Common Office Procedures

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Cryosurgery

Shave biopsy

Punch biopsy

Skin anatomy review

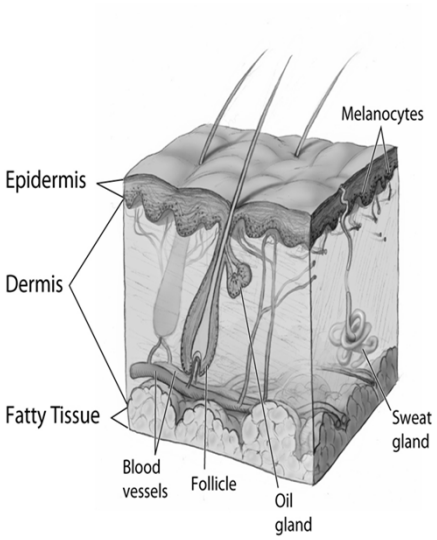

Image from National Cancer Institute

- Knowledge of skin anatomy critical to an effective procedure and understanding potential complications
- Epidermal thickness 0.05-1.5mm
- Dermal thickness 0.6-3mm

Cryosurgery

- Use of extremely low temperatures to produce local tissue destruction
- Liquid nitrogen most commonly used professionally
  - Produces much colder temps (-168C) than OTC products (i.e. dimethyl ether -24C)

Cryosurgery- vehicles

- Spray-tip canister
  - Direct contact not needed
- Cotton-tip applicator
  - Very precise
  - Small lesions near eyes
  - children
- Metallic instrument
  - Frozen in LN
  - Clamp to skin tag

Cryosurgery - mechanism

- Heat is transferred away from cells to the LN - causing tissue necrosis
- The freezing causes cell destruction
  - ice crystal formation
  - cell membrane disruption
  - vascular stasis
- Rapid cooling and slow thaw maximizes tissue destruction

Cryosurgery - indications

- **Benign lesions - skin tags, seborrheic keratosis, warts, molluscum, keloids, solar lentigines**
- **Pre-malignant lesions - actinic keratosis**
  - **Take care to biopsy any suspicious lesion for SCC**
- **Malignant lesions – superficial basal cell carcinoma, squamous cell carcinoma in situ**
  - **Used for thin, well defined lesions when other treatments are contraindicated (rare)**
  - **Require longer freezing times to reach lower tissue temperature**

Cryosurgery - technique

- **Freeze fast, thaw slowly**
  - **Better intracellular ice formation is more damaging**
- **Repeat freeze-thaw cycles for maximal destruction**
- **General parameters for benign and pre-malignant lesions:**
  - **1 to 2 cycles of 3-10 second freeze with 2mm lateral spread**

Cell Type	Temperature range for destruction
Melanocytes	- 4 to -7 C
Benign lesions (Keratinocytes)	-25 to -50 C
Malignant	At least -50C

Cryosurgery video

Cryosurgery-follow up

- **Expected side effects: Pain, edema, erythema, blister and crust formation**
- **Complications**
  - **Common: hypopigmentation (mild degree of freezing (-5C) to irreversibly damage melanocytes)**
  - **Uncommon: scarring, nail dystrophy, alopecia**

Cryosurgery

- Relative contraindications
  - Cold sensitivity (i.e. cold urticaria)
  - Ill-defined lesion, location (eyelid), tanned or dark skin
- Post-procedure care
  - Daily cleansing with soap and water
  - Petrolatum ointment
  - Sun protection
  - Healing expected within 1-3 weeks

Common Office Procedures

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Skin Biopsies

- Need to get informed consent
- Risks: Pain, bleeding, infection, scarring and the potential need for additional procedures
- Benefits: Diagnosis and potentially curative treatment

Shave biopsy

- Most common skin biopsy technique
- Diagnostic role - obtain specimen for histologic exam
- Therapeutic role - remove an inflamed or symptomatic skin lesion
  - If the intent is complete lesion removal then the term “shave excision” or “shave removal” is used

Shave biopsy

- Best for epidermal and superficial dermal processes
  - Biopsy of suspected basal cell carcinoma or squamous cell carcinoma
  - Removal of skin tags and other benign exophytic neoplasms

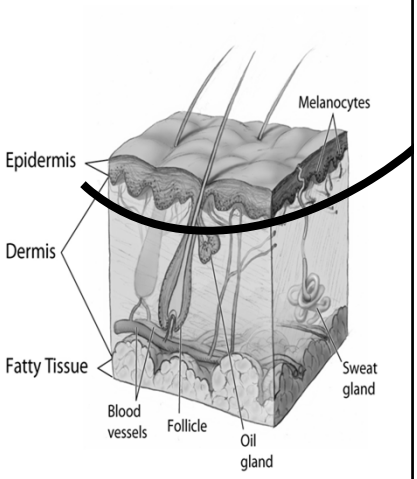


Image from National Cancer Institute

Shave biopsy

- Local anesthesia used to produce a wheal under the lesion
- Use a 15 blade or single-edged razor blade held semi-curved
- Move through skin in a sawing motion horizontally
  - Entering epidermis to depth of superficial dermis
- Goal is a shallow, saucer-shaped defect with a single intact specimen
- Submit specimen in 10% formalin or Michel's solution for immunofluorescence

Shave biopsy video

Punch biopsy

- **Deeper sampling than shave biopsy**
- **Diagnostic role - obtain specimen for histologic exam**
  - **Useful for rashes, dermal or subcutaneous nodules, melanocytic neoplasms**
- **Therapeutic role - removal of small dermal neoplasms**
  - **"benign excision" or "punch removal" are best terms**
  - **Useful for cysts, inflamed dermal nevi**

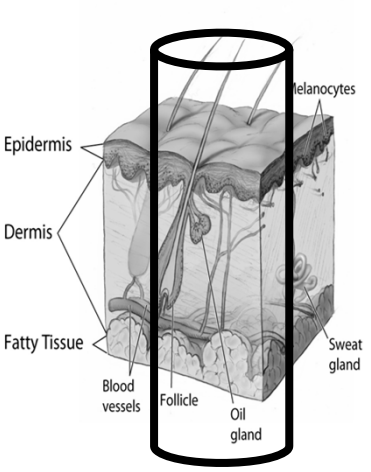


Image from National Cancer Institute

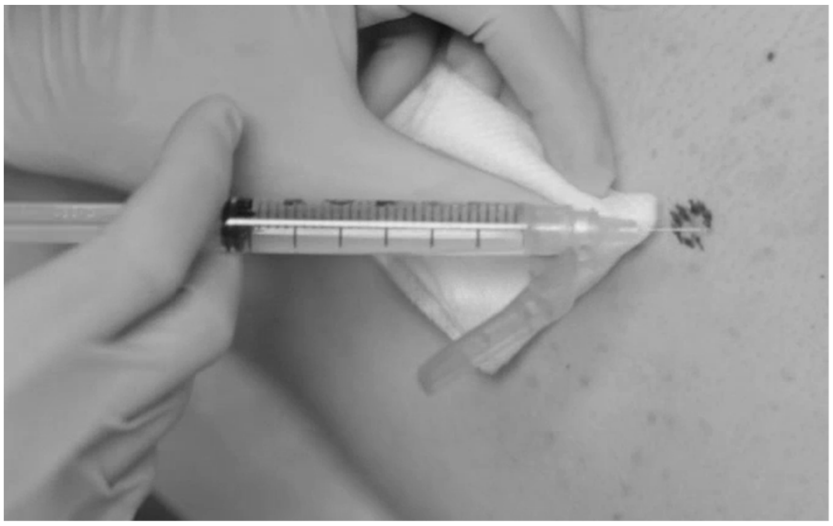
Punch biopsy

- Common punch tools vary from 2mm – 10mm
  - 4mm most common
- Oval-shaped defect is optimal
  - Created by spreading skin perpendicular to relaxed skin tension lines during biopsy
- Push and rotate punch tool to subcutaneous tissue (hub of the punch tool)
- Forceps and scissors used to extricate the specimen

Punch biopsy closure

- Sutures generally provide best closure
  - Nylon or polypropylene monofilament - require removal
    - 3-5 days for face (use 6-0)
    - 7-10 days for scalp and neck
    - 10-14 days for remainder of body
  - Fast-absorbing gut dissolves
- Secondary intention (if less than 4 mm)
- Wound closure strips in non tension areas
- Absorbable sponge product is a good choice for areas that are difficult to suture.

Punch biopsy video



Skin biopsy side effects and wound care

- Side effects
  - Pain, bleeding, crusting
  - Secondary infection
  - Delayed healing, especially hands, feet, lower legs in elderly person
  - Scar formation
- Wound care
  - Daily cleansing with soap and water
  - White petrolatum ointment + bandage changed daily
  - Sun protection to prevent scarring

Skin biopsy – bleeding risk

- Caution if severe thrombocytopenia, bleeding disorder or anticoagulant use
  - Biopsy may still be performed but hemostasis may be delayed
  - Lower legs, hands, feet, digits, lips, and scalp prone to bleeding
  - Use anesthetic with epinephrine – except tips or ears, fingers, toes or genital area
  - May need to use aluminum chloride, pressure dressing or absorbable sponge

Skin biopsy relative contraindications

- History of keloid scarring
- Infection at biopsy site
- Anesthetic allergy
  - More common with esthers than amides
  - Often due to a preservative rather than the anesthetic itself
  - Options
    - Anesthetic of alternate class in a preservative-free formulation
    - 1% diphenhydramine solution
    - Normal saline

Conclusions

- Knowledge of skin anatomy is critical to successful performance of dermatologic procedures and understanding side effects
- When performing cryosurgery tailor length of freeze and number of cycles to "thickness" of target lesion
  - Freeze fast and thaw slowly for best results
- Shave biopsy is best for epidermal and superficial dermal pathology
- Punch biopsy is best when assessment of dermal (or deeper) pathology is necessary

Office Procedures: Joint Injection Techniques

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Joint Injection Techniques
Objectives

- Injection, Aspiration
  - Indications for each
  - Relative and absolute contraindications
  - Outpatient setting (routine and urgent)
- Safety
  - Site identification and consent
  - Infection prevention
  - Prevent injury or tissue damage
  - Patient comfort
- Technique
  - Effective injection/aspiration
  - Key to success: anatomy

Joint Injection Techniques

- Indications
  - Diagnostic
    - Evaluation of synovial fluid
    - Local analgesia
  - Therapeutic
    - Improve pain/mobility
    - Adjuvant therapy
- Caution
  - Introduction of infection/worsen bleeding
  - Recurrence

Indications: Aspiration

- In setting of injury/trauma, historically:
  - Aspiration to obtain further diagnostic information
  - Hemarthrosis: ligament injury
  - Fat globules: bony injury
- Now essentially a historical use
  - Advances in imaging modalities
  - Avoid risk: injury, infection, or patient discomfort

Indications: Aspiration

- Diagnosis of infection or inflammatory arthritis,
  - Gout, RA, Pseudogout, etc.
  - Send aspirate for microbiological or fluid studies
- Management of septic arthritis
  - Serial aspiration
  - Rarely used as part of management strategy
  - Poor surgical candidate
  - May also be used to monitor clinical response
  - Send follow up aspirate for evaluation

Indications: Therapeutic Injection

- **Pain or inflammation of joint:**
  - **Osteoarthritis/ Degenerative Joint Disease**
  - **Rheumatoid Arthritis or other inflammatory arthropathy**
- **Tendonitis/Tenosynovitis/Bursitis:**
  - **Use Caution - may result in tendon injury**
  - **Inject bursa or tendon sheath**
  - **Rotator cuff tendinopathy/subacromial bursitis**
  - **Trigger finger, DeQuervain's tenosynovitis**
  - **Greater Trochanter, pes anersinus, other**

Indications: Therapeutic Injection

- **Enthesopathies**
  - **Lateral epicondylitis (Tennis elbow)**
  - **Medial epicondylitis (Golfer's elbow)**
  - **Achilles or Plantar fasciitis (caution)**

Contraindications:

- **Absolute:**
  - **Skin infection, contamination, or compromise at injection site**
    - **May be able to use alternate approach or location**
  - **Infected joint or bursa**
    - **Contraindication for Therapeutic injection**
    - **Indication for Diagnostic aspiration**
  - **Presence of Joint Prosthesis**
    - **Consult Ortho or refer patient back to treating surgeon**
  - **Patient preference/refusal**

Contraindications:

- **Relative:**
  - **Anatomic difficulty**
    - **Severe scarring**
    - **Ankylosis**
    - **Deep structure (intra-articular hip)**
    - **Excessive soft tissue envelope**
    - **Consider image guidance**
  - **Coagulopathy**
    - **depending on strength of indication, may be managed proactively**
  - **No/Minimal relief from previous**
  - **Osteoporosis surrounding**
  - **Uncontrolled diabetes mellitus**

Complications:

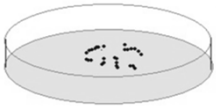
- Infection
- Reaction (local)
- Steroid flare
- Soft tissue atrophy
- Depigmentation
- Tendon rupture
- Systemic effects
- Direct needle injury

Safety:
Site Identification and Consent

- Informed consent
  - Review procedure, risks and benefits with patient
  - Document! (may be verbal or written)
- Determine correct site - patient agreement
  - Follow your institutional protocol
  - Each site of procedure should be identified
- Alert patient
  - Verbal confirmation of appropriate site
- Non-participating patient–include representative
  - Mark site according to institutional protocol

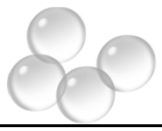
Safety:
Infection Prevention Skin Prep

- Decrease contamination/sterilize skin
- Do not place through non-intact skin!
  - Rash, cellulitis, psoriatic plaque, abrasion, etc.
  - May need alternate technique or delay procedure
- Skin Cleanse with antiseptic
  - Alcohol, Povidone-iodine and/or Chlorhexidine



Safety:
Infection Prevention Skin Prep

- Using basic sterile technique to prep:
  - Always wear gloves
  - Scrub field in circular pattern
    - center and moving outward
  - Do not touch field with non-sterile object
  - May use sterile alcohol swab to wipe injection site
  - If hair removal needed - snip or use clipper, not razor
- Allow alcohol to dry
  - Drying action hydrolyses bacteria to kill
- Perform procedure immediately to avoid re-contamination



Safety:
Patient comfort

- Try to make the experience as pleasant as possible
  - Avoid further discomfort or complications
  - Positioning, relaxation, watching, "Needle phobia"
- Use of Analgesics
  - Topical, local
- Accurate, confident injection technique
  - Know your anatomy and equipment
    - Needle and fluid "feel"
  - Difficult to reach target
    - Consider image guidance
  - Reassures patient

Safety:
Infection Prevention

- Use "no-touch" technique to place needle
  - important to avoid contaminating "field" by touching prepped area with unsterile object, e.g. glove
  - use of sterile gloves or sterile drape is optional
    - may require prepping larger field, and help of assistant
    - may be helpful if you need to palpate area for accuracy
- Cover with sterile dressing following injection
  - Compressive wrap optional

Injection Video:
Knee anatomy, Skin prep and Analgesia

Safety:
Avoid injury

- Direct mechanical injury,
  - bone, nerve, soft tissue, cartilage
- Vascular:
  - Intravascular injection, bleeding/ bruising
- Skin compromise:
  - Fistula formation
- Important to know anatomy of the area
- Medication Safety
  - Avoid allergy, side effects

Safety:
Medication - Steroid

- Efficacy generally accepted but little evidence
- Systemic side effects
  - Short term:
    - hyperglycemia
      - Persists for variable period following injection
  - Long term:
    - AVN
    - impaired immunity
    - adrenal suppression
  - Relatively rare with common injection dosing and occasional use

Safety:
Medication - Steroid

- True Allergy uncommon
  - May include allergy to carrier or other component of formulation
  - Still reported- rarely
- Local effects
  - Increased risk of infection
    - Possible increased risk of future periprosthetic infection
  - skin depigmentation
  - tendon attrition/tears
  - Actual effect on joint unknown, difficult to pinpoint

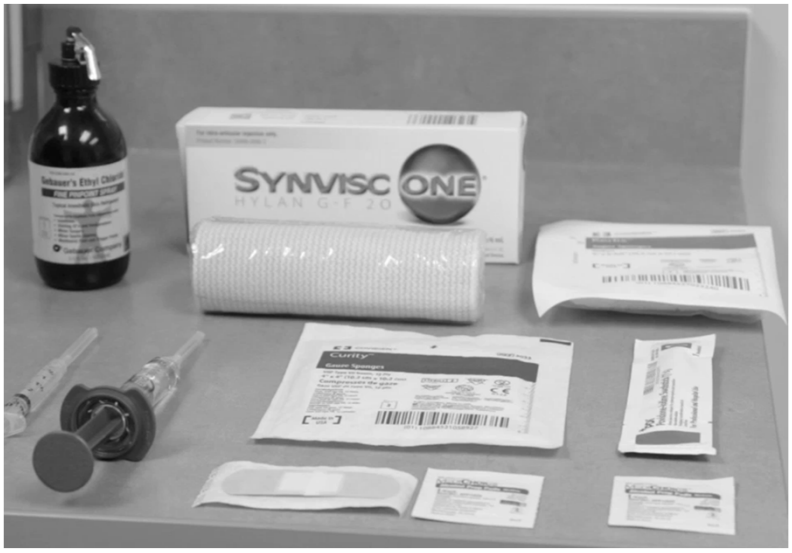
Safety:
Medication - Local anesthetics

- Lidocaine, ropivacaine, bupivacaine, etc.
- Allergy
- Toxicity
  - High intra-articular concentration linked to chondrotoxicity
  - CNS and Cardiovascular effects
    - Large dose
    - Inadvertent intravascular injection

Injection/Aspiration Technique

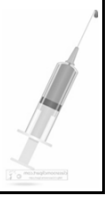
General comments:
- Sterile prep of area
  - Collect needed materials ahead of time
- Consider aspiration of the area just prior to injection
  - MAY yield fluid, confirming needle tip in "space"
  - Not always successful:
    - Smaller space, Minimal effusion
    - Edematous inflammatory tissue may obstruct needle on aspiration.
  - Safety: confirm that needle is NOT intravascular.
  - No blood return
- Fluid flow
  - Free flow of fluid -> needle reached the target

Injection Setup



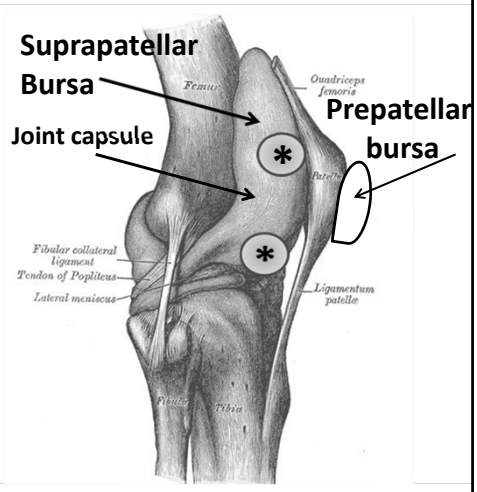
Injection/ Aspiration Technique Tips and Tricks-Needles

- Use same size needle for injecting/aspirating same fluid each time
  - consistent "feel" for the flow
- Smaller gauge may produce too much resistance to flow:
  - false feeling of not being in the space with injection attempt
  - may yield a false "dry tap" with aspiration attempt
- Larger gauge: flow may feel "too easy" even if not in joint.
- Needle length: Spinal needle for deep structures
  - Larger gauge due to flexibility and resistance to flow (18 or 20g)



Specific Technique: Knee

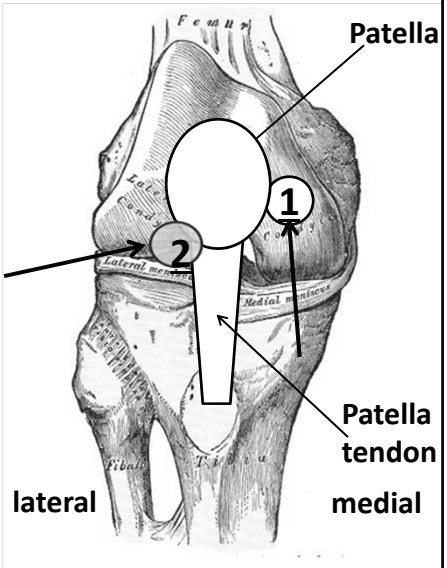
- **Relevant anatomy**
  - **Joint capsule extends from just below joint line to above patella, including suprapatellar pouch**
  - **Fibular head is lateral side, below joint line**
    - **Extra articular**
  - **Prepatellar bursa DOES NOT communicate with joint normally, Suprapatellar Bursa DOES.**



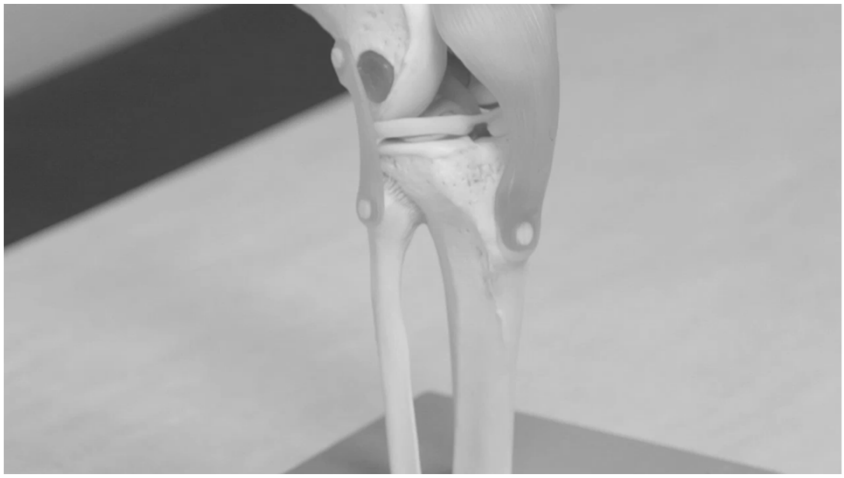
Anterolateral view Right Knee, lateral injection sites marked *

Specific injection technique Knee

- **Approach: anterior medial (1)**
  - **Knee flexed, patient seated**
    - **Medial femoral condyle**
    - **Needle aims directly posterior**
    - **Touch but do not penetrate articular cartilage**
- **Approach: anterior lateral (2)**
  - **Knee flexed, patient seated**
    - **Lateral arthroscopic portal**
    - **Location corresponds to lateral joint line, just lateral to Patella tendon**
    - **Aim needle posteromedially to enter femoral notch**
    - **Fluid should flow freely, otherwise advance slightly and gently apply pressure again**
      - **Needle may be in prepatellar fat pad**

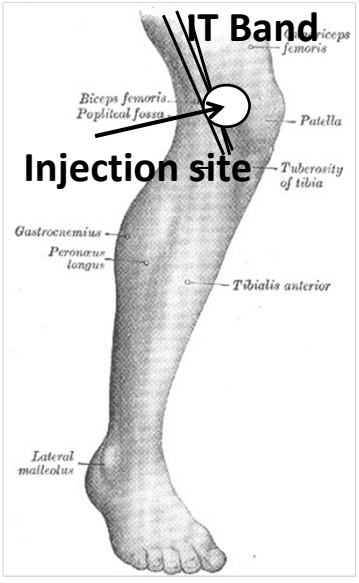


Simulation of Knee Injection with Anatomic Model



Specific injection technique: Knee

- Approach: lateral suprapatellar
  - Knee extended, patient supine
  - Inject suprapatellar pouch from lateral side
  - Palpate IT band (Posterior) and Quad Tendon (Anterior)
  - Insert needle at level just proximal to superior pole of patella
  - Should feel resistance at capsule, then "Pop" through
  - Needle should be able to pivot proximal and distal under patella/ quad tendon



Injection of pre-injected Knee with Viscosupplementation

Specific technique:
Greater Trochanteric Bursa Injection

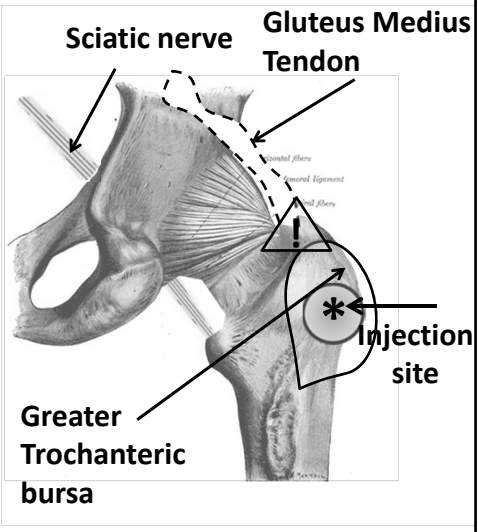
- Approaches:
  - Posterolateral "hip" / upper thigh
  - Lateral decubitus with affected side up
  - Can be done with patient standing and leaning over a table
    - Spinal needle sometimes needed for length
      - if large soft tissue envelope

Specific technique: Greater Trochanteric Hip Injection

- **Indications**
  - **Trochanteric "bursitis"**
    - **Maximally Painful area of posterolateral trochanter**
      - **may not correspond to physical fluid sac**
    - **Differentiate from Gluteus Medius tendon insertion**
    - **Inject point of maximal tenderness**

      (NOT G. Medius!)

      Avoid injection of tendon to avoid attritional tear



Specific technique: Greater Trochanteric Bursa Injection

Specific Technique: Shoulder
Subacromial Injection

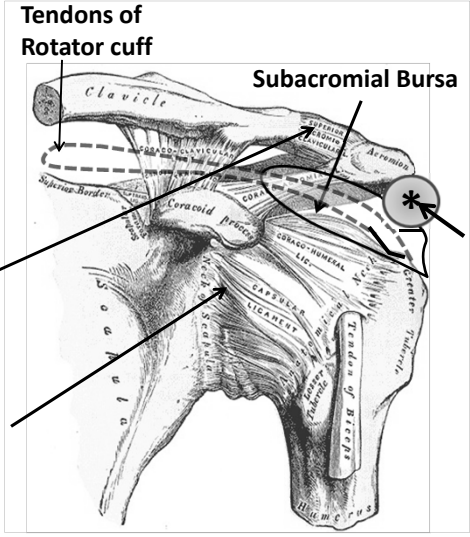
- Relevant anatomy
  - Subacromial bursa is separate from Glenohumeral joint if rotator cuff is intact
  - Lies between the Acromion and the rotator cuff tendons
- Positioning:
  - Seated upright or supine/beach chari
    - Seated position opens up subacromial space due to gravity on arm
    - Note: If there is full thickness Rotator Cuff tear, medication also reaches the Glenohumeral joint

Specific Technique: Shoulder
Subacromial Injection

- Diagnostic and/or therapeutic
- Indications
  - Subdeltoid/subacromial bursitis
  - Rotator cuff impingement
  - Rotator cuff tendinopathy
  - Adhesive capsulitis

Specific Technique: Shoulder

- **Multiple Shoulder injection targets**
  - **Subacromial Bursa**
    - **Most commonly performed**
    - **Topic of this instruction**
  - **Acromioclavicular Joint**
    - **Small joint superior/anterior to GH joint, lateral end of clavicle**
    - **May be difficult due to osteophytes**
  - **Glenohumeral Joint**
  - **(Intra-articular Shoulder)**
    - **Ultrasound guidance**



Anterior view of Left Shoulder

Specific Technique: Shoulder
Subacromial Injection

- **Palpate the distal, lateral, and posterior edges of acromion**
- **As prior with aseptic technique**
- **Needle is inserted just inferior to posterolateral edge of acromion**
  - **Directed anteromedially**

Acknowledgement

- Special thank you to Dr. Anne C. Sullivan, MD and Brian Valus, PA-C, for their expert assistance in preparing this presentation, including live patient demonstrations
- Many thanks also to the patients who consented to participate in the demonstrations for educational purposes.

References

- Bailie DS, Ellenbecker TS. Severe chondrolysis after shoulder arthroscopy: a case series. *J. Shoulder Elbow Surg.* 2009; 18:742-747.
- Cardone DA, DO., and Tallia AF, MD. *Am Fam Physician.* 2002 Jul 15;66(2):283-289.
- Henry Gray (1821–1865). Anatomy of the Human Body. 1918. (www. Bartelby.com)
- Werner BC, MD, Cancienne JM, MD, Browne JA, MD. The Timing of Total Hip Arthroplasty After Intraarticular Hip Injection Affects Postoperative Infection Risk. *J Arthroplasty*. 2016 Apr;31(4):820-3. doi: 10.1016/j.arth.2015.08.032. Epub 2015 Sep
- Sterile technique: https://onesource.osumc.edu/departments/PerioperativeServices/Documents/UHRossPolicies/Aseptic%20Technique%20UH.pdf