

Hand Disorders in Primary Care

*Carpal Tunnel Syndrome
and other common hand and wrist disorders*

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Talk Overview

- **I. Carpal Tunnel Syndrome**
 - **II. Cubital Tunnel Syndrome**
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- III. Trigger Fingers
- IV. Ganglia (Cysts)
- V. Dupuytren's
- VI. Tendonitis
- VII. Arthritis
- VIII. Trauma

... Questions

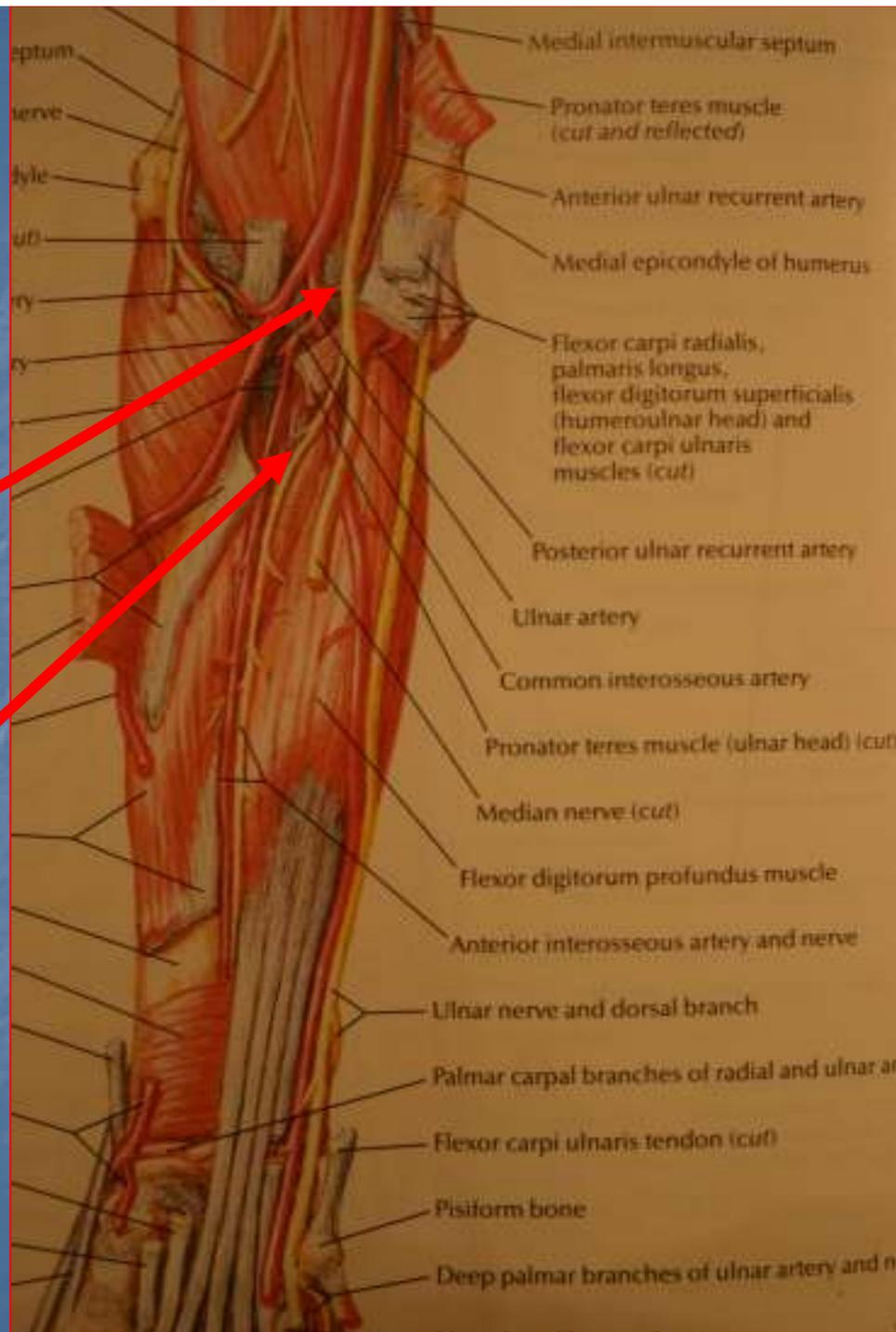
Compressive Neuropathies of the UE

- Median Nerve
 - Carpal Tunnel
 - Ulnar Nerve
 - Cubital Tunnel
-
- (Radial Nerve)



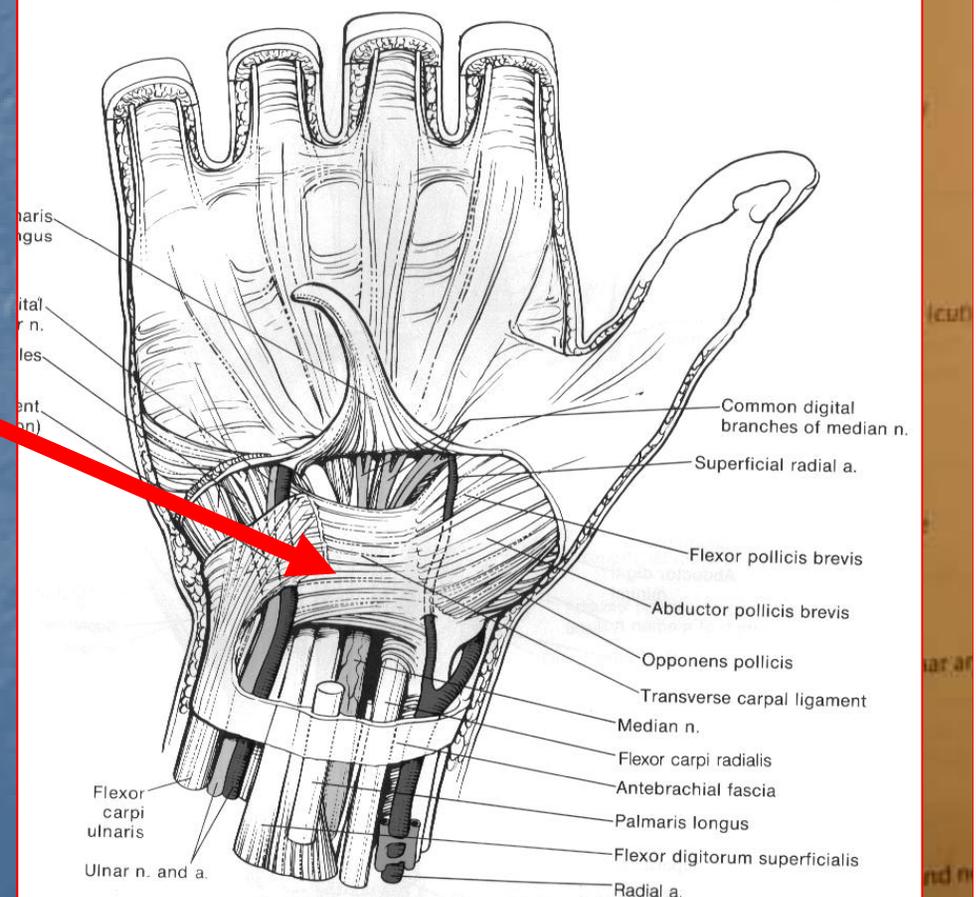
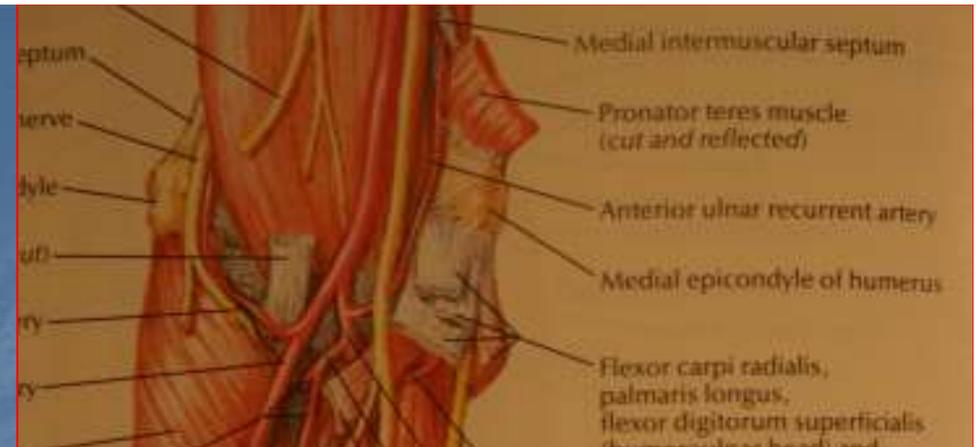
I. Carpal Tunnel Syndrome (Median Nerve)

- Med and lat cords of plexus
- FA between PT
- Gives off AIN branch
- Gives off PCBMN
- Under TCL

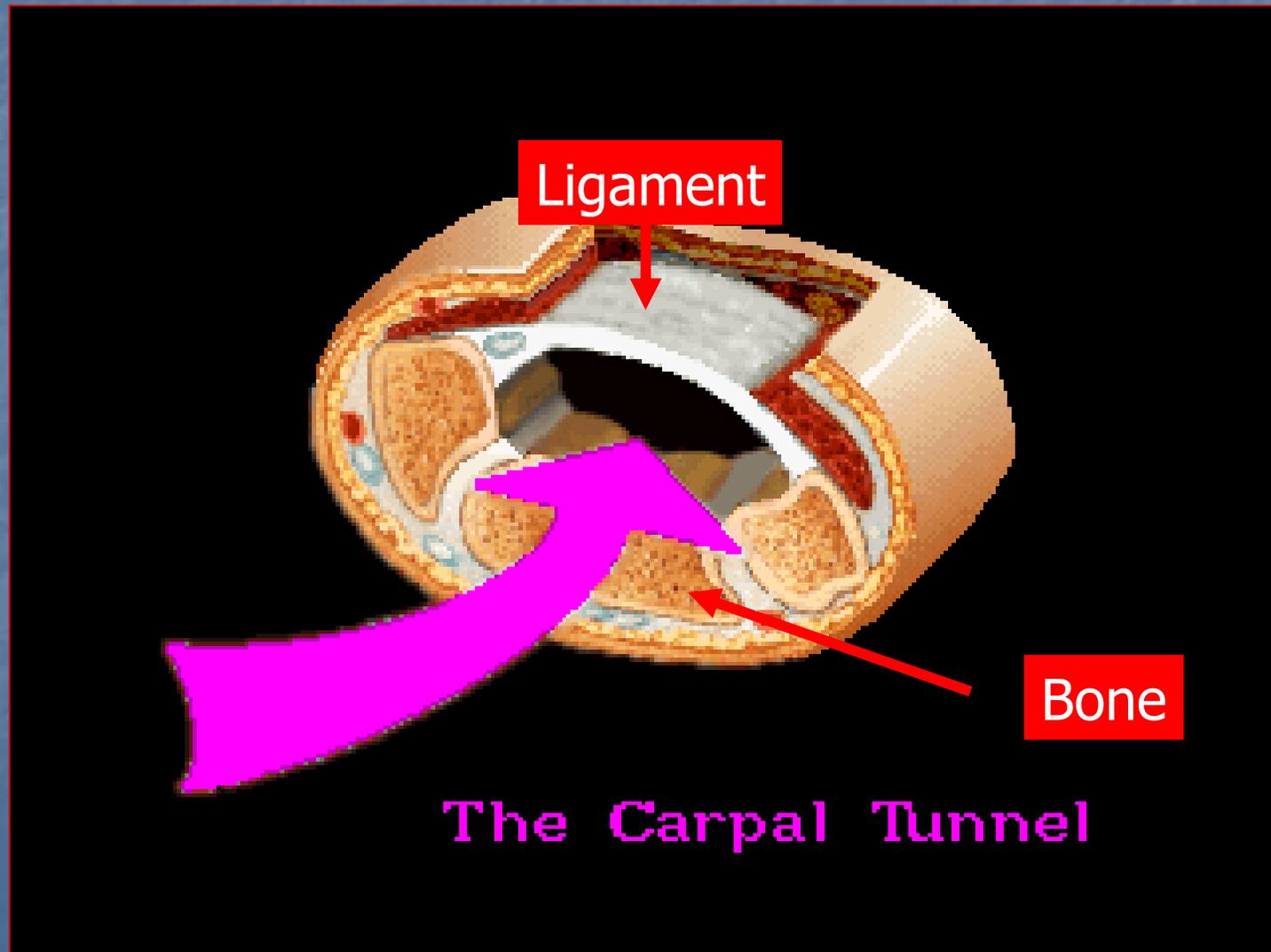


CTS: What is it?

- Compression of the median nerve at the wrist
- Causing pain, numbness, tingling



What is the "Carpal Tunnel" ?



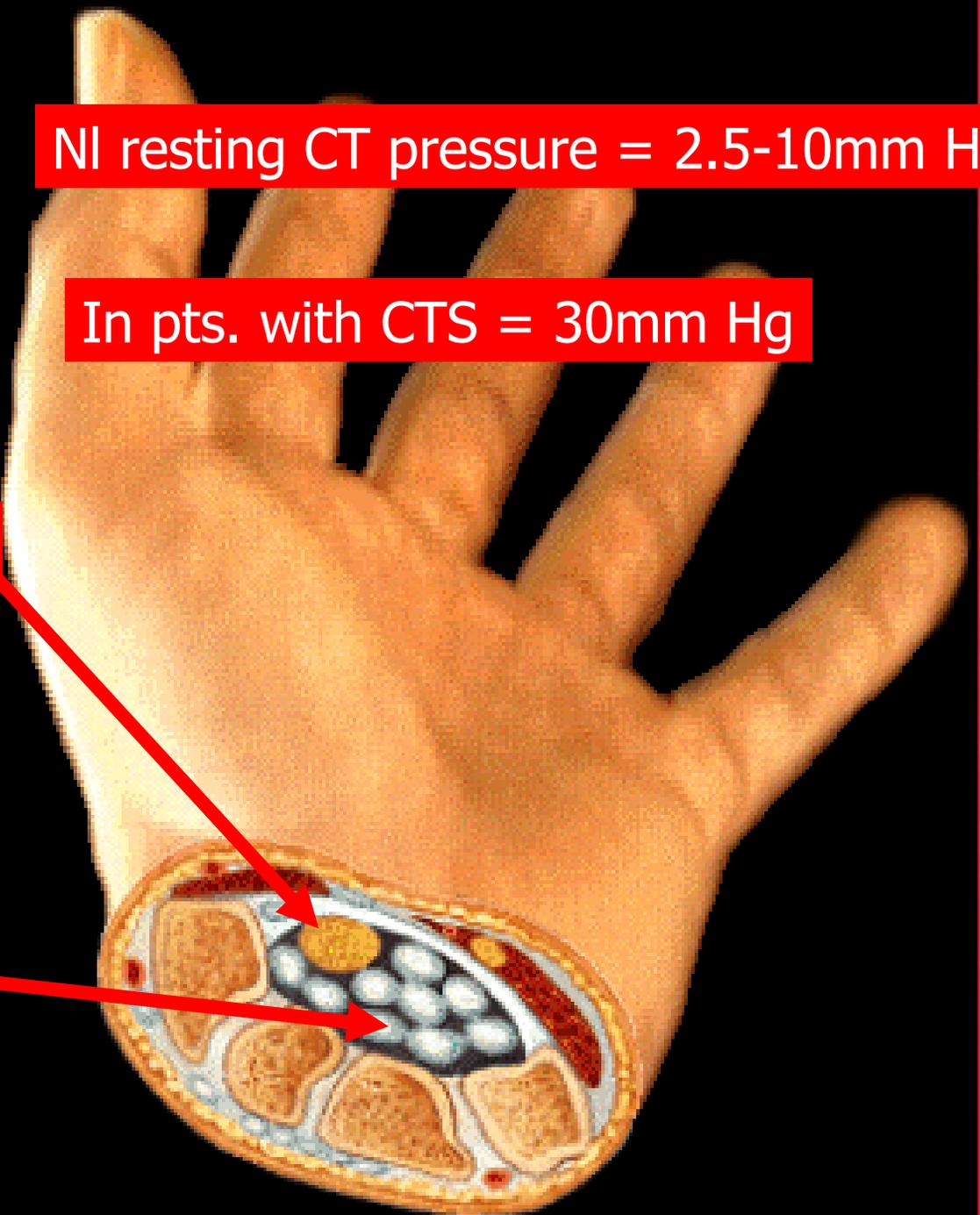
What goes through it?

NI resting CT pressure = 2.5-10mm Hg

In pts. with CTS = 30mm Hg

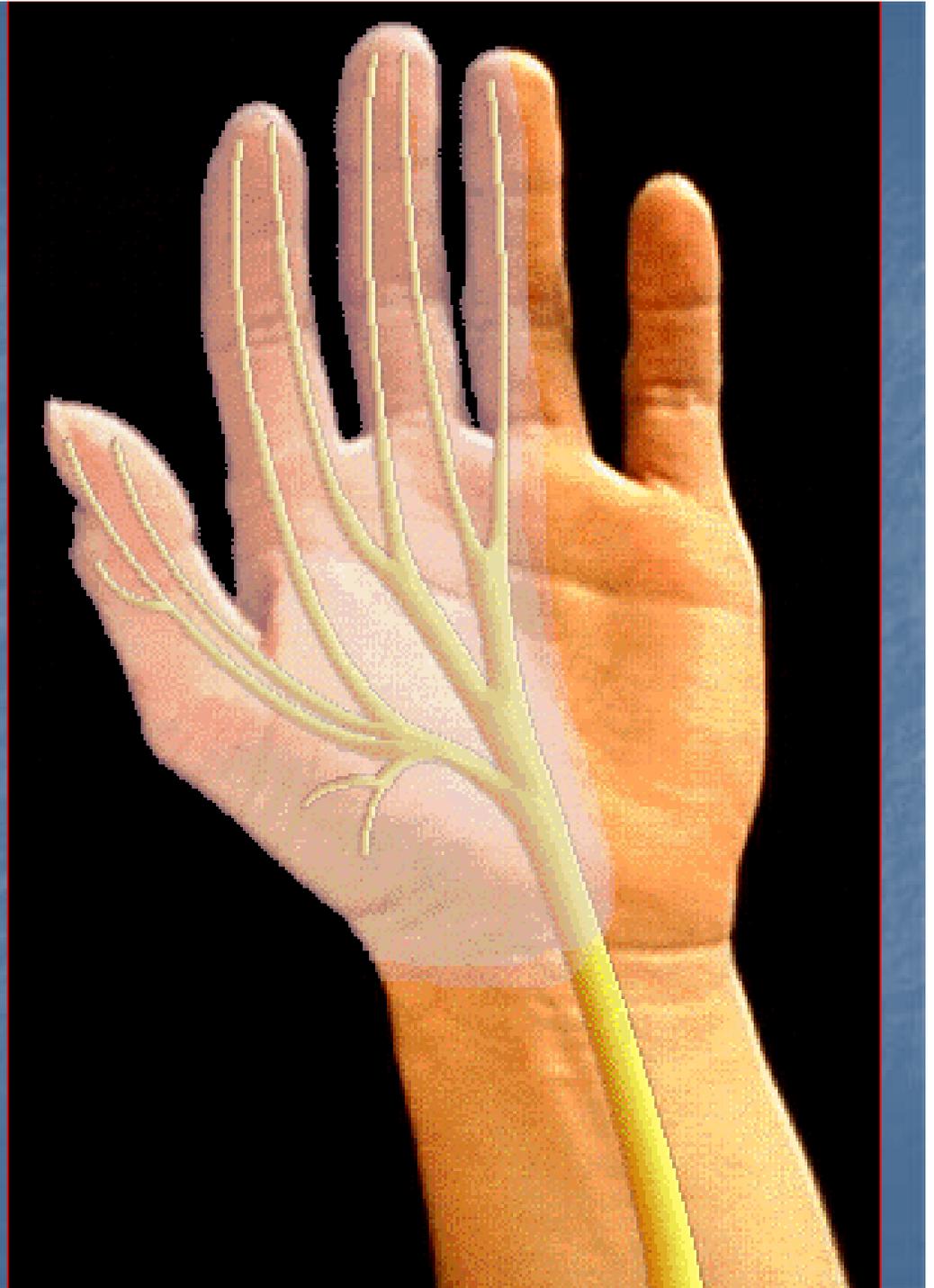
+ the median nerve

Nine tendons



What does the median nerve do?

- Sensation to palmar 3 ½ fingers
- Motor strength to thumb muscles



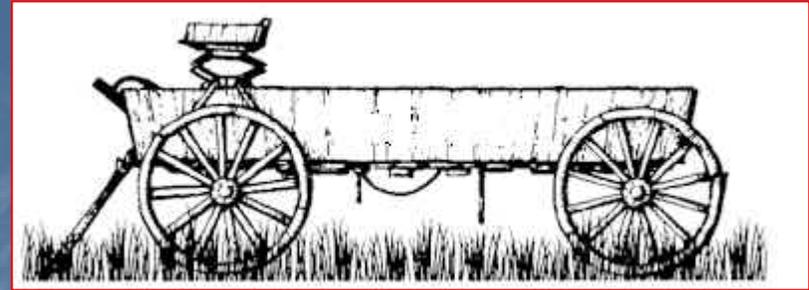
CTS is extremely common

- Most common compressive neuropathy in the body
- 1 million adults in the U.S. get treated for CTS each year!
- Worse with increased water in body (pregnancy)

Historical Perspective

- 1854 (Paget)
 - Rope tied around a wrist  amputated!
- 1913 (Marie and Foix)
 - Autopsy of pts. w/ thenar atrophy found neuromas proximal to the TCL
- 1938 (Moersch)
 - "Carpal Tunnel Syndrome"
- 1950s-70s (Phalen)
 - Defined the clinical entity

Nothing new . . . “Stagecoach Hands”



- Typing
- Driving
- Hairdressing
- etc.

Wrist-Fixed Activities (WFAs)

How do you diagnose it?

- Classic



- Worse

Sensory Testing

- Threshold Tests:

Good for subtle changes as in compressive neuropathy with gradual nerve fiber loss

- **Semmes-Weinstein monofilament**

- slowly-adapting fibers

- **Vibrometry**

- Rapidly-adapting fibers

Sensory Testing

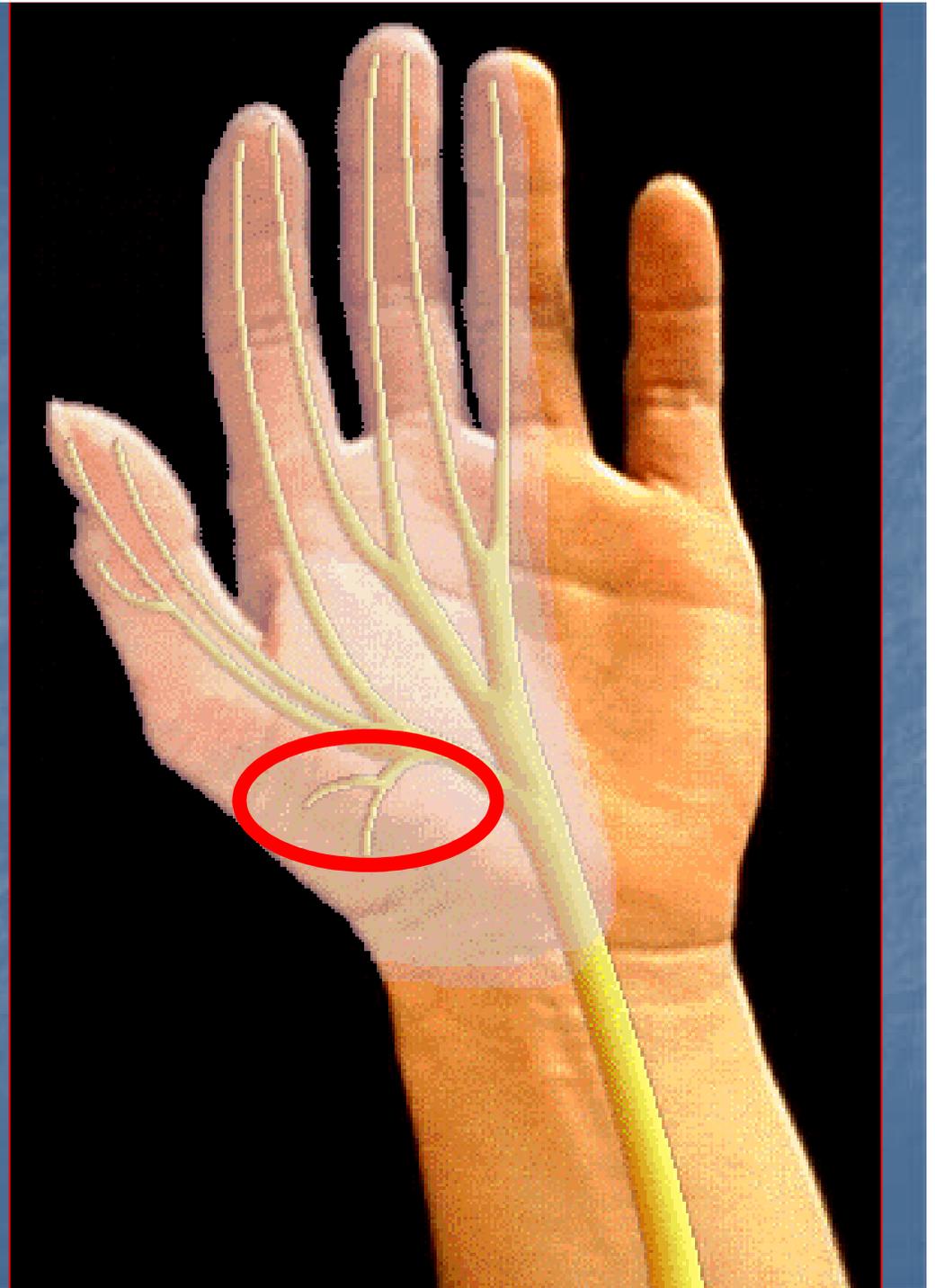
- Innervation Density Tests:

Good for assessing nerve regeneration after repair or decompression

- **Static 2-point discrimination**
 - slowly-adapting fibers
- **Moving 2-point discrimination**
 - Rapidly-adapting fibers

Motor Testing

- Thumb "OAF" muscles weak only in advanced cases



Differential Diagnosis . . .

- Other locations of nerve compression

CTS vs. PS:

- PCBMN
- Proximal Tinel's
- Provocative Maneuvers:
 - Resisted FA pronation with elbow extended
 - Resisted elbow flexion with FA supinated

- Intrinsic nerve damage
 - Peripheral neuropathy

Electrodiagn

- Nerve Conduction Velocity

Either slow or not

- Electromyography (EMG)

Muscle abnormal only in more severe cases

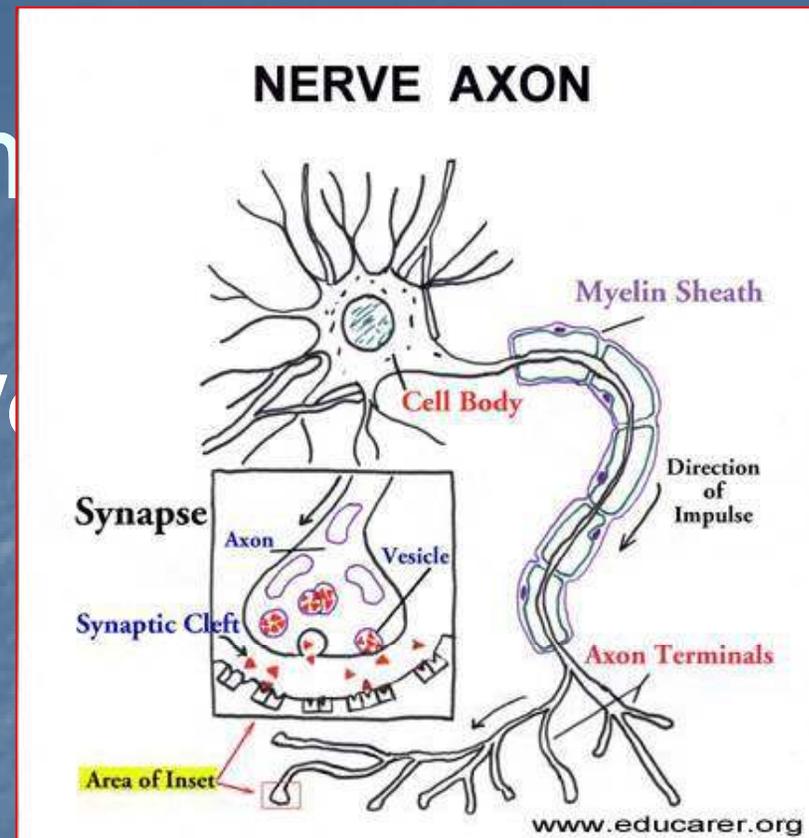


Table II. Electromyography: Normal and Abnormal Results During Each of 4 Phases

Phase	Normal Result(s)	Abnormal Results	Significance of Abnormality
Needle electrode insertion	<ul style="list-style-type: none"> Brief burst of electrical activity followed by silence 	<ul style="list-style-type: none"> Increased insertional activity Decreased insertional activity 	<ul style="list-style-type: none"> Earliest sign of denervation—very sensitive but not specific Nonviable fibrotic muscle
Muscle rest	<ul style="list-style-type: none"> Electrical silence 	<ul style="list-style-type: none"> Fibrillations Sharp positive waveforms Fasciculations Myokymia 	<ul style="list-style-type: none"> Denervation, either from lower motor neuron injury or from primary myopathy Same as for fibrillations Anterior horn cell disease (eg, amyotrophic lateral sclerosis, spinal muscle atrophy) Fatigued muscle (considered benign)
Minimal muscle contraction	<ul style="list-style-type: none"> Triphasic waveform Amplitude and duration within normal range for that particular muscle 	<ul style="list-style-type: none"> Decreased amplitude and duration Polyphasics Giant polyphasics 	<ul style="list-style-type: none"> Nonspecific evidence of pathology (eg, primary myopathy, compression neuropathy) Primary muscle disease or recovery after nerve injury Chronic denervating conditions (eg, amyotrophic lateral sclerosis, long-standing radiculopathy)
Maximal muscle contraction	<ul style="list-style-type: none"> Obliteration of electrical baseline Individual waveforms not apparent 	<ul style="list-style-type: none"> Partial interference pattern Presence of isolated action potentials Early interference pattern 	<ul style="list-style-type: none"> Muscle weakness or noncompliance with examination Severe denervation End-stage myopathy or neuropathy

Insertion

Muscle rest

Minimal cxtrn

Max cxtrn

EMG Overview

Can you prevent CTS?

~~■ Nature and Nurture~~

Ways to help symptoms:

- Take frequent breaks during repetitive WFAs
- Rotate tasks
- Keyboard at elbow height or slightly lower
- Focus on good posture
- No smoking

Treatment Overview

- Compressive Neuropathy “Phases”

- Mild/Early Intermittent sx's Favor nonop

- Moderate Very bothersome sx's Decompression reverses

- Severe/Late Decompression to prevent worsening

Nonoperative Tx

- Wrist splinting
- Hand Therapy
 - U/S, Tendon/Nerve Gliding Exercises
- Medications
 - NSAIDs
 - Diuretics
 - Vitamin B6
- Corticosteroids
 - Oral
 - Injections?



Ly-Pen, Andreu, et. al.
Arthritis & Rheumatism , 2005

- N=163
- Prospective, randomized
 - Local steroid vs. CTR (no motor weakness)
- At 6 and 12 mos., surgery better results but not statistically sig.
- 2 injections in >80% of the wrists required

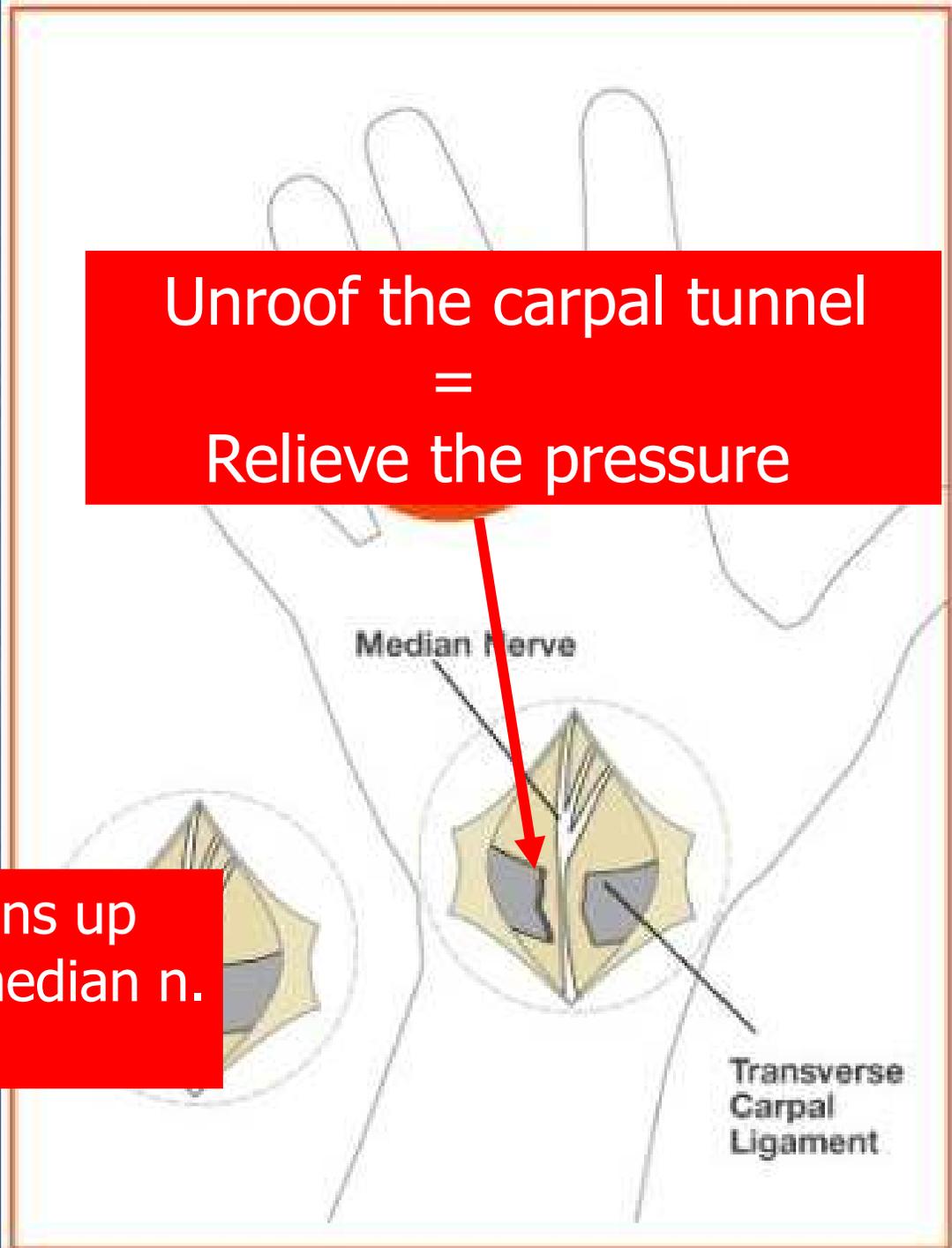
What do I do?

I review this paper and inject frequently if pt. wants me to

Operative Treatment

Unroof the carpal tunnel
=
Relieve the pressure

Transecting TCL opens up CT by 24%, shifts median n. anteriorly 3.5mm





Traditionally . . .

Large incision

vs. now . . . most recently trained hand surgeons do a “mini” incision



Local anesthetic +/- light sedation

Operative time = 5-10 minutes

Endoscopic similar



Postoperatively

- Use all the fingers normally → down to a band-aid at 72 hours
- 2 sutures out at 7-10 days
- No restrictions
- Can have some palm soreness (“pillar pain”) for a few days to a few months

A patient who gets no relief . . .

- Wrong dx?
- Technical error (incomplete release?)
- “Severe” preop nerve damage

A patient who got relief and sx's come back

- Recurrence

approx. 5% lifetime chance

Does it work?

YES

- Excellent relief of symptoms
 - Elimination of “pins and needles” very predictable if nerve “moderate to severe” preop or better

Preop nerve condition is key in counseling patients w/r/t expectations

Complications

- Rare, but consider Palmer, et. al., 1999 survey of ASSH
 - Over 5 years, 283 major complications tx'd by 616 respondents
 - 147 median nerve lacs (23 complete)
 - 29 ulnar nerve lacs (11 complete)
 - 54 digital nerve lacs
 - 34 vessel lacs
 - 19 tendon lacs (13 complete)

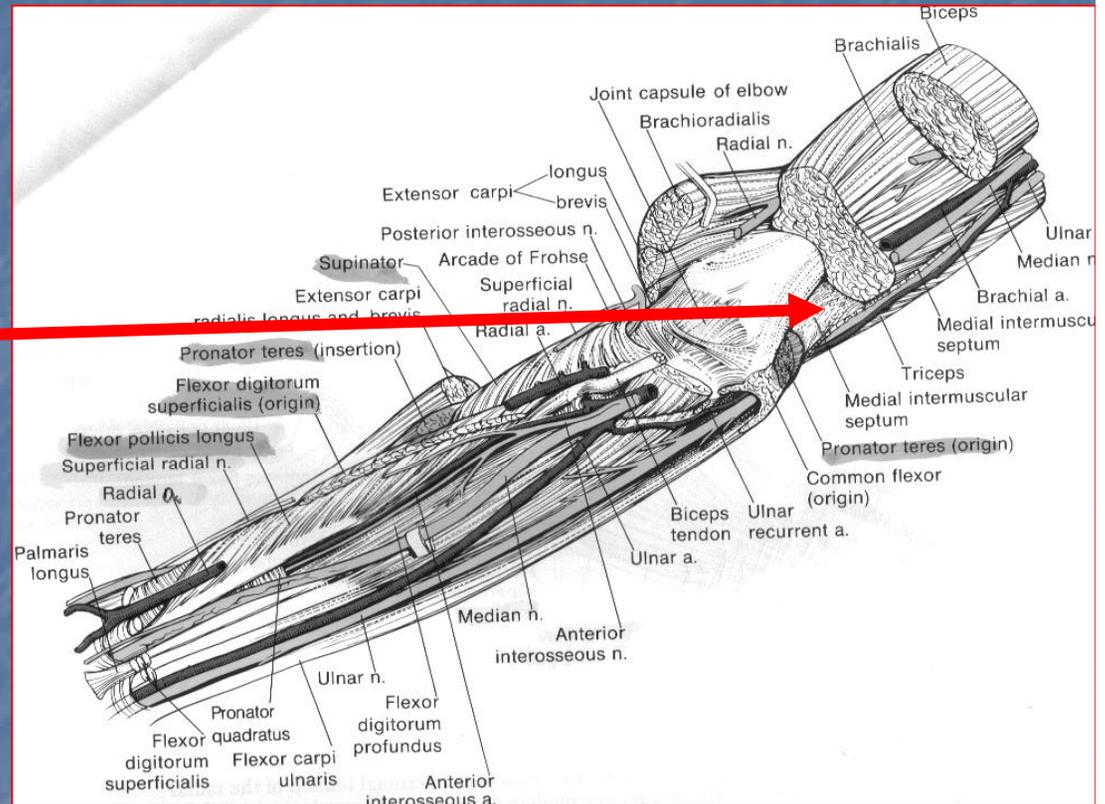
“Pillar Pain”

- Alterations of carpal arch
- Cutaneous nerve violation
- Scar tend 41% at 1 month . . . Povlsen, 1996

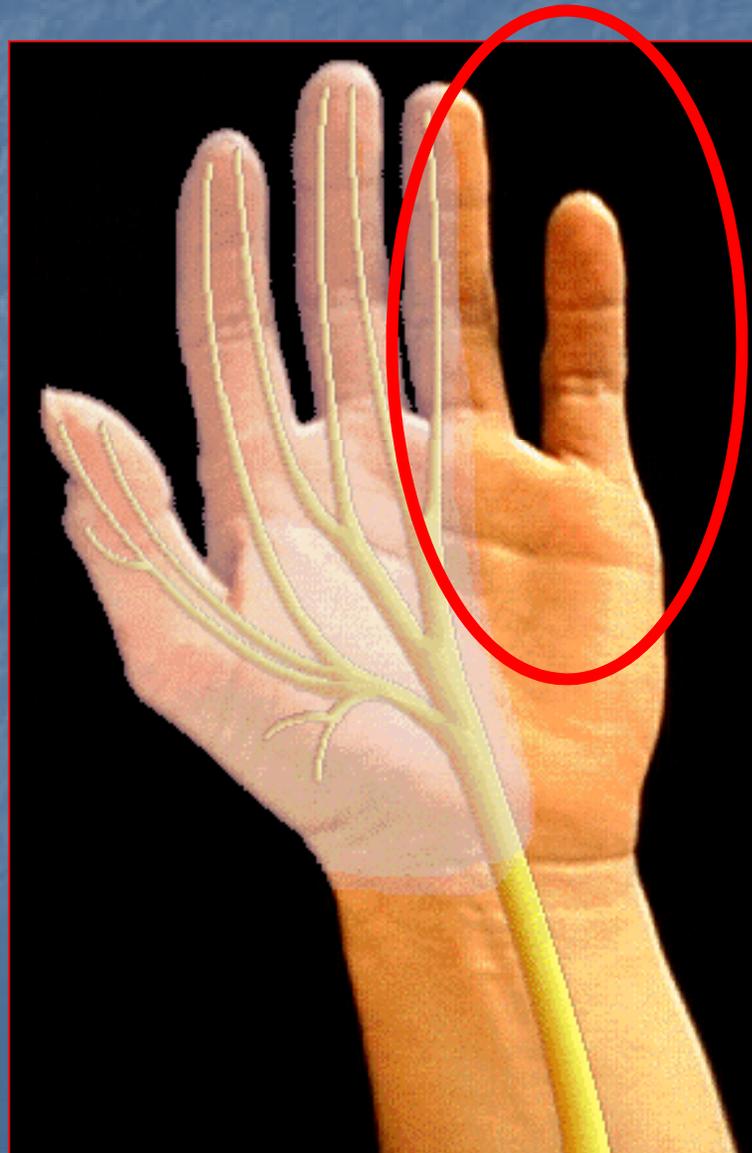
6% at 1 year

II. Cubital Tunnel Syndrome (Ulnar nerve)

- Medial cord of plexus
- Thru medial IM septum, post to med head of triceps
- Under Osborne's fascia
- FA between 2 heads of FCU
- Gives off DSBUN
- Thru Guyon's canal

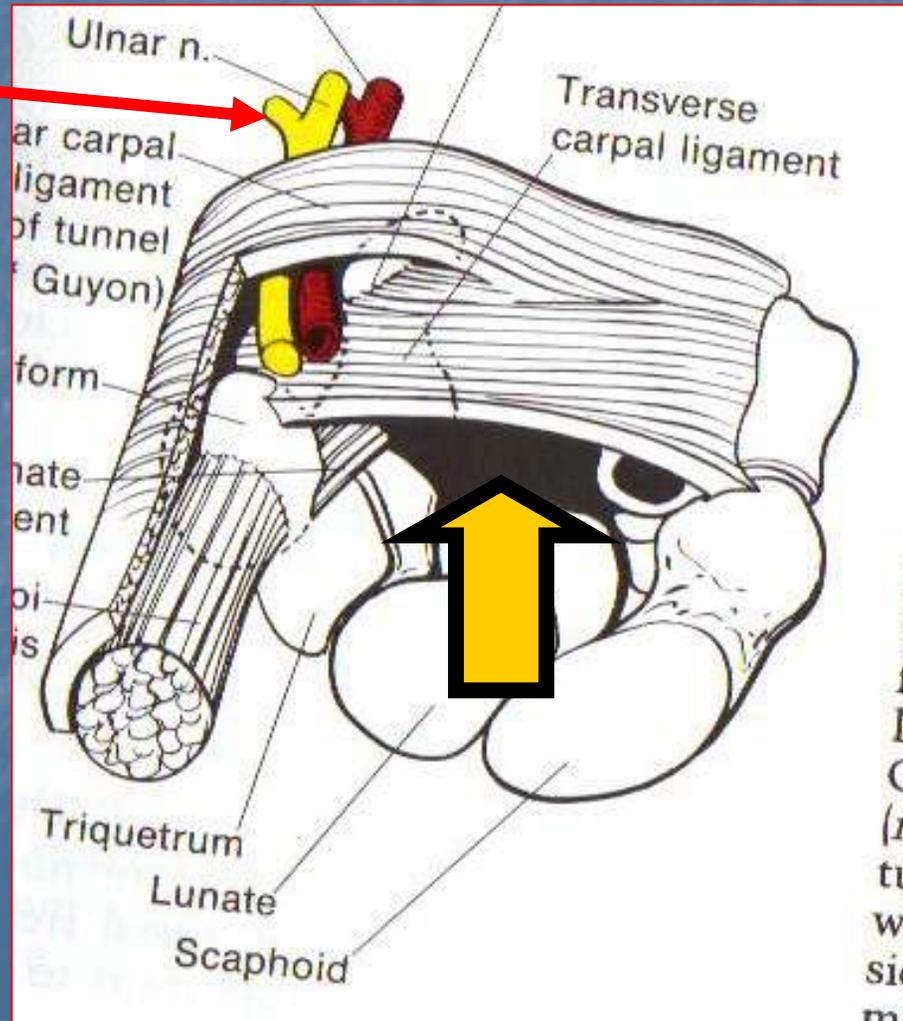


Q- What about when the small finger and ring finger are “numb and tingly” ?



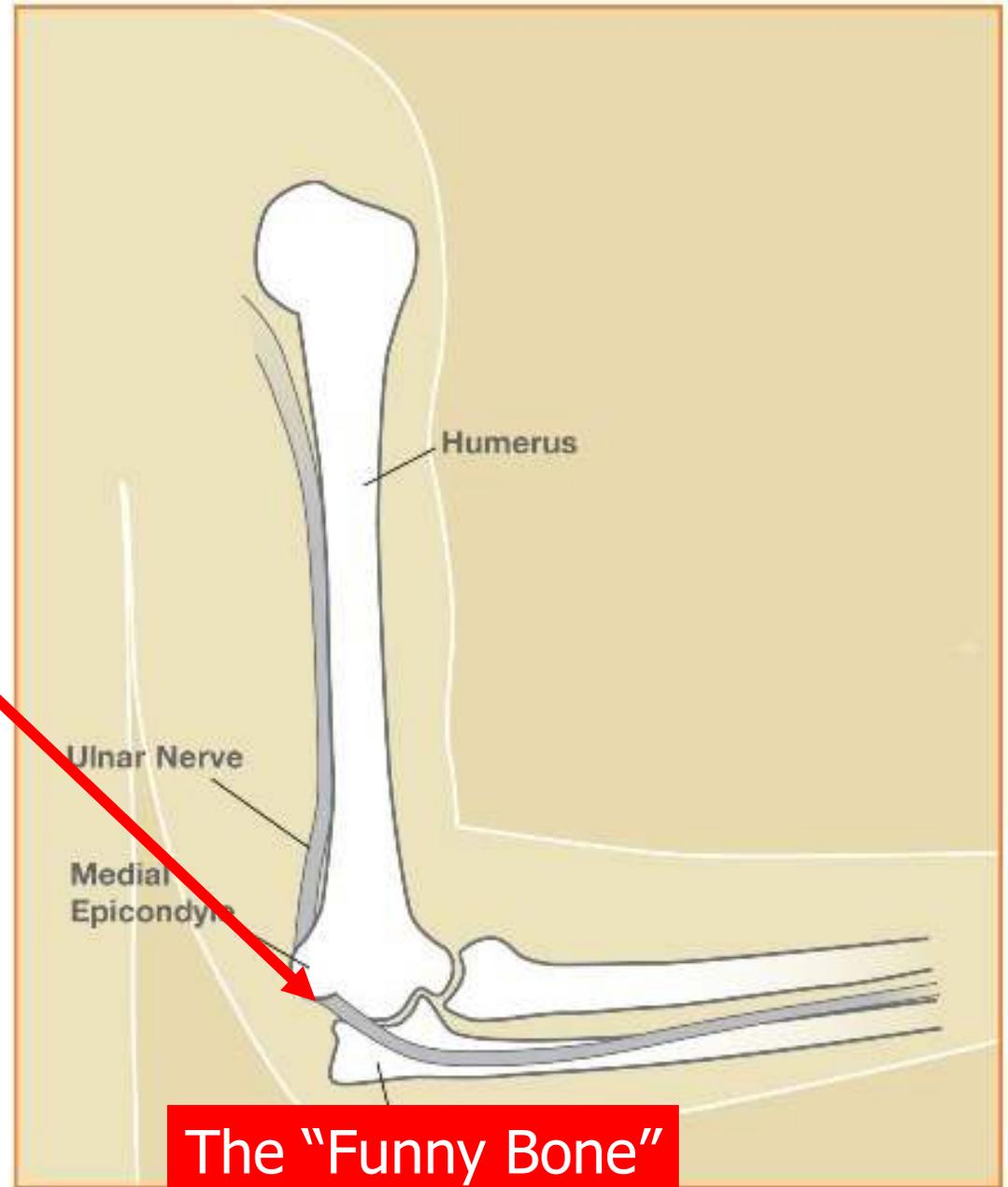
A- Not Carpal Tunnel Syndrome

Ulnar nerve



Where is the ulnar nerve most commonly compressed?

The Elbow!



II. Cubital Tunnel Syndrome: History and Physical Exam

- N/T ulnar 2 fingers

Froment's sign

- Posit

- Weal



Differential Diagnosis . . .

- Other locations of nerve compression
 - C8-T1 radiculopathy
 - Guyon's canal



Cubital Tunnel Syndrome vs. Guyon's Canal Compression:

- DSBUN
- Proximal Tinel's
- Elbow flexion test
- Extrinsic weakness
 - Intrinsic nerve damage
 - Peripheral neuropathy

Nonoperative Tx

- **Elbow splinting**
- Physical Therapy
 - U/S, Tendon/Nerve Gliding Exercises
- Medications