

## EQUIPMENT

- 10 mL syringe
- 25-gauge, 1-1/2 in. needle. (Consider 3-1/2 in., 25-gauge needles in large individuals.)
- 8 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Position the needle and syringe at about a 30 degree angle to the skin with the needle tip directed cephalad toward the acromion.
3. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
4. Get underneath the acromion and advance the needle toward the target until the needle tip touches the undersurface of the acromion. Back up the needle 1 to 2 mm.
5. Inject the steroid solution as a bolus into the subacromial space. The injected solution should flow smoothly into the space. Increased resistance may indicate that the injected fluid is entering the supraspinatus muscle or tendon. In that case, advance or withdraw the needle slightly before attempting further injection.
6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the subacromial space.
9. Reexamine the shoulder in 5 min to confirm pain relief.



**FIGURE 4** • Right shoulder subacromial space injection.

## AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider the use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20610—Injection of major joint or bursa

## PEARLS

- The correct identification of the acromion landmarks is more difficult than many primary care providers realize. Make sure to take your time and recheck the landmarks before proceeding with the injection.
- When palpating to determine the location of the acromion, use the fingertips of your index, middle, and ring fingers. Gently and methodically move in a distal-to-proximal direction. Mark the site where your fingers meet the bone.
- Ensure that the needle is underneath the acromion before advancing it toward the target finger.
- Always keep your target finger over the acromion to protect it from accidental needle stick.



A video clip showing a subacromial space injection can be found on the book's web site.

# Glenohumeral Joint—Posterior Approach

The glenohumeral (GH) joint is a relatively uncommon injection site for most primary care physicians. Successful injection can be difficult because of the limited space available in patients with adhesive capsulitis. Both anterior and posterior approaches can be used. For reasons listed in the previous chapter, the posterior approach is preferred. One uses the same injection site identified above in the Subacromial Space Injection chapter. Since the long head of the biceps tendon has its origin within the joint capsule, a GH joint injection offers an approach to tendonitis of this structure.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the joint space. A large diameter needle is not necessary since a significant amount of fluid usually does not collect in the joint capsule.

Indications	ICD-9 Code	ICD-10 Code
Shoulder pain	719.41	M25.51
Shoulder adhesive capsulitis	726.0	M75.0
GH joint arthritis, unspecified	716.91	M13.91
GH joint arthrosis, primary	715.11	M19.01
GH joint arthrosis, post-traumatic	716.11	M19.11
GH joint arthrosis, secondary	715.21	M19.21

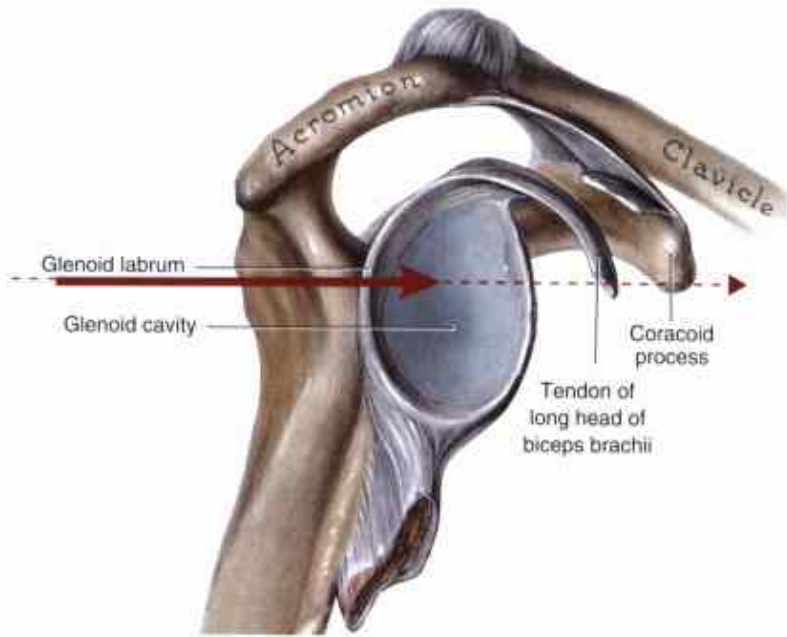
**Relevant Anatomy:** (Figs. 1 and 2)

## PATIENT POSITION

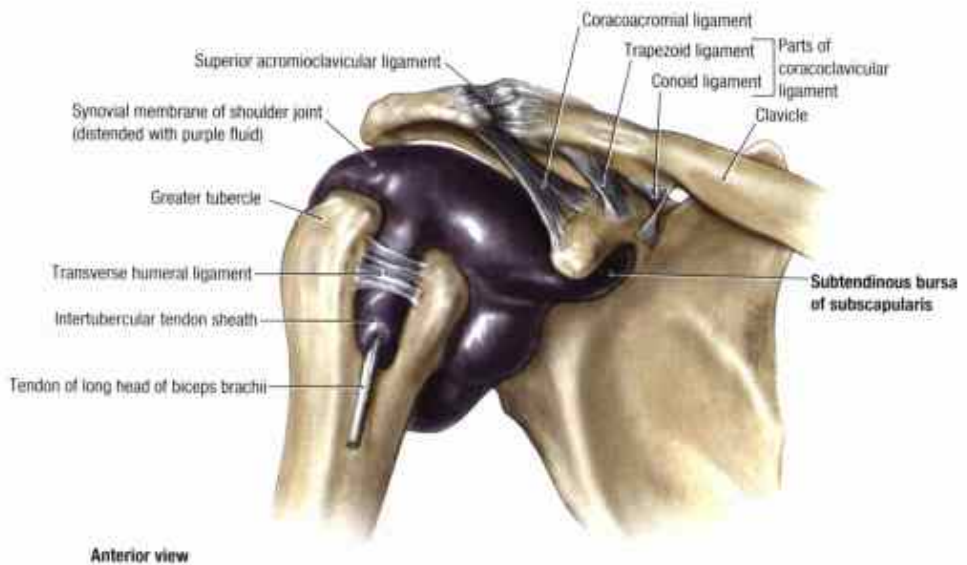
- Sitting on the examination table.
- The patient's hands are folded in his or her lap. The hand of the shoulder that is not involved is placed over the hand of the shoulder that is to be injected.

## LANDMARKS

1. With the patient seated on the examination table, the clinician stands lateral and posterior to the affected shoulder.
2. Find the lateral edge of the acromion and mark it with an ink pen.
3. Palpate the posterior edge of the acromion and mark that.
4. Having identified the posterior lateral corner of the acromion, drop a vertical line down from that point and mark a spot 2 cm below the posterior lateral corner.
5. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.



**FIGURE 1** • Right lateral shoulder (red arrow indicates path of the needle). (Adapted from Agur A, Lee M.J. *Grant's Atlas of Anatomy*. 10th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:456.)



Anterior view

**FIGURE 2** • Right GH joint capsule. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)



6. Next, identify the target site by placing the index finger of your nondominant hand over the coracoid process. This will be the target for the tip of the needle.
7. After the landmarks are identified, the patient should not move the shoulder or arm.

## ANESTHESIA

- Local anesthesia of the skin with lidocaine or topical vapocoolant spray is not necessary in most patients.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle.
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Position the needle and syringe perpendicular to the skin with the needle tip directed anterior toward the coracoid process.
3. Using the no-touch technique, introduce the needle at the insertion site (Fig. 3).
4. Advance the needle toward the target until the needle tip touches the humeral head. Back up the needle 1 to 2 mm.



**FIGURE 3** ● GH joint injection—posterior approach.

5. Inject the steroid solution as a bolus into the GH joint. The injected solution should flow smoothly into the joint space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the subacromial space.
9. Reexamine the shoulder in 5 min to confirm pain relief.

## AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider the use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20610—Injection of major joint or bursa

## PEARLS

- The correct identification of the acromion landmarks is more difficult than many primary care providers realize. Make sure to take your time and recheck the landmarks before proceeding with the injection.
- When palpating to determine the location of the acromion, use the fingertips of your index, middle, and ring fingers. Gently and methodically move in a distal-to-proximal direction. Mark the site where your fingers meet the bone.
- A smaller volume of lidocaine is used in this injection compared to the subacromial space injection because the joint capsule is frequently contracted—especially in patients with adhesive capsulitis.



A video clip showing a GH joint injection can be found on the book's web site.

# Glenohumeral Joint— Anterior Approach

The glenohumeral (GH) joint is a relatively uncommon injection site for most primary care physicians. Successful injection can be difficult because of the limited space available in patients with adhesive capsulitis. Because the physician is operating in front of the patient, this technique generates much more patient anxiety and perceived pain. For these reasons, the posterior approach is preferred. Since the long head of the biceps tendon has its origin within the joint capsule, a GH joint injection offers an approach to tendonitis of this structure.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the joint space. A large diameter needle is not necessary since a significant amount of fluid usually does not collect in the joint capsule.

Indications	ICD-9 Code	ICD-10 Code
Shoulder pain	719.41	M25.51
Shoulder adhesive capsulitis	726.0	M75.0
GH joint arthritis, unspecified	716.91	M13.91
GH joint arthrosis, primary	715.11	M19.01
GH joint arthrosis, posttraumatic	716.11	M19.11
GH joint arthrosis, secondary	715.21	M19.21

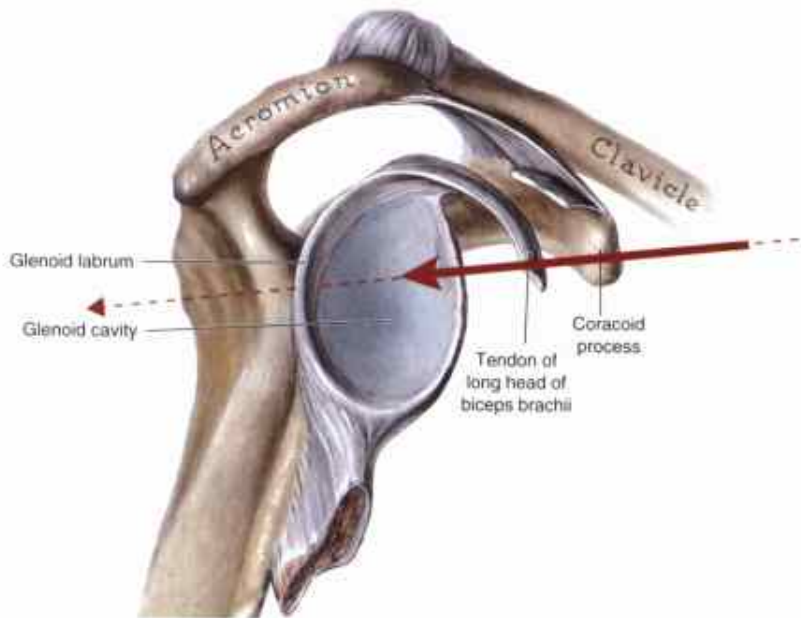
**Relevant Anatomy:** (Figs. 1 and 2)

## PATIENT POSITION

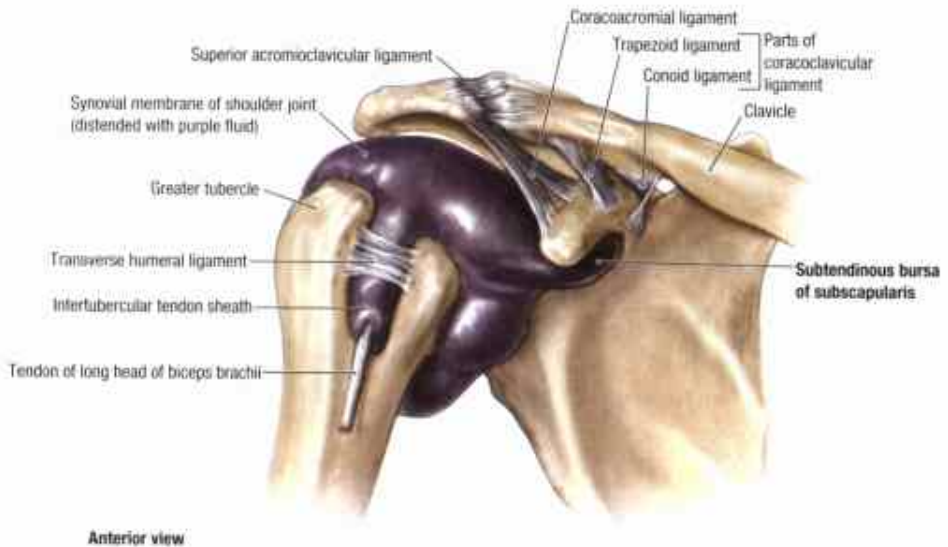
- Sitting on the examination table.
- The patient's hands are folded in his or her lap.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient seated on the examination table, the clinician stands lateral and anterior to the affected shoulder.
2. Identify the coracoid process. This is the hard and somewhat tender knob of bone immediately medial to the humeral head.
3. The injection point is just 1 cm lateral to the coracoid process.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. Find the lateral edge of the acromion and mark it with an ink pen.

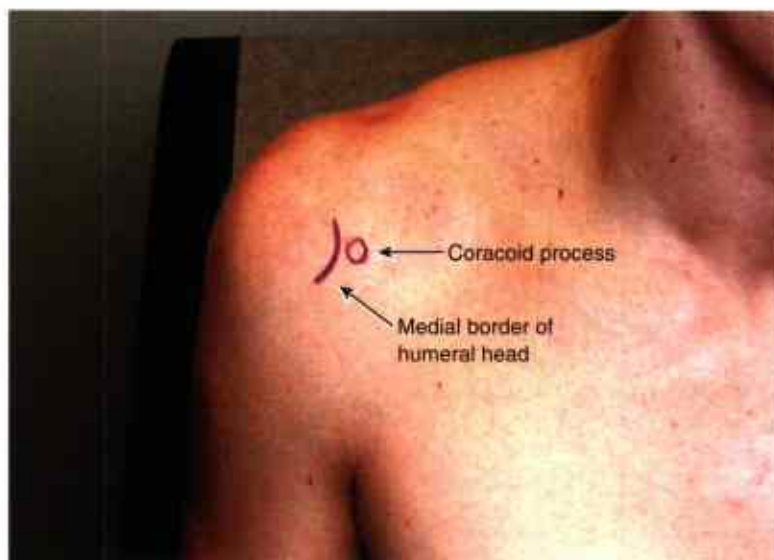


**FIGURE 1** • Right lateral shoulder (red arrow indicates path of the needle). (Adapted from Agur A, Lee MJ. *Grant's Atlas of Anatomy*. 10th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:456.)



**FIGURE 2** • Right GH joint capsule. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)





**FIGURE 3** • Anterior right shoulder landmarks.

6. Palpate the posterior edge of the acromion and mark that.
7. Having identified the posterior lateral corner of the acromion, drop a vertical line down from that point and mark a spot 2 cm below the posterior lateral corner. This will be the target for the tip of the needle (Fig. 3).
8. Once the landmarks are identified, the patient should not move the shoulder or arm.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle. (Consider longer, 25-gauge needles in large individuals.)
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two providone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the providone-iodine pads.
2. Position the needle and syringe perpendicular to the skin with the needle tip directed posterior toward the target site 2 cm caudad to the posterior lateral corner of the acromion.
3. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
4. Advance the needle toward the target until the needle tip touches the humeral head. Back up the needle 1 to 2 mm.



**FIGURE 4** • GH joint injection—anterior approach.

5. Inject the steroid solution as a bolus into the GH joint. The injected solution should flow smoothly into the joint space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
6. Following injection of the corticosteroid solution, withdraw the needle.
7. Apply a sterile adhesive bandage.
8. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the subacromial space.
9. Reexamine the shoulder in 5 min to confirm pain relief.

### AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20610—Injection of major joint or bursa

### PEARLS

- When palpating to determine the location of the coracoid, use the fingertips of your index, middle, and ring fingers. Firmly palpate the humeral head and methodically move in a lateral-to-medial direction. Mark the site where your fingers meet the coracoid.
- When palpating to determine the location of the acromion, use the fingertips of your index, middle, and ring fingers. Gently and methodically move in a distal-to-proximal direction. Mark the site where your fingers meet the bone.
- A smaller volume of lidocaine is used in this injection compared to the subacromial space injection because the joint capsule may be stenosed—especially in patients with adhesive capsulitis.

# Acromioclavicular Joint

The acromioclavicular (AC) joint is a relatively uncommon injection site for most primary care physicians. Successful injection can be difficult because of the small joint space. A small diameter needle is appropriate as this technique is only used to inject steroid solution into the AC joint.

Indications	ICD-9 Code	ICD-10 Code
AC joint pain	719.41	M25.51
AC joint sprain	840.0	S43.5
AC joint subluxation/dislocation	831.04	S43.1
AC joint arthritis, unspecified	716.91	M13.91
AC joint arthrosis, primary	715.11	M19.01
AC joint arthrosis, posttraumatic	716.11	M19.11
AC joint arthrosis, secondary	715.21	M19.21

## Relevant Anatomy: (Fig. 1)

### PATIENT POSITION

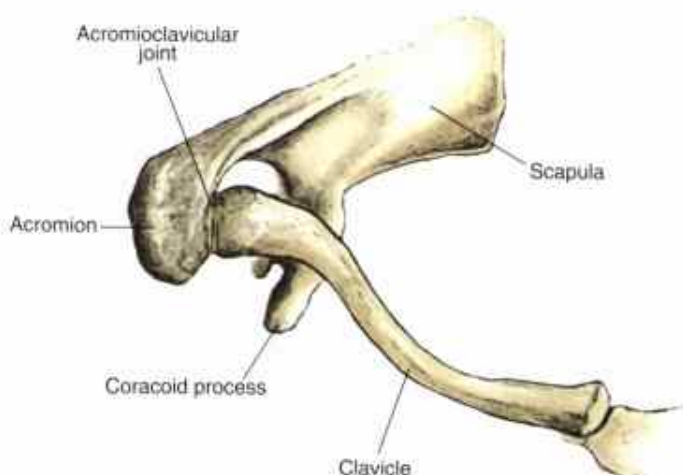
- Sitting or lying supine on the examination table.
- The patient's hands are folded in his or her lap.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

### LANDMARKS

1. With the patient seated or lying supine on the examination table, the clinician stands lateral and anterior to the affected shoulder.
2. Identify the AC joint. Palpate the clavicle in a medial-to-lateral direction. At the lateral aspect of the clavicle, there is a small depression that will be tender in the above conditions.
3. The injection point is located directly over the AC joint. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. Once the landmarks are identified, the patient should not move the chest or shoulder.

### ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.



**FIGURE 1** • Right AC joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed caudad.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the AC joint space.
6. Inject the steroid solution as a bolus into the AC joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the AC joint.
10. Reexamine the shoulder in 5 min to confirm pain relief.

## AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider the use of an arm sling.





**FIGURE 2** ● AC joint injection with landmarks.

- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20600—Injection of small joint

### PEARLS

- The AC joint is superficial. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.

# Sternoclavicular Joint

The sternoclavicular (SC) joint is an uncommon injection site for most primary care physicians. Successful injection can be difficult because of the small joint space.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the SC joint.

Indications	ICD-9 Code	ICD-10 Code
SC joint pain	719.41	M25.51
SC joint sprain	848.41	S43.6
SC joint subluxation/dislocation	739.61	S43.2
SC joint arthritis, unspecified	716.91	M13.91
SC joint arthrosis, primary	715.11	M19.01
SC joint arthrosis, post-traumatic	716.11	M19.11
SC joint arthrosis, secondary	715.21	M19.21

**Relevant Anatomy:** (Fig. 1)

## PATIENT POSITION

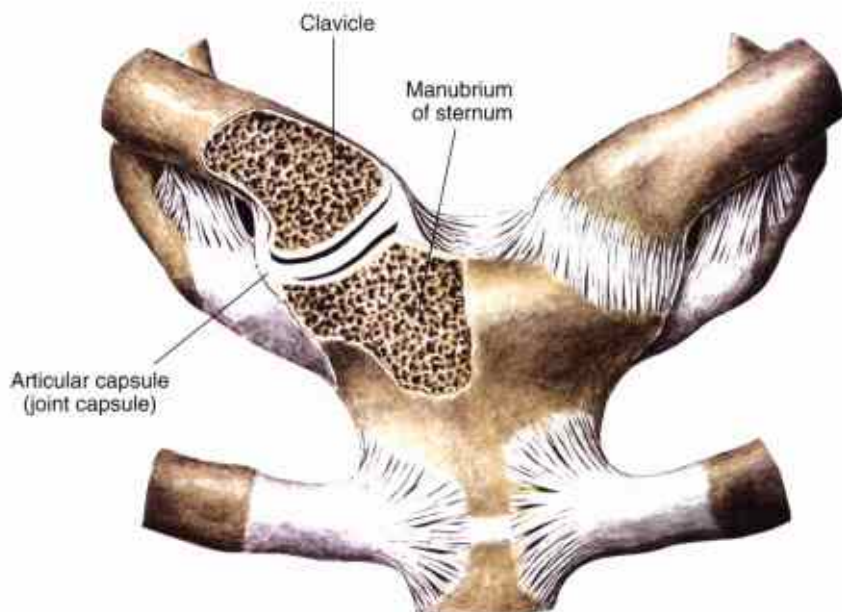
- Supine on the examination table.
- The patient's hands are folded across his or her abdomen.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient supine on the examination table, the clinician stands to the patient's side.
2. Identify the SC joint. Palpate the clavicle in a lateral-to-medial direction. At the medial aspect of the clavicle, there is a small depression that represents the SC joint. This structure will be tender.
3. It may be helpful to rotate the ipsilateral shoulder in order to more easily identify the SC joint.
4. The injection point is directly over the SC joint.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the chest or shoulder.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.



**FIGURE 1** • SC joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the SC joint space.
6. Inject the steroid solution as a bolus into the SC joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her shoulder through its full range of motion. This movement distributes the steroid solution throughout the SC joint.
10. Reexamine the SC joint in 5 min to confirm pain relief.



**FIGURE 2** ● SC joint injection with landmarks.

### AFTERCARE

- Avoid excessive use of shoulder over the next 2 weeks.
- Consider use of an arm sling.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20600—Injection of small joint

### PEARLS

- The SC joint is superficial. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.



# Bicipital Tenosynovitis— Long Head

Patients occasionally present to the primary care office for evaluation and treatment of bicipital tendonitis. This is an inflammatory/degenerative condition more frequently seen in the long head than the short head of the biceps brachii muscle. It develops either from direct acute trauma or chronic overuse in throwing athletes and nonathletes who use their arms to do repetitive biceps contraction, resisted forearm supination, or overhead work. Bicipital tendinitis is frequently diagnosed in association with rotator cuff disease as a component of the impingement syndrome or secondary to intra-articular pathology, such as labral tears. Local tenderness is usually located over the bicipital groove of the humerus. Treatment usually involves corticosteroid injections and physical therapy.

## Indications

Bicipital tenosynovitis

## ICD-9 Code

726.12

## ICD-10 Code

M75.2

**Relevant Anatomy:** (Fig. 1)

## PATIENT POSITION

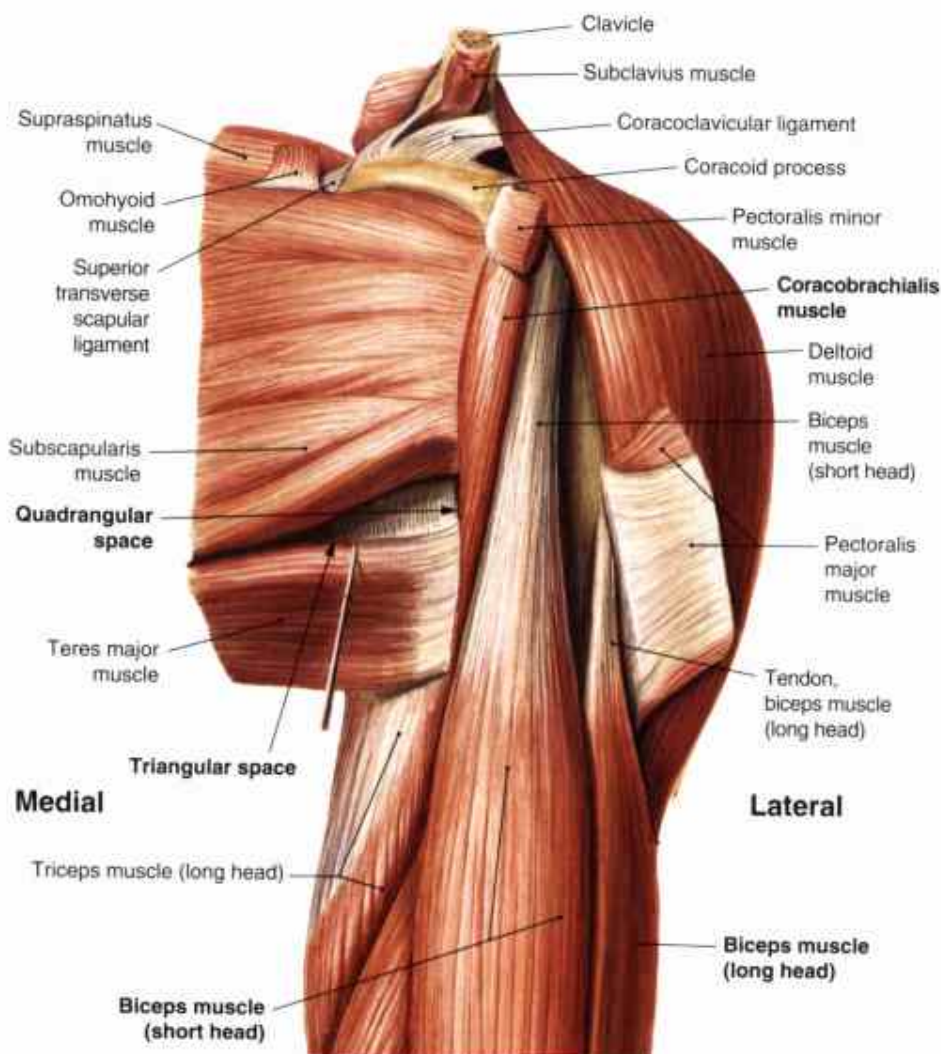
- Supine on the examination table with the head of the bed elevated 30 degrees.
- The patient's hands are placed in a position of supination at his or her side with slight external rotation of the arm.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient lying supine on the examination table, the clinician stands lateral and posterior to the affected arm.
2. Instruct the patient to flex the elbow and contract the biceps muscle.
3. Palpate the course of the long head of the bicipital tendon over the anterior aspect of the upper arm.
4. Determine the location of maximal tenderness which will most likely be under the edge of the pectoralis major muscle. Mark that spot with an ink pen.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the shoulder or arm.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.



**FIGURE 1** • Muscles of anterior left arm. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.



**FIGURE 2** • Bicipital tenosynovitis injection.

3. Position the needle and syringe at a 45-degree angle to the skin with the needle tip directed proximally.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle until the needle tip touches the tendon. (An increase in resistance will be detected.) Back up the needle 1 to 2 mm.
6. Inject the steroid solution as a bolus around the bicipital tendon. The injected solution should flow smoothly into the tenosynovial sheath. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her biceps muscle and shoulder through their full range of motion. This movement distributes the steroid solution throughout the tenosynovial sheath.
10. Reexamine the arm in 5 min to confirm pain relief.

## AFTERCARE

- Avoid all throwing and excessive use of arm and shoulder over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20550—Injection of single tendon sheath

## PEARLS

- Failure to recognize or treat this condition may lead to rupture of the long head of the biceps brachii tendon.

- Make sure to place the injection around the tendon and not into the substance of the tendon in order to prevent iatrogenic degeneration of the tendon and rupture.
- Subacromial or glenohumeral joint steroid injections are recommended for persistent cases of bicipital tendinitis.



A video clip showing a bicipital tenosynovitis injection can be found on the book's website.



# Cubital Tunnel Syndrome

Cubital tunnel syndrome is an uncommon condition encountered by primary care physicians. It occurs when the ulnar nerve becomes entrapped in the cubital tunnel posterior to the medial epicondyle. Treatment of this usually involves conservative measures including avoidance of predisposing repetitive movements, nighttime application of an elbow brace and NSAIDs. Corticosteroid injection of the cubital tunnel may bring pain relief. Care must be used to avoid injury to the ulnar nerve. Successful treatment may require surgical transposition of the nerve over the medial epicondyle.

Indications	ICD-9 Code	ICD-10 Code
Cubital tunnel syndrome	354.2	G56.2

## Relevant Anatomy: (Fig. 1)

### PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- Shoulder at 30 degrees of abduction and full external rotation.
- The affected elbow is flexed at 90 degrees.
- The wrist is in a neutral position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

### LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Identify and mark the medial epicondyle of the humerus.
3. Identify and mark the course of the ulnar nerve in the ulnar groove posterior to the medial epicondyle.
4. Mark the point of maximal tenderness over the ulnar nerve. This is usually just posterior to the medial epicondyle.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the elbow.

### ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.





**FIGURE 2** • Right cubital tunnel injection.

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 30 degree angle to the skin with the tip of the needle directed distally along the ulnar nerve.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle slowly at a shallow angle to a position just along the side of the ulnar nerve.
6. If any pain, paresthesias or numbness is encountered, withdraw the needle slightly and redirect the needle tip using a slightly different angle.
7. When the needle is placed along the ulnar nerve, slowly deposit the steroid solution as a bolus around that structure.
8. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Instruct the patient to move their wrist and elbow through their full range of motion.
12. Reexamine the elbow in 5 min to confirm pain relief and the development of numbness in the distribution of the ulnar nerve from the local anesthetic.

## AFTERCARE

- Avoid further overuse mechanisms of injury.
- Use an elbow extension brace while sleeping to avoid excessive elbow flexion.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

# Elbow Joint

Aspiration and injection of the elbow joint are uncommon procedures in most primary care practices. Tense collections of blood distending the elbow joint develop with fractures of the radial head. Significant pain relief follows aspiration. Arthritis in the elbow most commonly occurs due to rheumatoid arthritis, gout, and osteoarthritis. This may respond to corticosteroid injection.

Indications	ICD-9 Code	ICD-10 Code
Elbow pain	729.5	M25.52
Elbow sprain	841.9	S53.4
Elbow joint arthritis, unspecified	716.92	M13.92
Elbow joint arthrosis, primary	715.12	M19.02
Elbow joint arthrosis, posttraumatic	716.12	M19.12
Elbow joint arthrosis, secondary	715.22	M19.22

## Relevant Anatomy: (Fig. 1)

### PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The elbow is positioned at 135 degrees of extension.
- The wrist is in a neutral position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

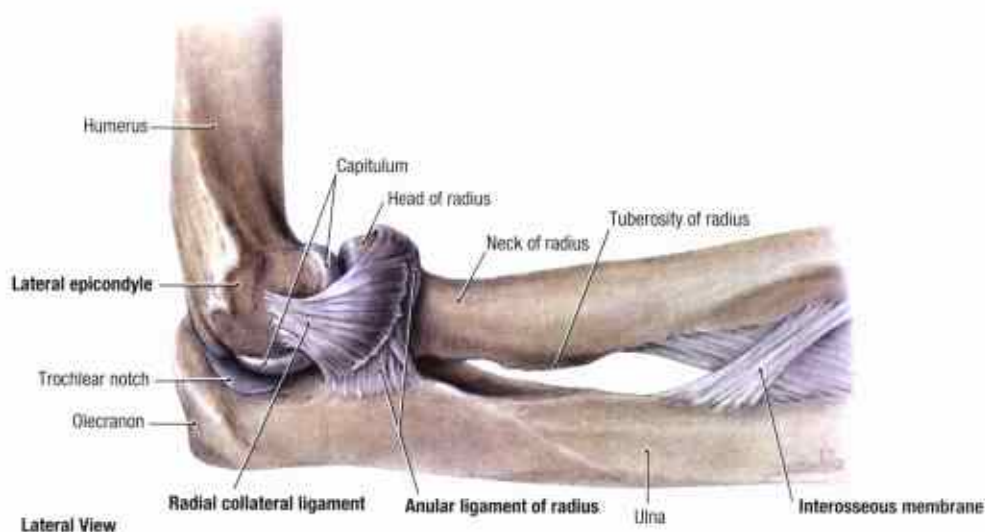
### LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Locate the radial head by palpating over the lateral aspect of the elbow while supinating and pronating the wrist.
3. Find the depression immediately proximal to the radial head and mark it with ink.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the elbow.

### ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.





**FIGURE 1** • Right lateral elbow joint. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

## EQUIPMENT

- 3-mL syringe
- 10-mL syringe—for optional aspiration
- 25-gauge, 1 in. needle
- 20-gauge, 1 in. needle—for optional aspiration
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed medially toward the elbow joint.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the elbow joint. This places the needle tip between the humeral lateral condyle and the radial head.
6. If aspirating, withdraw fluid using a 20-gauge, 1 in. needle with the 10-mL syringe.
7. If injection of corticosteroid is to follow the aspiration, grasp the needle firmly, remove the 10-mL syringe from the 20-gauge needle, and then attach the 3-mL syringe filled with the steroid-lidocaine mixture.
8. If only injecting the steroid mixture, use a 25-gauge, 1 in. needle with the 3-mL syringe.
9. Inject the steroid solution as a bolus into the elbow joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.



**FIGURE 2** • Left elbow joint injection.

10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.
12. Instruct the patient to move his or her elbow through its full range of motion. This movement distributes the steroid solution throughout the elbow joint.
13. Reexamine the elbow in 5 min to confirm pain relief.

### AFTERCARE

- Consider use of a neoprene elbow sleeve.
- Avoid vigorous use of the elbow over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20605—Arthrocentesis, aspiration, and/or injection of intermediate joint or bursa

### PEARLS

- The joint space at the radial head can be “opened up” by extending the elbow.
- Since the elbow has a narrow joint space, a 20-gauge needle is used for aspiration instead of the larger diameter, 18-gauge needle.
- If a fracture is suspected, do not inject corticosteroid.



A video clip showing an elbow joint injection can be found on the book's web site.

# Olecranon Bursitis

Olecranon bursitis is a relatively common aspiration and injection site for primary care physicians. Successful aspiration is usually accomplished because the location of the bursa is readily evident. The subcutaneous olecranon bursa may become inflamed and accumulate fluid when subjected to repeated excessive pressure or friction. The fluid may consist of blood in acute trauma, thick proteinaceous mucoid fluid after repetitive injury, or purulent fluid if infected. Corticosteroids should never be administered if an infectious bursitis is suspected.

An 18-gauge needle is used to aspirate a large volume of fluid. Occasionally, the clinician may elect to inject a steroid solution if the fluid reaccumulates—but only when an infection is excluded.

Indications	ICD-9 Code	ICD-10 Code
Olecranon bursitis	726.33	M70.2

## Relevant Anatomy: (Fig. 1)

### PATIENT POSITION

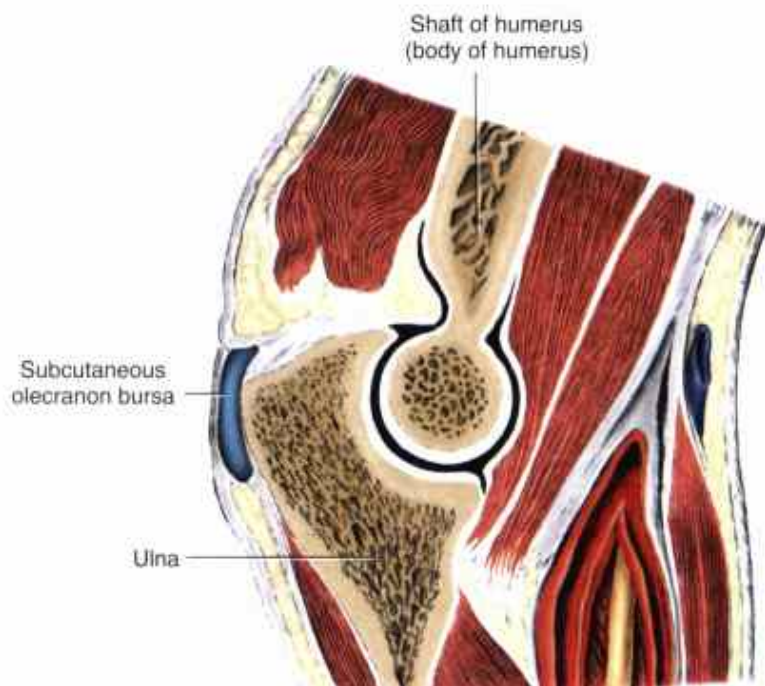
- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected elbow is maximally flexed.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

### LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. The point of maximal fluctuance is identified.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the elbow.

### ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.



**FIGURE 1** • Left lateral elbow. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

## EQUIPMENT

- 20-mL syringe—for aspiration
- 3-mL syringe—for optional injection
- 18-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine—for optional injection
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)—for optional injection
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the 18-gauge needle and syringe with the needle tip directed toward the area of maximal fluid collection.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle into the center of the bursa.
6. Aspiration should be easy accomplished. Use multiple syringes if the effusion is large (Fig. 3).
7. If injection following aspiration is elected, grasp the hub of the needle, remove the large syringe, and then attach the 3-mL syringe filled with the steroid solution.





**FIGURE 2** ● Olecranon bursa aspiration.



**FIGURE 3** ● Aspiration of hemorrhagic olecranon bursitis.

8. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following complete aspiration, and possible injection of corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage followed by a compressive elastic bandage.
11. Reexamine the elbow in 5 min to confirm pain relief.

## AFTERCARE

- Avoid excessive use of elbow over the next 2 weeks.
- Consider the use of a neoprene elbow sleeve or elastic compression bandage.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20605—Aspiration and/or injection of intermediate bursa

## PEARLS

- If the olecranon bursitis is due to an infection or acute hemorrhagic event, do not follow aspiration with corticosteroid injection.
- Injection of corticosteroid is usually reserved for recurrent bursitis.



A video clip showing an olecranon bursitis aspiration can be found on the book's web site.

# Lateral Epicondylitis

Lateral epicondylitis is one of the most common soft tissue conditions treated by primary care providers. It usually is the result of an overuse injury to the origin of the wrist extensor and supinator muscle groups. Injection of corticosteroids for the treatment of lateral epicondylitis is one of the most common injections. A small diameter needle is appropriate as there will not be a fluid collection.

## Indications

Lateral epicondylitis

## ICD-9 Code

726.32

## ICD-10 Code

M77.1

**Relevant Anatomy:** (Fig. 1)

## PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected elbow is slightly flexed.
- The wrist is in a neutral-to-slightly pronated position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

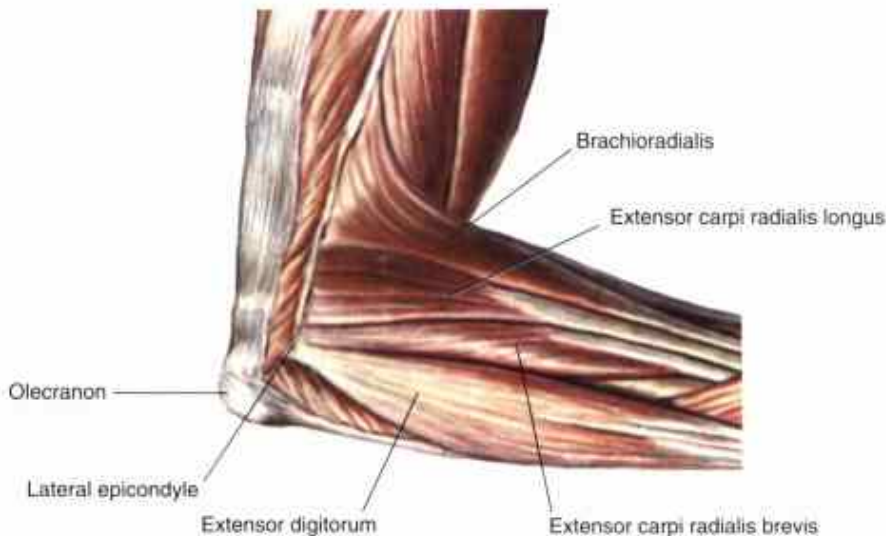
1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Identify and mark the point of maximal tenderness adjacent to the lateral epicondyle.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the elbow.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad



**FIGURE 1** • Right lateral forearm muscles. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed medially toward the lateral epicondyle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle to the bone of the lateral epicondyle.
6. Withdraw the needle 1 to 2 mm.
7. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her wrist and elbow through their full range of motion.
11. Reexamine the elbow in 5 min to confirm pain relief.

## AFTERCARE

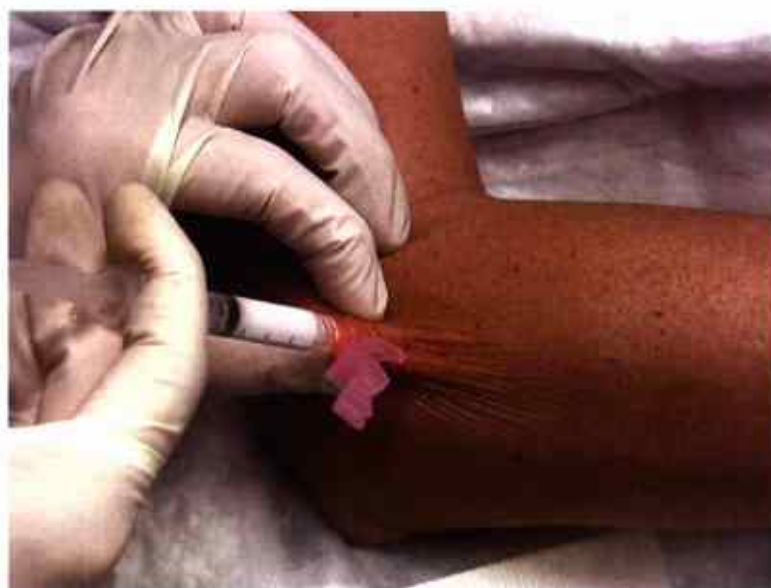
- Avoid excessive wrist extension and supination over the next 2 weeks.
- Consider the use of a neoprene elbow sleeve or elastic compression bandage.
- Consider the use of a wrist brace to limit wrist extension.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20551—Injection of tendon origin or insertion





**FIGURE 2** ● Left elbow lateral epicondylitis injection.



**FIGURE 3** ● Pinch up the tissue to avoid subcutaneous deposition.

## PEARLS

- Entrapment of branches of the radial nerve in the elbow and forearm can mimic the pain of lateral epicondylitis. Radial tunnel syndrome is most commonly caused by entrapment of the deep radial nerve as it enters the supinator muscle at the arcade of Frohse. Pain in this condition occurs about 4 cm distal and anterior to the lateral epicondyle.
- The lateral epicondylitis injection can be superficial—especially in thin persons. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. This particular injection is notorious for the development of this complication. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.

- In order to prevent this complication, one can use the pinch technique (Fig. 3). After insertion, gently grasp the skin on either side of the needle and push that up toward the syringe. This provides a greater distance between the skin and the actual injection site, thus minimizing the chance of developing atrophy and hypopigmentation.



A video clip showing a lateral epicondylitis injection can be found on the book's web site.

# Medial Epicondylitis

Medial epicondylitis is a fairly common soft tissue condition encountered by primary care physicians. It usually is the result of an overuse injury to the origin of the wrist flexor and pronator muscle groups. A small diameter needle is appropriate as there will not be a fluid collection.

## Indications

Medial epicondylitis

## ICD-9 Code

726.31

## ICD-10 Code

M77.0

**Relevant Anatomy:** (Fig. 1)

## PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- Shoulder at 30 degrees of abduction and full external rotation.
- The affected elbow is flexed at 90 degrees.
- The wrist is in a neutral position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

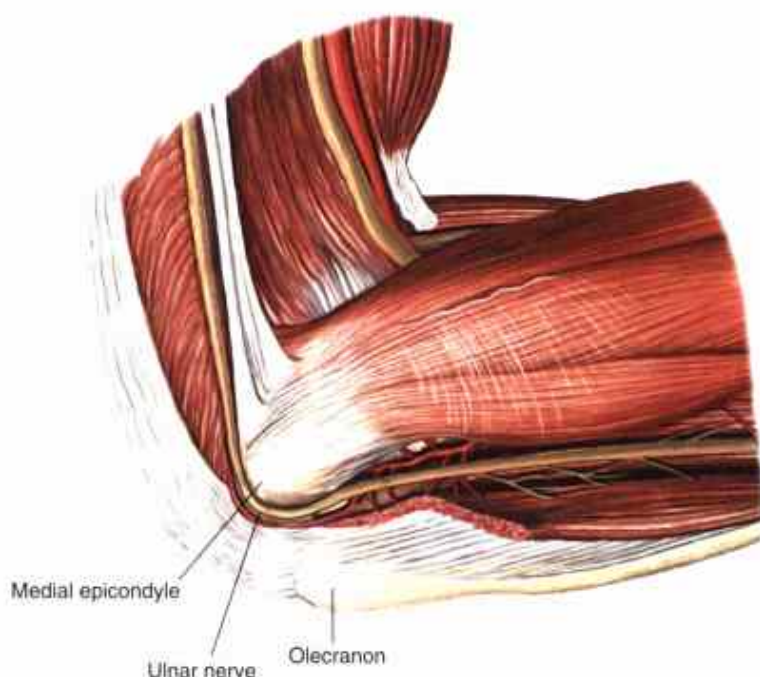
1. With the patient supine on the examination table, the clinician stands lateral to the affected elbow.
2. Identify and mark the point of maximal tenderness adjacent to the medial epicondyle.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the elbow.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle



**FIGURE 1** • Left medial elbow. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)

- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed laterally toward the medial epicondyle.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle to the bone of the medial epicondyle.
6. Withdraw the needle 1 to 2 mm.
7. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
8. Following injection of the corticosteroid solution, withdraw the needle.
9. Apply a sterile adhesive bandage.
10. Instruct the patient to move his or her wrist and elbow through their full range of motion.
11. Reexamine the elbow in 5 min to confirm pain relief.





**FIGURE 2** • Right elbow medial epicondylitis injection.

## AFTERCARE

- Avoid excessive wrist flexion or pronation over the next 2 weeks.
- Consider the use of a neoprene elbow sleeve or elastic compression bandage.
- Consider the use of a wrist brace to limit wrist flexion.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20551—Injection of tendon origin or insertion

## PEARLS

- The ulnar nerve travels in close proximity to this injection. It courses just posterior and inferior to the medial epicondyle. On occasion, the local anesthetic spreading out from a properly placed injection may involve the ulnar nerve. The patient should be warned that transient numbness might occur in the lateral aspect of the hand as well as the ring and little fingers.



A video clip showing a medial epicondylitis injection can be found on the book's web site.

# Radial Nerve Entrapment

Patients uncommonly present to the primary care office for treatment of radial nerve entrapment in the forearm. This syndrome is caused by entrapment of the deep branch of the radial nerve (posterior interosseous nerve) as it enters the supinator muscle at the arcade of Frohse. Compression or scarring of the posterior interosseous nerve may cause denervation of extensor/supinator muscles and numbness or paresthesias in the distribution of the radial sensory nerve. The result can be pain, weakness, and dysfunction. Pain in this condition occurs about 4 cm distal to the lateral epicondyle. A nerve block utilizing local anesthetic and corticosteroid injection may be attempted, but successful treatment often requires surgical release.

Indications	ICD-9 Code	ICD-10 Code
Radial nerve entrapment syndrome	354.2	G56.3

## Relevant Anatomy: (Fig. 1)

### PATIENT POSITION

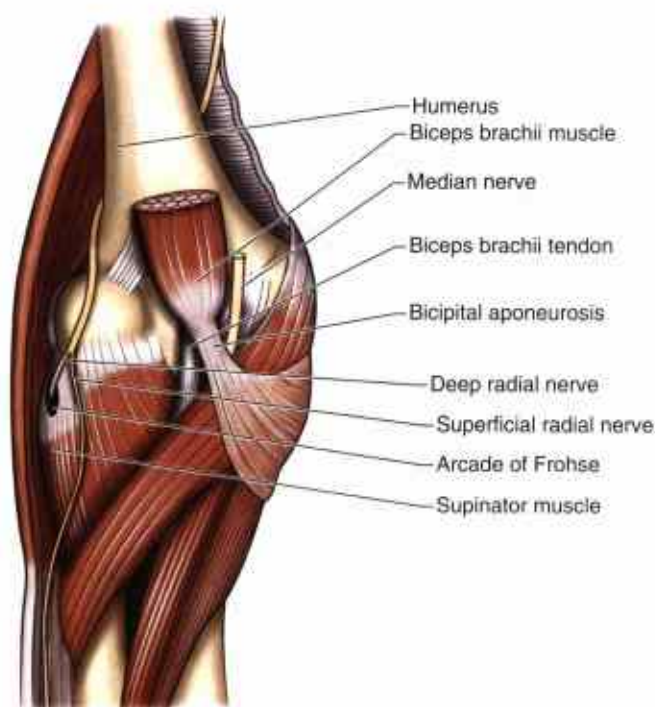
- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected elbow is slightly flexed.
- The wrist is in a neutral to slightly pronated position.
- The elbow is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

### LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected forearm.
2. Identify the lateral epicondyle.
3. The point of maximal tenderness is usually located about 4 cm distal and anterior to the lateral epicondyle.
4. Identify and mark the point of maximal tenderness.
5. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the elbow.

### ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.



**FIGURE 1** • Anterior aspect of right elbow.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Slowly advance the needle until the needle tip is at the anticipated injection site at the radial nerve.
6. If any pain, paresthesias, or numbness is encountered, withdraw the needle slightly.
7. When the needle is placed along the radial nerve, slowly deposit the steroid solution as a bolus around that structure.



**FIGURE 2** ■ Radial nerve entrapment injection.

8. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Instruct the patient to move his or her wrist and elbow through their full range of motion.
12. Reexamine the proximal forearm in 5 min to confirm pain relief and the development of numbness in the distribution of the radial nerve from the local anesthetic.

## AFTERCARE

- Avoid excessive wrist extension and supination over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 64450—Injection, nerve block, therapeutic, other peripheral nerve or branch

## PEARLS

- Entrapment of branches of the radial nerve in the elbow and forearm can mimic the pain of lateral epicondylitis.



A video clip showing a radial nerve entrapment injection can be found on the book's web site.



# Carpal Tunnel Syndrome—Proximal Approach

Carpal tunnel syndrome is a very common condition encountered in primary care. It represents a compressive injury to the median nerve as it traverses the carpal tunnel in the wrist. This usually occurs as a result of an overuse injury following repetitive handgrip movements or compression of the contents of the carpal tunnel from various disease processes. Predisposing factors may include previous injury, pregnancy, diabetes, hypothyroidism, rheumatoid arthritis, or amyloidosis. Corticosteroid injection of the carpal tunnel is an effective but underutilized treatment option by primary care providers.

The specific injection technique used in this text was described by Dammers et al. in 1999<sup>1</sup>. Other approaches can be used, but they do not have the literature demonstrating the efficacy and safety as this approach. The study referenced is a randomized, double-blind, placebo-controlled trial. Following a single 40 mg methylprednisolone injection, there was 77% improvement at 1 month. It was still effective in 50% of patients at 1 year versus 7% of controls. A second injection resulted in further improvement. The investigators reported no side effects.

Indications	ICD-9 Code	ICD-10 Code
Carpal tunnel syndrome	354.0	G56.0

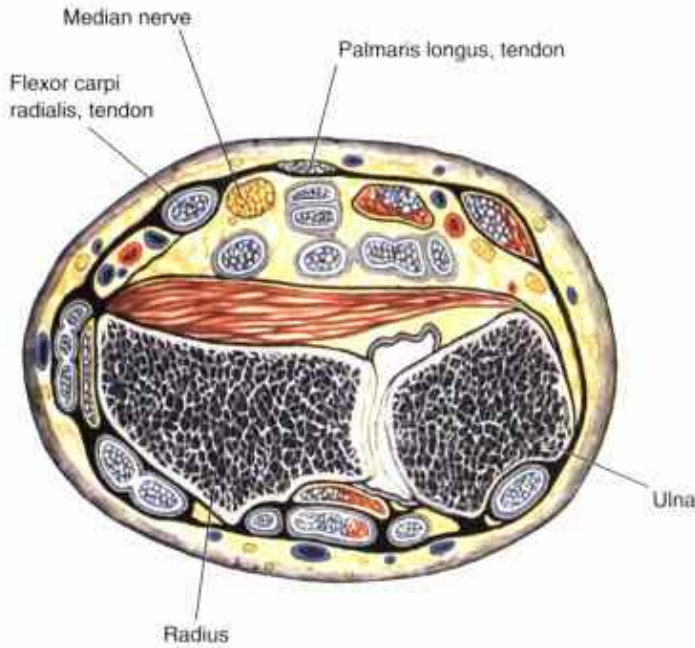
**Relevant Anatomy:** (Figs. 1 and 2)

## PATIENT POSITION

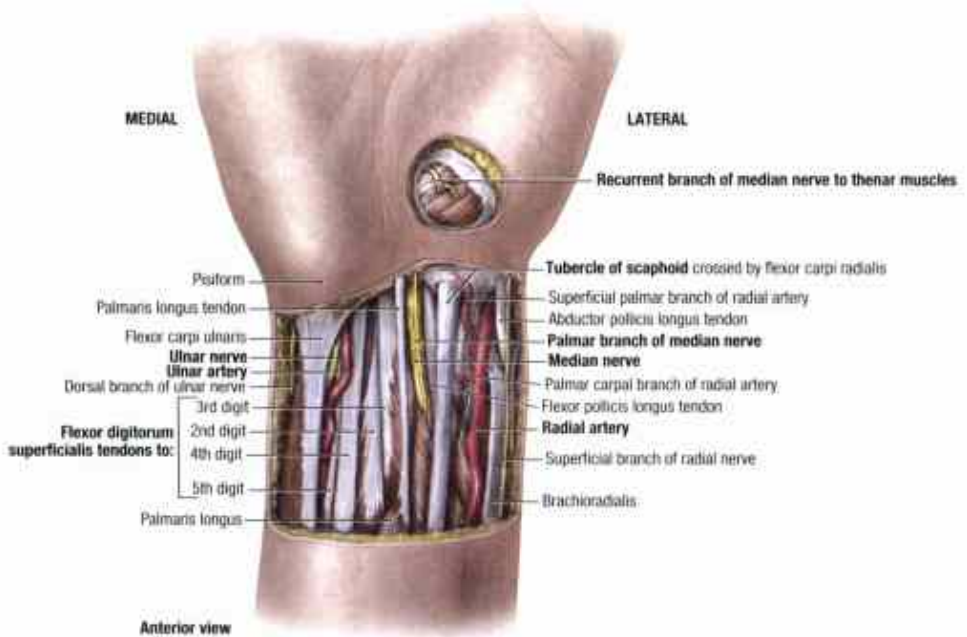
- Supine on the examination table with the head of the bed elevated at an angle of 30 degrees.
- The elbow is slightly flexed with the wrist in supination.
- The wrist is then positioned in slight hyperextension with the placement of chucks pads or towels underneath the supinated wrist.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

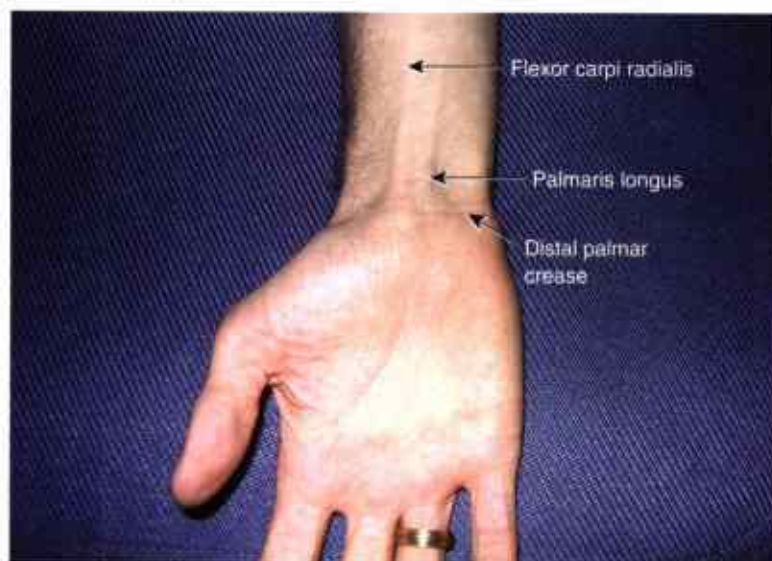
1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify and mark the distal palmar crease as shown (Fig. 3).



**FIGURE 1** • Right wrist cross-section at the level of the distal radioulnar joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)



**FIGURE 2** • Right wrist—volar aspect. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)



**FIGURE 3** • Right carpal tunnel surface anatomy.

3. Identify and mark the course of the palmaris longus and flexor carpi radialis tendons.
4. Mark a point 4 cm (1.5 in.) proximal to the distal palmar crease and between the tendons. This is the entry point for the needle.
5. Mark a spot at the intersection of the distal palmar crease between the palmaris longus and flexor carpi radialis tendons. This is the target site.
6. At both the entry point and target site, press firmly on the skin with the retracted tip of a ballpoint pen.
7. After the landmarks are identified, the patient should not move the wrist.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1-1/2 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 10 to 20 degrees angle to the skin with the needle tip directed distally.





**FIGURE 4** • Right carpal tunnel injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
5. Very slowly advance the needle toward the wrist, keeping the needle between the palmaris longus and flexor carpi radialis tendons.
6. If any pain, paresthesias, or numbness is encountered, withdraw the needle slightly and redirect the needle tip using a slightly different angle.
7. When the needle has been fully inserted, slowly deposit the steroid solution as a bolus around the median nerve.
8. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.
10. Apply a sterile adhesive bandage.
11. Reexamine the hand in 5 min to confirm pain relief or the development of numbness in the distribution of the median nerve from the local anesthetic.

## AFTERCARE

- Avoid further overuse mechanisms of injury.
- Use a carpal tunnel wrist brace while sleeping to avoid wrist flexion and extension.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20526—Injection of carpal tunnel

## PEARLS

- The approach illustrated here is easy to perform and has few side effects.
- Steroid injections into the carpal tunnel may damage the median nerve.
- Warn the patients that the median nerve may be contacted when using this approach. Ask them to calmly report any pain or electrical shock sensation without jerking their arm away. If this occurs, simply withdraw the needle a few millimeters before continuing to advance the needle using a slightly different path medially or laterally.



- Since the injection is made just proximal to the carpal tunnel, the overlying flexor retinaculum will not be pierced with the needle.

## REFERENCE

1. Dammers JW, Veering MM, Vermeulen M. Injection with methylprednisolone proximal to the carpal tunnel. Randomised double blind trial. *Br Med J*. 1999;319:884–886.



A video clip showing a carpal tunnel injection using the proximal approach can be found on the book's web site.

# Carpal Tunnel Syndrome—Traditional Approach

Carpal tunnel syndrome is a very common condition encountered in primary care. It represents a compressive injury to the median nerve as it traverses the carpal tunnel in the wrist. This usually occurs as a result of an overuse injury following repetitive handgrip movements or compression of the contents of the carpal tunnel from various disease processes. Predisposing factors may include previous injury, pregnancy, diabetes, hypothyroidism, rheumatoid arthritis, or amyloidosis. Corticosteroid injection of the carpal tunnel is an effective but underutilized treatment option by primary care providers. This injection technique is the most commonly performed injection of the carpal tunnel. Although it is straightforward to perform, there is a higher risk for direct needle injury to the median nerve compared to an injection performed proximal to the carpal tunnel.

Indications	ICD-9 Code	ICD-10 Code
Carpal tunnel syndrome	354.0	G56.0

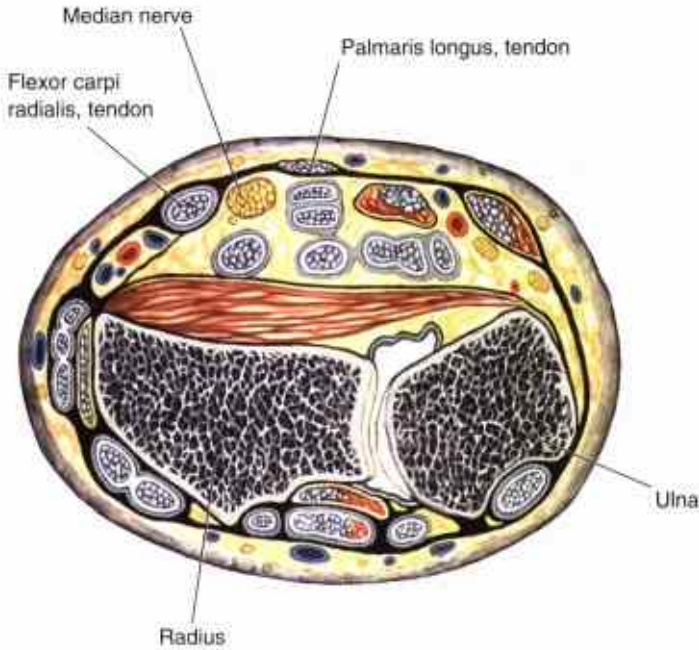
**Relevant Anatomy:** (Figs. 1 and 2)

## PATIENT POSITION

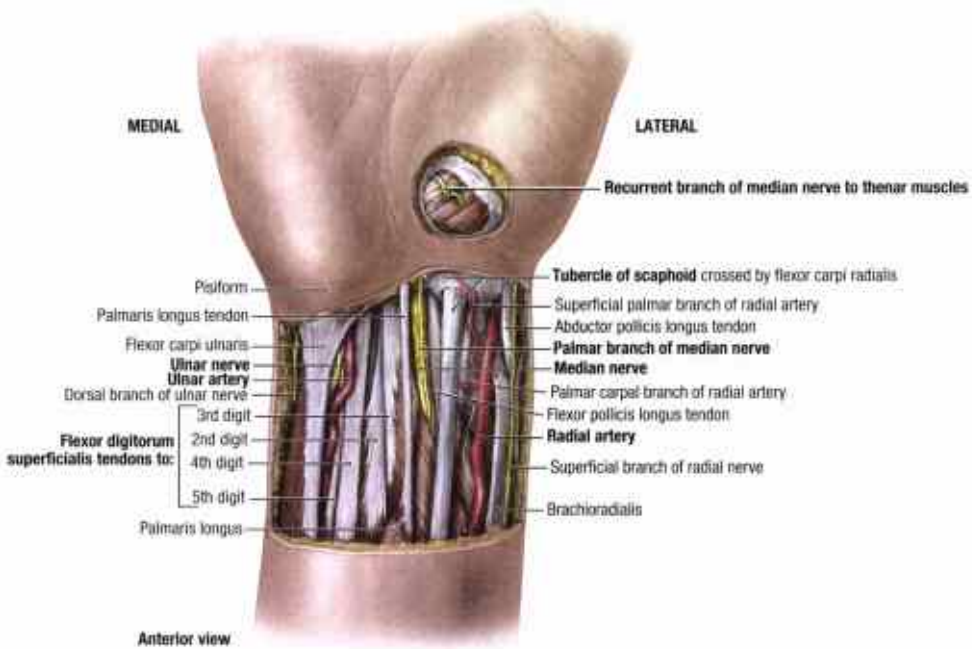
- Supine on the examination table with the head of the bed elevated 30 degrees.
- The elbow is slightly flexed with the wrist in supination.
- The wrist is then positioned in slight hyperextension with the placement of chucks pads or towels underneath the supinated wrist.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify and mark the distal palmar crease as shown (Fig. 3).
3. Identify and mark the intersection of the palmaris longus tendon with the distal palmar crease.
4. Mark a spot 1 cm proximal and 1 cm ulnar to this intersection.
5. At that site, press firmly with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
6. After the landmarks are identified, the patient should not move the wrist.



**FIGURE 1** • Right wrist cross-section at the level of the distal radioulnar joint. (Adapted from Putz R, Pabst R. *Sobotta Atlas of Human Anatomy*. 13th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001:168.)



**FIGURE 2** • Right wrist—volar aspect. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)



**FIGURE 3** • Right carpal tunnel surface anatomy.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 1 in. needle
- 1 mL of 1% lidocaine without epinephrine
- 1 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 45 degree angle to the skin of the wrist with the needle tip directed toward the base of the thumb.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 4).
5. Slowly advance the needle toward the base of the thumb, until the needle tip is approximately 1 cm deep into the intersection of the palmaris longus and the distal palmar crease.
6. If any pain, paresthesias, or numbness is encountered, withdraw the needle slightly and redirect the needle tip using a slightly different angle.
7. Slowly deposit the steroid solution as a bolus around the median nerve.
8. Inject the steroid solution steadily into this area. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
9. Following injection of the corticosteroid solution, withdraw the needle.





**FIGURE 4** • Carpal tunnel injection—traditional approach.

10. Apply a sterile adhesive bandage.
11. Reexamine the hand in 5 min to confirm pain relief or the development of numbness in the distribution of the median nerve from the local anesthetic.

### AFTERCARE

- Avoid further overuse mechanisms of injury.
- Use a carpal tunnel wrist brace while sleeping to avoid wrist flexion and extension.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20526—Injection of carpal tunnel

### PEARLS

- The approach illustrated here is easy to perform and has few side effects.
- However, the possibility of direct needle injury to the median nerve is greater with the traditional technique because the nerve is “fixed” in position by the carpal tunnel.
- Warn the patients that the median nerve may be contacted when using this approach. Ask them to report any pain or electrical shock sensation. If this occurs, simply withdraw the needle a few millimeters before continuing to advance the needle using a slightly different path medially or laterally.



A video clip showing a carpal tunnel injection can be found on the book's web site.

# Wrist Joint

Injection of the wrist joint is a relatively uncommon procedure in primary care. Pain and swelling in the wrist may be the result of trauma, osteoarthritis, an infectious etiology, or an inflammatory disorder such as rheumatoid arthritis. Occasionally, there will be a small collection of synovial fluid to remove. In the absence of a fluid collection, a small diameter needle is used for corticosteroid injection.

Indications	ICD-9 Code	ICD-10 Code
Wrist pain	719.43	M25.53
Wrist sprain of unspecified site	842.00	S63.5
Wrist joint arthritis, unspecified	716.93	M13.93
Wrist joint arthrosis, primary	715.13	M19.03
Wrist joint arthrosis, posttraumatic	716.13	M19.13
Wrist joint arthrosis, secondary	715.23	M19.23

## Relevant Anatomy: (Fig. 1)

### PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The elbow is slightly flexed with neutral positioning of the wrist in pronation.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

### LANDMARKS

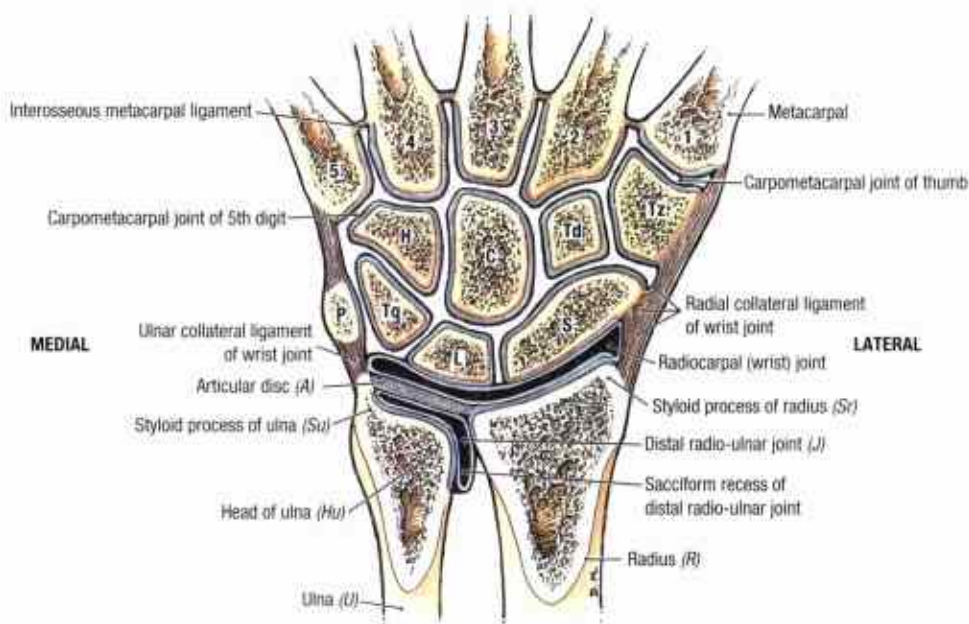
1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify and mark the area of maximal tenderness and/or swelling over the dorsal aspect of the wrist joint.
3. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
4. After the landmarks are identified, the patient should not move the wrist.

### ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

### EQUIPMENT

- 3-mL syringe
- 10-mL syringe—for optional aspiration



**FIGURE 1** • Coronal section of the wrist. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

- 25-gauge, 1 in. needle—for injection
- 20-gauge, 1 in. needle—for optional aspiration
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (40 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle down into the wrist joint.
6. If aspirating, withdraw the fluid using a 20-gauge, 1 in. needle with the 10-mL syringe and then inject through the same syringe.
7. If only injecting, use a 25-gauge, 1 in. needle with the 3-mL syringe.
8. If injection following aspiration is elected, remove the large syringe from the 20-gauge needle and then attach the 3-mL syringe filled with the steroid solution.
9. Inject the steroid solution as a bolus into the wrist joint. The injected solution should flow smoothly into the space. If increased resistance is encountered, advance or withdraw the needle slightly before attempting further injection.
10. Following injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.



**FIGURE 2** ● Right dorsal wrist joint injection.

12. Instruct the patient to move his or her wrist through its full range of motion. This movement distributes the steroid solution throughout the joint.
13. Reexamine the wrist in 5 min to confirm pain relief.

### AFTERCARE

- Consider the use of a wrist brace.
- Avoid excessive use of the wrist over the next 2 weeks.
- NSAIDs, ice, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20605—Arthrocentesis, aspiration, and/or injection of intermediate joint or bursa

### PEARLS

- There are many septae that create multiple partitions within the wrist joint complex. Successful administration of corticosteroid involves pinpoint precision and may require multiple injections during the same office visit.
- Work on the dorsal aspect of the wrist. The volar aspect contains the radial artery, median nerve, and ulnar artery. These must all be avoided.
- If multiple injections are performed, do not give more than 1 mL (40 mg of triamcinolone) of the steroid solution to the patient at any single office visit.



A video clip showing a wrist joint injection can be found on the book's web site.



# de Quervain's Tenosynovitis

Injection of corticosteroids for the treatment of de Quervain's tenosynovitis is a fairly common procedure for primary care physicians. This condition represents a stenosing tenosynovitis of the radial aspect of the wrist. The extensor pollicis brevis and abductor pollicis longus tendons run alongside each other and share a common tendon sheath. Overuse movements that require repetitive extension and abduction of the thumb generally cause this condition. However, there may be an underlying inflammatory disorder present.

Indications	ICD-9 Code	ICD-10 Code
de Quervain's tenosynovitis	727.04	M65.4

**Relevant Anatomy:** (Fig. 1)

## PATIENT POSITION

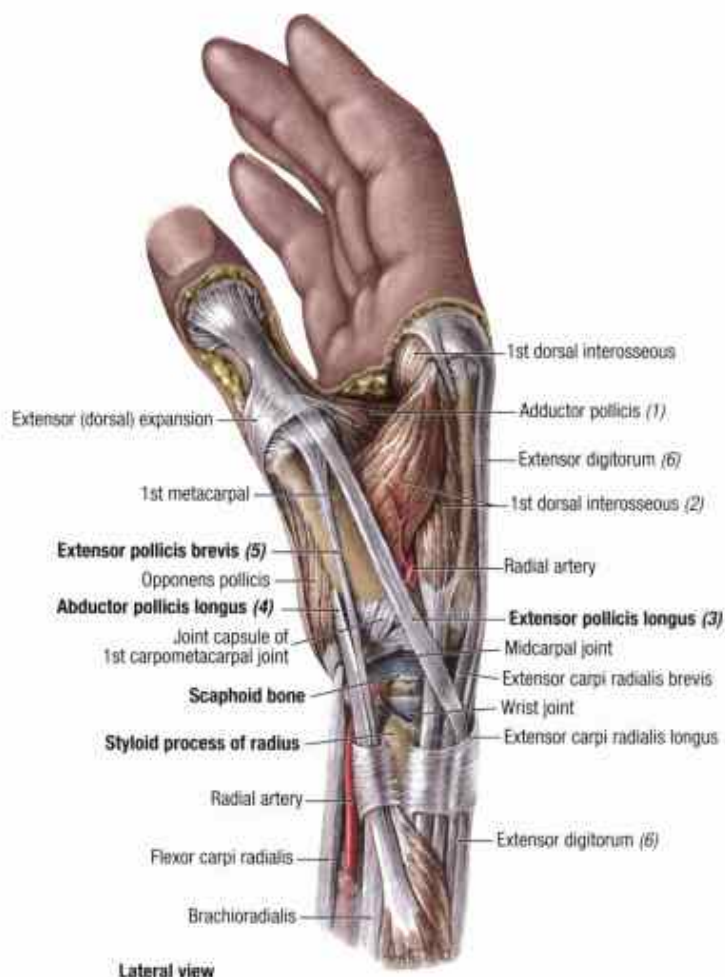
- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected wrist is held in a neutral position. The thumb is directed superiorly midway between supination and pronation.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify tenderness located in the tendon sheath that contains the abductor pollicis longus and the extensor pollicis brevis.
3. The injection point is located directly between these two tendons. Mark this spot.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the wrist or thumb.

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.



**FIGURE 1** • Right hand anatomy. (From Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.)

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe at a 45 degree angle to the skin with the needle tip directed proximally.



**FIGURE 2** • de Quervain's tenosynovitis injection.

4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle toward the convergence of the abductor pollicis longus and the extensor pollicis brevis tendons until the needle tip is located between the tendons in the tendon sheath.
6. Slowly inject the steroid solution as a bolus into the tendon sheath. A small bulge in the shape of a sausage should develop in the tendon sheath.
7. Following injection of the corticosteroid solution, withdraw the needle.
8. Apply a sterile adhesive bandage.
9. Instruct the patient to move his or her thumb through its full range of motion. This movement distributes the steroid solution throughout the tenosynovial sheath.
10. Reexamine the hand and wrist in 5 min to confirm pain relief.

## AFTERCARE

- Ensure no excessive wrist flexion or pronation over the next 2 weeks by the application of a wrist thumb spica splint.
- NSAIDs, ice, heat, and/or physical therapy as indicated.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20550—Injection of single tendon sheath

## PEARLS

- The de Quervain's tenosynovitis injection is superficial—especially in thin persons. Depositing corticosteroid in the subcutaneous tissues can result in the complication of skin atrophy and hypopigmentation. de Quervain's injection is notorious for the development of this complication. Avoid the development of a subdermal wheal while performing all injections of corticosteroid solutions.



A video clip showing a de Quervain's injection can be found on the book's web site.

# Ganglion Cyst

Aspiration and possibly corticosteroid injection of wrist ganglion cysts are common procedures for primary care physicians. Ganglions are cysts containing clear mucinous fluid. They may originate from the wrist joint or tendon sheaths. A common site of occurrence is along the extensor carpi radialis brevis as it passes over the dorsum of the wrist joint. Although most commonly found in the wrist, ganglion cysts may also occur in other joints. Ganglion cysts located over the dorsal surface of the wrist joint are commonly treated with aspiration and rarely treated with corticosteroid injections. Those cysts involving the volar surface of the wrist are best managed with surgical referral.

Indications	ICD-9 Code	ICD-10 Code
Ganglion cyst of joint	727.41	M67.4
Ganglion cyst of tendon sheath	727.42	M67.4

**Relevant Anatomy:** (Fig. 1)

## PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- For ganglion cysts over the dorsal aspect, the wrist is held in pronation and slight flexion.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected wrist.
2. Identify the cystic structure over the dorsal aspect of the wrist joint.
3. The injection point is located directly over the cyst.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the wrist.

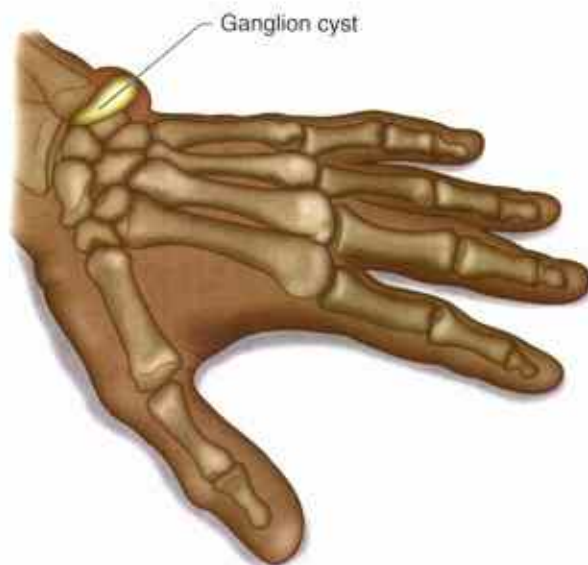
## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 5-mL syringe
- 3-mL syringe—for optional injection





**FIGURE 1** • Dorsal wrist ganglion cyst.

- 18-gauge, 1-1/2 in. needle
- 0.25 mL of 1% lidocaine without epinephrine—for optional injection
- 0.25 mL of the steroid solution (10 mg of triamcinolone acetonide)—for optional injection
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly.
4. Using the no-touch technique, introduce the needle at the insertion site (Fig. 2).
5. Advance the needle quickly but carefully into the cyst.
6. Apply suction with the syringe and withdraw the expected small amount of a clear gel (Fig. 3).
7. With gloved fingers, apply firm pressure to the tissues surrounding the punctured cyst. Remove all extruded clear gel with sterile gauze pads (Fig. 4).
8. If injection following aspiration is elected, do not remove the needle. Rather, remove the large syringe from the 18-gauge needle and then attach the 3-mL syringe filled with the steroid solution. In this case, do not attempt to extrude the ganglion fluid after the procedure.
9. If indicated, slowly inject the steroid solution into the ganglion cyst.
10. Following aspiration and/or injection of the corticosteroid solution, withdraw the needle.
11. Apply a sterile adhesive bandage.



**FIGURE 2** • Right wrist dorsal ganglion cyst aspiration.



**FIGURE 3** • Multiple ganglion cysts.

### AFTERCARE

- Consider immobilizing the wrist with a splint for 2 weeks.
- Consider follow-up examination in 2 weeks.

**CPT code:** 20550—Injection of ganglion cyst

- CPT 2009 gives specific instructions when reporting multiple ganglion cyst aspirations/injections. In this case, the code 20612 is used and the modifier -59 appended.



**FIGURE 4** ● Mashing of a ganglion cyst.

### PEARLS

- Use extreme caution when treating ganglion cysts over the volar aspect of the wrist. These commonly involve the area immediately next to the radial artery. An accidental injury of this artery with a 18-gauge needle can have disastrous results.
- Initial treatment of a symptomatic ganglion cyst usually requires only cyst aspiration with manual extrusion of remaining contents.
- Treatment of recurrent cysts may require the injection of a small amount of a corticosteroid.
- Even with proficient technique, ganglion cysts frequently recur and may require surgical referral for definitive management.



A video clip showing a ganglion cyst injection can be found on the book's web site.

# Thumb Carpometacarpal Joint

The carpometacarpal (CMC) joint of the thumb is a relatively common injection site for most primary care physicians. This joint articulates the trapezium and the 1st metacarpal bone of the thumb. It is the most common site of osteoarthritis in the hand.

A small diameter needle is appropriate as this technique is only used to inject steroid solution into the CMC joint. There is no joint effusion to remove.

Indications	ICD-9 Code	ICD-10 Code
Pain of thumb CMC joint	719.44	M25.54
CMC joint arthropathy, unspecified	716.94	M18.9
CMC joint arthrosis, primary	715.14	M18.0
CMC joint arthrosis, posttraumatic	716.14	M18.3
CMC joint arthrosis, secondary	715.24	M18.5

**Relevant Anatomy:** (Fig. 1)

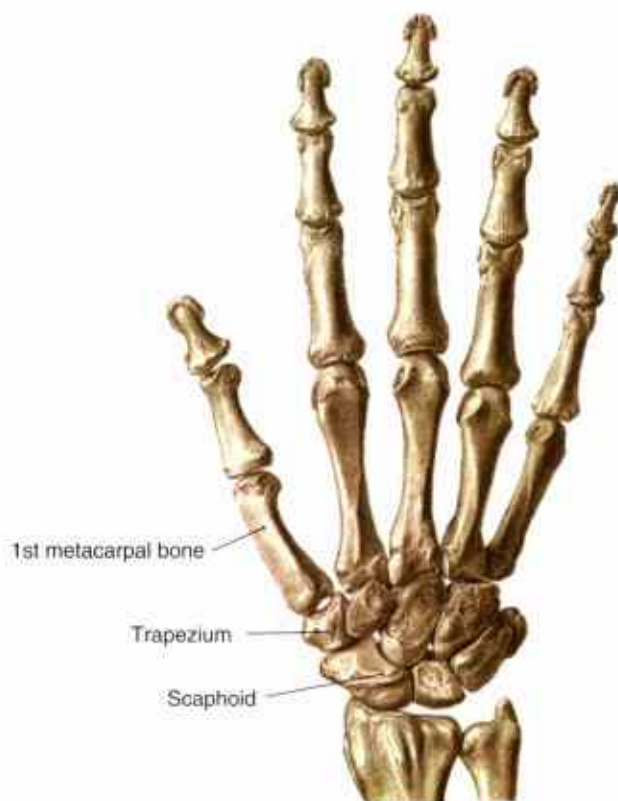
## PATIENT POSITION

- Supine on the examination table with the head of the bed elevated 30 degrees.
- The affected wrist is held in a neutral position between supination and pronation.
- The wrist is supported with the placement of chucks pads or towels.
- Rotate the patient's head away from the side that is being injected. This minimizes anxiety and pain perception.

## LANDMARKS

1. With the patient supine on the examination table, the clinician stands lateral to the affected hand.
2. Locate the CMC joint by palpating the thumb metacarpal bone in a distal-to-proximal direction. At the proximal aspect of the first metacarpal, there will be tenderness as the examiner's finger passes over, then drops into the CMC joint. This is located between the first metacarpal and the trapezium bone. The patient will report tenderness in this joint.
3. Mark the injection point directly over the CMC joint.
4. At that site, press firmly on the skin with the retracted tip of a ballpoint pen. This indentation represents the entry point for the needle.
5. After the landmarks are identified, the patient should not move the hand or thumb.





**FIGURE 1** • Dorsal aspect of the right hand. (Adapted from Sobotta: Atlas der Anatomie des Menschen © Elsevier GmbH, Urban & Fischer Verlag München.)

## ANESTHESIA

- Local anesthesia of the skin using topical vapocoolant spray.

## EQUIPMENT

- 3-mL syringe
- 25-gauge, 5/8 in. needle
- 0.5 mL of 1% lidocaine without epinephrine
- 0.5 mL of the steroid solution (20 mg of triamcinolone acetonide)
- One alcohol prep pad
- Two povidone-iodine prep pads
- Sterile gauze pads
- Sterile adhesive bandage
- Nonsterile, clean chucks pad

## TECHNIQUE

1. Prep the insertion site with alcohol followed by the povidone-iodine pads.
2. Achieve good local anesthesia by using topical vapocoolant spray.
3. Position the needle and syringe perpendicular to the skin with the needle tip directed posteriorly toward the first CMC joint.