Soft Tissue/MSK

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I HAVE OPINIONS OF MY OWN - STRONG OPINIONS, BUT I DON’T ALWAYS AGREE WITH THEM.

GEORGE BUSH
Objectives / Introduction

- Review normal sonographic anatomy
  - MSK anatomy
  - Soft Tissue anatomy
- Image recognition of common pathologies
- Identify tendon rupture, hematoma
- Pulling it together - Joint Ultrasound
Orientation / Anatomy

- Anatomy of skin/muscle/connective tissue
  - Location of bursa
  - Reference to anatomic landmarks
- Orientation depends of area of interest
  - Anterior/Posterior
  - Medial/Lateral
- Label what you are doing!
Orientation / Anatomy

Dermis thickness

Eyelid 0.15mm
Forearm 0.5mm
Back 3.0mm
Heel 3.5mm
Dorsum of Hand

Back of Neck

Forearm

Lower Extremity

Skin
Muscle

Long Axis

Short Axis
Probe Selection & Scanning Technique

- High frequency linear probe (endocavitary probe)
- Image area of interest in two orthogonal planes
- Image comparison side (or site)
- Image area around the area of interest
- Adjuncts to imaging
  - Manual pressure
  - Dynamic movement
Imaging Tendons

- Hold probe over tendon of interest
- Orient probe along axis of tendon
- Look for discontinuity in tendon sheath, tendon architecture
- Look for surrounding inflammatory changes or hematoma
- Compare to “other side” or “other area”
Anisotropy

Changing angle of probe improved visualization of tendon structures
Tendon insertion into bone introduces a normal interruption of bony matrix.
Tendon Rupture

- **Complete**
  - Disruption/Loss of tendon structure
  - Hematoma/fluid
  - Look for end of tendon

- **Partial**
  - Peripheral vs Central lesion
  - Loss of Continuity of Tendon structure
  - Surrounding Inflammation
Imaging Soft Tissue

- Hold probe over area of interest
- Image in two planes (orthogonal)
- Look for alterations in cutaneous and subcutaneous architecture
- Abscess pockets, Cellulitis, Inflammation
- Compare to “other side” or “other area”
Anatomy of an Abscess

- Abscess cavity
- Inflammatory Changes
- Posterior enhancement
- Debris
- Uninfected tissue
Imaging Joints

- Each joint has its own set of images
- Clinical suspicion may alter imaging protocol
- Individual evaluation of bony and tendon elements
- Evaluation for effusion
- Compare to “other side”
Knee Pain

- Systematic review of Tendons, Bones, Bursa, Soft Tissue, Vasculature, Lymph Nodes, Joint Effusion
- Compare to “other side”
- Traumatic knee pain - XRAY +/- Ultrasound
- Atraumatic Knee Pain
- Guided by History and Physical Exam
Knee Joint

Anatomy of the Knee Joint

- Quadriceps femoris
- Quadriceps femoris tendon
- Suprapatellar bursa
- Prepatellar bursa
- Patella
- Synovial membrane
- Joint cavity
- Infrapatellar fat pad
- Superficial infrapatellar bursa
- Deep infrapatellar bursa
- Femur
- Bursa under lateral head of gastrocnemius
- Joint capsule
- Articular cartilage
- Meniscus
- Tibia
Knee Bursa

- Suprapatella Pouch
- Prepatella
- Infrapatella
- Deep infrapatella
- Subsartorial
- Semi-membranous Pouch
Probe Placement

+ Any Swollen Area
Knee

- Effusion
- Cellulitis
- Abscess
- Baker’s Cyst
- Fracture
- Tendon Rupture
- Bursa
Effusion

No Effusion
Summary

- Spend time relearning your anatomy
- MSK covers a lot of area
- Learn what you want first, then expand
- Fractures/tendon ruptures are visualized as discontinuity of bony surface/tendon structure
- MSK ultrasound extends your diagnostic skills for common pathology such as
  - Bursitis, effusion, tendonitis...
CASE

- Bilateral arm pain for 2 days
- Following cross-fit exercising
- Difficulty bending arms
- Diffuse tenderness of triceps
Unaffected area

Affected area