

# ORTHOPAEDIC INJECTION AND ASPIRATION TECHNIQUES

OAAPN  
October 20, 2016  
David H. Sohn, JD MD  
Chief, Shoulder and Sports Medicine  
University of Toledo Medical Center

---

---

---

---

---

---

---

---

## Orthopaedic Injection and Aspiration Techniques

- When to aspirate?
  - To rule out infection
  - To obtain studies for crystals
  - Symptomatic pain relief
  - Therapeutic washouts

- When to inject?
  - Corticosteroids
  - Viscosupplementation
  - Diagnostic

---

---

---

---

---

---

---

---

## Orthopaedic Injection and Aspiration Techniques

- When not to aspirate?
  - Overlying cellulitis
  - Recent joint replacement
  - Blood dyscrasia (relative)
- When not to inject steroids?
  - Infection
  - Diabetes (relative)

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- Risks of aspiration
  - Syncope
  - 1 in 12,000 risk of infection
- Risks of steroid injection
  - Elevated blood sugars
  - Theoretical risk of avascular necrosis
- Risks of viscosupplementation
  - Allergic reaction (looks like infection)
  - Give steroid injection

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- Lidocaine
  - 1% or 2% without epinephrine
  - Onset: 1-2 minutes
  - Duration: 4 hours
  - Risks
    - Avoid intravascular injection (cardiac effects)
    - Allergic or toxic reaction (usually a result of the paraben preservative in multi-dose vials)

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- Bupivacaine (0.25% or 0.5%)
  - Onset: 2-5 minutes
  - Duration: 12 hours
  - Risks
    - Allergic or toxic reaction (usually a result of the paraben preservative in multi-dose vials)
    - 0.5% has dose and time-dependent chondrotoxicity

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- Corticosteroids
  - Onset: 3 days
  - Duration: 3 months
- Risks
  - Infection
  - Elevated blood sugar
  - Tendon rupture
  - Decreased healing (contraindicated for OCD's)

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- Viscosupplementation
  - Onset: weeks
  - Duration: 3-6 months
- Risks
  - Infection (multiple injections)
  - Cross allergen with eggs

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent
  - Step II: Identify landmarks

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent
  - Step II: Identify landmarks
  - Step III: Prep skin

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent
  - Step II: Identify landmarks
  - Step III: Prep skin
  - Step IV: Anesthetize skin (if freezing spray available)

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent
  - Step II: Identify landmarks
  - Step III: Prep skin
  - Step IV: Anesthetize skin (if freezing spray available)
  - Step V: Direct needle into joint

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent
  - Step II: Identify landmarks
  - Step III: Prep skin
  - Step IV: Anesthetize skin (if freezing spray available)
  - Step V: Direct needle into joint
  - Step VI: Make sure patient is ok

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- How to Inject and Aspirate a Joint
  - Step I: Consent
  - Step II: Identify landmarks
  - Step III: Prep skin
  - Step IV: Anesthetize skin (if freezing spray available)
  - Step V: Direct needle into joint
  - Step VI: Make sure patient is ok
  - Step VII: Give post-care instructions

---

---

---

---

---

---

---

---

### Orthopaedic Injection and Aspiration Techniques

- How accurate are injections?
  - Shoulder 82% n=34
  - Elbow 100% n=31
  - Wrist 97% n=37
  - MCP 97% n=39
  - Knee 100% n=37 superior-lateral
  - Ankle 77% n=54

---

---

---

---

---

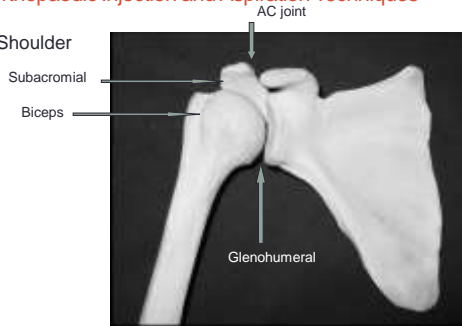
---

---

---

### Orthopaedic Injection and Aspiration Techniques

- Shoulder



---

---

---

---

---

---

---

---

### Subacromial bursa

- Bursa between acromion and rotator cuff
- Rotator cuff tendonitis
- Rotator cuff tears



---

---

---

---

---

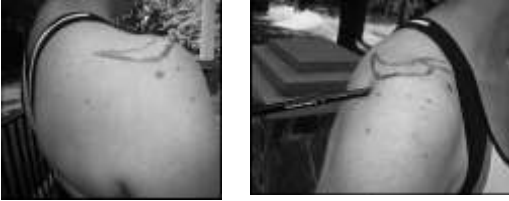
---

---

---

### Orthopaedic Injection and Aspiration Techniques

- Subacromial injection
  - Aim for anterior aspect of acromion
  - Posterior approach, 2 cm below posterior acromion
  - Spinal needle, 18 gauge



---

---

---

---

---

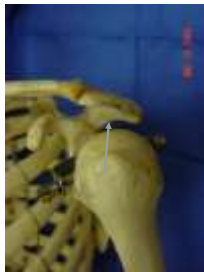
---

---

---

### Subacromial Bursa

- Lateral injection
  - just below lateral border of the acromion
  - no chance of getting into glenohumeral joint



---

---

---

---

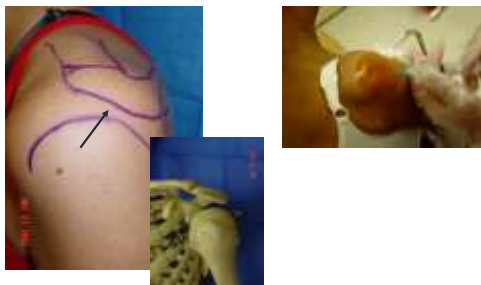
---

---

---

---

### Subacromial bursa - lateral



---

---

---

---

---

---

---

---

## Subacromial Bursa

- Posterior injection
  - may be easier to palpate landmarks
  - possible to be too medial and get into glenohumeral joint



---

---

---

---

---

---

---

---

## Subacromial bursa - posterior



---

---

---

---

---

---

---

---

## Glenohumeral joint

- Aspiration
  - sepsis
- Osteoarthritis
- Rheumatoid arthritis
  - 2-3 cm inferior
  - 1-2 cm medial
  - post-lat
  - acromion



---

---

---

---

---

---

---

---



### Orthopaedic Injection and Aspiration Techniques

- Glenohumeral injection
  - Pt supine
  - Externally rotate arm
  - Aim between humeral head and coracoid
  - Aim perpendicular to scapula



---

---

---

---

---

---

---

---

### Acromioclavicular joint

- Weight lifters
- A/C arthritis



---

---

---

---

---

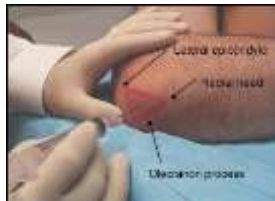
---

---

---

### Orthopaedic Injection and Aspiration Techniques

- Elbow injection
  - Find triangle if suspect intra-articular
  - Lateral elbow
  - Palpate bony prominences



---

---

---

---

---

---

---

---

### Elbow - lateral soft spot



---

---

---

---

---

---

---

---

### Elbow

- Radial Head Fractures
  - aspirate hematoma to allow early motion
- Inflammatory
  - RA
  - Crystalline
- Osteoarthritis



---

---

---

---

---

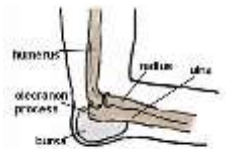
---

---

---

### Orthopaedic Injection and Aspiration Techniques

- Elbow injection
  - Just aspirate bursa if only olecranon bursitis



---

---

---

---

---

---

---

---

## Lateral Epicondylitis

- Tennis elbow
- Inflammation of the extensor origin
- Angiofibrodysplasia of the ECRB tendon



---

---

---

---

---

---

---

---

## Lateral epicondylitis



---

---

---

---

---

---

---

---

## Wrist

- Not often necessary
- Dorsal impingement
- 1 cm distal to Lister's tubercle
- Ganglia
  - near 100% recurrence after aspiration and/or injection



---

---

---

---

---

---

---

---

## Ulnocarpal joint

- TFCC injuries
- Ulnar impaction
- Synovitis



---

---

---

---

---

---

---

---

## Hand

- Carpal tunnel
- Dequervain's tenosynovitis
- Trigger digits
- CMC joint thumb
- Small joints

---

---

---

---

---

---

---

---

## Carpal Tunnel

- Median nerve and finger flexor tendons
- Curative in early or mild cases
- Diagnostic
- Beneficial during pregnancy or hypothyroidism



---

---

---

---

---

---

---

---

### Carpal Tunnel

- Median nerve lays directly below PL
- Start at wrist crease
- Ulnar to PL tendon
- Angle down at 45° and slightly radial



---

---

---

---

---

---

---

---

### DeQuervain's

- 1st extensor compartment tendonitis
- APL & EPB tendons



---

---

---

---

---

---

---

---

### DeQuervain's

- Ulnar deviate wrist
- Tendons palpable
- Start just distal to radial styloid
- Follow direction of tendons



---

---

---

---

---

---

---

---

### Stenosing tenosynovitis

- Trigger digits
- Swelling and inflammation at A1 pulley



---

---

---

---

---

---

---

---

### Trigger digits

- Start at MP flexion crease
- in the midline
- angle proximal at 30°



---

---

---

---

---

---

---

---

### Thumb CMC

- Osteoarthritis
- TB syringe



---

---

---

---

---

---

---

---

## Small joints

- MP joints for isolated synovitis
  - adjacent to extensor tendon
- PIP's rarely
- DIP's never



---

---

---

---

---

---

---

---

## Orthopaedic Injection and Aspiration Techniques

- Wrist
  - Dorsal approach
    - Between EPL and EDC



---

---

---

---

---

---

---

---

## Lower extremity

- SI joint
- Hip
- Knee
- Ankle
- Plantar fascia

---

---

---

---

---

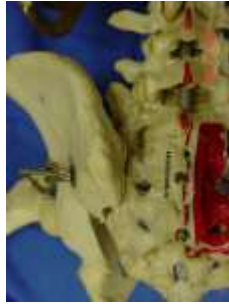
---

---

---

### Sacroiliac joint

- Inject for sacroiliitis, ankylosing spondylitis
- Difficult to get into
- CT guided injection to confirm location



---

---

---

---

---

---

---

---

### Hip

- Aspirate to R/O sepsis
- Injection rarely indicated
- Has to be done under fluoroscopy



---

---

---

---

---

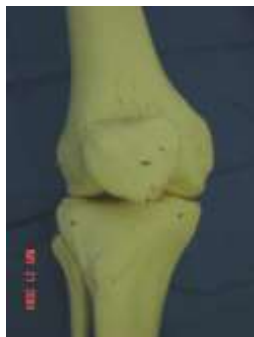
---

---

---

### Knee

- Evacuate effusions
- Aspirate for cells, labs
- Inject for osteoarthritis
  - corticosteroids
  - visco supplementation
- Inject for rheumatoid arthritis



---

---

---

---

---

---

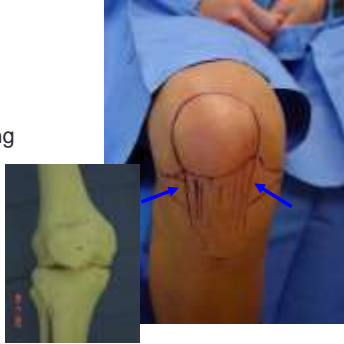
---

---



### Knee

- Inferolateral or medial
- Best for injecting



---

---

---

---

---

---

---

---

### Knee - superolateral

- Easier for aspiration
- 16 g needle
- Press effusion out



---

---

---

---

---

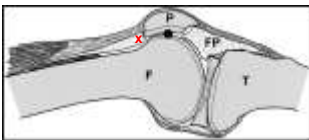
---

---

---

### Orthopaedic Injection and Aspiration Techniques

- Knee injection landmarks



---

---

---

---

---

---

---

---

### Orthopaedic Injection and Aspiration Techniques

• Which is best?

	Total	Extra-articular	Intra-articular	Accuracy
Anterolateral	80	23	57	71%
Anteromedial	80	20	60	75%
Superolateral	80	6	74	93%

Jackson JBJS 2002

---

---

---

---

---

---

---

---

### Orthopaedic Injection and Aspiration Techniques

• Aim above the patella



---

---

---

---

---

---

---

---

### Ankle

- Synovitis
- Lateral impingement



---

---

---

---

---

---

---

---

### Orthopaedic Injection and Aspiration Techniques

- Ankle
- HAND
  - Hallucis
  - Artery
  - Nerve
  - Digitorum
- Stay medial to EHL



---

---

---

---

---

---

---

---

### Ankle

- Medial to Tib-Ant tendon
- Lateral soft spot



---

---

---

---

---

---

---

---

### Heel Spurs

- Plantar fasciitis
- Originates on calcaneal tuberosity
- Supports arch



---

---

---

---

---

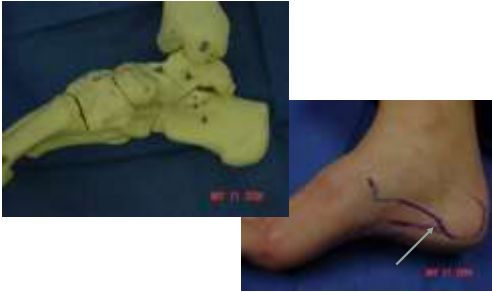
---

---

---

---

Plantar fasciitis



---

---

---

---

---

---

---

---

---

Orthopaedic Injection and Aspiration Techniques

---

---

---

---

---

---

---

---

---

Orthopaedic Injection and Aspiration Techniques

- A

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- A

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- A

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- A

---

---

---

---

---

---

---

---



Orthopaedic Injection and Aspiration Techniques

- A

---

---

---

---

---

---

---

---