Knee, Ankle, and Foot: Normal and Abnormal Features with MRI and Ultrasound Correlation

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Outline
• Knee
  – Joint effusion
  – Extensor mechanism
  – Baker cyst
• Ankle and Foot
  – Achilles
  – Peroneal tendons

Joint Effusion
• Suprapatellar recess
  – Superior
    • Prefemoral & quadriceps fat pad separation
    • Distends with partial knee flexion
  – Medial and lateral to patella
    • Distends with knee extension
    • Transducer pressure displaces joint effusion

Suprapatellar Recess and Gutters

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Quadriceps Tendon: tendinosis

Quadriceps Tendon: Partial Tears

Quadriceps Tendon: full-thickness tear
**Patellar Tendinosis:**

- Jumper’s knee
- Hypoechoic swelling
- Mucoid degeneration, possible interstitial tearing
- Hyperemia: neovascularity
- No inflammatory cells

Radiology 1996; 200:821

**Patellar Tendon: tendinosis**

- color Doppler
- power Doppler

**Patellar Tendon: full-thickness tear**

Patella

Prox Distal

Longitudinal

**Knee Bursae**

- Suprapatellar Recess
- Prepatellar Bursa
- Deep Infrapatellar Bursa
- Superficial Infrapatellar Bursa
- Baker Cyst
- Semimembranosus-Tibial Collateral Ligament Bursa
- Pes Anserinus Bursa

**Prepatellar Bursa: aseptic fluid**

Sagittal Axial
**Superficial Infrapatellar Bursa**

- Case #1
- Case #2

**Deep Infrapatellar Bursa**

- Normal
- Abnormal

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**Baker Cyst:**

- Semimembranosus-medial gastrocnemius bursa
- 50% over age of 50 have communication with knee joint
- Cyst communication to posterior knee between SM-MG tendons required

AJR 2001; 176:373

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**Anatomy: posterior**

From: Netter’s Atlas of Human Anatomy

**Baker Cyst**

Axial

Axial T2w
Baker Cyst

- Intraarticular body
- Rupture

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Achilles Tendon:

- 2 – 6 cm proximal to insertion
  - Tendinosis
  - Full-thickness tear
- Calcaneal attachment
  - Tendinosis, tear
  - Haglund Syndrome

Paratenonitis: Achilles
Tendinosis: Achilles

Achilles Tendon: partial-thickness tear

Achilles Tendon: full-thickness tear

Achilles Tendon: dynamic imaging

Achilles Tendon: healing tear
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Longitudinal split: peroneus brevis

Transverse: proximal

Transverse: distal

Peroneal Tendon Subluxation:

- Abnormal movement may only occur dynamically
- Predisposes to peroneal tendon tears
  - Longitudinal split of peroneus brevis
- US: examine with dorsiflexion / eversion
  - 100% accurate diagnosis with US

Neustadter et al. AJR 2004; 183:985

Peroneal Retinaculum

Rosenberg et al. AJR 2003; 181:1551

Superior Peroneal Retinaculum Injury

Short Axis to Peroneal Tendons

Long Axis
Intrasheath Subluxation

- Abnormal snapping of peroneal tendons
- No lateral displacement, intact retinaculum
- Associations:
  - Convex posterior fibula in 92%
  - Tendon tear in 86%
  - Low lying peroneus brevis muscle in 71%

J Bone Joint Surg Am 2008; 90:992
J Foot Ankle Surg 2009; 48:323

Take Home Points

- Knee effusion:
  - Suprapatellar and medial/lateral recesses
- Extensor mechanism: dynamic evaluation
- Baker cyst: must see neck to diagnose
- Achilles: dynamic imaging
- Peroneal: dynamic, subluxation

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