Become an Orthopedic Injection Pro

With This Essential Toolkit!

Laurel Short, DNP, FNP-C

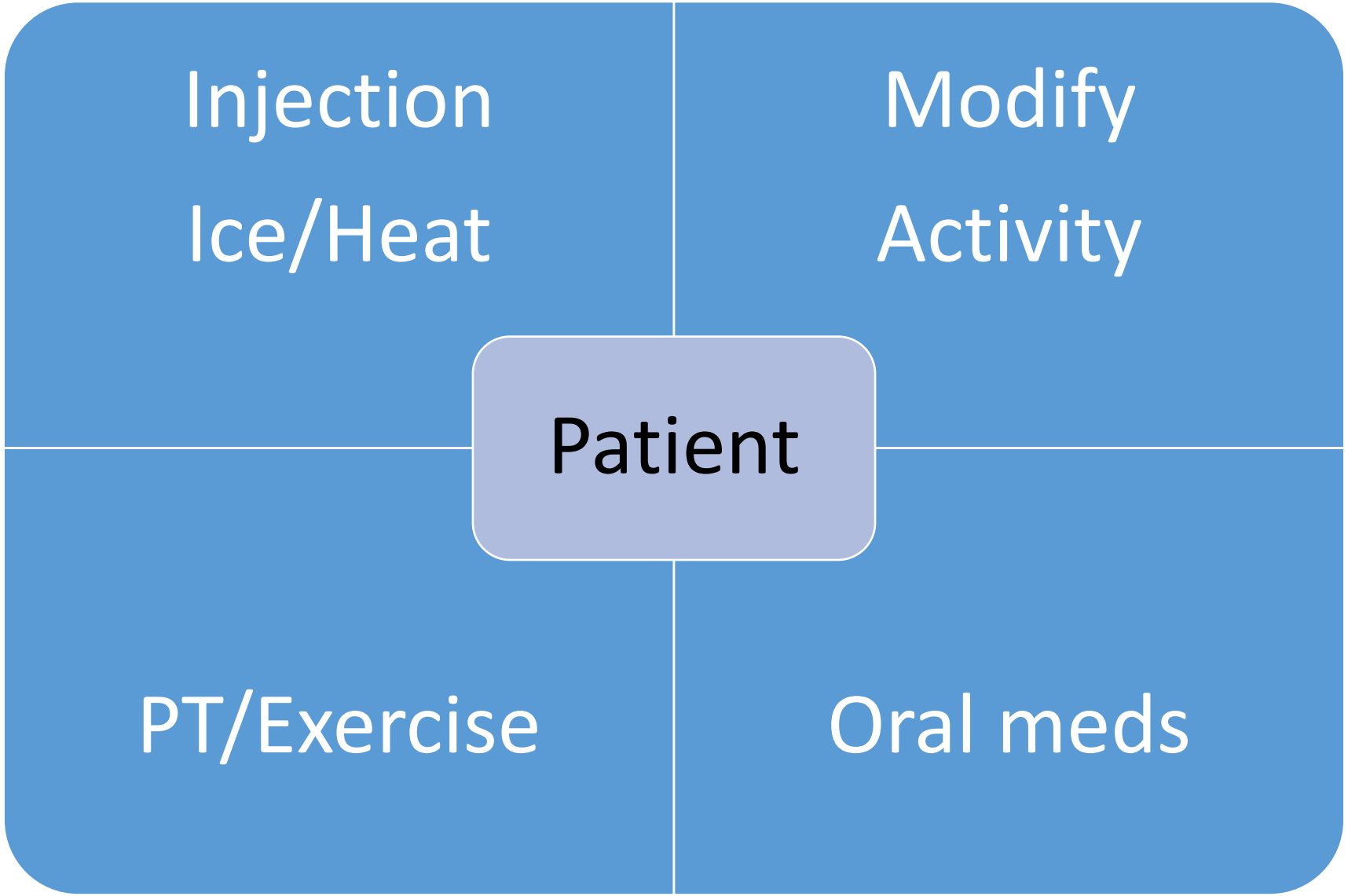
Disclosure

I have no current affiliation or financial interest with any grantor or commercial interests that might have direct interest in the subject matter of the CE Program.



Objectives

- List the indications and precautions for muscular and joint injections
- Identify rationale for using injectable corticosteroids and local anesthetics
- Describe safety considerations and aseptic technique for musculoskeletal injections
- Review functional anatomy for the shoulder, elbow, wrist, hip, and knee
- Demonstrate injection technique guidelines and describe aftercare


Injection
Ice/Heat
Modify
Activity
Patient
PT/Exercise
Oral meds

General Principles

- Anatomic vs. trigger point injection
- Arthrocentesis = joint space aspiration
- Local anesthetic as diagnostic tool
  - Followed by corticosteroid injection OR
  - Combo corticosteroid + local anesthetic



Shopping List

Medications & Supplies





The Drugs

Corticosteroids, Local Anesthetics, Viscosupplementation

Commonly Used Corticosteroids

Intermediate Acting

Methylprednisolone acetate

Depomedrol 40 mg/ml

Depomedrol + lidocaine

May cause more injection site pain, premixed not recommended due to difficulty adjusting doses

Long Acting

Triamcinolone acetonide

Kenalog 40 mg/ml

Recommended -easy to adjust volume and administer

Corticosteroid Injection Indications

- Diagnostic AND/OR
- Therapeutic
  - Suppressing inflammation/inflammatory “flares”
  - Breaking up inflammatory damage-repair-damage cycle (?)
  - Possible chondroprotective effect on cartilage metabolism or other process not related to inflammation
  - Pain relief for tolerance of physical therapy

Local Anesthetics

- Work by causing a reversible conduction block along sensory nerve fibers
- Can make the procedure more comfortable
- Diagnostic tool
- Dilution- increased volume helps spread steroid to a larger surface area

Local Anesthetics

Short Acting

Lidocaine hydrochloride

0.5% 5mg/ml

1.0% 10mg/ml

2.0% 20mg/ml

Recommended. Acts rapidly, within seconds. Duration ~ 30 minutes.

Long Acting

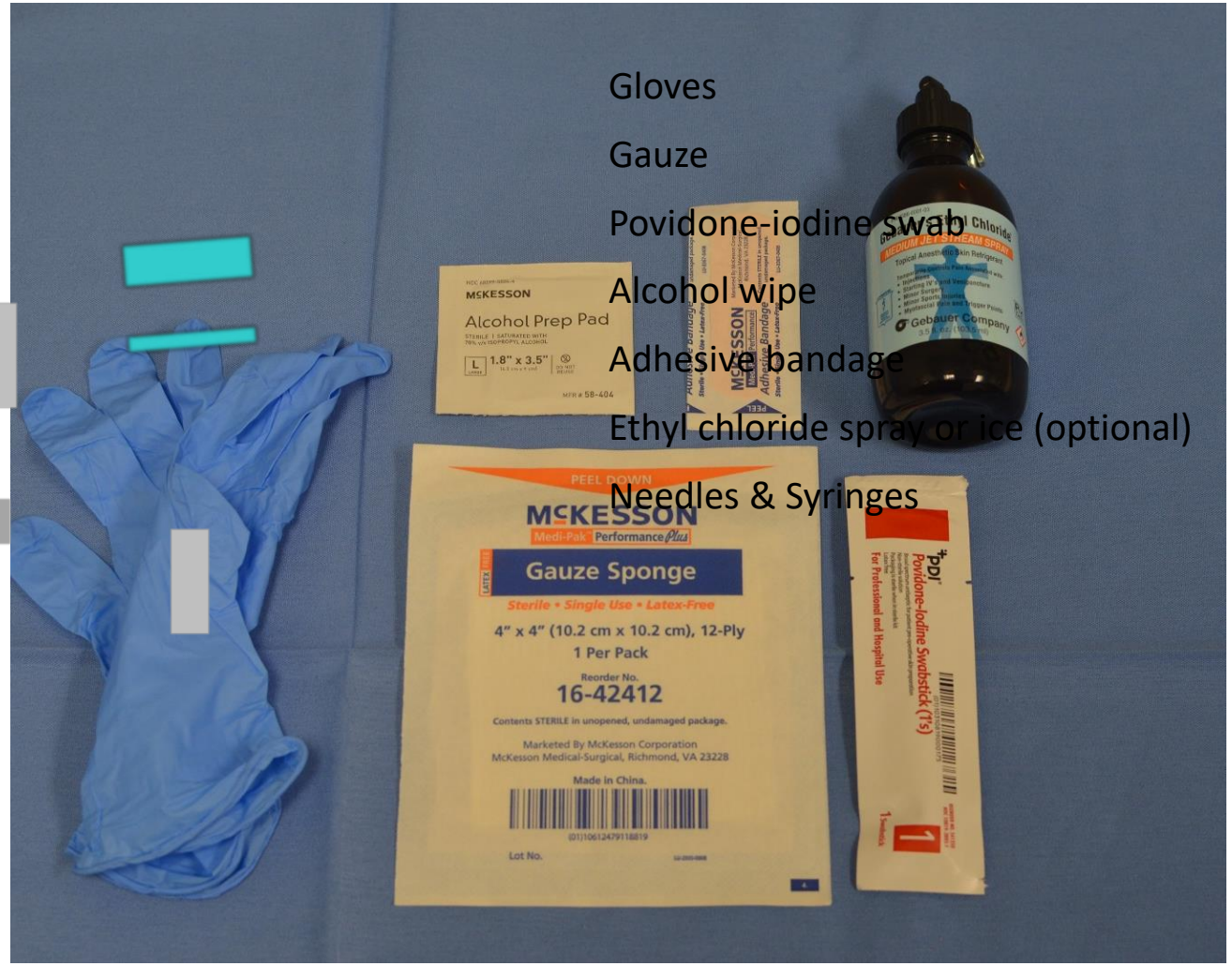
Bupivacaine (Marcaine)

0.25% 2.5mg/ml

0.5% 5mg/ml

Slower onset, ~30 minutes for full effect. Duration >8 hours.

Additional Supplies



Gloves

Gauze

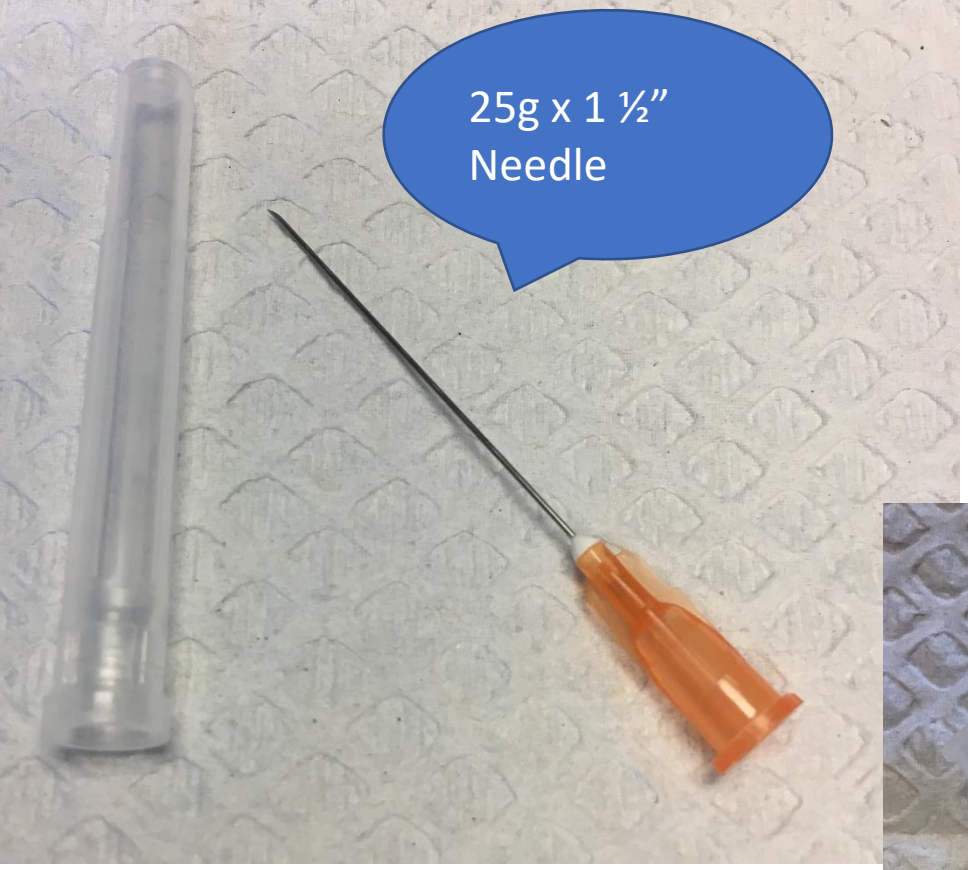
Povidone-iodine swab

Alcohol wipe

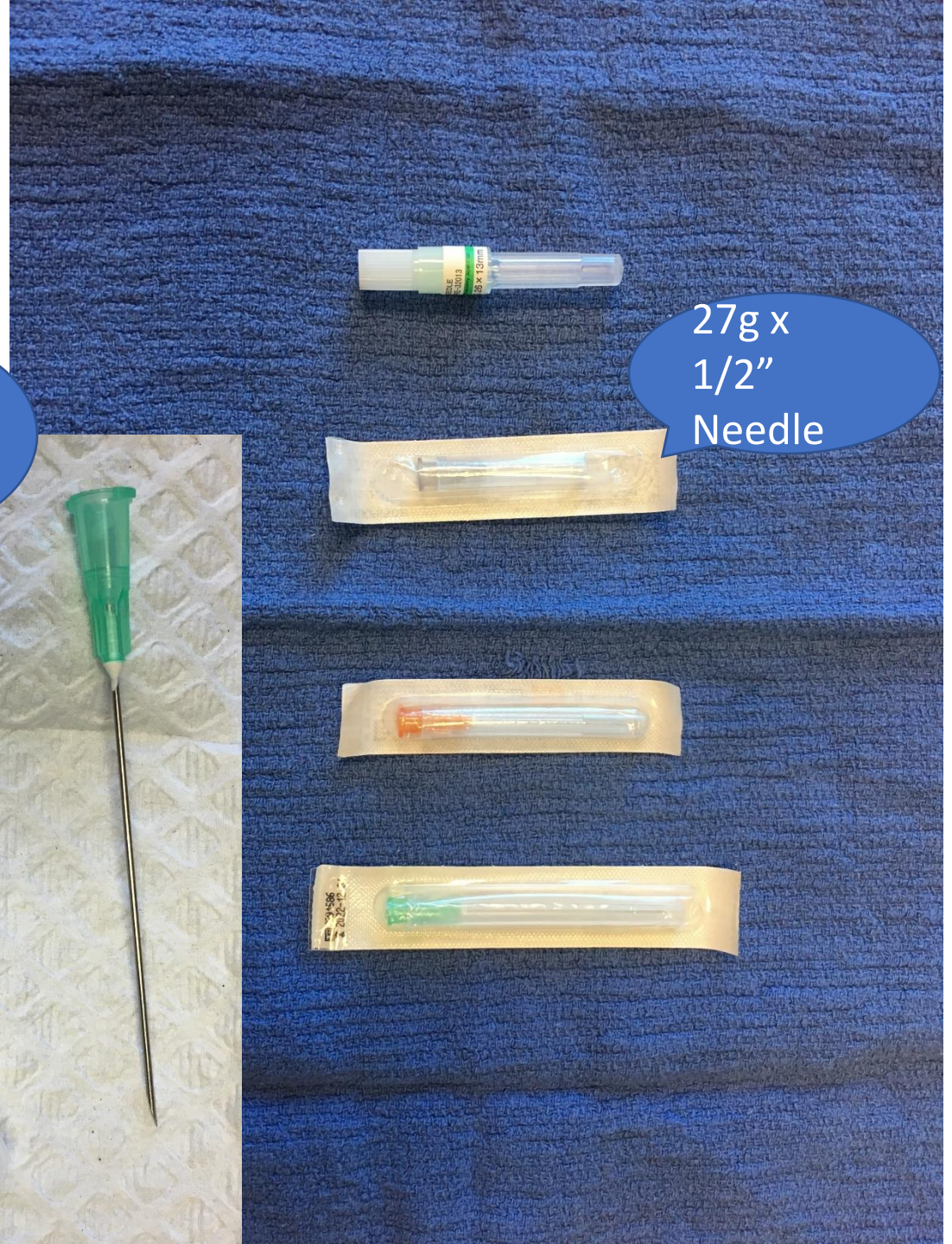
Adhesive bandage

Ethyl chloride spray or ice (optional)

Needles & Syringes







Needle Examples

Cheat Sheet

Knee:
2cc 1 % Lidocaine
2cc 10mg Triamcinolone acetonide
25g x 1 ½” Needle

Shoulder:
3cc 1 % Lidocaine
2cc 10mg Triamcinolone acetonide
25g x 1 ½” Needle

CTS, DEQ, Trigger Finger:
1/2cc 1 % Lidocaine
1/4cc 40mg Triamcinolone acetonide
27g x 1/2” Needle

Elbow (Medial & Lateral), Pes Anserine Bursa:
1cc 1 % Lidocaine
1/2cc 40mg Triamcinolone acetonide
25g x 1 ½” Needle

Trigger Point Injection:
2cc 0.25 % Bupivacaine
2cc Sodium Chloride
25g x 1 ½” Needle

Trochanteric Bursa:
4cc 1 % Lidocaine
2cc 0.25% Bupivacaine
1cc 40mg Triamcinolone acetonide
21g x 2” Needle *(or longer if needed)*

Organize Team Members!

- Injections can be added on to a clinic visit or scheduled separately (rarely requires prior authorization)
- Coordinate who will prep the injection
- Option of having patient ice before and/or after for pain relief



Awesome staff, easy access to cheat sheet/supplies

Billing Codes: Aspiration/Injection

20610 Shoulder, Hip, or Knee

(20605 Wrist, Elbow, or Ankle)

20600 Fingers or Toes

20551 Tendon origin/insertion

20550 Tendon sheath, ligament

Trigger point injection

20552 (1-2) Muscles

20553 (3+) Muscles

64450 Occipital nerve block- check coverage ahead of time

Medications

Triamcinalone J3301

Dexamethasone J1100

(Bupivacaine J7799- usually do not bill)

Ice pack applies 97010- patient keeps ice pack

Guidelines

Key Points to Assess Before Injecting





- Identify underlying etiology = good MSK exam
- Discuss risks & benefits with patient
- Knowledge of functional anatomy
- Avoid injecting an unstable joint (e.g. suspected rotator cuff or ACL tear)
- Avoid repeating injection too soon/too often- rule of thumb is no sooner than q 3 months

Potential Adverse Effects

- Postinjection flare (2-10%)
- Subcutaneous atrophy and/or skin depigmentation- more common with superficial injection
- Bleeding or bruising
- Steroid arthropathy – no real evidence for promotion of disease progression!
- Joint sepsis- rare
- Tendon rupture- minimized by good technique
- Facial flushing (1-5%)
- Hyperglycemia- usually <1 week
- Menstrual irregularity
- Decreased ESR/CRP levels
- Anaphylaxis- rare

Contraindications

Absolute

- Sepsis- local or systemic
- Fracture site
- Prosthetic joint
- Pediatric patients
- Bacteremia
- Allergy
- Uncontrolled bleeding disorder

Relative

- Diabetes
- Immunocompromised
- Large tendons (Achilles, infrapatellar)
- Sickle cell anemia
- Anticoagulation therapy- injection does not increase bleeding risk

Talking Points

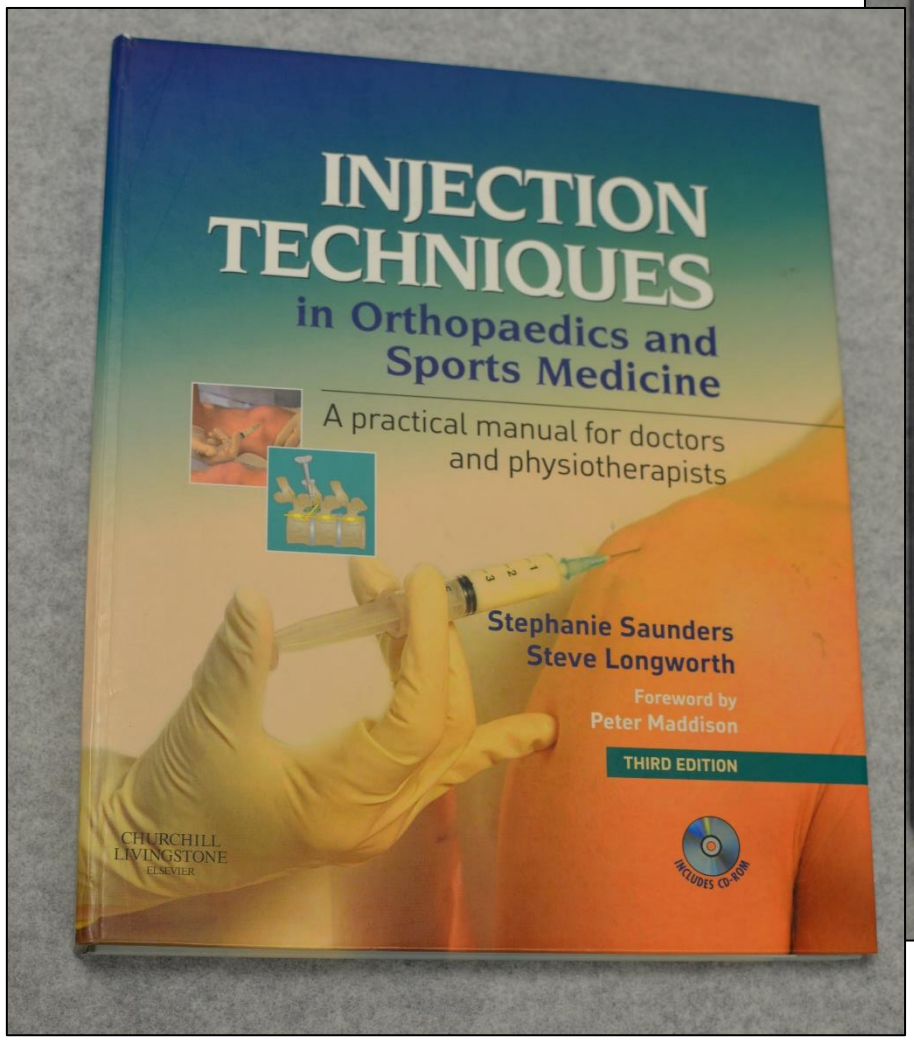
- Gain patient confidence by discussing risks, benefits, additional recommendations
- Informed consent- verbal or written
- Steroids
  - *Serious side effects usually seen PO rather than injection due to less systemic absorption*
  - *The body makes 20-30mg cortisone daily…we are using a small dose similar to your natural hormone*
  - *You will better tolerate physical therapy/exercise when pain is controlled*

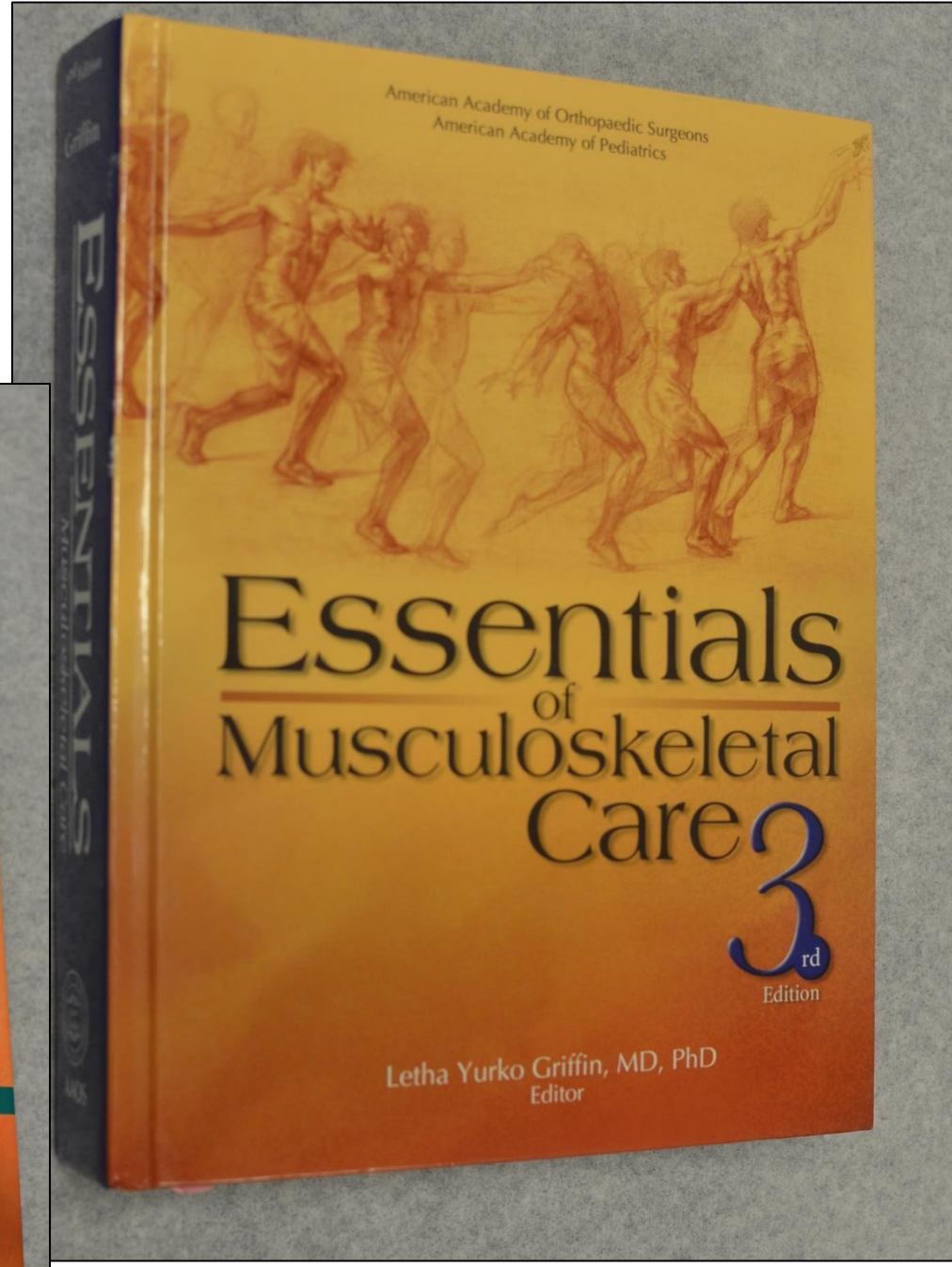

Caffeine
PO
Q4H
PRN

Helpful Resources

JNP

Geier, K. A., & Benham, A. J. (2015). Musculoskeletal Injections in Primary Care. *The Journal for Nurse Practitioners*, *11*(10), 968–978. https://doi.org/10.1016/j.nurpra.2015.08.009





Conference Adventures



Neck and Shoulder

Trigger point and posterior shoulder injections

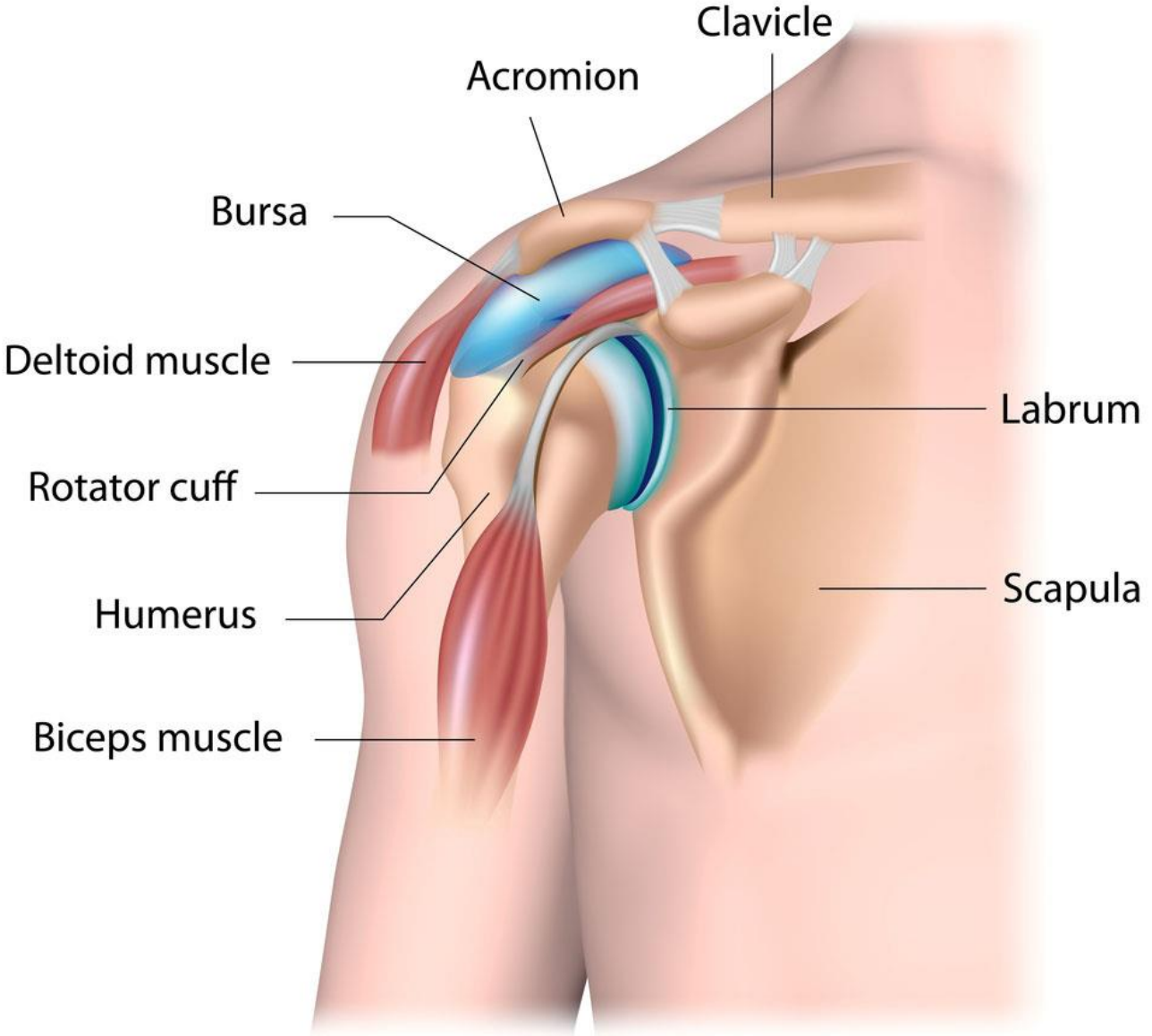
Shoulder Anatomy

- 3 Bones

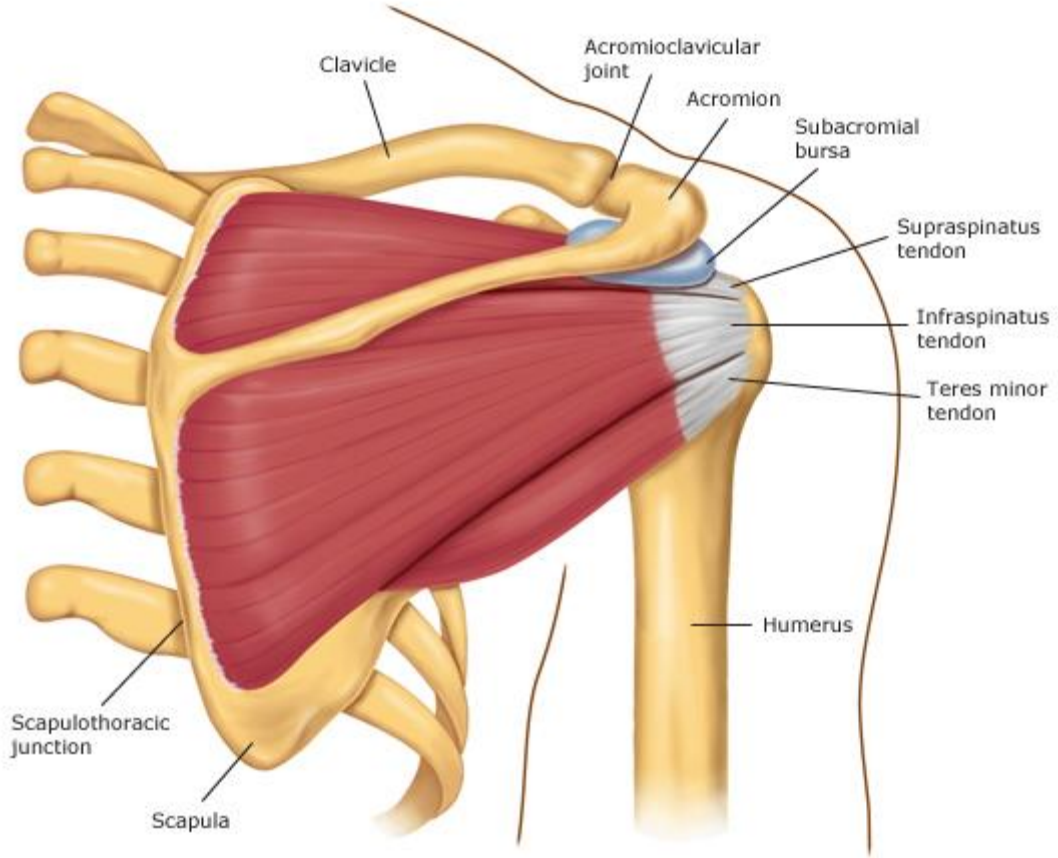
scapula
clavicle
humerus

- Rotator cuff muscles (SIT

Supraspinatus
Infraspinatus
Teres Minor
Subscapularis



Posterior View



Shoulder Indications

- Tendinitis/tendinosis
- Impingement syndrome
- Bursitis
- Osteoarthritis

Subacromial Shoulder Injection
code 20610

- Subacromial space
  - Bursa is at anterior margin
  - Size of a silver dollar
- Posterior approach
  - Least pain receptors
  - Biggest portal of entry
  - Acromion slopes down in back- Angle up (about 15 °) with injection

Shoulder- Posterior Approach , 25 g 1.5” needle, 2cc 10mg triamc c 1% Lidocaine





General Injection Tips

Comfortable position for you and patient!

Identify landmarks

Mark with tip of prep swab, needle cap, or make-up pencil

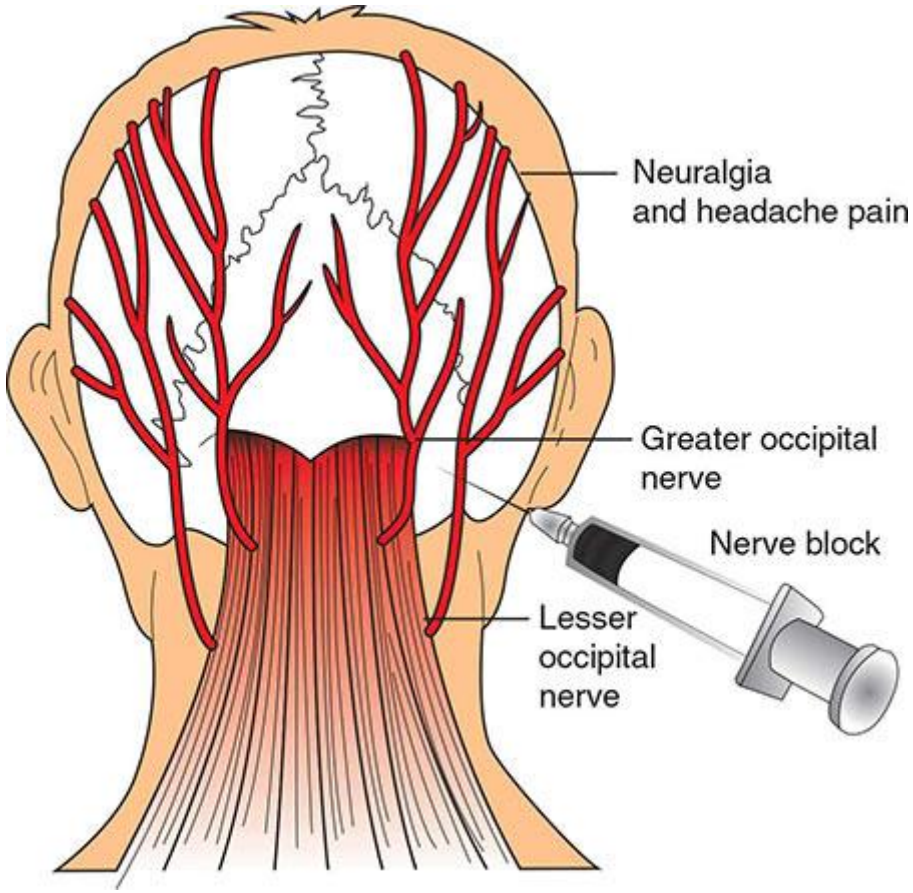
Prep skin, optional “cold” spray

Quick insertion, Steady rate of injection

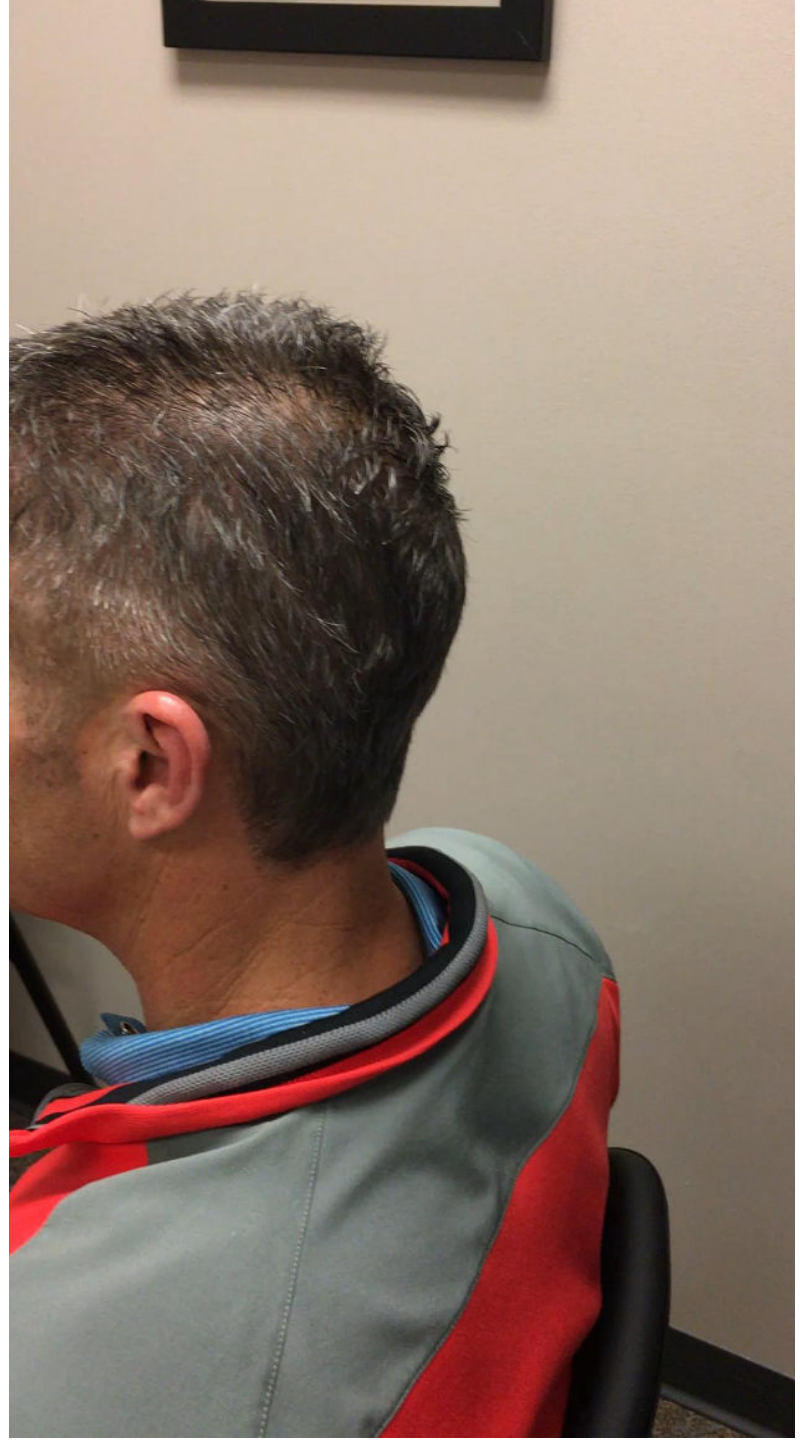
If there is resistance, withdraw slightly

Post-injection compression & directions

Occipital Nerve Block



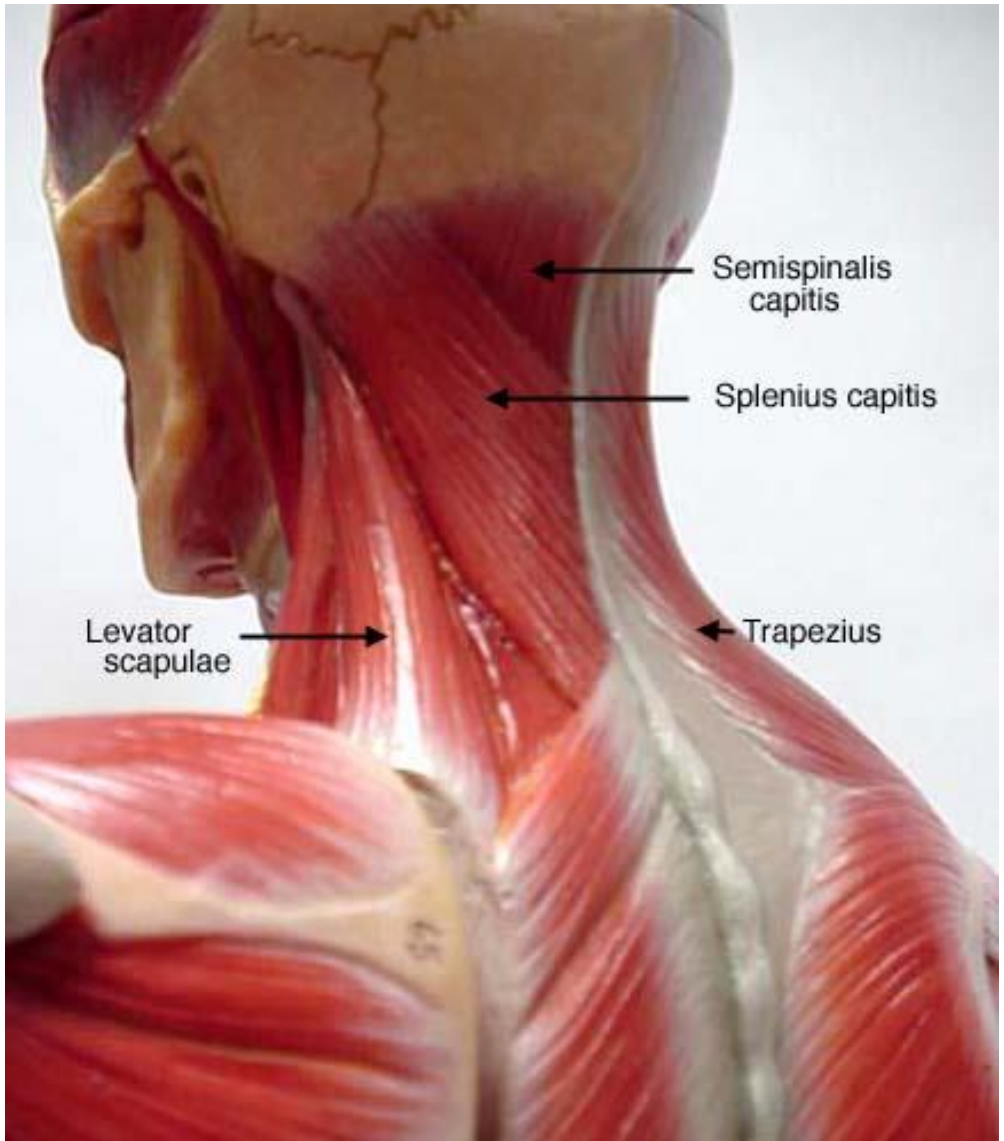
- Approach can use 1-3 injection sites
- Local anesthetic only, 1-2 mL per side
- Corticosteroid not recommended
- Can combine with trigger point injections



Posterior Neck- Trigger Point Injections

20552 (1-2) Muscles

20553 (3+) Muscles



Trigger Point Injections

- Focal, hyper-sensitive areas in tight areas of muscle
- Tender to palpation and can produce pain in a referral pattern
- May cause tension headaches, TMJ pain, regional pain, low back pain
- No steroid needed: 2ml normal saline + 2 ml anesthetic = 4ml total volume
- Inject 1ml to each trigger point, may see twitch response



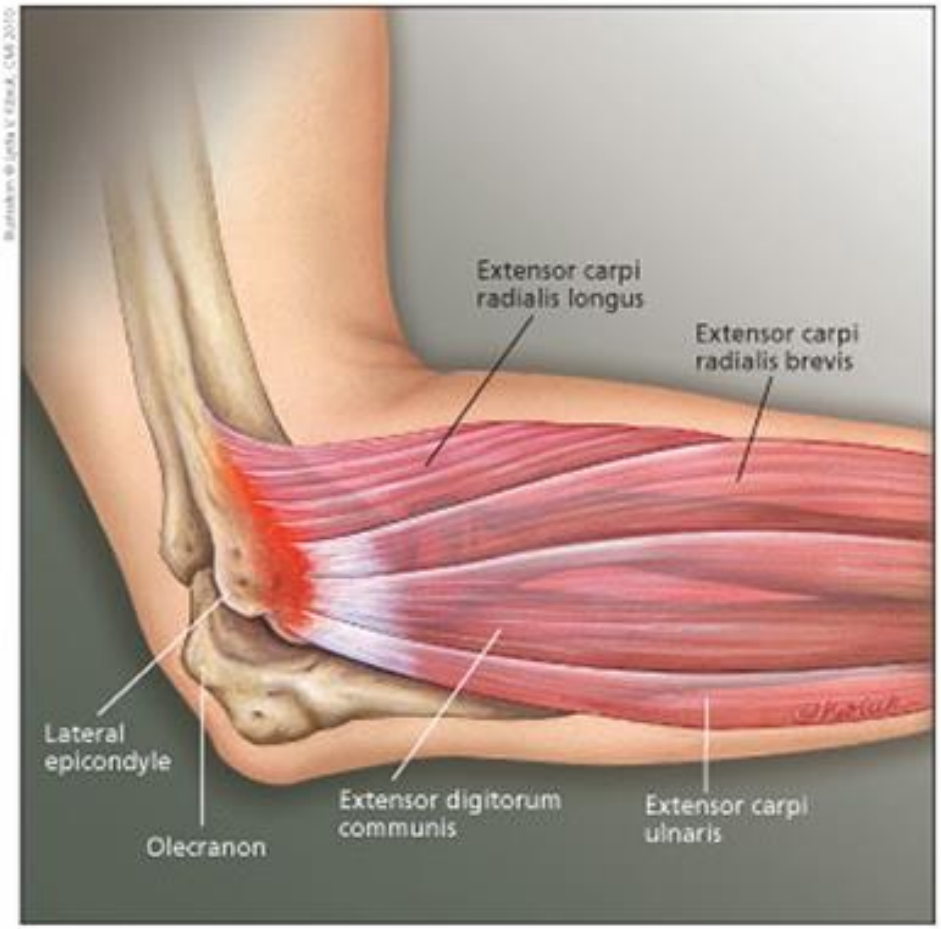




Elbow

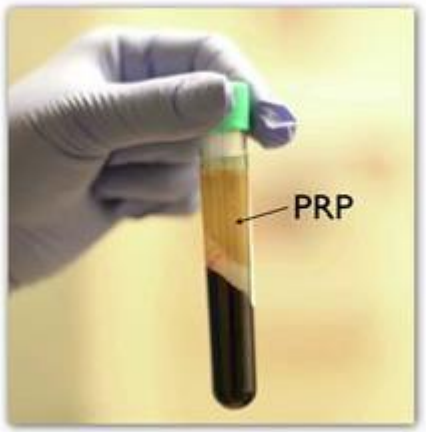
Lateral Epicondylitis, Medial Epicondylitis

Elbow Anatomy





Platelet Rich Plasma (PRP)



Still considered experimental

- Patient's whole blood (citrate dextrose as anticoagulant)
- Platelets spun down & activated by Thrombin & CaCl
- Thought to repair & regenerate cartilage, ligaments, muscle, tendons, and bone through cytokinens/growth factors
- Ultrasound guided injection, CPT Code 0232T

3ml syringe, 25 g 1.5” needle, 1/2cc 40mg triamcinolone + 1cc 1% Lidocaine *code 20551*

- Mostly Lateral
  - Tennis elbow
  - Extensor-supinator. Occurs at the origin of the common extensor tendon. Anterior facet of the lateral epicondyle.
- Medial
  - Golfer’s elbow
  - Flexor-pronator. Origin of the common flexor tendon. Anterior facet of the medial epicondyle.
  - Careful of Cubital tunnel- ulnar nerve

Elbow Video



Elbow Video 2



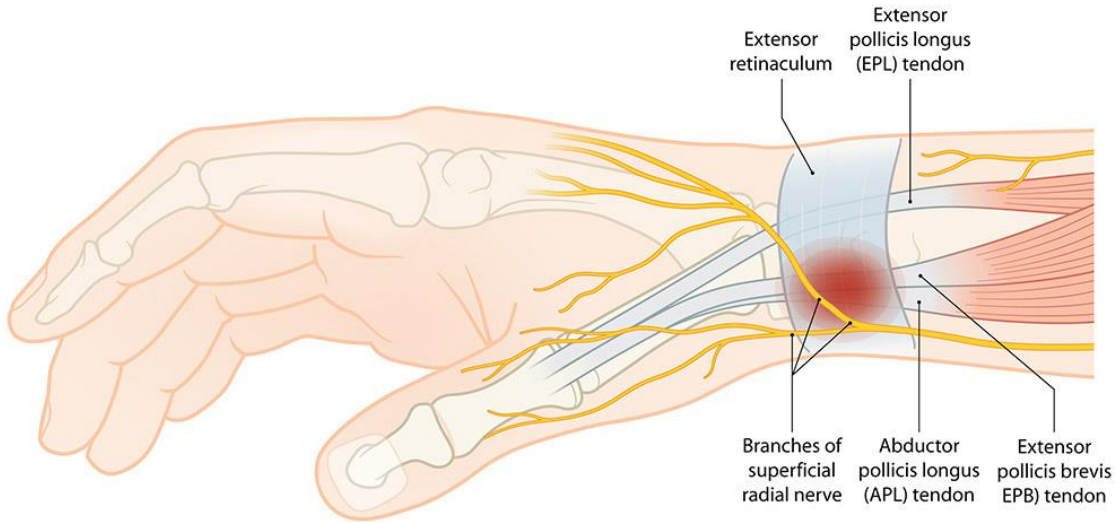


Wrist/Hand

De Quervain’s tenosynovitis, Trigger finger

De Quervain's Tenosynovitis

- Overuse injury of abductor pollicis longus & extensor pollicis brevis
- Pain at base of thumb & over radial styloid process
- Finklestein's test



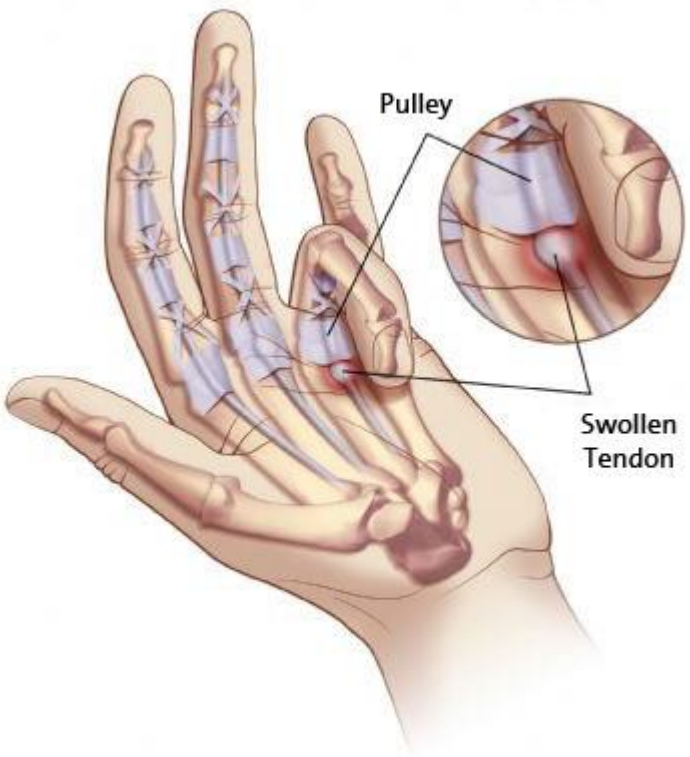
3ml syringe, 25-27g, 0.5” needle with 1/4cc 40mg triamcinolone + 1/2cc Lidocaine

- Thumb in slight flexion
- Feel gap between the 2 tendons
- Insert needle into the gap, then advance between the tendons
- Inject solution as a bolus



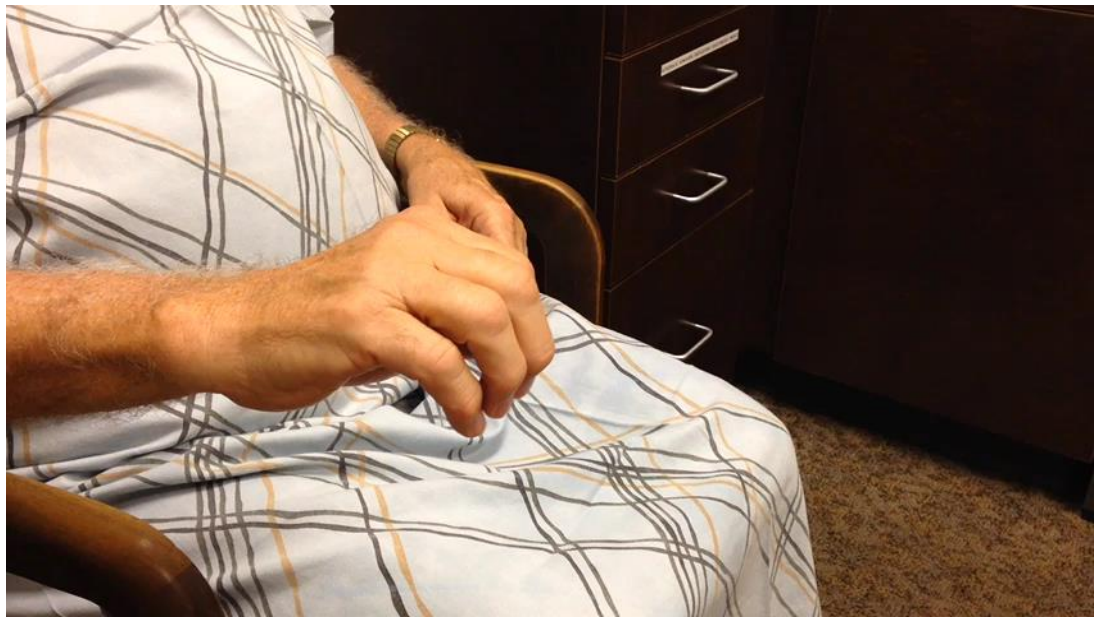
Trigger finger or trigger thumb

- May be acute or chronic
- Painful clicking and/or locking of finger or thumb
- May have painful, tender nodule at the base of the digit
- More common in those with diabetes



3ml syringe, 25-27g, 0.5” needle, 1/2cc 40mg triamcinolone + 1cc Lidocaine

- Position hand palm up
- Mark nodule at the A1 pulley
- Insert needle into the nodule
- Inject ½ solution into the nodule, then advance the needle slightly and inject the other ½ into the tendon sheath

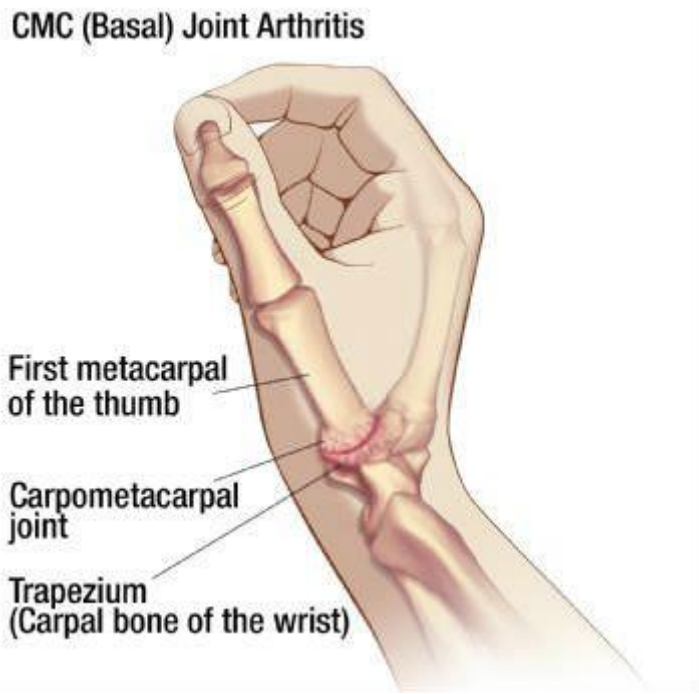


Advanced upper limb- CMC & Finger Joints

- CMC is common site for OA!
- Assess for tenderness, swelling, “grind test”
- First metacarpal articulates with the trapezius. Easiest entry is at the apex of the snuff-box on the dorsum of the wrist.
- Flex and extend the thumb while palpating for the joint space.

CMC and Finger Joints

- 25-27g, 0.5” needle
- 10mg triamcinolone + 0.5-0.75 Lidocaine (Total volume .75-1 mL)
- Rest hand with thumb up and gentle traction
- Identify gap of joint space at apex of snuff box
- Insert needle perpendicularly into gap



Repetition Makes Permanent

Remember what it felt like to learn a skill as a kid?

Kind of scary, but so exciting!



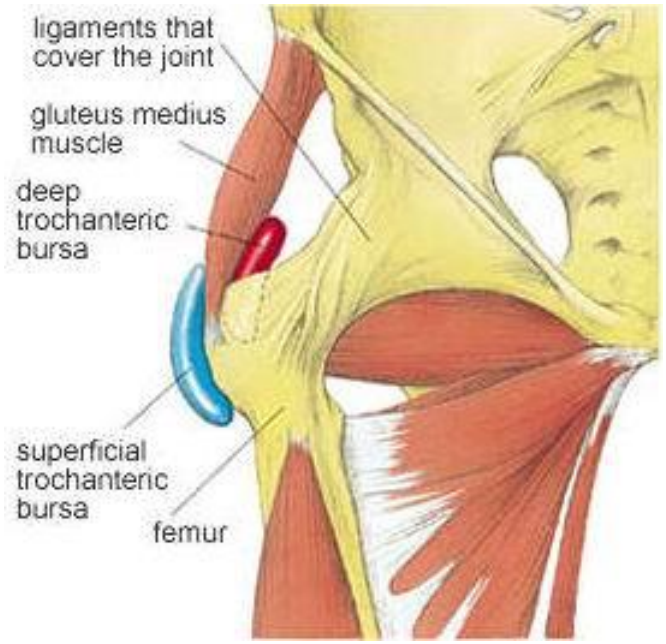
Hip

Trochanteric Bursitis

Greater Trochanteric Pain Syndrome

- Bursa- in line with pubis symphysis
- Rarely the primary issue! Key point- assess gait & strength
- Hip “rotator cuff”
  - Abductor muscles: gluteus medius, minimus
  - Abductor + external rotation: piriformis

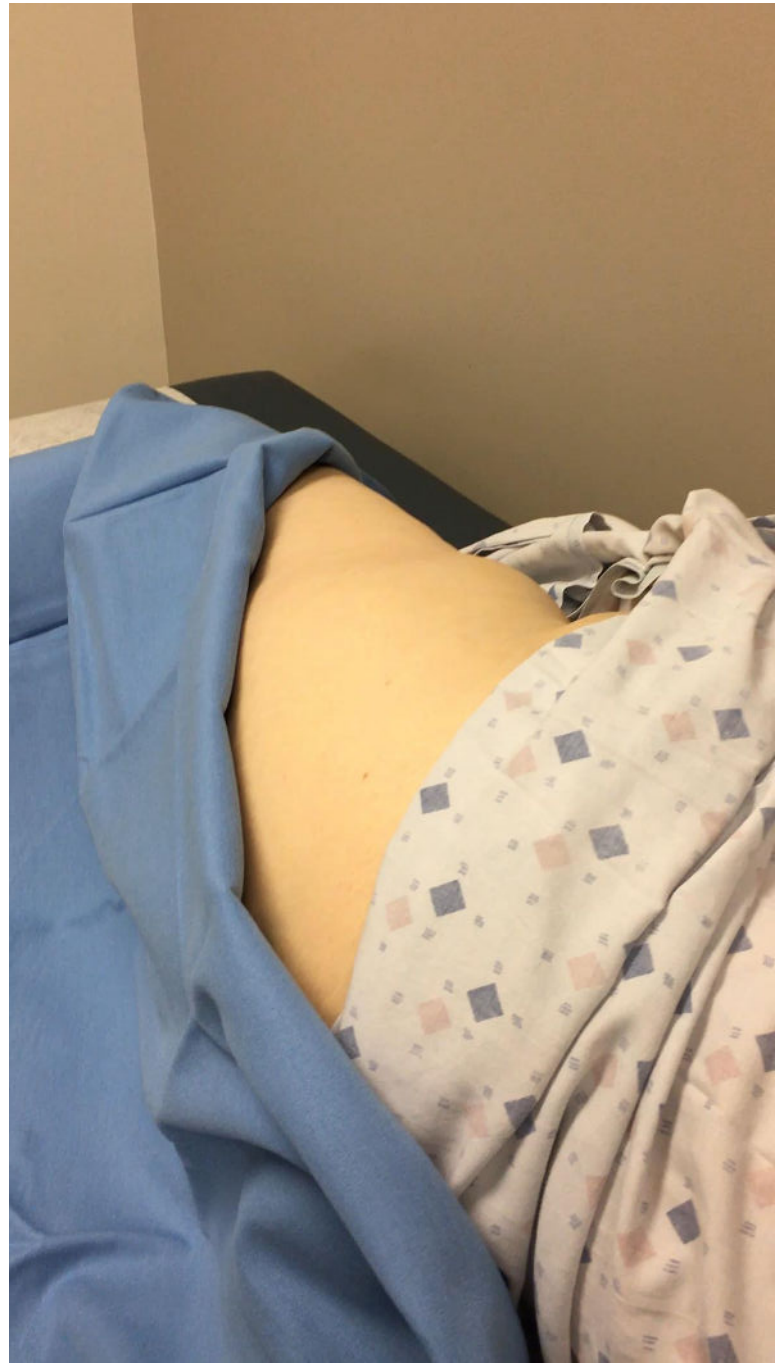
Lateral hip



- Tenderness over the greater trochanter
- Pain with sidelying, difficult to sleep
- Painful passive hip abduction/adduction
- May be chronic if underlying gait or muscle imbalance issues not addressed

5ml syringe, 18 g 2” needle, 1cc 40mg triamcinolone + 4cc 1% Lidocaine *code 20610*

- Patient lies on unaffected side
- Upper leg extended
- Identify and mark point of maximum tenderness, over or near greater trochanter
- Insert needle perpendicular and advance to touch bone
- Pull back slightly, inject as bolus



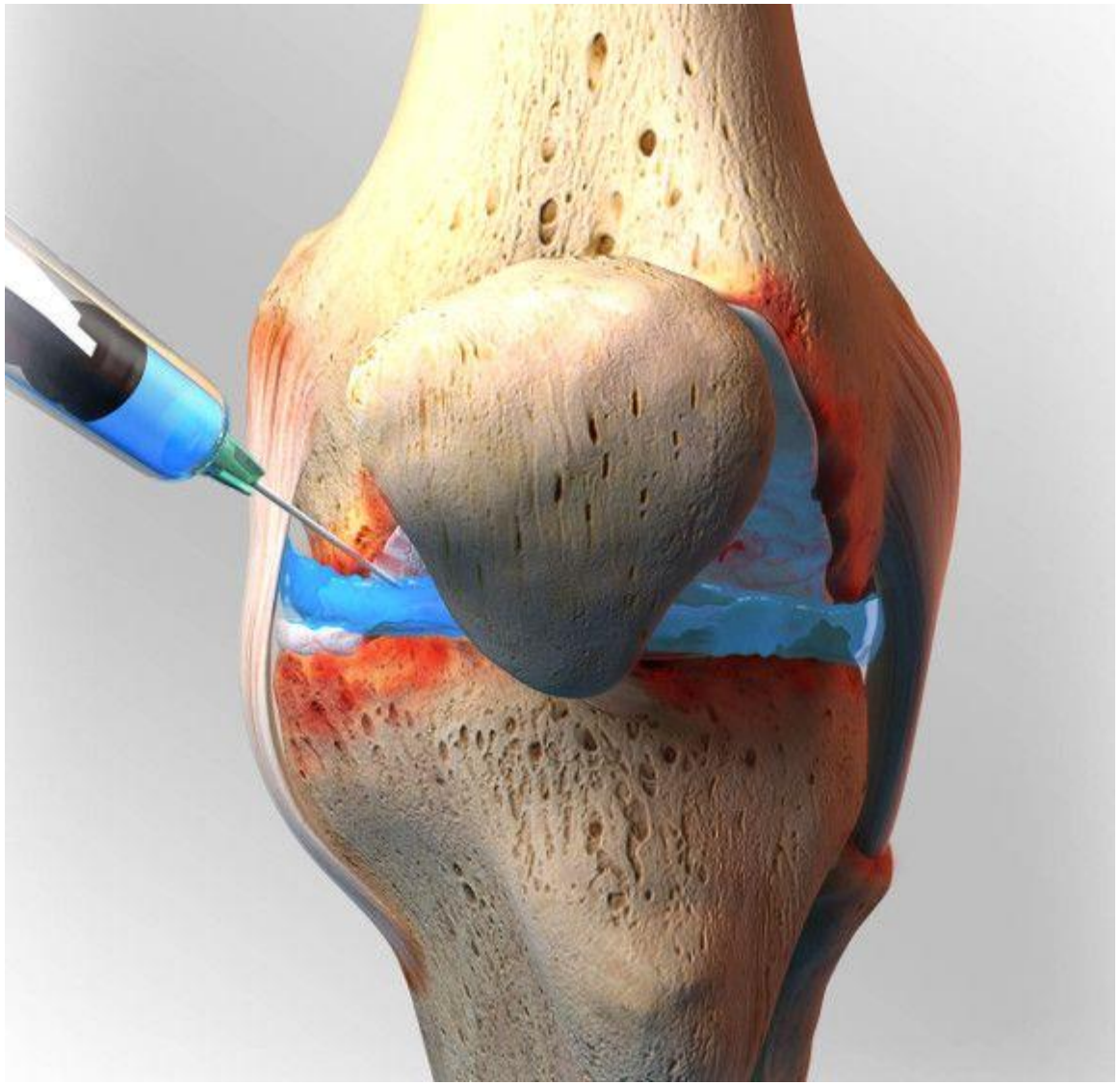
Knee

Knee joint, Pes anserine bursitis



Knee Joint

- Primary indication: osteoarthritis
- Can be used for knee strain and pain associated with meniscus tear



Knee Anatomy

3 bones articulate:

- Femur, tibia, patella
- Main ligaments: lateral, medial, patellar, ACL, PCL
- Meniscus: medial & lateral



5ml syringe, 25 g 1.5” needle, 2cc 10mg triamcinolone + 2cc 1% Lidocaine *code 20610*

- Patient sits or lies supine with knee flexed
- Identify and mark intersection of lateral and inferior joint lines
- Insert needle and advance slowly
- Injection solution as bolus



Viscosupplementation

- Osteoarthritis of the knee can be treated by lubricant injections
- OA = less lubrication and shock absorption within the joint
- In part related to less hyaluronic acid, part of synovial fluid
  - HA molecules produce viscous solution that is both a lubricant and shock absorber

Viscosupplementation



- Indication- OA of knee
  - Failed conservative treatments (oral NSAIDs, cortisone injection)
  - Prolonging need for joint arthroplasty, or patients who are not good surgical candidates
- Proposed mechanisms of action
  - Cytokines/PGE inhibitor
  - Inhibition of cartilage degredation
  - Direct protective action on nociceptive endings





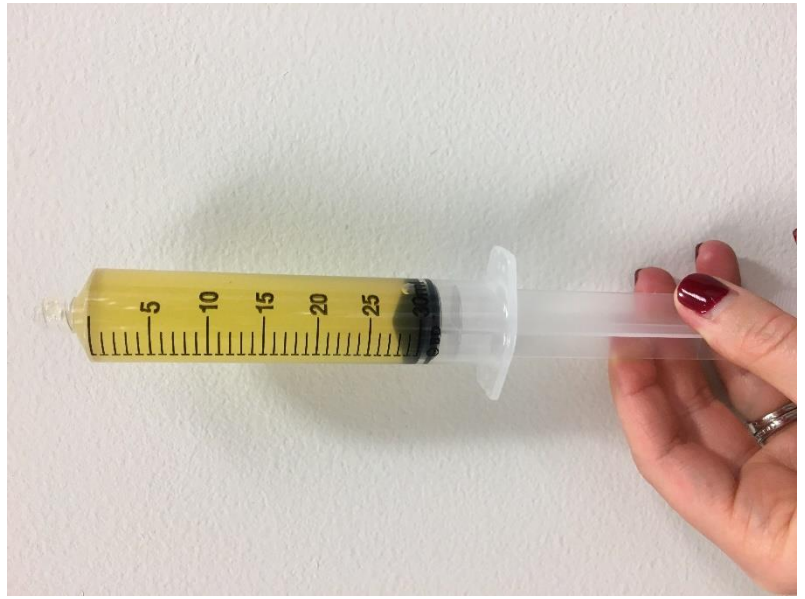


Knee Aspiration Examples

Chronic Hematoma

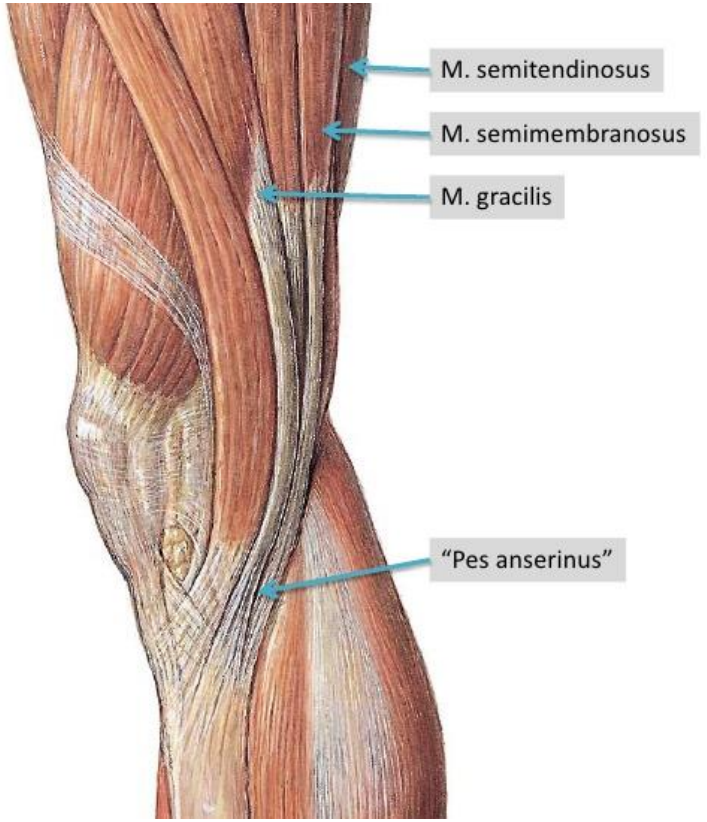


Serous- Typical w/ OA



Pes Anserine bursitis

- Overuse injury- common in athletes
- Pain at the attachment site: medial side tibia just below joint line
- Combined tendon insertion



3ml syringe, 25 g 1.5” needle, 1/2cc 40mg triamcinolone + 1cc 1% Lidocaine *code 20551*

- Patient sits or lies supine with knee flexed
- Identify and mark tender area over the bursa, if needed have patient flex knee against resistence
- Insert needle and advance to touch bone
- Pull back slightly and inject solution as bolus

Pes Anserine Bursa



Lower Limb- Advanced Injections

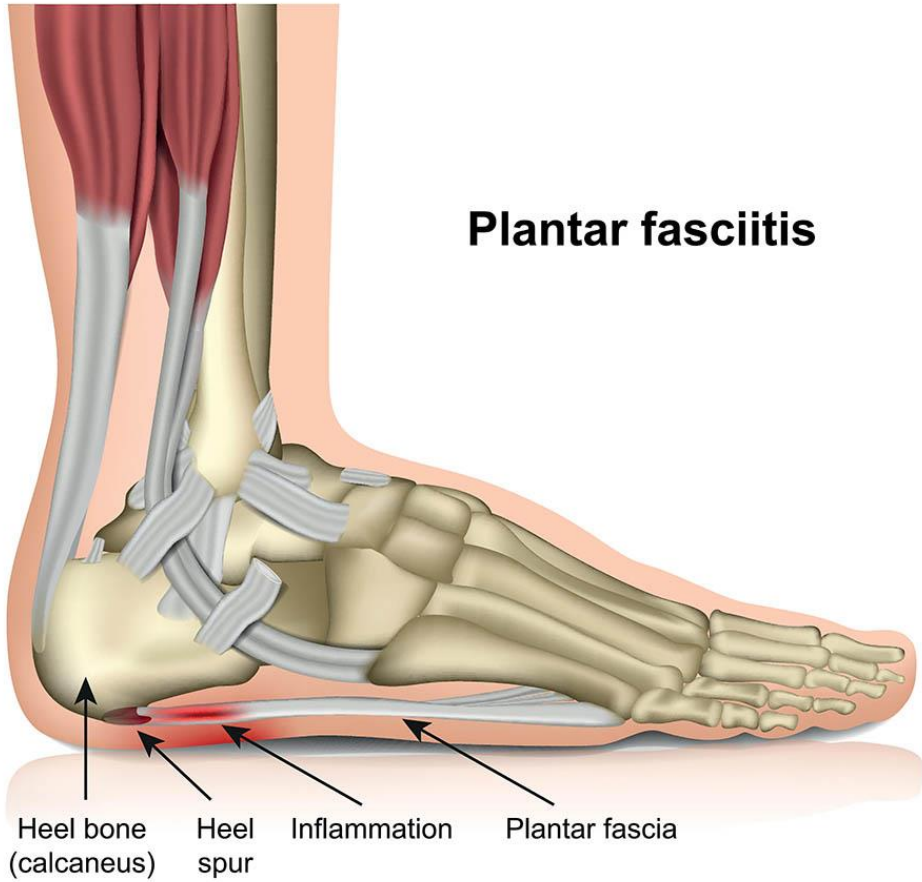
Plantar fascia

Overuse, poor footwear

Pain when first weight bearing in the morning

Tenderness over medial edge or origin of fascia from calcaneus

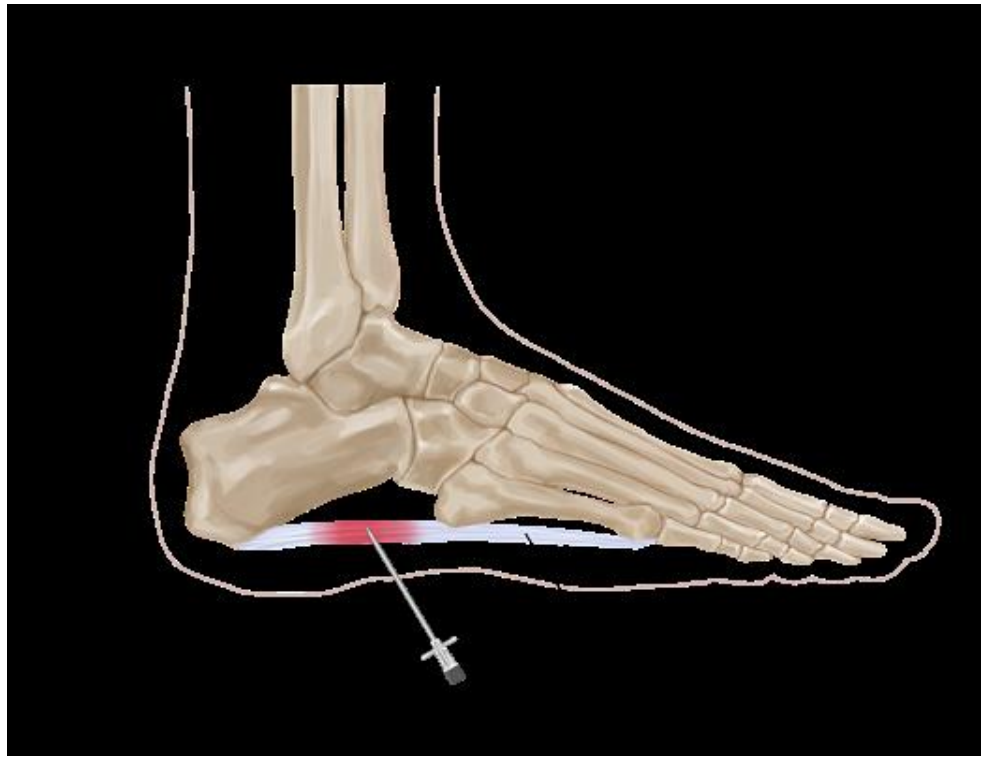
Often tight calf/gastric- refer to PT!



Plantar Fascia

- Patient lies prone with foot supported in dorsiflexion
- Identify tender area
- Insert needles perpendicularly into medial side of sole, just distal to heel pad. Advance at 45˚until it touches bone
- This is a more comfortable approach compared to straight through the heel pad
- Ultrasound guidance may be beneficial

25g, 1.25” or 1.5” needle, 20mg triamcinolone, 1mL Lidocaine





Review and Documentation

Post-injection Instructions



- Avoid excessive activity for 24-48 hours
- Gradual return to full activity
- Apply ice 3 x per day for 3 days (easy to remember)
- Ok to take NSAID/pain reliever
- Patient specific directions (DM, etc)
- Follow-up in 1-2 weeks, then rehab

Assess Outcomes- Feel like a hero!

- Follow-up within 2 weeks post-injection
- Consider physical therapy or a home exercise program to reduce risk of recurrence
- Additional modalities: ice/heat, oral or topical NSAID, essential oils, massage, yoga, exercise, PT
- If adequate improvement is not seen in 6-8 weeks, consider referral



Documentation Examples

After verbal consent, under sterile conditions, I injected 2 ml of 10mg/ml triamcinolone and 2 ml of 1% lidocaine into the patient's left/right knee. The patient tolerated the injection well.

After verbal consent, under sterile conditions, I injected 1 ml of 40 mg/ml triamcinolone and 4 ml of 1% lidocaine into the patient's left/right trochanteric bursa. The patient tolerated the injection well.

After verbal consent, under sterile conditions, I injected 2ml of 10mg/ml triamcinolone and 3 ml of 1% lidocaine into the left/right shoulder subacromial space from a posterior approach. The patient tolerated the injection well.

After verbal consent, under sterile conditions, I injected 0.5 ml of 40mg/ml triamcinolone and 1 ml of 1% lidocaine into the left/right elbow at the lateral epicondyle. The patient tolerated the injection well.

Documentation

After verbal consent, under sterile conditions, I injected 2ml of 0.25% bupivicaine and 2ml of Sodium Chloride Saline Solution into the patient's (list muscles). The patient tolerated the injection well.

After verbal consent, under sterile conditions, I injected 0.25 ml of 40mg/ml triamcinolone and 0.75 ml of 1% lidocaine into the left/right thumb/finger A1 Pulley. The patient tolerated the injection well.

After verbal consent, under sterile conditions, I anesthetized the skin with 5ml of 1% lidocaine and then cc's of clear yellow fluid was aspirated from the left/right knee and then injected 2ml of 10mg/ml triamcinolone. The patient tolerated the procedure well.

Contact

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www.yourmigrainetoolkit.com

Images/graphics: Unless otherwise noted, all images/graphics are from open sources or property of Laurel Short



References

Frontera, W. R., Silver, J. K., & Rizzo, T. D. (2014). *Essentials of physical medicine and rehabilitation: Musculoskeletal disorders, pain, and rehabilitation* (3rd ed.). London, United Kingdom: Saunders (W.B.) Co.

Geier, K. A., & Benham, A. J. (2015). Musculoskeletal Injections in Primary Care. *The Journal for Nurse Practitioners*, *11*(10), 968–978. https://doi.org/10.1016/j.nurpra.2015.08.009

Holm, G. (2015). *Arthrocentesis* (Powerpoint slides).

Sarwark, J. F. (Ed.). (2014). *Essentials of musculoskeletal care*. United States: American Academy of Orthopaedic Surgeons.

Saunders, S., & Longworth, S. (2012). *Injection techniques in Musculoskeletal medicine: A practical manual for Clinicians in primary and secondary care* (4th ed.). London: Elsevier Health Sciences.