Evidence Based Approach to Shoulder Injections

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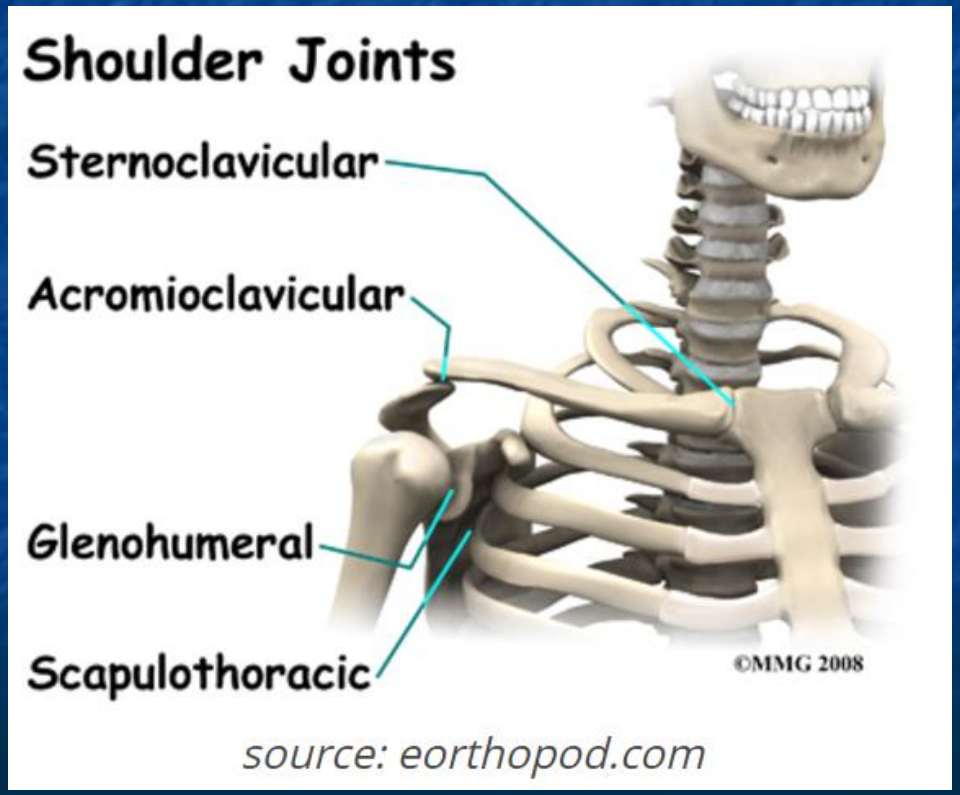
Objectives

- Relevant Anatomy
- Indications for injections
- Injection approaches
  - Evidence on best practices

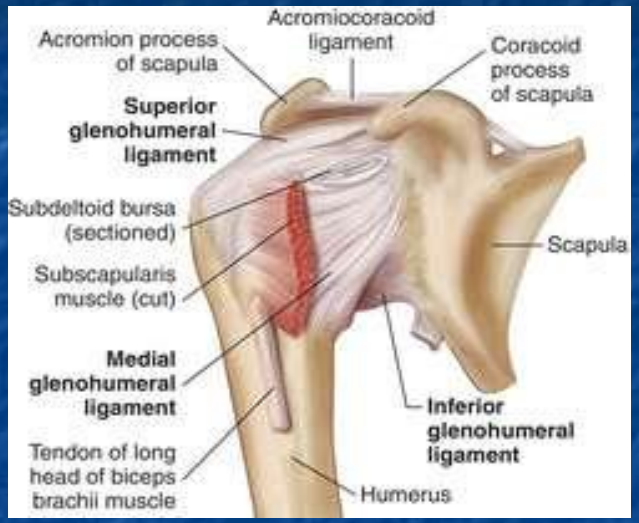
Anatomy

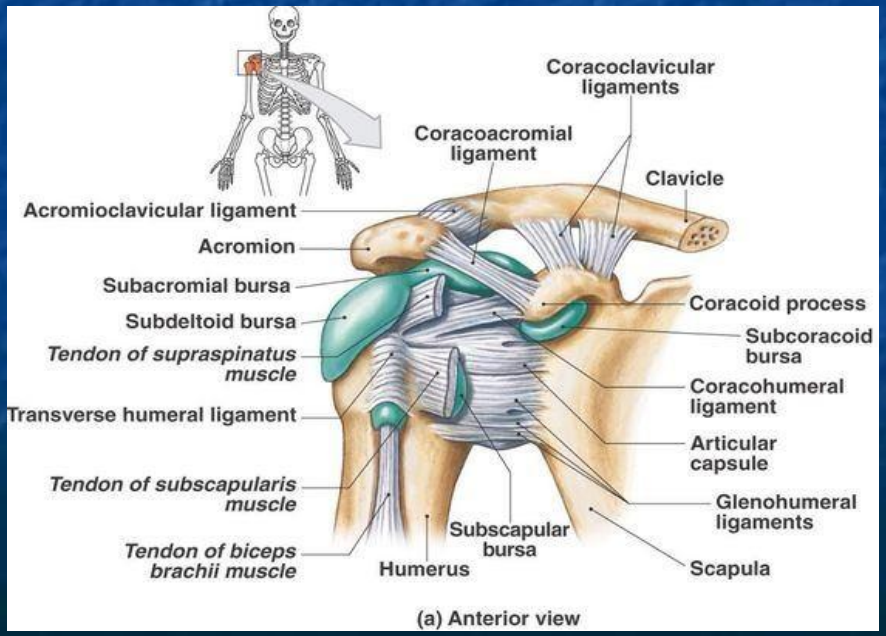
- Four Joints of the Shoulder
  - Sternoclavicular
  - Acromioclavicular
  - Glenohumeral
  - Scapulothoracic



Anatomy

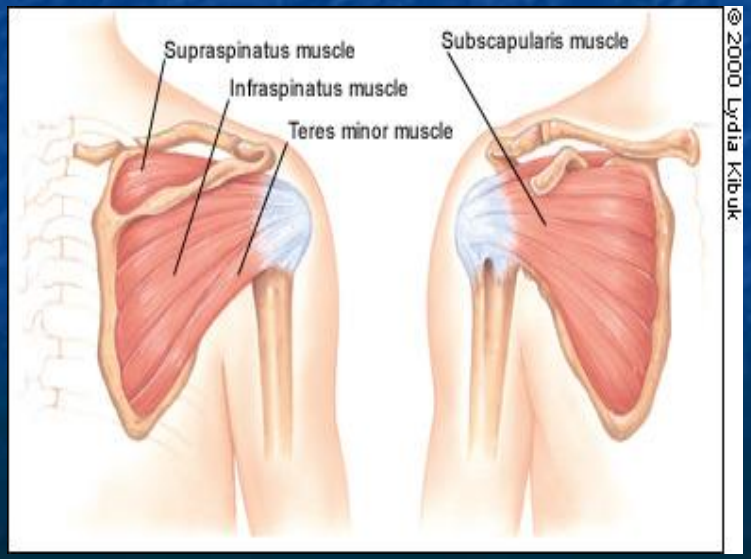
- Glenoid Capsule
  - Glenohumeral Ligaments:
    - Superior
    - Middle
    - Inferior
      - Anterior/posterior bands
  - Rotator Cuff Muscles
- Bursae
  - Subacromial
  - Subdeltoid
  - Subcoracoid
  - Subscapular



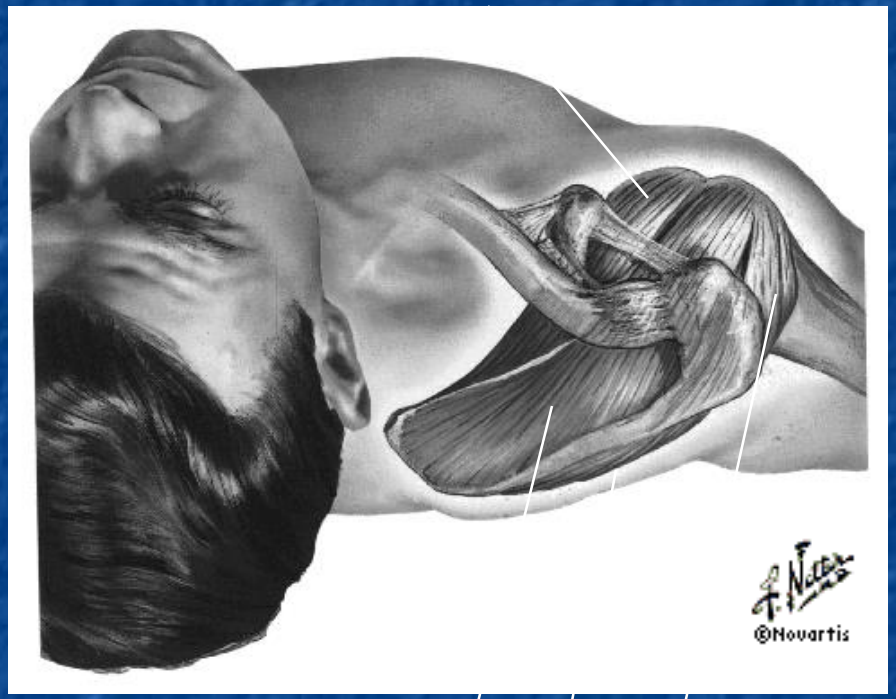


Anatomy

- Muscles/Tendons:
  - Rotator cuff (**SITS**)
  - Biceps/Triceps
  - Pectoralis
  - Trapezius/Rhomboids
  - Levator Scapulae/TM



Subscapularis



Supraspinatus

Infraspinatus

Teres Minor

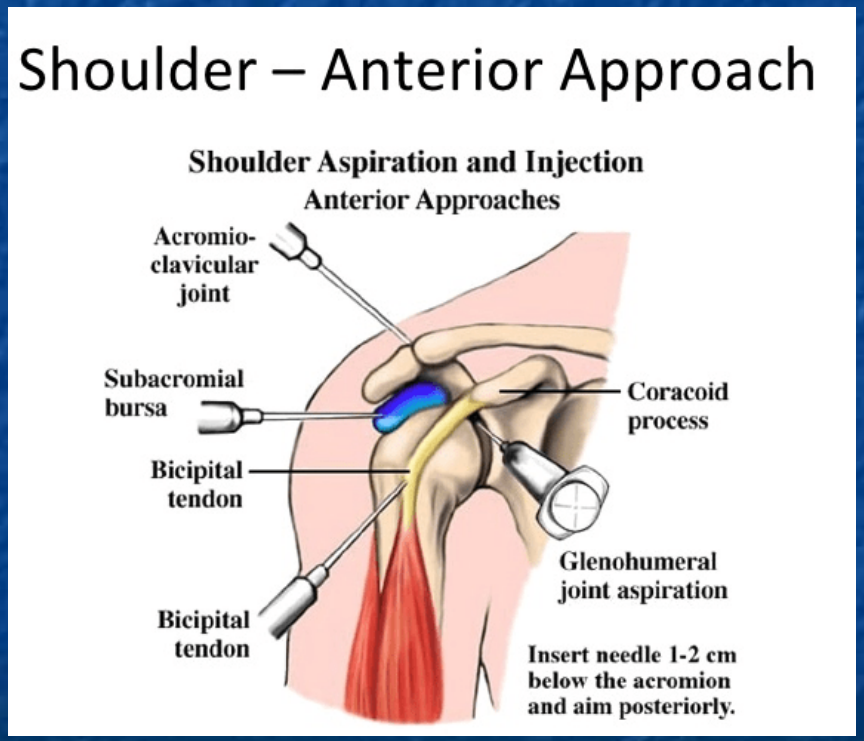
Injection Indications

- Biceps tenosynovitis/tendinosis
- AC joint pain/arthritis
- Rotator Cuff Pathology[1,2,5]
  - Impingement[2,8]
  - Excluding a Full thickness tear
- Bursitis
- Adhesive Capsulitis
- GH arthritis
- Labral pathology

Injection Materials

- Alcohol/Betadine/Chlorhexidine wipes
- Sterile/nonsterile gloves
- 25-30G, 0.5-1.0-inch needles for local skin anesthesia
- 22-25G, 1.5-inch needles for injections (may need 3.5-inch)
- 18-20G, 1.5-inch needles for aspirations (may need 3.5-inch)
- 1ml-10mL syringes for injection
- 3ml-60mL syringes for aspirations
- Local anesthetic
- Corticosteroid
- Hemostats
- Laboratory tubes (culture/fluid analysis from aspirations)
- Adhesive Band-Aids/dressing

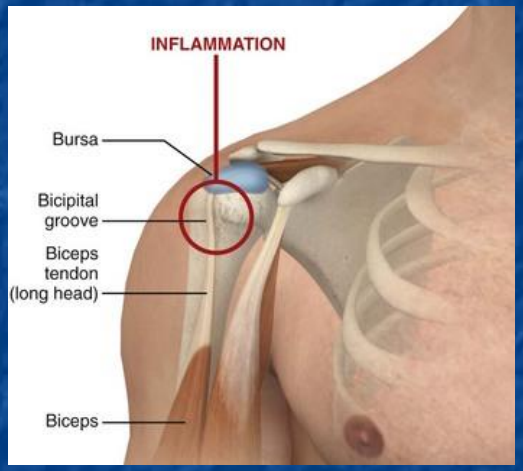
Anterior injection approaches



- Subacromial
- Glenohumeral
- Acromioclavicular
- Biceps tendon

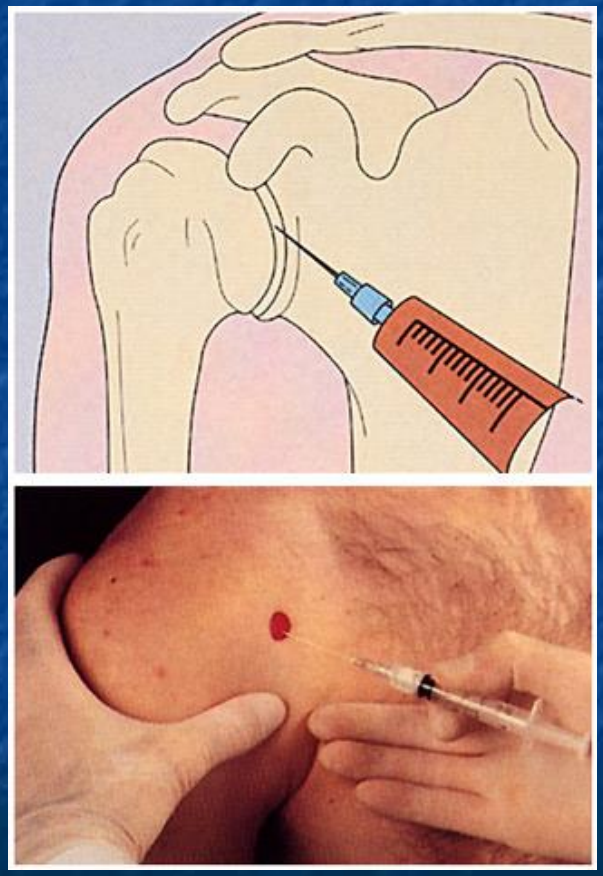
Subacromial Injection

- Recommend 22-25G needle, minimum 1 ½” Patient sitting with arm distracted by gravity
- Arm in 0° abduction, 20° external rotation
- Inferior anterior edge of acromion (depression immediately laterally to AC joint) and 1 cm inferior to the clavicle
- Needle aimed to posterior, cephalad and slightly lateral



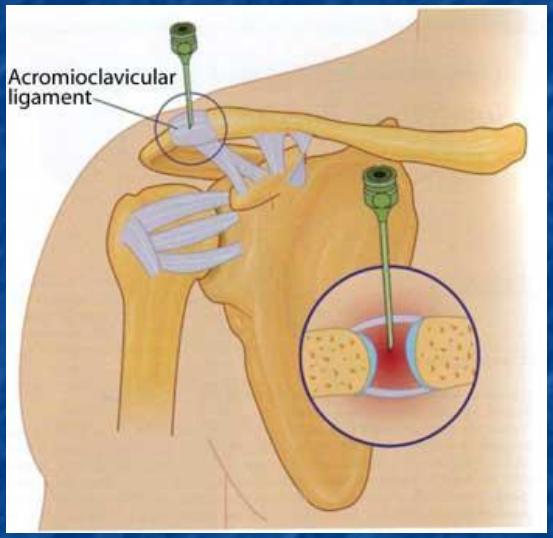
Glenohumeral joint injection

- Recommend 22-25G needle, minimum 1 ½” Patient sitting with arm distracted by gravity
- Scapula slightly retracted
- Palpate anterolateral corner of acromion and coracoid process to determine the midpoint[3]
  - approximately 2.5cm inferior to the AC joint

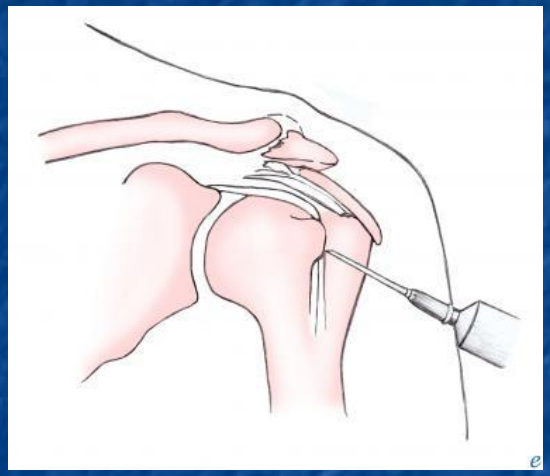


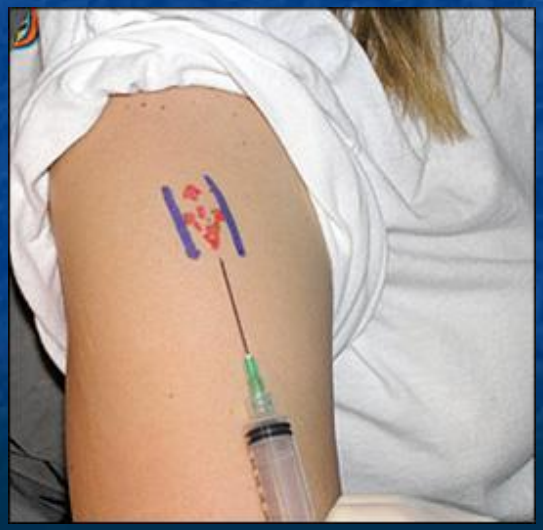
Acromioclavicular injection

- Recommend 22-25G needle, minimum 1 ½” Patient sitting with arm distracted by gravity
- Arm in 0° abduction
- Perpendicular to joint aiming for anterior aspect of joint
- Needle angled caudal and marched along bony surface until entering joint



Biceps tendon

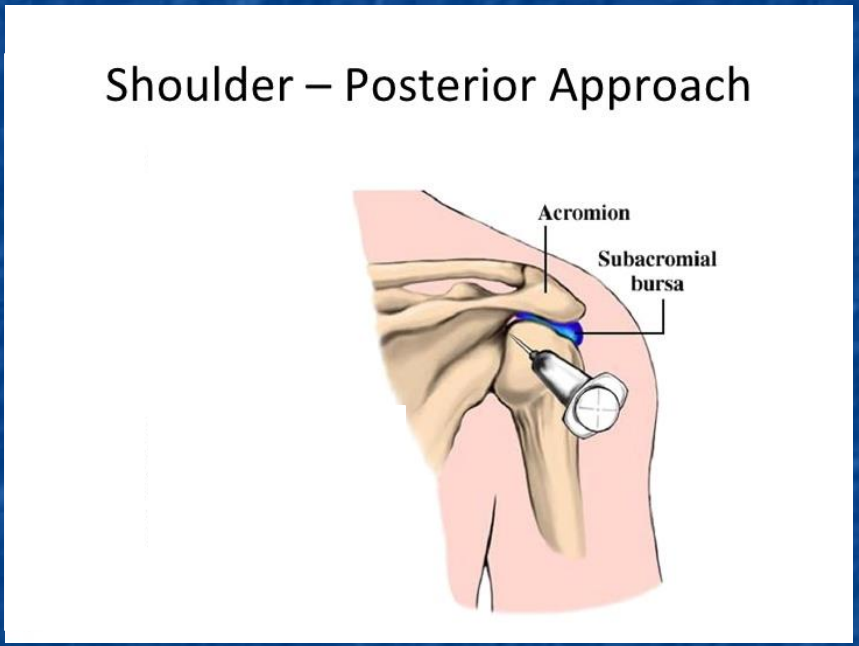




- Recommend 22-25G needle, minimum 1 ½” Patient sitting
- Arm in 0° abduction, elbow in full supination
- Bicipital grove
- Needle angled slightly cephalad and perpendicular into biceps tendon sheath surrounding tendon

Posterior approach injections

- Subacromial
- Glenohumeral

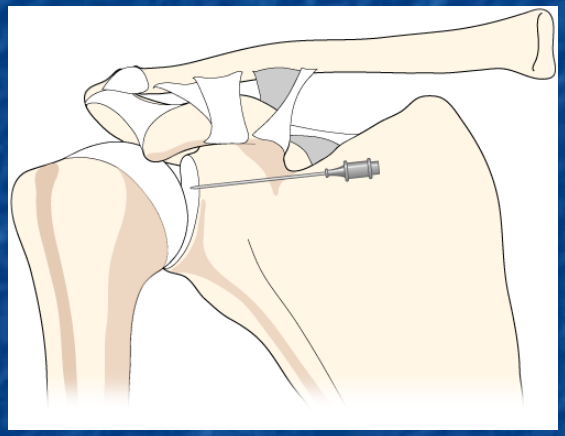


Subacromial

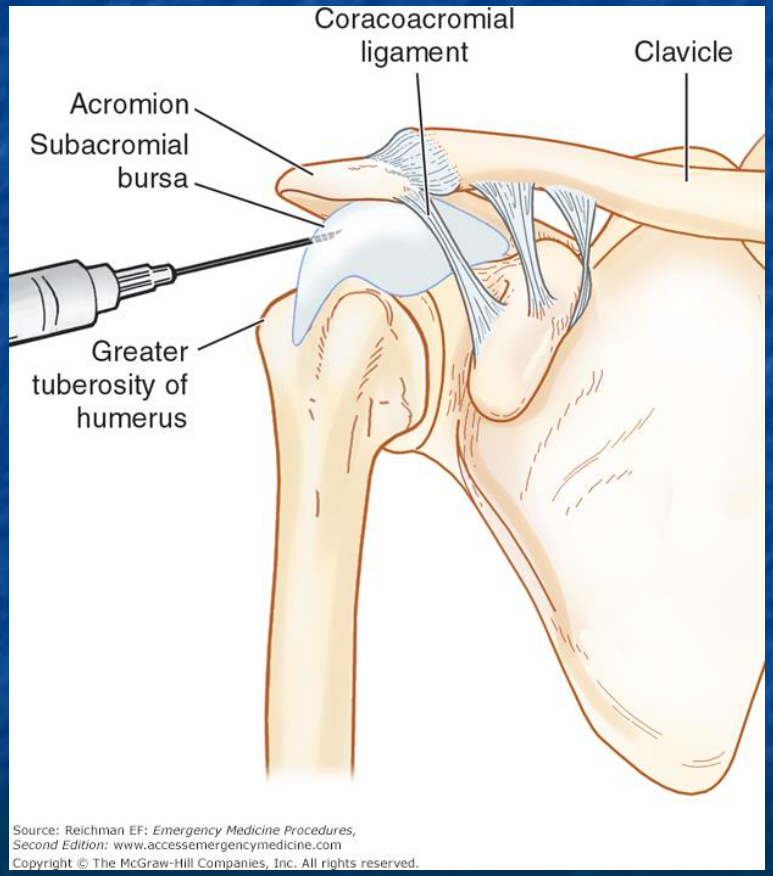
- Recommend 22-25G needle, minimum 1 ½” Patient sitting with arm distracted by gravity
- Arm in 0° abduction
- 1 cm inferior and medial to the postero-lateral corner of the acromion
- Needle angled cephalad along the undersurface of the acromion toward the anterior edge of the acromion

Glenohumeral

- Recommend 22-25G needle, minimum 1 ½” Patient sitting with arm distracted by gravity
- Arm in 0° abduction
- 1-2 cm inferior and medial to the postero-lateral corner of the acromion
- Needle angled toward the coracoid process



Lateral approach injections



Source: Reichman EF: *Emergency Medicine Procedures, Second Edition:* www.accessemergencymedicine.com
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Subacromial

- Recommend 22-25G needle, minimum 1 ½”
  Patient sitting with arm distracted by gravity
- Just inferior to the mid-lateral aspect of the acromion
- Needle slightly cephalad

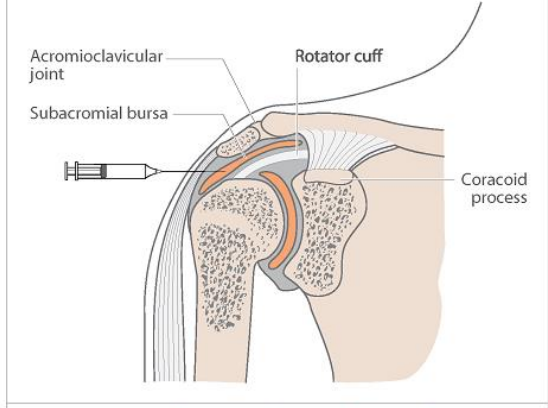

FIGURE 4. Lateral approach to subacromial injection.

Accuracy of subacromial injections

- For Bursitis
  - Anterior and Lateral routes are more accurate than Posterior Route
  - In women – posterior route least accurate method

Prospective, randomized control study

Injection Route	Accuracy
Posterior	56%
Anterior	84%
Lateral	92%
Overall	77%

Marder R, Kim S, Labson J, *et al*.

Accuracy of subacromial injections

- Impingement Syndrome
  - Anterior and posterior approaches had similar efficacy for pain reduction and functional improvement
    - Prospective, randomized control study

Ramappa A, Kempland W, Herder L, *et al*

Accuracy of subacromial injections

- Impingement Syndrome
  - Anterior, posterior, and lateral had an overall accuracy of 70%, with no difference in the portal.
    - Prospective, randomized control study

Kang M, Rizio L, Prybicien M, *et al*

Injection Route	Accuracy
Posterior	75%
Anterior	75%
Lateral	60%
Overall	70%

Accuracy of GH injection

- Modified Posterior Bone Touch Technique
  - 97% accuracy
  - Posterior approach with bone touch of humerus and ER 20degrees

Axe & Axe, 2013

Questions

References

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8. Rhon D. Boyles R, Cleland J. One-year Outcome of Subacromial Corticosteroid Injection Compared with Manual Physical Therapy on the Management of Unilateral Shoulder Impingement Syndrome. Ann Internal Med 2014; 161: 161-9.
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Workshop

- 12 models
- Practice injection techniques