Children's Hospital San Diego' logo.

Infraspinatus scan plane: Patient's hand towards unaffected shoulder.



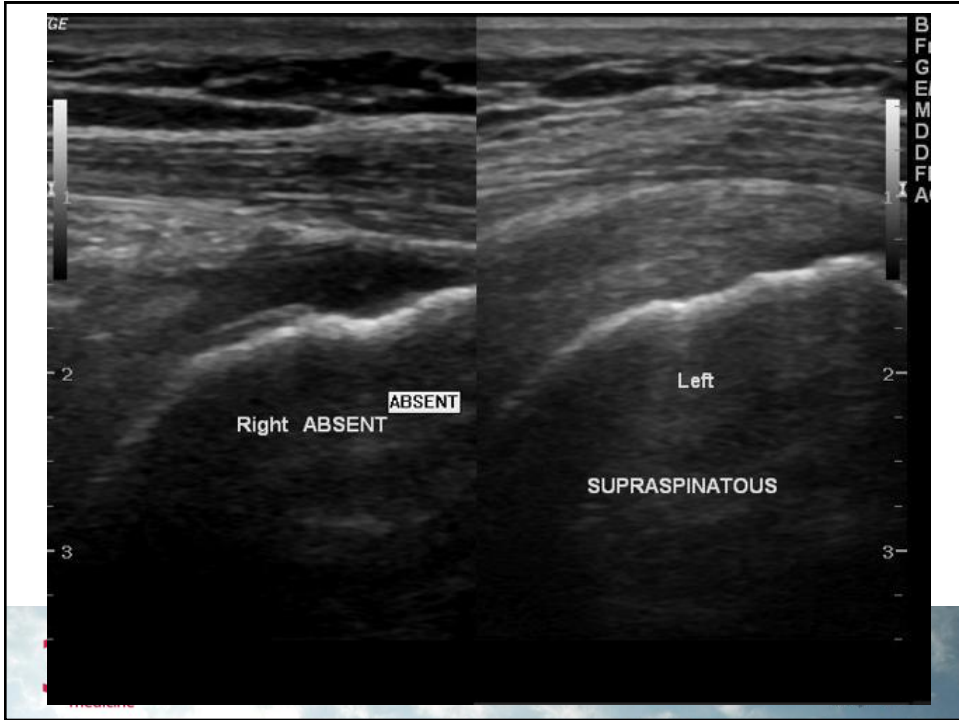
Infraspinatus

INFRASPINATUS |

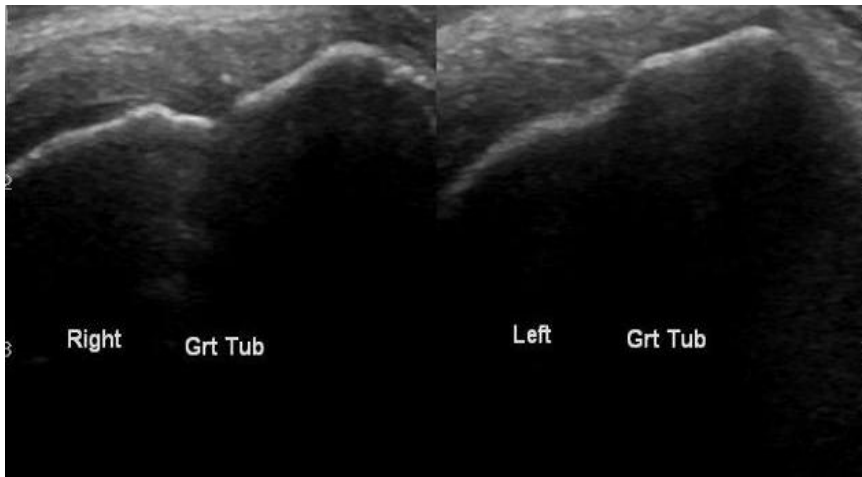
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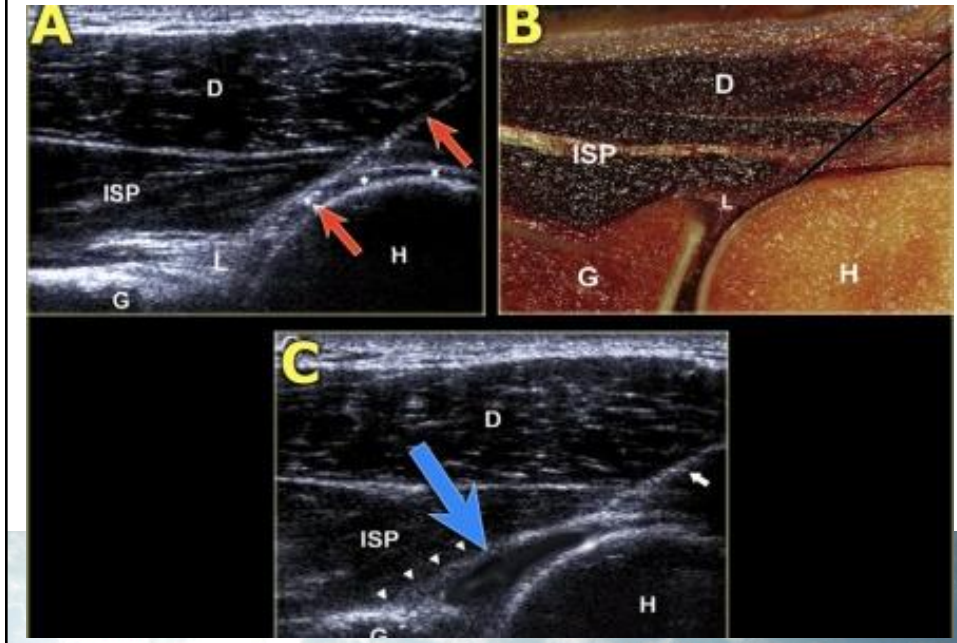
This slide illustrates the Infraspinatus scan plane. On the left, a photograph shows a patient's shoulder being scanned with an ultrasound probe, with the patient's hand positioned towards the unaffected shoulder. On the right, the corresponding ultrasound image shows the Infraspinatus muscle. The text 'INFRASPINATUS |' is visible at the bottom of the ultrasound image. The slide footer includes the '360 sports medicine' logo and the 'Rady Children's Hospital San Diego' logo.



Greater Tuberosity Fracture Comparison of right left greater tuberosity.

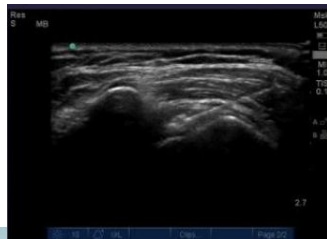


GH Injection



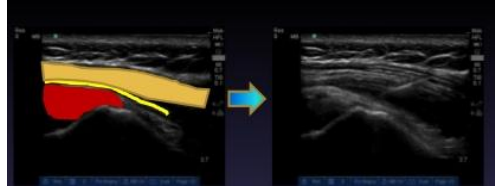
Improved Accuracy

- Despite overwhelming evidence that accuracy in injections is quite low and ultrasound significantly improves this accuracy, many **DO NOT BELIEVE**
- Many Physicians will feel that they are “excellent” at injections and “never” miss



Ultrasound – Accurate / Versatile

- 30% of injections miss subacromial bursa – Experts
 - Eustace (1197)
 - Yamakado (2002)
 - Henkus (2006)
 - Sethi (2006)
- Naredo et al. (2004)
 - Randomized cohort (41 patients to blind vs. U/S guided subacromial cortisone injections)
 - VAS ($p=0.001$) & SFA ($p=0.012$) sig better in U/S guided group



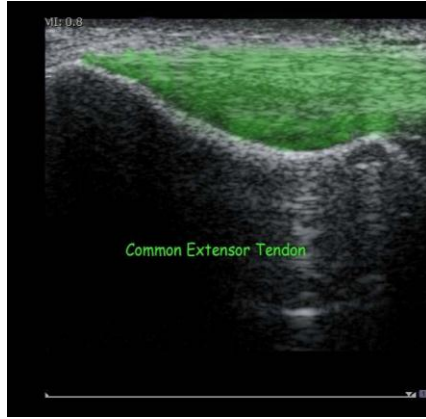
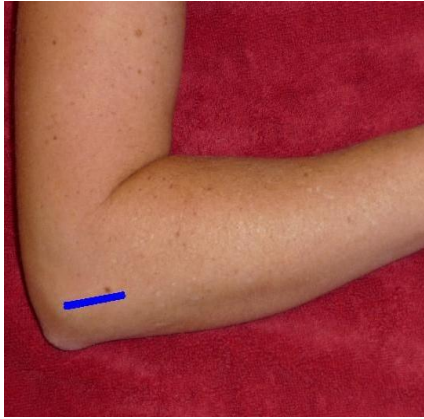
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Subacromial Injection – Arm Neutral



Common extensor tendon insertion to the lateral humeral epicondyle.

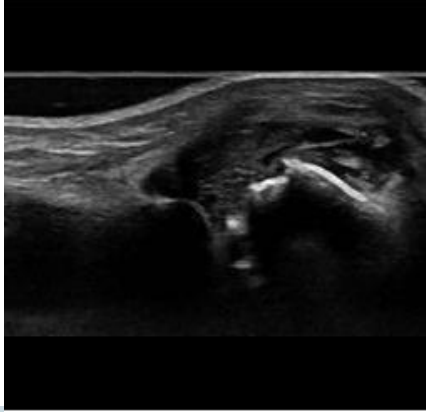


Biceps insertion onto radial tubercle- Longitudinal

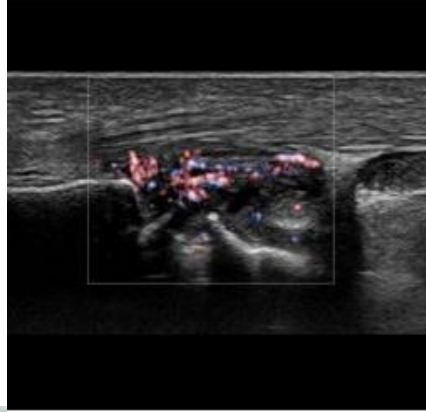


Rheumatoid arthritis of the MCP joint in a 21 year old female with synovial thickening and bony erosions. Increased vascularity volar aspect

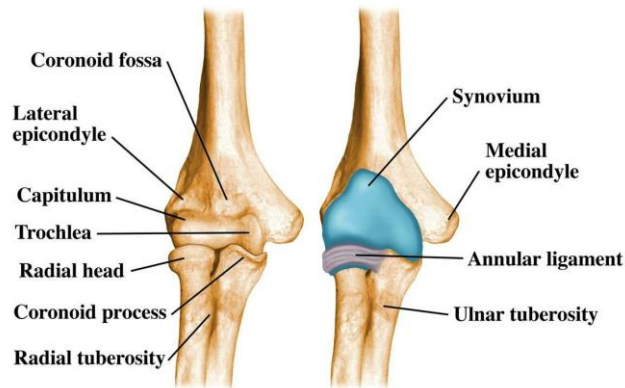
dorsal



volar



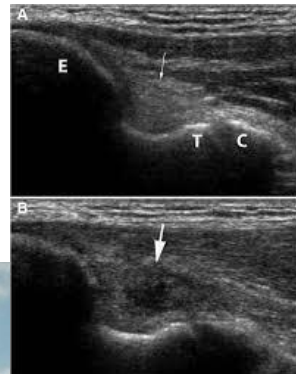
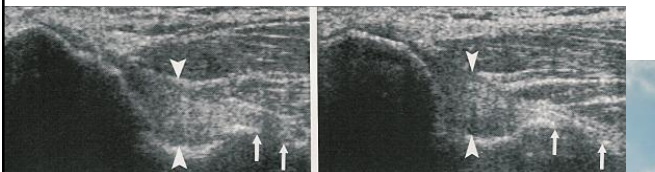
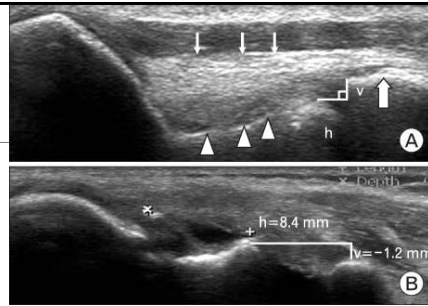
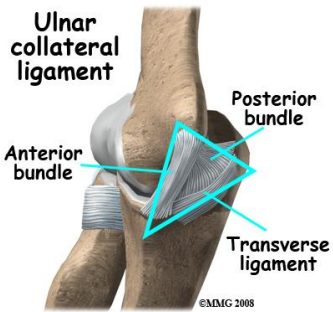
Elbow



Normal ulna collateral ligament



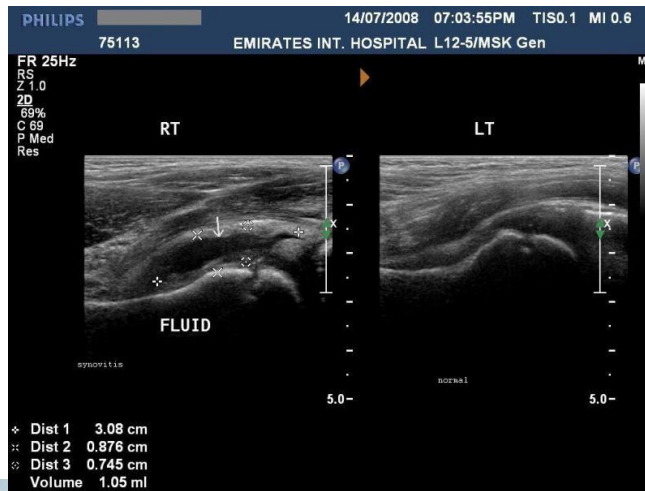
UCL injury in high school pitcher



Normal longitudinal triceps insertion



Benefits and limitations of ultrasound of the hip Transient synovitis?



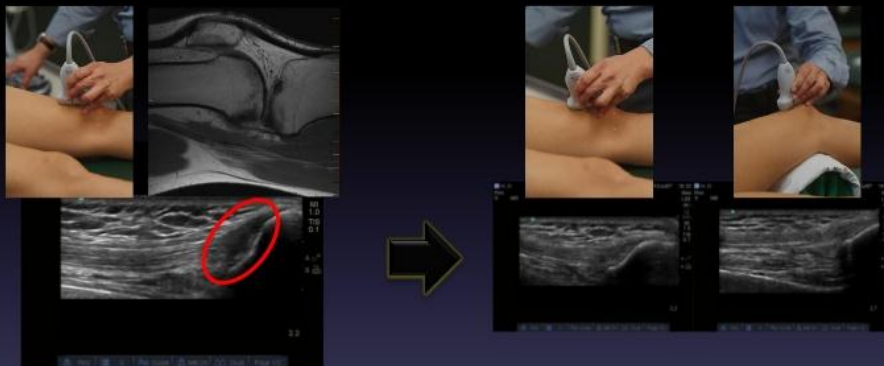
Hip ultrasound guided injection



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Quadriceps – Poor Technique

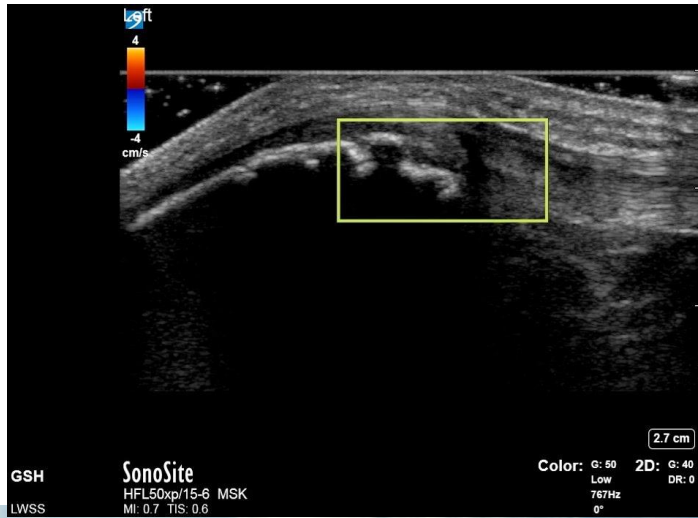


Quad tear?

- Leg position: Extension
- Problem: Concave tendon & false positive for tendon tear
- Solutions: Angle transducer perpendicular to tendon
Bend knee to 30°

NO!!! - ANISOTROPY

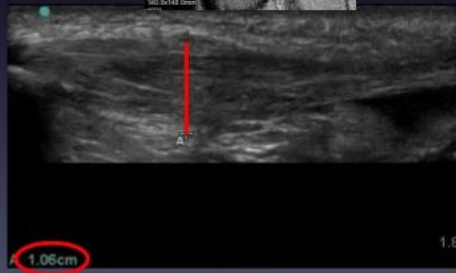
SLJ Inferior pole of the patella?



Patellar Tendinosis

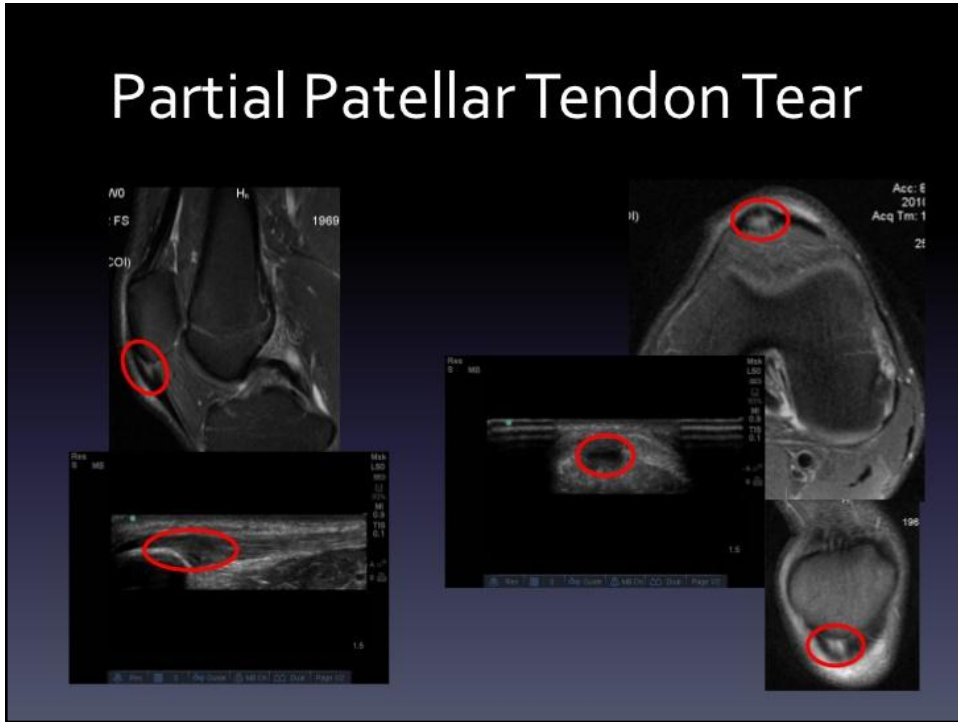


Normal



Swollen

Partial Patellar Tendon Tear

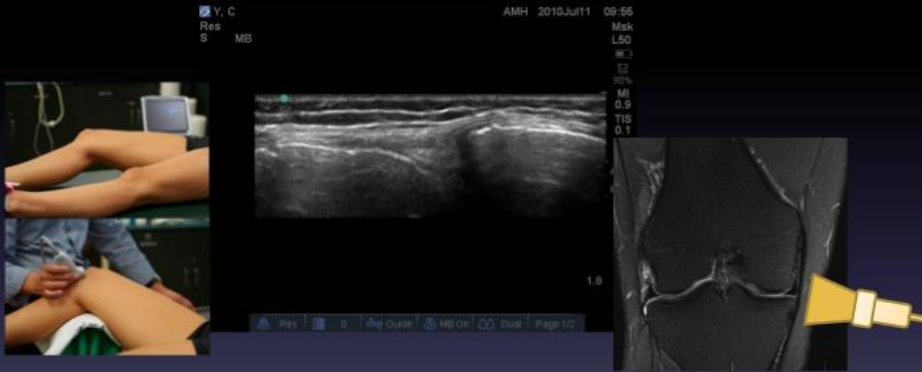


Femoral Condyles - Anterior



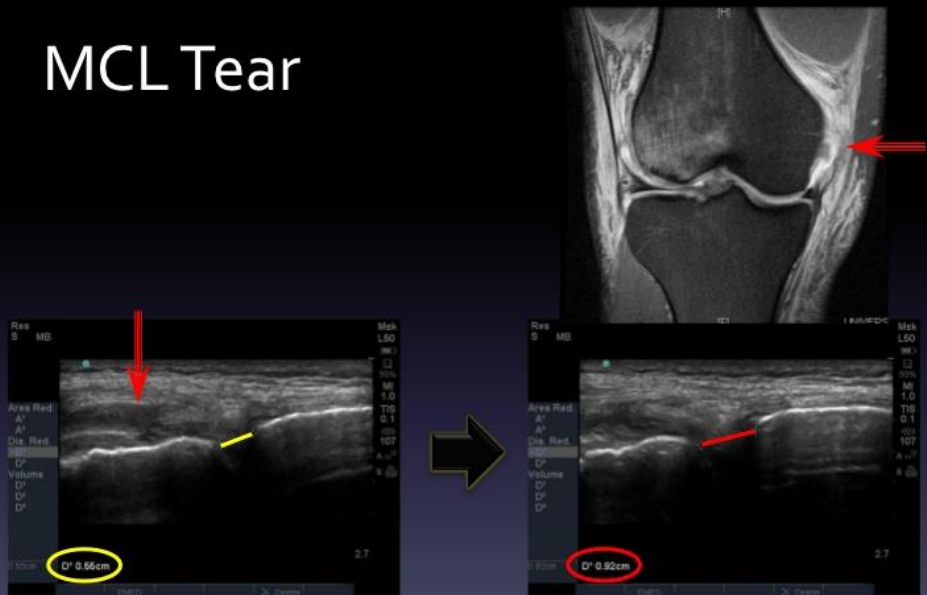
- Leg position: Full Flexion
- Tip: Superior to patella
- MRI equivalent: Sagittal plane

MCL



- Leg position: 30° Flexion; Hip externally rotated
- Tip: Find medial epicondyle and follow to joint
- MRI equivalent: Frontal plane

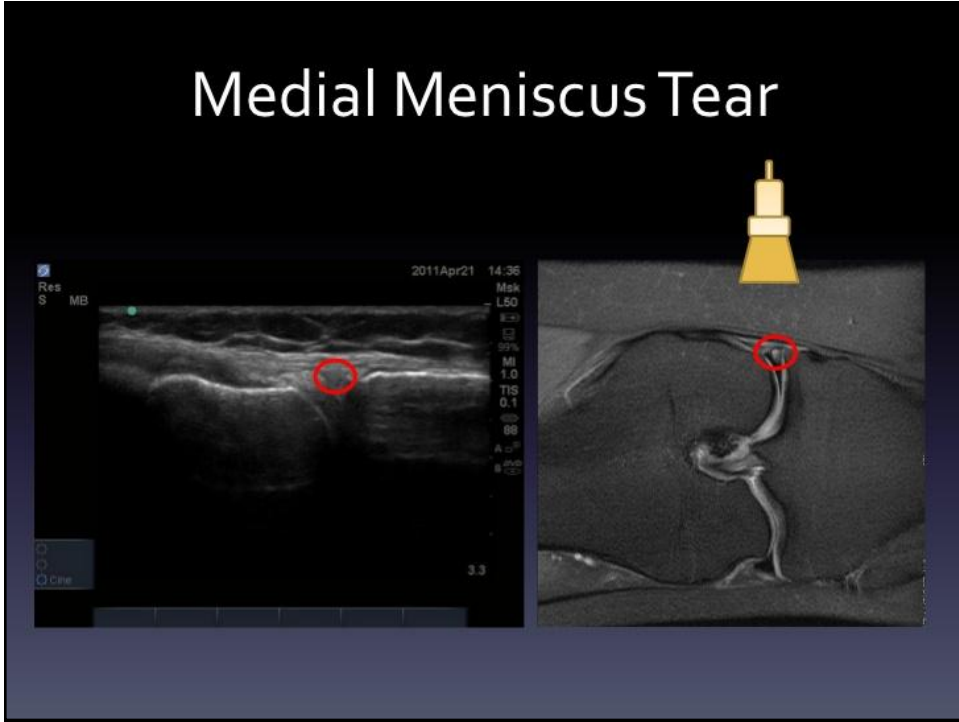
MCL Tear



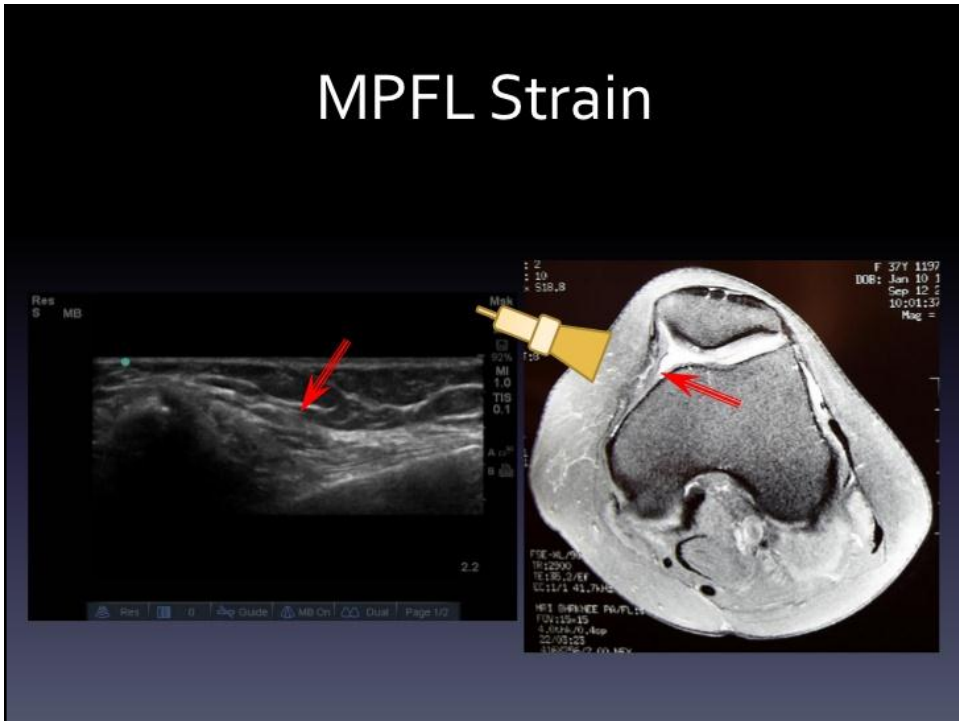
Varus Stress

Valgus Stress

Medial Meniscus Tear



MPFL Strain



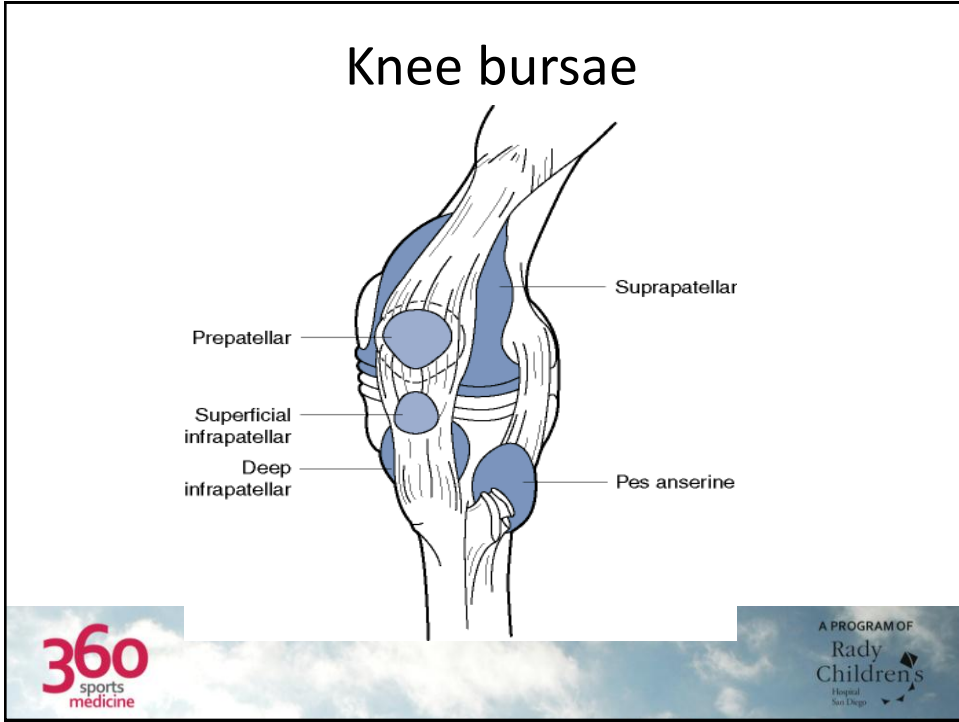
IT Band



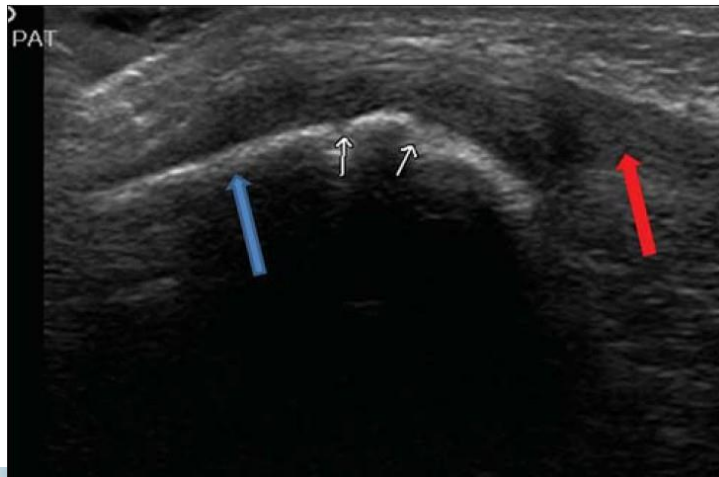
- Leg position: Extension; Hip internally rotated
- Tip: Find Gerdy's tubercle and follow proximally
- MRI equivalent: Frontal plane

Posterior Medial Meniscus Tear





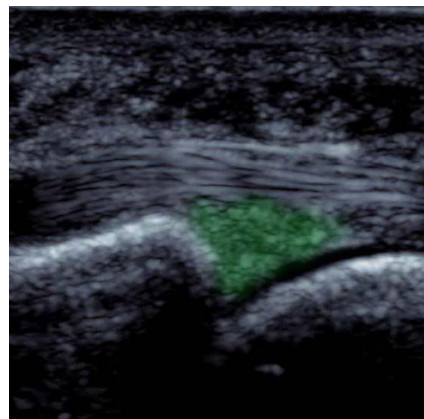
8-year-old girl suffered from pain at the anterior part of the right knee after falling down on a pedestrian walk. X-ray of the patella revealed no pathology.



Tibiotalor Joint

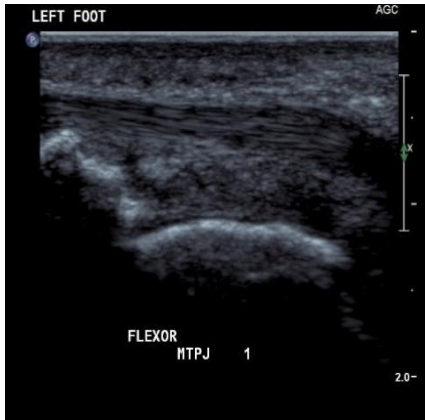


Normal Planter Plate

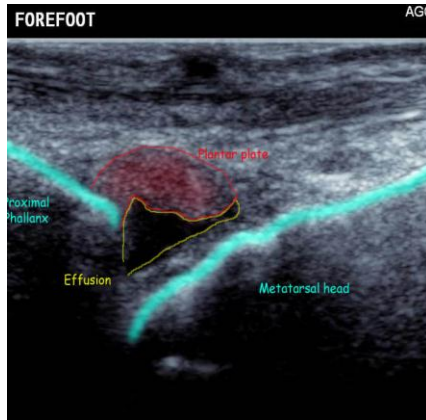


Dancers Foot injuries

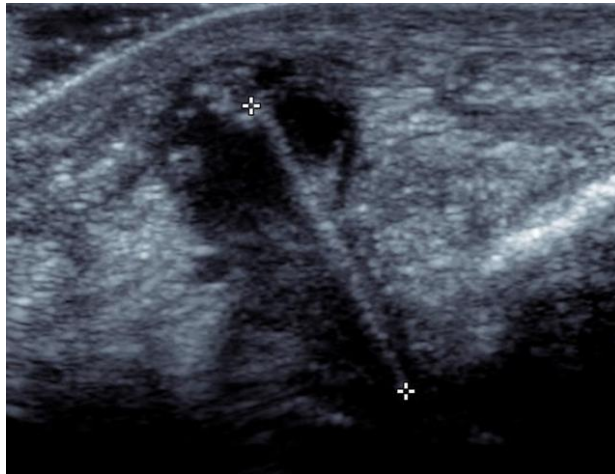
Degenerative Plantar Plate



Joint effusion elevating plantar plate



A date-palm thorn in the foot





Thank You

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