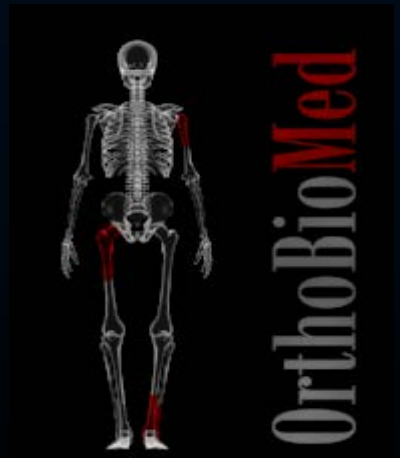
ENDOSCOPIC CARPAL TUNNEL RELEASE



Lifelong Learning

Carpal Tunnel Syndrome

- Compression of the median nerve in a fibroosseus canal on the palmar surface of the wrist:
the carpal tunnel.
- Most common entrapment neuropathy
- 2-3% of the population.
- Variations in prevalence data is likely due to variations in occupational exposure.
- 90% have a good outcome and are able to work again and 10 % are permanently disable

Carpal Tunnel Syndrome

commonest upper limb nerve entrapment syndrome

- carpal tunnel release:

400.000/ yr USA Cost : **2** billion $

Palmer & Hanrahan Ins Course Lect 1995

Causes and Associated Disorders

- More comnon in women: ratio of 2.5:1
- Middle age: 40-60 years.
- Occupational factors.
- The dominant hand is most often involved.
- 10% of patients have bilateral compromise.
- Predisposed patients: congenital small carpal tunnel cannal.
- Common cause: thickening or fibrosis of the flexor synovialis.

• Conditions that increase the volume of the contents of the carpal tunnel: ganglion cyst, benign mass, amyloid infiltration (multiple myeloma or amyloidosis).
• Rheumatoid arthritis: synovial overgrowth and alterations in carpal bone alignment.
• Acromegaly.
• Hyper and hypothyroidism.
• Pregnancy: 62% of pregnant women report symptoms. Usually resolve following delivery.

Clinical Symptoms and Signs

- Sensory complaints: 80-100% of patients.

Numbness and tingling in any of the sensory areas supplied by Median nerve.

Night pain that awakens the patient.

- Motor complaints:

Problems grasping or pinching.

Thenar atrophy.

- Acute CTS: severe pain, wrist or hand swelling,

cold hand, or decreased finger motion.

Tests

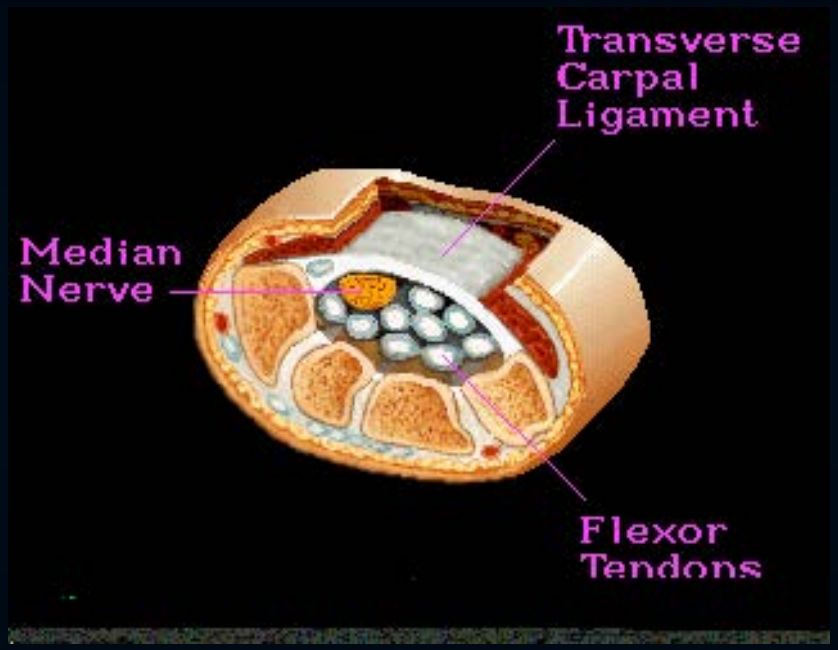
- Seek to reproduce pain or paresthesias in the median nerve's distribution within 30-60 seconds.
- Tinel's sign: Percussion over the TCL. Sensitivity 80%.
- Phalen's test: Maximal flexion of the wrist. Sensitivity 80%.
- Wormser's test (reverse Phalen's): Hyperextension of the wrist.
- Tourniquet: Significant damage if paresthesias appear in 15 seconds. Sensitivity 83%.
- Durkan's test: Carpal compression test. Pressure of 20 Kpa (150 mmHg) as long as 30 seconds.

Electrical Studies

- Important role in the differentiation among the possible affected areas: roots in the cervical spine, brachial plexus, or along the arm.
- Sensory nerve conduction studies are the most sensitive in confirming the diagnosis: increase in distal latency due to focal slowing of conduction across the carpal tunnel.
- Sensitivity and specificity: 90%

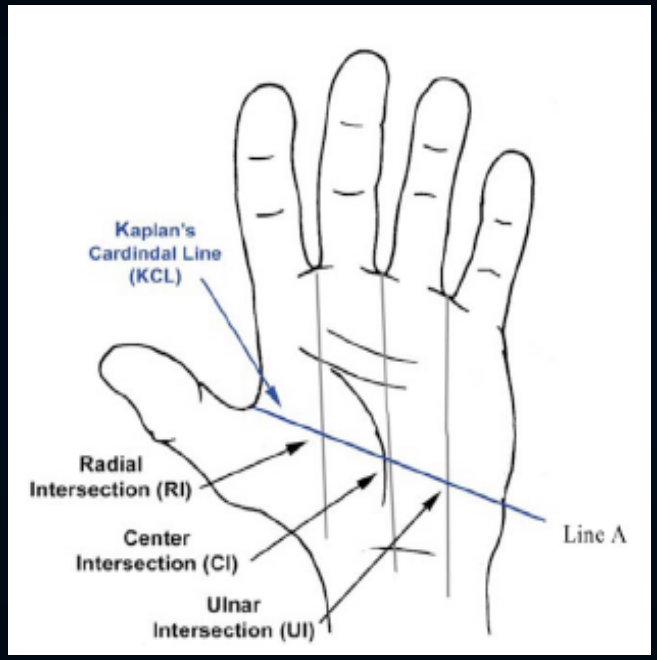
Carpal Tunnel Anatomy

- Fibro-osseus tunnel bounded by the carpal bones, the interosseus ligaments and the transverse carpal ligament (the flexor retinaculum).
- Content: Median nerve, tendons of flexor digitorum superficialis (FDS), tendons of flexor digitorum profundus (FDP), and tendon of flexor pollicis longus (FPL).



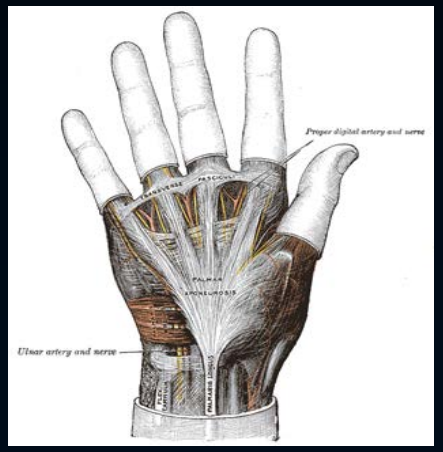
Surgical Anatomy

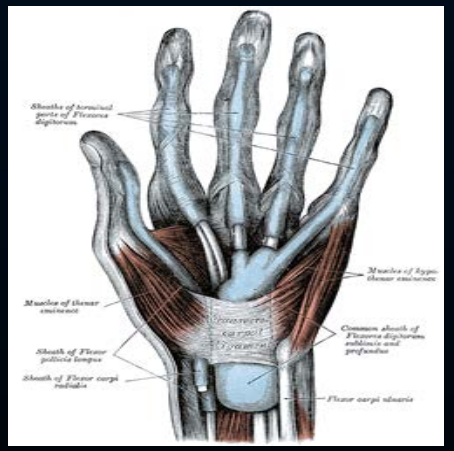
Kaplan's Cardinal Line:
• Apex of the First web space (between the thumb and index finger)
• Parallel with the proximal palmar crease.
• Intersects a line drawn as a continuation of the ulnar border of the ring finger at the hook of hamate.



The Flexor Retinaculum

- Extends 1 cm or more proximal to the most distal wrist crease distally at least 3 to 4 cm into the palm.
- Constituted by the fusion of the TCL and deeper transverse fibers of the palmar aponeurosis.





Median Nerve within the Carpal Tunnel

- Radial Component:

Sensory branches to the palmar surfaces of the 1st and 2nd fingers.

Motor branches to the abductor pollicis brevis, opponens pollicis, and superficial head of flexor pollicis brevis.

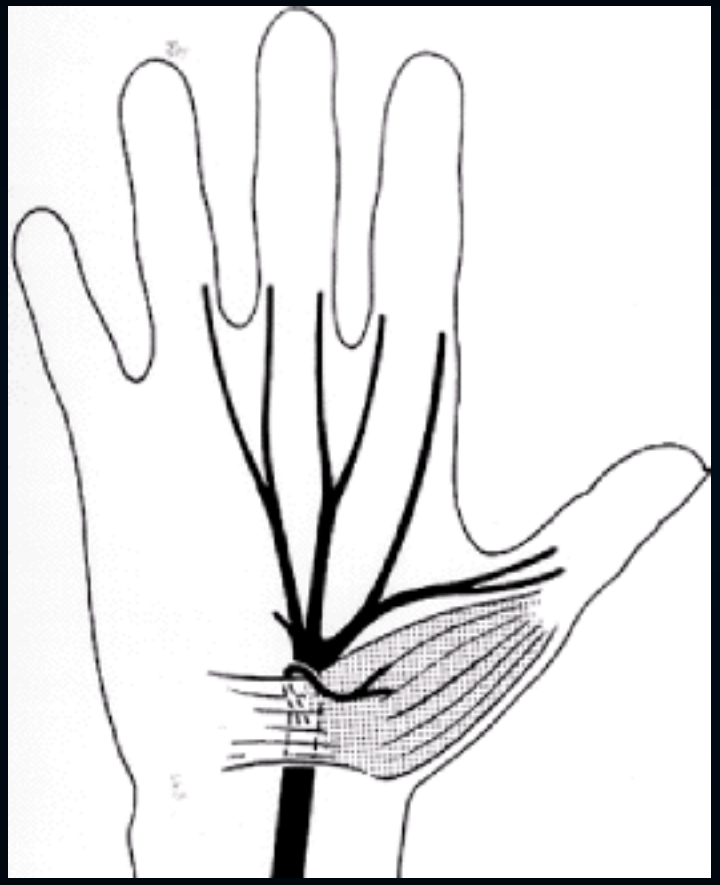
- Ulnar component:

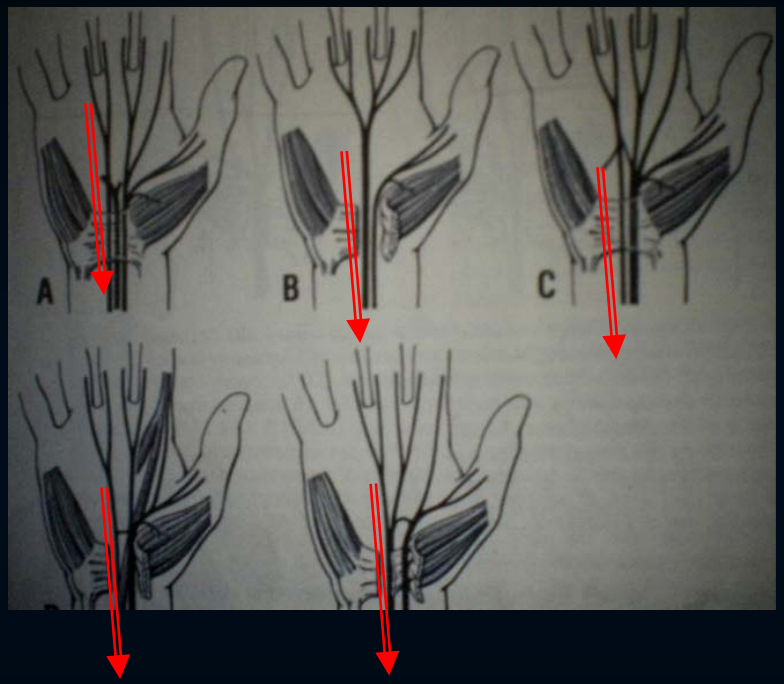
Sensory branches to the palmar surface of 2nd , 3rd , and radial side of the 4th finger.

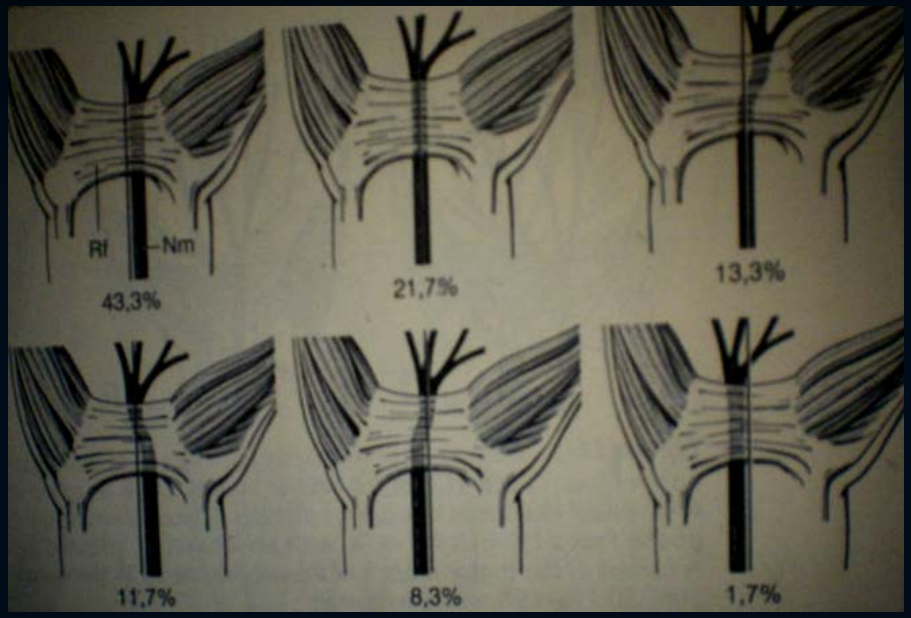
- Additionally, the median nerve can supply the dorsal surfaces of the 2nd , 3rd , and 4th fingers distal to the interphalangeal joint.

Recurrent Motor Branch

- Leaves the radial side of the median nerve distal tothe flexor retinaculum.
- Curves back around to enter the thenar muscle mass.
- Multiple anatomical variations.
- 31% of cases: leaves the ulnar side of the median nerve beneath the TCL
- 20 % of cases: transligamentous course.







Siverhus SW. Orthop Rev. 1989
A cadaveric study of the anatomic variations
of the recurrent motor branch of the median nerve.

Palmar Cutaneous Branch

- Originates from the median nerve before it enters to the carpal tunnel.
- Exits the median nerve along its anterolateral quadrant about 3 to 4 cm above the distal wrist crease.
- Passes superficial to the TCL.
- Supplies sensation to the proximal surface of the thenar eminence.