Joint Injection Techniques

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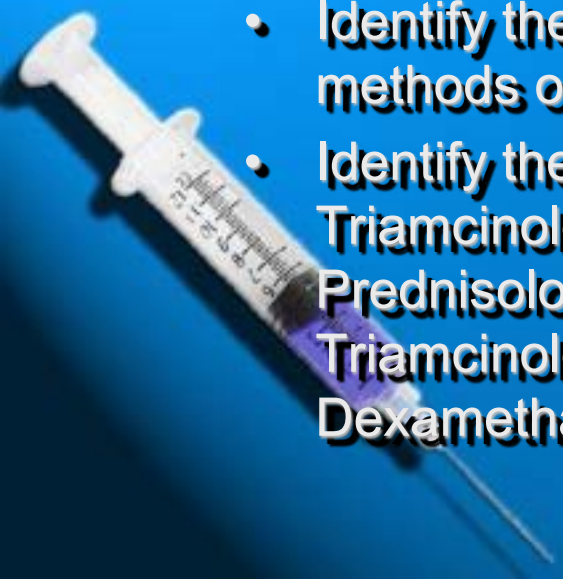
13 SEP 2023

Learning Objectives

- Describe the benefits, risks and the various types of local anesthesia used in joint injections.
- The degree and duration of the neural blockade and the proximity of the targeted nerves.
- Demonstrate the appropriate techniques and discuss when and where to use sympathomimetic agent such as epinephrine and the effects of its usage.
- Identify the unique anatomy of commonly injected joints and the methods of administration of local Corticosteroids injections.
- Identify the dosages for the following Corticosteroid injections: Triamcinolone hexacetonide, Triamcinolone acetonide, Prednisolone tebutate, Methlprednisolone acetate, Triamcinolone diacetate, Prednisolone acetate, Dexamethasone acetate.



General Principles

- Anatomical placement
- Local anesthetic blocks
- Corticosteroid injection vs visco-supplementation vs regenerative (PRP/stem cells/etc)
- Rest/restricted use
- Adjunctive physical therapy

Inject with caution

- Patellar tendon
- Achilles tendon
- Biceps tendon
- Infected joint

Materials

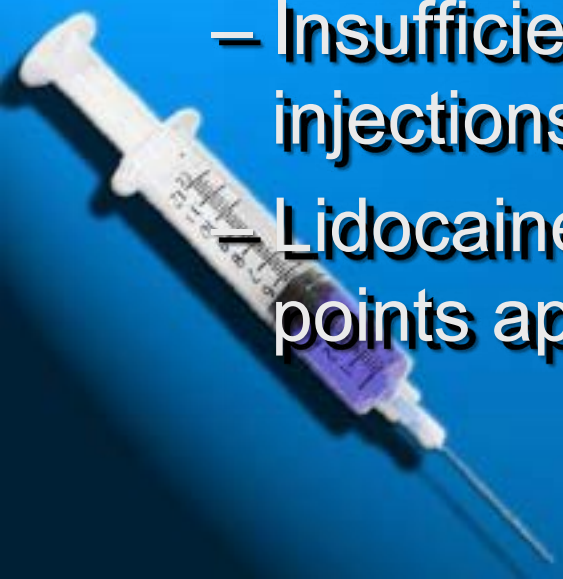
- Prep materials
  - Betadine, alcohol preps, chlorhexidine, chloraprep
- Anesthetic
  - Ethyl chloride
  - 1% lidocaine without epinephrine
- Steroid of choice
- Syringe

Materials

- Needles
- Medium hemostat
- Post-injection prep
  - Band-aids, 4 x 4 gauze, 1” tape, elastic wrap
- Epinephrine readily available

Benefits to injection

- Pain relief, improved function
  - Viscosupplementation--effective treatment for knee OA of the knee—improved pain, function and patient global assessment (Cochrane meta-analysis)
  - Insufficient evidence with corticosteroid injections (Cochrane database)
  - Lidocaine injection into myofascial trigger points appears effective (Cochrane database)

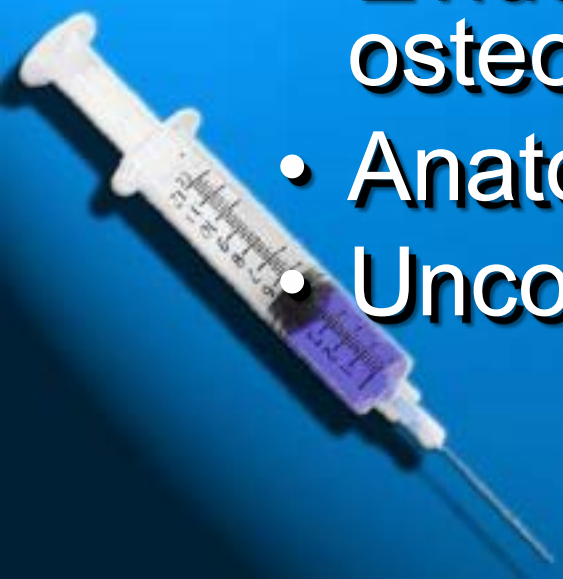


Absolute Contraindications

- Local cellulitis
- Joint prosthesis
- Septic arthritis
- Bacteremia
- Acute fracture
- History of allergy or anaphylaxis to injectable pharmaceuticals or constituents

Relative contraindications

- Minimal relief after two previous corticosteroid injections
- Underlying coagulopathy
- Anticoagulation therapy
- Evidence of surrounding joint osteoporosis
- Anatomically inaccessible joints
- Uncontrolled diabetes mellitus



Side Effects

All patients should be warned about:

- 30%--soreness or pain after injection (2-3 days, ice, Tylenol)
- 10%--inflammatory flare reaction (2-3 days, ice, narcotics)
- 30%--fat or skin atrophy (90% revert to normal in 6-12 months)
- Reevaluate if redness, swelling, and pain beyond 3-4 days (infection risk < 1:10,000)

Side Effects

Remember these complications also:

- Tendon rupture (if injected into the tendon)
- Damage to the cartilage after repeated injection
- Can cause a crystalline arthritis

Synovial Fluid

- Can't be aspirated from a healthy joint
- Often holds key to diagnosis
- Normally, fluid is transparent, doesn't contain large proteins or clot
- Send fluid for analysis, cultures, protein, cell count, and crystals

Synovial Fluid Analysis

Parameter	Normal	Noninflammatory	Inflammatory	Septic
Clarity	Transparent	Transparent	Translucent to opaque	**Opaque**
Color	Clear	Yellow	Yellow to green	Yellow to green
Viscosity	High	High	Low	Variable
WBC/mm^3	<200	200-2,000	**2,000-150,000**	**15,000-200,000**
Polys	<25%	<25%	**>50%**	**>75%**
Culture	Negative	Negative	Negative	**Usually Positive**
Protein (gm/dl)	<2.5	<2.5	**>2.5**	**>2.5**

Common Injectable Corticosteroids

Medication	Potency	Onset	Duration
Hydrocortisone (cortisol)	1	Fast	Short
Prednisolone terbutate (Hydeltra)	4	Fast	Intermediate
Methylprednisolone acetate (Depo-Medrol)	4	Slow	Intermediate
Triamcinolone acetonide (Kenalog)	5	Moderate	Intermediate
Triamcinolone hexacetonide (Aristospan)	5	Moderate	Intermediate
Betamethasone (Celestone)	25	Fast	Long
Dexamethasone sodium phosphate (Decadron)	25	Fast	Long

Usual Doses of Methylprednisolone or Equivalent by Site

Dose	Anatomic site
5 to 10 mg	Phalangeal joints
20 to 30 mg	Wrist
20 to 30 mg	Elbow and ankle
40 to 80 mg	Shoulder, hip, or knee

Common Injection Sites

- Shoulders
- Elbow
- Hand and wrist
- Hip
- Knee
- Foot and ankle
- Trigger points

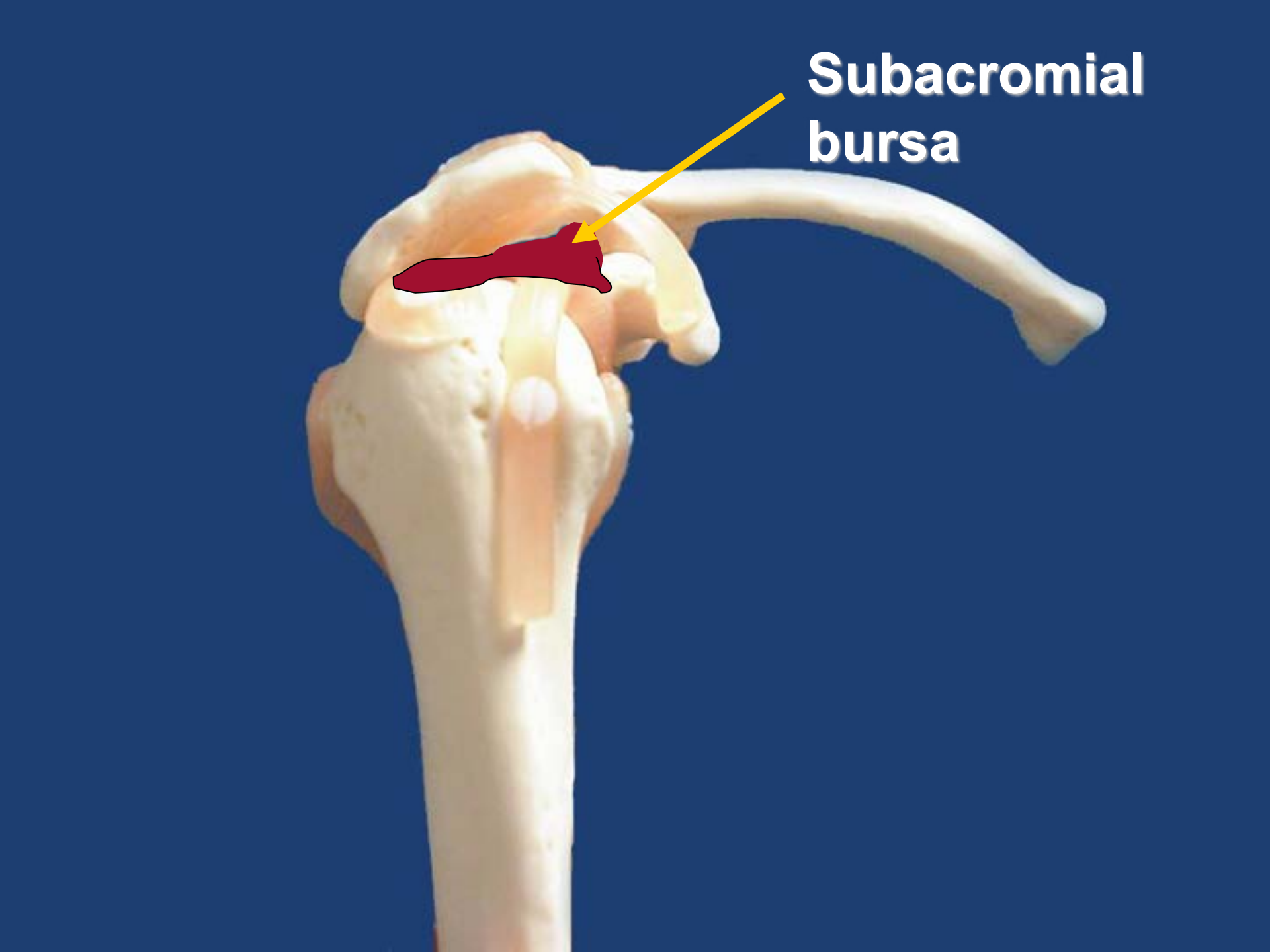
Shoulder

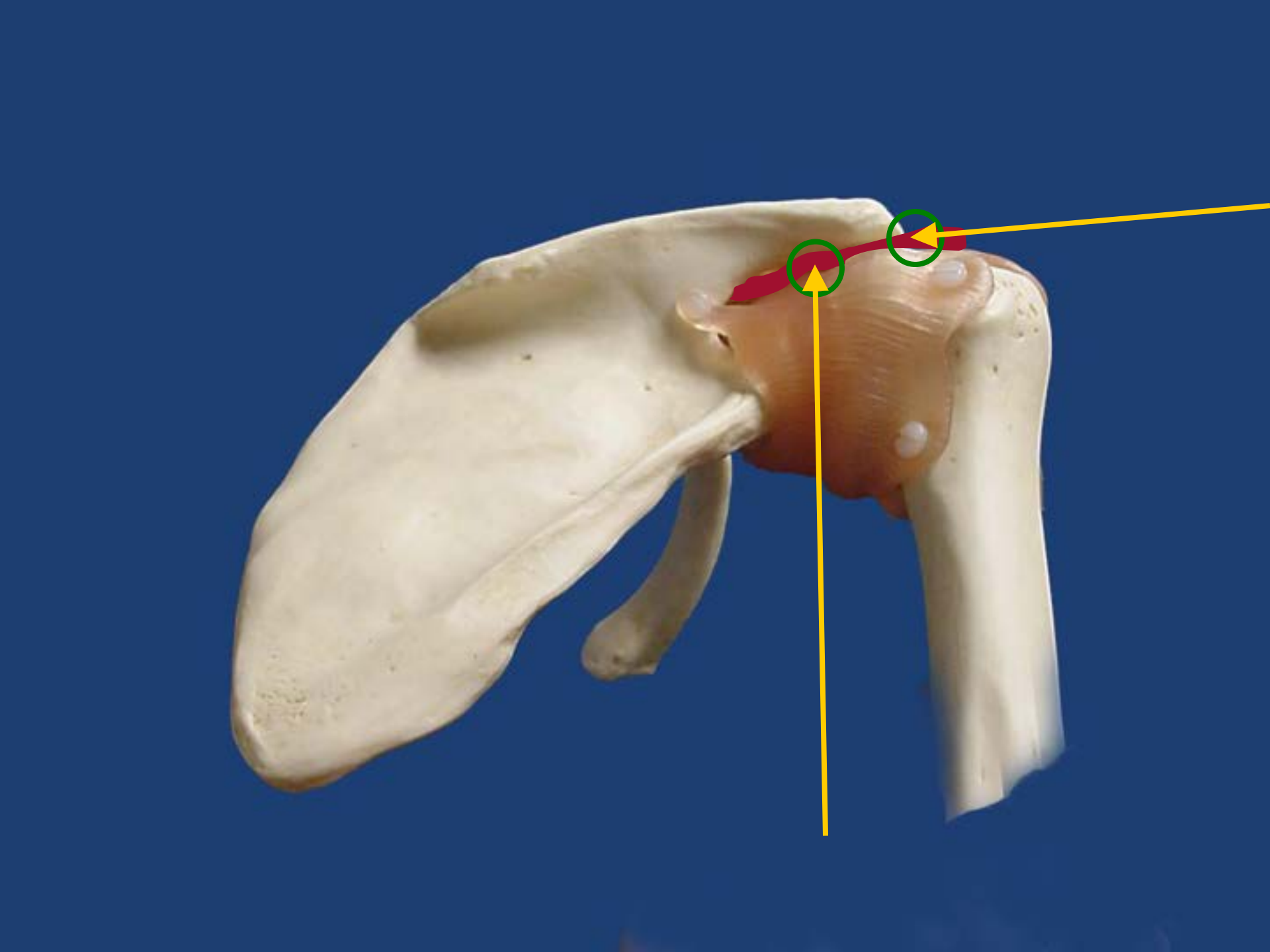
Three locations

- Subacromial/subdeltoid bursa
  - Impingement, rotator cuff tear
- Acromioclavicular joint
  - osteoarthritis
- Glenohumeral joint

Subacromial Bursa

- Palpate the acromion and posterior humeral head
- Use 1.5” 25 gauge needle, instilling 10 cc of steroid/anesthetic combo
- Enter posteriorly aiming toward the coracoid process anteriorly
- Enter laterally, pulling down on the arm to open the joint up, aiming slightly upward under the acromion

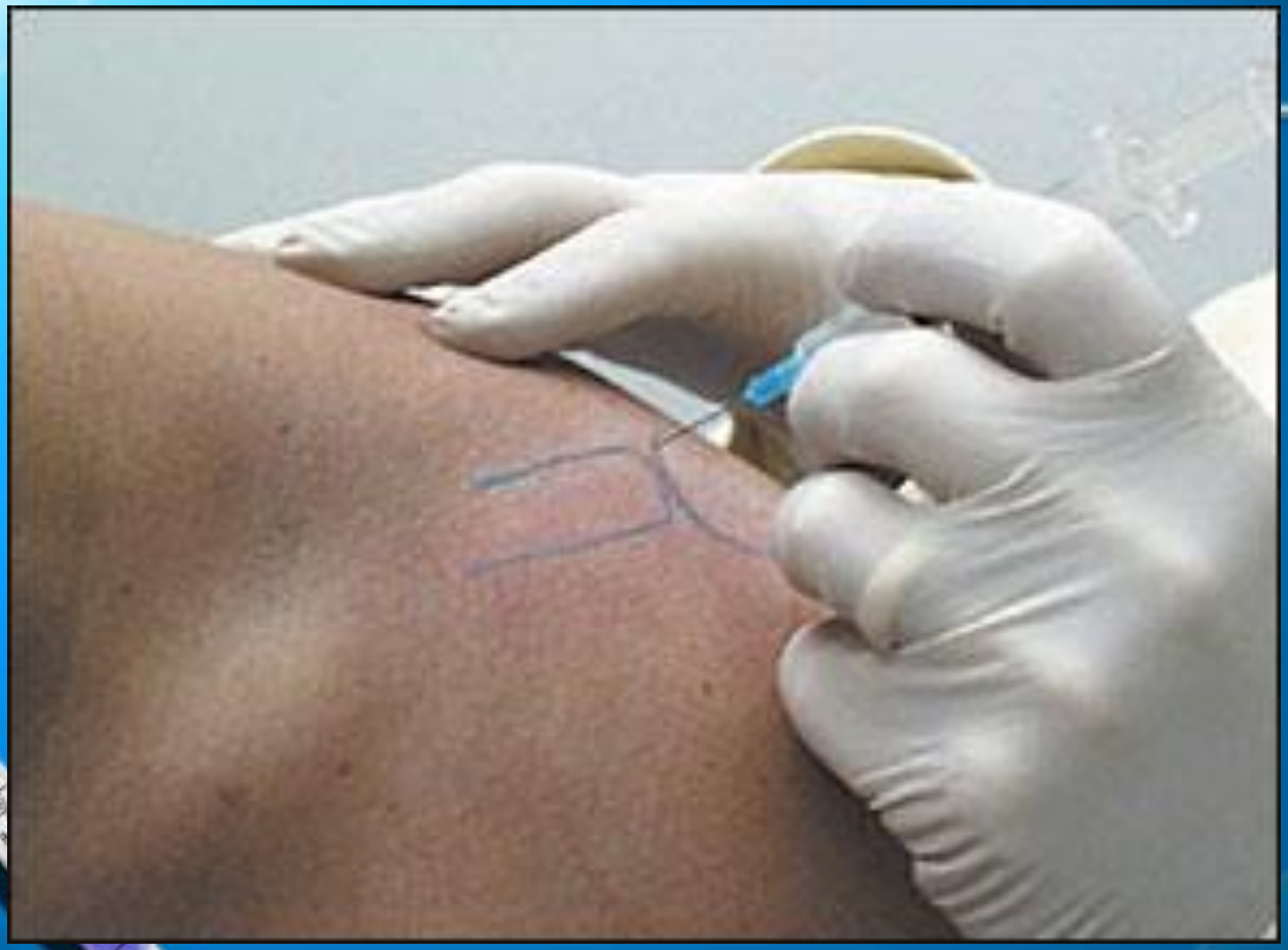

Subacromial
bursa



LATERAL APPROACH SUBACROMIAL

Acromioclavicular Joint

- Palpate distal edge of clavicle, proceed until you feel a bump (this is the joint)
- Insert 1” 25 gauge needle from posterior surface, angle medially (will feel needle slip into place)
- Use small volume, 2-5 ml of steroid-anesthetic combination



Elbow

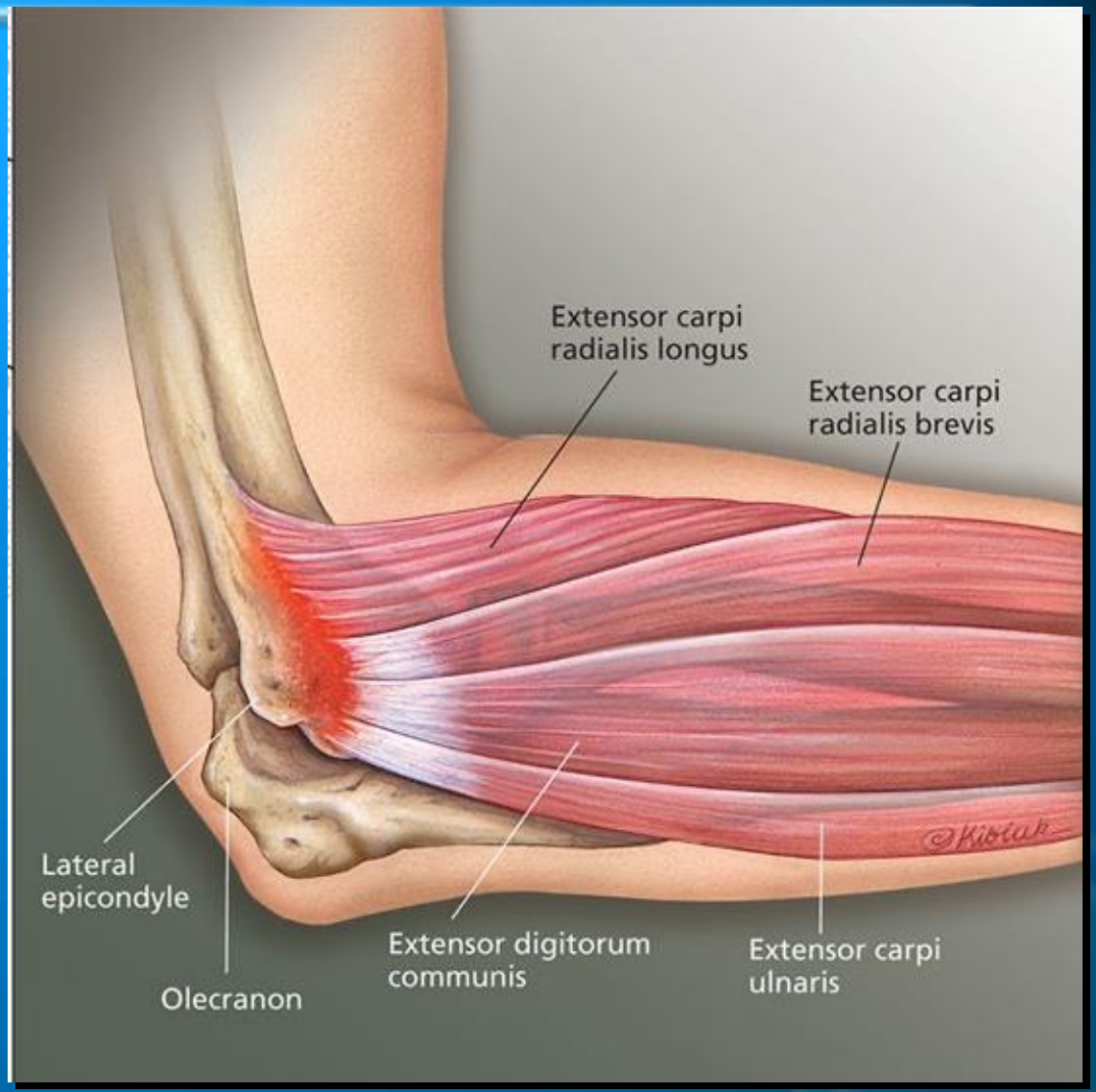
Common reasons for injection/aspiration of the elbow:

- Lateral/medial epicondylitis
- Olecranon bursitis
- Degenerative arthritis

Epicondylitis

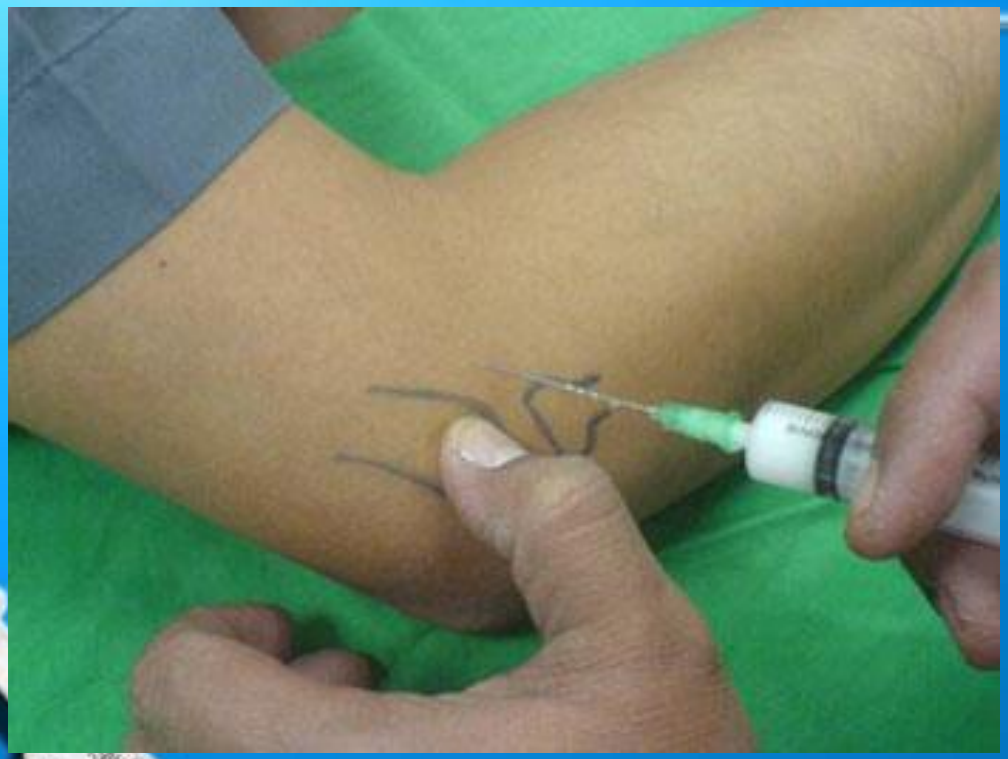
- Locate most tender area. Insert 1.5” 25 gauge needle at 90º angle, go down to the periosteum and begin injecting into it (key to a good response), withdraw slightly and complete infiltration
- Be careful to not infiltrate the ulnar or radial nerve
- Massage medication into the region to disperse
- Rest for 7-10 days

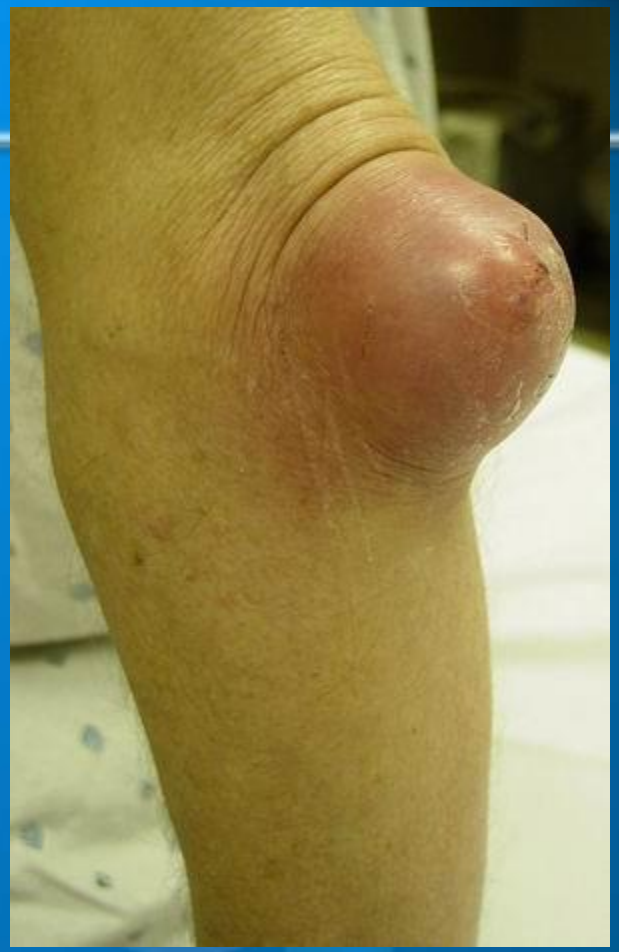
LATERAL EPICONDYLE



Olecranon Bursitis

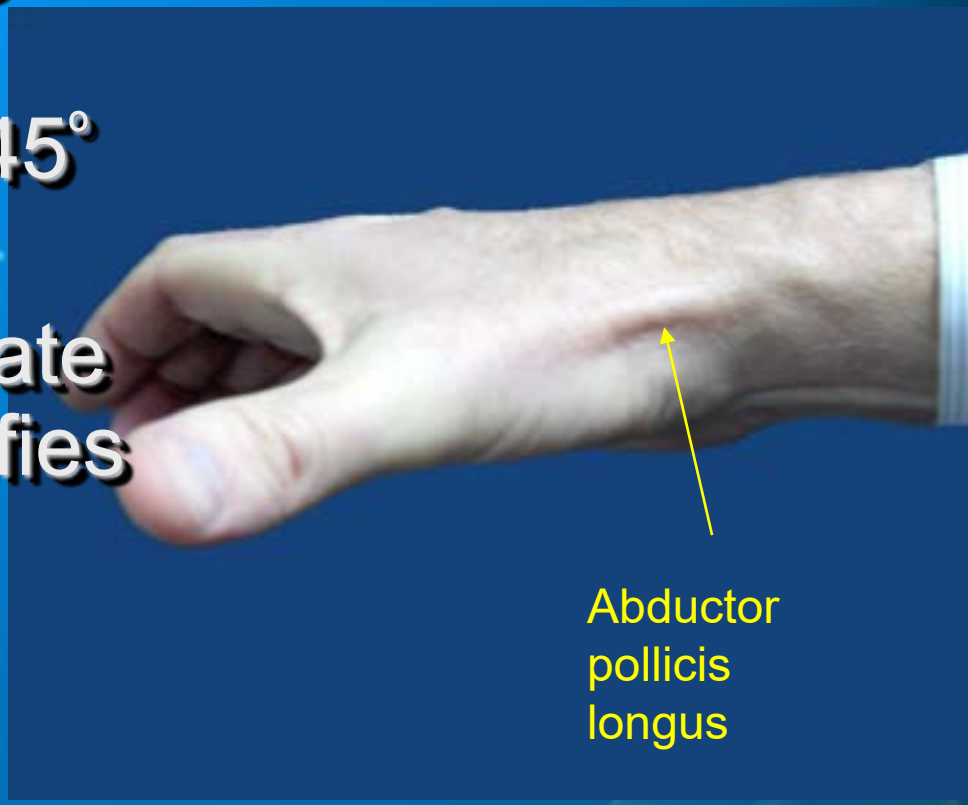
- Elbow 90º of flexion, insert the needle from the back of the elbow, parallel to ulna posterior
- Use larger needle (20 or 22 gauge)
- If fluid is clear, then may use steroids; but if slightly cloudy, don't





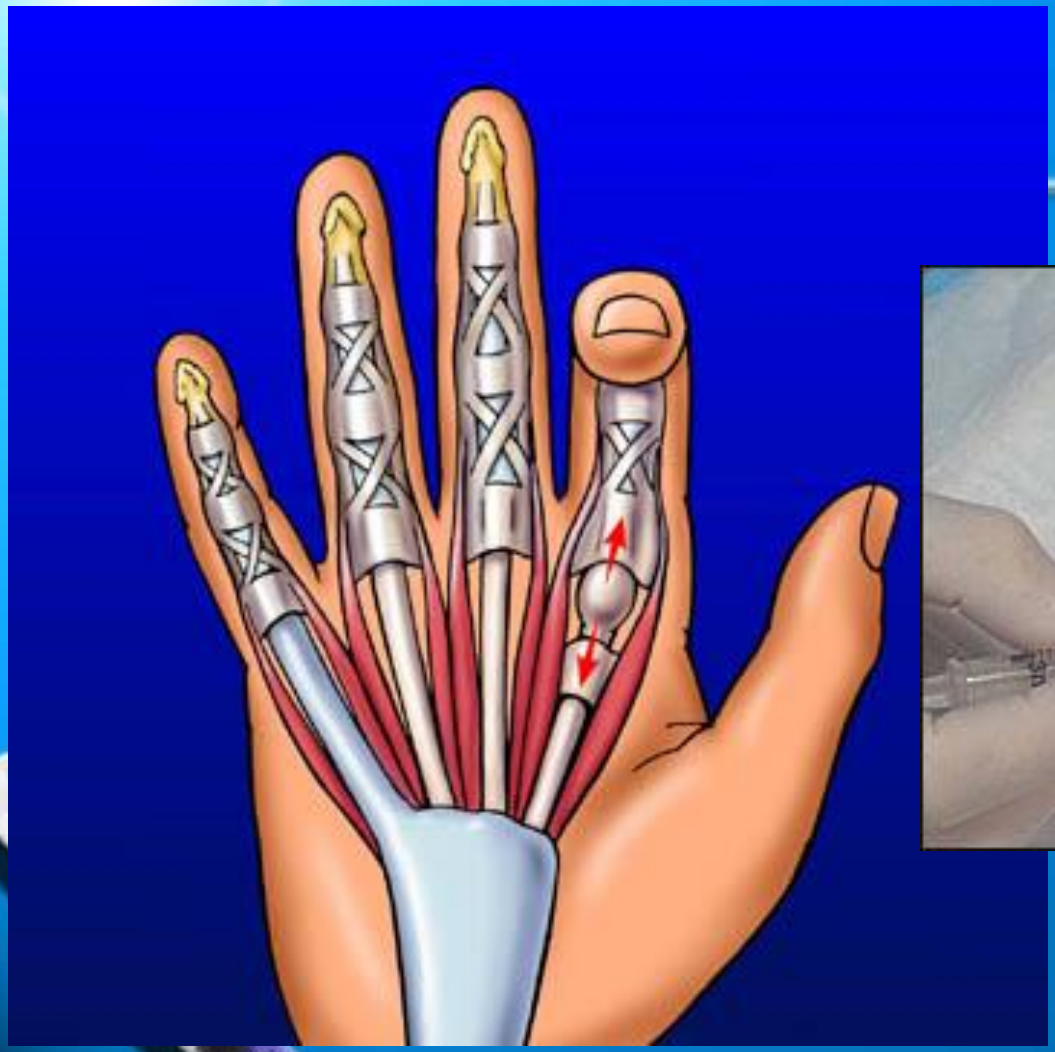
DeQuervain's Tenosynovitis

- Insert 1" 25 gauge needle over the tendon sheath at 45° angle
- Should balloon/dilate as infiltrates, signifies medication is in sheath



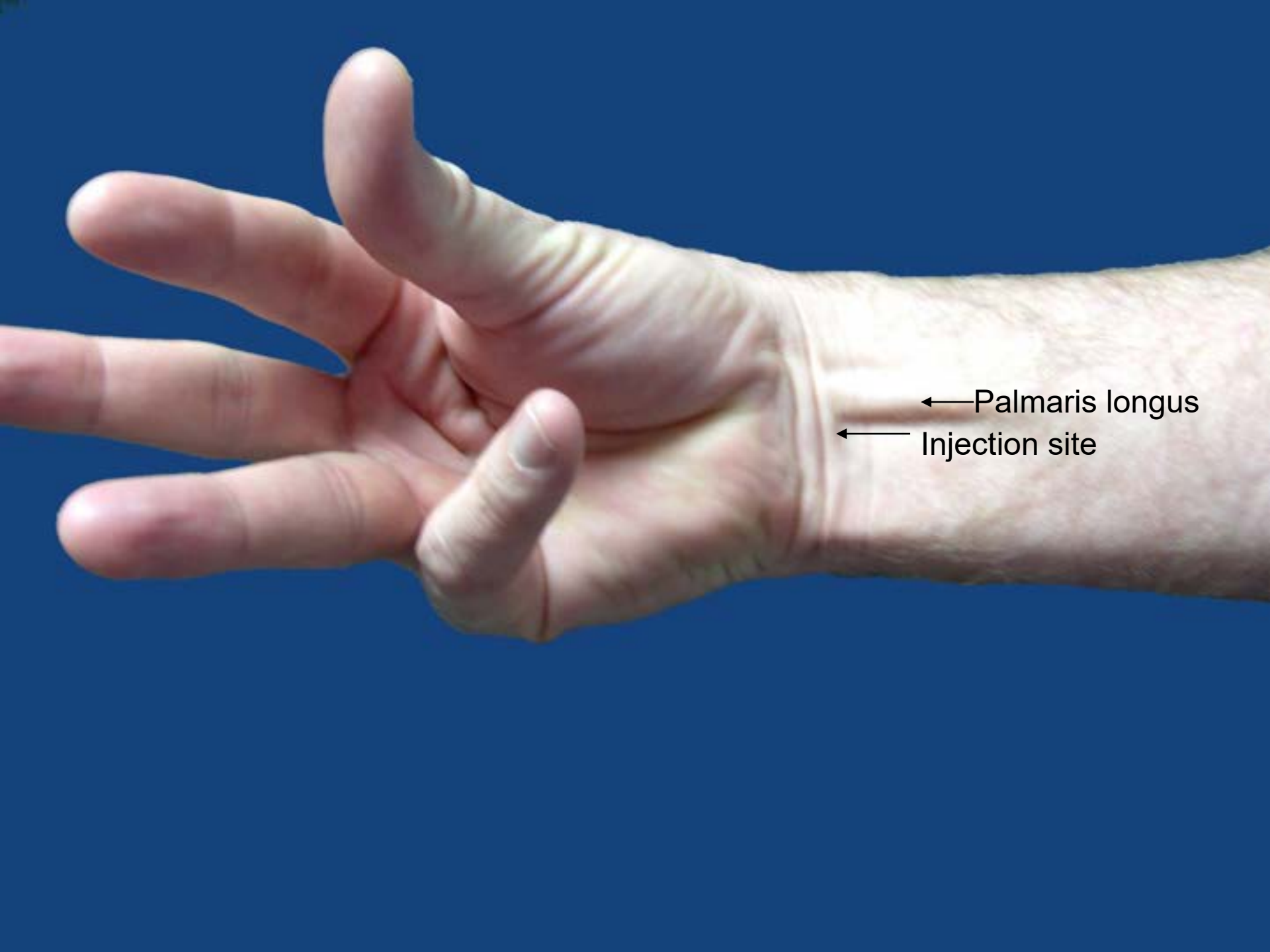
Trigger Finger

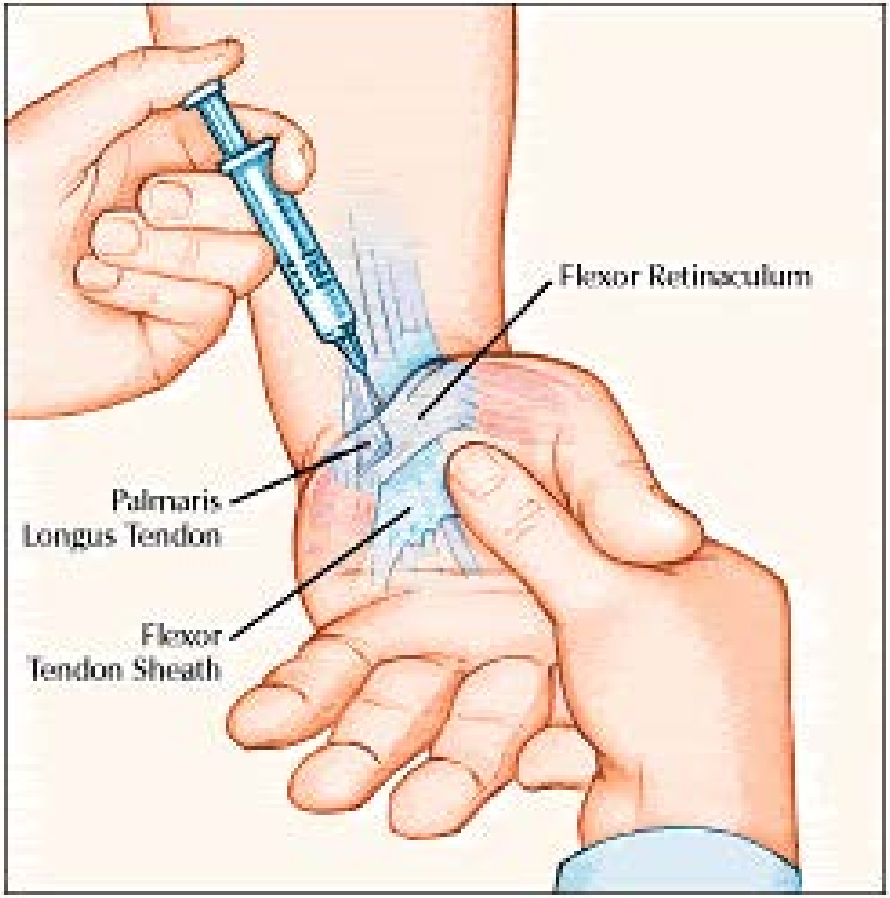
- Locate nodule by palpating tendon at junction of A-1 pulley, distal to the distal palmar crease
- Tendon is very superficial (2-3 mm) deep
- Inject on top/volar surface of flexor tendon
- 50% resolve within days

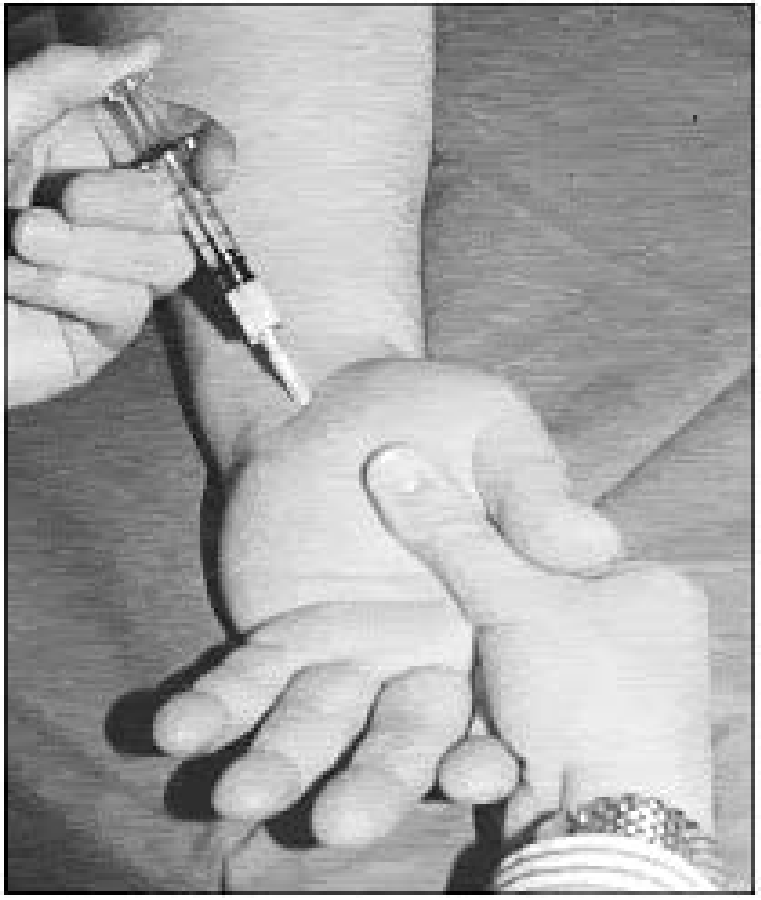


Carpal Tunnel Syndrome

- Locate palmaris longus tendon at proximal crease of wrist
- Median nerve is directly under tendon
- Insert 1.5” 25 gauge needle just ulnar to tendon using 45º angle, aiming distally
- Begin injecting when 1” deep
- If feels pain or tingling, need to reposition needle


Palmaris longus
Injection site

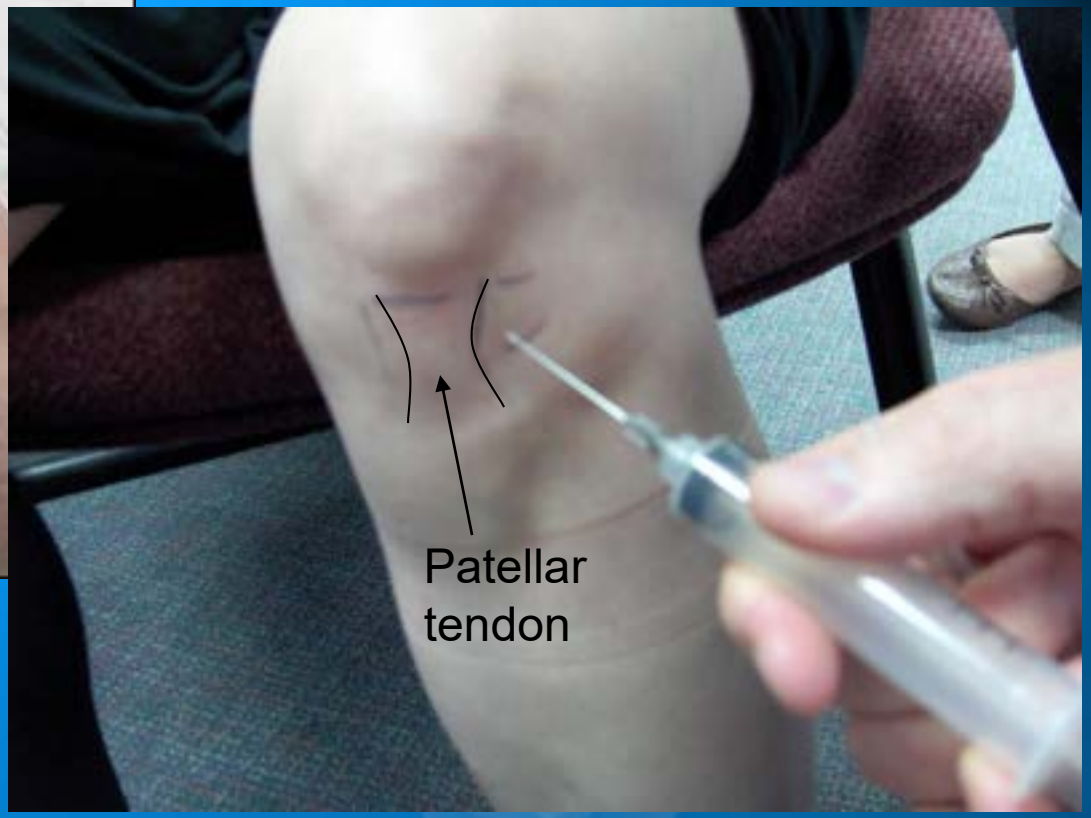

Flexor Retinaculum
Palmaris
Longus Tendon
Flexor
Tendon Sheath

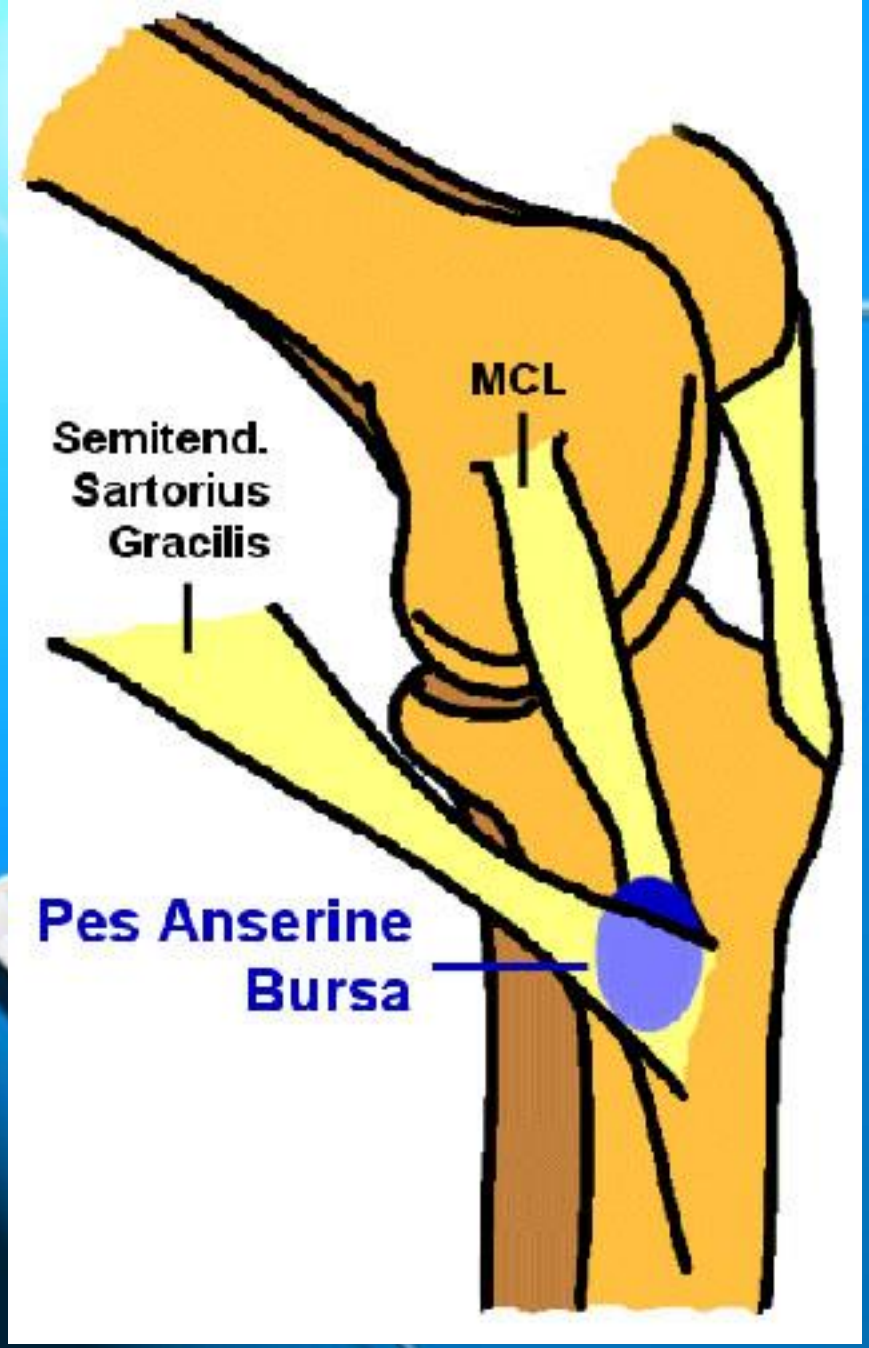


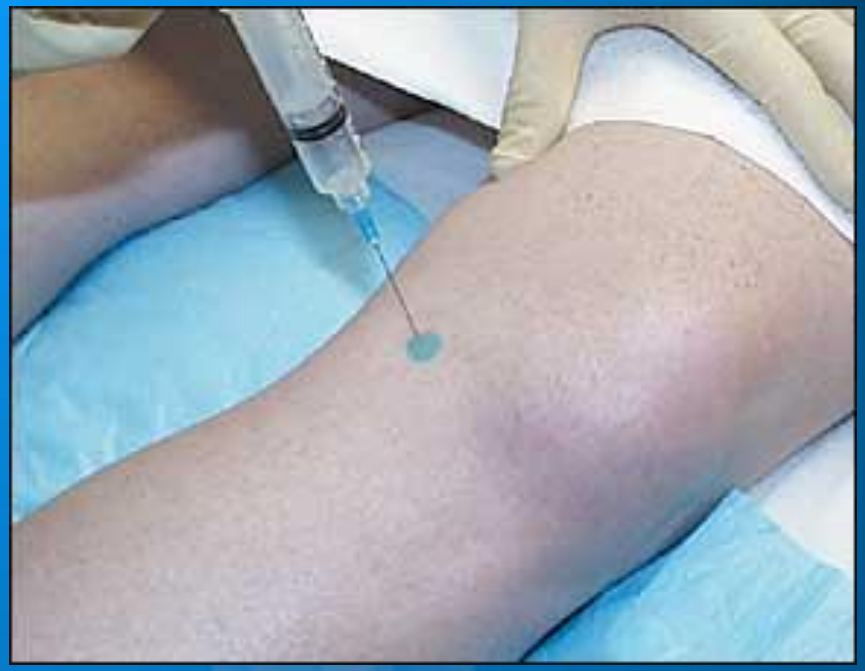
Knee
Two Common Methods

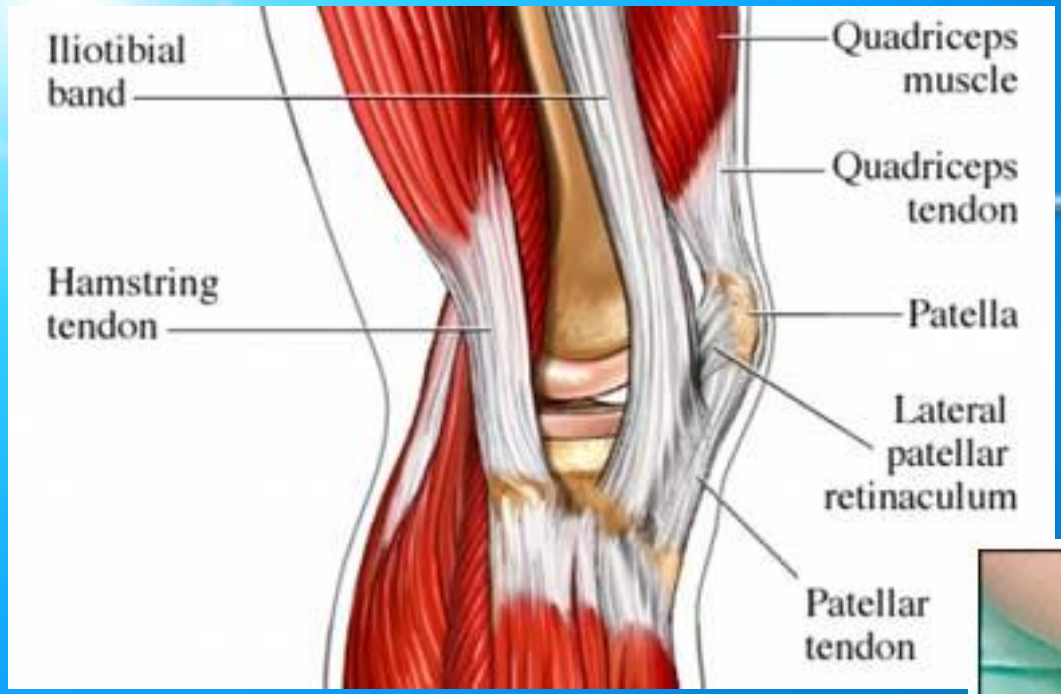
- Knee extended
  - Palpate superior pole of patella
  - Insert needle laterally/medially just deep to patella into suprapatellar pouch
- Knee flexed
  - Insert needle at the level of inferior pole, lateral/medial to the patellar ligament into intercondylar notch
- Aspiration = 18-20 gauge 1.5”

Injection = 22 gauge 1.5” needle


Patellar
tendon


MCL
Semitend.
Sartorius
Gracilis
Pes Anserine
Bursa

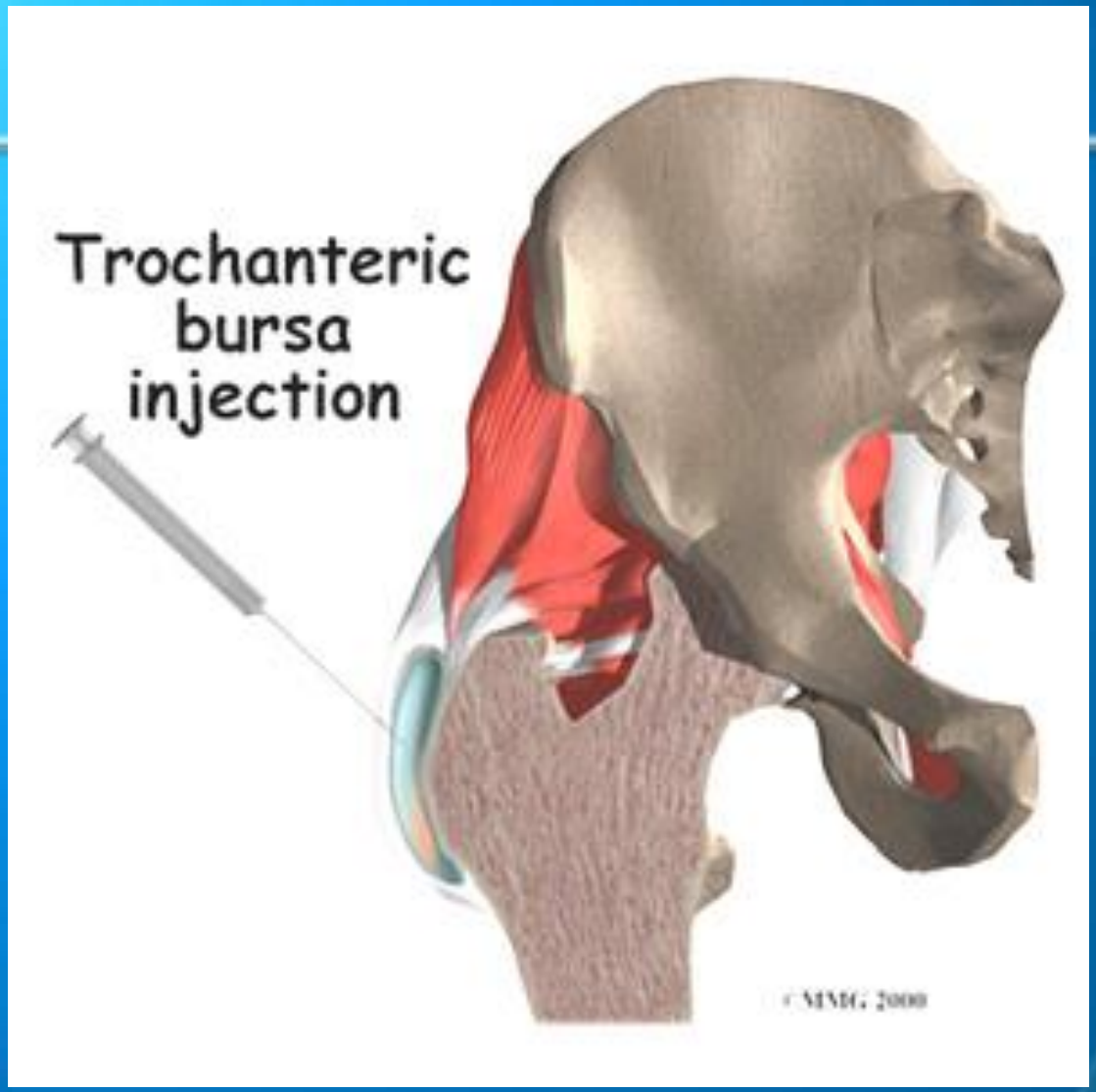



Iliotibial band
Quadriceps muscle
Quadriceps tendon
Hamstring tendon
Patella
Lateral patellar retinaculum
Patellar tendon


Femoral condyle
Gerdy's tubercle

Hip

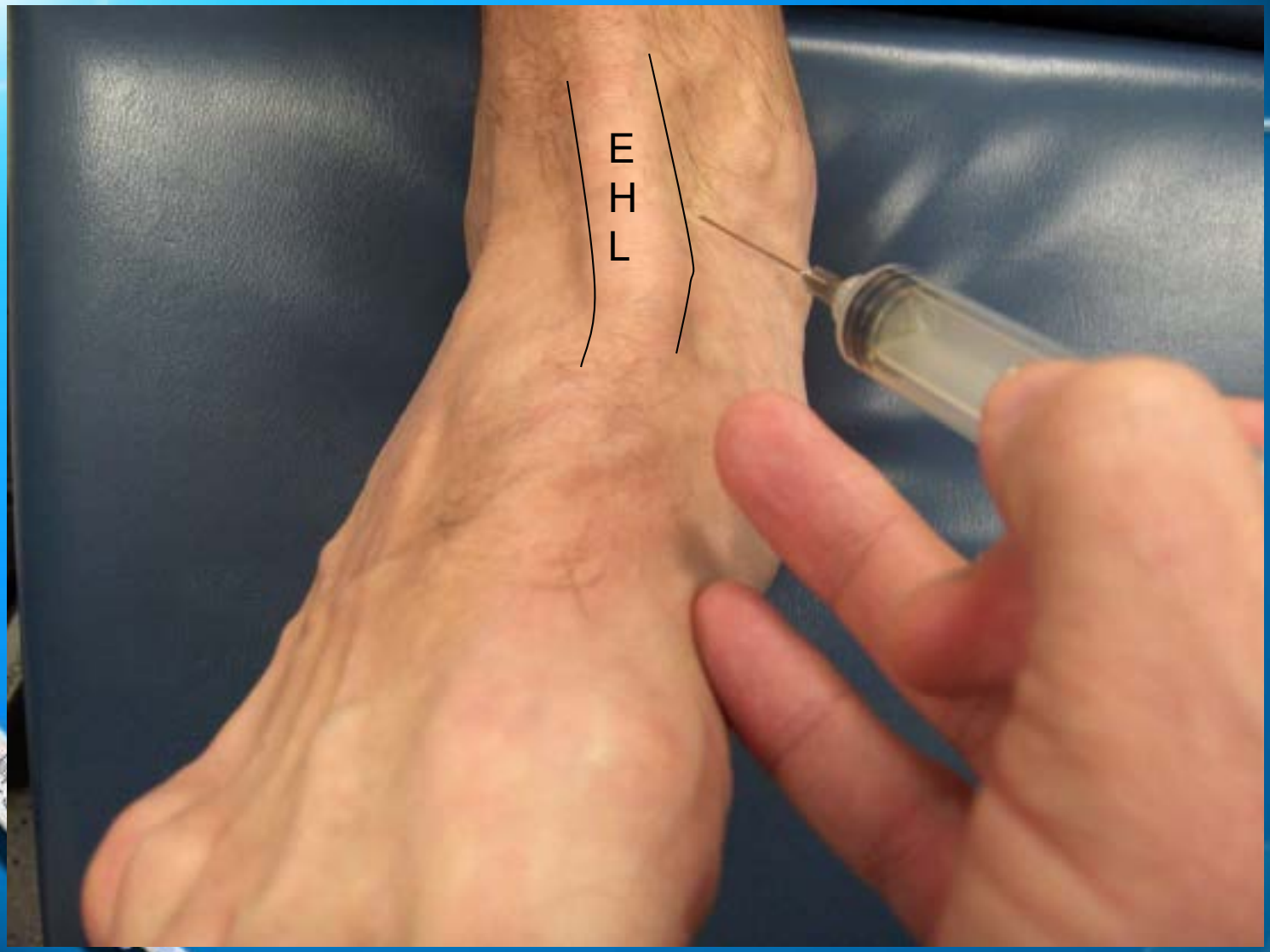
- Intra-articular joint injection → orthopedic referral—use guidance for injection
- Greater trochanteric bursitis
  - Patient lay on their side with affected side up
  - Palpate area of maximal tenderness
  - Insert 3.5” 25 gauge spinal needle down to periosteum, infiltrate some on periosteum and withdraw slightly to complete


Trochanteric
bursa
injection
© MMG 2000

Ankle

- Aspiration = 1.5” 18 gauge;

  Injection = 1.5” 25 gauge needle
- Insert needle 0.5 cm lateral to medial malleolus and medial to extensor hallucis longus tendon
- Direct the needle toward dome of the talus

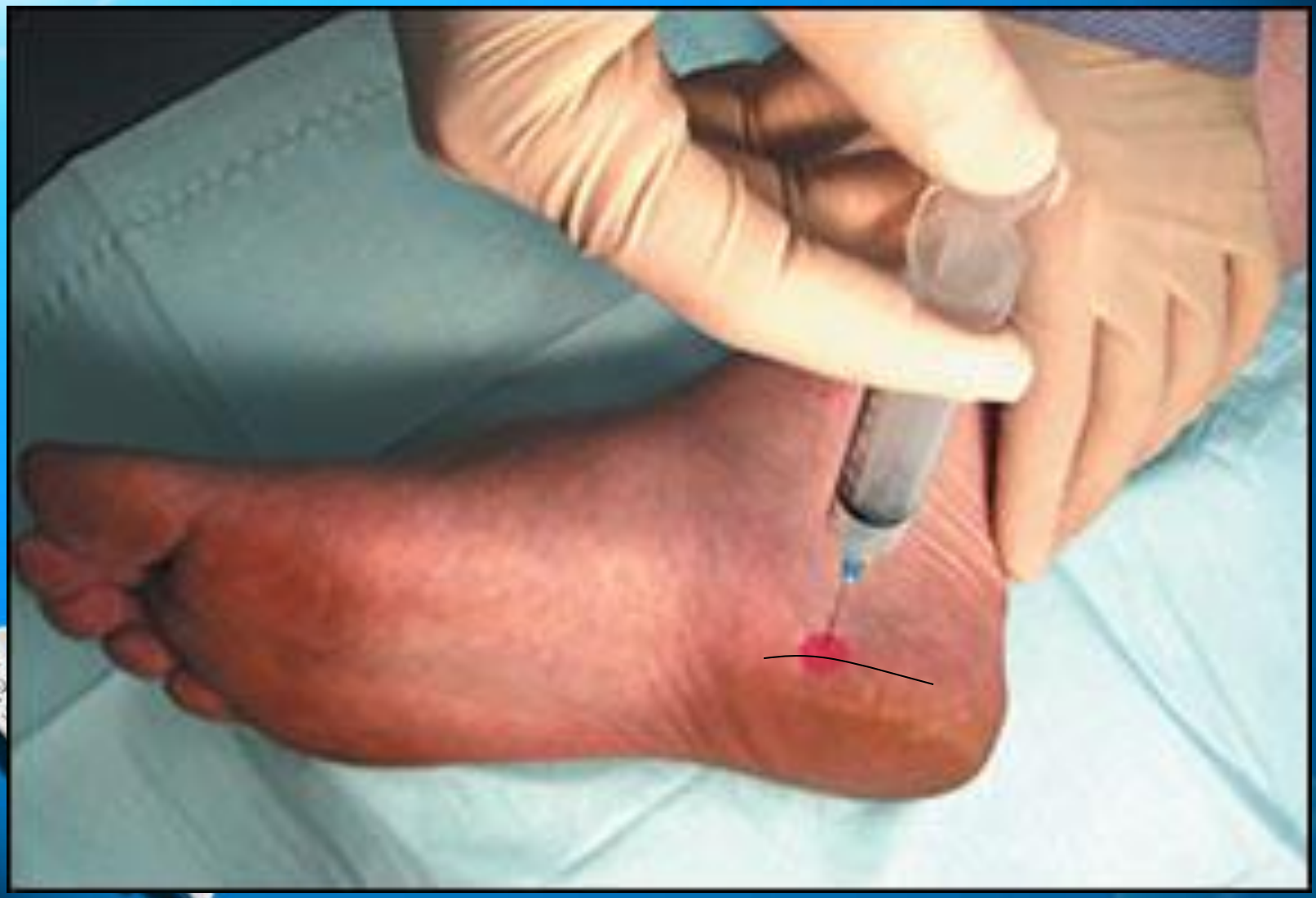

E
H
L

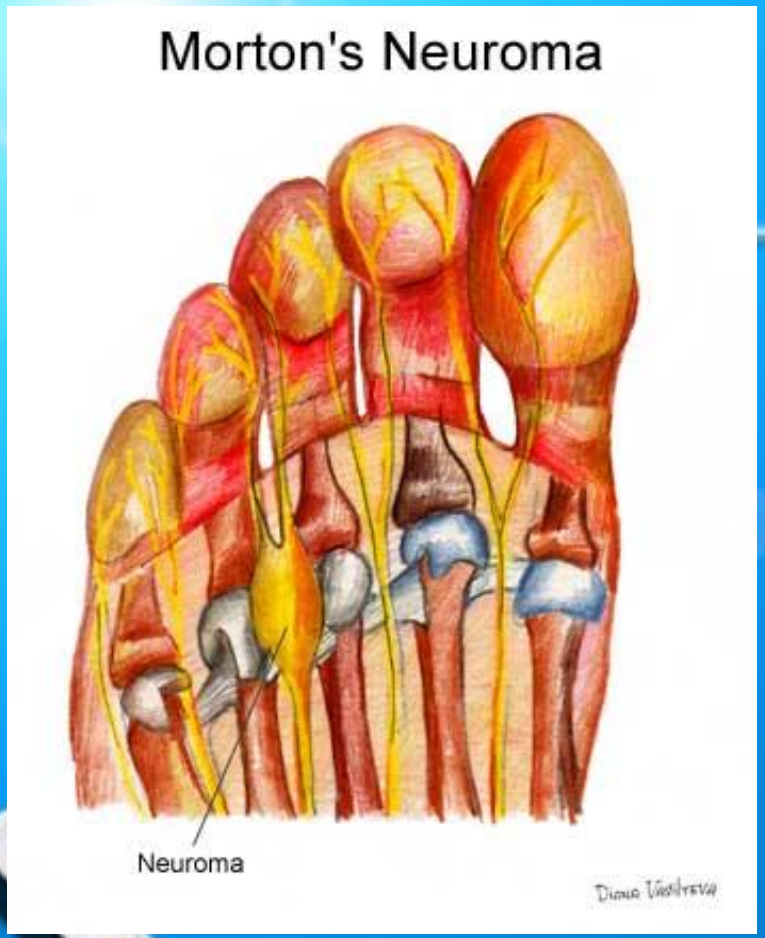
Ankle
Subtalar Arthritis

- Inject into the sinus tarsi on the lateral aspect of the ankle, just below the lateral malleolus
- Inverting the foot will help to locate the space
- Use a 1½" 25 gauge, direct needle posterior and medially, as you walk off the talus of calcaneus
- Can use 5-10 ml anesthetic-steroid mixture

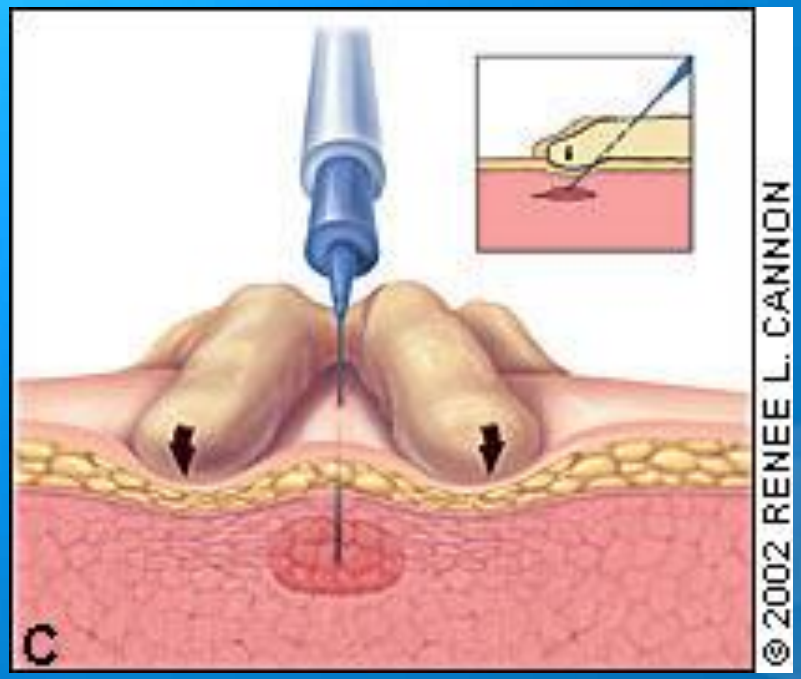
Foot
Plantar Fasciitis and Heel Spurs

- Locate point of maximal tenderness on plantar heel, go deep to the bone
- Avoid fat pad as can cause fat atrophy




Morton's Neuroma
Neuroma

Trigger points



Coding issues

- 20600 Arthrocentesis, aspiration and/or injection. small joint or bursa. (eg, finger, toes)
- 20605 intermediate joint or bursa (eg, temporomandibular, acromioclavicular, wrist, elbow or ankle)
- 20610 major joint or bursa (eg, shoulder, hip, knee)
- 20526 Injection, therapeutic (eg. local anesthetic, corticosteroid), carpal tunnel.

Coding Issues (cont)

- 20550 Injection(s), single tendon sheath, or ligament, aponeurosis (eg, plantar "fascia')
- 20551 single tendon origin/insertion
- 20552 Injection(s), single or multiple trigger point(s)
- 20553 single or multiple trigger point(s), three or more muscle(s)

Conclusions

- Understand risks and benefits of aspiration and injections
- Anatomic placement important
- Easy procedure to add to your armamentarium

THE END----- questions?