The Essential Toolkit for Musculoskeletal Injections in Primary Care

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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
Roadmap

• Didactic: general injection principles and safety

• 6 breakout sessions for specific injections- description/demonstration followed by practice time

• Review
Injections: Part of a Comprehensive Plan!

- Injection
- Rest
- Rehab
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

<table>
<thead>
<tr>
<th>Intermediate Acting</th>
<th>Long Acting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylprednisolone acetate</td>
<td>Triamcinolone acetonide</td>
</tr>
<tr>
<td>Depomedrol 40 mg/ml</td>
<td>Kenalog 40 mg/ml</td>
</tr>
<tr>
<td>Depomedrol + lidocaine</td>
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</tbody>
</table>

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

*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

<table>
<thead>
<tr>
<th>Short Acting</th>
<th>Long Acting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lidocaine hydrochloride</td>
<td>Bupivacaine (Marcaine)</td>
</tr>
<tr>
<td>0.5% 5mg/ml</td>
<td>0.25% 2.5mg/ml</td>
</tr>
<tr>
<td>1.0% 10mg/ml</td>
<td>0.5% 5mg/ml</td>
</tr>
<tr>
<td>2.0% 20mg/ml</td>
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</table>

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

*Slower onset, ~30 minutes for full effect. Duration >8 hours.*
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 degradation
  – Direct protective action on nociceptive endings
Hyaluronan (Orthovisc ®)

No avian protein allergy (not from rooster comb),
Largest molecule, Series of 3 injections

Hylan G-F 20 (Synvisc ® Synvisc-One ®)

Avian protein allergy
Uses formaldehyde & vinyl sulfone to increase molecular weight

Sodium Hyaluronate (Euflexxa®, Gel-one®, Hyalgan®, Supartz®, Neovisc®)
3 - 5 weekly injections
CAUTION: avian protein allergy (eggs, feathers, poultry)
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
Additional Supplies

- Gloves
- Gauze
- Povidone-iodine swab
- Alcohol wipe
- Adhesive bandage
- Ethyl chloride spray or ice (optional)
- Needles & Syringes
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, AC Joint:**
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
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

Medications
Triamcinalone J3301
Dexamethasone J1100
(Bupivacaine J7799)
Ice pack applies 97010
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*
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
What if it is not going as planned?
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
Helpful Resources

INJECTION TECHNIQUES in Orthopaedics and Sports Medicine
A practical manual for doctors and physiotherapists

Stephanie Saunders
Steve Longworth

FOREWORD BY
Peter Maddison

THIRD EDITION

Essentials of Musculoskeletal Care
3rd Edition

Letha Yurko Griffin, MD, PhD
Editor
Caffeine
PO
Q4H
PRN
Conference Adventures
Neck and Shoulder

Trigger point and posterior shoulder injections
Shoulder Anatomy

• 3 Bones
  scapula
  clavicle
  humerus

• Rotator cuff muscles (SITS)
  Supraspinatus
  Infraspinatus
  Teres Minor
  Subscapularis
Shoulder Indications

- Tendinitis/tendinosis
- Impingement syndrome
- Bursitis
- Osteoarthritis
Subacromial Shoulder Injection

- 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: 5ml syringe, 25 g 1.5” needle, 2cc 10mg Kenalog + 3cc 1% Lidocaine
Posterior Neck - Trigger Point Injections
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
3ml syringe, 25 g 1.5” needle, 1/2cc 40mg Kenalog + 1cc 1% Lidocaine

• Mostly Lateral
  – Tennis elbow

• Medial
  – Golfer’s elbow
  – Careful of Cubital tunnel- ulnar nerve
Elbow Video
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 g 1.5” needle, 1/4cc 40mg Kenalog + 1/2cc 1% 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 g 1.5” needle, 1/2cc 40mg Kenalog + 1cc 1% 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
On Your Mark, Get Set, Practice!
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 Kenalog + 4cc 1% Lidocaine

• 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 Kenalog + 2cc 1% Lidocaine

- 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
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 Kenalog + 1cc 1% Lidocaine

- Patient sits or lies supine with knee flexed
- Identify and mark tender area over the bursa, if needed have patient flex knee against resistance
- Insert needle and advance to touch bone
- Pull back slightly and inject solution as bolus
Review and Documentation
After verbal consent, under sterile conditions, I injected 2 ml of 10mg/ml Kenalog and 2 ml of 1% Xylocaine 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 Kenalog and 4 ml of 1% Xylocaine 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 Kenalog and 3 ml of 1% Xylocaine 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 Kenalog and 1 ml of 1% Xylocaine into the left/right elbow at the lateral epicondyle. The patient tolerated the injection well.

After verbal consent, under sterile conditions, I injected 2ml of 0.25% Marcaine 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 Kenalog 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% Xylocaine and then cc’s of clear yellow fluid was aspirated from the left/right knee and then injected 2ml of 10mg/ml Kenalog. The patient tolerated the procedure well.
Contact

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References


