

## WRIST AND HAND PAIN

The hand is the chief sensory organ of touch and is designed for grasping. The radial side of the hand performs pinch grip between the fingers and thumb, while the ulnar side performs power grip between the fingers and palm.

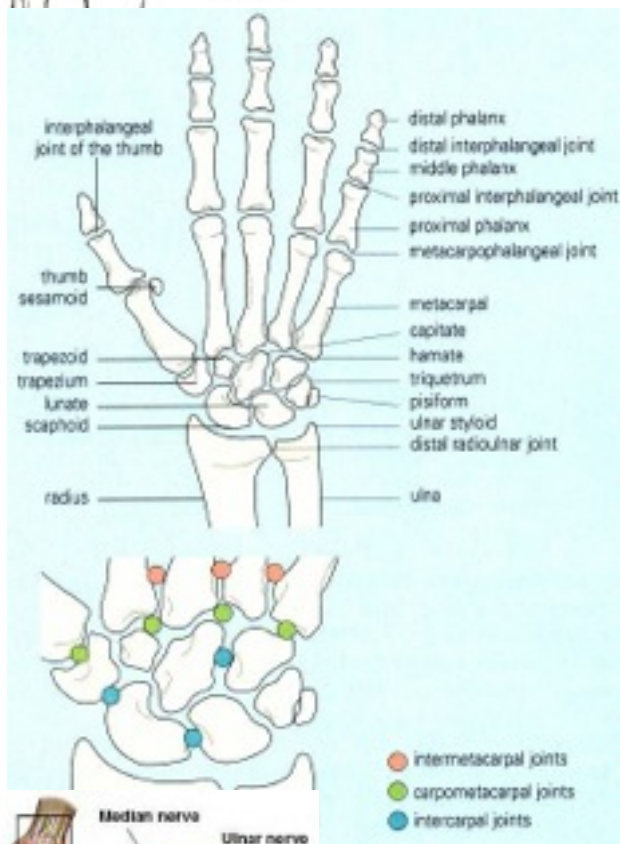
Pain in the wrist and hand may have its origin in the bones and joints, periarticular soft tissues, nerve roots and peripheral nerves, and vascular structures or be referred from the cervical spine, thoracic outlet, shoulder or elbow.



The bones of the hand are divided into a central fixed unit for stability, and three mobile units for dexterity and power. The fixed unit comprises the eight carpal bones tightly bound to the metacarpals. The three mobile units projecting from the fixed unit are:

- the thumb, the 1st carpometacarpal joint
- the index finger
- the middle, ring and little fingers

The soid articu- artic- of the



wrist or radiocarpal joint is an ellip- joint between the distal radius and ular disc proximally, and scaphoid, nate and triquetrum distally. The ular disc, or triangular fibrocartilage wrist, joins the radius to the ulna.



The flexor retinaculum straps down the flexor tendons as they cross the wrist. The ulnar nerve, artery and vein cross over the retinaculum but are sometimes covered by a fibrous band - superficial part of the transverse

carpal ligament - to form the ulnar tunnel, or Guyon's canal.



The anatomic snuffbox corresponds to the depression between the extensor pollicis longus tendon and tendons of the abductor pollicis longus and extensor pollicis brevis.

Movements of the wrist include palmar flexion, dorsiflexion (extension), ulnar deviation, radial deviation and circumduction. The intercarpal joints contribute to wrist movements, particularly palmar flexion. Pronation and supination of the hand and forearm occur at the proximal and distal radioulnar joints.



Thickening and contracture of the palmar aponeurosis (Dupuytren's contracture) often produces flexion deformities of the ring and, less commonly, the little and middle fingers.



Swan-neck deformity

Bou-  
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Z-shaped deformity of thumb

Four principal mechanisms of injury have been described:

1. throwing
2. weight bearing
3. twisting
4. impact

Any of these mechanisms of injury can cause either traumatic or overuse injuries involving bones or soft tissue, including nerves and vasculature.



The Finkelstein test can indicate the presence of de Quervain's tenosynovitis. The patient folds the thumb under the fingers and the examiner ulnarly deviates the wrist. The test is positive if pain results.



In the triangular fibrocartilage complex load test, an axial load is applied across the patient's ulnarly deviated wrist. The test reproduces pain in patients with tears of the triangular fibrocartilage. Pain in this area and a snap or click felt in this region with pronation, supination, or flexion can also indicate injury to the complex.

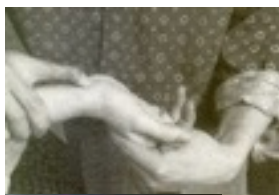
Pain with any of the following clinical maneuvers suggests fracture of the scaphoid bone.



The examiner supports the patient's wrist with one hand. With the other hand he extends the patient's thumb then squeezes the snuff-box with the thumb of the supporting hand.



Axial compression of the patient's thumb.



To evaluate the scaphoid tuberosity for fracture the examiner extends the patient's wrist with one hand and applies pressure to the tuberosity at the proximal wrist crease with the opposite hand.



Tinel's sign consists of tapping over the median nerve and is positive if the patient perceives paresthesia, which radiates distally. To be effective percussion must be done with the wrist in extension.



Phalen's test is performed by having the patient hold the wrists in flexion for one minute. It is positive if paresthesias are reproduced.

## DeQuervain's Tenosynovitis

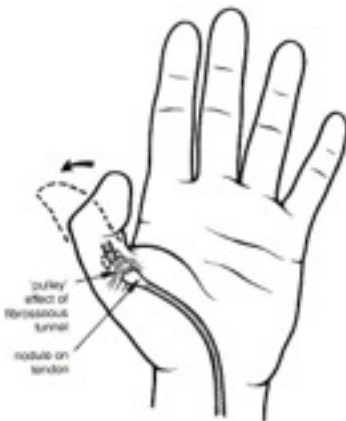
Involves the abductor pollicis longus and extensor pollicis brevis and is usually due to repetitive strain injury due to chronic overuse of the wrist and hand. It is most common in women between 30 and 50 years of age. DeQuervain's may also occur in association with:

- Rheumatoid arthritis
- Psoriatic arthritis
- Direct trauma
- Pregnancy



The diagnosis is often confused with osteoarthritis of the 1st CMC joint and with the intersection syndrome due to tenosynovitis of the second extensor compartment at its intersection with the tendons of the first extensor compartment. Finkelstein's Test is positive and a tendon crepitus may be palpable.

## Trigger Finger or Thumb

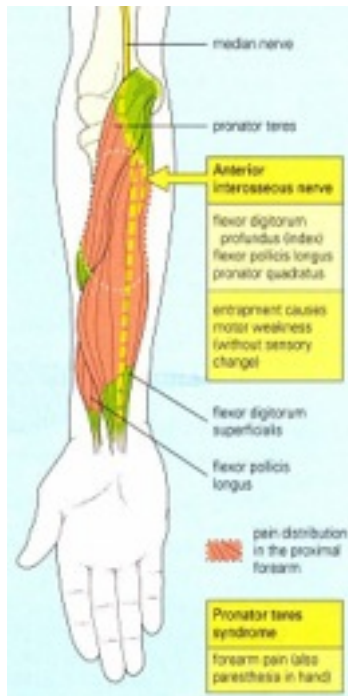


Also known as stenosing digital tenosynovitis or snapping finger or thumb. It is the most common repetitive strain injury of the hand. A tendon nodule develops at the site of stenosis. The nodule and/or tendon sheath constriction interfere mechanically with normal tendon gliding, resulting in pain over the area of the pulley and snapping, triggering, or catching movement of the finger or thumb. Rheumatoid arthritis, psoriatic arthritis, diabetes, and hypothyroidism can also cause trigger finger or thumb.



## Anterior Interosseous Nerve Syndrome

This nerve is a motor nerve that branches off the median nerve about 6 cm below the lateral epicondyle. Because there are no sensory fibers in the nerve, the patient has no sensory complaints and experiences only motor weakness. The typical pattern is loss of distal flexion of the thumb and index finger giving a characteristic pinch sign. The pronator quadratus is tested with the elbow fully flexed. There will be decreased resistance to forced supination of the forearm. The patient may note a dull, aching pain in the volar aspect of the proximal forearm.

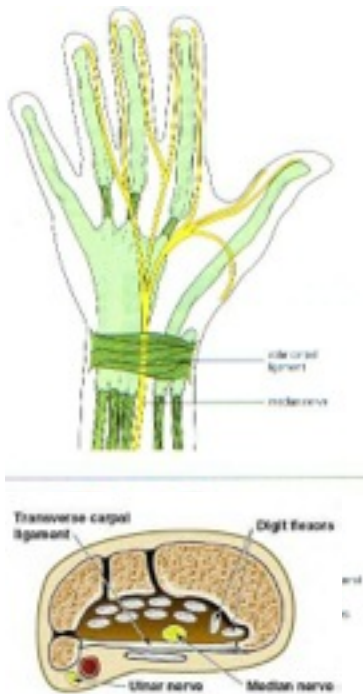


## Pronator Teres Syndrome

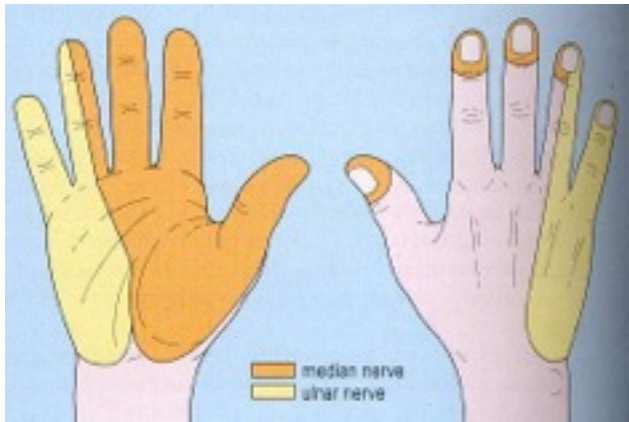
The median nerve may be entrapped by the pronator teres muscle or by fibrous bands at the superficial head of this muscle. The most consistent symptom in this syndrome is an aching pain in the proximal forearm, which often begins insidiously. Paresthesias are common and follow the median nerve distribution into the hand. As sensory findings are similar to carpal tunnel syndrome, the two conditions may be confused. A provocative test that may reproduce the pain consists of pronation of the forearm and flexion of the wrist performed against resistance.

## Carpal Tunnel Syndrome

This is the most common entrapment syndrome. There are two ways in which the median nerve may be entrapped. Pressure may be exerted on the nerve due to reduction in capacity of the carpal tunnel, as with swelling or lesions of the surrounding tissues, or there may be an increase in volume of the contents of the tunnel, an example being flexor tenosynovitis. There are many causes of carpal tunnel syndrome. Carpal tunnel syndrome is noted most commonly in persons whose occupation or avocation requires substantial use of the hands. Crystal-induced rheumatic disorders have been known to cause CTS. Carpal tunnel syndrome is reported as a complication of several connective tissue diseases, most commonly rheumatoid arthritis. Carpal tunnel syndrome is particularly common in patients on hemodialysis. A number of metabolic and endocrine diseases may have CTS as one of their manifestations. These include diabetes, myxedema, mucopolysaccharidosis and acromegaly. All varieties of amyloidosis may cause CTS. There is a high



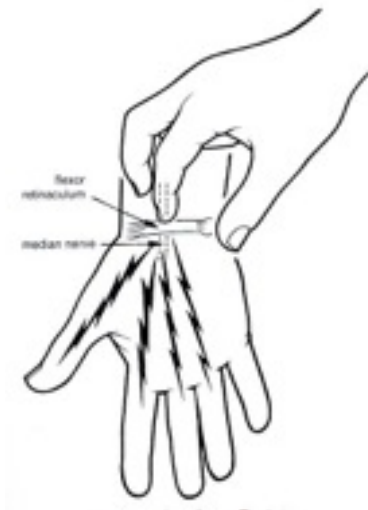
incidence of CTS during pregnancy. Symptoms begin in the third trimester, usually resolve spontaneously after delivery and do not require surgery.



Because the median nerve supplies sensory branches to the radial three fingers and one-half of the ring finger, these digits may have sensory loss in CTS. Typically, patients complain of burning, pins-and-needles sensations, numbness and tingling in the fingers. The archetypal complaint of patients with CTS is that they are awakened at night by abnormal sensations, and they have to shake the hand in an attempt to relieve the numbness.

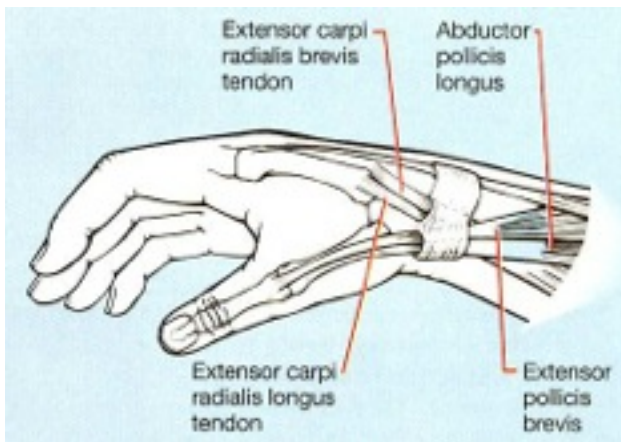


To determine motor loss, the strength of the thenar muscles (abductor pollicis brevis and opponens pollicis) should be tested. Inspection of the hand may reveal thenar atrophy.



Tinel's may be positive along with Phalen's, but the most effective test is the carpal compression test.

### Intersection Syndrome



This is tendinitis or tenosynovitis in the first and second dorsal compartments of the wrist. This overuse syndrome has been reported in rowing, canoeing, racket sports, weight lifting, and skiing. Physical examination demonstrates tenderness and crepitation or squeaking several centimeters proximal to Lister's tubercle.

## Myofascial Disruption Treatment

Myofascial bands of the wrist are usually located along the radial and ulnar styloid processes and central posterior wrist. With a myofascial band of the thenar eminence, the patient will push the thumb into the thenar muscles.

Tingling or numbness in the median nerve distribution of the hand indicates superficial fascial disruption of the flexor retinaculum. This is treated with double thumb traction technique. Diffuse finger pain is treated with two finger traction with rotation in opposite directions. Diffuse vague discomfort is an indicator for superficial fascial disruption treatment.

The complaint of stiff finger indicates a synovial fixation. Pain deep in a joint indicates myofascial layer disruption. Deep ache in joint, particularly associated with swelling on both sides of the joint indicates traction/thrust manipulation for a myofascial layer disruption type of joint dysfunction.

Enthesis disruption causing enthesopathy of the wrist and hand is indicated by the patient pointing to spots of pain with one finger. These are treated with enthesis compression or electric point stimulation.

In carpal tunnel syndrome there is usually a superficial fascial disruption of the flexor retinaculum and myofascial bands. Sprained wrists usually present with enthesopathies, myofascial bands and myofascial layer disruption type of joint dysfunction. Thumb sprains are usually myofascial bands of the thenar muscles with enthesopathies around the joint.

Osteoarthritis of the hand and fingers can be treated with traction or compression manipulation followed by enthesopathy technique; however, *Arthritis Relief Plus*, a topical herbal product has been shown in controlled clinical trials to be up to 90% effective for long-term relief of osteoarthritis.



Research has shown that the scaphoid-capitate and lunate-capitate joints have controlling effects on the adjacent carpal joint motion. Loss of motion in these joints affects global wrist motion as if all the adjacent joints were fused.

Myofascial trigger points in numerous muscles can cause pain felt in the wrist or hand. Trigger points in the supinator and extensor carpi radialis brevis can mimic carpal tunnel syndrome.

Dorsal wrist and hand pain can be caused by the extensor carpi radialis brevis.

Base-of-thumb pain and radial hand pain can be caused by the supinator, scalenes, brachialis, brachioradialis, opponens pollicis, and adductor pollicis.

Dorsal finger pain can be caused by trigger points in the extensor digitorum, dorsal interossei, scalenes, and abductor digiti minimi.

Volar wrist pain and pain in the palm can be caused by the flexor carpi radialis and palmaris longus.

Volar finger pain can be caused by the flexor digitorum superficialis, the interossei, and the abductor digiti minimi.



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