ELBOW PROBLEMS IN PRIMARY CARE

I. Lateral Epicondylitis (Tennis Elbow)

Pathology
- Not really tendonitis.
- No classic inflammatory changes.
- Tissue degeneration is main finding.
  ➢ Angiofibroblastic proliferation.
- Extensor carpi radialis brevis is main tendon involved.

Clinical Findings
- Pain with wrist extension and supination.
  ➢ Using screwdriver, racquet sports, direct trauma.
- Point tender over lateral epicondyle – cardinal finding.
- Pain exacerbated with resisted wrist extension. (Test more accurate with elbow extended.)

Differential Diagnosis
- Cervical radiculopathy – typically C6 root.
- Radial tunnel syndrome.
  ➢ Pain more in substance of extensor muscle wad.
  ➢ Diffuse tenderness.
  ➢ Occasional referred sensory findings distal, radial forearm and wrist. Can extend to dorsum of hand over thumb and index metacarpals.
- Elbow synovitis/arthritis.
- Radial head fracture if acute injury.

Treatment – Lateral Epicondylitis
- Activity modification crucial.
- Short course of NSAID’s – particularly in early stages.
- Ice/heat.
- Stretch/strengthen after acute pain has subsided.
- Injection into area of maximum tenderness.
- If approximately 3 injections not curative, consider referral.
Tennis Elbow Injection

The classic tender spot in lateral epicondylitis of the elbow (tennis elbow) is at or just distal to the lateral epicondyle of the humerus with the elbow in flexion.

**Step 1**
Wear protective gloves at all times during the procedure and use sterile technique.

**Step 2**
Place the patient’s arm in the Losee position, with the arm against the chest or abdomen, the elbow flexed at least 90 degrees, and the forearm fully supinated (palm up). In carpi radialis brevis (ECRB) muscle origin is easily palpated just distal to the lateral epicondyle.

**Step 3**
Palpate the prominence and mark a circle with a pen, 1” in diameter, just distal to the lateral epicondyle.

**Step 4**
Cleanse the skin with an iodinated soap or similar antiseptic solution.

**Step 5**
Insert the 27-gauge needle, make a subcutaneous skin wheal with the local anesthetic and advance through the tendon of the ECRB to inject the remaining 2 to 3 mL of local anesthetic. (Figure 1).

**Step 6**
Wait 3 to 4 minutes, then insert the 25-gauge needle through the skin and tendon and inject the corticosteroid preparation.

**Step 7**
Dress the puncture wound with a sterile adhesive bandage.

**Adverse outcomes**
Subcutaneous fat atrophy may follow subcutaneous infiltration of the cortisone, leading to a waxy appearing depression in the skin. Although rare, infection is possible.

**Aftercare/patient instruction**
Advise the patient that pain may increase 24 to 48 hours following the injection. Pain often improves with the application of ice. In some patients, administration of narcotic analgesics may be necessary for pain relief.
TENNIS ELBOW AND GOLFER’S ELBOW

WHAT IS IT?
Pain at the elbow due to an inflammation (irritation) at the forearm muscle tendon attachment. Tennis elbow is on the outside of the elbow where the muscles attach which bend the wrist back (up). Golfer’s elbow is on the inside where the muscles attach which bend the wrist down.

WHAT CAUSE IT?
Overuse, repetitious or unaccustomed movements of the wrist. Anyone can get it. The tennis player gets it from a weak back hand, but also electricians, mechanics, keyboard operators or anyone untrained for repetitious movements can get it. Weak and stiff muscles are mostly the cause for it.

WHAT MAY I EXPECT?
The inflammation is accompanied by muscle shortening and weakening. The most common mistake in recovery is thinking that the problem is gone when the pain is gone. It will recur if you do not lengthen and strengthen the muscles. Ice helps to decrease inflammation. For prolonged pain that is disabling for daily activities, discuss the risks of a trial of anti-inflammatory pills or a cortisone injection with your doctor.

WHAT CAN I DO?
- Modify activities to be pain-free. Do not continue to stress the muscle.
- Shake the tension out of the arm for 5-10 seconds repeatedly throughout the day.
- Apply ICE for 10-15 minutes, 3 times a day.
- Learn to do activities with your wrist in a “neutral” position, that is straight. Avoid bending it back & forth, especially when power is needed. As we fatigue, we get sloppy about this.
- A tennis elbow band worn around the fullest part of the forearm to take the direct pull off the tendon attachment is optimal. It may help less in golfer’s elbow.
- Massage the painful spot; rub with your thumb across the tender area. This can be painful. Start with 5 seconds, work up to 1 minute, initially once a day, increase up to once an hour. Ice if too painful.
- STRETCH anytime the muscles are warm, holding each position for 1-2 minutes at least 3 times a day so as to feel a gentle pull but not pain. The elbow should be straight. No bouncing.
AND STRENGTHEN the muscles. Do the following exercises IN ORDER, adding the next exercise when the previous one is done PAIN-FREE. It can take many weeks or months to safely progress through all these exercises.

1. **Isometric** (without movement). Push the palm of one hand against the back of the other hand with the wrists bent 90 degrees (L-shaped) and the elbows straight. Switch hands. Hold each position for up to 1 minute, repeat 3 times a day.

2. **Gripping**  
   Start with squeezing a sponge or a wash cloth. As you tolerate this you may squeeze a rubber ball or putty. You may also exercise your grip by putting your hand into a bag filled with sand, opening and closing the fist for 2 min. 3 times a day.

3. **Wrist Curls**  
   Support your forearm at the end of the table allowing the wrist to move freely. Start with your palm up, then repeat with palm down. Make a fist and VERY SLOWLY bend it as far up and as far down as possible. Do 30 reps 3 times a day. Add a ½ lb. weight (can, dumbbell), gradually increasing to 2 lbs. as tolerated.

4. **Twisting** With elbows straight, practice wringing out a towel with both hands. Repeat 10 times 3 times a day.

5. Strengthening of the upper arm, shoulder, and spine muscles is also recommended. Handouts are available.

**HOW CAN I PREVENT RECURRENT PAIN?**
- Return to your sport only after you can ALL the above PAIN-FREE.
- Start out slowly and increase your activity gradually by 10-20 % a week.
- Warm-up and stretch daily before activities. Keep muscles strong.
- Use different parts of the muscles by changing and alternating the grip. Use less grip action.
- Use rackets, instruments, tools, pens with fatter handles and lighter weight.
- The tennis player should consider a lighter racket with a larger grip, a smaller headsize and looser string tension – and a two-handed backhand.
- The keyboard operator should adjust the height and position of the keyboard (or chair), so that the elbows bent to 90 degrees (L-shaped) and the wrist is neutral (level). Wrist support pads may help. Intermittent exercises, stretches and shaking the arm out will help prevent tightening up of the muscles.
II. Medial Epicondylitis (Golfer’s Elbow)
- Much less common than lateral epicondylitis.
- Similar microscopic pathology to lateral epicondylitis.
- Pain with resisted wrist flexion.
- Commonly associated with ulnar neuritis.
- Treatment similar general protocol as for lateral epicondylitis.

III. Entrapment of the Ulnar Nerve
- Ulnar neuritis.
- Cubital tunnel syndrome.

Etiology
- Pressure on ulnar nerve in cubital tunnel.
- Direct blow.
- Repetitive motion – particularly elbow flexion.
- Diabetes, alcoholism, and cervical root irritation can exacerbate.

Clinical Findings
- Numbness and tingling ring/little fingers.
- Intrinsic muscle weakness – can produce decreased grip strength and pinch, poor coordination, occasional “clawing” of ring/little fingers.
- Medial elbow and/or forearm pain.

Examination
- Positive Tinel’s sign over cubital tunnel.
- 2-point discrimination > 7 min. Test with paper clip opened to desired amount.
- Flexion test > 30 seconds is positive.
- Test pinch and grip and compare to opposite side.
- Crossed finger test is often quite sensitive.
- Often nerve conduction studies helpful to confirm diagnosis.
- If history of previous elbow trauma, x-rays indicated to rule out spurs.

Differential Diagnosis
- Cervical root irritation (C8-T1).
- Carpal tunnel syndrome.
  - Thumb, index, long fingers.
- Medial epicondylitis.
  - No distal numbness/weakness/paresthesias.
  - Mainly tender over medial epicondyle.
- Ulnar nerve compression at wrist (no elbow findings).
Treatment
- Avoid elbow flexion – stretches nerve in ulnar groove.
- Night splint at 45 degrees helpful. Not tolerated by all.
- Sports “knee pad” can protect nerve from direct pressure.
- Injections not helpful.
- If signs of progressive numbness and/or weakness despite conservative prescription – refer.

IV. Olecranon Bursitis
Inflammation of bursal tissue between tip of olecranon and skin. Septic and aseptic.

Aseptic
- Swelling, cool to touch, usually full range of motion, often non-tender.
- Acute trauma is common etiology – often without large fluid collection. Usually tender.
- Aspirate, +/- steroid injection, compression, avoid direct pressure.
- In chronic cases, patients may be aware of adhesions or scar tissue that feels like “gravel”. Can have large effusions.
- Chronic recurrent bursitis may require excision.

Septic
- Exquisite tenderness, erythema, warmth.
- Often decreased range of motion.
- Aspirate, culture any cloudy or otherwise suspicious fluid. (Cell count and differential as well!) If any question of infection, do not inject steroids until ruled out.
- I&D, splint, antibiotics.

Differentail Diagnosis
- Olecranon fracture.
- Gout.
- Rheumatoid nodule.

V. Radial Head Fracture
- Fall on outstretched hand.
- Decreased range of motion in all directions.
- Point tenderness, effusion.
- X-ray needed to rule out fracture.
- Fat pad sign.
- Sling, analgesics, early range of motion for type I fractures.
- Refer types II and III.
VI. **Ruptured Distal Biceps Tendon**
- Usually men, approximately 30-50 years old, strain during flexion/supination at elbow.
- Anterior elbow pain, weakness in supination more noticeable than flexion.
- High-riding biceps.
- Surgery indicated for those requiring strong supination, heavy laborers, etc.
- Should refer for orthopedic evaluation.

VII. **Arthritis Synovitis**
- Gout, OA, RA, trauma.
- Appropriate lab and x-ray evaluation.
- NSAID’s, activity modification, treat the primary disease.
- Aspiration/steroid injection may be indicated.

VIII. **Loose Bodies (\(^?\) X-ray loose bodies)**
- Post-traumatic, OA, osteochondritis.
- Pain, episodic locking.
- Diagnosis often difficult.
  - Plain x-ray.
  - CT scan with contrast.
- No effective prescription short of surgery. Refer if patient willing to consider surgery.
TRIGGER FINGER

I. Introduction
- Finger flexor tendons are inflamed and swollen where they cross the metacarpal head in the palm.
- The swollen tendon acts like a knotted rope, snapping in and out of a tight fibrous ring (pulley) which is attached to the metacarpal neck.

II. History
- Patients complain of “triggering” or clicking when attempting to move the involved finger.
- Usually painful, but not always. Patients often erroneously localize pain at the PIP joint.
- Most common in middle-aged women. Increased incidence in diabetes.
- Symptoms often worse in the morning. Usually feel better with hot shower, warm soaks.
- Commonly associated with de Quervain’s, carpal tunnel syndrome. Collectively known as stenosing tenosynovitis.

III. Physical
- On exam, “click” is palpable at palmar crease with flexion/extension of the finger.
- PIP joint in nontender.
- May feel nodule at palmar crease as digit moves.
- Finger is occasionally “stuck” in flexion.

IV. Treatment
- Steroid injections will cure about 90% of trigger fingers.
- Use ¼ cc of Depo-Medrol (or Celestone) mixed with ¼ cc lidocaine without epinephrine in a 3 cc syringe with a 5/8” 25 gauge needle.
- Insert needle at palmar crease until rubbery resistance is felt (usually about 5 mm deep). Apply gentle pressure only to avoid injecting tendon.
- May require follow-up injections at one to two month intervals.
- If injection fails or patient defers, refer for consideration of surgery.
DE QUERVAIN’S

I. Introduction

• Inflammation of the tendons which abduct (bring away from other fingers) and extend the thumb.
• These tendons fit snugly into a sheath which is attached to the radial styloid (1st dorsal compartment). Repetitive thumb motion produces friction which causes irritation and results in painful tendonitis.

II. History

• Occupations which require frequent grasping and pinching have increased incidence.
• Ten times as common in females in the 30 to 50 age group.
• Pain often radiates to the forearm and wrist.

III. Physical

• Tender distal to the radial styloid on the lateral side of the wrist.
• May have palpable nodule or cyst.
• Finkelstein’s test is performed by grasping the thumb and deviating the thumb and wrist ulnarly while applying tension. This reproduces lateral wrist pain = de Quervain’s tenosynovitis.
• The CMC grind test for thumb arthritis is painless.

IV. Treatment

• Splinting for 4 to 6 weeks. Alternatively, patient can be treated with a steroid injection on the first visit. Injection cures 75-90% of cases.
• Use ½ cc of Depro-medrol (or Celestone) with 1 to 2 cc lidocaine in a 3 cc syringe with a 5/8” 25 guage needle. Enter the sheath just distal to radial styloid, and advance until rubbery resistance is felt. Sheath will inflate as fluid is injected. Gentle pressure to avoid injecting tendon.
• Repeat injection at one to two months if symptoms persist. If patient declines, refer to specialist for follow-up injection versus surgical release.
ARTHRITIS OF THE THUMB BASAL JOINT
Most common form of arthritis in the hand

I. Incidence and Etiology
   A. Usually in women between ages 30-60.
   C. Cause usually idiopathic but thought to be related to anatomic factors.
      a. Joint configuration
      b. Ligamentous laxity.
   D. These predispose joint to instability, shear forces, and ultimately, DJD.

II. Clinical Symptoms
   A. Pain and weakness most common complaints. Activities involving pinch or grip are
      biggest culprits.
      a. Because of force couple, pressure of pinch multiplied tenfold at basal joint!
   B. Catching and “clicking” not uncommon.
   C. Late changes – stiffness, adduction of metacarpal, hyperextension at metacarpal
      phalangeal joint.
   D. Carpal tunnel syndrome can coexist and mimic symptoms.

III. Physical Findings
   A. Hallmark is tenderness at joint. Often prominence at base of metacarpal.
      a. Grind test – axial loading combined with rotation.
      b. Crank test – axial loading with flexion/extension. Use your own thumb to
         ballotte joint at same time – most sensitive.

IV. Differential Diagnosis
   A. DeQuervain’s tenosynovitis
      a. Most common condition confused with basal thumb arthritis.
   B. Carpal Tunnel – high association with basal thumb disease. Important to identify
      especially before surgical treatment.
   C. Also associated with trigger digits, volar and dorsoradial ganglia.

V. Treatment
   A. Rest – splint full-time 1-3 weeks, then gradual increase in painless use.
   B. NSAID’s
   C. Thumb flexibility and strengthening exercises may be helpful but usually less so
      than in arthritis in other locations.
   D. Low profile splint for specific, repetitive activities.
   E. Injections can be very helpful in short run. Limit to three.
Thumb Arthritis Injection

**Step 1**
Wear protective gloves at all times during this procedure and use sterile technique.

**Step 2**
Cleanse the skin with alcohol, allow it to dry, then cleanse the area with iodinated soap or similar antiseptic solution.

**Step 3**
The joint can be injected from the dorsum (back of the hand) or from the volar radial side. Insert a 27-gauge needle on the volar (palmar) and radial side of the thumb, as there is less chance of penetrating a sensory nerve in this area. Inject 1% of the anesthetic subcutaneously. To locate the joint space, manipulate the metacarpal and then palpate the base of the metacarpal. Next pull on the end of the thumb to open the joint space.

**Step 4**
Advance the needle into the joint and inject 0.5 to 1 mL of a 1% local anesthetic (Figure 1).

**Step 5**
Using the 25-gauge needle, inject 0.5 mL of 40 mg/mL corticosteroid preparation through the same needle tract. The injection of fluid should meet little resistance if the needle is in the CMC joint.

**Step 6**
Dress the puncture wound with a sterile adhesive bandage.

**Adverse outcomes**
Injury to sensory branches of the radial nerve, joint space infection, and depigmentation and fat atrophy at the site of injection are all possible.

**Aftercare / patient instructions**
Advise the patient that 33% of patients may experience a “flare” manifested by increased joint pain for 1 to 2 days. NSAIDs or an analgesic may be given to alleviate this pain. Also, ice may be helpful in the first 24 hours of pain. If available, the patient may wear a thumb sprain splint for 2 to 3 days after the injection.
GANGLION CYST

I. Introduction

- Ganglion = lump = fluid-filled sac, usually attached by stalk to wrist joint.
- Most common mass of the hand or wrist. Sixty percent are dorsal, but can be in any location. A variant of the ganglion arises from a degenerative DIP joint, called a mucus cyst.

II. History

- Ninety percent of cases are spontaneous. History of trauma in 10%.
- Usually a cosmetic rather than a functional problem, but occasionally painful and can limit joint motion.
- Tend to wax and wane over time.
- No evidence that they are related to occupation.

III. Physical

- Cyst is generally firm but can be hard as bone and mistaken for spur.
- Rarely tender to palpation and pain with endpoints of motion, especially forced dorsiflexion.
- Cyst will transilluminate with penlight.
- Rarely, nerve or vascular compression occurs. Volar ganglions are commonly wrapped around the radial artery.

IV. Treatment

- Aspiration has about 50% success rate. Inject 2 cc of 1% lidocaine with a 3 cc syringe, 5/8” 25 gauge needle over the cyst. Then use a 1 ½” 18 gauge needle and a 10 cc syringe. Large bore needle because fluid can be as thick as honey, 10 cc so that you can generate enough vacuum. Multiple punctures are OK in case you miss it on the first go.
- Don’t aspirate volar ganglions because of proximity to the radial artery.
- Use of splints and/or steroids is controversial. Usually not necessary.
- Surgery is the only definitive treatment. Recurrence rate 10%.
- Mucus cysts arise from the DIP joint. They are often painful and can groove the nail plate. Can be confused with Heberden’s nodes which are also a result of degenerative arthritis, but are usually symmetric on several digits. Steroid injections are effective in about 75% of cases.
DUPUYTREN’S CONTRACTURE

- Thickenning and contracture of the tissue which attaches skin to the underlying bone (palmar aponeurosis). May cause pits, fissures, dimples.
- Cause unknown. Not related to trauma or occupation. Increased in middle-aged men of Northern European descent.
- Spontaneous development of nodule in palm which may or may not be painful. Often (but not always) progress to contracture of PIP or MCP joint.
- Patient can easily flex the finger but is unable to extend.
- Splints, shots, medications, massage are not helpful. Surgery is only effective treatment.

COMMON HAND INFECTIONS

I. Paronychia
- Most common hand infection. Caused by ingrown nail, puncture, or sliver in the soft tissue about the nail, called the paronychium. Staph aureus is the most common organism.
- If caught within the first few days, treat with warm soaks, oral antibiotics.
- Late cases with established infection/abscess require drainage. Perform a digital block with 4-6 cc of 1% lidocaine without epinephrine. Elevate the nail fold and/or incise the abscess. If the plate is ingrown, remove approximately one-quarter of the nail.

II. Felon
- Deep abscess of the fingertip pad. Can be caused by puncture or crush. Staph aureus again the most common cause.
- Extremely tender and swollen on pad/pulp.
- Fibrous septae divide pad into multiple compartments. Infection breaks down these septae. Can necrose skin and nerves, “compartment syndrome.” Can cause osteomyelitis if untreated.
- Requires surgical drainage and should be referred to specialist.

III. Flexor Tenosynovitis
- Most worrisome of the three common finger infections. Infection of the flexor tendon sheath can quickly destroy the gliding mechanism of the tendon, causing a permanently stiff finger. Requires surgical drainage.
- Usually caused by a penetrating injury but may be hematogenous.
- Kanavel described four classic findings. If the finger is swollen and slightly bent, if it hurts to straighten it out and push on the flexor tendon, then immediate surgical referral. If the process can be caught within 24 to 48 hours, there are usually no sequelae.
CARPAL TUNNEL SYNDROME
Most common compressive neuropathy

I. Pathoanatomy
A. 9 tendons and median nerve pass through carpal tunnel
B. 3 sides of canal formed by wrist bones and roof formed by thick transverse carpal ligament.
C. Nerve provides sensation to thumb, index, long and radial ½ of ring finger. Also motor function to thenar muscles.
D. Conditions which increase pressure in canal can cause CTS.
   a. Overuse/synovitis.
   b. Medical conditions: hypothyroidism, diabetes, fluid retention (pregnancy), acute fracture, rheumatoid arthritis.

II. History
A. Classic finding of numbness at night – often awakens patient – in median nerve distribution.
   a. Probably due to wrists in slight flexion during sleep which increases carpal canal pressure.
B. Numbness in activities with hand elevated, i.e., driving.
C. Pain in hand. Also feeling of fullness/swelling.
D. Proximal radiation of pain but rarely proximal to elbow. If to shoulder or neck, consider more proximal compressive neuropathy such as C-spine.
E. Dropping objects or weakness may also be present.
III. Physical Findings

A. Phalen’s test, compression test most reliable. They attempt to increase pressure in carpal tunnel.
   a. Flex wrist or press directly over nerve for 30 seconds.
B. Tinel’s sign – less reliable – tests nerve irritability.
   a. Tap nerve over carpal canal.
C. Thenar abduction test – muscle strength/atrophy.
   a. Should be able to form thenar wad into firm, golf-ball-hard muscle.
D. Don’t forget to check C-spine/radiculopathy.
   a. C6 – sensation to thumb +/- to index.
   b. C7 - +/- index and long.
   c. C8 – ring and small.

IV. Diagnostic Tests

A. Electrodiagnostic studies: often not needed in clear-cut cases. In worker’s comp cases or unclear diagnosis they are helpful.
   a. Nerve conduction most helpful. EMG used only to document motor involvement.
   b. Very helpful to rule out double-crush problems. (Multiple areas of nerve compression.)
   c. 5-8% of patients with negative NCS can have clinical CTS!!
B. X-ray – usually not needed – only if history of hand/wrist trauma, arthritis/stiffness.
C. Lab tests – FBE, thyroid, rheumatology workup.
   a. Usually not needed.

V. Differential Diagnosis

A. Medical conditions – Diabetes, hypothyroidism.
B. Cervical radiculopathy.
C. Other compressive neuropathies.
   a. Pronator syndrome – median nerve compression in mid-proximal forearm, wrist flexors and pronator are weak.
   b. Ulnar neuropathy.
D. Conditions producing pain/weakness: arthritis (base of thumb), volar radial ganglion, flexor carpi radialis tendonitis.
VI. Treatment

A. Mechanical
   a. Splint – wrist in neutral. May start full-time, then wean to nighttime. Try to avoid splint as “crutch”.

B. Medication
   a. NSAID’s – variably helpful. May exacerbate if significant fluid retention.
   b. Diuretics.

C. Steroid injection.
   a. Most helpful diagnostically – often eliminates need for nerve conduction studies.
   b. Usually only short-term relief. Long-term benefit in maximum of 25% of patients.
   c. 3 cc syringe, 25 or 27 g, 5/8” needle, 1-2 cc, 1% Lidocaine, ½ cc steroid preparation (Celestone, Kenalog, dexamethasone). Insert needle at 45 degree angle approximately 5 mm ulnar to palmaris tendon. DO NOT INJECT if any paresthesias – redirect needle before injecting. See following diagram.

VII. Red Flag

• If obvious thenar muscle atrophy or muscle denervation on EMG, refer early!

VIII. Surgery

A. Five “risk factors” shown to be associated with need for surgery.
   a. Age > 50
   b. Duration of symptoms > 1 year.
   c. Positive Phalen’s test
   d. Presence of trigger finger
   e. Constant numbness/tingling.

B. Increased number of (+) risk factors = increased likelihood of surgery. In “classic” cases (multiple risk factors), nerve conduction studies are not necessary. In questionable cases (few risk factors), NCS are often helpful.

<table>
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<th>Risk Factors</th>
<th>% of Needing Surgery</th>
<th>NCS Indicated (+/-)</th>
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<tr>
<td>One</td>
<td>About 1/3</td>
<td>(+)</td>
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<tr>
<td>Two</td>
<td>About 2/3</td>
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<tr>
<td>Three or more</td>
<td>&gt; 90%</td>
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C. In general, one-third of patients seen by primary care with a diagnosis of CTS respond to medical management, one-third don’t improve but decline surgery, and one-third end up with surgical intervention. 90% success rate with surgery.
Carpal Tunnel Injection

### Materials
- Sterile gloves
- Alcohol
- Skin preparation solution (iodinated soap or similar anti-septic solution)
- 3 mL syringe with a 25-gauge, ¾-inch needle
- Mixture of 2 mL of a 1% local anesthetic (without epinephrine) and 1 mL of a 40 mg/mL depo corticosteroid preparation
- Adhesive bandage

### Step 1
Wear protective gloves at all times during this procedure and use sterile technique.

### Step 2
Cleanse the volar aspect of the wrist with alcohol, allow it to dry, then cleanse the area with iodinated soap or similar antiseptic solution.

### Step 3
Inject 1 mL of the local anesthetic/corticosteroid mixture at the proximal wrist. The needle is inserted 1 cm proximal to the wrist flexion crease and 3 to 5 mm from the ulnar side of the palmaris longus. The needle is directed toward the hand at an angle of 30 degrees to 45 degrees (Figure 1). If the palmaris longus is absent, the direction of the needle may be aligned with the ring finger. Have the patient flex the fingers fully into the palm, then advance the needle approximately 1 to 1.5 cm until resistance is felt.

### Step 4
Instruct the patient to slightly wiggle the tips of the ring and little finger. If this causes slight movement of the tip of the needle, the needle is safely positioned.

### Step 5
Ask the patient to extend the fingers as gentle pressure is applied to the needle. The distal excursion of the ring and little flexor tendons will carry the point of the needle into the carpal canal.

### Step 6
If the patient reports any tingling, the needle has entered the nerve. If this occurs, do not continue with the injection. Otherwise, inject 1 to 2 mL of local anesthetic/corticosteroid mixture into the carpal canal.

### Step 7
Dress the puncture wound with a sterile adhesive bandage.

### Adverse outcomes
Infection or intraneural injection is possible.

### Aftercare/patient instructions
Advise the patient that there may be occasional mild soreness and that the injection may require 24 to 48 hours to work.
Bibliography – Robert Hoffman, MD


2. Green’s Operative Hand Surgery, Churchill Livingstone, 1999