

Compressive Neuropathy of the Upper Extremity

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**CONTRA COSTA REGIONAL
MEDICAL CENTER
NOON CONFERENCE SERIES**

***DISCLOSURE OF CONFLICT OF
INTEREST***

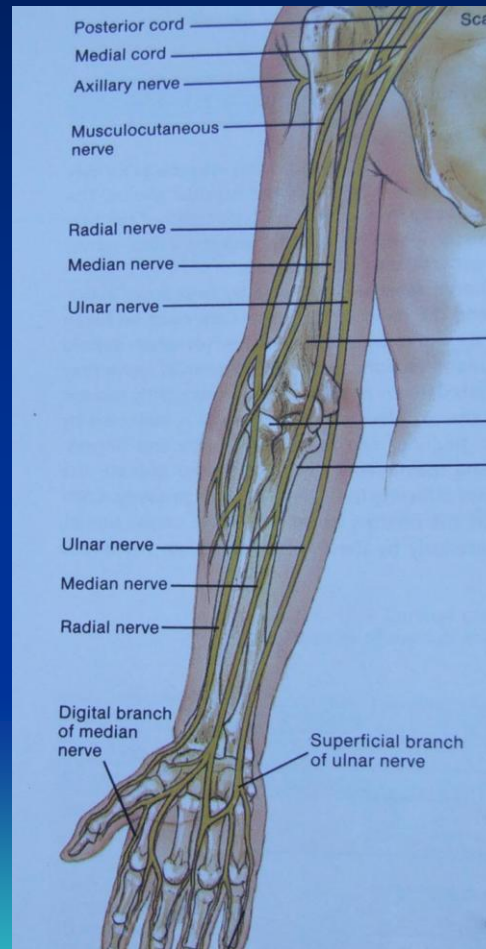
- Speaker has nothing to disclose



Review of the anatomy of Median, Ulnar, and Radial Nerves



Upper Extremity Nerves



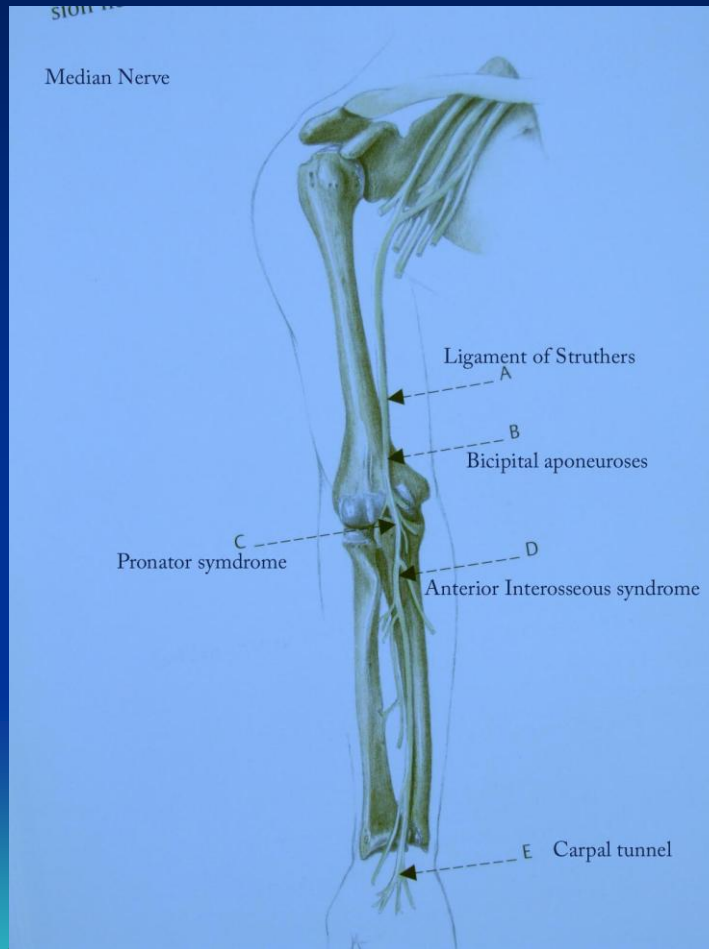
Carpal Tunnel Syndrome: Median Neuropathy at the wrist.

Cubital Tunnel Syndrome: Ulnar neuropathy at the elbow.

Radial Nerve Palsy at the spiral groove of the humerus.



Median Nerve



Carpal Tunnel Syndrome : Etiology

- CT- a natural bottleneck in the course of median nerve.
- Disproportion between available space and its contents = increased pressure within CT
- Median nerve most delicate: mostly affected: functional disturbance



Carpal Tunnel Syndrome : Etiology

- Disproportion between Space vs. Contents

Actual narrowing of the walls of the canal
vs.

Increase in the volume of its contents

But usually multifactorial.



Carpal Tunnel Syndrome :

Etiology: nerve compression

- 2.5 mm Hg healthy subjects
- 20 mm Hg decreased epineural perfusion
- 30 mm Hg decreased axonal transport
- 40 mm Hg paresthesia
- 50 mm Hg epineural edema
- 60 mm Hg intraneural ischemia, sensory/motor block.



Thickening of the paratenon

- Chronic non-specific Tenosynovitis:
occupational, reactive, hormonal
(Idiopathic CTS)

Idiopathic	85%
Rheumatoid	9%
Post-traumatic	3%
Acute	3%
Other cases	<1%



Idiopathic CTS

- Largest number of cases
- Thickening of para-tendinous tissue-
specially of the FDP tendons
- Chronic edema, fibrinoid swelling, hyaline
and mucoid degeneration followed by
- Fibrotic thickening, increased collagen
formation.
- Influenced by hormonal factors and
repetitive occupational overuse.



Chronic non-specific tenosynovitis

- Chronic edema : primary causative factor
- Other conditions:
 - Trigger finger
 - de Quervain's disease



Hormonal factors

- Edematous thickening of paratenons: third trimester of pregnancy or shortly after delivery
- 45 % of all pregnant women complain of some tingling, numbness of the fingers-resolves in most cases after delivery.
- Pre-menopausal
- Contraceptive drugs



Chronic/Acute Specific Inflammation

- Rheumatoid Tenosynovitis
- JRA
- Tuberculous tenosynovitis
- Acute pyogenic Infection
- Acute thrombophlebitis
- Erroneous I.V. infusion



Post-traumatic CTS

- Blunt trauma- edema, bleeding
- Carpal bone dislocation- lunate
- Distal radial fracture
- Compartment syndrome
- Abnormal wrist position
- Malunited distal radial fracture
- Osteophytes from chronic arthritis



Systemic disease

- Gout
- Myxedema
- Amyloidosis
- Diabetes
- Myeloma
- Acromegaly
- Chronic Renal failure



Diagnosis-History

- Nocturnal paresthesia
- Numbness/tingling/burning or cramplike sensations-median nerve distribution
- Pain of the resting hand-pathognomonic
- May subside with manual activity
- Weaknes/clumsiness
- Postural aggravation



Diagnosis-History

- Proximal pain: may radiate upto shoulder
- Pain may subside in advanced cases
- Feeling of cold, and swollen fingers: disturbance of autonomous function of median nerve.
- Flattenning of thenar eminence



Median nerve: findings

Depends on stages:

Tinel's Sign

Digital sensibility

Phalen's wrist flexion

Brain's wrist extension

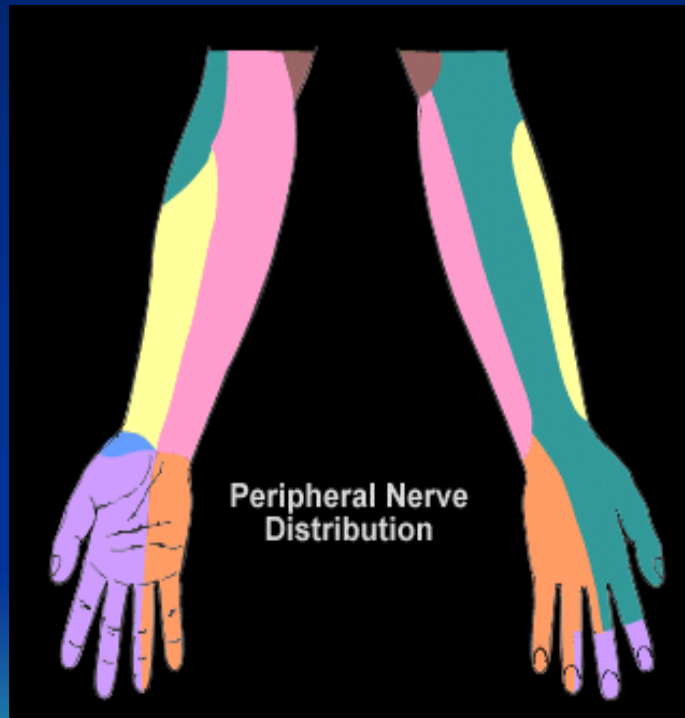
Tourniquet test

Median nerve compression

Muscle testing: abductor pollicis brevis



Sensory Distribution



Median Nerve testing



testing abductor pollicis brevis (Median nerve)

Median nerve



Median nerve



Ring test for Median nerve=positive

Median nerve: findings

Imaging studies:

Plain radiographs: cervical, chest, wrist, hand

Magnetic resonance imaging: unclear
diagnosis, anatomic causes, failure of CTR

Ultrasound: space occupying lesion



Electrodiagnostic testing

- Nerve Conduction study
 - Segmental demyelination-> slowed nerve conduction:conduction block
- Electromyography
 - Axonal loss-> Wallerian degeneration; muscle denervation



Electrodiagnostic testing

- Confirm clinical diagnosis
- Provide baseline data
- Rule out proximal compression, double crush, polyneuropathy



Electrodiagnostic testing:limitations:

- Measure large myelinated fibers
- Abnormal only after Wallerian degeneration
- False negative results (10%)
- Static test- not dynamic



Treatment: conservative

- Wrist splint
- Activity modification
- Steroid injection
- NSAID
- ?Vit B6
- Stretching exercises / ergonomic equipments (prevention)

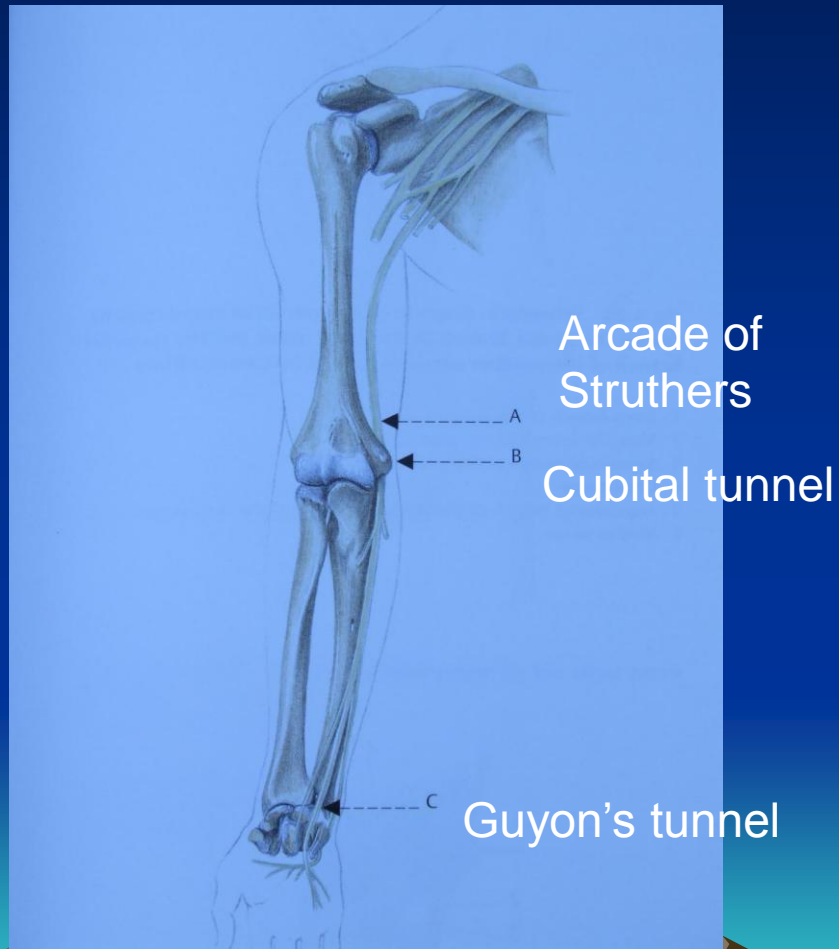


Carpal Tunnel Release (CTR)

- Open
- Endoscopic
- Limited incision



Ulnar Nerve



Cubital Tunnel Syndrome

- Paresthesia in ulnar digits
- Weakness
- Intrinsic wasting
- Elbow pain



Cubital Tunnel Syndrome: findings

- Ulnar nerve subluxation
- Tinel's sign
- Elbow flexion test
- Intrinsic muscles
- Sensation



Ulnar Nerve Testing



Ulnar Nerve testing

testing abductor digiti minimi (Ulnar nerve)

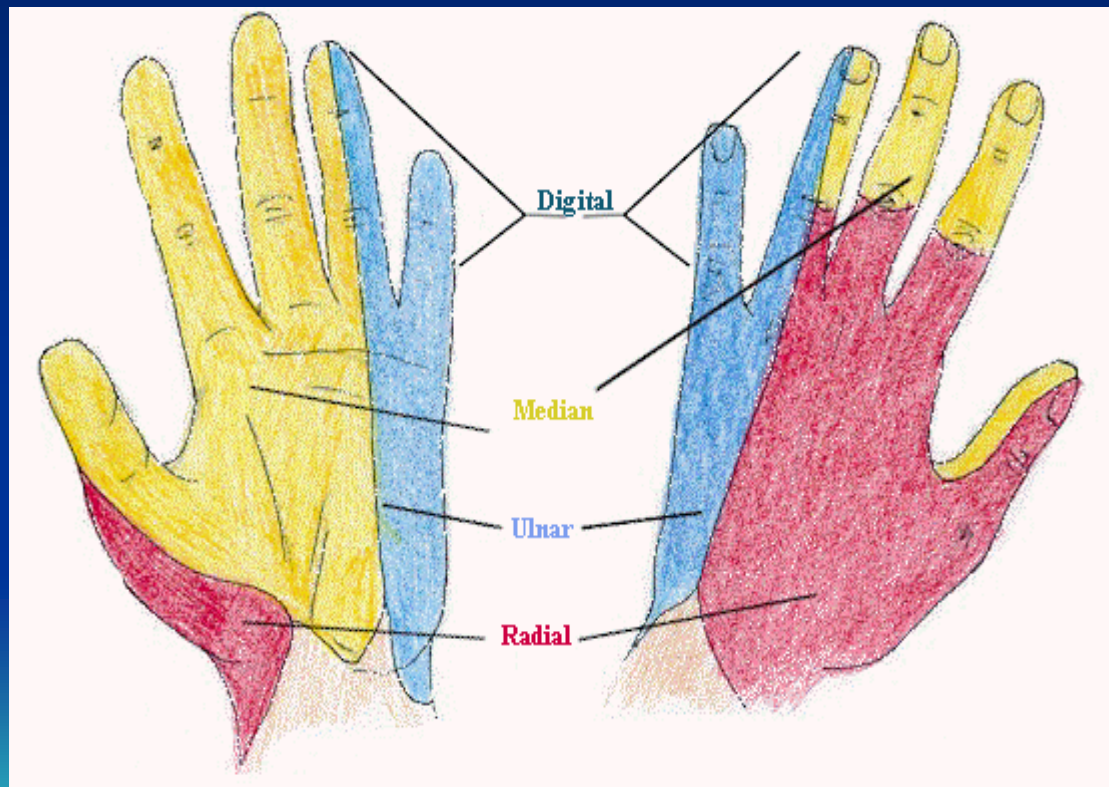


Ulnar Nerve testing

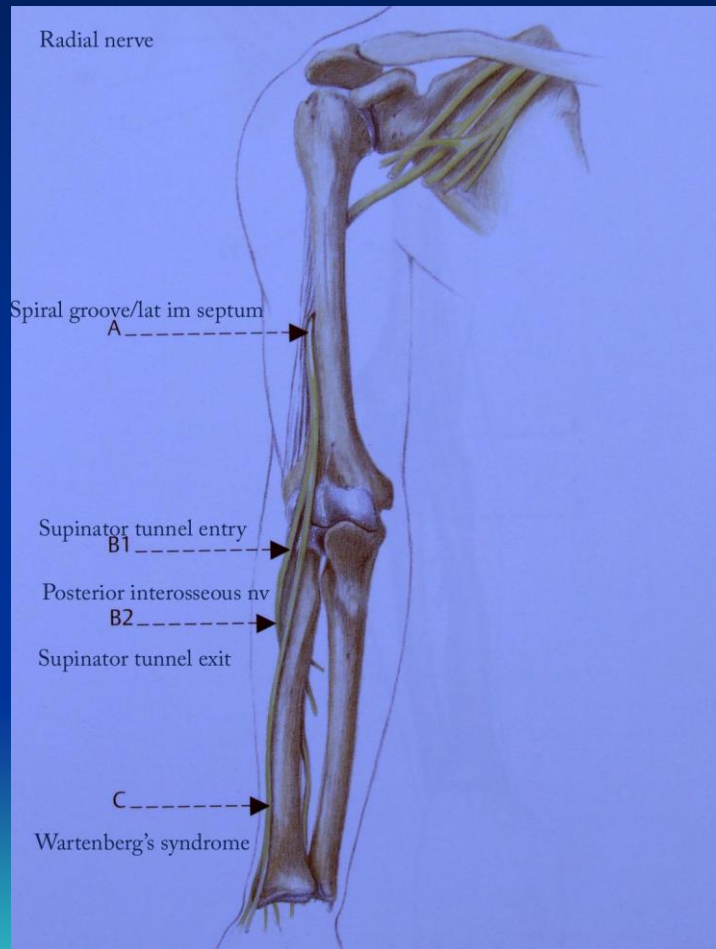
testing 1st dorsal interosseus (Ulnar nerve)



Sensory Distribution



Radial Nerve



Radial Nerve Palsy

- Wrist drop: weak wrist/ finger extension
- Sensation changes

Findings dependant on etiology:

Saturday night palsy

Fracture humerus: post reduction

Gunshot wound

Post operative

compression



Sensory Distribution



Radial Nerve Test

Wrist drop = Radial palsy

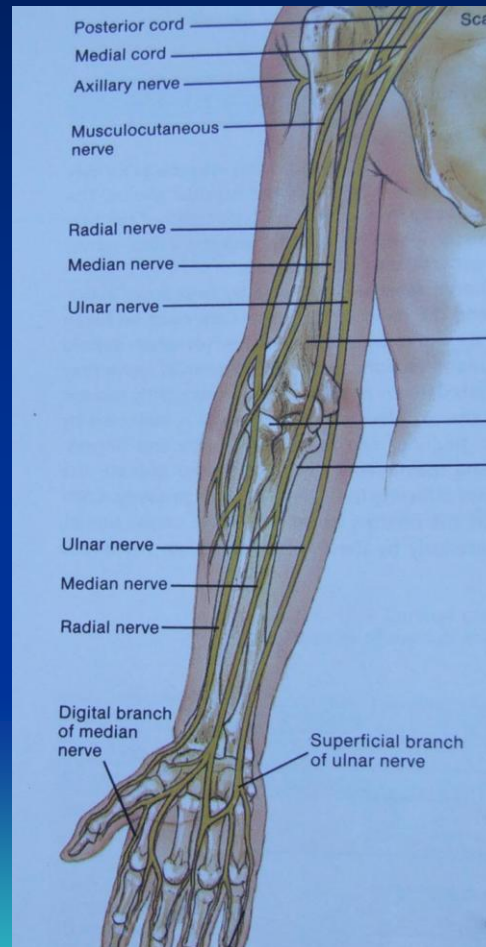


Scratch-Collapse Test

- Annual Meeting of the American Society for Hand Surgery: San Francisco 2009
- Median Nerve
- Ulnar nerve
- Radial nerve



Upper Extremity Nerves



<- Spiral groove: RADIAL

<- Cubital tunnel: ULNAR

<- Carpal tunnel: MEDIAN

Thank you!

