Common Office Procedures

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Cryosurgery

Shave biopsy

Punch biopsy

Skin anatomy review

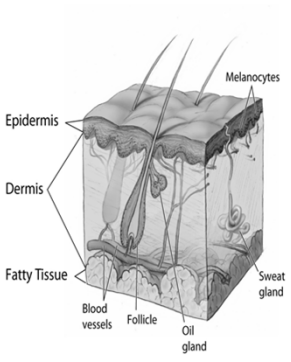

Image from National Cancer Institute

- 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

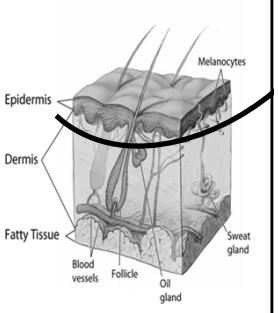
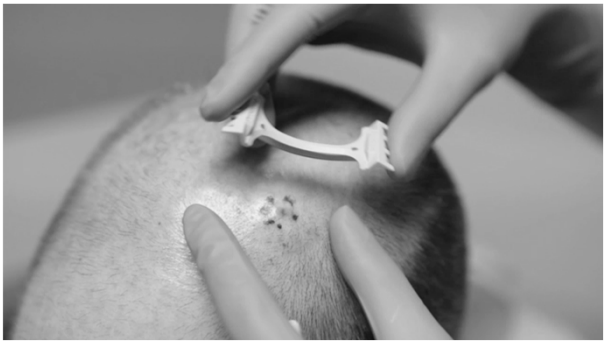


Image from National Cancer Institute

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

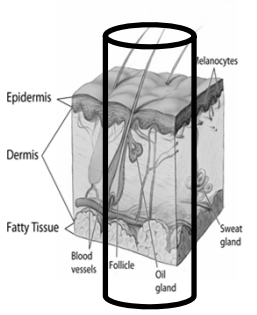
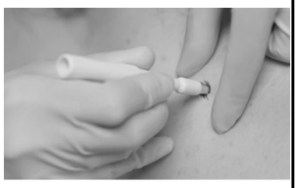


Image from National Cancer Institute

Punch biopsy

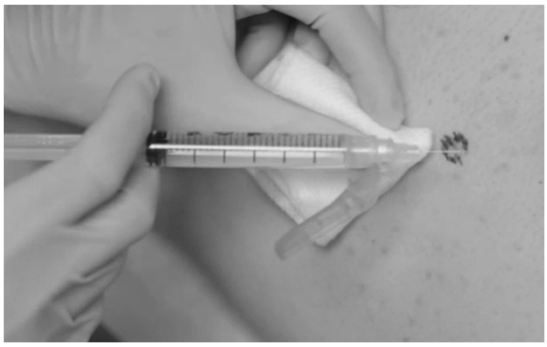
- Common punch tools vary from 2mm – 10mm
  - 4mm most common
- Oval-shaped defect is optimal
  - Created by spreading skin perpendicular to relaxed skin tension lines during biopsy
- Push and rotate punch tool to subcutaneous tissue (hub of the punch tool)
- Forceps and scissors used to extricate the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

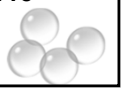
- Informed consent
  - Review procedure, risks and benefits with patient
  - Document! (may be verbal or written)
- Determine correct site - patient agreement
  - Follow your institutional protocol
  - Each site of procedure should be identified
- Alert patient
  - Verbal confirmation of appropriate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



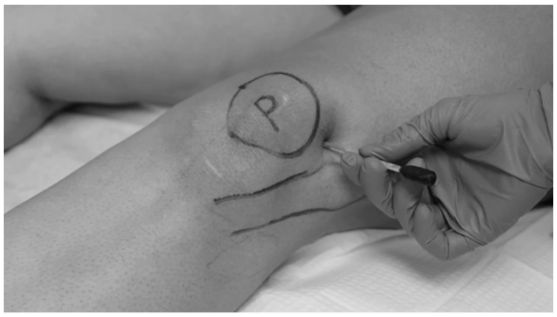
Safety:
Patient comfort

- 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

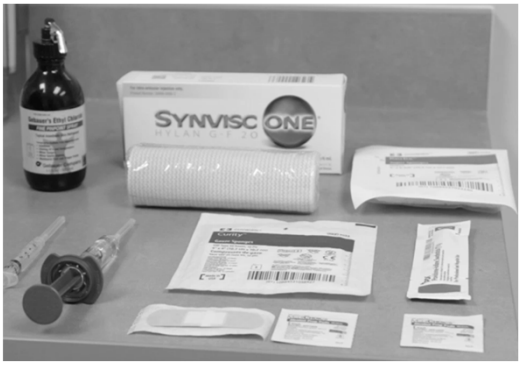
Safety:
Medication - Local anesthetics

- 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

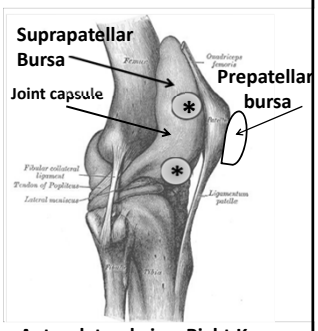


Injection/ Aspiration Technique Tips and Tricks-Needles

- 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

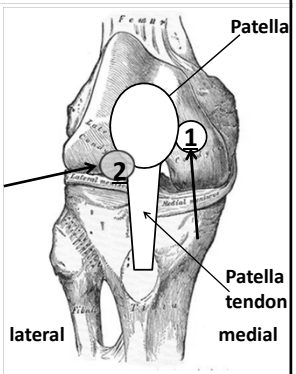
- **Relevant anatomy**
  - Joint capsule extends from just below joint line to above patella, including suprapatellar pouch
  - Fibular head is lateral side, below joint line
    - Extra articular
  - Prepatellar bursa DOES NOT communicate with joint normally, Suprapatellar Bursa DOES.



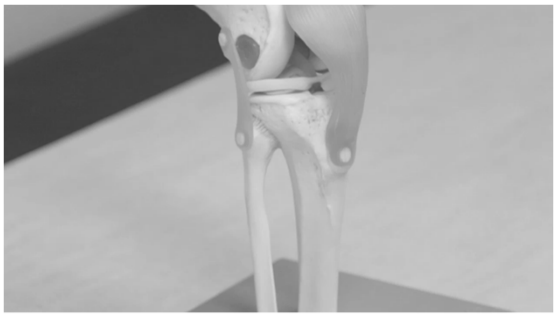
Anterolateral view Right Knee, lateral injection sites marked *

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

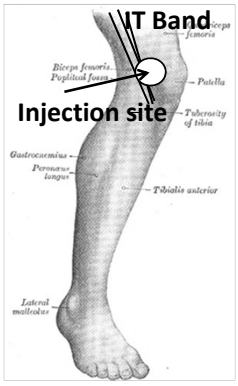


Simulation of Knee Injection with Anatomic Model

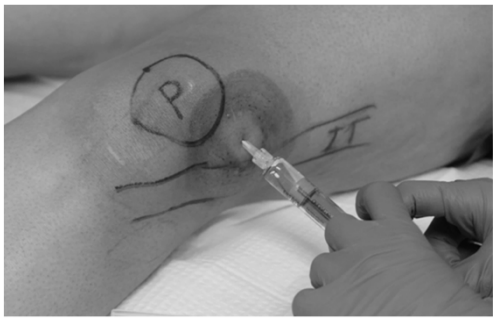


Specific injection technique: Knee

- 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

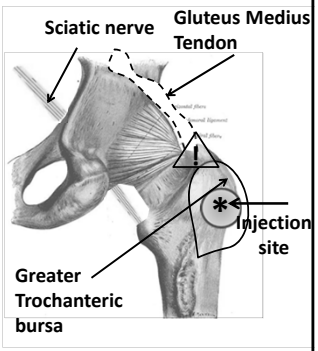


Specific technique:
Greater Trochanteric Bursa Injection

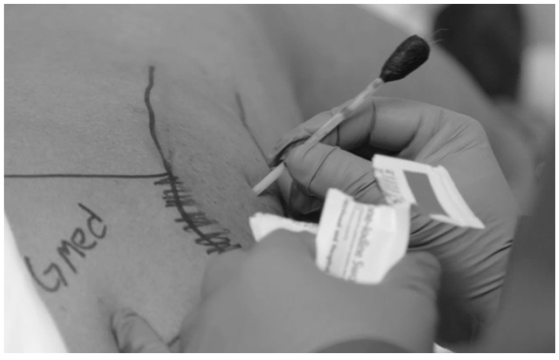
- Approaches:
  - Posterolateral "hip" / upper thigh
  - Lateral decubitus with affected side up
  - Can be done with patient standing and leaning over a table
    - Spinal needle sometimes needed for length
      - if large soft tissue envelope

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

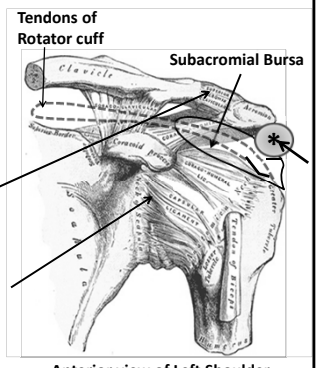
- Relevant anatomy
  - Subacromial bursa is separate from Glenohumeral joint if rotator cuff is intact
  - Lies between the Acromion and the rotator cuff tendons
- Positioning:
  - Seated upright or supine/beach chari
    - Seated position opens up subacromial space due to gravity on arm
    - Note: 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.

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