Ultrasound Guided Injections
Eric W. Lee, MD

Las Vegas, NV

Disclosures
- Speaker: Sonosite, Arthrex
- Royalties: None
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I do not intend to discuss any off-label use/unapproved use of drugs or devices

Why should I use ultrasound guidance for injections?
- Better Accuracy
- Less Procedural Pain

Better results!
Accuracy of Knee Injections

- FACT:
  - Anatomical or Landmark based injections often miss their intended target
  - 7-29% of knee injections are NOT intra-articular
  - Needle placement accuracy ranges from 39-100%
    - Avg 22.2% miss rate
- Jackson (2002)

Accuracy of Landmark-based Subacromial Injections

- 30-40% of injections miss the subacromial bursa
  - Eustace (1997)
  - Yamakado (2002)
  - Henkus (2006)
  - Sethi (2006)

US guided injections are more accurate

- AC joint: 45% vs. 100%
- Biceps Tendon Sheath: 40% vs. 87%
- Glenohumeral Joint: 79% vs. 95%
- Subacromial Space: 63% vs. 100%
- Knee: 79% vs. 99%

AJSM 2011, JSES 2011
Do Ultrasound guided knee injections have better results?

- Sibbitt et al. (2009)
  - 43% reduction in procedural pain ($p < 0.001$)
  - 59% reduction ($p < 0.001$) in absolute knee pain scores at 2 weeks vs. anatomical-guided injections

Do Ultrasound-guided shoulder injections have better results?

- Naredo et al. (2004)
  - Randomized cohort (41 patients) to blind vs. US guided subacromial cortisone injection
  - VAS (pre vs) & SFA (pre vs) significantly better in US group at 6 weeks

How do I do it?
Injection Techniques: In-Plane

- Needle is parallel to the long axis of the transducer
- Can see entire path of needle if correctly performed
- Beware of Anisotropy
  - Sonographic artifact associated with linear structures
  - Occurs when a linear structure is not parallel to ultrasound beam
  - Tilting the transducer will cause the structure to appear smaller than actual

Injection Technique: Out-of-plane

- Needle path perpendicular to long axis of transducer
- Will see pinpoint flash as needle passes through plane of ultrasound transducer
  - Tissue Movement
  - Tactile Feedback
  - Depth

Tips on utilizing ultrasound for needle placement

- Be cognizant of bony architecture
- Think Planar
- Always know your orientation
- See first, inject second
- Brace yourself
- Highly operator dependent. Practice makes perfect!
Knee Injections: In-Plane Technique

- Identify longitudinal

Proper Leg position: Knee flexed 20–30 degrees

Knee Injections: In-Plane Technique

- Swivel Transverse

Knee Injections

- Suprolateral approach into pouch
- Beware of pre-femoral fat pad
Knee Suprapatellar Injection

Subacromial Injections
- "In Plane" Technique Preferred
- Hand on hip position to "uncover" subacromial bursa
Posterior Glenohumeral Joint Injection

Out of plane technique preferred

Bicep Tendon Sheath Injection

[Diagrams and illustrations related to the text]
Bicep Tendon Sheath Injection

- In plane injection:
  - Lateral Medial

Bicep Tendon Sheath Injection

- Transverse Approach:
  - Short axis
  - Laterally approached needle in long axis to the probe
  - Slight external rotation

AC joint injection short axis needle

Out of plane needle
Ultrasound-Guided Injections

- **ACTION:** Using ultrasound in my office takes too long
- **FACT:** Proper US incorporation for in-office injections adds negligible time

What do you need?
- Sterile gown/gloves, mask/hat
- Sterile drapes
- Sterile transducer sheath or cover
- Sterile gel
- Sterile operating room

**NO! Just use standard in-office sterile technique.**

Tips on Efficiency
- Have your staff prepare injection, alcohol swabs, band aid, Ethyl chloride, gauze, and gown for patient
- Set up machine
- Patient identification
- Date
- Site label
- Gel probe

**Room time:** 30-60 seconds
Anterior Hip Joint Ultrasound Anatomy

1. Femoral Head
2. Articular Cartilage
3. Acetabulum
4. Labrum
5. Overlying Muscles
6. Femoral Neck
7. Joint Capsule

Hip Joint – Ant. Synovial Recess

- Position: Supine
- Tip: Start in the sagittal plane and find ASIS
- Move medial and find the femoral head
- Tilt probe obliquely in line with neck/head

MRI equivalent: Oblique between Sagittal / Axial planes

Needle Path
AC joint injection long axis needle

AC joint injection long axis needle

Biceps Sheath Injection

Out of Plane  In Plane
Posterior Glenohumeral Joint Injection

Ultrasound Improves Injection Accuracy

- **FACT**: Anatomical or landmark based injections often miss their intended target.
- **FICTION**: Other physicians may miss, but I don’t.

Posterior Glenohumeral Joint Identification
Subacromial Injection
- Approach: Lateral long axis to rotator cuff

Knee Injection – No Effusion

MSK Ultrasound Imaging Consideration
- Anisotropy: Sonographic artifact associated with linear structures
  - Occurs when a linear structure is not 90 degrees to ultrasound beam
  - Muscles, Tendon, Ligament, Cortex and Nerve
  - Tilting the transducer will cause the structure to appear artificially absent
- Shoulder Imaging PEARL: If the bone is bright, the tendon typically is also