



# Carpal Tunnel Syndrome

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# Anatomy

- Carpus is a word derived from the Greek word "karpos" which means "wrist."
- The wrist is surrounded by a band of fibrous tissue that normally functions as a support for the joint.

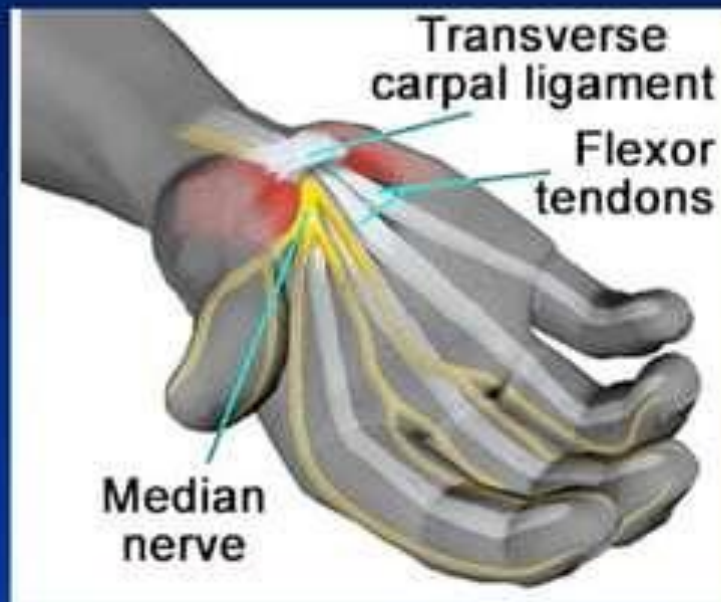


# Anatomy

- The tight space between this fibrous band and the wrist bone is called the carpal tunnel.
- The median nerve passes through the carpal tunnel to receive sensations from the thumb, index, and middle fingers of the hand.



# Anatomy



# Carpal Tunnel Syndrome

- Carpal tunnel syndrome is pressure on the median nerve -- the nerve in the wrist that supplies feeling and movement to parts of the hand.
- It can lead to numbness, tingling, weakness, or muscle damage in the hand and fingers.



# Symptoms

- Numbness or tingling in the thumb and next two or three fingers of one or both hands
- Numbness or tingling of the palm of the hand
- Pain extending to the elbow
- Pain in wrist or hand in one or both hands



# Symptoms

- Problems with fine finger movements (coordination) in one or both hands
- Wasting away of the muscle under the thumb (in advanced or long-term cases)
- Weak grip or difficulty carrying bags (a common complaint)
- Weakness in one or both hands



# Causes

- Usually the cause is unknown.
- Pressure on the nerve can happen several ways:
- swelling of the lining of the flexor tendons, called tenosynovitis.





# Causes



- Joint dislocations
- Fractures
- Osteoarthritis can narrow the tunnel
- Posture - keeping the wrist bent for long periods of time
- Repetitive wrist movements



# Causes

- Fluid retention during pregnancy can cause swelling in the tunnel and symptoms of carpal tunnel syndrome, which often go away after delivery.
- Thyroid conditions (hypothyroidism)
- Rheumatoid arthritis
- Diabetes mellitus



# Causes

- **Women** are three times as likely as men are to develop carpal tunnel syndrome, according to the National Institute of Neurological Disorders and Stroke.
- **Heredity:** You may be significantly more likely to develop carpal tunnel syndrome if close relatives have had the condition. Inherited physical characteristics, such as the shape of your wrist, may make you more susceptible.



# Diagnosis

- History
- Physical Examination:
- Tinel sign: is a way to detect irritated nerves. It is performed by lightly tapping (percussing) over the nerve to elicit a sensation of tingling or "pins and needles" in the distribution of the nerve



# Diagnosis

- **Phalen's maneuver** is a diagnostic test for carpal tunnel syndrome discovered by an American orthopedist named George S Phalen.



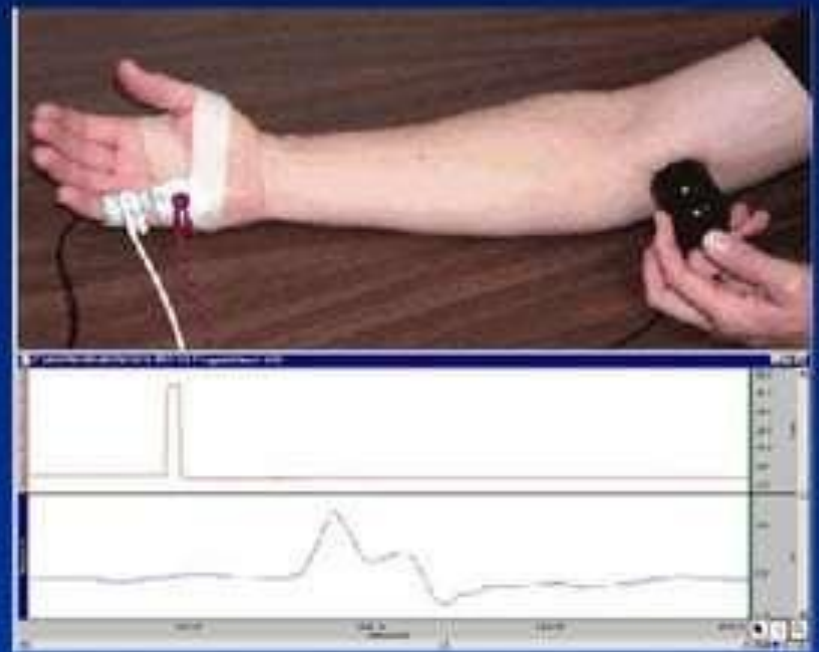
# Diagnosis

- Atrophy of the thenar eminence – severe cases
- Abductor pollicis brevis
- Flexor pollicis brevis
- Opponens pollicis



# Diagnosis

- **Nerve Conduction Studies**
- Prolongation of the distal latencies of the median motor and sensory evoked potentials
- Excludes peripheral neuropathy and other nerves lesions



# Diagnosis

- **Electromyography** – evaluates the electrical impulses from the muscle fibers
- Excludes cervical radiculopathy
- Denervation potentials on the muscles supplied by the median nerve – criteria for surgical decompression





# Treatment

- The goal of treatment for CTS is to reduce the swelling and pressure on the median nerve.
- Wrist brace
- Avoid inadequate posture and repetitive wrist movement



# Ergonomics

- Keyboard and mouse support



# Treatment

- **Vitamin B6 (Pyridoxine)** - 200mg po daily for 90 days – may relieve numbness and tingling



# Treatment

- **Median Nerve Gliding Exercises**



# Median Nerve Gliding Exercises



# Carpal Tunnel Stretch



# Cold Laser Therapy

- Low level laser therapy (LLLT):  
The exact mechanism of its effect on carpal tunnel and other pain syndromes is unknown; hypotheses have included improved cellular repair and stimulation of the immune, lymphatic, and vascular systems.



# Local Cortisone Injection

- Corticosteroids and Lidocaine (local anesthetic) can be injected directly into the wrist





# Treatment

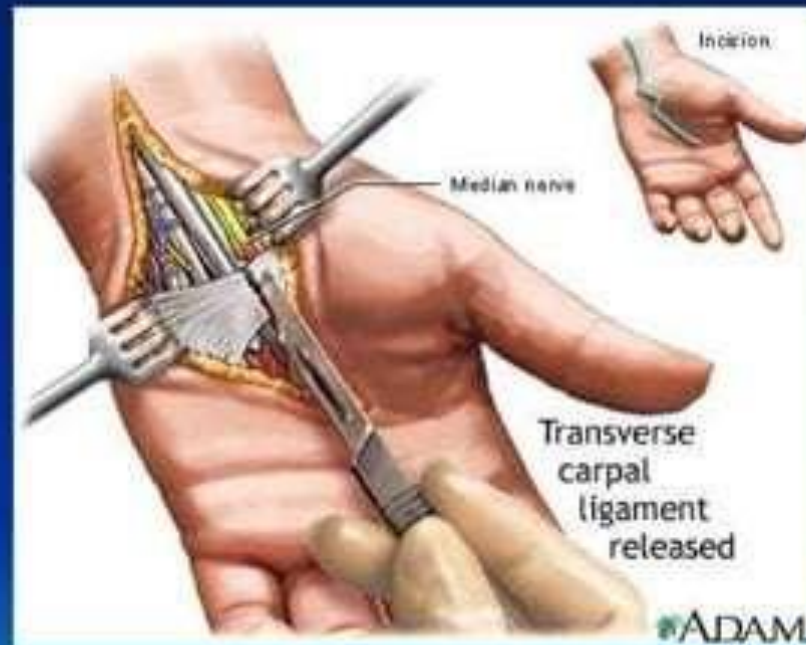
- Oral cortisone usually medrol dosepack



- The local injection and oral cortisone are used to relieve pressure (inflammation) on the median nerve and provide immediate, temporary relief to persons with mild or intermittent symptoms.

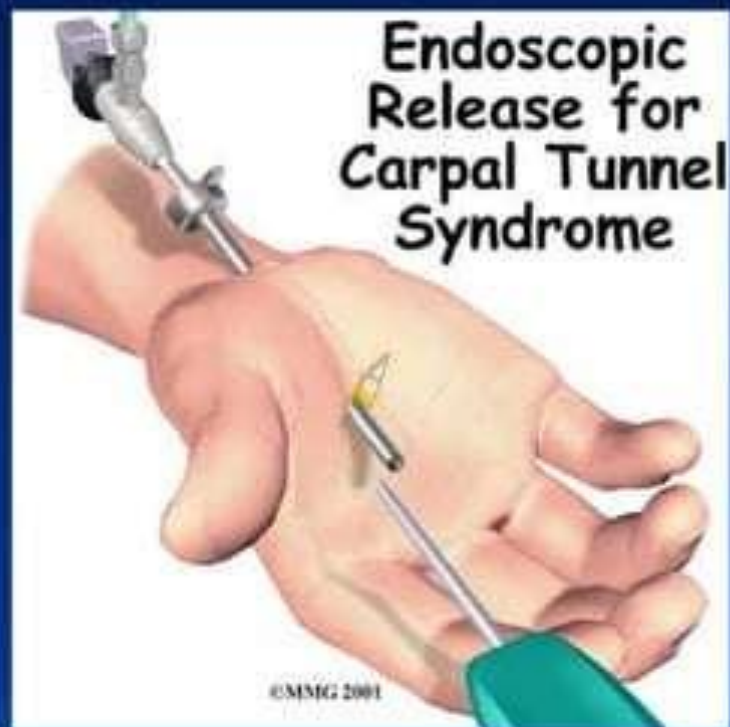
# Surgery

- Open Carpal Tunnel Release



# Surgery

- Endoscopic carpal tunnel release – minimal invasive



# Post Op



# Rehabilitation after Surgery

- Gentle massage for the scar tissue  
-desensitize the incision
- Modalities to decrease pain, inflammation and swelling (heat, cold, e-stim)
- Progressively exercises to strengthen and stabilize the muscles and joints in the hand.
- Exercises to improve fine motor control and dexterity.



Thanks



Gracias

