

# Manual therapy approach to the Patient with Carpal Tunnel Syndrome

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# Symptoms and Signs

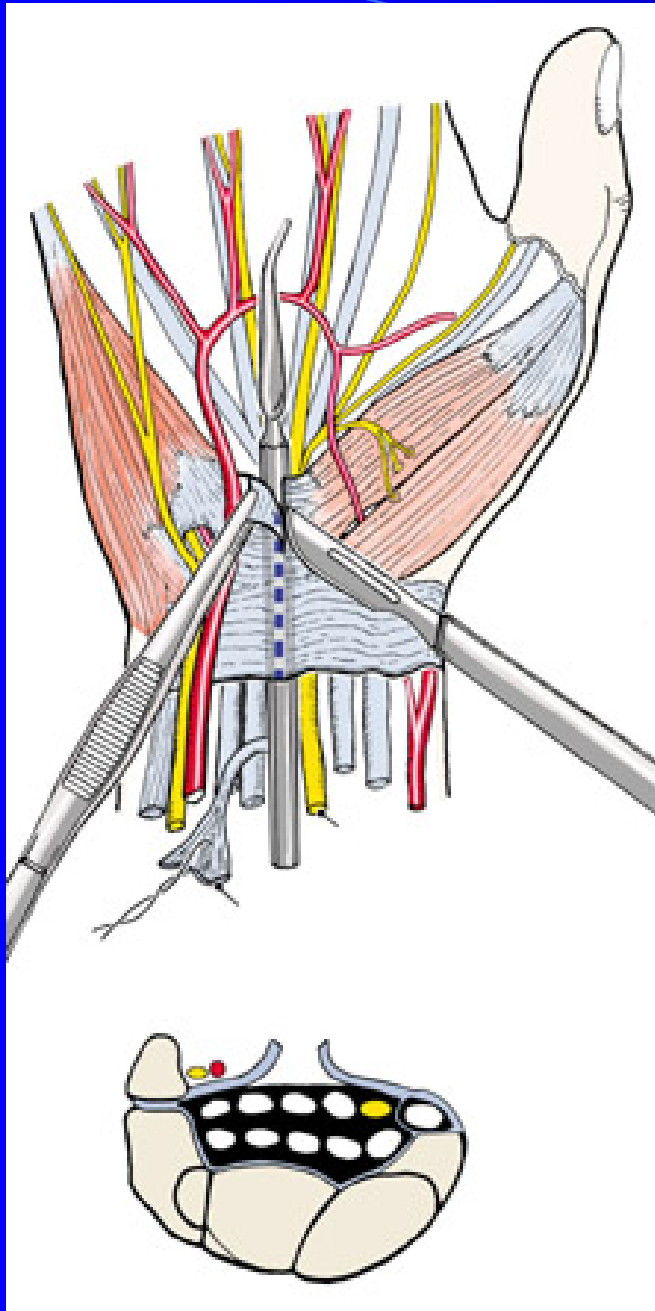
- Thumb, index, middle, and radial aspect of ring finger
  - Hand Pain
  - Paresthesia
  - Numbness
  - Pins and Needles
  - Nocturnal Paresthesia
- Thenar weakness/atrophy
- Diminished vibratory sensation/2 point discrimination
- Weak grip with thumb
- Phalen's sign
- Tinel's sign

# Incidence

- Rising due to widespread use of computers
- higher in patients with:
  - DM
  - thyroid disease
  - amyloidosis
  - RA
  - pregnancy

# Treatment Overview

- Mild and moderate cases :
  - nocturnal and or daytime splints
  - rest
  - evaluation and manipulation to relieve dysfunctions
  - frequent self stretch
  - injection if no better with splints (steroid)
    - into the space of the canal, not the nerve or tendon
- Severe cases: thenar atrophy, worsening rather than improving, or no improvement over 6 weeks:
  - surgical referral

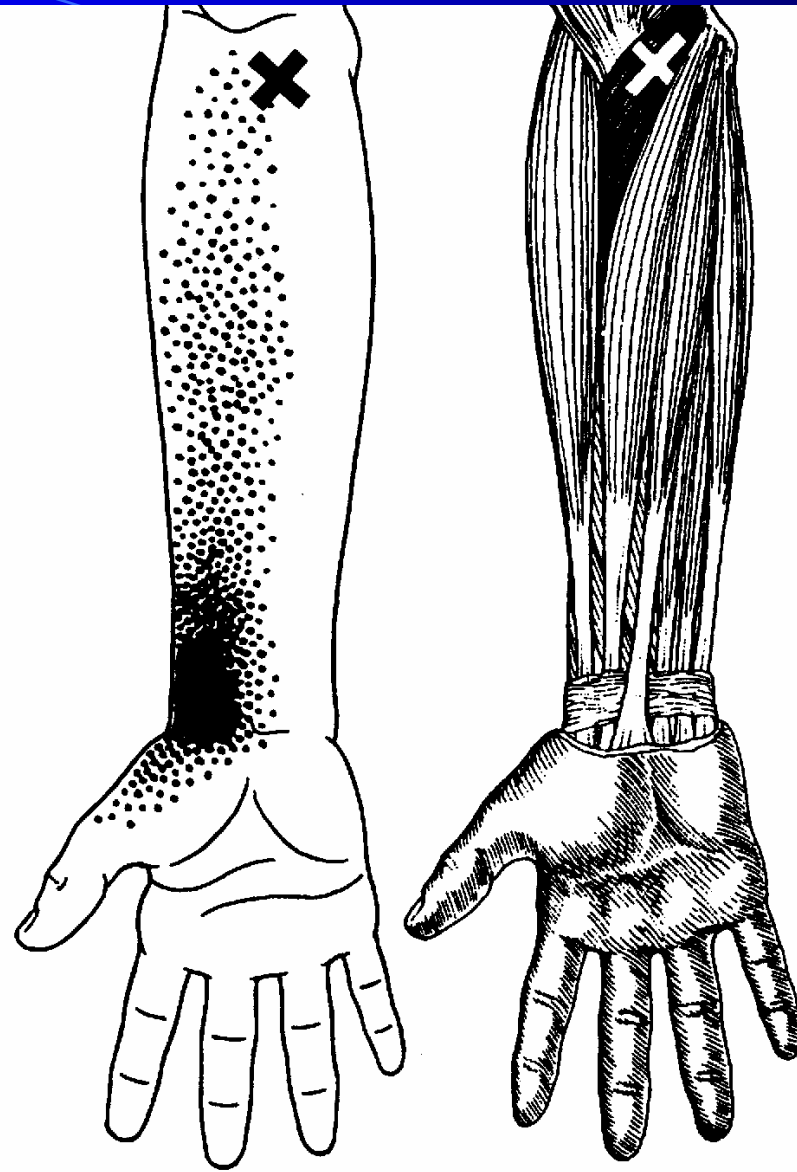


- Surgical section may increase carpal arch by only 2-3mm in the transverse dimension
- Cadaver studies show transverse lengthening (as a result of manipulation or loading with weights) 1-3mm
- Palpatory evaluation will elicit areas of functional constriction other than the carpal tunnel

- MRI studies show transverse carpal ligament is distensible,
- able to yield to external loads
- produced objective increases in transverse carpal arch dimension
- Distal band of TCL is thicker
- Distal cross section of the tunnel is smaller
- Combining guy-wire technique and distal carpal row extension with muscle energy techniques is most likely to produce results in this area.

# Course of the Median Nerve

- brachial plexus
- passes between the humeral and ulnar heads of the pronator teres
- sometimes pierces the humeral head
- passes beneath the flexor digitorum superficialis between radial and humeroulnar heads
- through the carpal tunnel



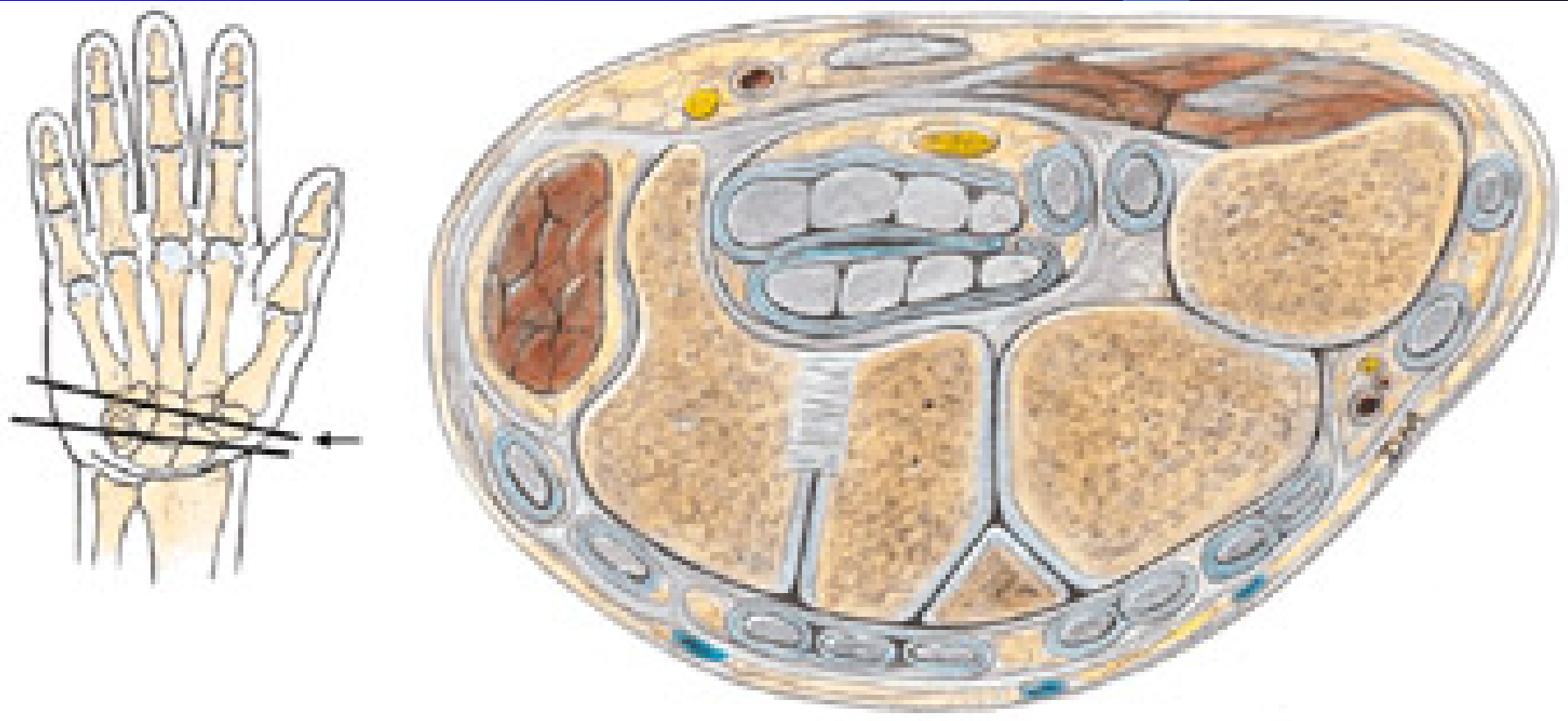
Pronator teres



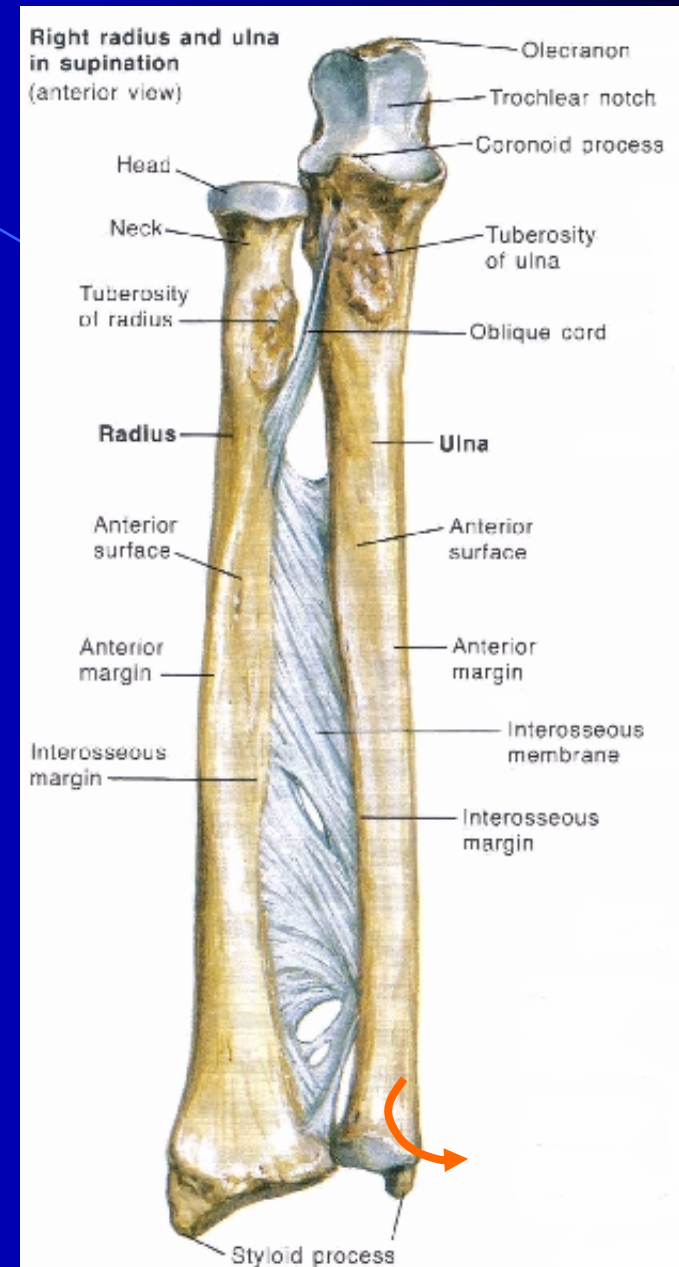
# Anatomy

- Bony attachments of flexor retinaculum
  - Pisiform and Hook of the Hamate on the medial (ulnar) side
  - Trapezium and Scaphoid (Navicular) on the lateral (radial) side
- Contents of the canal:
  - Tendons: flexor digitorum profundus, flexor pollicis longus, flexor digitorum superficialis,
  - Median Nerve

# Carpal Tunnel



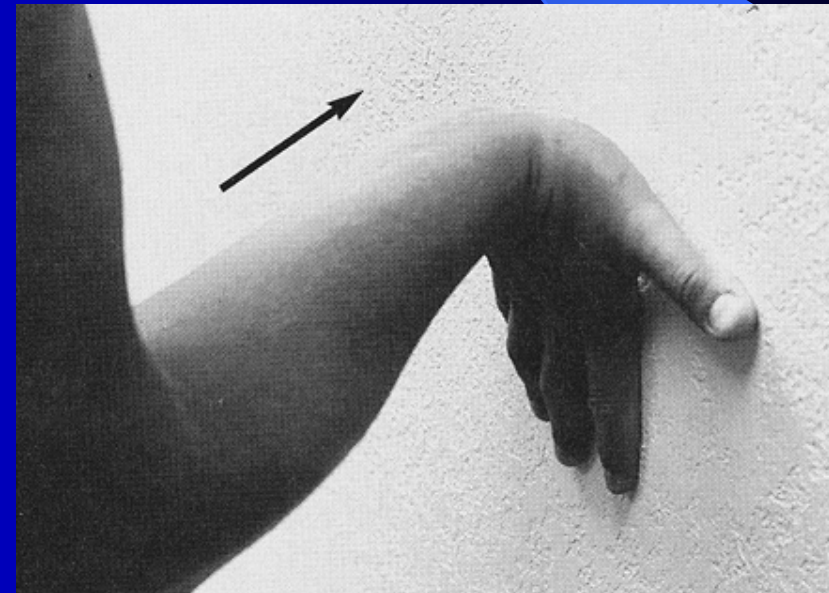
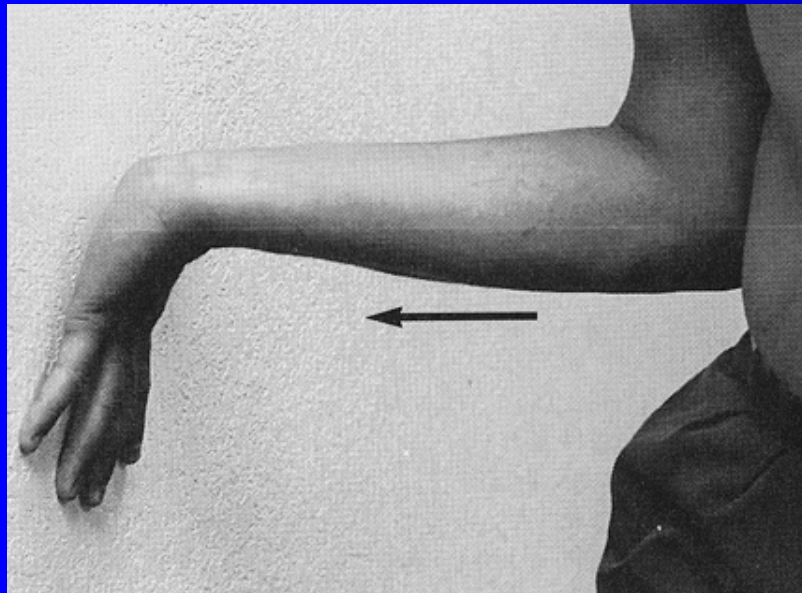
- The interosseous membrane acts like a joint because of its intimate participation in force transmission and motion of the radius in relationship to the ulna.
- Internally rotated radius changes the tension on the interosseous membrane and the tension on the carpal bones.



Interosseous Membrane

# Manipulative Highlights

- transverse carpal ligament has visco-elastic properties: manipulation and stretching can actually increase the size of the canal

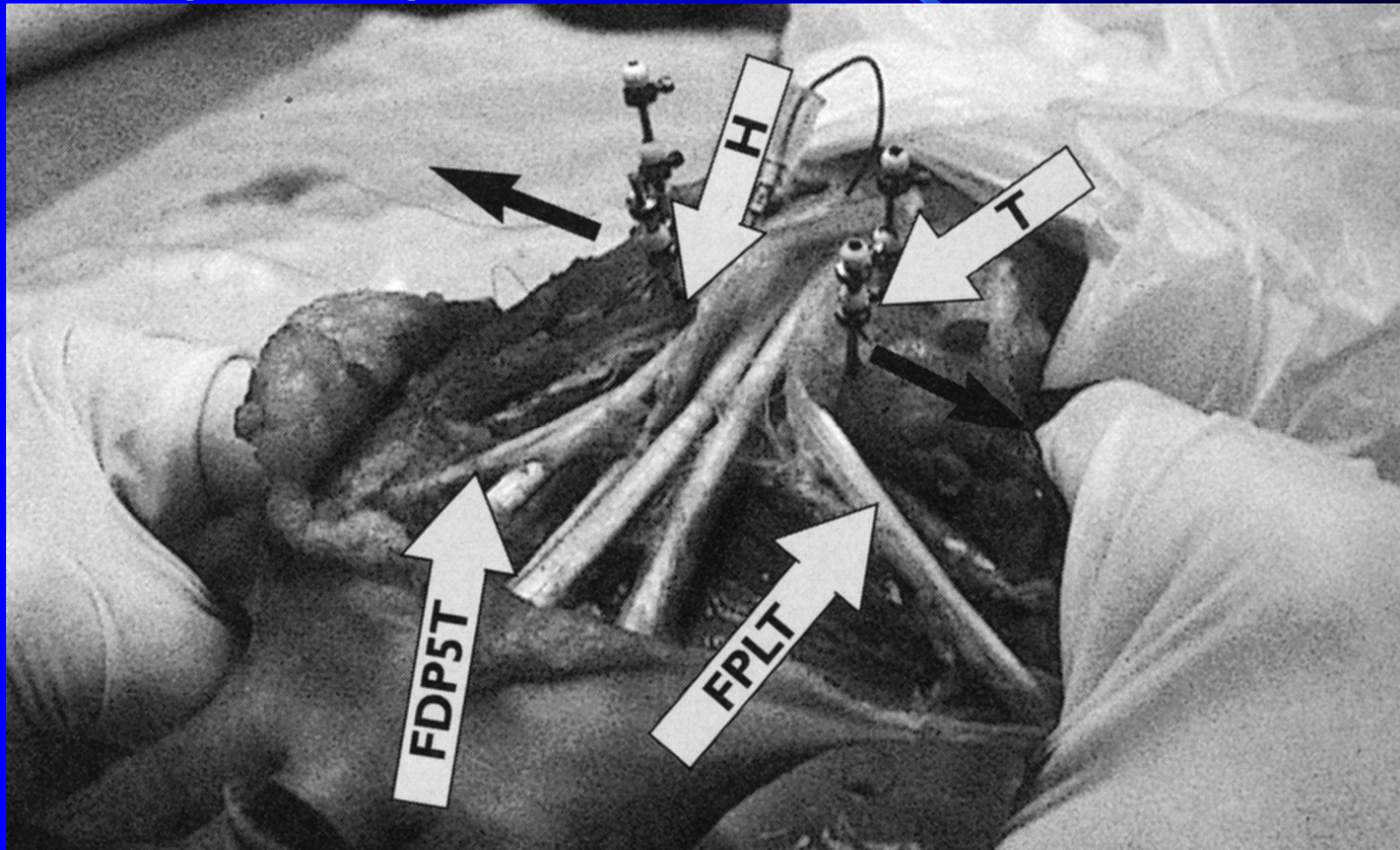


- opponens pollicis roll directly elevates the transverse carpal ligament off the median nerve: muscles blend into the flexor retinaculum





- guy-wire technique uses flexor digitorum profundus and flexor pollicis longus to gap the tunnel





# Radius Internally Rotated

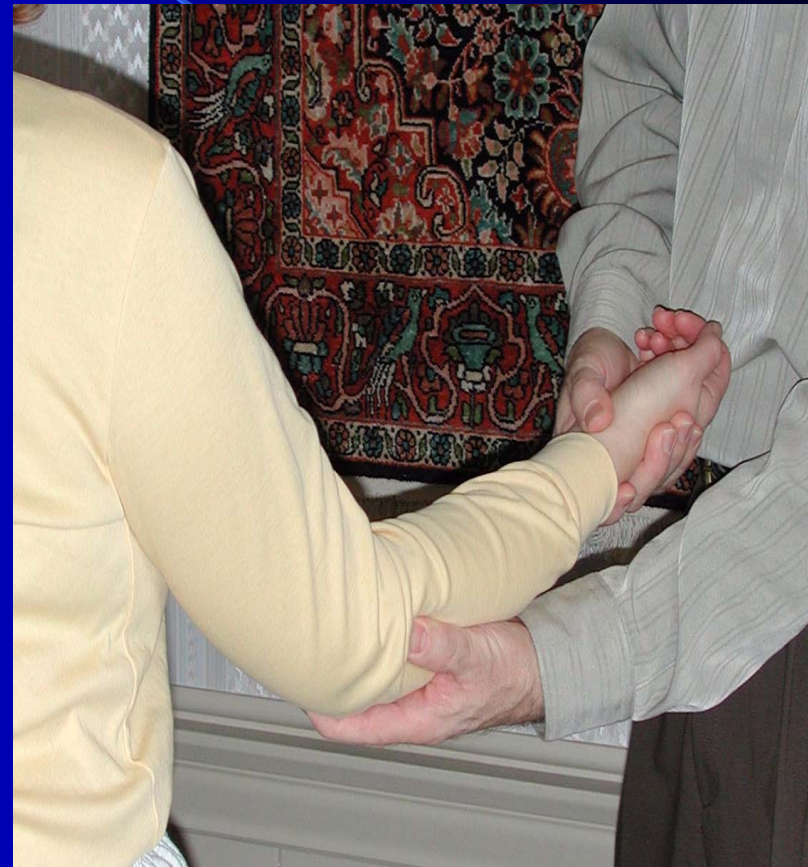
- Often present when carpal tunnel symptoms are present
- Diagnosed by checking supination:
  - Will be decreased
  - With boggy end-range





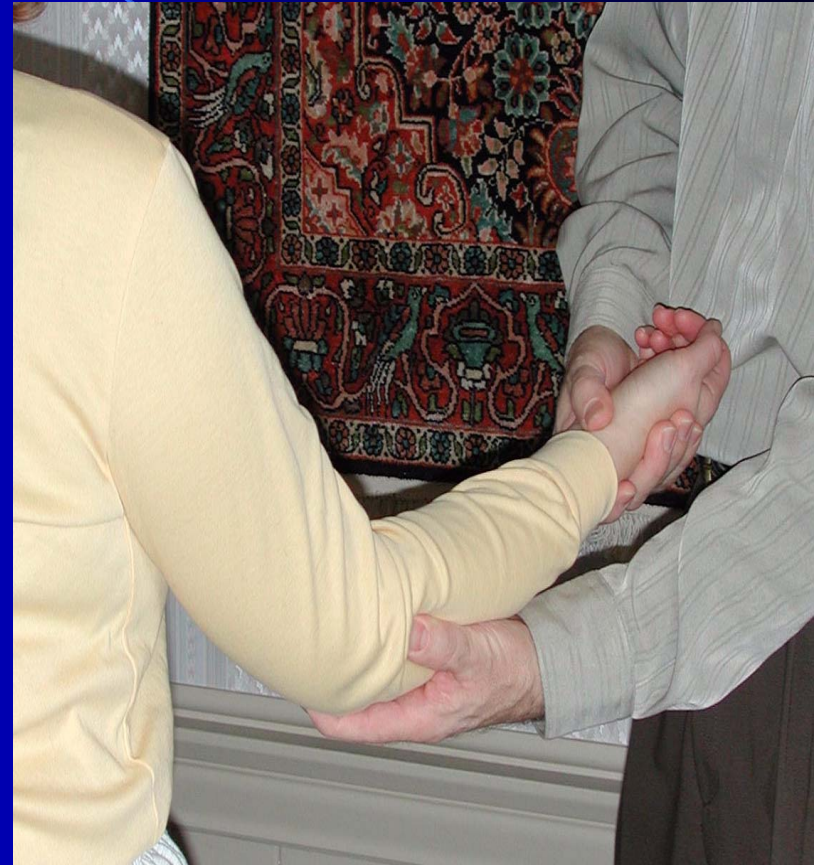
# Radius Internally Rotated

- Proximal Hand:  
Contact the patient's proximal forearm on the extensor surface



# Radius Internally Rotated

- Distal Hand: Contact the patient's radial styloid process with the thumb; the rest of the hand is in a hand shake position.
- Introduce supination with the distal hand while setting up a fulcrum into the resistant forearm tissues with the proximal hand





## Radius Internally Rotated

- Distal Thumb on Radial Styloid
- Proximal Hand supporting and monitoring radius at the elbow
- Test Supination
  - Radial styloid: feel poor elasticity at end-range
- Treatment:
  - ME – Pt. Attempts to pronate forearm
  - Relax, Reposition, Repeat, Retest
- Common finding with wrist and forearm complaints

## Other treatments...

- Articulatory treatment of carpal bones with decreased joint play
- Pronator teres counterstrain point
- Articulatory treatment of restrictions in radial or ulnar motion
- Spray and stretch or ultrasound and stretch of involved tight muscles
- treat scalene, upper rib, pectoral impingement on brachial plexus
  - contributes to double-crush syndromes



# References

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