

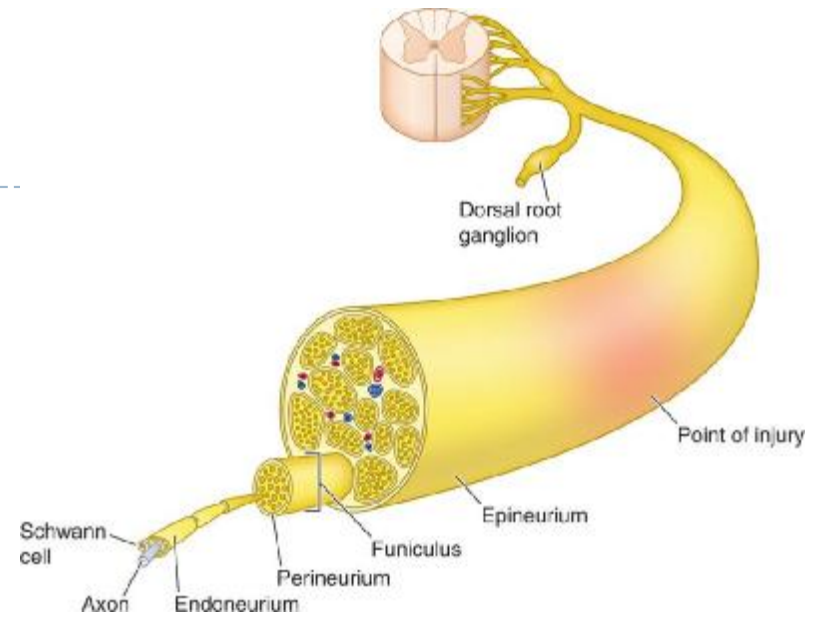
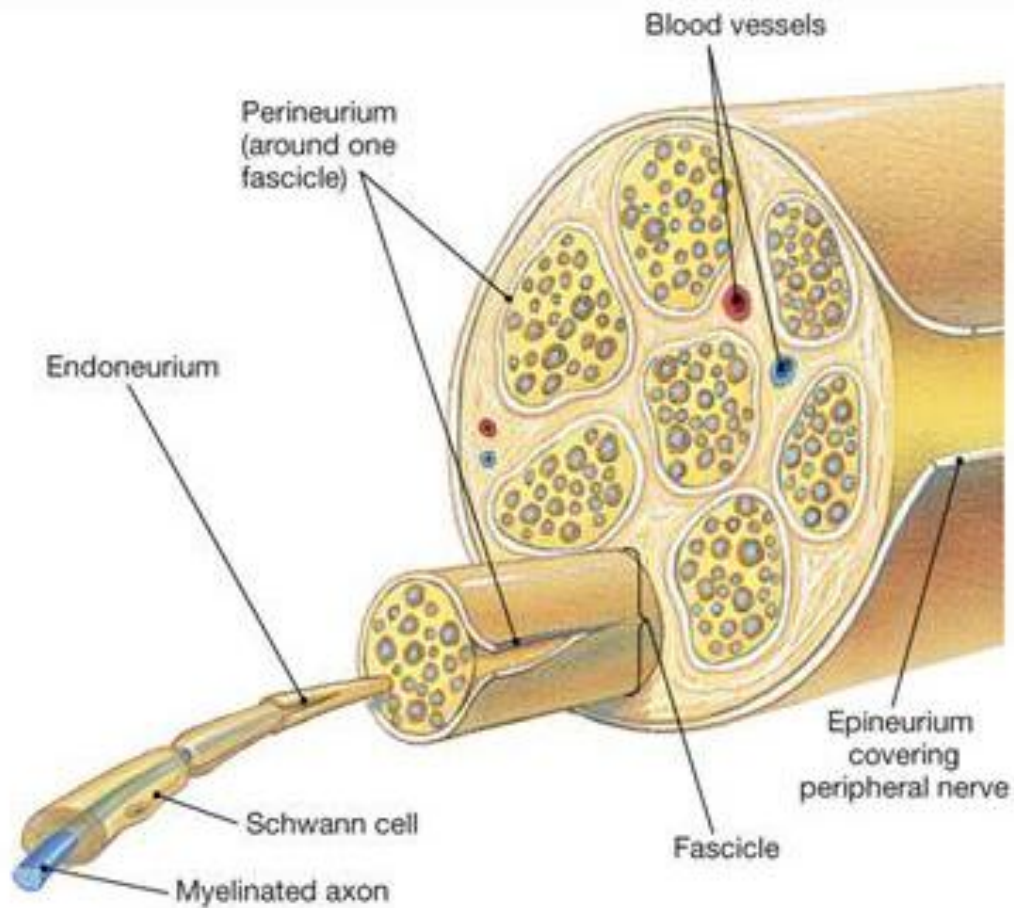
IN THE NAME OF GOD



Upper limb neuropathy

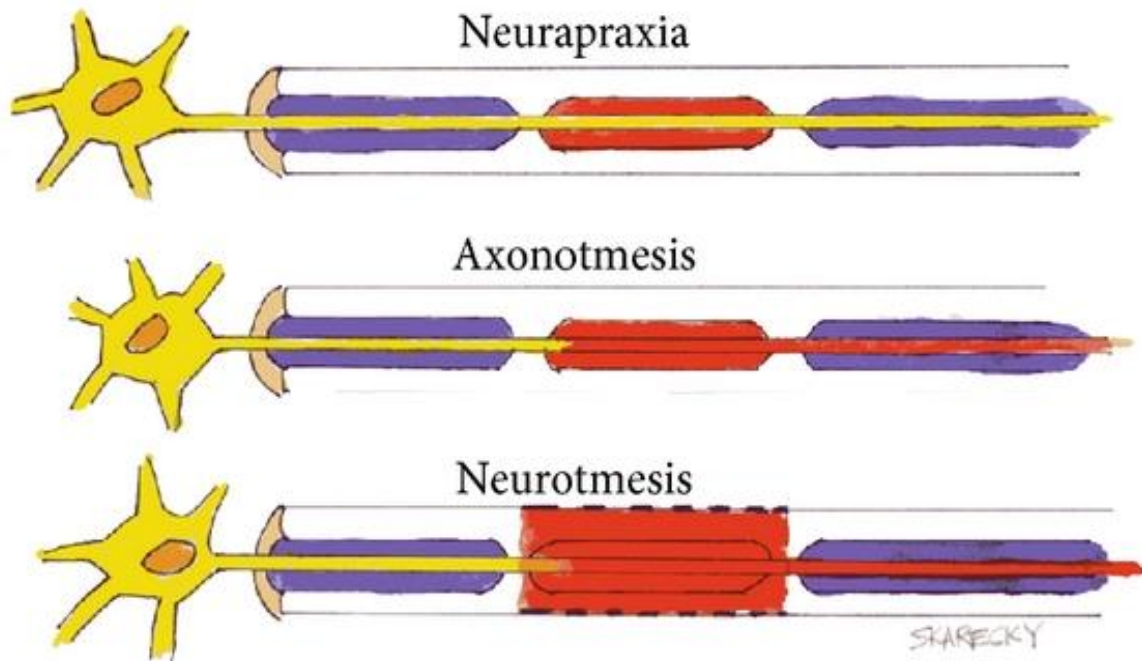
Dr. Leila Poorsaadat, Neurologist

Peripheral nerves



Degree of Nerve injury

Seddon classification



Type of Nerve injury

} Compression

} (compressive neuropathy)

- CTS, cubital tunnel
- Neurapraxia
- Axonotmesis
- Rx : Decompression, release

Cut wound

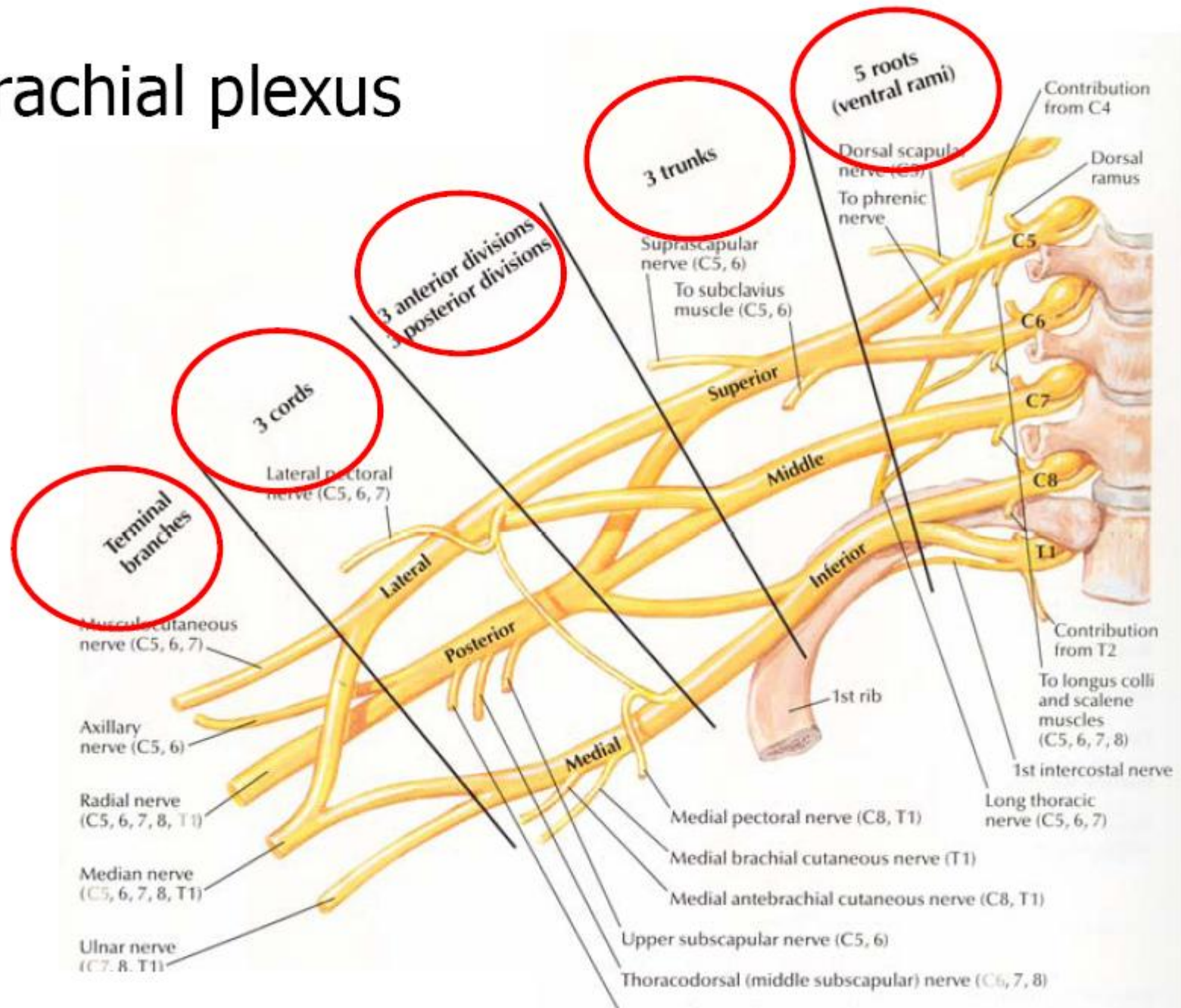
- Trauma
- Neurotmesis
- Rx : Nerve repair

Common nerve injury : upper

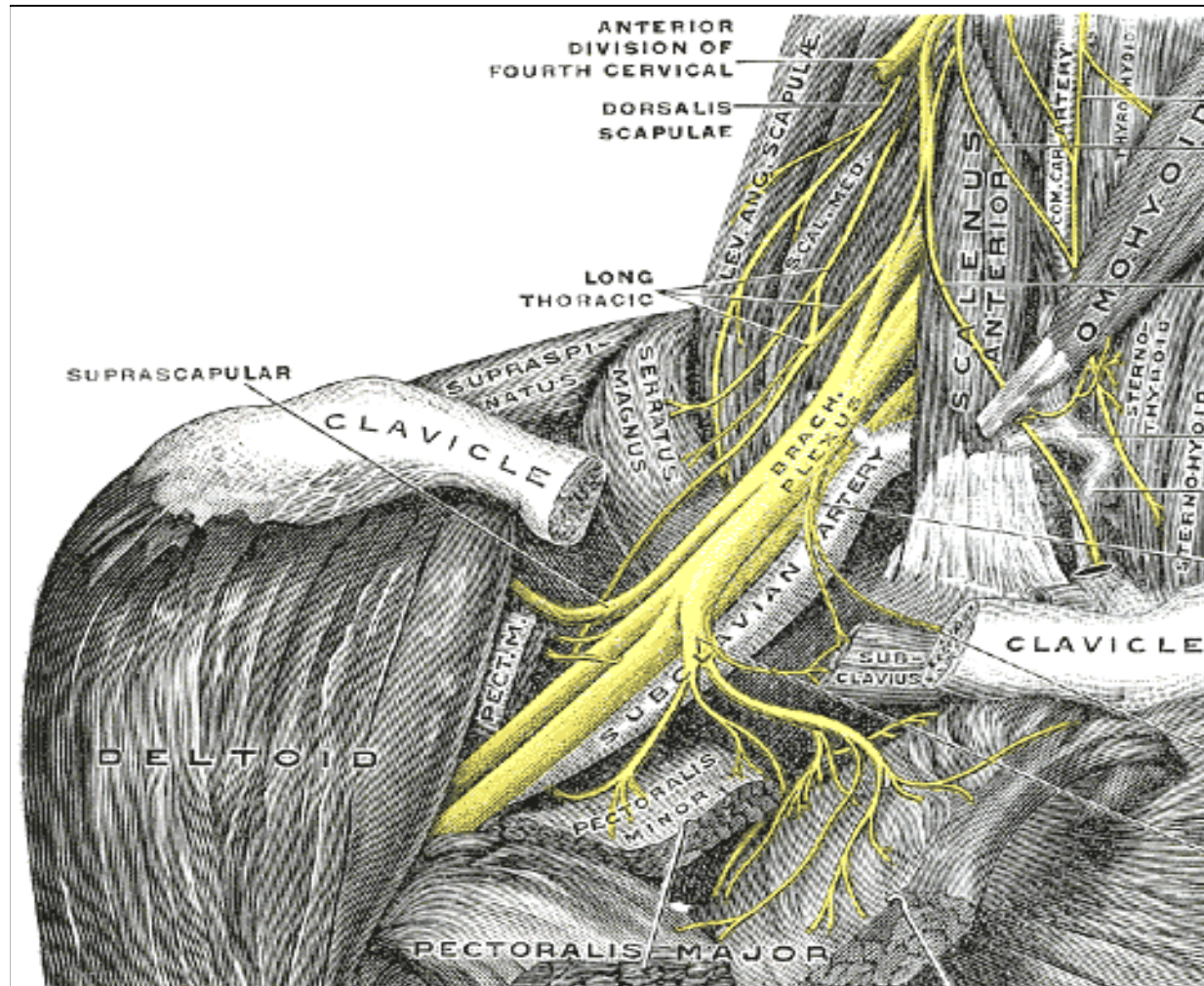
extremity

Nerve	Clinical	Causes
Brachial plexus injury	<ul style="list-style-type: none">• Weakness of arm (upper arm type, total arm type)	<ul style="list-style-type: none">• Trauma• Birth trauma (newborn)
Ulnar nerve	<ul style="list-style-type: none">• numbness• Intrinsic hand weakness	<ul style="list-style-type: none">• Cubital tunnel• Guyon canal syndrome
Median nerve	<ul style="list-style-type: none">• Numbness• Thenar muscle atrophy	<ul style="list-style-type: none">• Carpal tunnel syndrome
Radial nerve	<ul style="list-style-type: none">• Wrist and finger drop• Numbness	<ul style="list-style-type: none">• Humerus fracture• Iatrogenic during humerus fixation

brachial plexus



Brachial Plexus behind clavicle, in upper thorax



Brachial Plexus Neuropathies


- } Of obvious cause are those that result from trauma, in which the arm is hyperabducted or the shoulder violently separated from the neck.
- } Rarely, the brachial plexus or other peripheral nerves may be damaged at the time of an electrical injury.

Direct compression of parts of the plexus by adjacent skeletal anomalies (cervical rib, fascial bands, narrowed thoracic outlet).



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- } A subcutaneous or intramuscular injection of vaccine or foreign serum ,heroin injection.

 - } Granulomatous diseases such as sarcoid and secondary inflammatory processes related to lymphoma ,thrombosis of the subclavian artery or vein (Paget-Schrotter syndrome) is known.

 - } More common, however, is an idiopathic brachialplexus neuritis of obscure origin, also called ParsonageTurner Syndrome.
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Median Nerve

- } This nerve originates from the fifth cervical to the first thoracic roots but mainly from the sixth cervical root
- } It innervates the pronators of the forearm, long finger flexors, and abductor and opponens muscles of the thumb and is a sensory nerve to the palmar aspect of the hand.
- } The nerve may be injured in the axilla by dislocation of the shoulder and in any part of its course by stab, gunshot, or other types of wounds



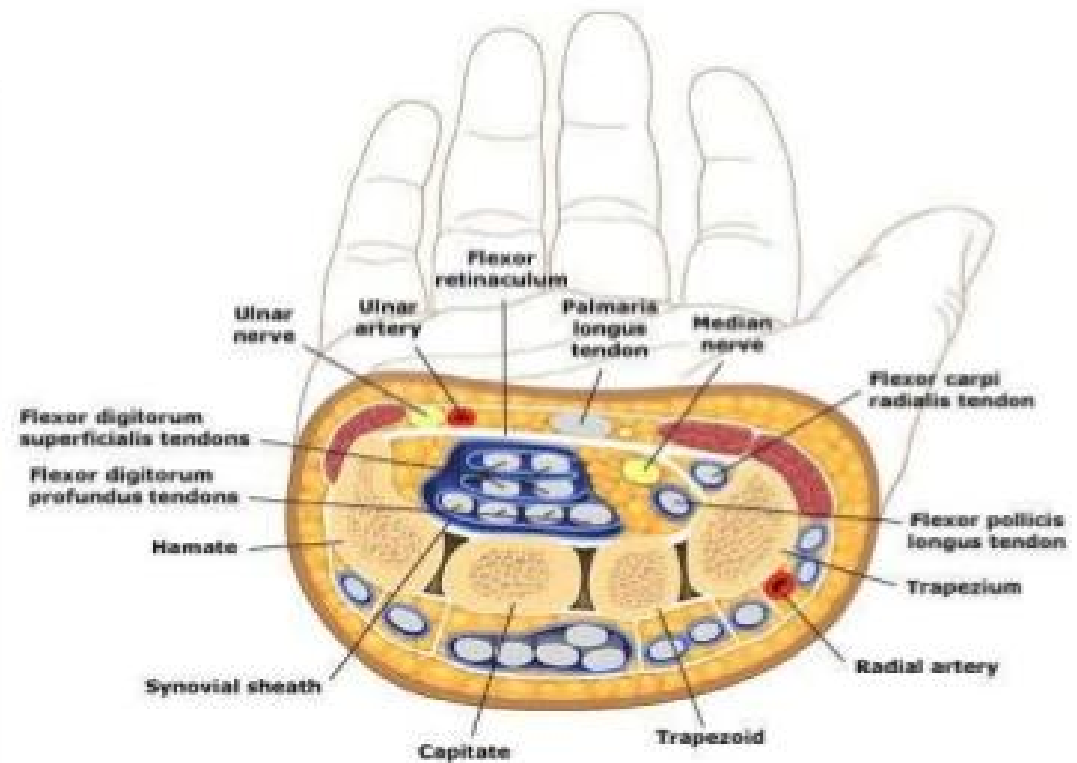
Carpal Tunnel Syndrome

- } Compression of the median nerve at the wrist (carpal tunnel syndrome) is the most common disorder affecting the median nerve and the most frequent nerve entrapment syndrome.
 - } The problem arises usually as a result of excessive use of the hands and occupational microtrauma. Infiltration of the transverse carpal ligament with amyloid (as occurs in multiple myeloma and amyloidosis) or thickening of connective tissue in rheumatoid arthritis,
 - } acromegaly, mucopolysaccharidosis, and hypothyroidism
 - } pregnancy, DM.
-



carpal tunnel syndrome

- Median nerve



- } The syndrome is essentially a sensory one; the loss or impairment of superficial sensation affects the palmar aspect of the thumb and the index and middle

- } **The Phalen** maneuver consists of hyperflexion of the wrist for 30 to 60 s-usually performed by opposing the outer surfaces of the hands with the wrists flexed.

- } The **Tinel** sign is elicited by lightly tapping the volar aspect of the wrist at the transverse carpal ligament (distal to the first wrist crease).

- } The sensitivity of these tests is close to 50 percent, but their specificity is considerably higher.

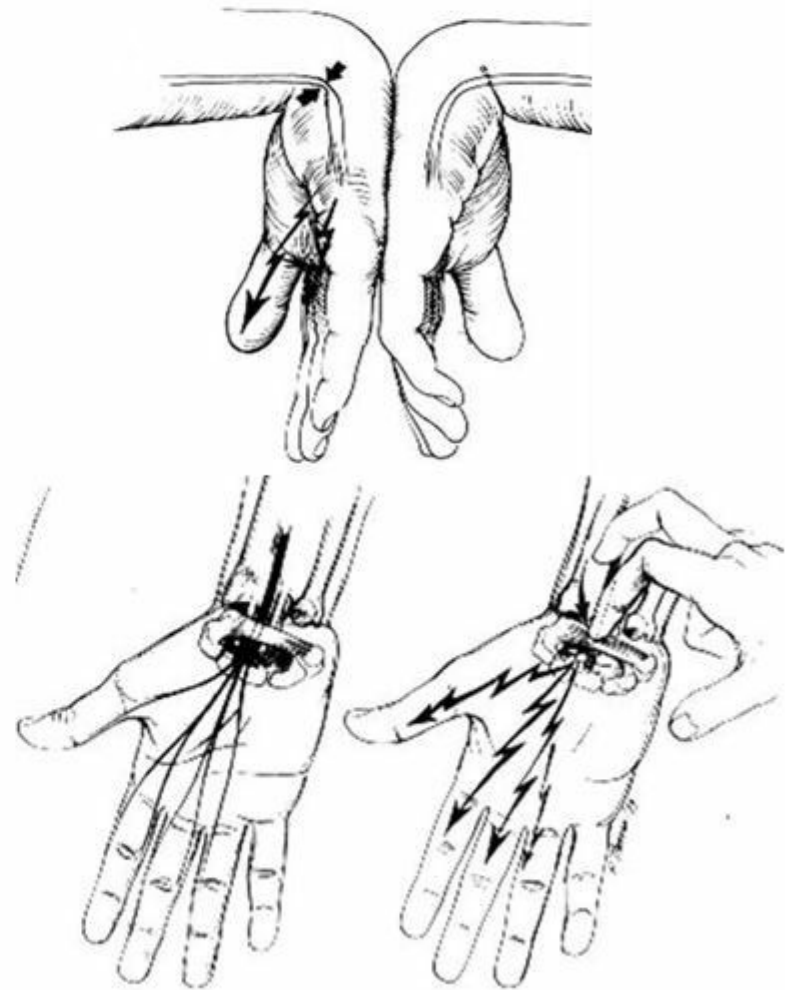
- } Other tests involving prolonged pressure over the median nerve have been devised, but they are of uncertain value, e.g., **Durken's** test of the Phalen maneuver combined with digital compression of the nerve.



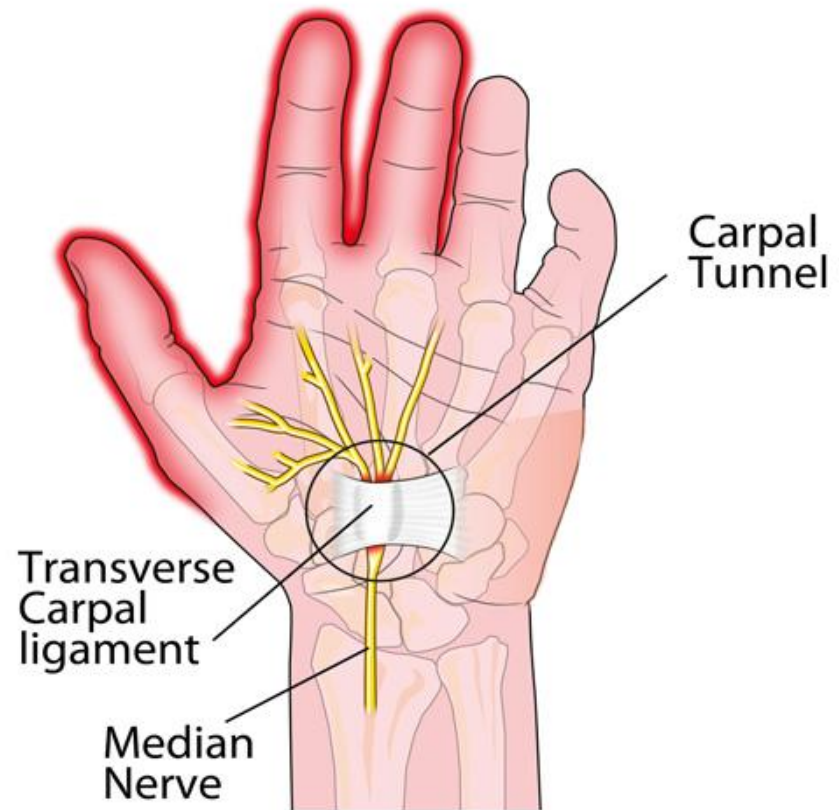
Special Tests

Phalen's & Tinel's Tests

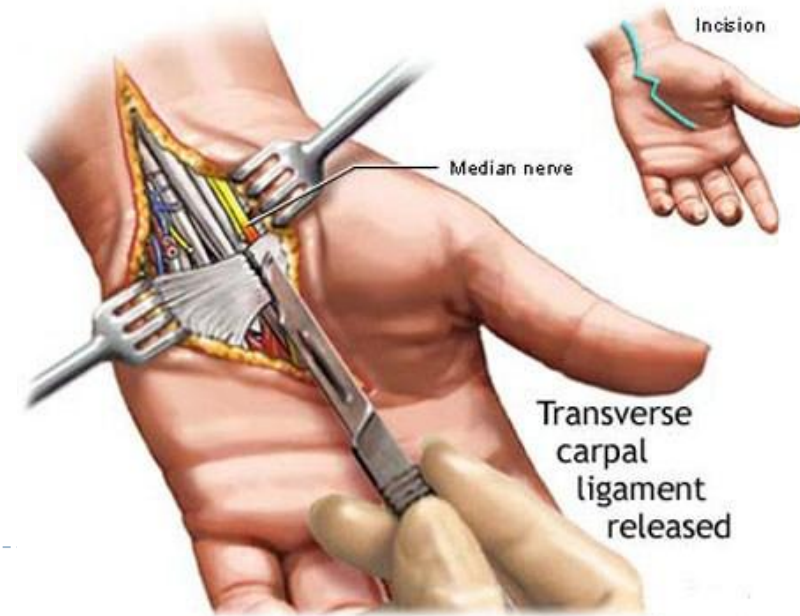
- Phalen's
 - Wrist flexion to maximum for 60 sec
- Tinel's
 - Tapping over transverse carpal ligament
- Symptoms
 - Pain
 - Anesthesia
 - Paresthesia



Carpal tunnel syndrome



- NSAIDs
- Steroid injection
- Carpal tunnel release




radial nerve compression

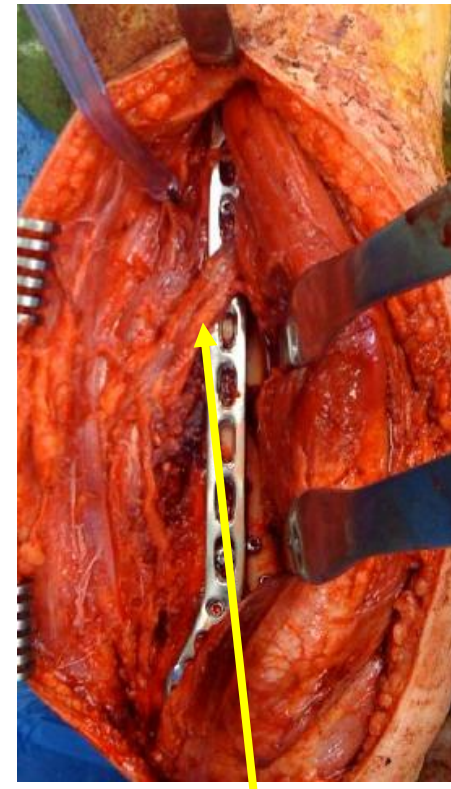
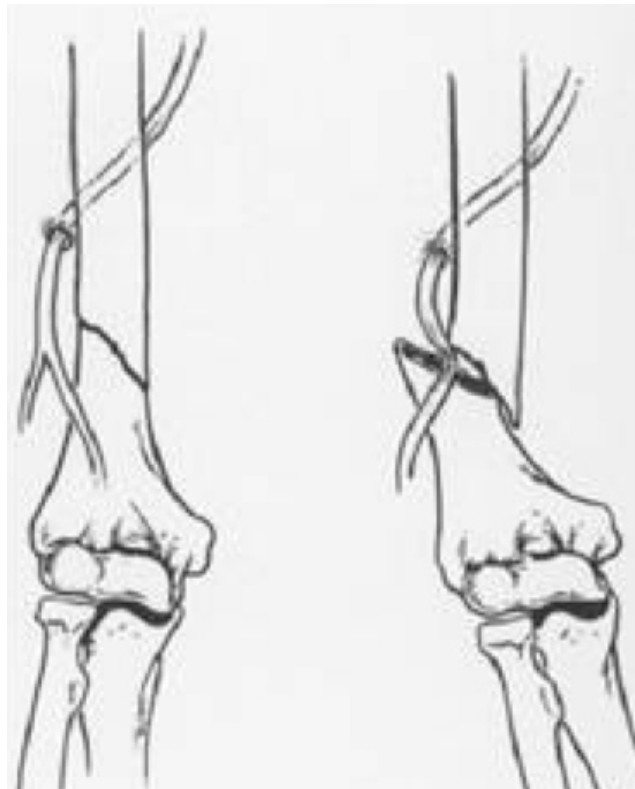
- Radial
axilla, spiral groove



Radial Nerve

- } This nerve is derived from the sixth to eighth (mainly the seventh) cervical roots and is the distal extension of the posterior cord of the brachial plexus.
 - } It innervates the extensor muscles of the wrist and fingers, the main abductor of the thumb (the abductor pollicis longus, which is easier to isolate than the median nerve innervated abductor pollicis brevis), and the extensors of the fingers at both joints.
 - } A complete proximal radial nerve lesion results in paralysis of extension of the elbow, flexion of the elbow with the forearm midway between pronation and supination (a result of paralysis of the brachioradialis muscle), supination of the forearm, extension of the wrist and fingers, and extension and abduction of the thumb in the plane of the palm.
 - } If the lesion is confined to the posterior interosseous nerve, only the extensors of the wrist and fingers are affected.
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Radial nerve palsy after humerus fracture / fixation



▶ Holstein-Lewis fracture

Radial nerve identified humerus

cubital tunnel syndrome

- Ulnar



Ulnar Nerve

This nerve is derived from the eighth cervical and first thoracic roots.

- } It innervates the ulnar flexor of the wrist, the ulnar half of the deep finger flexors, the adductors and abductors of the fingers, the adductor of the thumb, the third and fourth lumbricals, and muscles of the hypothenar Eminence
 - } Complete ulnar paralysis is manifest by a characteristic clawhand deformity; wasting of the small hand muscles results in hyperextension of the fingers at the metacarpophalangeal joints and flexion at the interphalangeal joints.
 - } The flexion deformity is most pronounced in the fourth and fifth fingers, as the lumbrical muscles of the second and third fingers, supplied by the median nerve, counteract the deformity.
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Cut wound at forearm

- Claw hand
- Intrinsic hand muscle atrophy
- Numbness

The ulnar nerve is vulnerable to pressure in the **axilla** from the use of **crutches**, but it is most commonly injured at the elbow by fracture or dislocation involving the joint.

Delayed ("tardive") ulnar palsy may occur many months

or years after an injury to the elbow that had resulted in a **cubitus valgus** deformity of the joint.

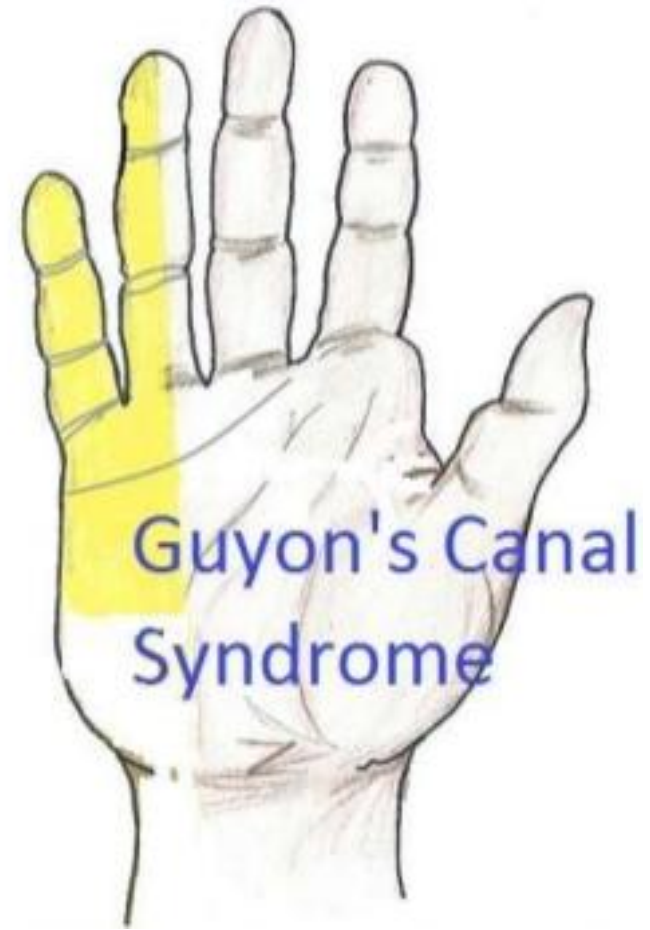
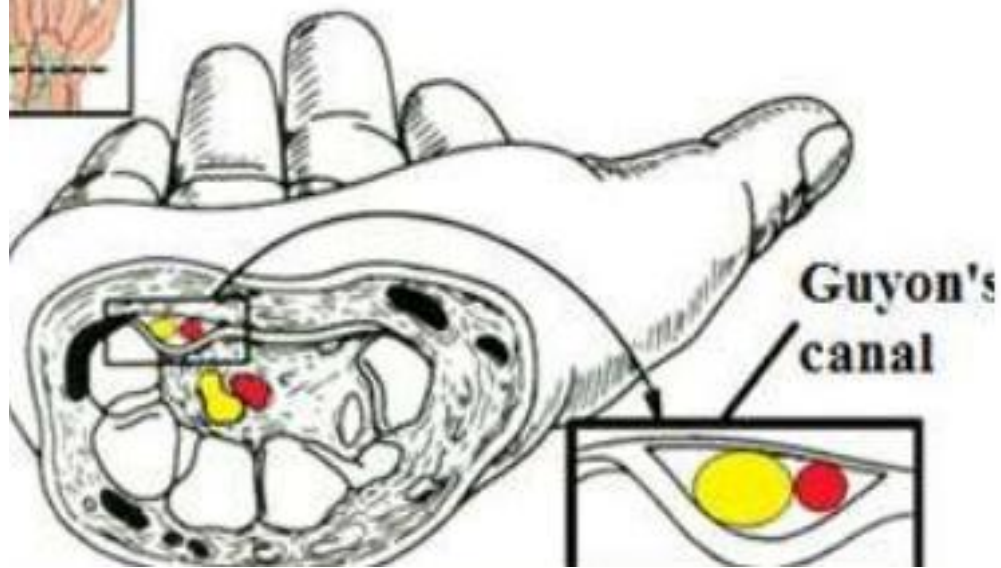


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- } Yet another site of ulnar nerve compression is in the ulnar tunnel at the wrist.
 - } Prolonged pressure on the ulnar part of the palm may result in damage to the deep palmar branch of the ulnar nerve, causing weakness of small hand muscles but no sensory loss.
 - } This site is most often implicated in patients who hold tools or implements tightly in the hand for long periods
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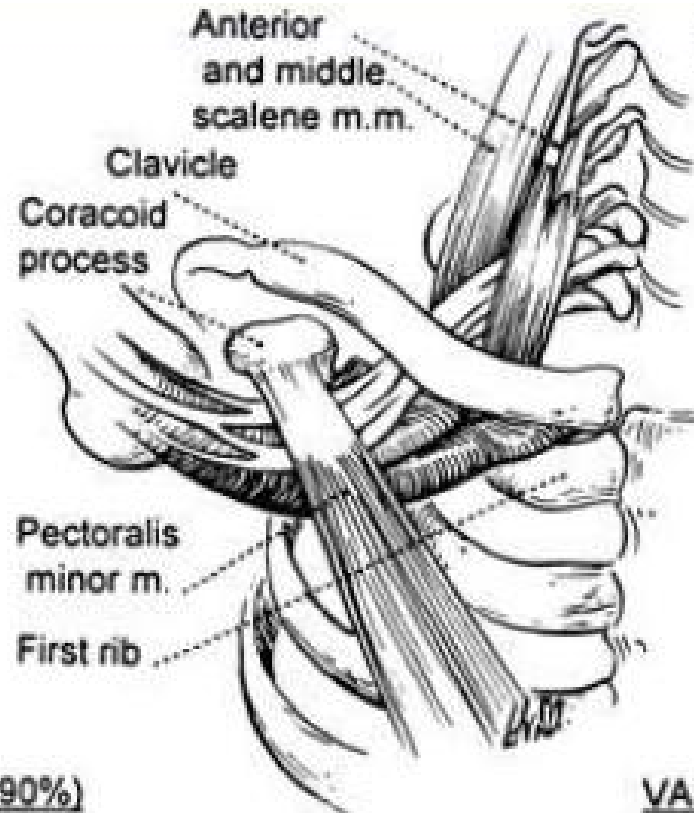
Guyon's canal syndrome

- Ulnar



SOFT TISSUE LESIONS

- Scalene mm. (ant, middle & minimus) & fibromuscular bands
- Subclavian m. & costo-clavicular (costo-coracoid) ligament.
- Pectoralis minor m.



BONY LESIONS

- Cervical rib
- First rib anomalies
- Long C7 transverse process
- Clavicular abnormalities

NEURAL SYMPTOMS (90%)

Peripheral

- Pain
- Paresthesia
- Motor weakness
- Atrophy (rare)

Sympathetic

- Raynaud's phenomenon

Pain
Color & temperature changes (coldness)
Ischemia
Trophic changes

VASCULAR SYMPTOMS (10%)

Subclavian a.

- Loss of pulse
- Motor weakness
- Claudication
- Thrombosis
- Peripheral emboli, necrosis

Subclavian v.

- Pain
- Edema
- Venous distention
- Cyanosis
- Collateral v.
- Paget-Schroetter syndrome

Thoracic Outlet Syndromes


- } thoracic outlet syndrome are an anomalous incomplete cervical rib, with a sharp fascial band passing from its tip to the first rib; a taut fibrous band passing from an
- } elongated and down-curving transverse process of C7 to the first rib; less often, a complete cervical rib, which articulates with the first rib; and anomalies of the position and insertion of the anterior and medial scalene muscles.
- } Depending on the postulated abnormality and mechanism of symptom production, the terms cervical rib, anterior scalene, costoclavicular, and neurovascular compression have been applied.

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- } There is slight wasting and weakness of the hypothenar, interosseous, adductor pollicis, and deep flexor muscles of the fourth and fifth fingers(i.e., the muscles innervated by the lower trunk of the brachial plexus and ulnar nerve).

 - } Weakness of the flexor muscles of the forearm may be present in advanced cases.

 - } Tendon reflexes are usually preserved.

 - } In addition, most patients complain of an intermittent aching of the arm,
 - } particularly of the ulnar side, and about half of them complain also of numbness and tingling along the ulnar border of the forearm and hand

 - } A loss of superficial sensation in these areas is variable.
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Thank you for attention

