

## Interventional Musculoskeletal US: Lower Extremity

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### Disclosures

- Consultant: Bioclinica
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- Contractor: POCUS PRO
- Advisory Board: Philips
- Not relevant to this talk

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Fundamentals of Musculoskeletal Ultrasound are copyrighted by Elsevier Inc.*

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### Outline:

- Joint
- Tendon sheath
- Bursa
- Cyst
- Calcific tendinitis
- Miscellaneous

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### Joint Aspiration and Injection

- Aspiration:
  - Infection, crystal disease
- Injection:
  - Anesthetic: Lidocaine, Ropivacaine
  - Steroids
  - Therapeutic or diagnostic

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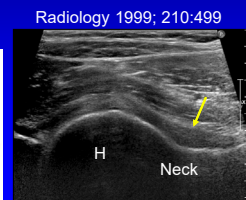
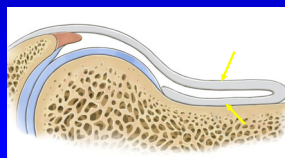
### Joint Aspiration and Injection

- Know which joint recesses become distended and which are accessible
- For joint access:
  - Aim for joint fluid seen at ultrasound
  - Aim for specific joint recess
  - If no recess, aim for joint space

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### Hip: anterior recess

- Anterior and posterior layers
  - Fibrous tissue + minute layer of synovium
  - Hyperechoic
  - Each 2 - 4 mm thick



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### Joint injection

- Anterior recess
- In plane
- Transducer:
  - Parallel to femoral neck
  - Consider curvilinear
- Needle: distal to proximal
- 97% accuracy<sup>1</sup>

<sup>1</sup>Smith J. J Ultrasound Med 2009; 28:329

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### Joint injection

- Transducer: in plane
  - Lateral to medial
  - Horizontal and parallel to sound beam

Courtesy of Mark Cresswell, Vancouver

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### Joint Injection

- Femoral neck target
- Preferred over head
- High volumes
- Less extra-articular contrast

From Kantarci F et al. Skeletal Radiol 2013; 42:37.

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### Knee Joint

- Suprapatellar recess or medial/lateral recesses
- In plane
- Transducer: axial
- Needle: lateral to medial

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### Ankle Joint

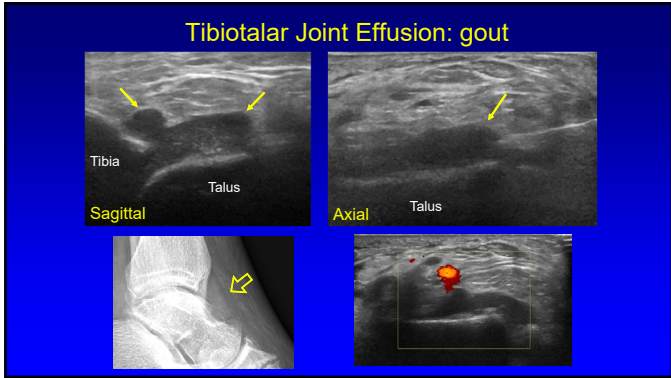
- Anterior joint recess
- In plane
- Transducer: sagittal
- Needle: inferior to superior

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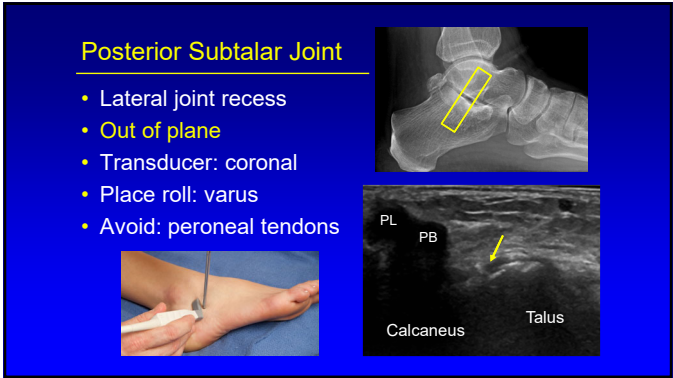
### Ankle Joint

- Anterior joint recess
- In plane
- Transducer: axial
- Needle: medial to lateral
- Deep to dorsalis pedis

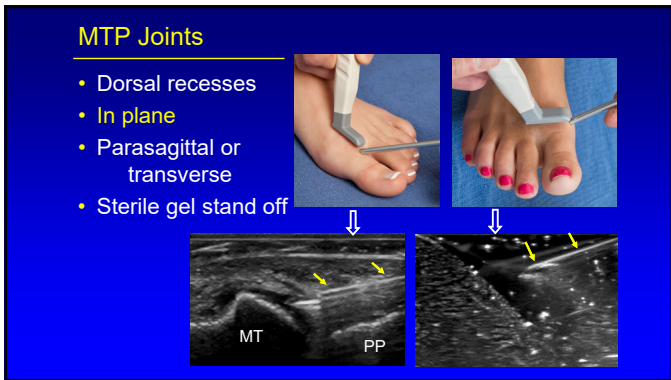
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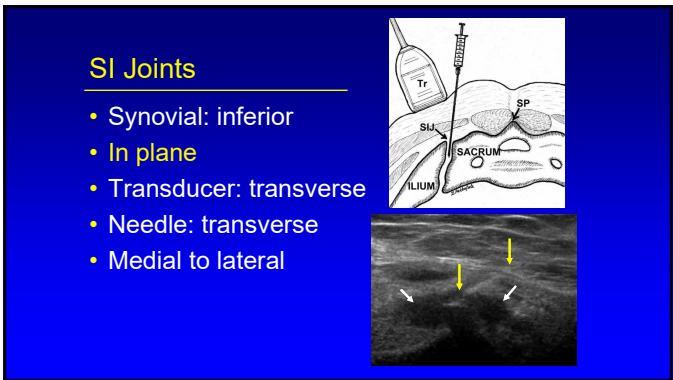
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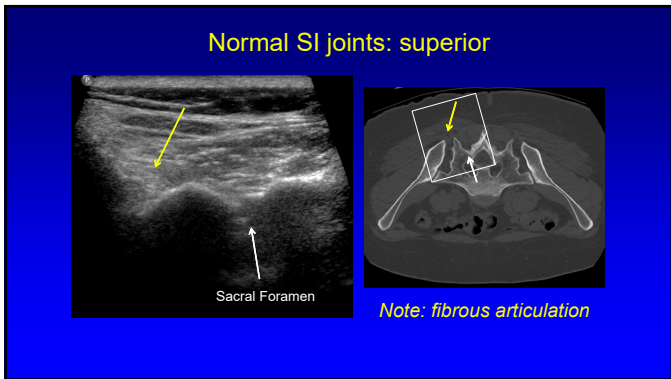
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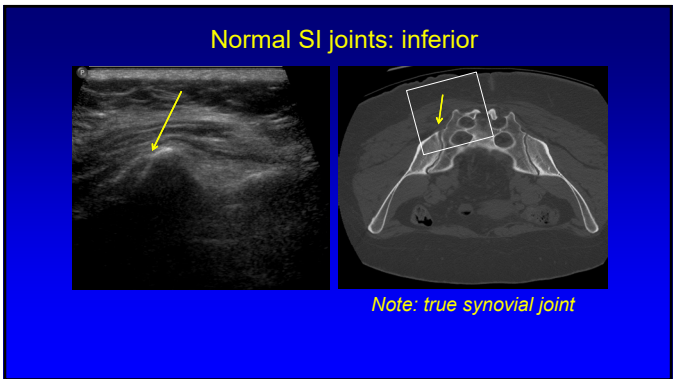
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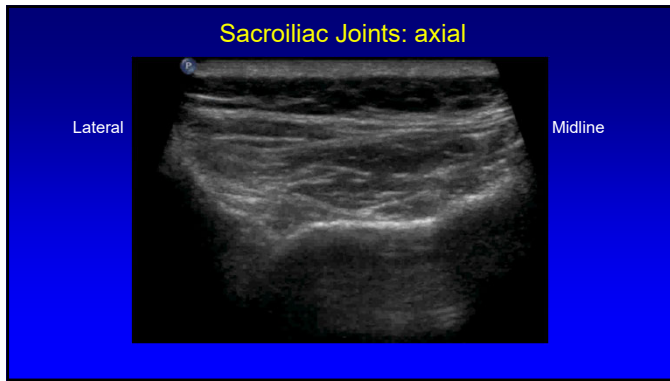
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- Outline:**
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- Tendon Sheath**
- Aspiration:
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  - Injection:
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- Tendon Sheath: injection**
- Short axis to tendon
  - Anterior or posterior
  - Deep to tendon:
    - Decreased risk of depigmentation, fat atrophy
  - 100% accurate
- Muir JJ et al. Am J Phys Med Rehab 2011; 90:564
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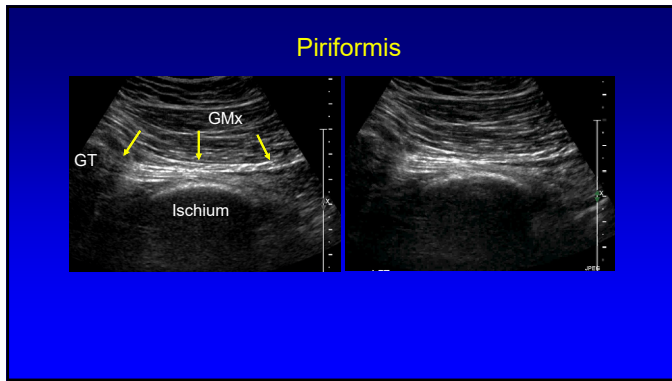
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- Piriformis Injection:**
- Piriformis syndrome:
    - Uncommon cause of pain
    - Inject: steroids, local anesthetic, botulinim toxin
  - Muscle injection<sup>1</sup>
    - Ultrasound more accurate than fluoroscopy<sup>2</sup>
  - Peri-sciatic infiltration<sup>3</sup>
- <sup>1</sup>Peng PW et al. Pain Physician 2008; 11:215  
<sup>2</sup>Finoff JT et al. J Ultrasound Med 2008; 27:1157  
<sup>3</sup>Reus M et al. Eur Radiol 2008; 18:616

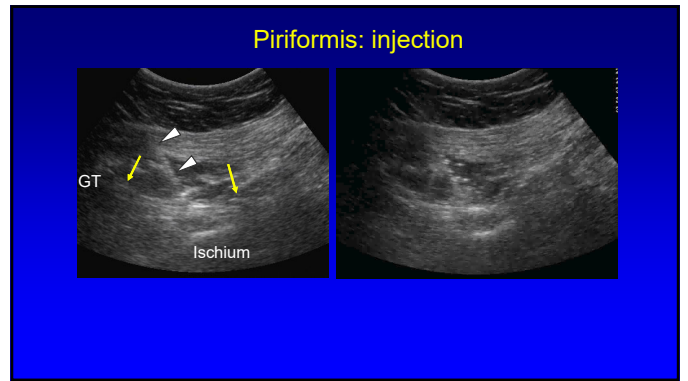
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- Piriformis Injection:**
- Technique:
    - Low frequency **curvilinear** transducer
    - Axial plane
    - Move transducer inferior to SI joint
    - Angle transducer: inferior and lateral
    - Rotate hip internally: movement of tendon
- Finoff JT et al. J Ultrasound Med 2008; 27:1157

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- ### Outline:
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  - **Bursa**
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- ### Bursa
- 
- Aspiration:
    - Infection, crystal disease
  - Injection:
    - Steroids
    - Therapeutic

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### Iliopsoas Bursa

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- Oblique-axial plane:
  - Superior to femoral head
  - Lateral to medial
  - Inject between tendon, ilium<sup>1</sup>
- Pain relief = successful iliopsoas surgical release<sup>2</sup>

<sup>1</sup>Dauffenbach J et al. J Ultrasound Med 2014; 33:405

<sup>2</sup>Blankenbaker DG. Skeletal Radiol 2006; 35: 565

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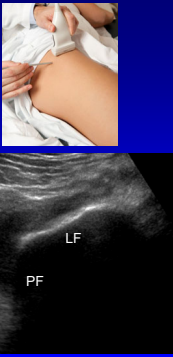
### Greater Trochanter

AF: anterior facet  
LF: lateral facet  
PF: posterior facet

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### Trochanteric Region Bursae

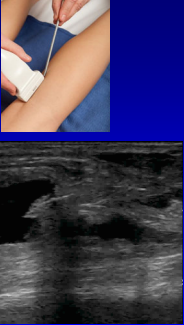
- Trochanteric: deep to gluteus maximus
- Subgluteus medius
- Subgluteus minimus
- Axial or coronal plane



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### Baker Cyst

- Aspiration
  - Inferior to superior
  - Medial to lateral
- Aspirate joint effusion first if present
- Steroid injection
  - Baker cyst injection works better than intra-articular injection!



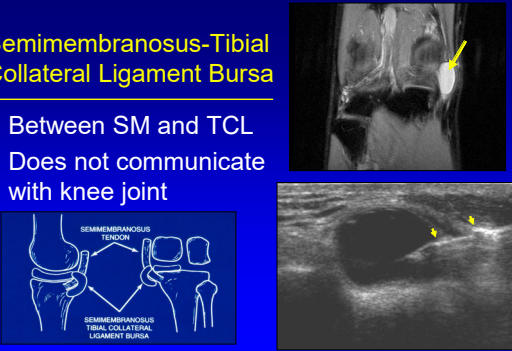
Banidelli F, et al. Clin Rheum 2012; 31:727

Inferior to superior

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### Semimembranosus-Tibial Collateral Ligament Bursa

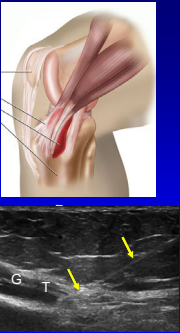
- Between SM and TCL
- Does not communicate with knee joint



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### Pes Anserinus

- Pes anserinus: "goose foot"
  - Sartorius
  - Gracilis
  - Semitendinosus
- Bursa:
  - Deep to tendons
  - Superficial to MCL

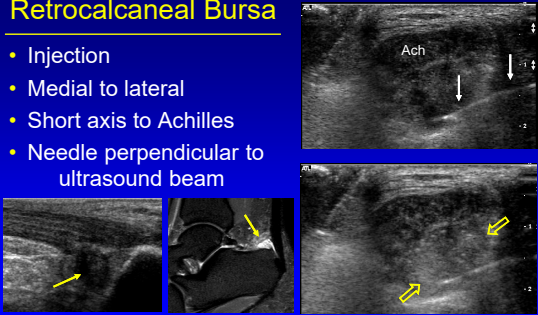


Radiology 1995; 194:525

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### Retrocalcaneal Bursa

- Injection
- Medial to lateral
- Short axis to Achilles
- Needle perpendicular to ultrasound beam



Post steroid injection

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### Cyst Aspiration

- Ganglion:
  - Multilocular, non-compressible
  - Large bore needle
  - Fenestrate neck
- Other cysts:
  - Paralabral cysts: shoulder and hip labrum
  - Parameniscal cysts

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### Ganglion Cyst: aspiration

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### Ganglion Cyst: aspiration

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### Paralabral Cyst

- Ultrasound-guided aspiration
- 18 – 20 gauge spinal needle
- Steroid injection

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### Ganglion: aspiration

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### Medial Meniscus: tear and parameniscal cyst

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**Calcific Tendinitis**

- Ultrasound-guided lavage and aspiration
- 20 gauge spinal needle

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**Morton Neuroma**

- Steroid injection<sup>1</sup>
  - 3 month: pain relief
- Alcohol injection<sup>2</sup>
  - Symptoms return at 5 yrs
- Radiofrequency ablation<sup>3</sup>
  - 85% effective at 6 months

<sup>1</sup>Thomson CE JBJS 2014; 96A:334  
<sup>2</sup>Gurdezi S Foot Ank Int 2013; 34:1064  
<sup>3</sup>Chuter GSJ Skeletal Radiol 2013; 42:107

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**Meralgia Paresthetica**

- Sensory: anterolateral thigh
- Hypoechoic enlargement
- Ultrasound-guided steroid injection

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**Take Home Points:**

- Joint:
  - Aim for recess
- Bursa:
  - Know anatomic locations
- Cyst:
  - Large bore needle
- Calcific tendinitis:
  - One puncture, lavage and aspiration

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