



## Common Office Procedures

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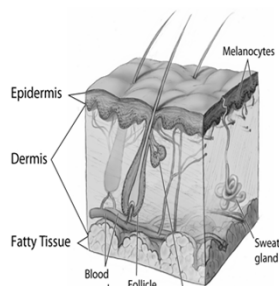
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## Objectives

- Review normal skin anatomy
- Define cryosurgery
- Discuss the indications
- Illustrate some techniques for cryosurgery
- Describe contraindications and post surgical care for cryosurgery

## Skin Anatomy



Knowledge of skin anatomy is 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)
- Relative contraindications
  - Cold sensitivity (i.e. cold urticaria)
  - Ill-defined lesion, location (eyelid), tanned or dark skin

### 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

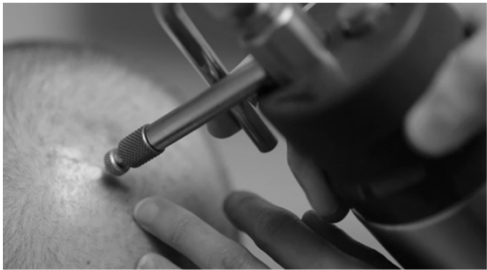
- Benign lesions - skin tags, seborrheic keratosis, warts, molluscum, keloids, solar lentiginos
- Pre-malignant lesions - actinic keratosis
  - Take care to biopsy any suspicious lesion for SCC
- Malignant lesions – superficial basal cell carcinoma, squamous cell carcinoma in situ
  - Used for thin, 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	-25 to -50 C
Malignant lesions	At least -50C

### Cryosurgery Video



### Cryosurgery – Post Procedure Care

- Daily cleansing with soap and water
- Petrolatum ointment
- Sun protection
- Healing expected within 1-3 weeks

### Cryosurgery – Post Procedure Expectations

- 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



### Common Office Procedures Skin Biopsies

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## Skin Biopsies

- Obtain informed consent
  - Risks:
    - Pain
    - Bleeding
    - Infection
    - Scarring
    - Potential need for additional procedures
  - Benefits
    - Diagnosis and
    - Potentially curative treatment

## Skin Biopsies- Relative Contraindications

- Bleeding Risk- severe thrombocytopenia, bleeding disorder, or anticoagulant/antiplatelet use
- 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 alternative class in preservative-free formulation
  - 1% diphenhydramine solution
  - Normal saline

## Skin Biopsies- Bleeding Risk

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

## Shave Biopsy

- Most common skin biopsy technique
- Diagnostic role- obtain specimen for histologic exam
- Therapeutic role- removed inflamed or symptomatic 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

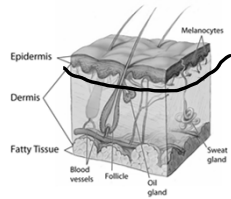


Image from National Cancer Institute

## Shave Biopsy

- Local anesthesia used to produce a wheal under the lesion
- Use a 10- or 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

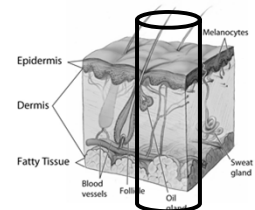


Image from National Cancer Institute

## Punch Biopsy

- Common punch tools vary from 2 mm – 10 mm
  - 4 mm is most common
- Oval-shaped defect is optimal
  - Create 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 can be used to extricate the specimen



## Punch Biopsy Closure

- Let close by secondary intention if < 4 mm
- 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
- Wound closure strips in non-tension areas
- Absorbable sponge product is a good choice for areas that are difficult to suture

## Punch Biopsy Video



## 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



## Common Office Procedures: Joint Injections

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### Objectives

- Overview common musculoskeletal procedures
- Discuss indications and contraindications for performing aspirations and injection of joints
- Review therapeutic and diagnostic benefit of such procedures

### Points to Review

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

### Aspiration Indications

- 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

### Aspiration Indications

- 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

### Injection Indications

- 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
  - 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
  - Drug allergies
  - Acute Fracture



### Contraindications

- Relative:
  - Anatomic difficulty
  - Severe scarring
  - 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
- Hypopigmentation
- Tendon rupture
- Systemic effects
- Direct needle injury

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### 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 peripherally
  - 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

### Infection Prevention - Skin Prep

- 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
  - Reassure 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

## Medication

### *Corticosteroid*

- 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

## Medication

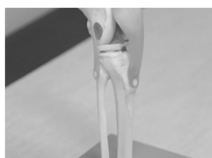
### *Corticosteroid*

- 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 hypopigmentation
  - Tendon attrition/tears
  - Actual effect on joint unknown, difficult to pinpoint

## 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



## Aspiration/Injection Technique

### *General Comments*

- 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)

**Aspiration/Injection Technique**

*Setup – Joint Injection Video*

**Injection video – Knee anatomy, Skin**



**Video - Aspiration/Injection Technique**

*Setup – Joint Injection Video*

**Instruments**



**Aspiration/Injection Technique**

*Specific - 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.

**Aspiration/Injection Technique**

*Specific - 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



### Aspiration/Injection Technique

*Specific - 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

### Video - Aspiration/Injection Technique

*Joint Injection Video*

Simulation of Knee Injection with Anatomic Model



### Video - Aspiration/Injection Technique

*Joint Injection Video*

Injection of pre-injected Knee with Viscosupplementation



### Aspiration/Injection Technique

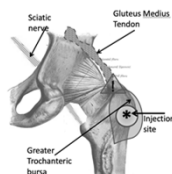
*Specific - GT Bursa*

- 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

## Aspiration/Injection Technique

### Specific - GT Bursa

- 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



## Aspiration/Injection Technique

### GT Bursa Injection Video

#### Video - Specific technique: Greater Trochanteric Bursa



## Aspiration/Injection Technique

### Specific - Subacromial Bursa

- 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 chair
    - 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

## Aspiration/Injection Technique

### Specific - Subacromial Bursa

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

## Aspiration/Injection Technique

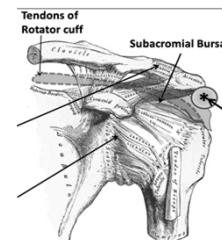
### Specific - Subacromial Bursa

- 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

## Aspiration/Injection Technique

### Specific - Subacromial Bursa

- 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



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