

The Axilla

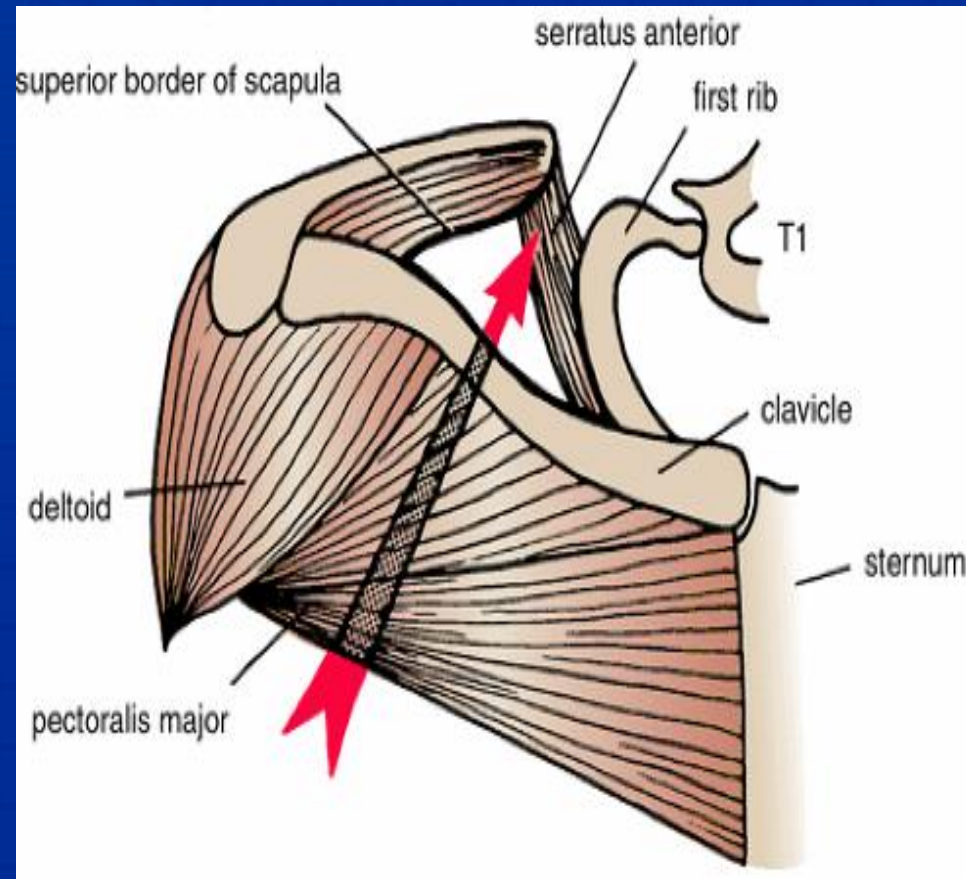
A pyramidal space between upper part of the arm & the upper part of side of chest wall, just inferior to shoulder joint.

Importance:

- **Passageway** for vessels & nerves between the neck & upper limb which pass through its apex.
- Contain a group of important lymph nodes embedded in soft fat (**Axillary L.N.**)

Its made up of:

Apex, base & 4 walls



Apex:

- The entrance from the root of the neck (**cervico-axillary canal**)
- Lies at medial side of coracoid process.
- Main nerves and vessels of UL pass through apex

Boundaries:

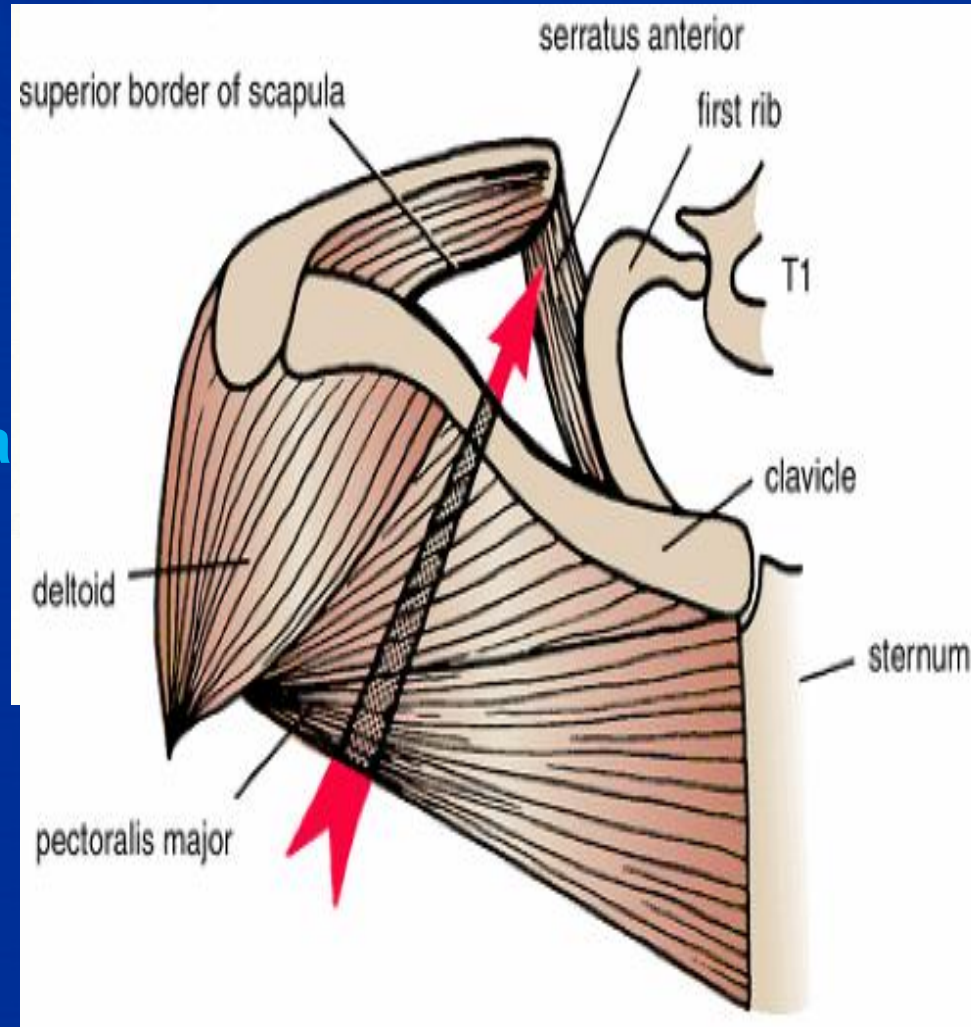
Ant.: **clavicle**

Post.: **upper border of scapula**

Med.: **1st rib**

Base:

Formed by the **skin** concavity extending from the arm to thoracic wall.



Anterior Wall:

Pect. Major (**superficial layer**)

Pect. Minor (**deep layer**) Subclavius
, clavipectoral fascia suspensory
lig of axilla.

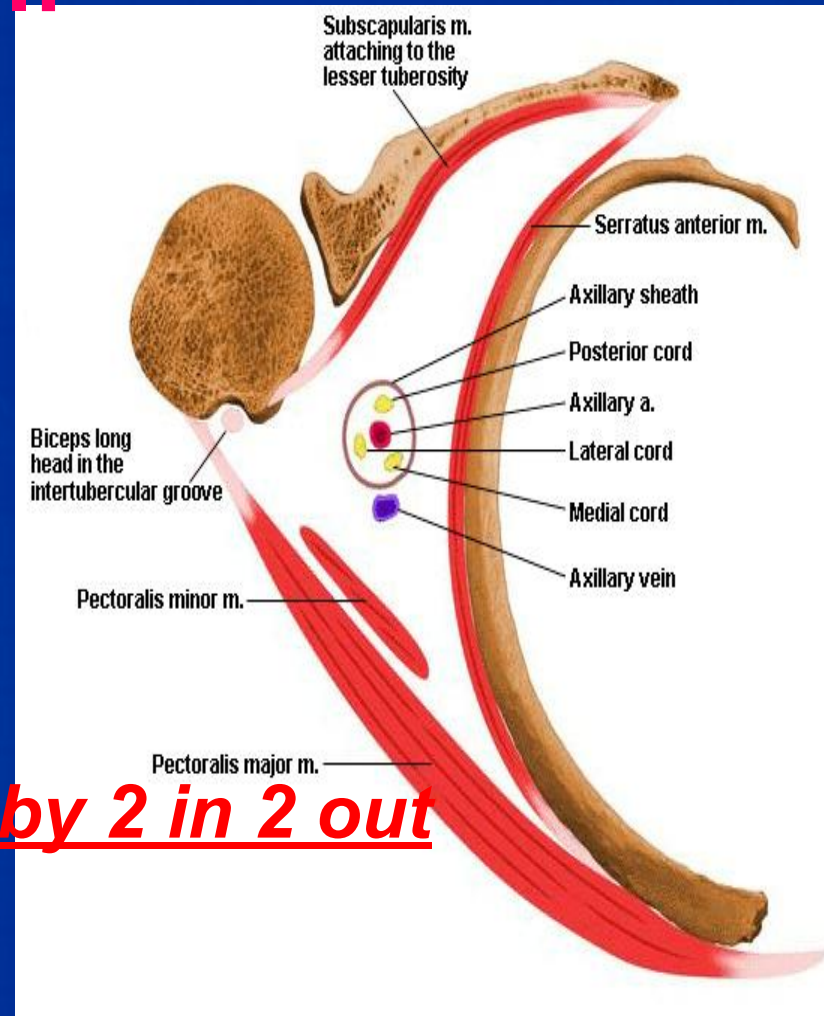
Clavipectoral Fascia: Is the fascia
of anterior wall of axilla

Thickened membrane of Deep
facial layer that extends from

clavicle to floor of axilla, **pierced by 2 in 2 out**

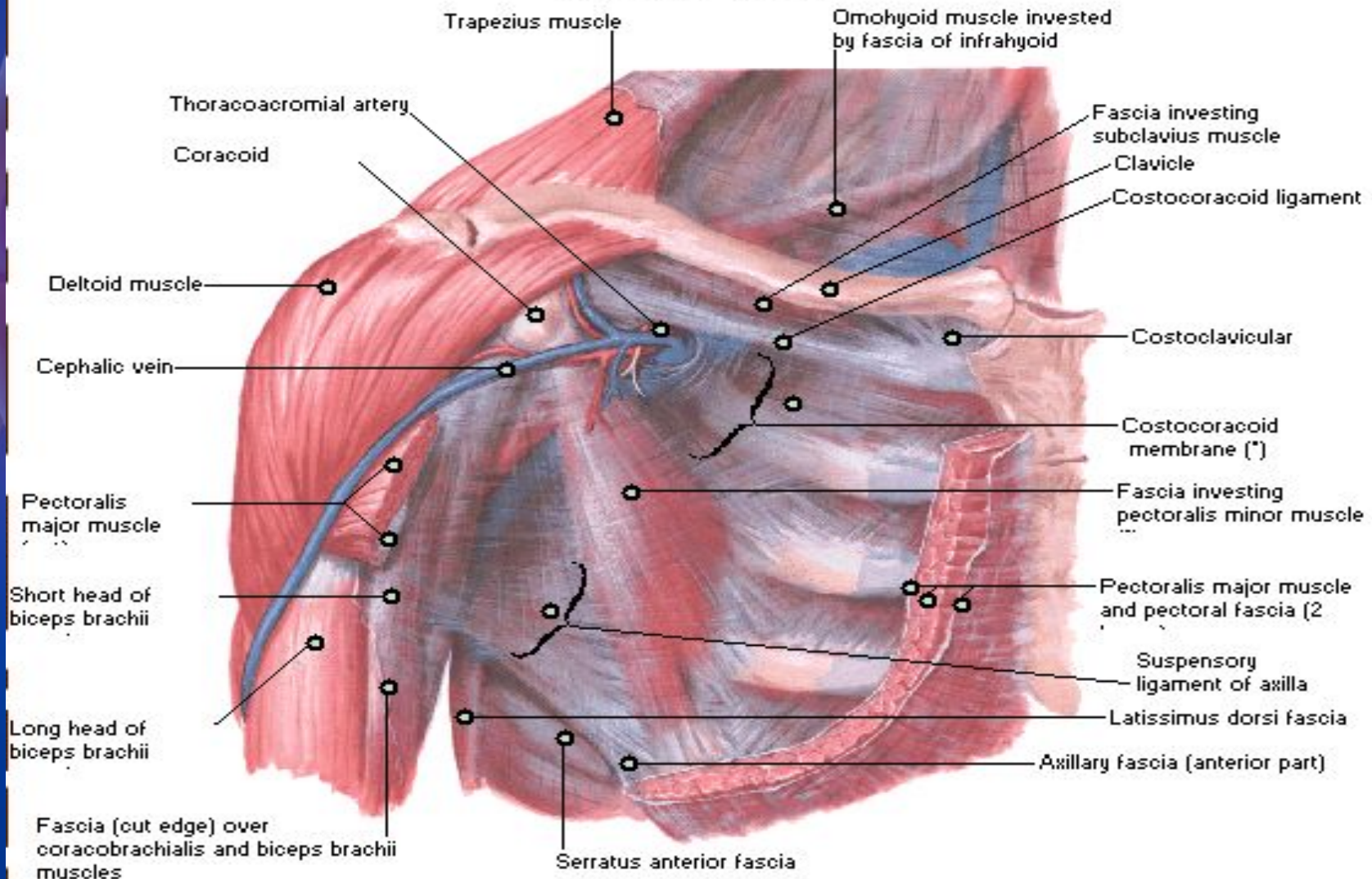
- Cephalic vein
- Infraclavicular lymph node
- Acromothoracic artery
- Lateral pectoral nerve

Fibers run from medial to lateral



Pectoral, Clavipectoral and Axillary Fasciae

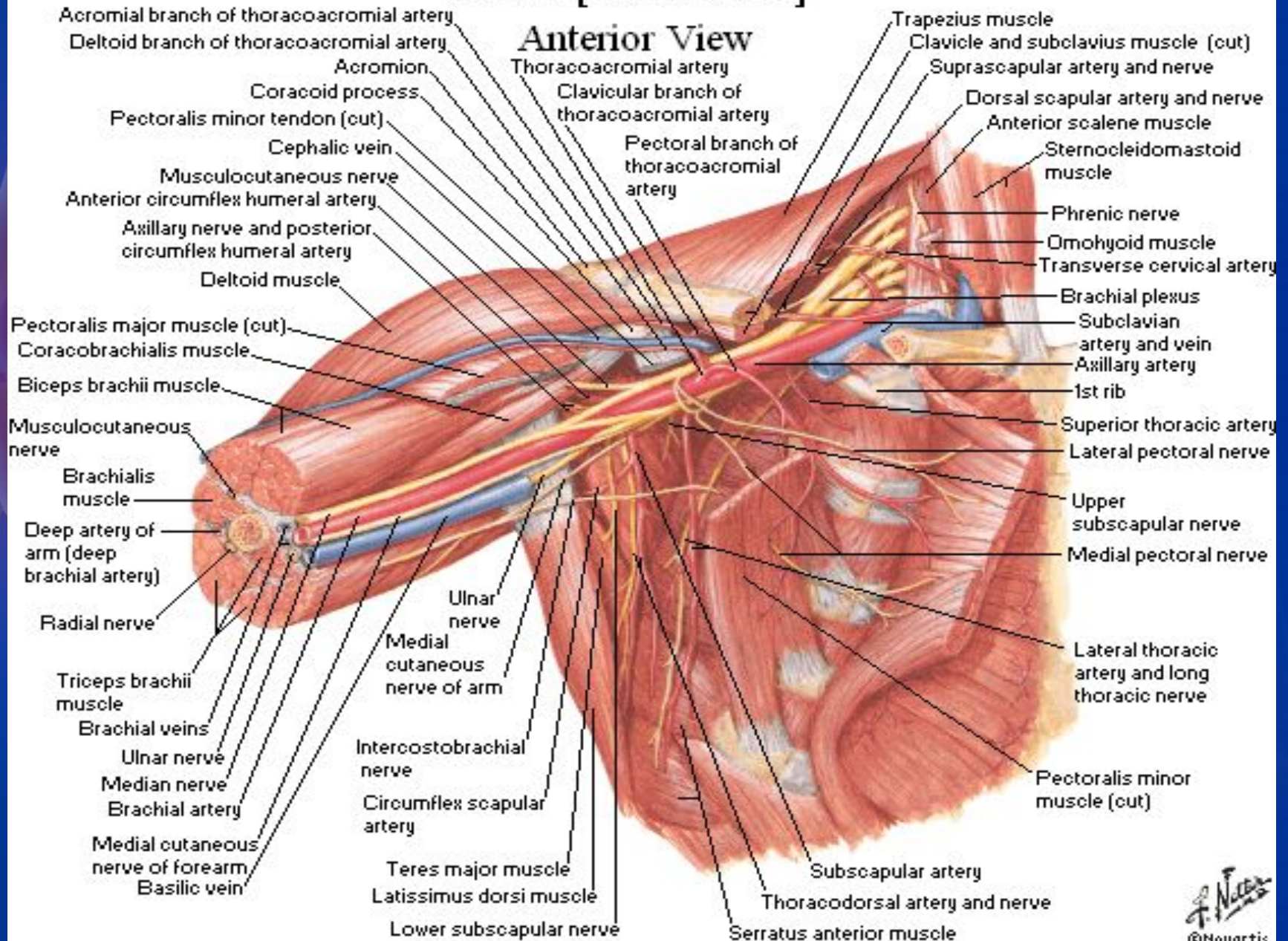
Anterior View



*Components of clavipectoral fascia

Axilla [Dissection]

Anterior View



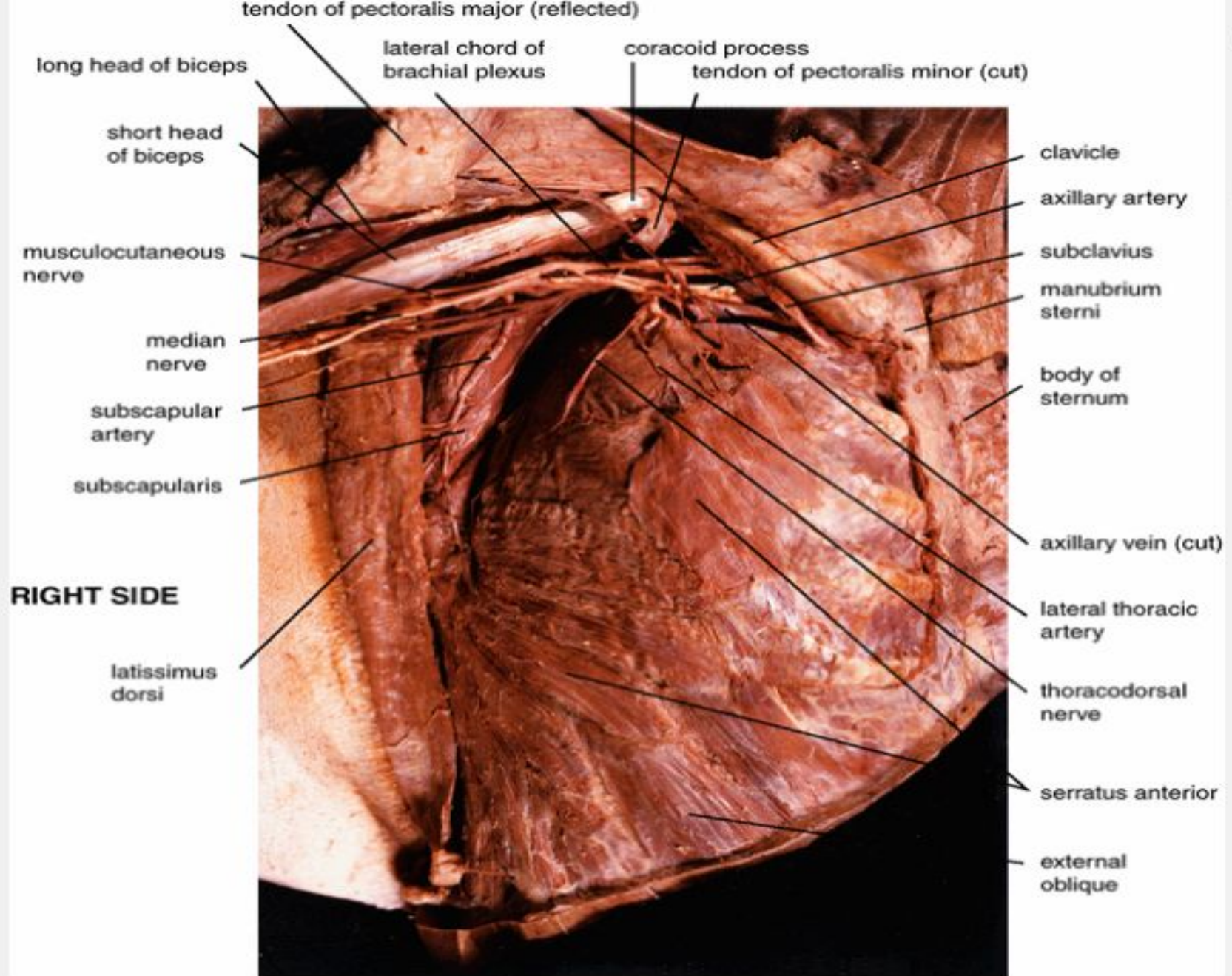
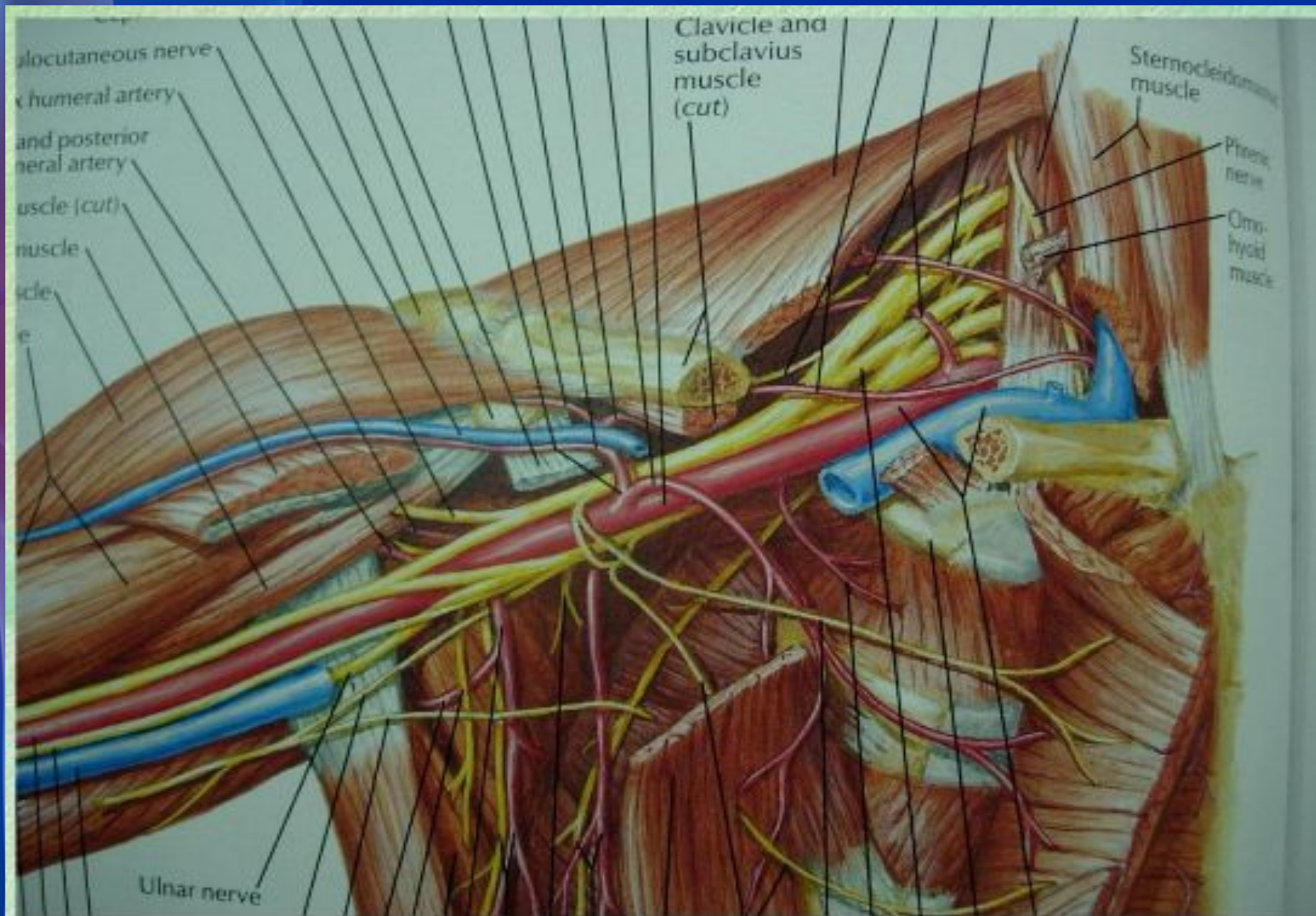
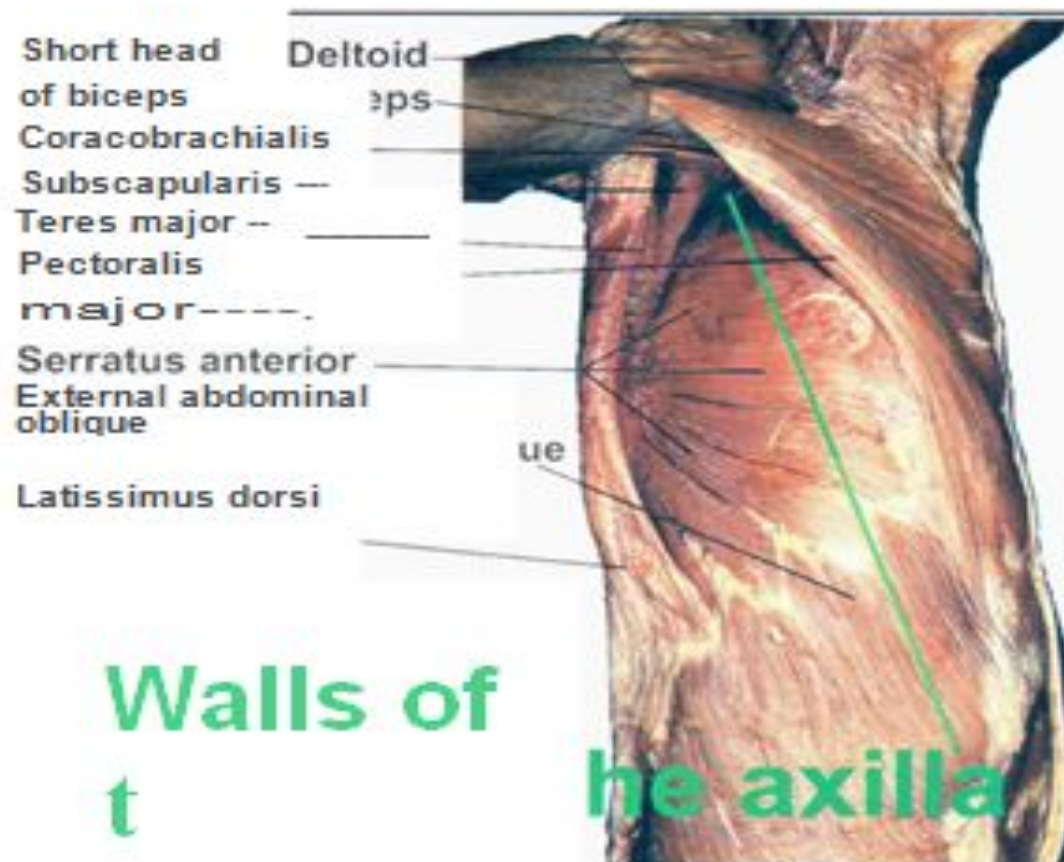


Figure 9-16 Dissection of the right axilla. The pectoralis major and minor muscles and



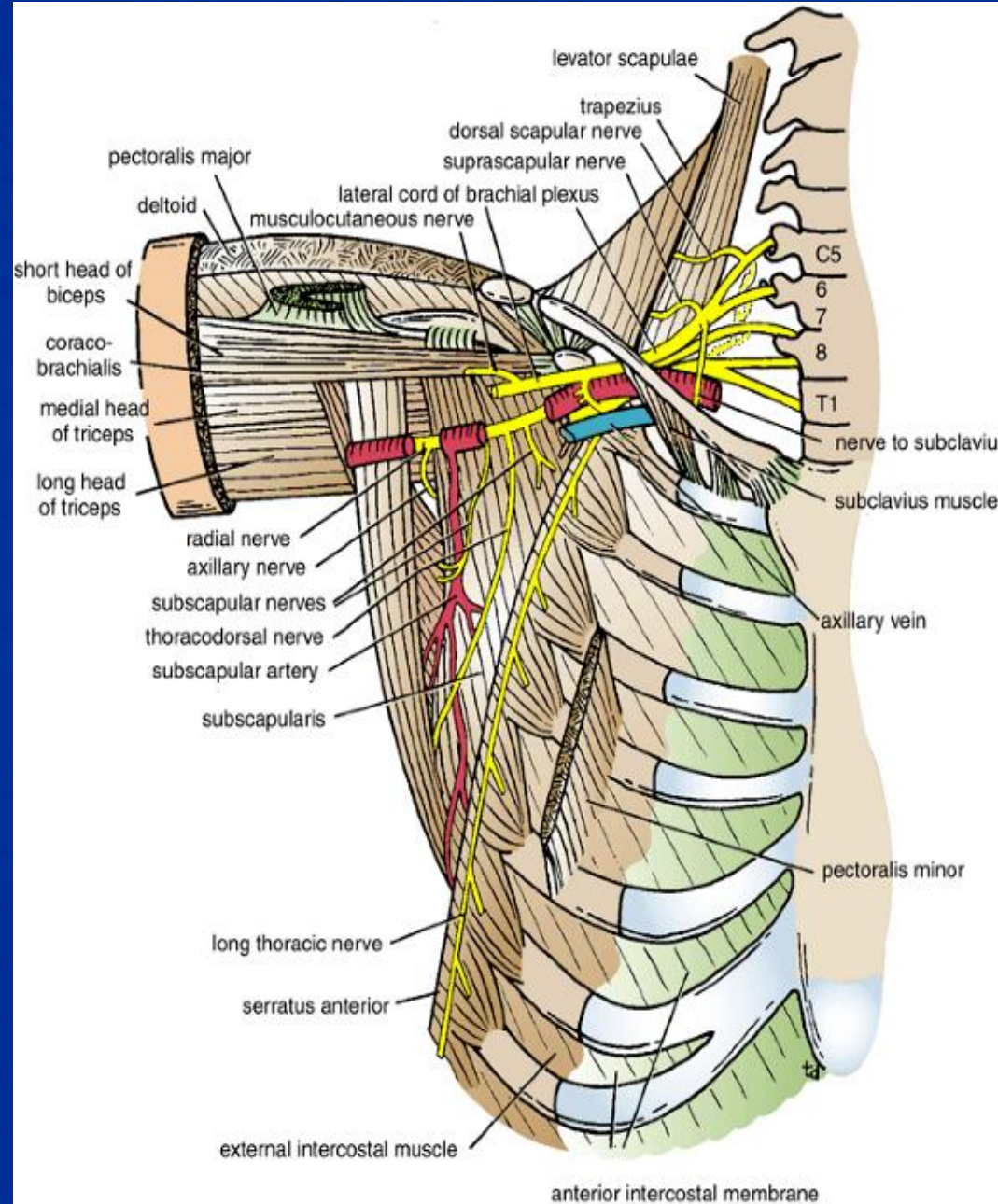


Posterior Wall:

Is longer than anterior wall

Formed by

- **Subscapularis (medially)**
- **Teres major**
- **Latissimus dorsi (laterally)**

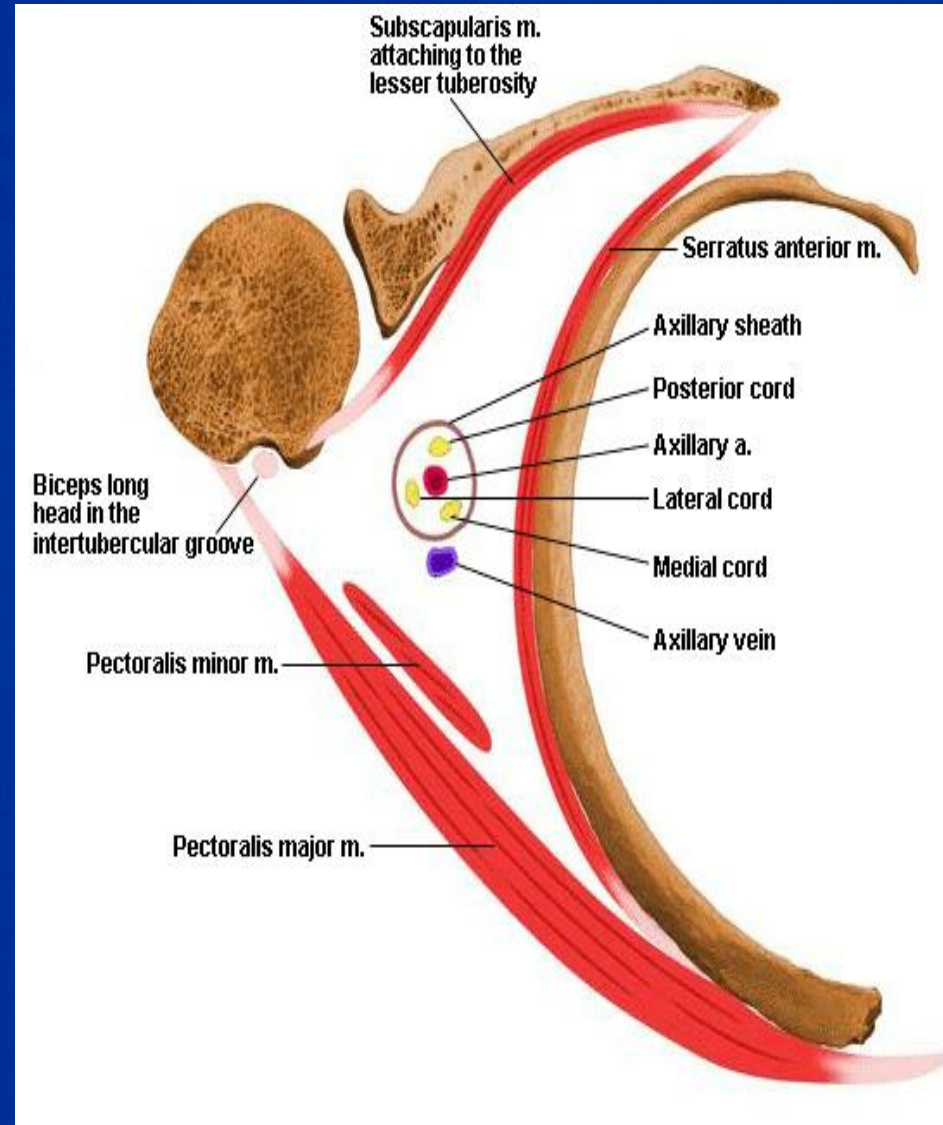


Medial Wall:

1st 4th ribs
& intercostal muscles in
Between overlying **serratus
ant. m.**

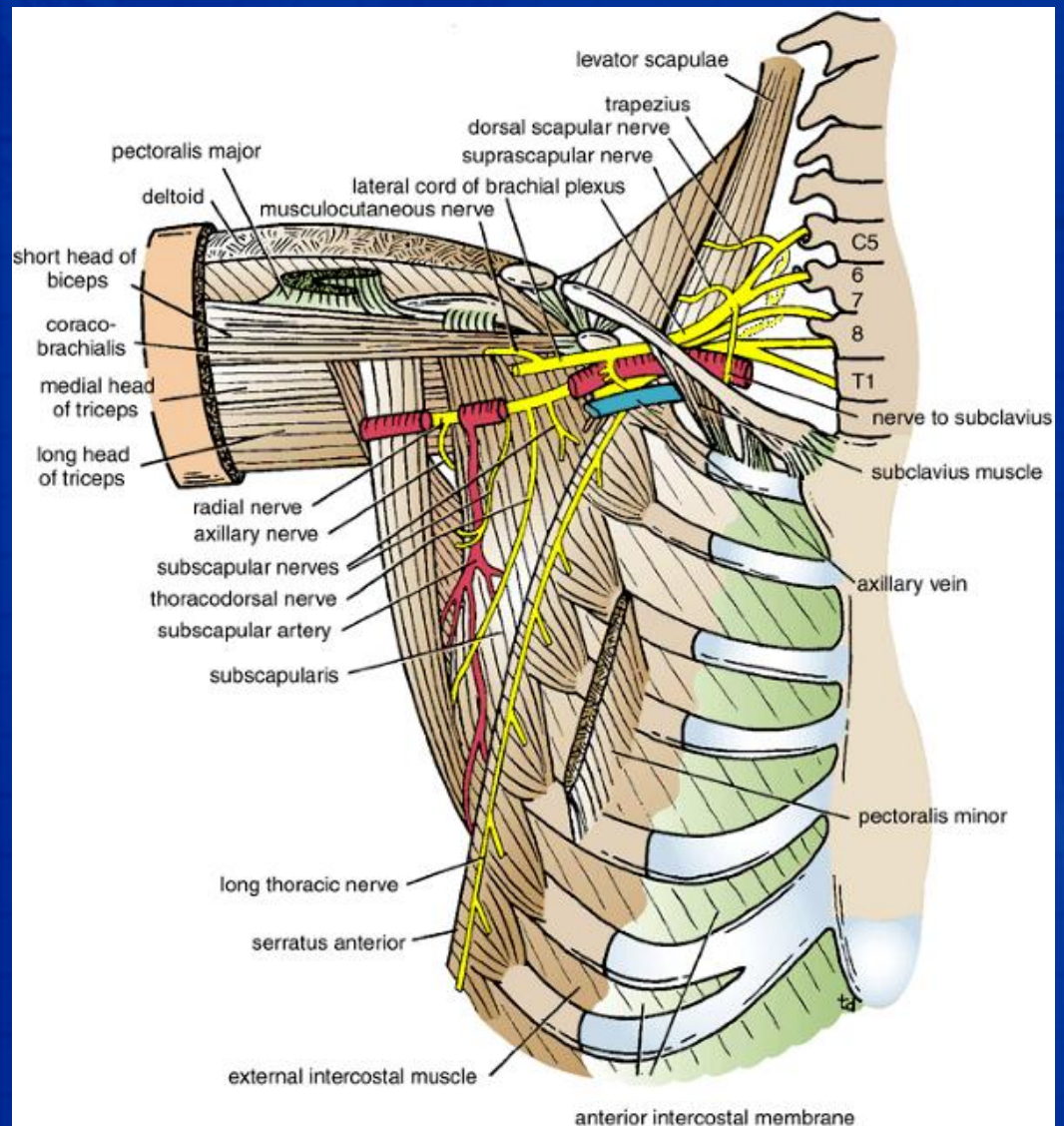
Lateral Wall:

Intertubercular groove
of the humerus hidden from
view by short head of biceps
and coracobrachialis



Contents of The Axilla

- Axillary artery
- Axillary vein
- Axillary lymph nodes
- Brachial plexus



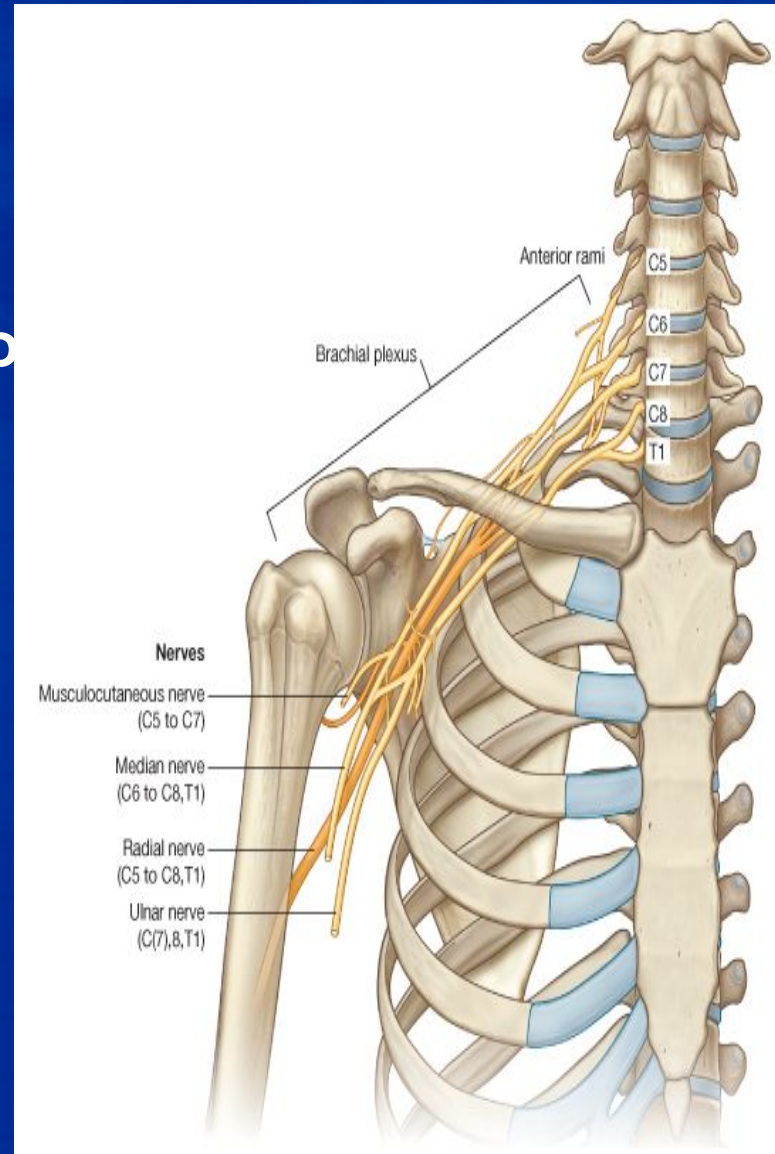
Brachial Plexus

A major network of nerves that supply the upper limb

Formed by **Anterior primary rami** of C5- C6- C7- C8-T1 spinal nerves

Composed of:

- Roots (root of neck)
- Trunks (in post. triangle of the neck).
- Divisions (post. To middle third the clavicle).
- Cords (within the axilla).

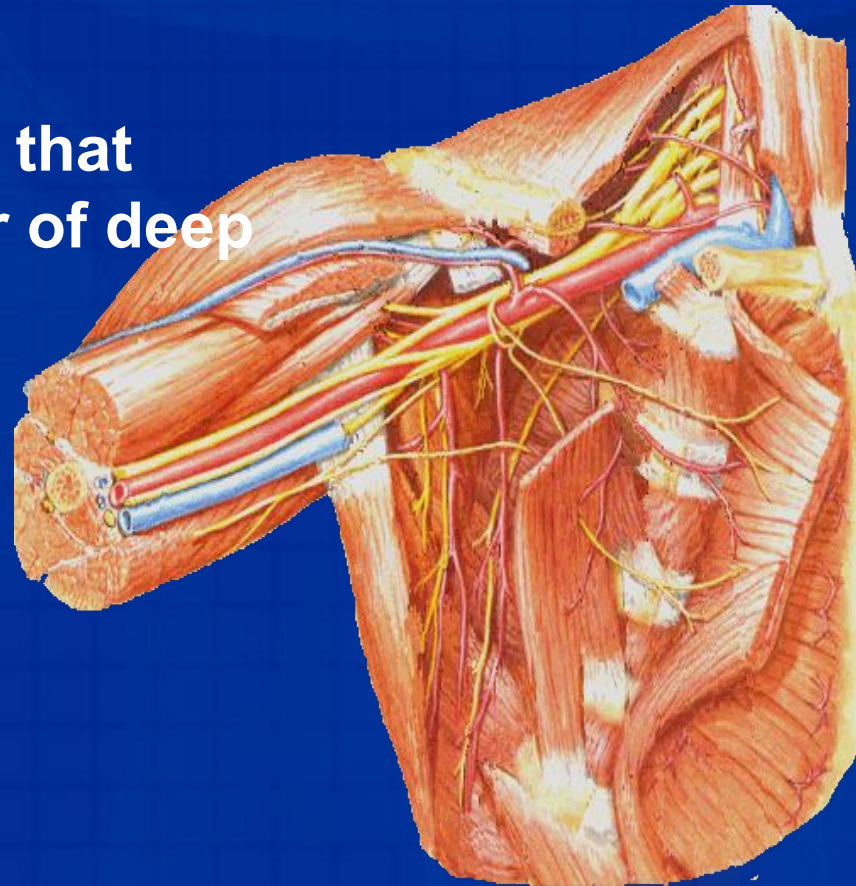


Brachial plexus

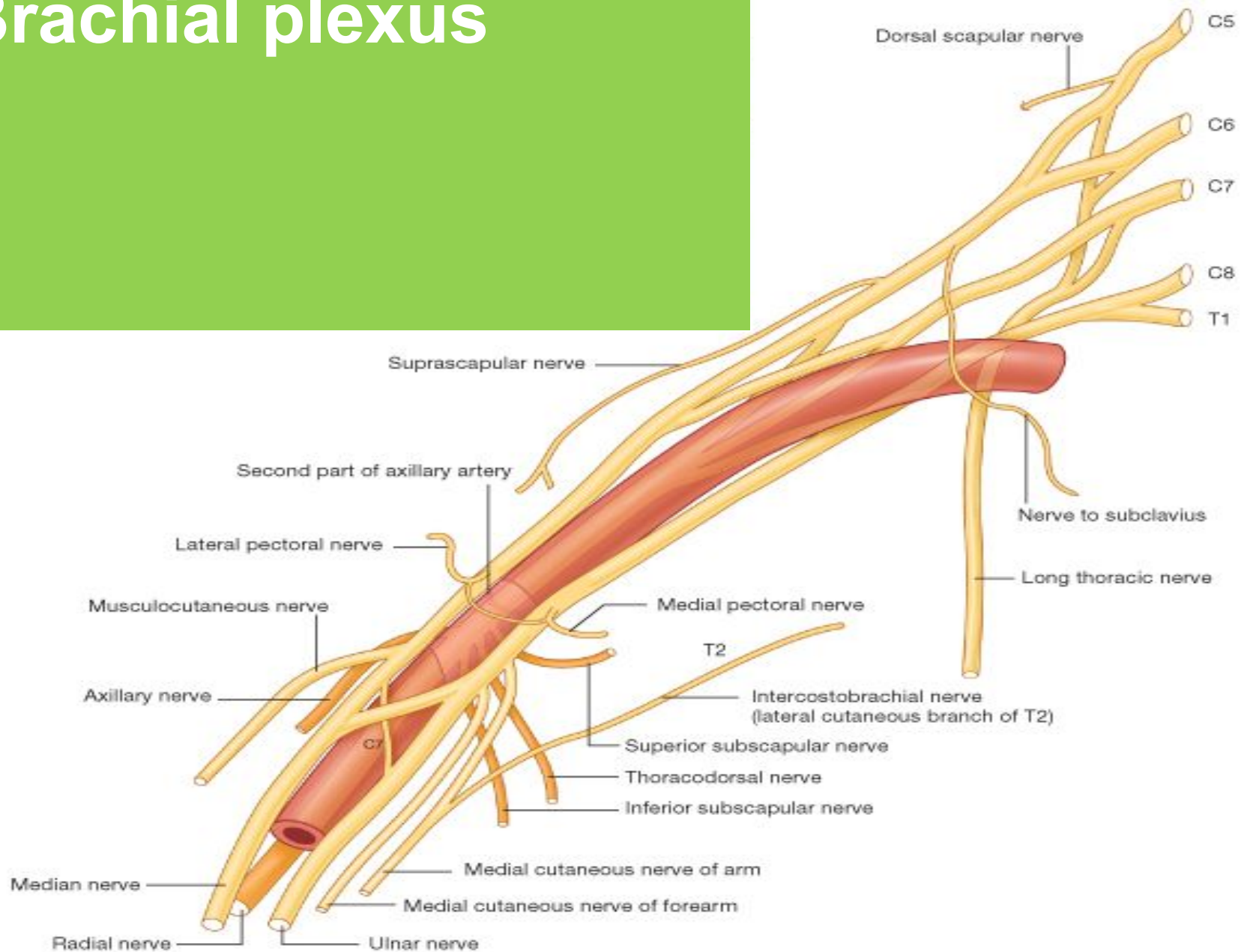
B.P. is covered with Axillary sheath

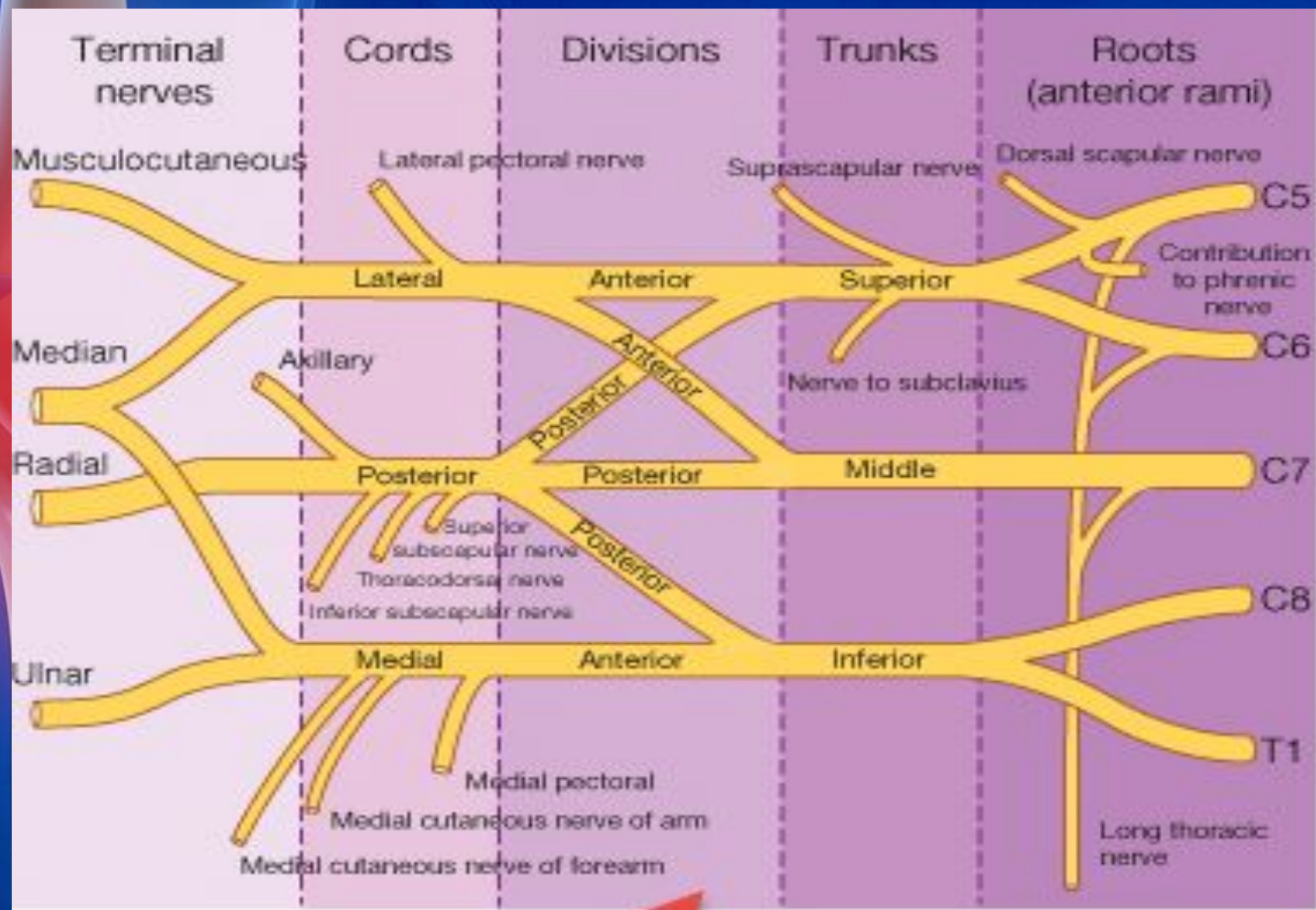
Axillary Sheath: a fascial covering that derived from prevertebral layer of deep cervical fascia & covers:

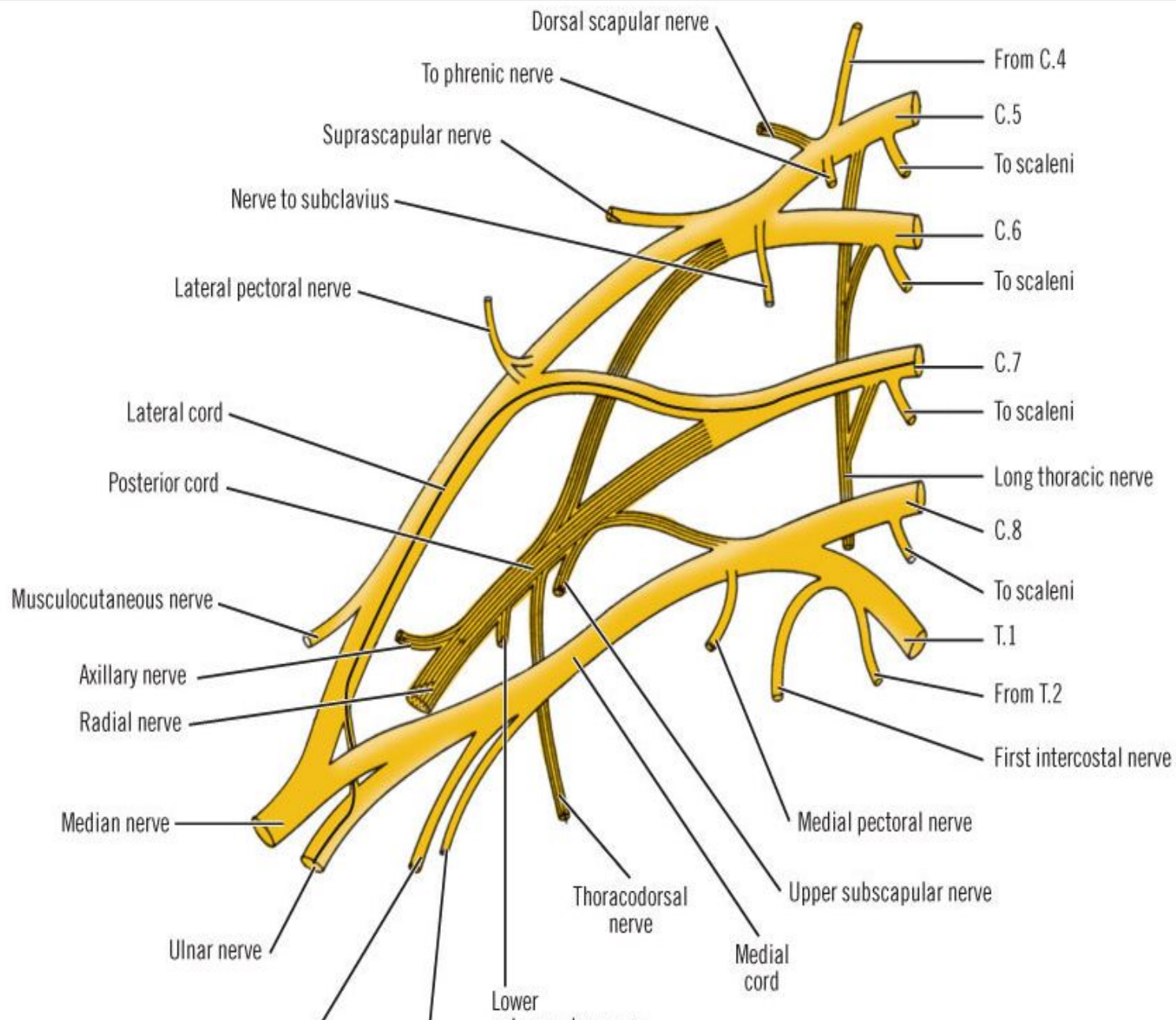
Brachial plexus, Axillary artery
& Axillary vein



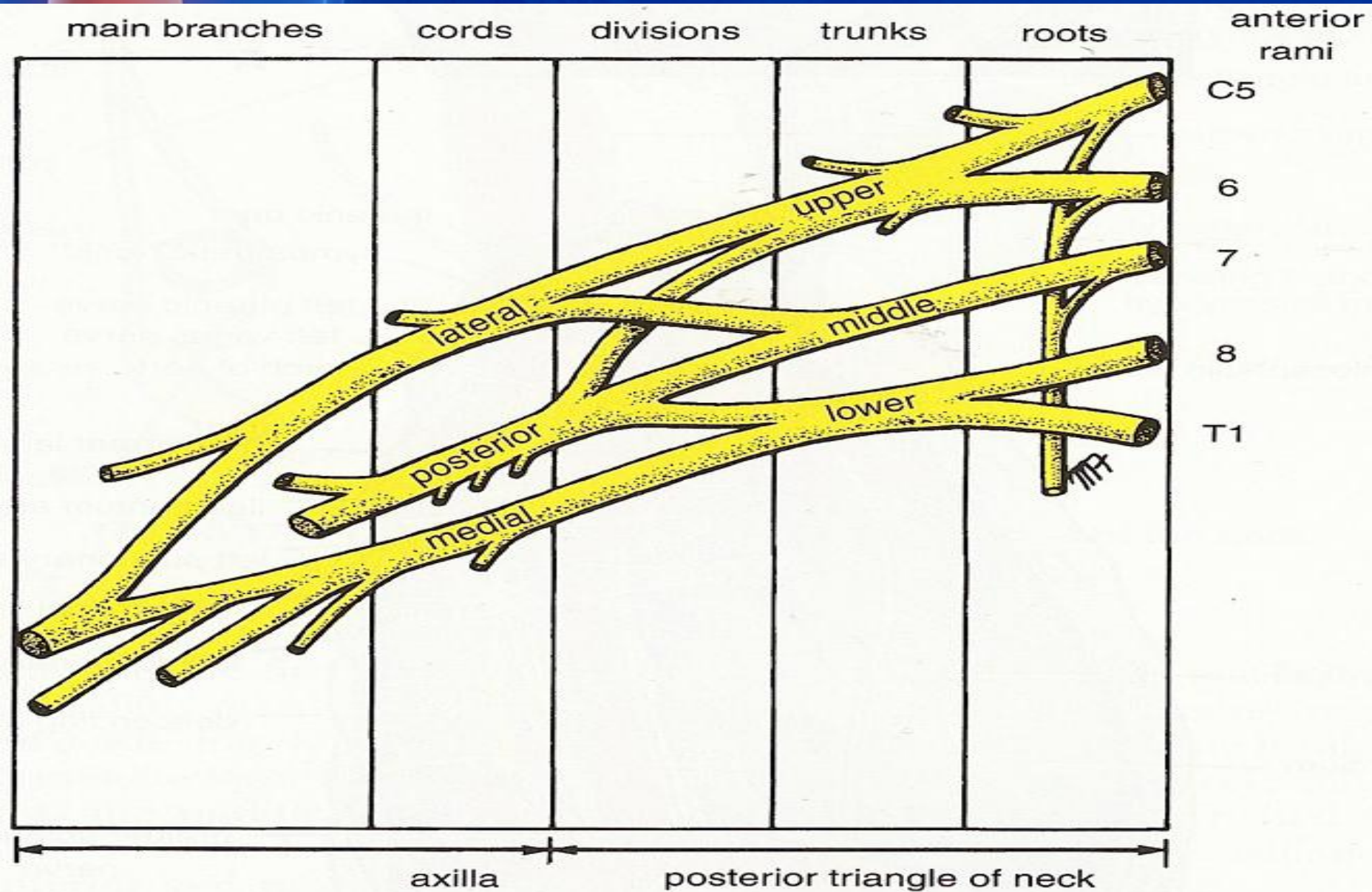
Brachial plexus







Brachial plexus



Roots & Trunks

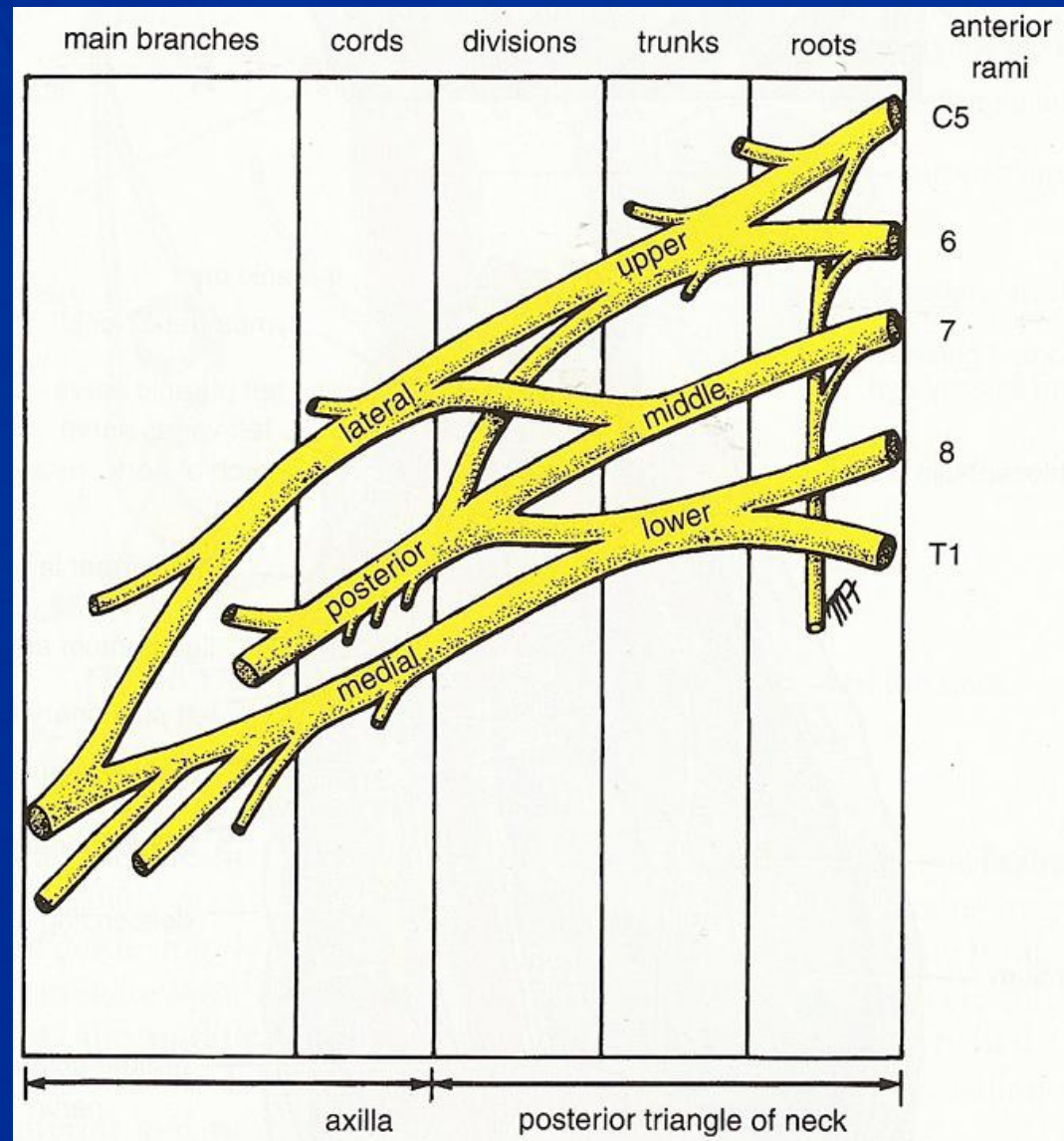
Roots: C5, 6, 7, 8 & T1

Trunks:

upper: C5 & C6

middle: C7

Lower: C8 & T1



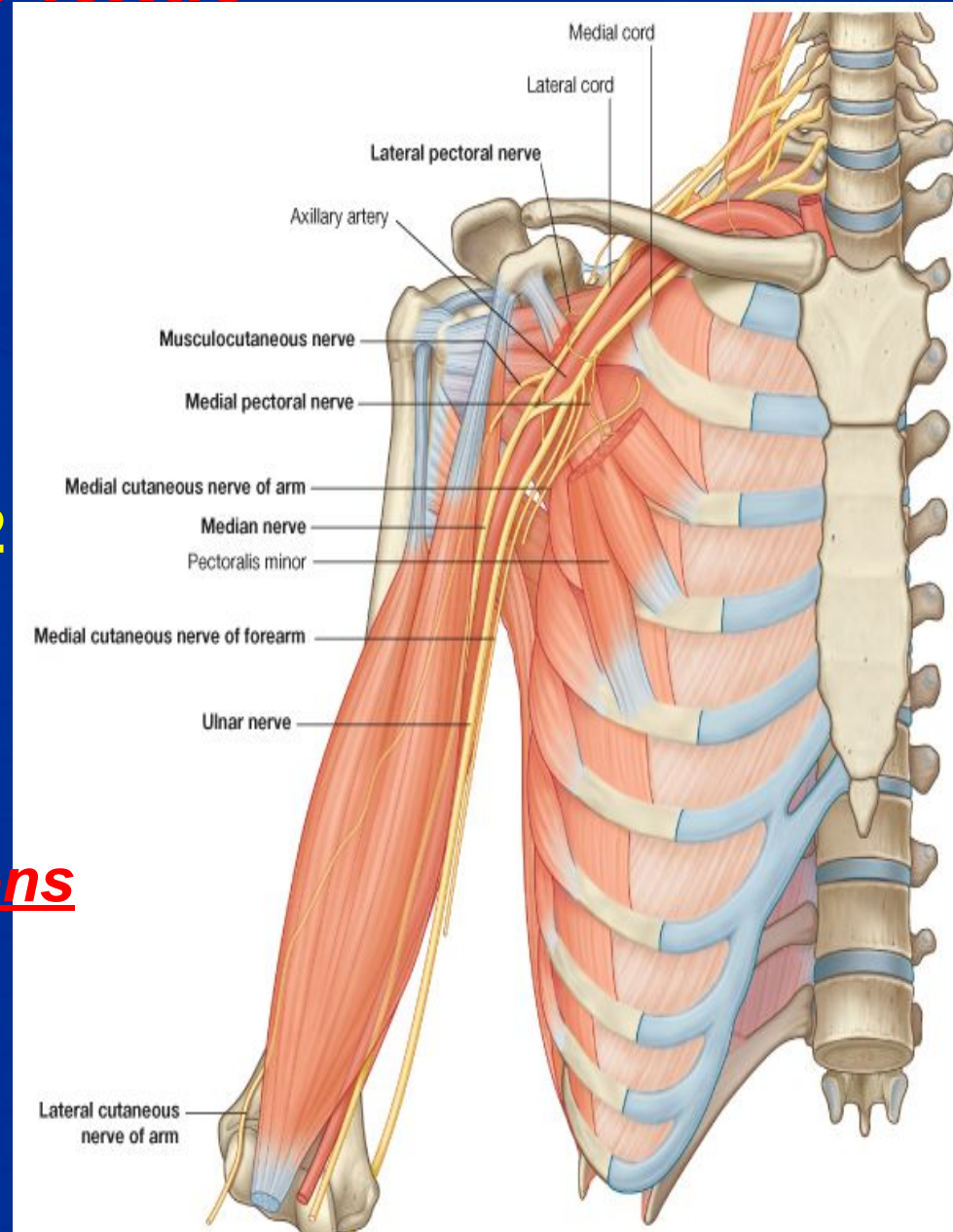
Branches of Brachial Plexus

Branches from the **roots**: 2

Branches from **upper trunk**: 2

Branches from the **cords**

No branches from the divisions



Divisions & Cords

Divisions:

Ant. & Post. from each trunk

Located behind the clavicle

Cords:

lateral: Ant. divisions of upper & middle trunks

medial: ant. division of lower trunk

posterior: by all 3 post. divisions

*the cords are named according to their position around the axillary artery

Branches From The Roots

- **Dorsal Scapular nerve** : from **C5**

Supply the rhomboids & levator scapulae muscles

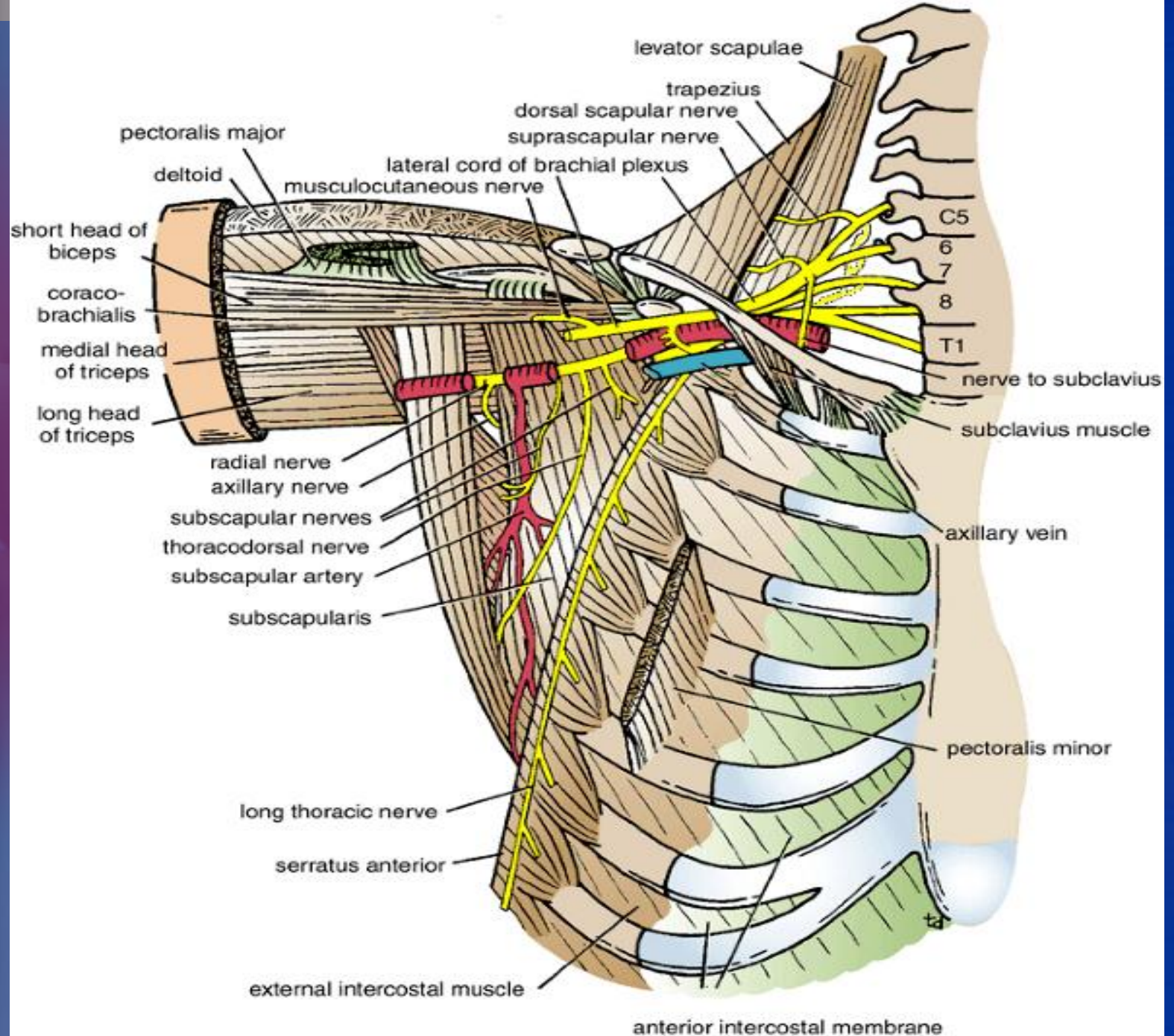
- **Long Thoracic nerve of Bell**:

From **C5, 6, 7**

Descends in the thorax at lat. Surface of serratus anterior m.

Supply the serratus anterior m.





Branches From Trunks

From upper trunk only

1. Nerve to subclavius:

From C5 & C6

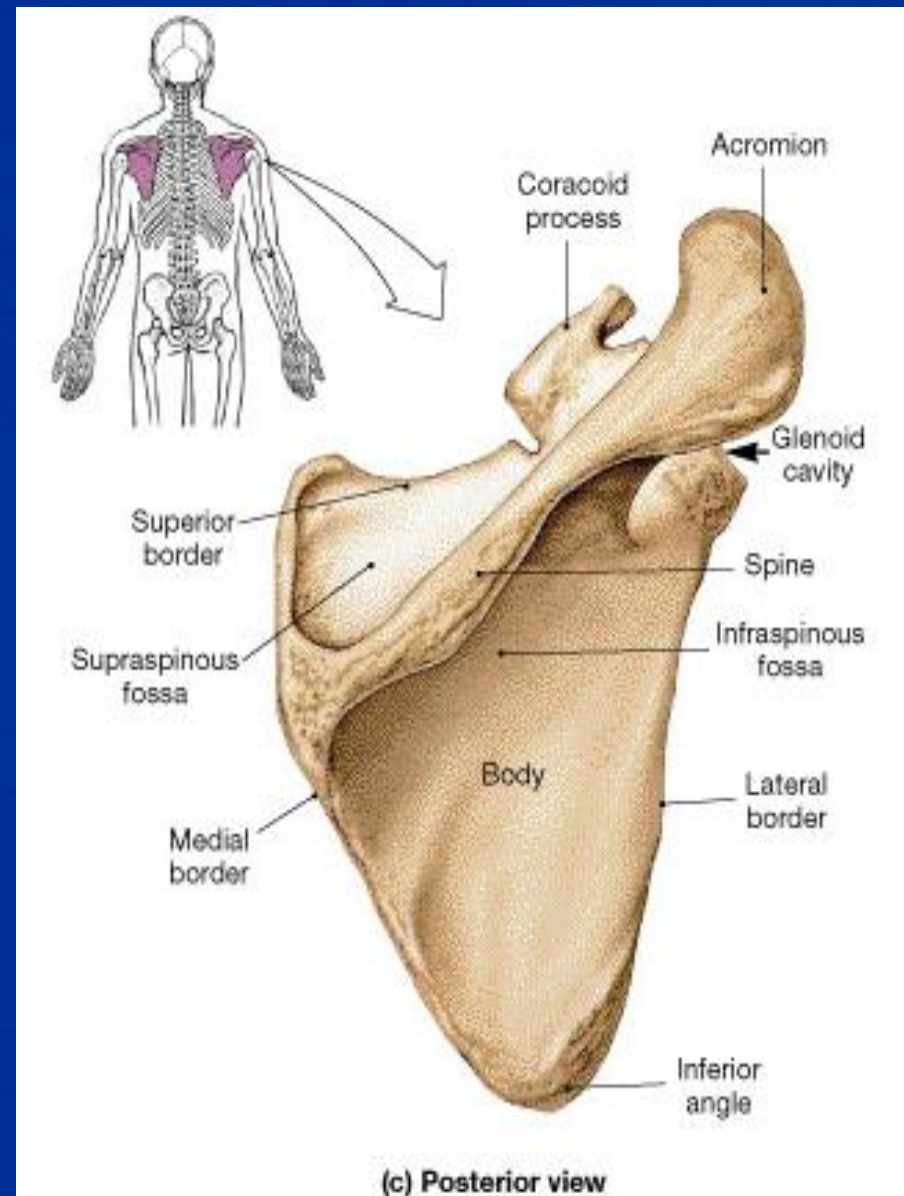
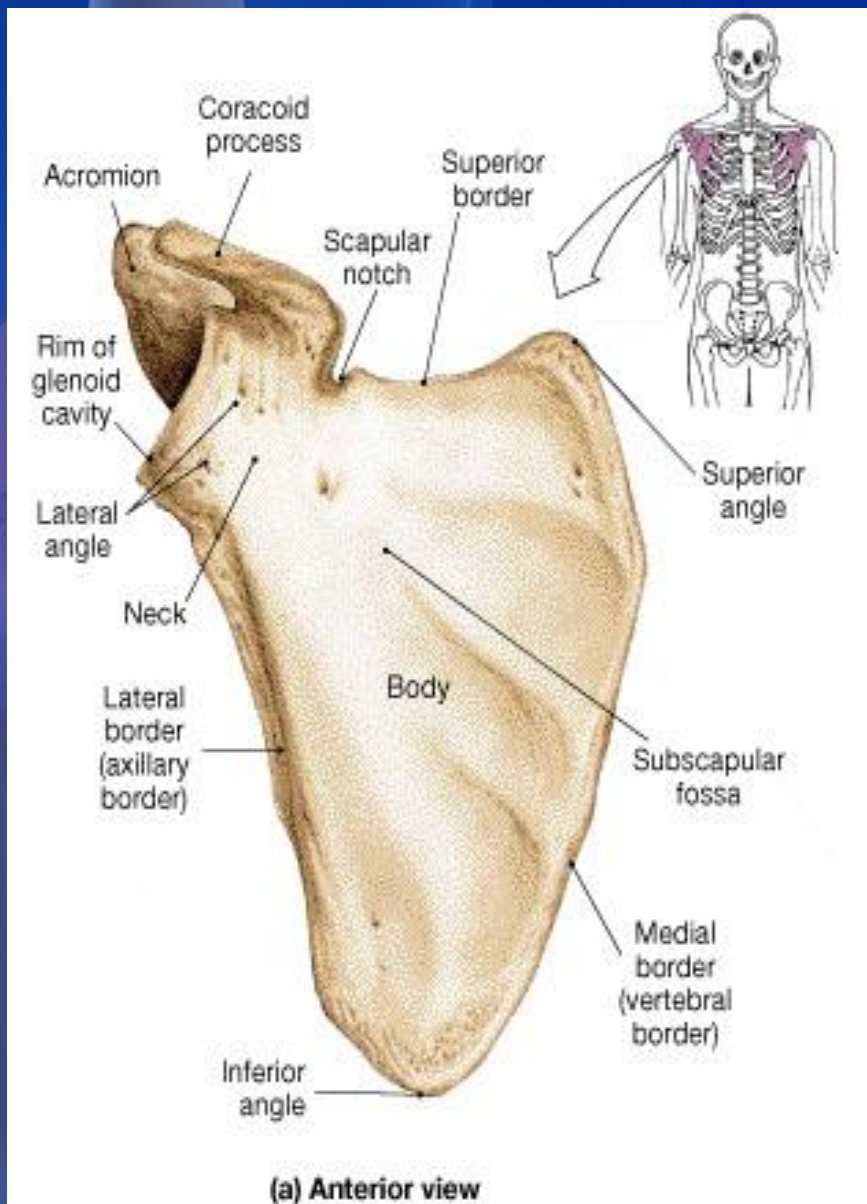
2. Suprascapular nerve:

Pass lat. & then post. through suprascapular notch in the scapula

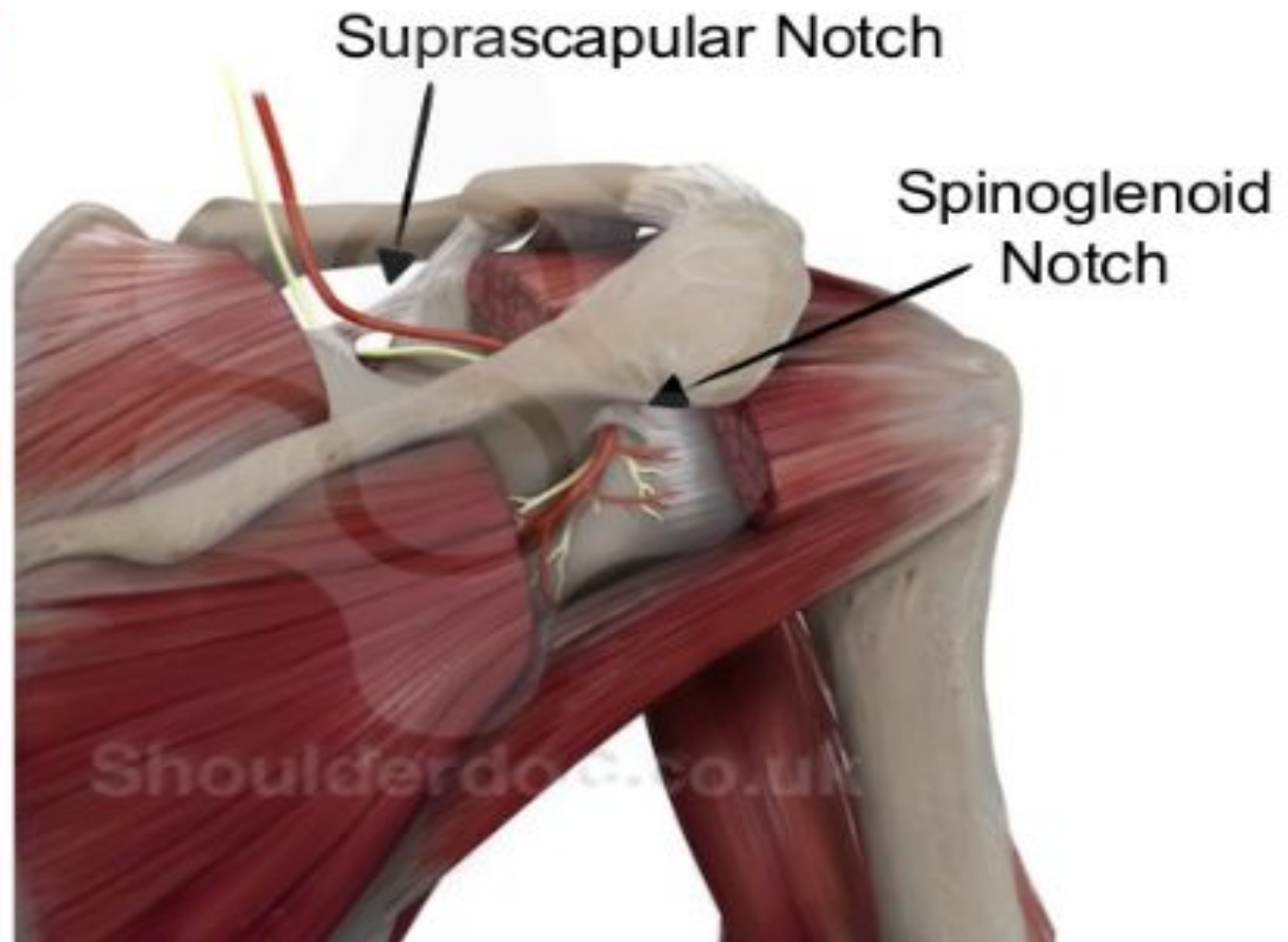
Supply the supraspinatus & infraspinatus m.

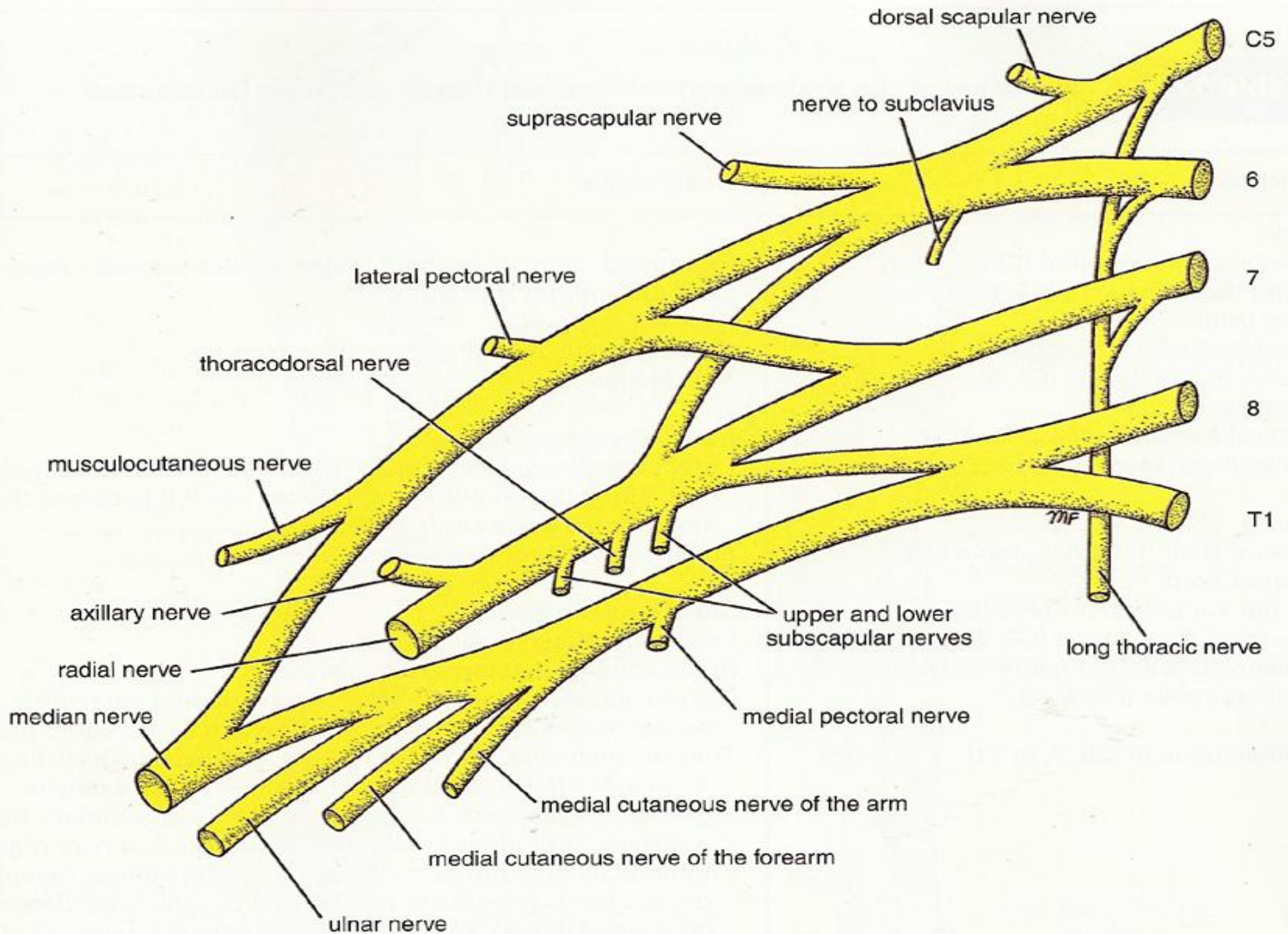
Branches from roots & trunks are considered:

Supraclavicular branches

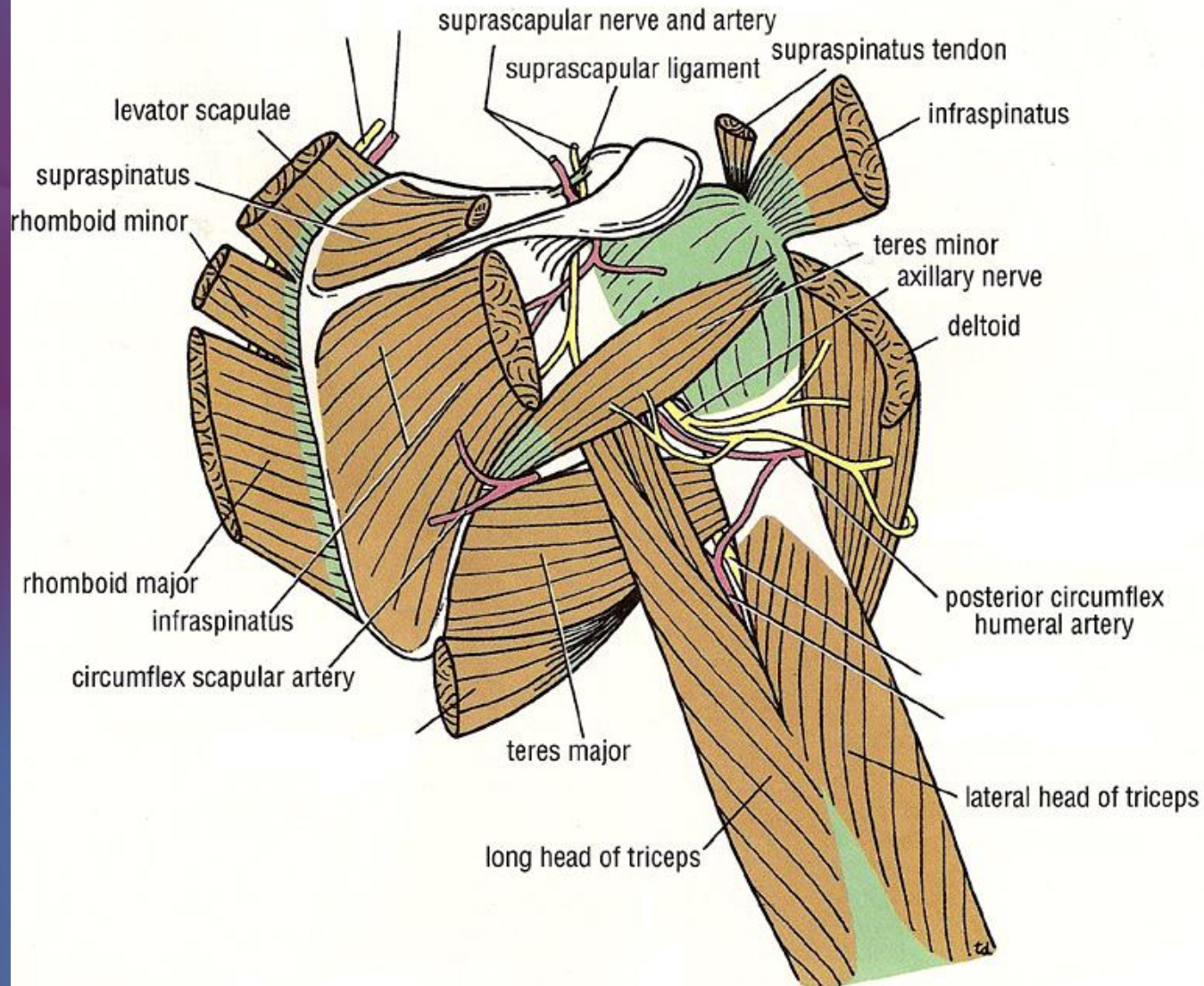


Sites





Suprascapular Nerve



Lateral Cord Branches

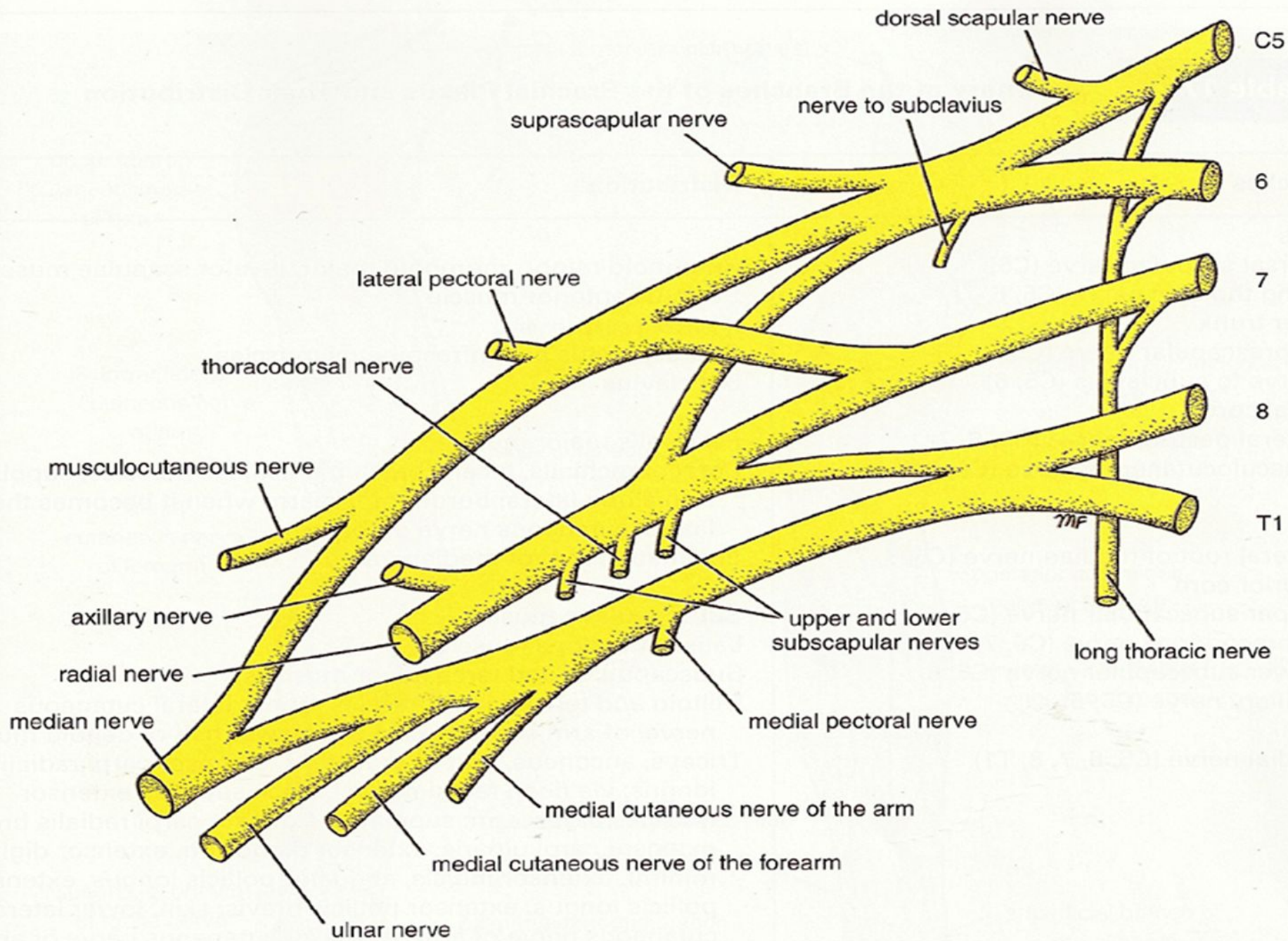
1. Lat. Pectoral nerve:

Supply pect. Major

2. Musculocutaneous nerve:

Muscle + skin

3. Lat. 1/2 of median nerve



Musculocutaneous Nerve

From lateral cord of B.P. (C5, 6, 7)

Pierces coracobrachialis muscle &
Pass in ant. compartment of the arm
(between biceps brachii & brachialis m.)

Branches

Motor: to Ant. arm muscles (3)

Sensory: Elbow joint

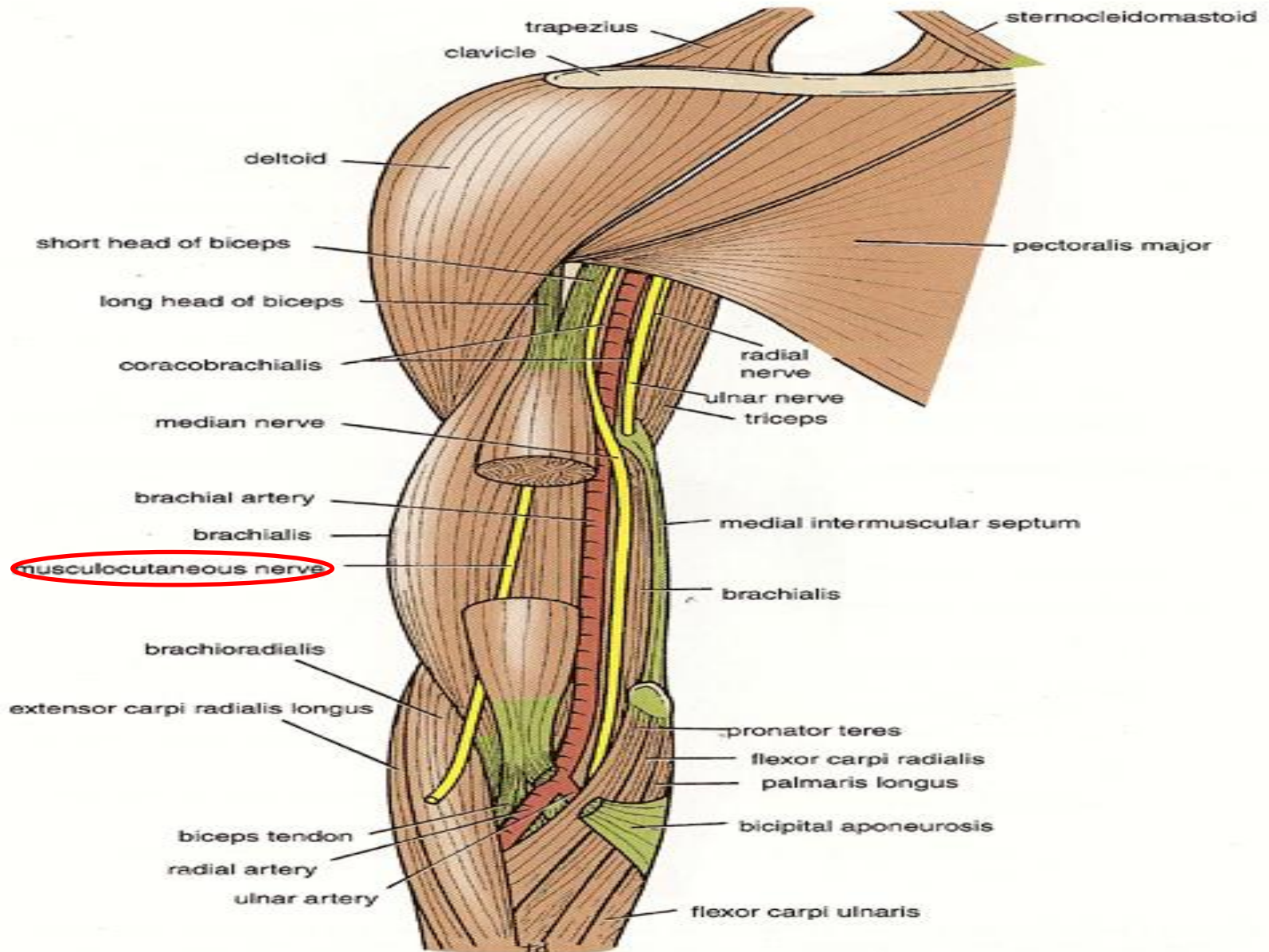
lateral side of forearm and ball of thumb
(lat. Cutaneous nerve of forearm)

Injury of musculocutaneous nerve

How it commonly occurs: An injury to the MCN is relatively uncommon, as it is well protected within the axilla. The most common cause is a stab wound to the axilla region.

- **Motor functions:** The coracobrachialis, biceps brachii and brachialis muscles are paralyzed. **Flexion at the shoulder** is weakened, but can still occur due to the pectoralis major. **Flexion at the elbow** is also affected, but can still be performed because of the brachioradialis muscle. Also, **supination** of the affected limb is greatly weakened, but is produced by the supinator muscle.
- **Sensory functions:** Loss of sensation over the lateral side of the forearm.





Medial Cord Branches

1. Medial pectoral n.

Pass through pec. Minor m.

Innervates: pec. Minor & major

2. Medial cutaneous nerve of the arm

Sensory to skin of the medial side of arm

3. Medial cutaneous nerve of forearm

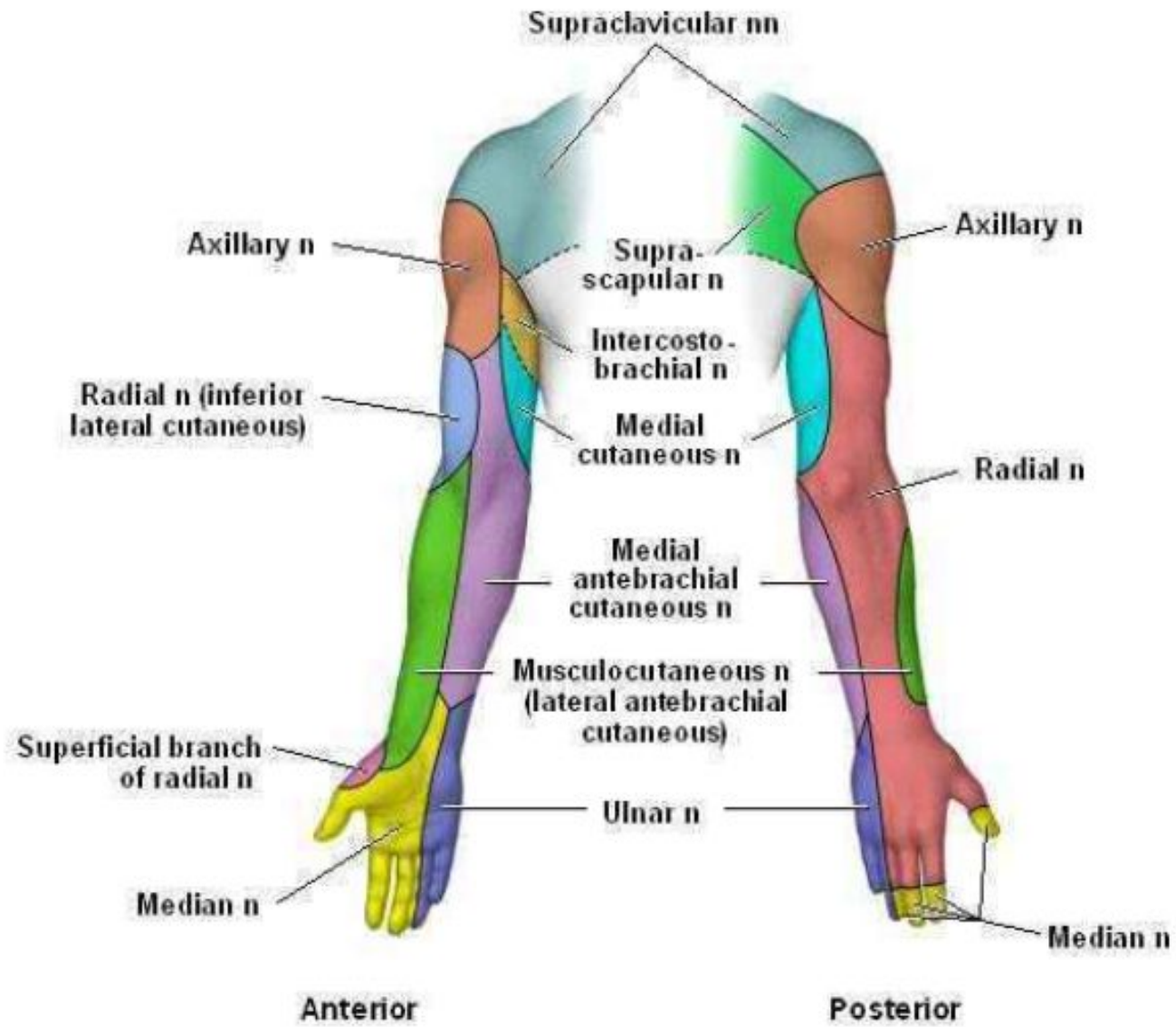
Sensory to the skin of the medial side of forearm

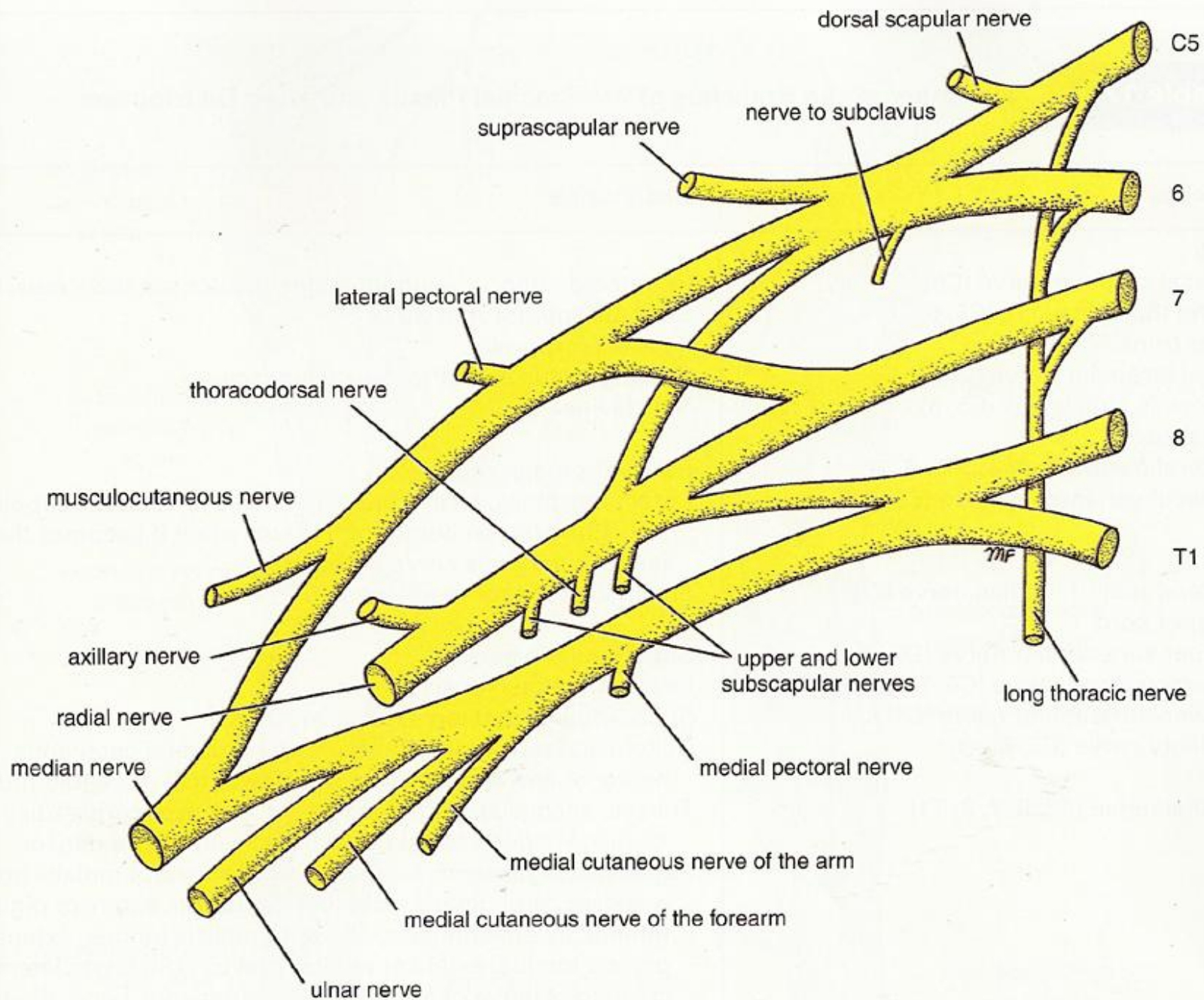
4. Ulnar n.

Terminal branch

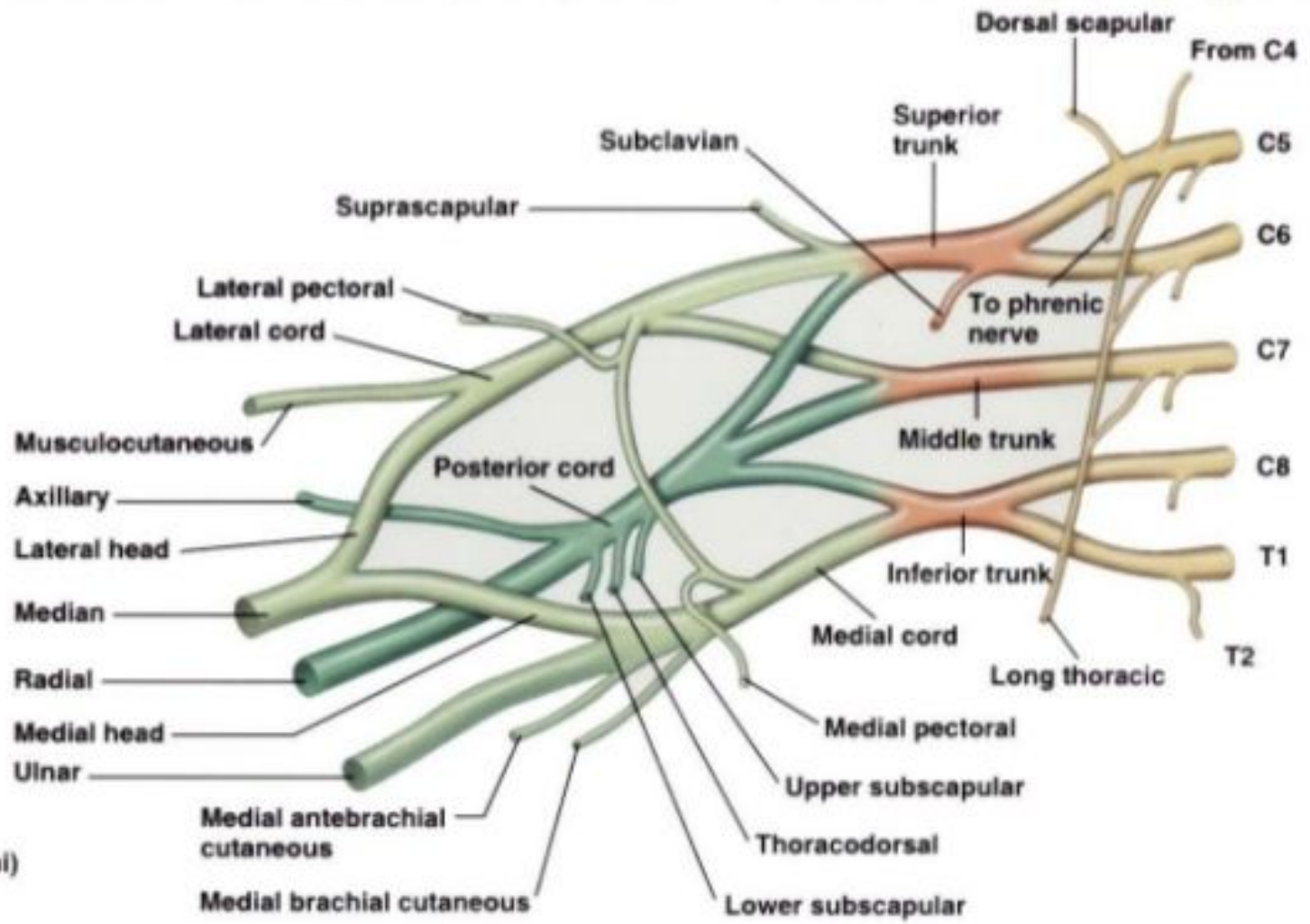
5. Medial ½ of median n.

Terminal branch





Brachial Plexus



(a) Origin of brachial plexus

- Roots (anterior rami)
- Trunks
- Anterior divisions
- Posterior divisions

Ulnar Nerve

From medial cord of B.P. (C8 & T1)

End on FR by dividing into superficial and deep branches

In the arm:

No branches

Medial to axillary & brachial a.

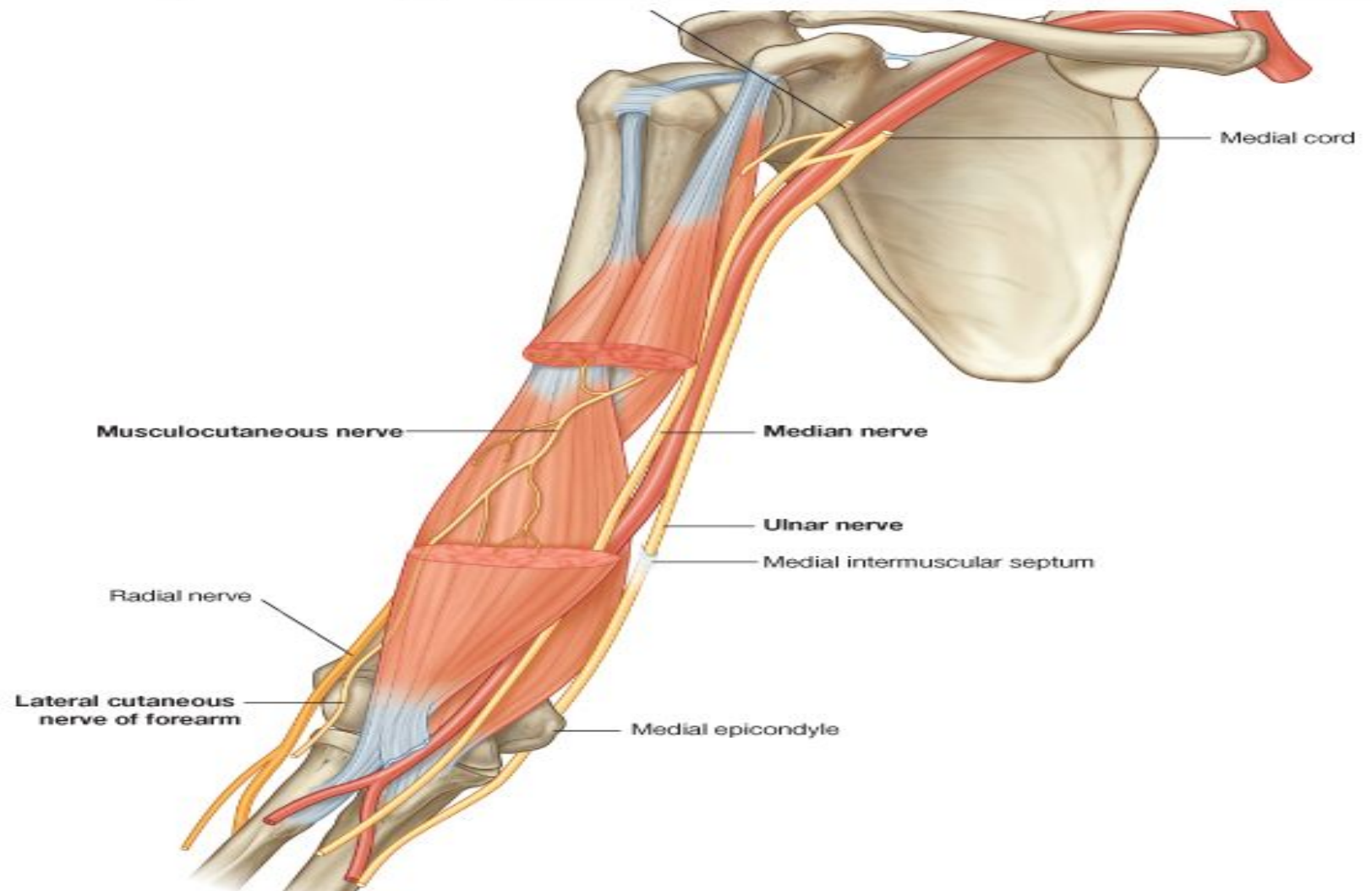
At elbow:

Pass post. to medial epicondyle of the humerus (subcutaneous)

Innervates medial muscles in the forearm & hand

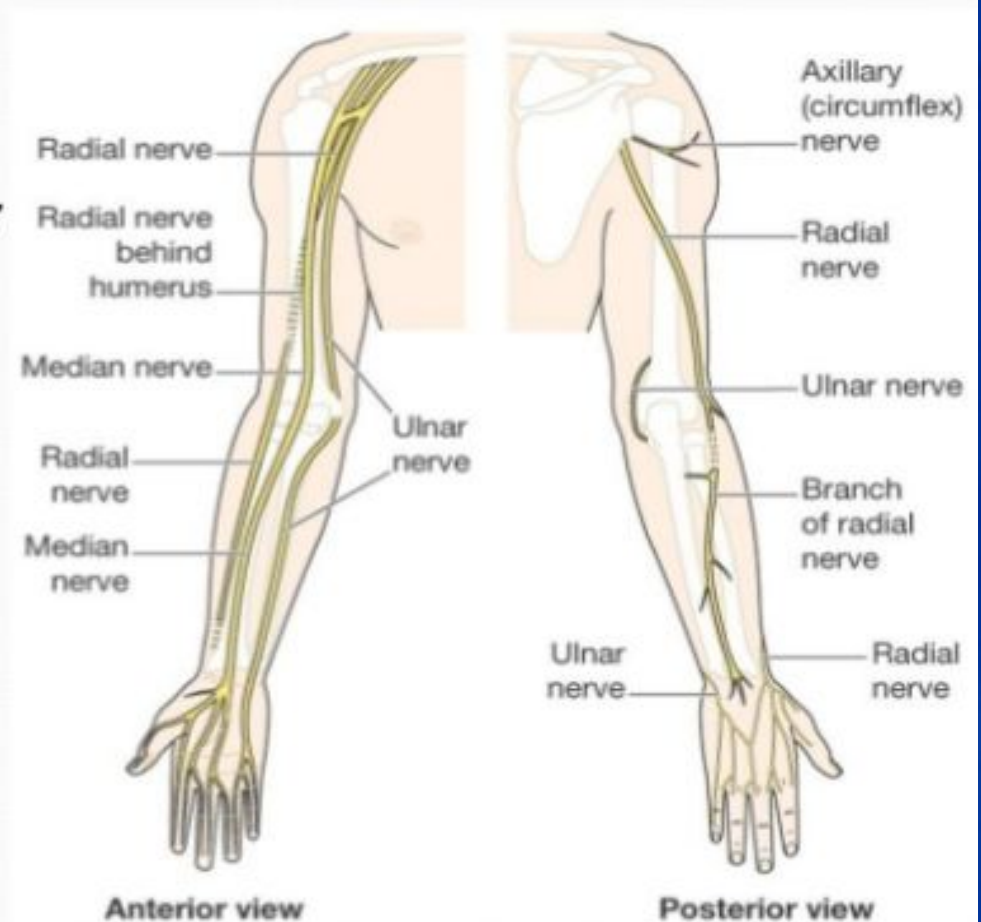


Ulnar nerve



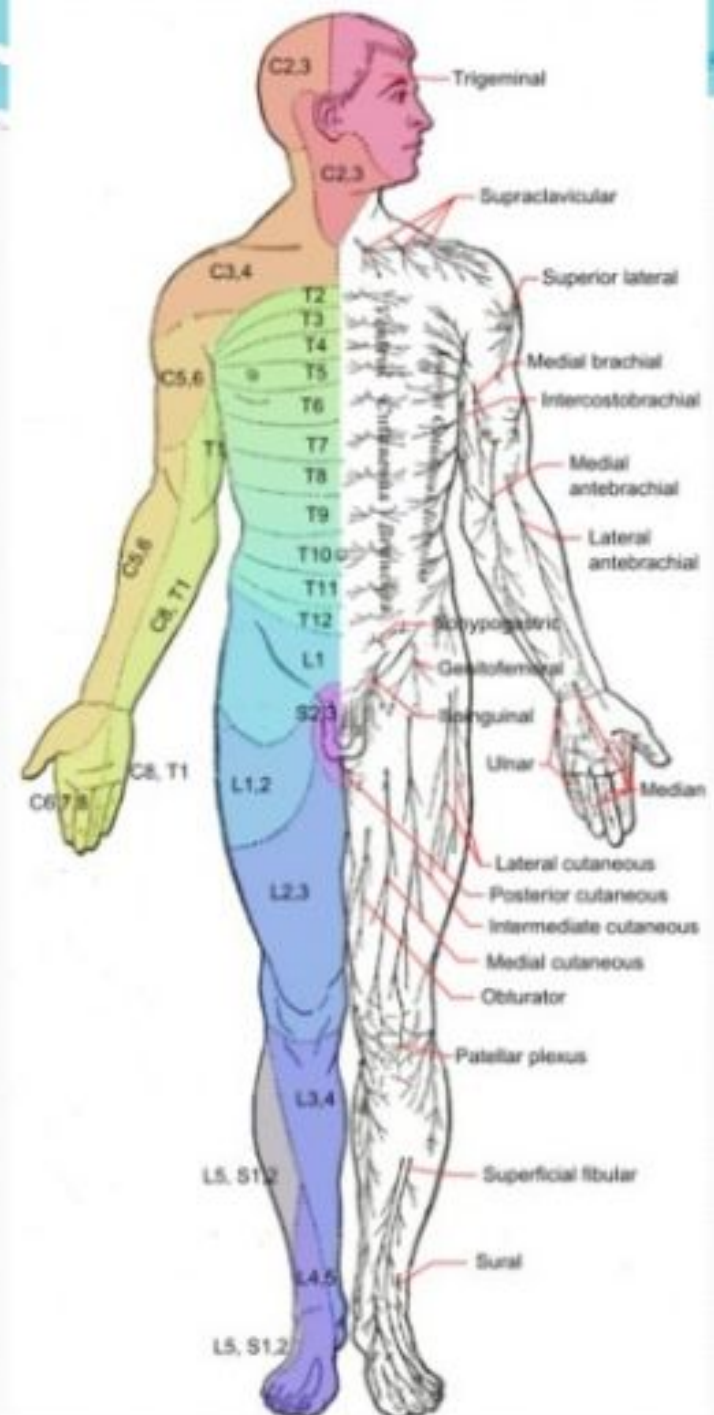
Ulnar Nerve

- Arise from medial cord of brachial plexus
- Root C8 and T1 (mostly C7)
- Descend on the posteromedial of the humerus.
- Then it goes posterior to the medial epicondyle.

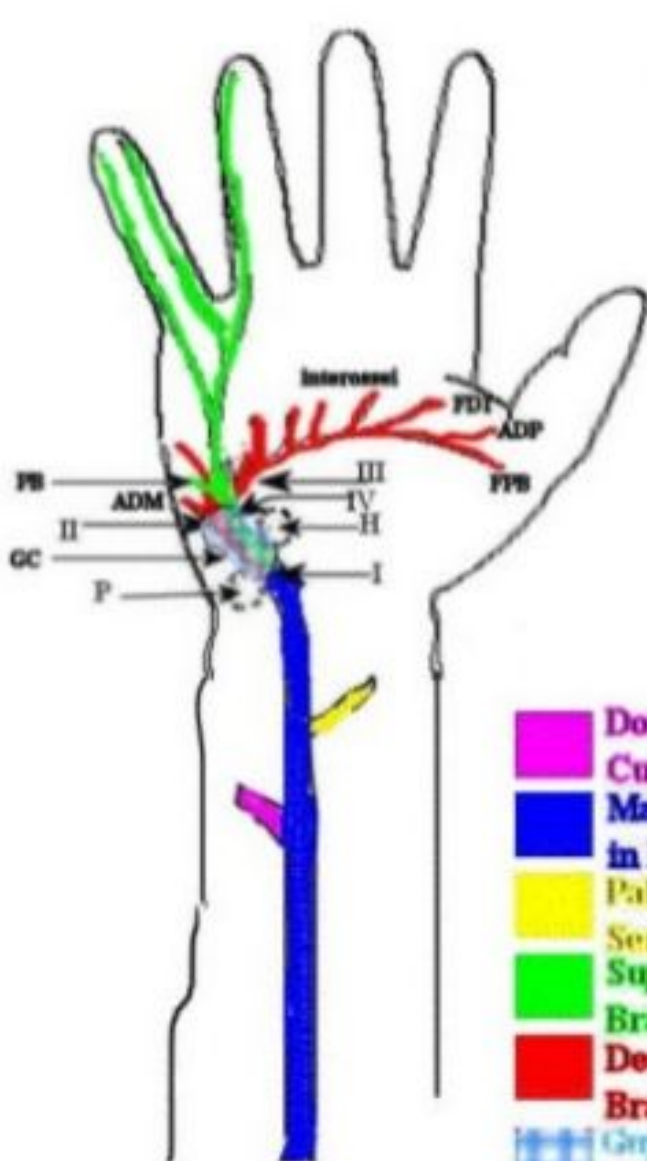


Dermatomes

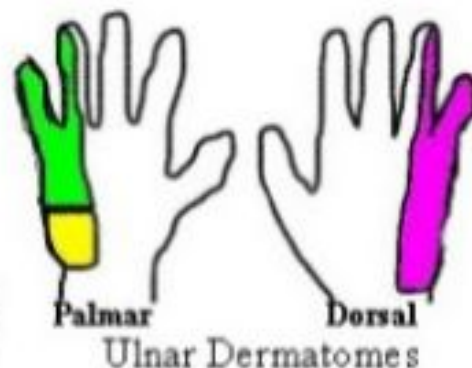
- Area of the skin that supplied by single spinal nerve.
- the area of the skin that provides sensory input to the dorsal roots of a pair of spinal nerves
- There are 8 cervical, 12 thoracic, 5 lumbar and 5 sacral spinal nerves that relays cutaneous sensation (pain, thermal, itch, touch etc) from particular region of the body to the brain
- Dermatomes are useful in neurology for finding the site of damage to the spine



Ulnar Nerve: Forearm, Guyon's Canal, and Hand



- Dorsal Ulnar Cutaneous nerve
- Main Trunk of Ulnar in Distal Forearm
- Palmar Cutaneous Sensory Nerve
- Superficial Terminal Branch of Ulnar
- Deep Terminal Branch of Ulnar
- Guyon's Canal



Common Ulnar Impingement Sites: Guyon's Canal Region

- I. At the very entrance of Guyon's canal or just within it, potential impacting all terminal branches (red and green).
- II. Right after the nerve comes out of the canal, impacting the deep terminal motor branch (red). No sensory loss.
- III. The deep motor branch after the branch to the hypothenar muscles has taken off. Motor loss except in hypothenar area. No sensory loss.
- IV. The superficial terminal branch (green). All sensory except for a small branch (PB) to the palmaris brevis muscle. Sensory loss on the fifth and the ulnar half of the 4th digit.

Abbreviations

M - Muscle

PB-Branch to Palmaris Brevis M.

ADM-Adductor Digiti Minimi M., also represents other hypothenar muscle including flexor and Opponens digiti minimi

FDI-First Dorsal Interossei M.

ADP-Adductor Pollicis M.

FPB-Flexor Pollicis Brevis M.

GC-Guyon's Canal; P Pisiform bone; H hamate bone

Interossei-Interosseous muscle of the hand. Other ulnar Intrinsic hand muscles are also similarly innervated

Claw Hand Deformities



Claw Hand



Median Nerve

From medial & lateral cords of
B.P., unite in front third part of
axillary artery

(C5, 6, 7, 8 & T1)

Within Axilla:

Lat. To axillary a.

In the arm:

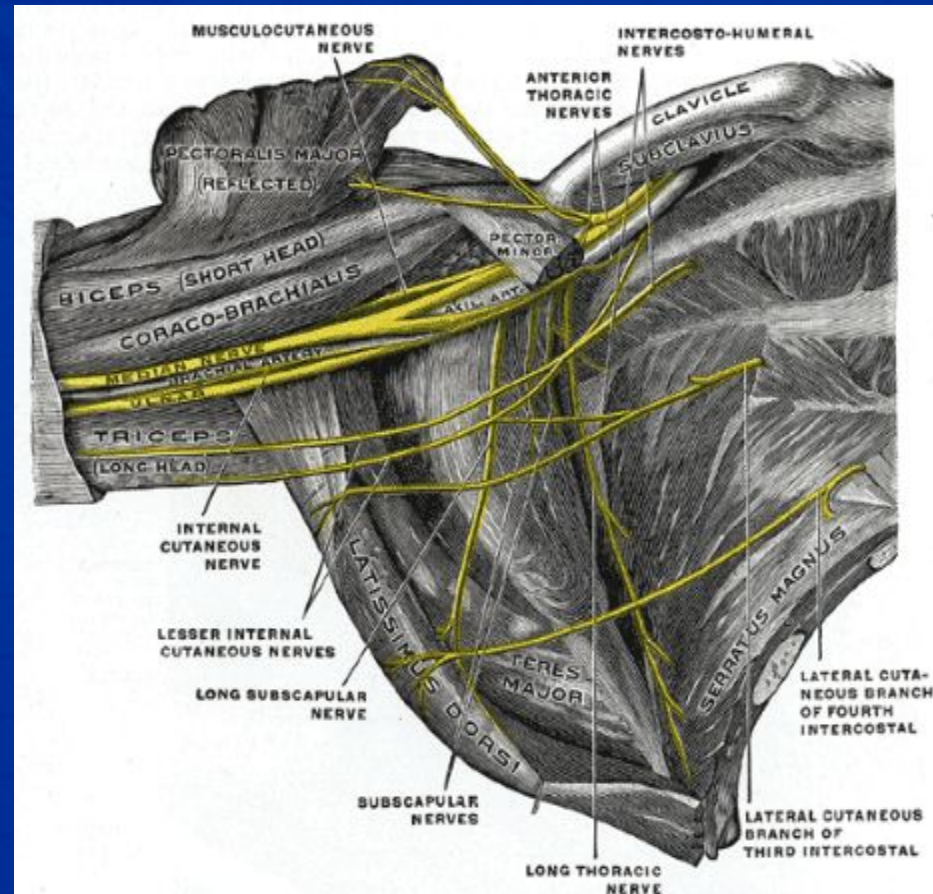
Upper ½: **lat.** To brachial a.

Lower ½: crosses in front then
medial to brachial a.

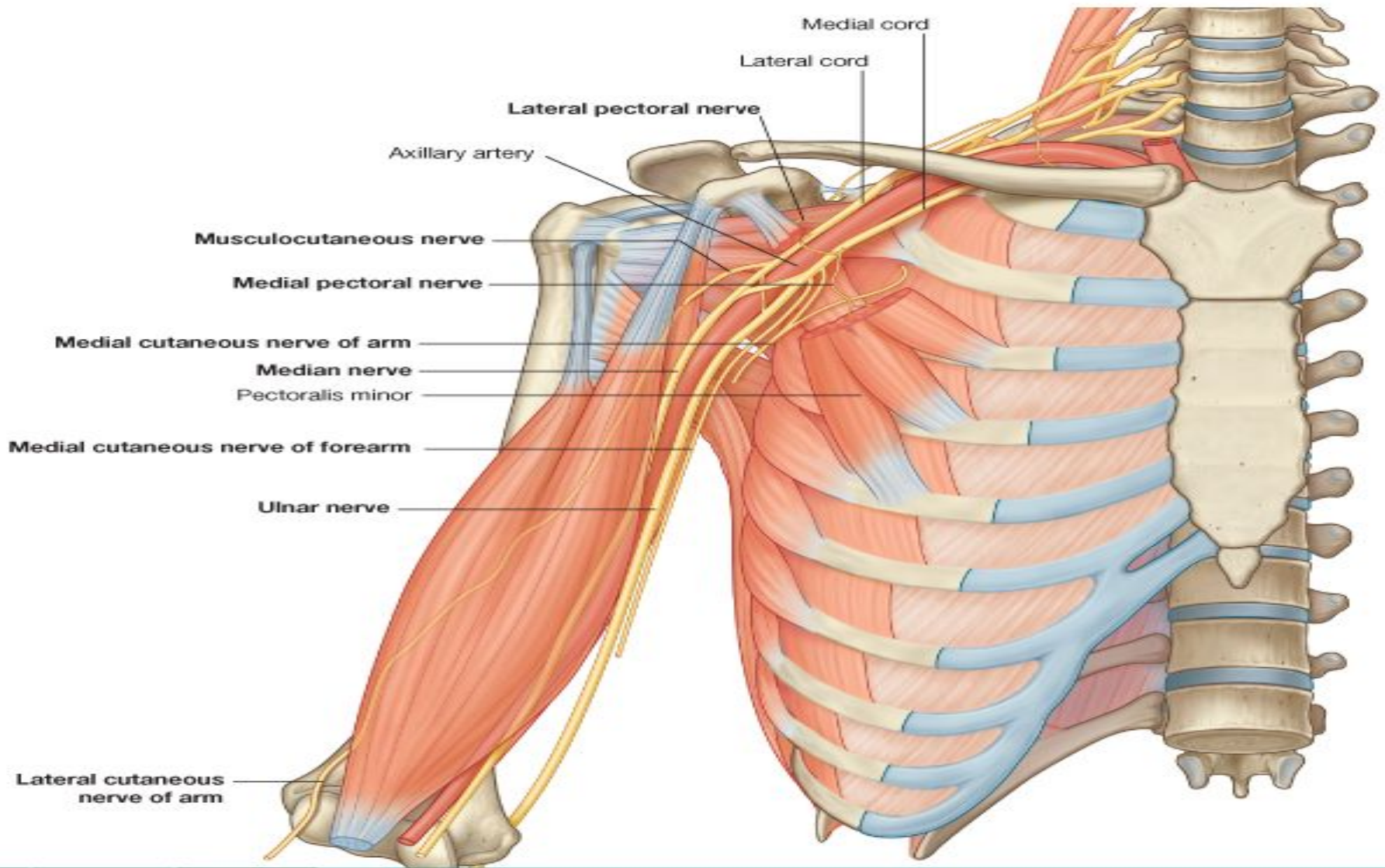
Enter fore arm between two heads
of pronator teres muscle

No branches in the arm

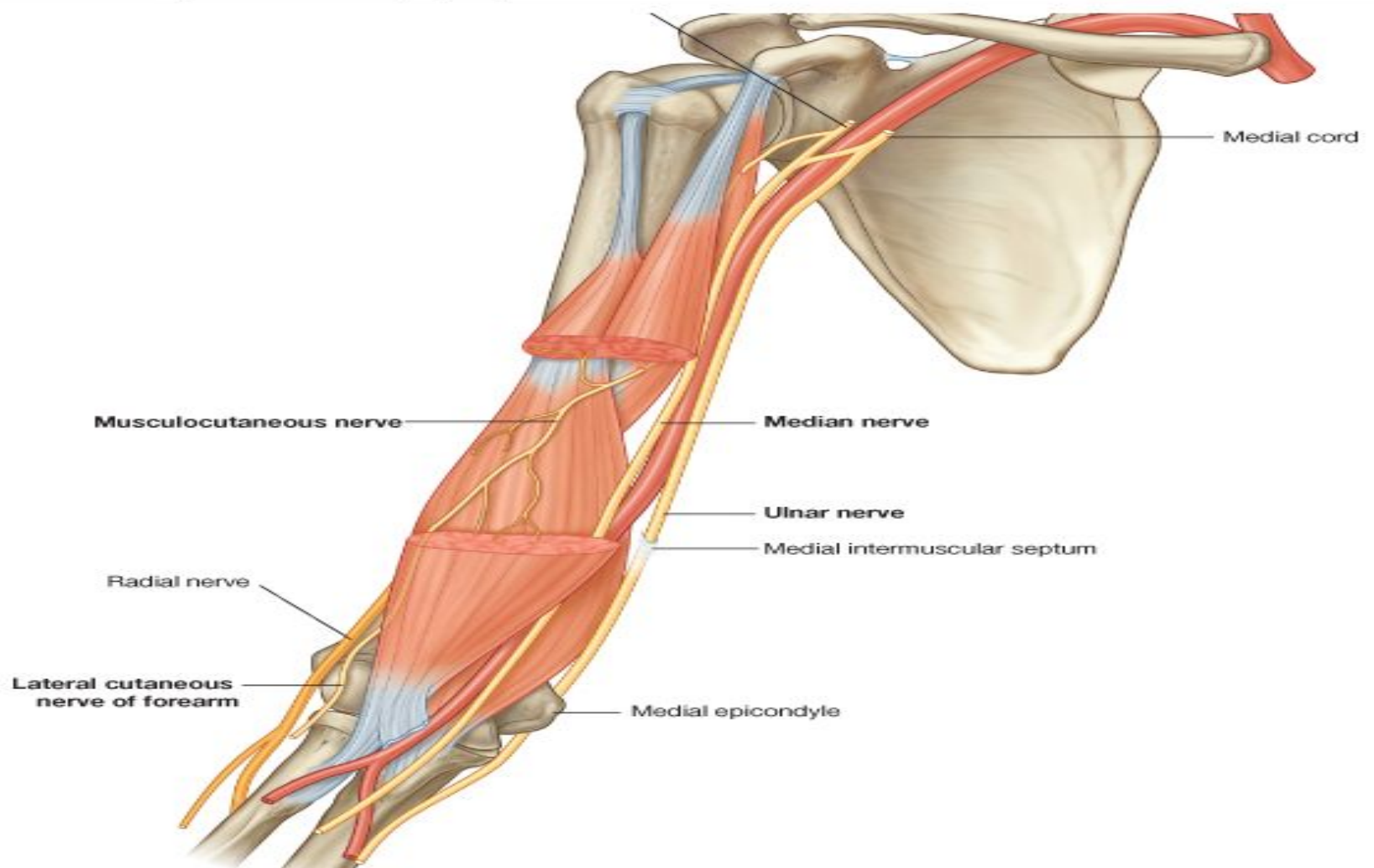
Innervates most of flexor (ant.)
muscles in forearm & hand

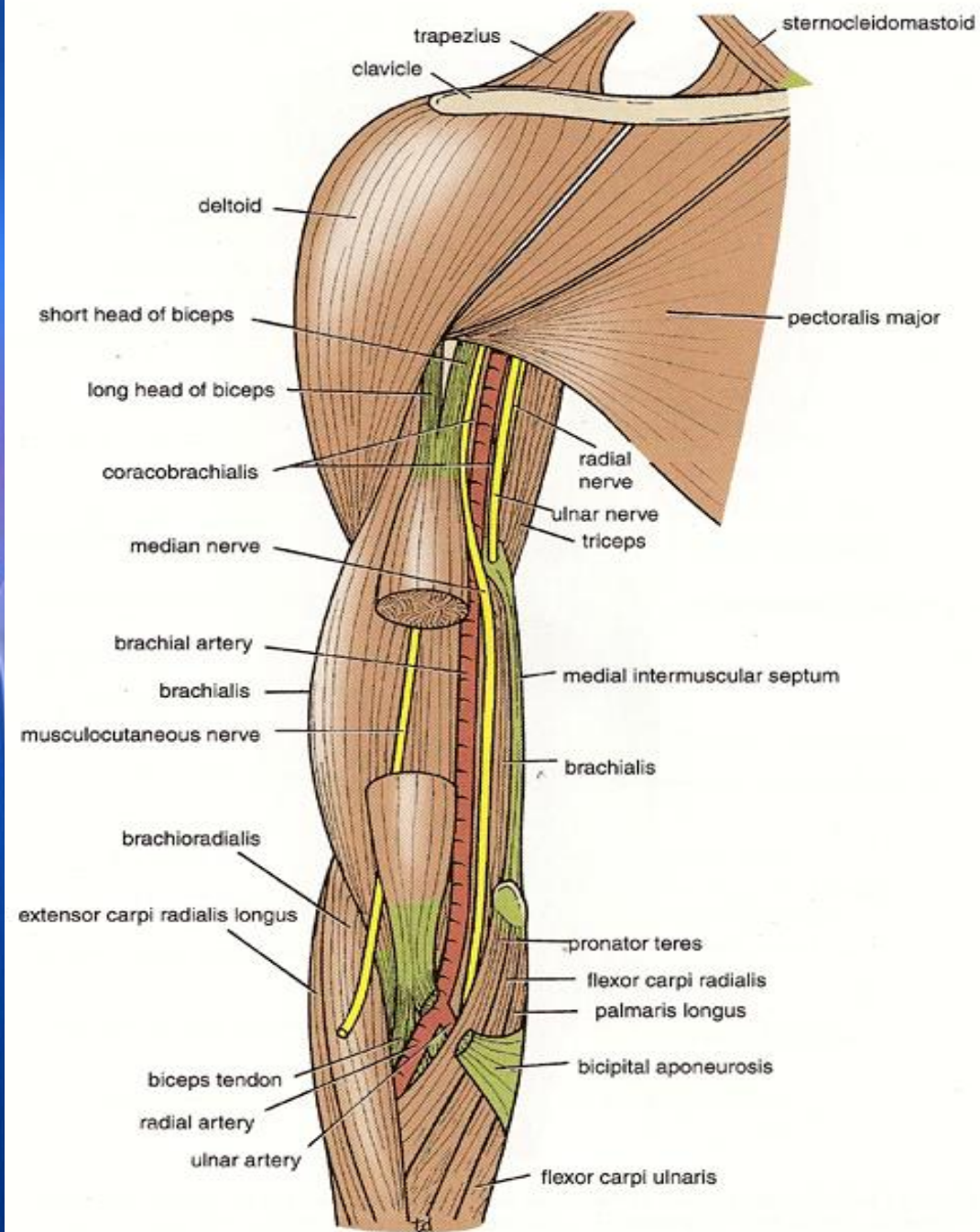


Median nerve



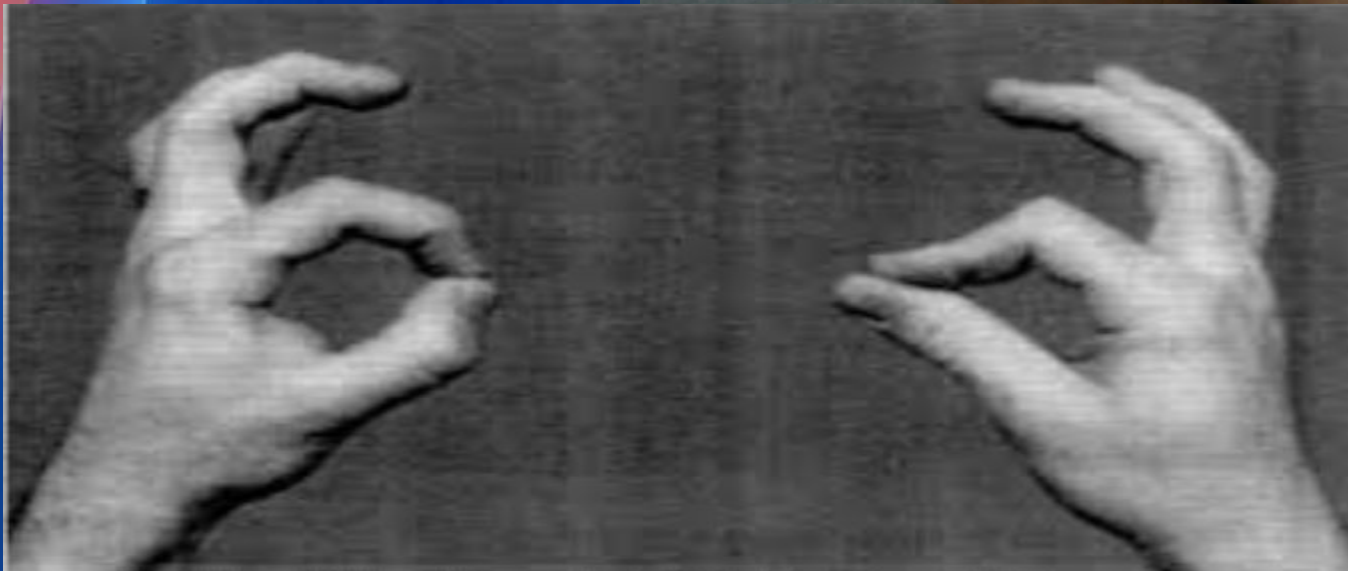
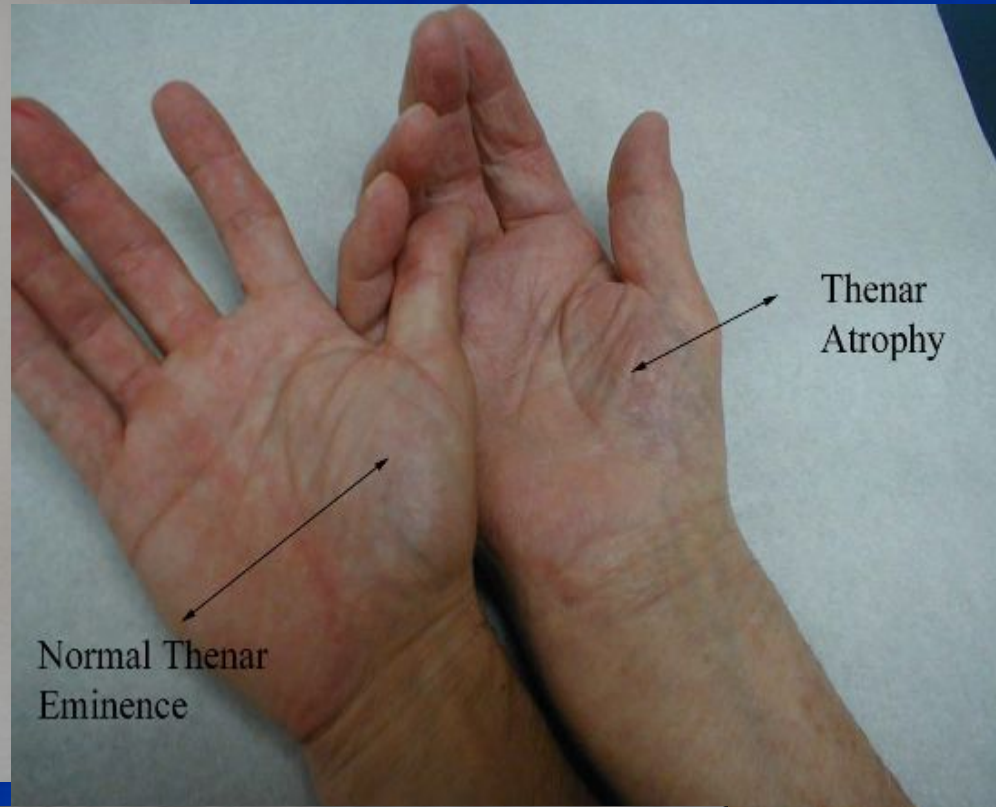
Median nerve





Median nerve dermatomes





The Median Nerve

- Muscles innervated

- Flexor carpi radialis, palmaris longus, pronator quadratus, pronator teres, digital flexors

- Motor functions

- Thumb flexion and opposition, flexion of digits 2 & 3, wrist flexion and abduction, forearm pronation

- Sensory

- Skin over anterolateral surface of hand

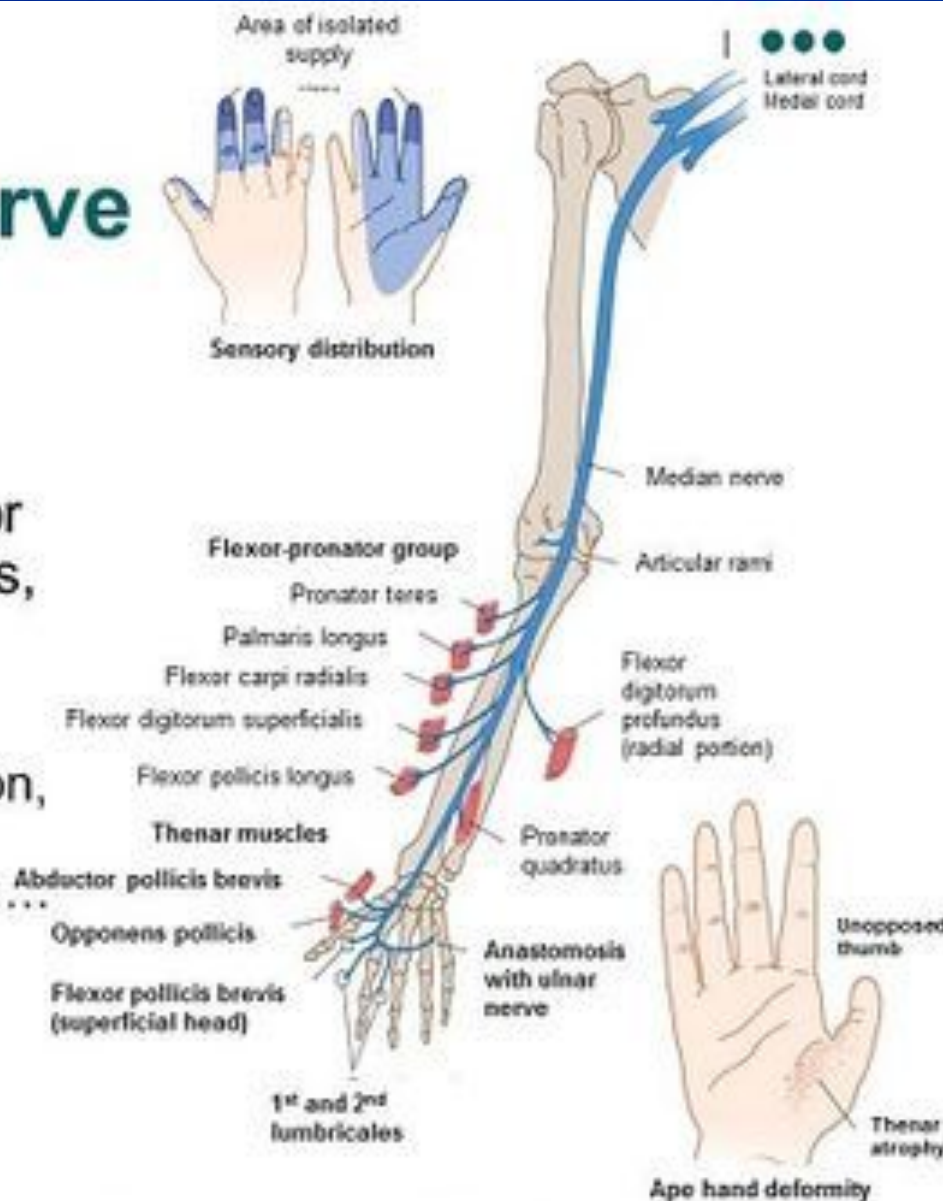


Figure 23-8 . The median nerve (C6-S; T1). In: Waxman SG. *Clinical Neuroanatomy*, 26th ed. <http://www.accessphysiotherapy.com>. Accessed May 10, 2011.

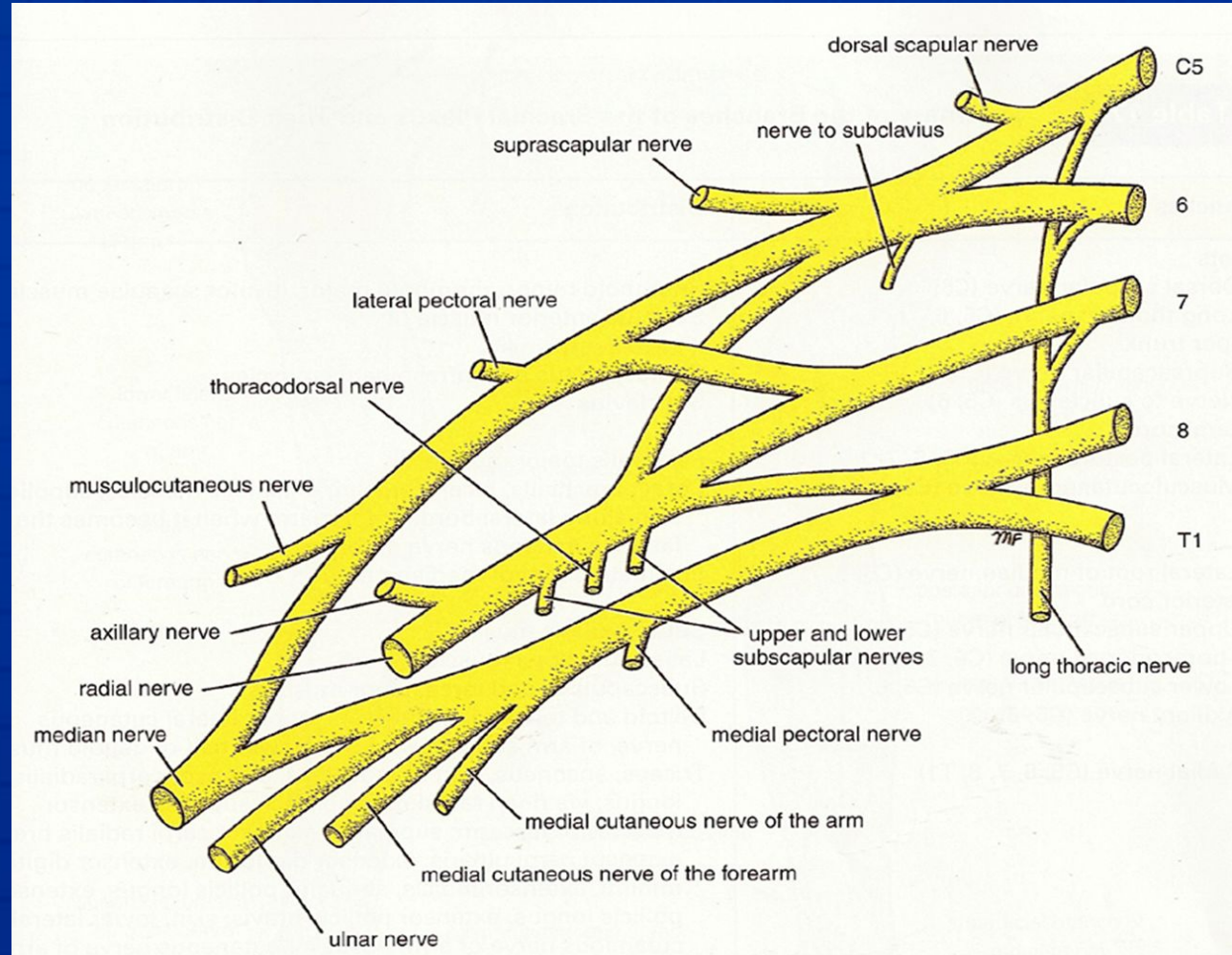
'M' Shape Terminal Branches

Ant. terminal branches form the shape of letter "M":

Musculocutaneous n.:
lateral border

Median n.:
2 middle lines

Ulnar n.:
medial border



Posterior Cord Branches

1. Upper subscapular n.

supply subscapularis m.

2. Lower subscapular n.

3. Thoracodorsal n C6-C7-C8

Between upper & lower subscapular n.

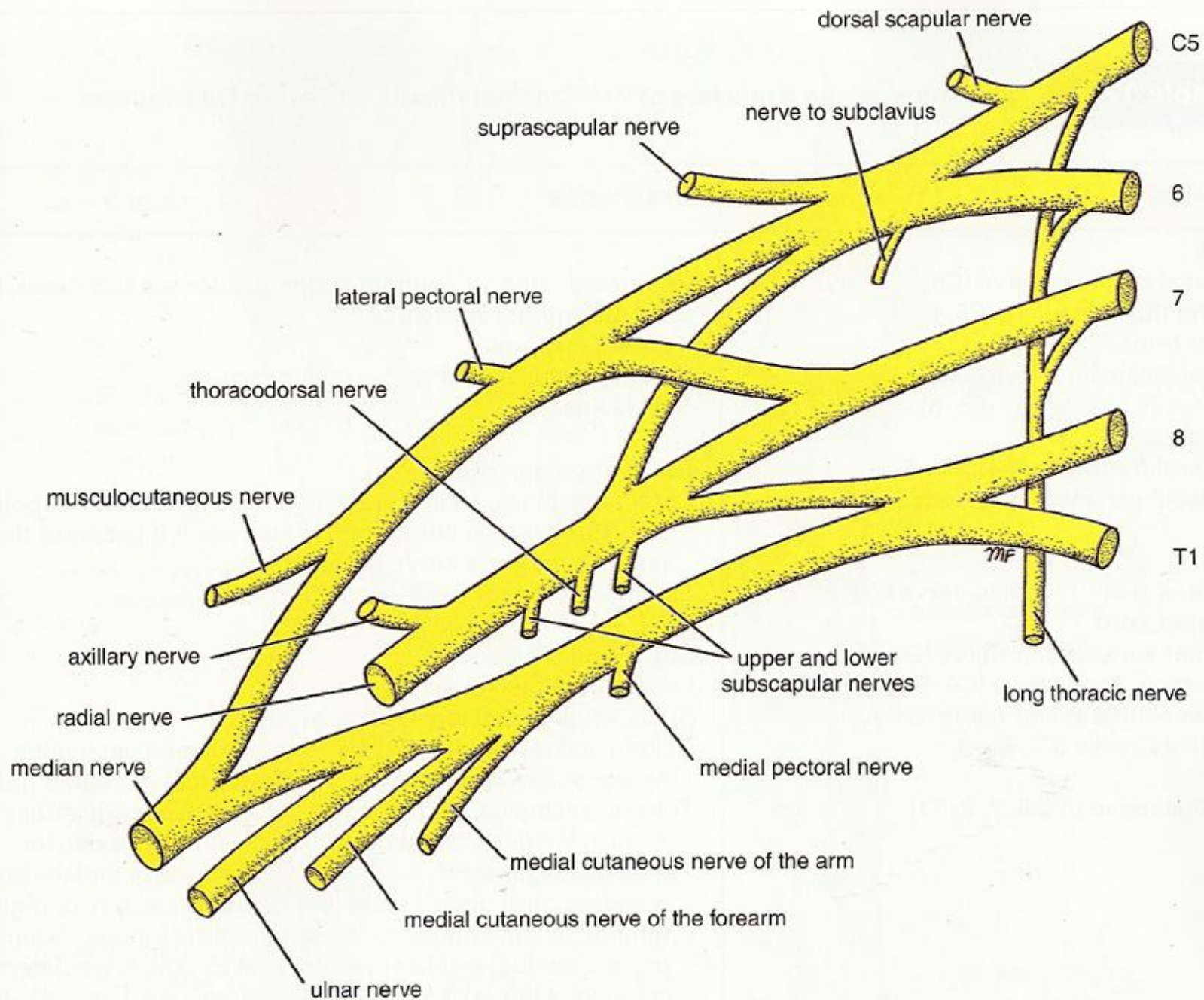
Supply the latissimus dorsi m.

4. Axillary n.

Terminal branch, supply deltoid & teres minor m.

5. Radial n.

Terminal branch, **largest** branch of B. P.



Axillary Nerve

From post. cord of B. P.
(C5, 6, 7)

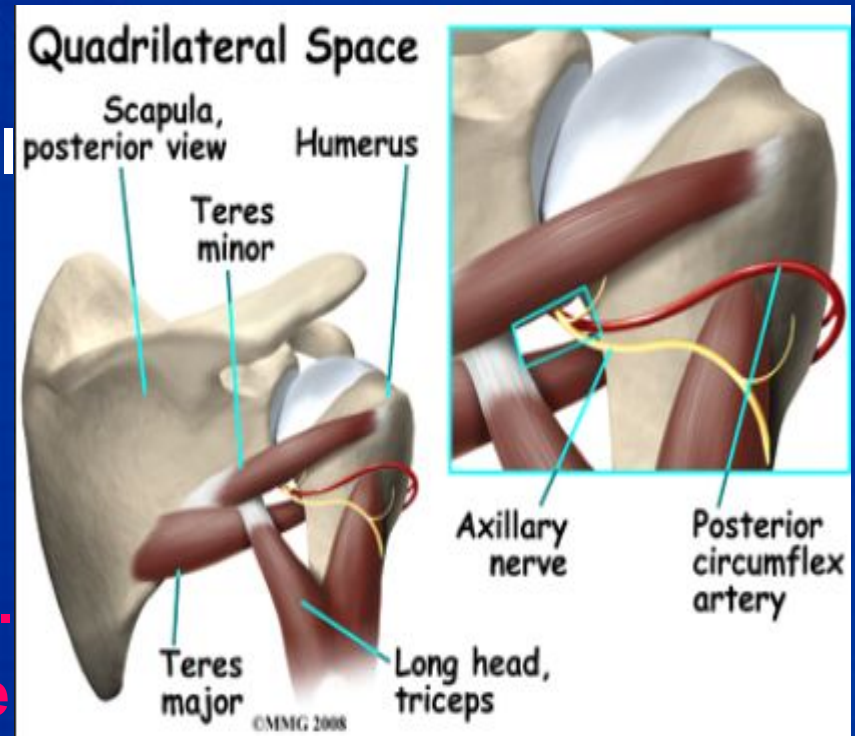
Pass posteriorly around surgical neck of humerus.

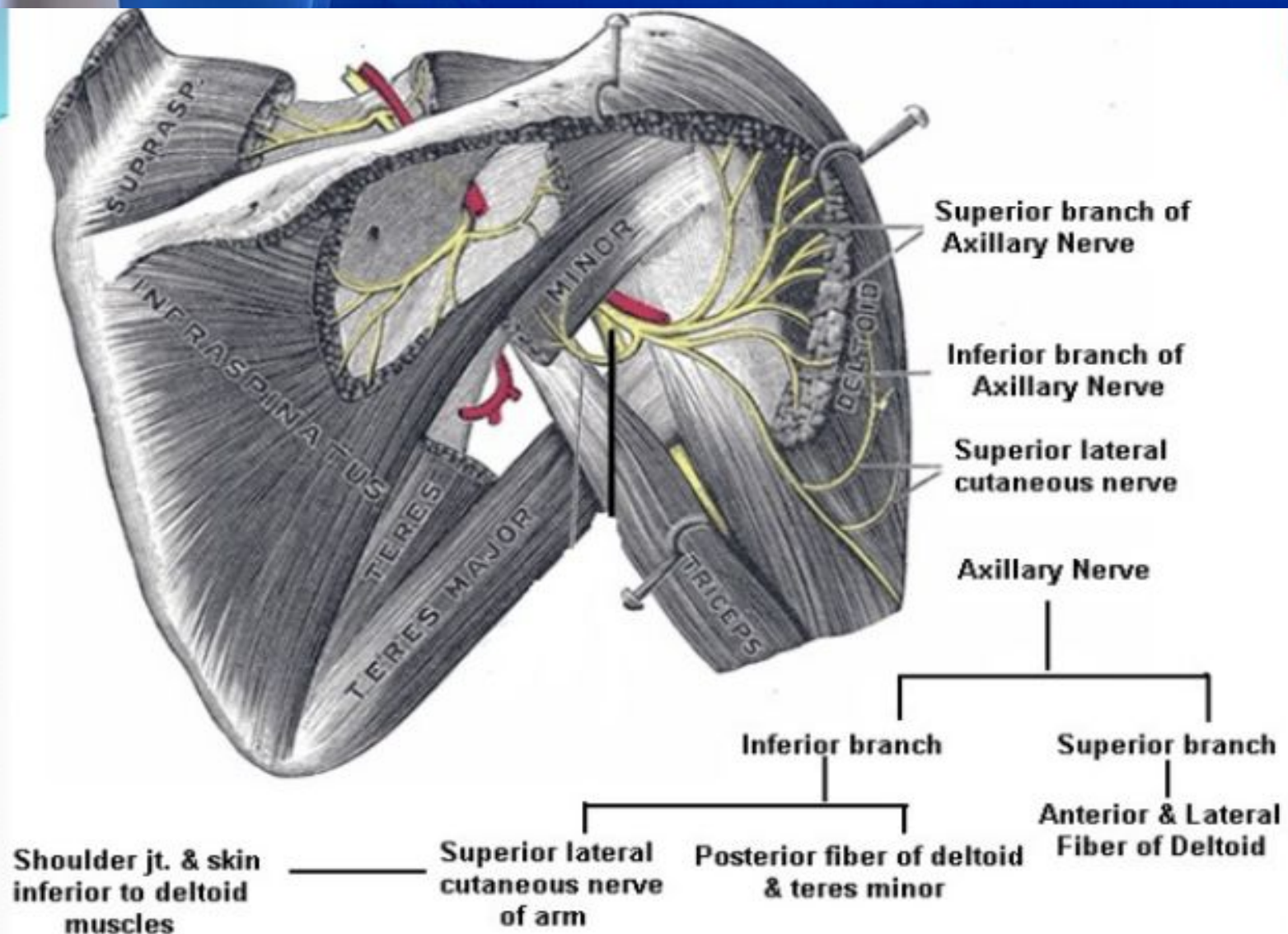
Then through the quadrangular space with PCHV

Innervations:

Motor: Deltoid & teres minor m.
And long head of triceps muscle

Sensory: upper lateral cutaneous
n. of the arm





Posterior View of the Shoulder

- 
- **Clinical significance of axillary nerve injury**

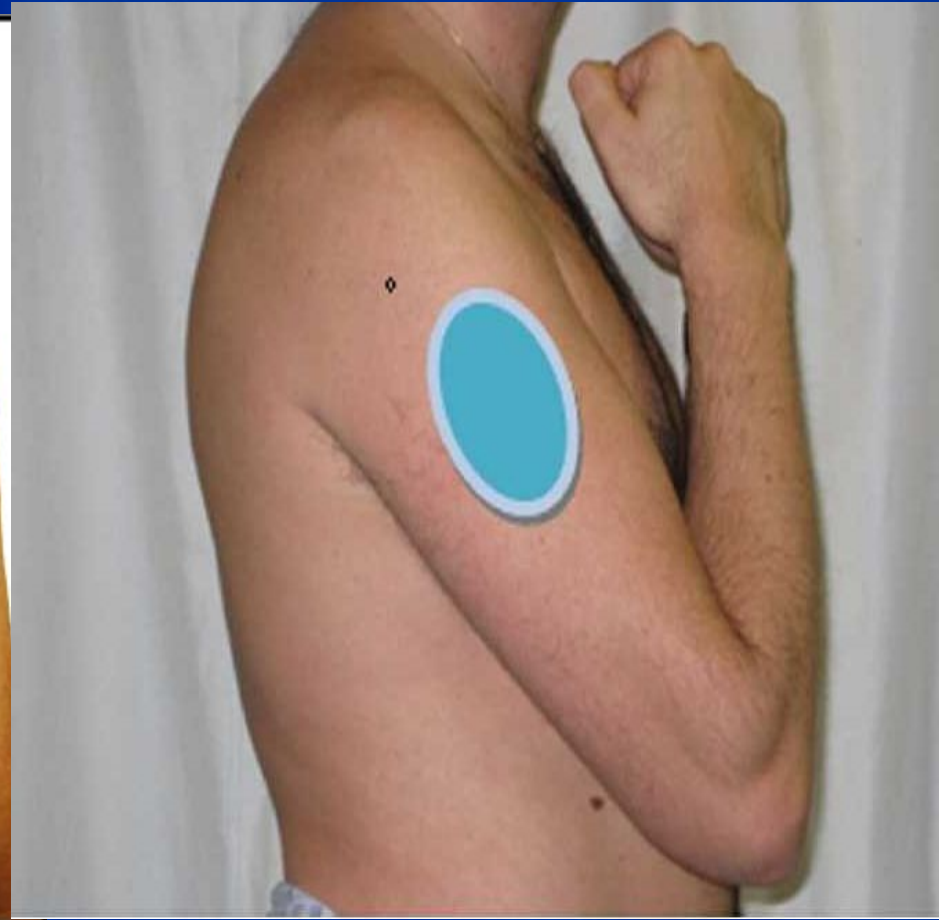
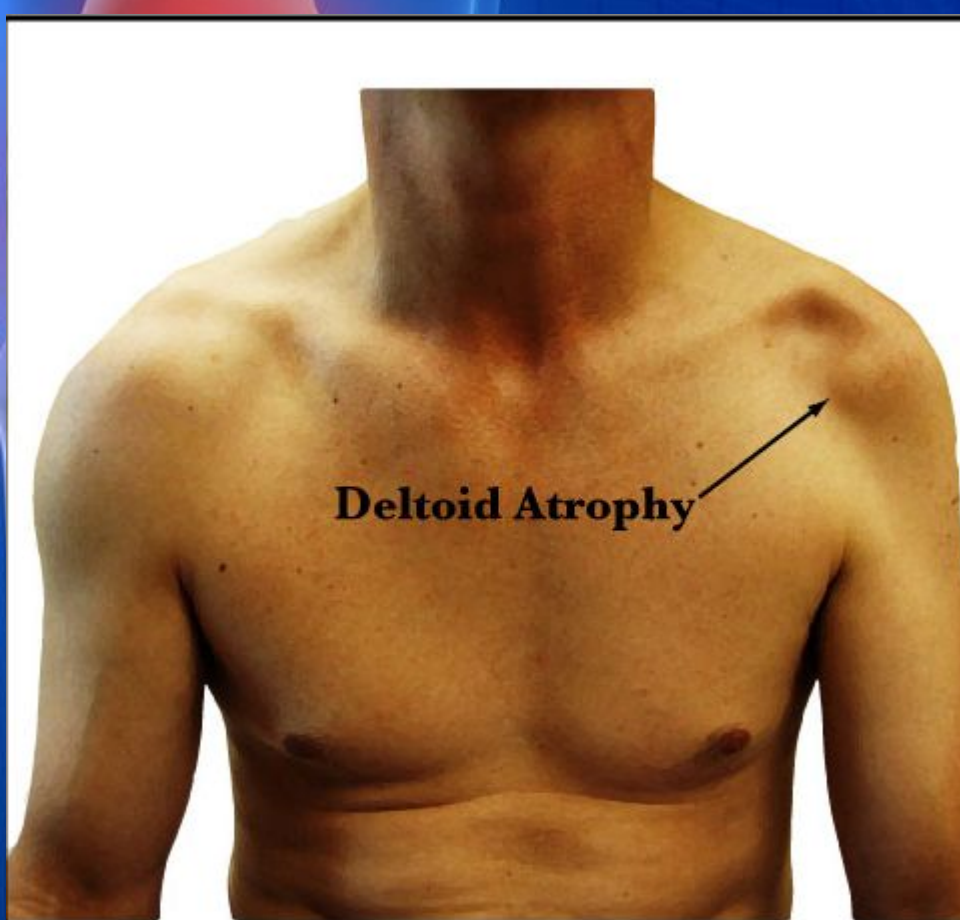
Causes of axillary nerve injury

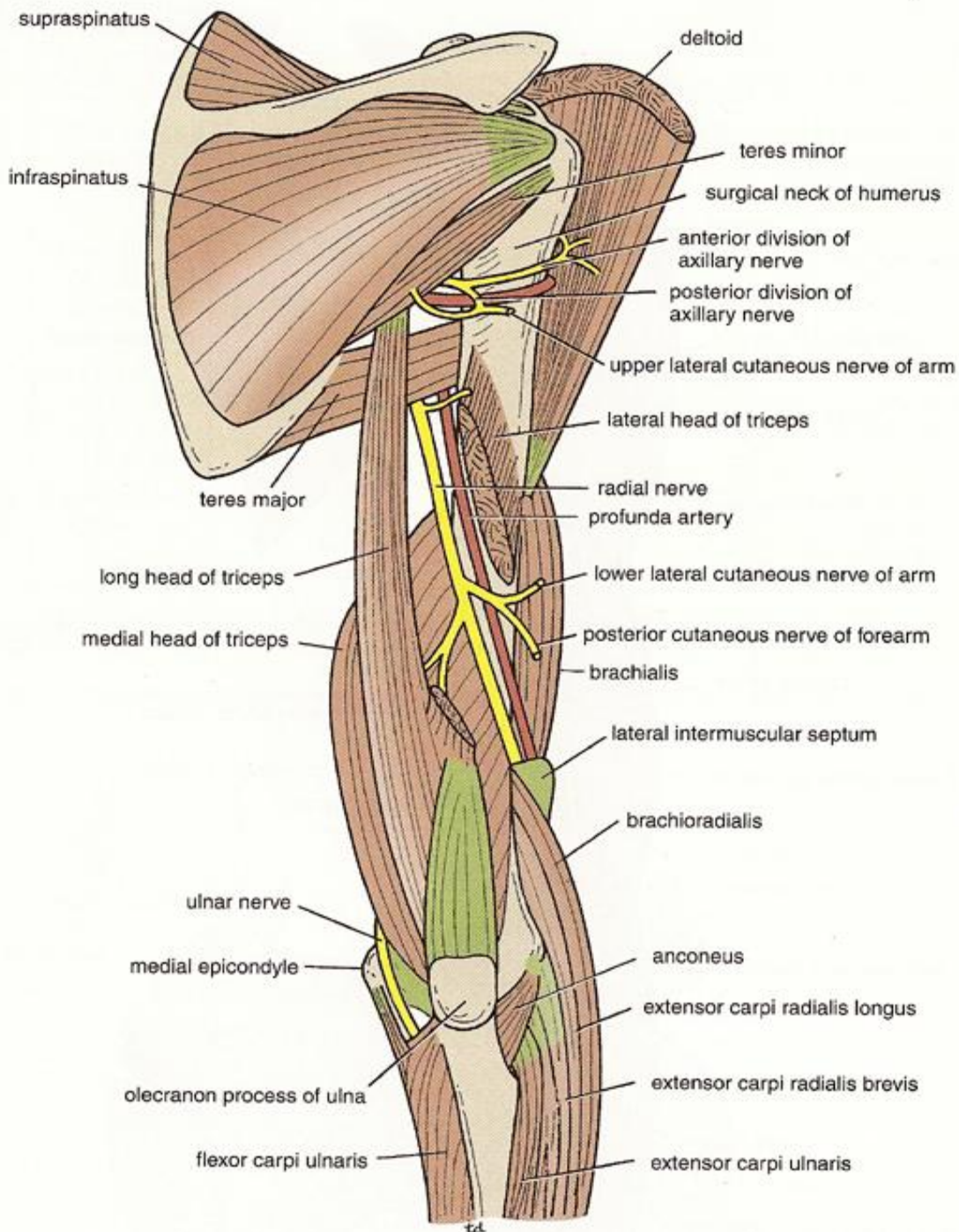
- Anterior-inferior dislocations of the shoulder joint.
- Compression of the axilla with a crutch.
- Fracture of the surgical neck of the humerus.

Injury to the nerve results in:

- Paralysis of the teres minor muscle and deltoid muscle, resulting in loss of abduction of arm (from 15-90 degrees).
- Weak flexion, extension, and rotation of shoulder.
- Paralysis of deltoid and teres minor muscles results in flat shoulder deformity.
- Loss of sensation in the skin over a small part of the lateral upper arm (an area known as the **regimental badge/patch**).

Axillary nerve injury





Radial Nerve

From post. cord of B.P. (C5, 6, 7, 8, T1)

In axilla: Pass post. to axillary a.

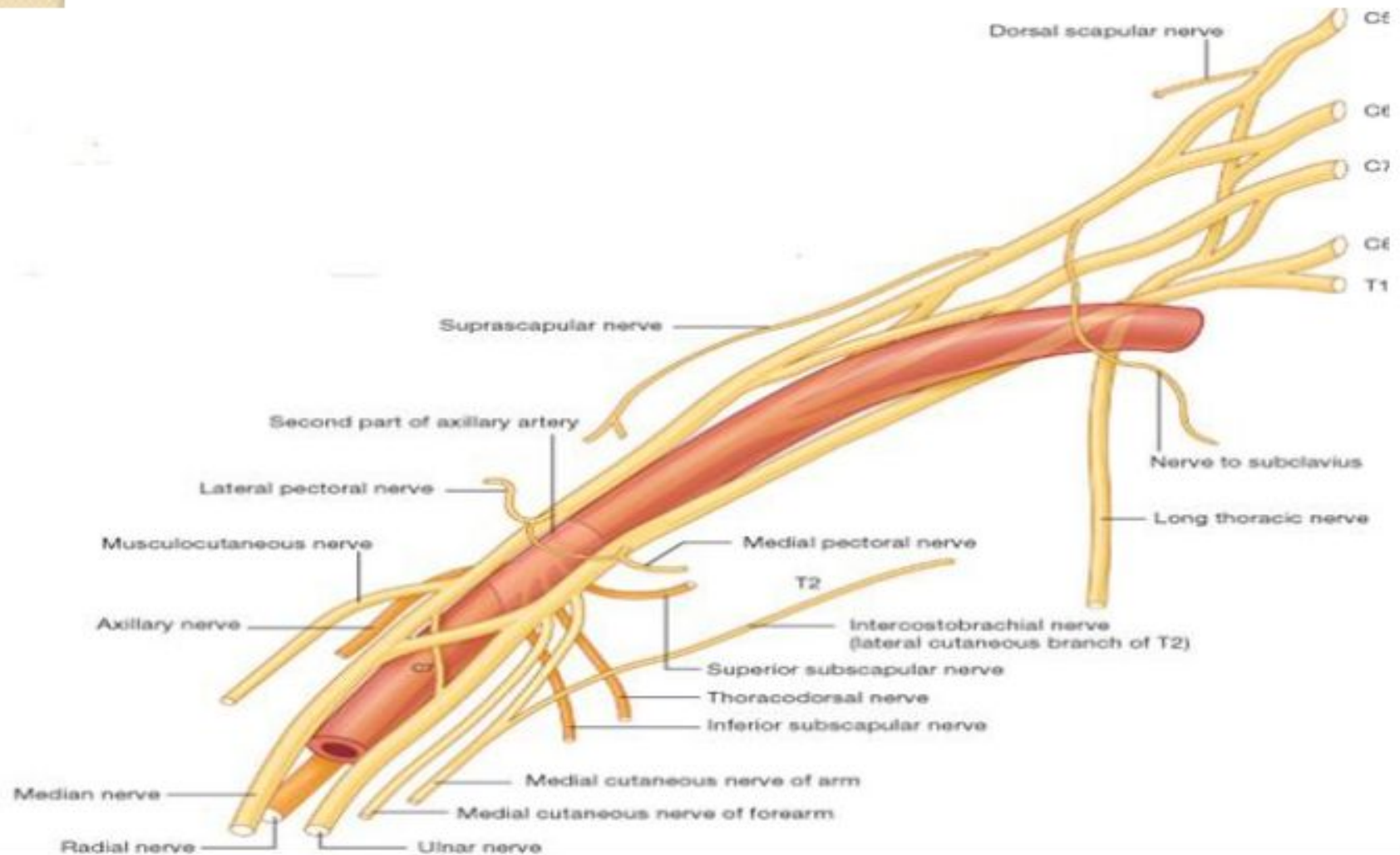
In arm: winds around the back of humerus in spiral groove between medial and lateral heads of triceps to reach back compartment.

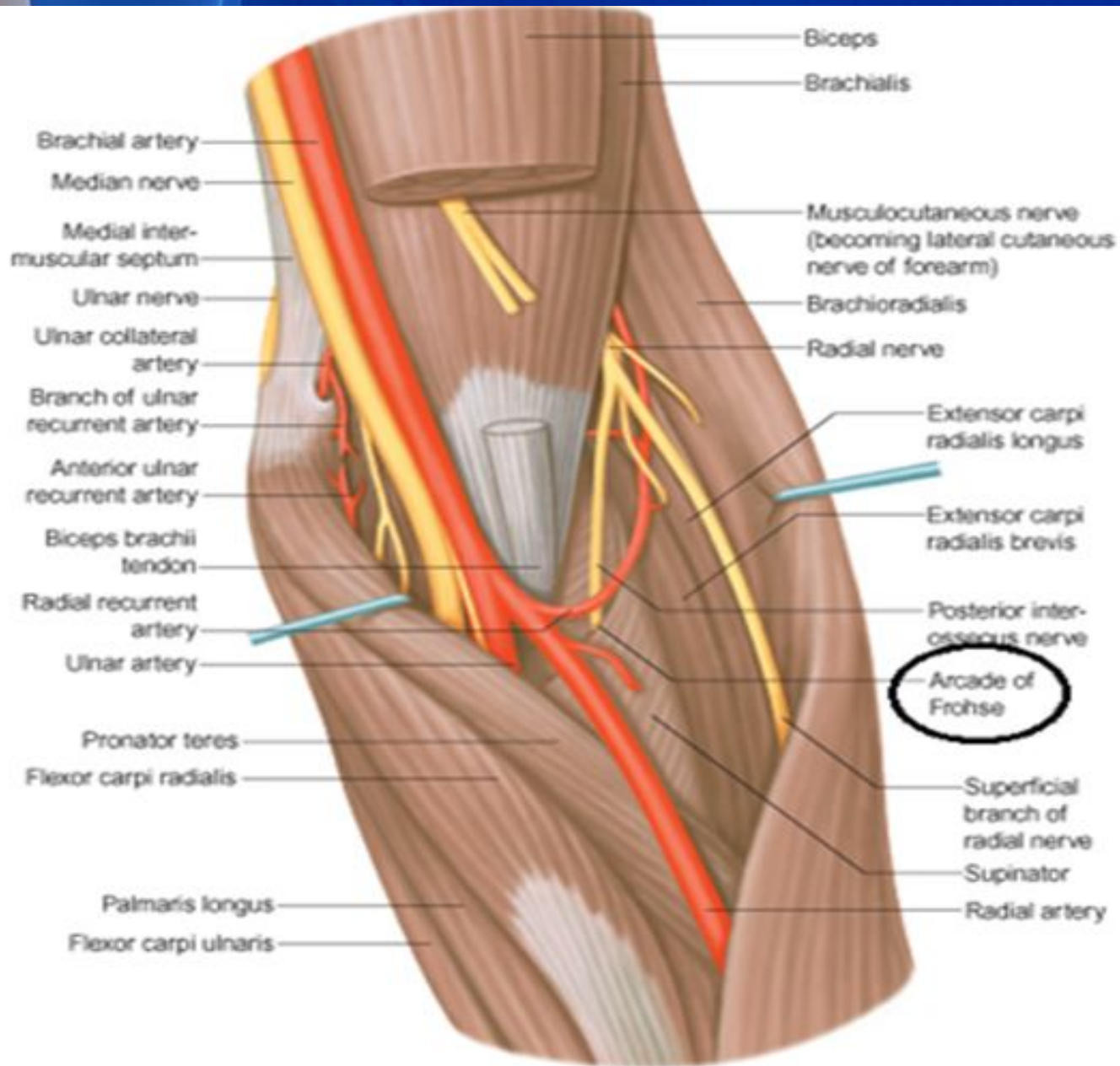
In lower third of arm

It enter anterior compartment and lie between brachialis and brachioradialis m



Relationships to the axillary artery.





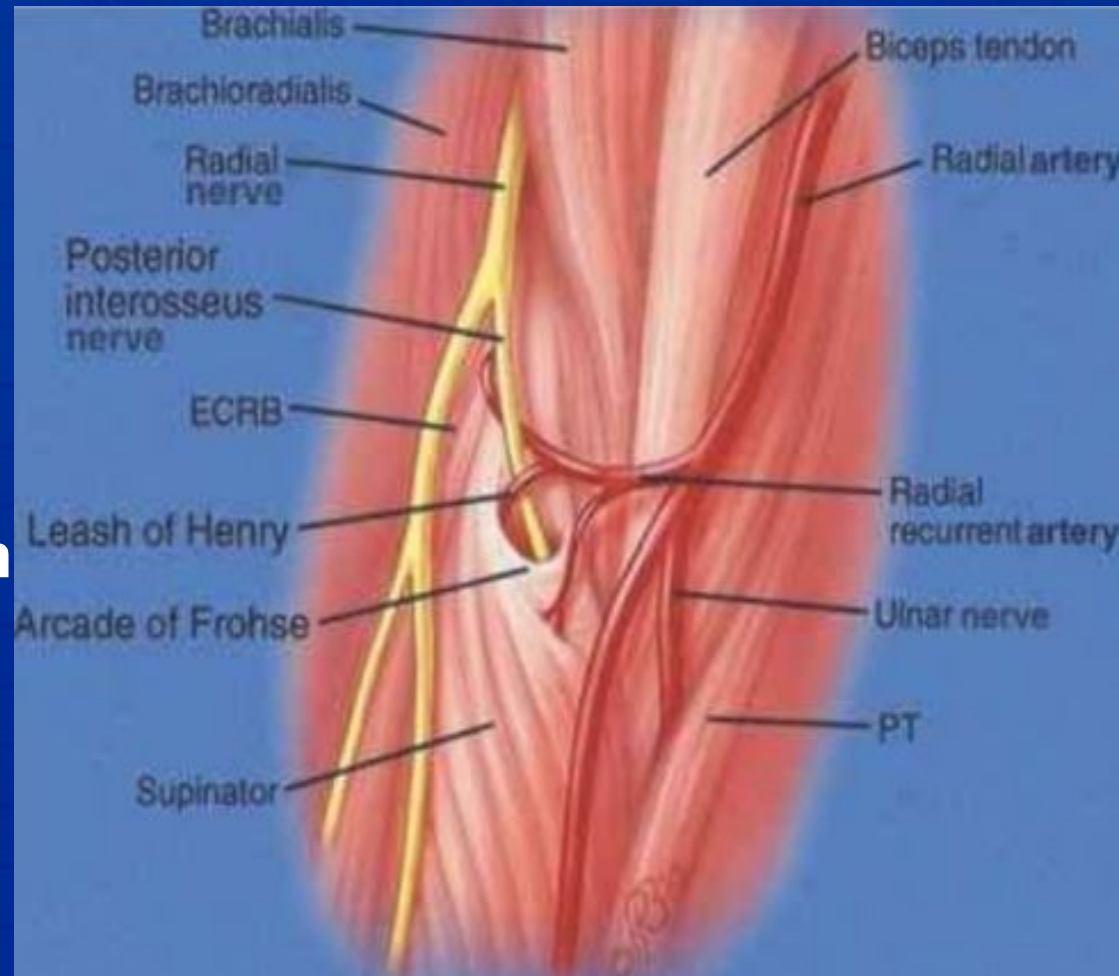
Continue radial nerve

At elbow: pass **Ant.** to lateral epicondyle of humerus where it gives posterior interosseous nerve, then continues as superficial radial nerve, and lies lateral to radial artery.

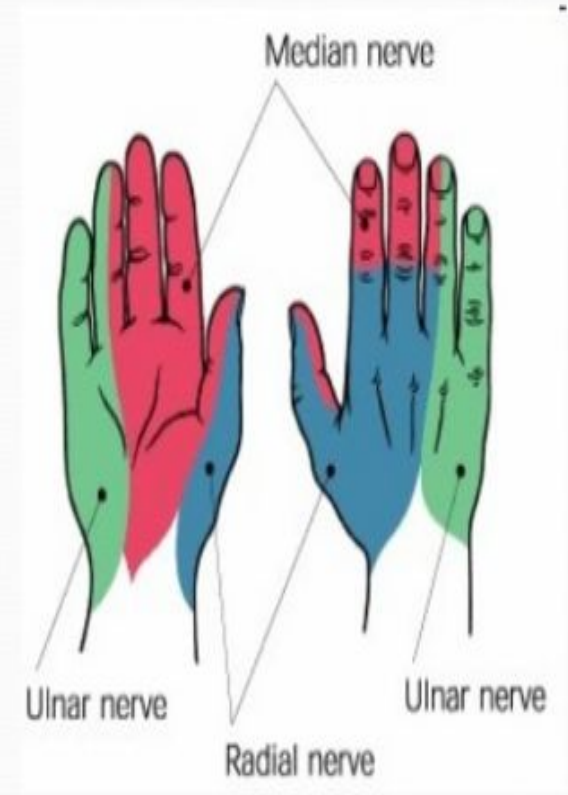
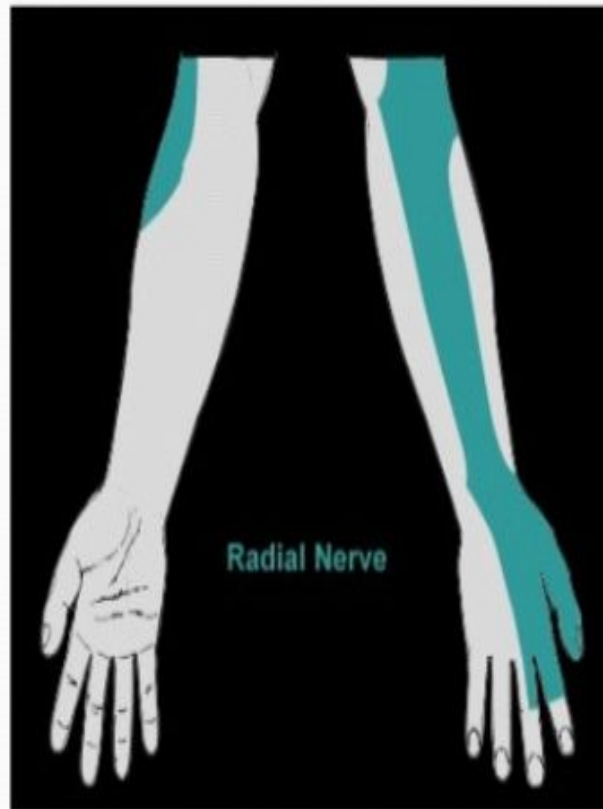
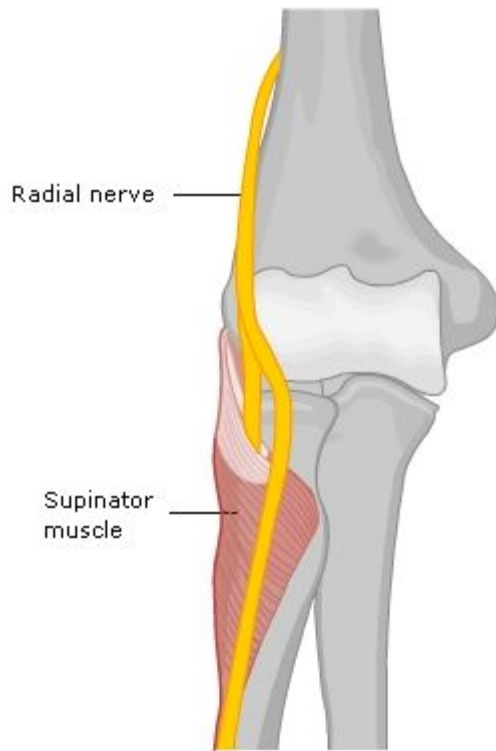
Innervations.

Motor : post. muscles of arm & forearm.

Sensory: lower lat. cutaneous n. of arm.
post. cutaneous n. of arm & forearm.



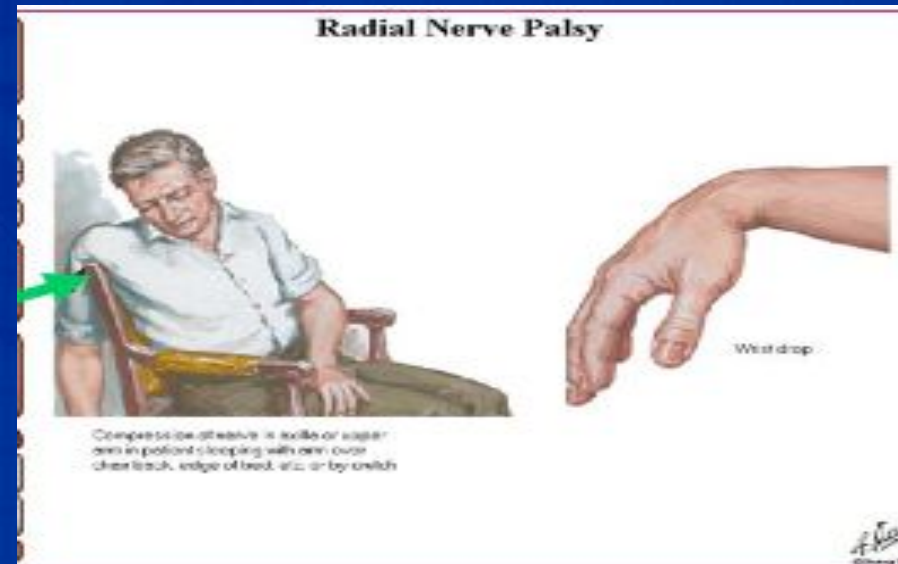
Radial Nerve Dermatomomes



Injuries of Radial Nerve

Can be injured by:

- Pressure of badly fitting crutches
- Drunkard falling asleep with one arm over the back of a chair
- Fractures or dislocation of the proximal end of the humerus

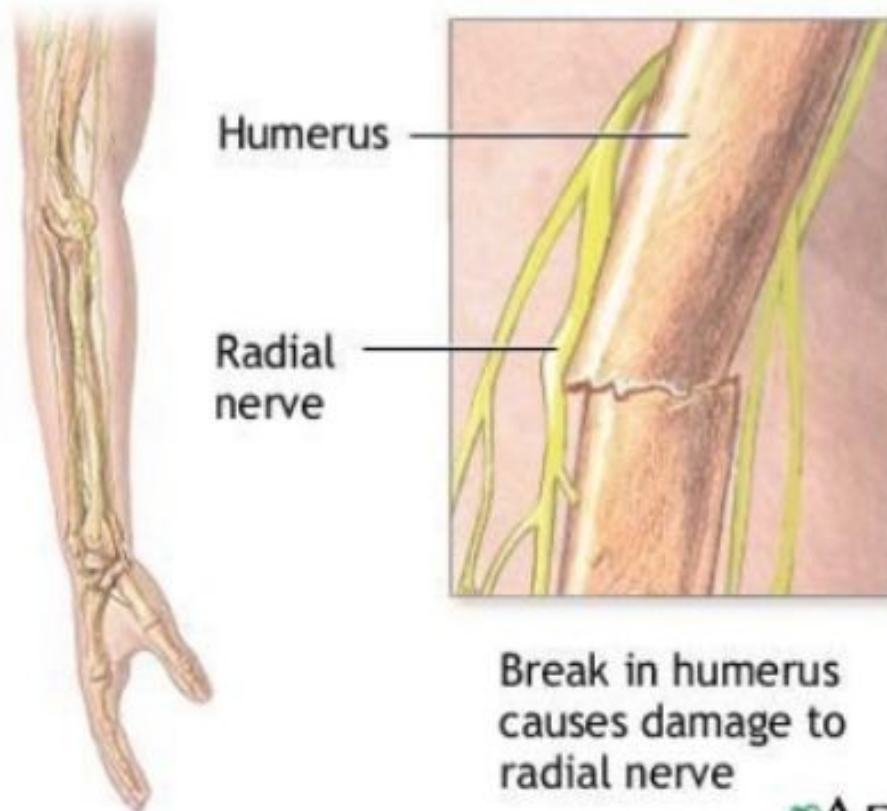


Wrist Dropped



Paralysis
Wrist Extensors

Fracture of the humerus

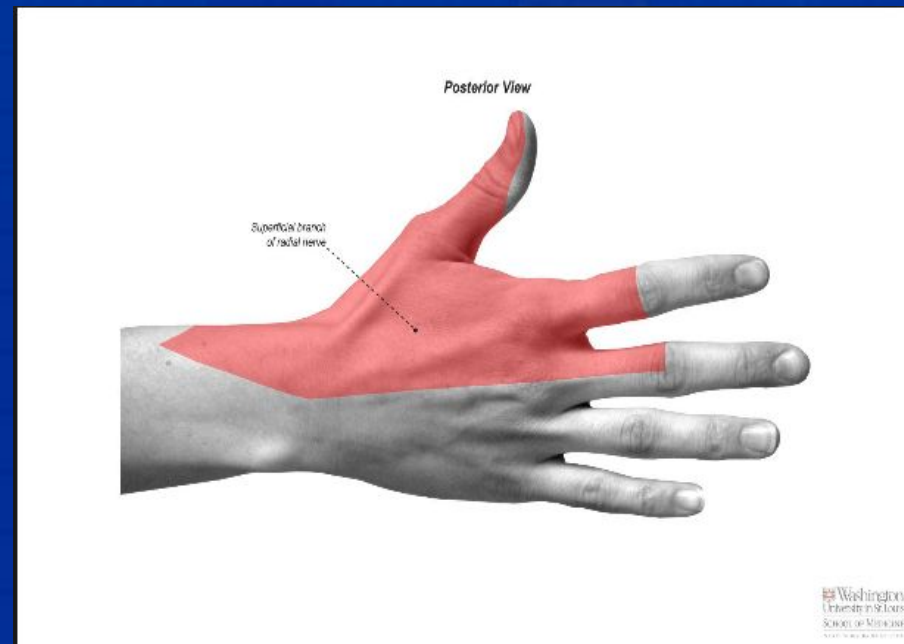


Findings in Radial N. Injury

- Triceps, ancones and long extensors of the wrist are paralyzed
- Unable to extend the elbow joint, wrist joint and fingers.
- Wrist drop or flexion of wrist occurs.
- Unable to flex the fingers firmly for gripping.
- Brachioradialis & supinator are paralyzed.

Sensory Findings

- Little loss of skin sensation over posterior surface of lower part of the arm.
- Sensory loss on the lateral part of dorsum of the hand.
- Sensory loss on the dorsal surface of the roots of the lateral 3 & ½ fingers .



In the Spiral Groove

- Radial nerve can be injured in the spiral groove at the time of fracture of shaft of the humerus
- Wrist drop occurs
- Sensory loss on the dorsal surface of the roots of the lateral 3 & ½ fingers



Review: B. P. Branches

Medial cord branches
(5)

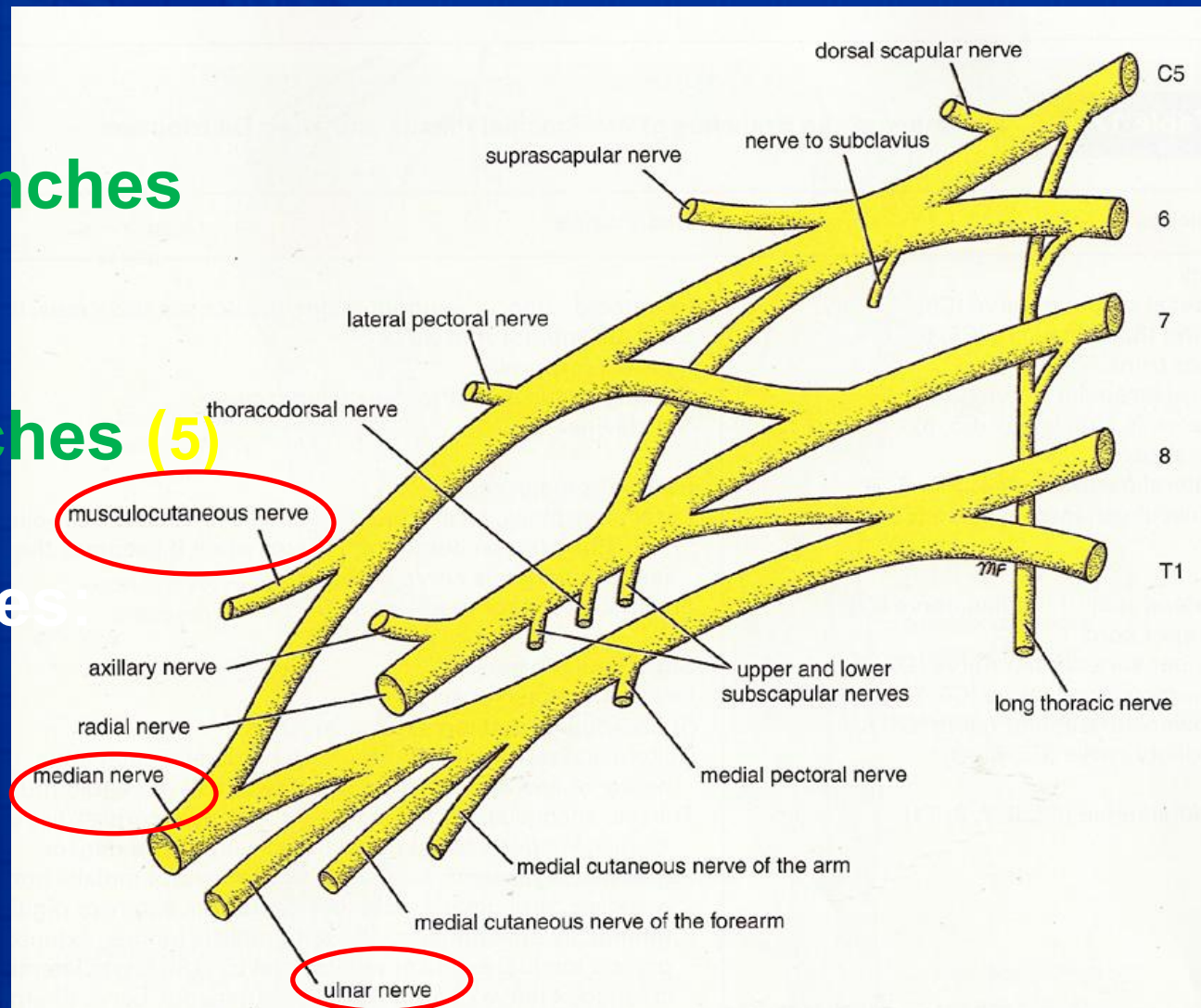
Lateral cord branches
(3)

Post. cord branches (5)

Terminal branches:

Ant.: "3 = M"

Post.: 2





Deep Branch of Radial Nerve

- Can be damaged in the fracture of the proximal end of radius or during dislocation of the radial head.
- No wrist drop as extensor carpi radialis longus is undamaged.
- No sensory loss as this is a motor nerve.

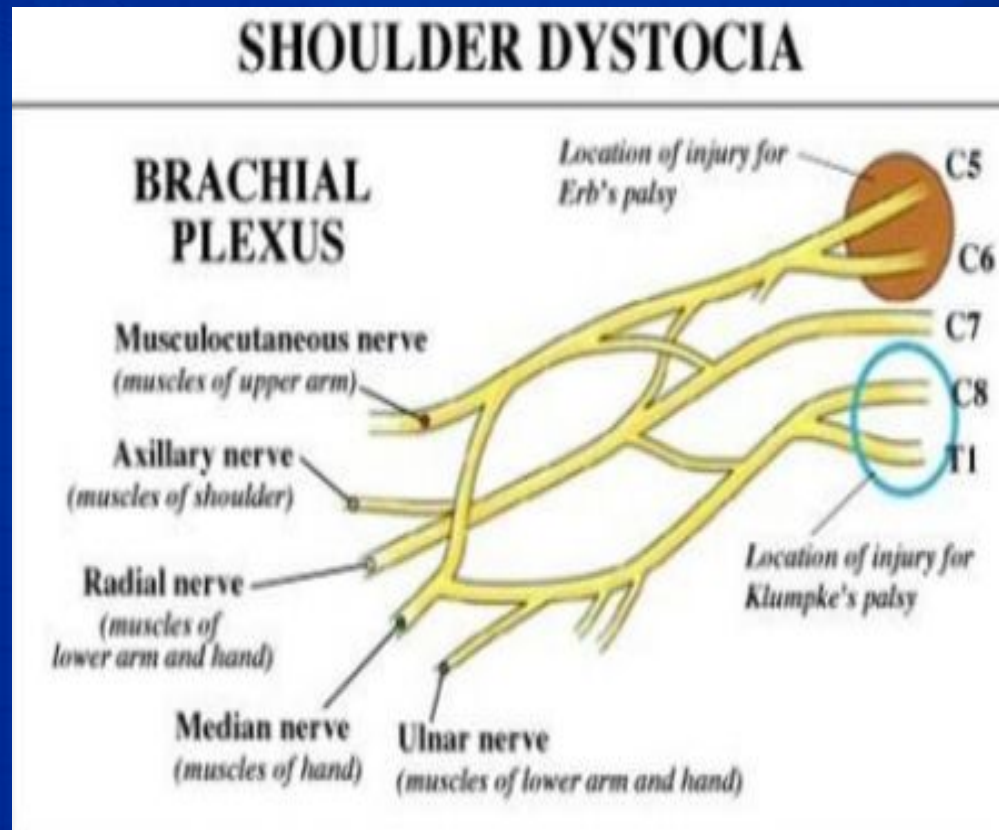
Injuries to Brachial Plexus

Affect movements (muscles)
& sensations in upper
limb

2 types:

Superior part injuries:
C5 & C6

Inferior part injuries:
C8 & T1

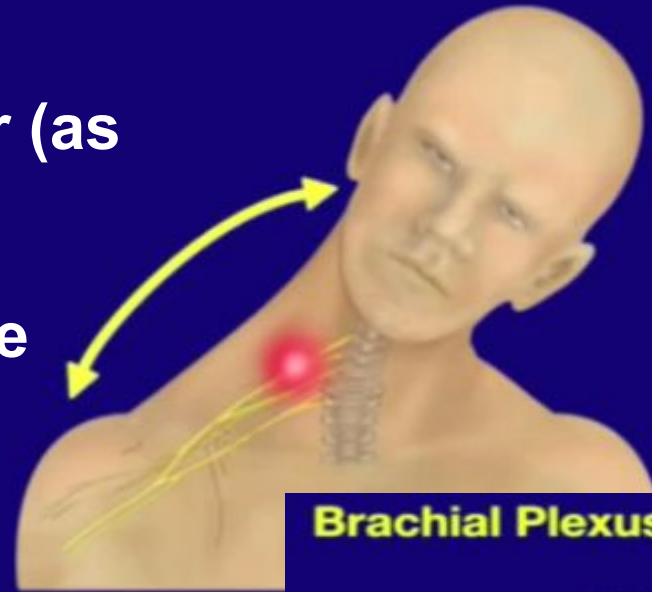


Superior Injuries

Causes:

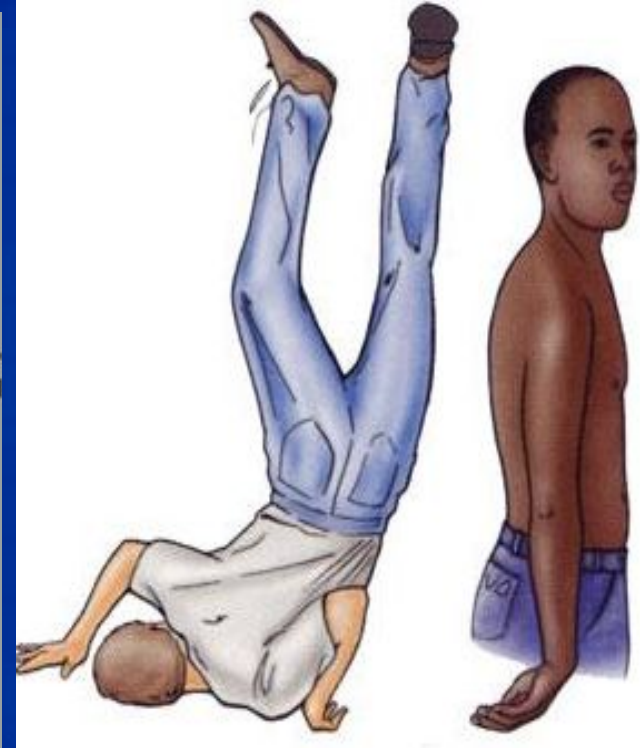
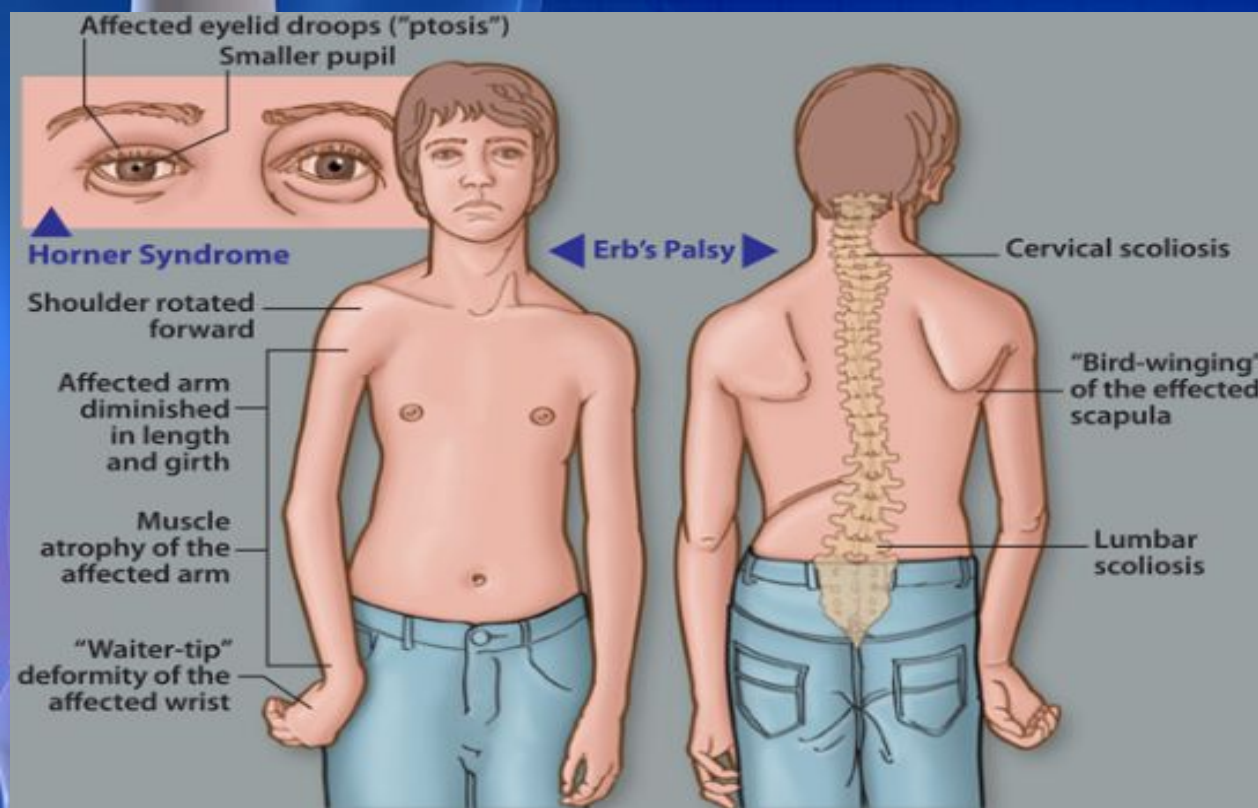
- 1. Falling down on the shoulder (as falling from a horse)
- 2. In newborns due to excessive stretching of the neck
- during delivery
- The angle between the neck & shoulder is increased
- Stretch & tears in upper part of B. P. (C5 & 6)
- suprascapular nerve,
Musculocutaneous nerve, and the
axillary nerve are most nerves

Brachial Plexus Trauma



Brachial Plexus Trauma

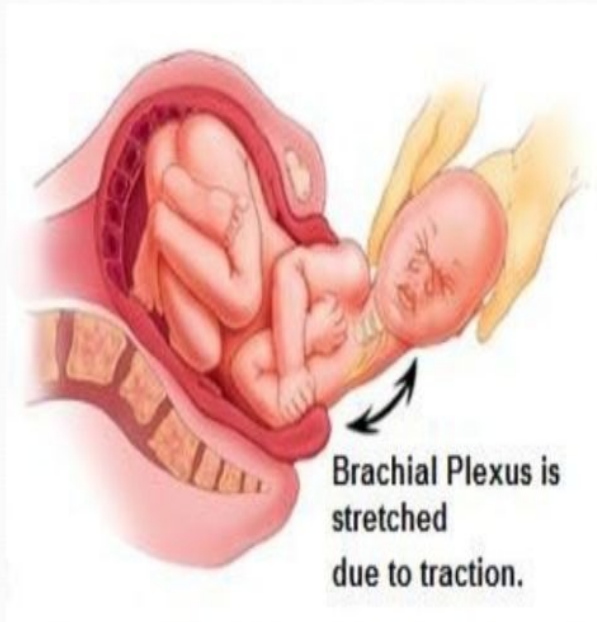




**Injury to muscles of shoulder region
supra, infraspinatus teres major
subscapularis, deltoid**

**Injury to biceps and brachialis
which flex and supinate elbow joint
Loss of sensation lateral aspect of
arm and forearm**





Erb's Duchenne Palsy



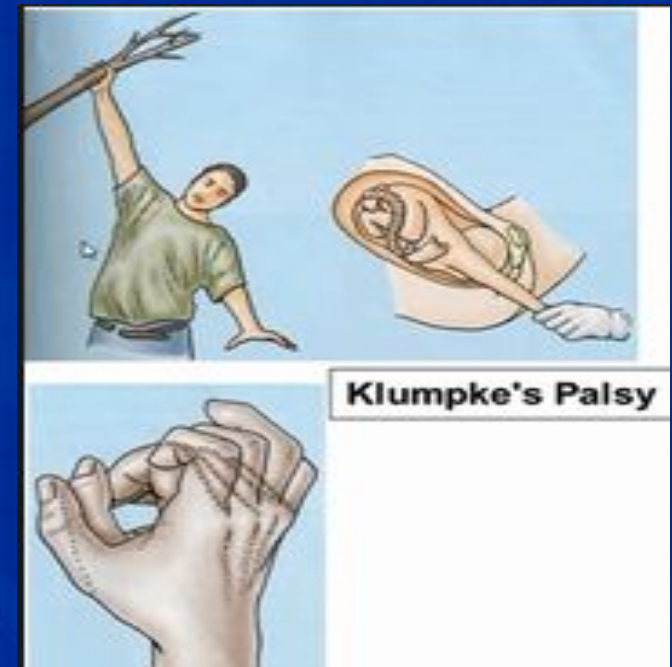
- This posture occurs because of paralysis and atrophy of:
- Deltoid
- Biceps brachii
- Brachialis
- brachioradialis

Inferior Injuries

Less common

Causes:

- 1. Sudden pull of upper limb superiorly.
(as getting kids in school bus)
- 2. In newborns due to upper limb is pulled excessively during delivery.
- Stretch & tears in lower part of B. P. (C8 & T1).



Klumpke's palsy



Klumpke's Palsy

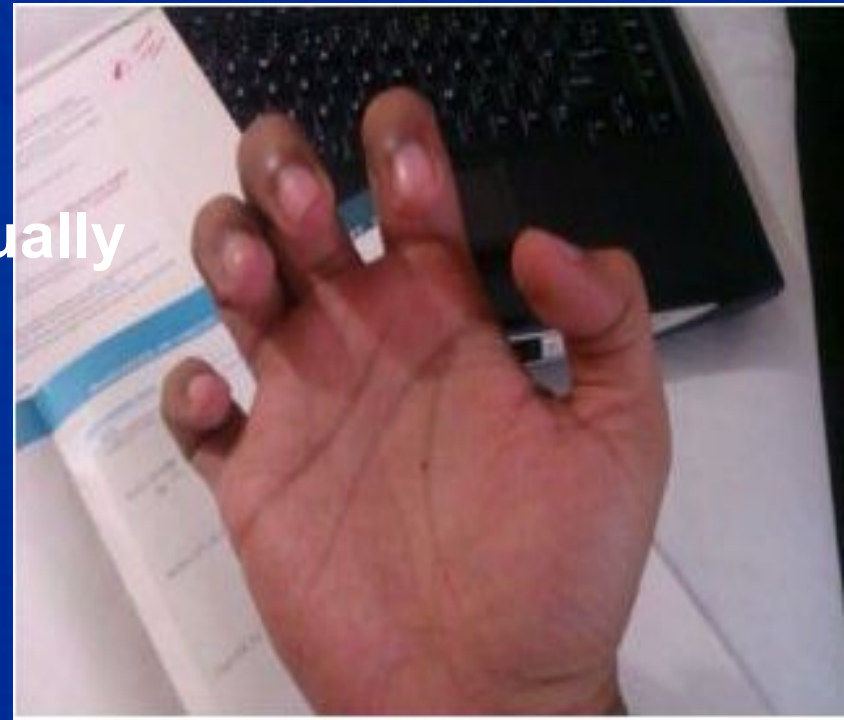
- Rare
- Involving lower root (C8 and T1)
- Affecting forearm and hand
- Characterize by paralysis and atrophy of the small hand muscles and flexor of the wrist.
- Claw hand



Injury of all intrinsic muscles of hand interosseus and lumbricals

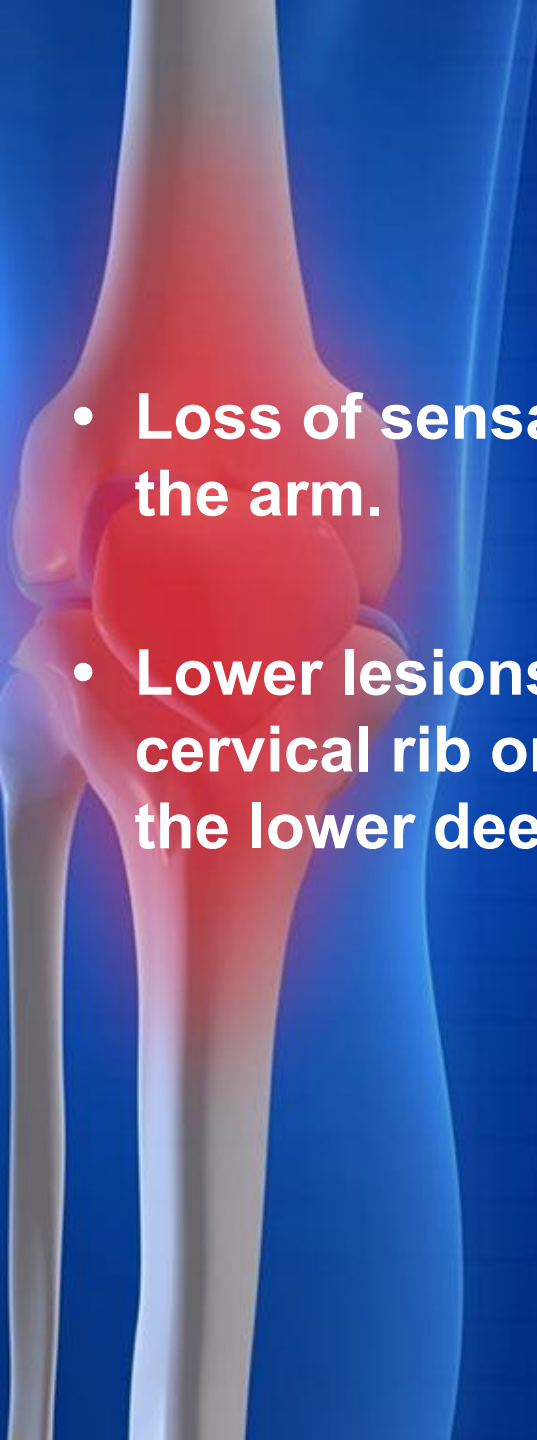
Brachial Plexus Injuries (Lower lesions)

- Are usually a traction injuries caused by excessive abduction of the arm
- The first thoracic nerve is usually torn.
- The hand has a clawed appearance caused by hyperextension of metacarpophalangeal joints & flexion of interphalangeal joints



Brachial Plexus Injuries (Lower lesions)

- Loss of sensation will occur along the medial side of the arm.
- Lower lesions can also be produced by a presence of a cervical rib or malignant metastases from the lungs in the lower deep cervical lymph nodes.



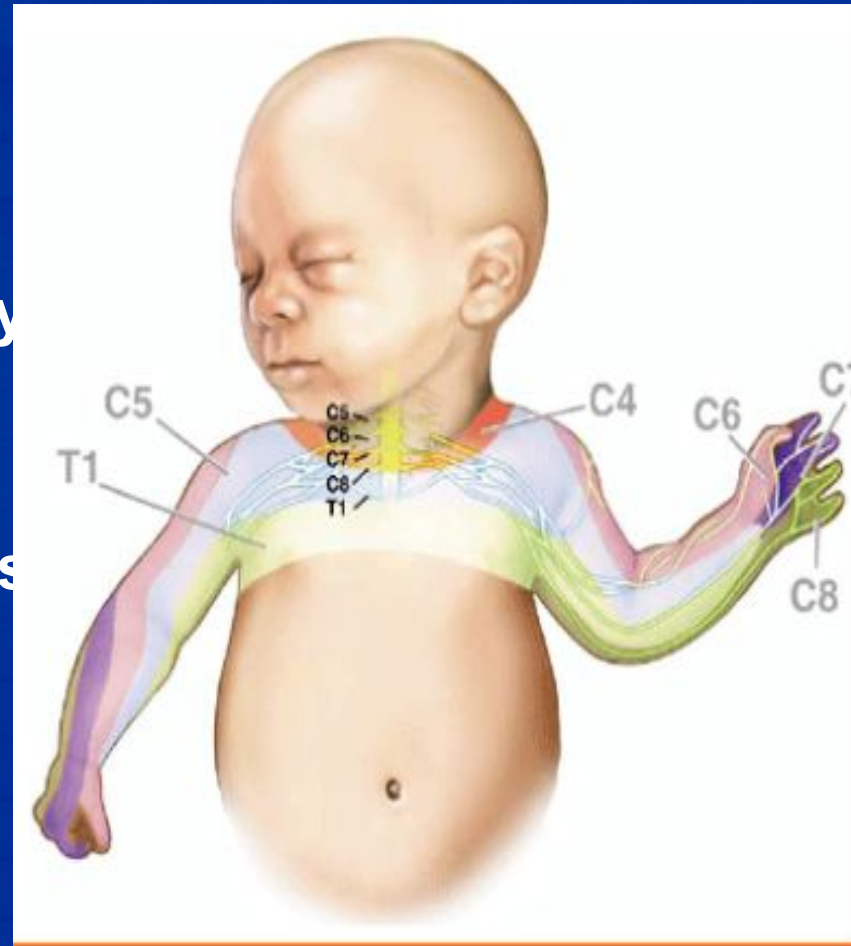
Transient Paralysis

From pressure on the axilla
(as heavy sleep on the armpit)

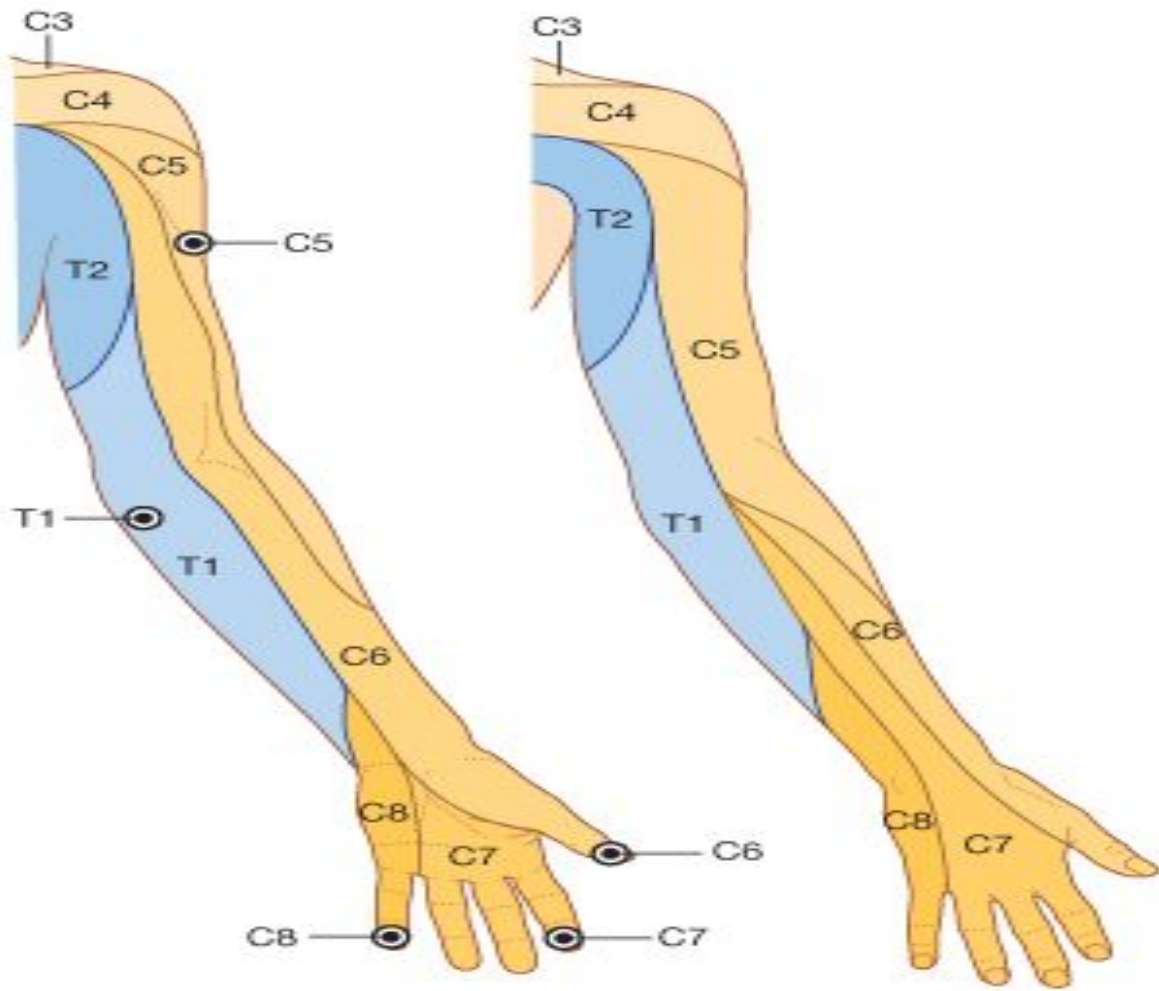
Radial & ulnar are most frequently
involved

It can stay up to 24 hrs sometimes

Released by it self



A



Lateral Wall

- Coracobrachialis
- Short head of biceps

Medial Wall

Serratus anterior

Axilla

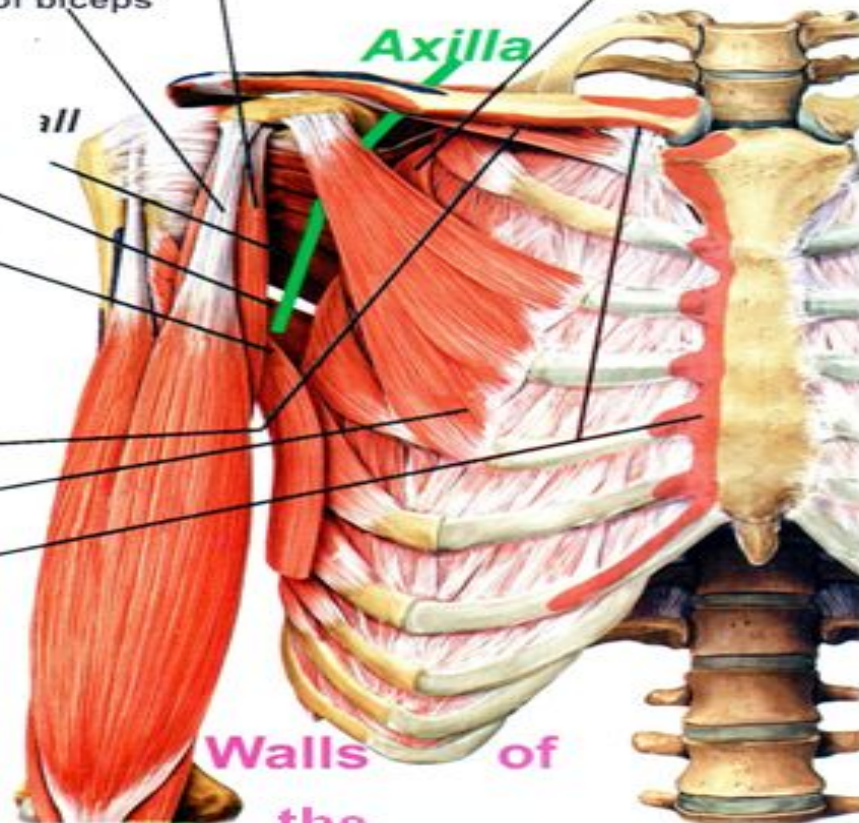
Posterior Wall

- minor
- Pectoralis

Walls of the axilla

Subscapularis

- Teres major
- Latissimus dorsi.



musculocutaneous nerve

coracobrachialis

biceps brachii

median nerve

lateral cutaneous nerve of forearm (sensory)

brachialis

pronator teres

pronator teres

flexor carpi radialis

palmaris longus

flexor pollicis longus

flexor digitorum superficialis

pronator quadratus

flexor digitorum profundus (lateral 2,3 digits)

thenar muscles

2, 3 lumbricals

palmar sensory branches of median nerve

C5
C6
C7
C8
T1

ulnar nerve

medial cutaneous nerve of the arm (sensory)

flexor digitorum profundus (medial 4,5 digits)

flexor carpi ulnaris

medial cutaneous nerve of the forearm (sensory)

dorsal cutaneous branch (sensory)

palmar cutaneous branch (sensory)

palmar interossei
palmaris brevis
hypothenar muscles

4,5 lumbricals

superficial terminal branches (sensory)

adductor pollicis

dorsal interossei

C7
C8
T1

axillary nerve

deltoids

subscapularis

teres major

latissimus dorsi

radial nerve

triceps brachii

upper cutaneous nerve of the arm (Sensory)

brachioradialis

extensor carpi radialis longus

extensor carpi radialis brevis

supinator

posterior interosseous nerve

extensor carpi ulnaris

extensor digiti minimi

extensor digitorum

extensor indicis

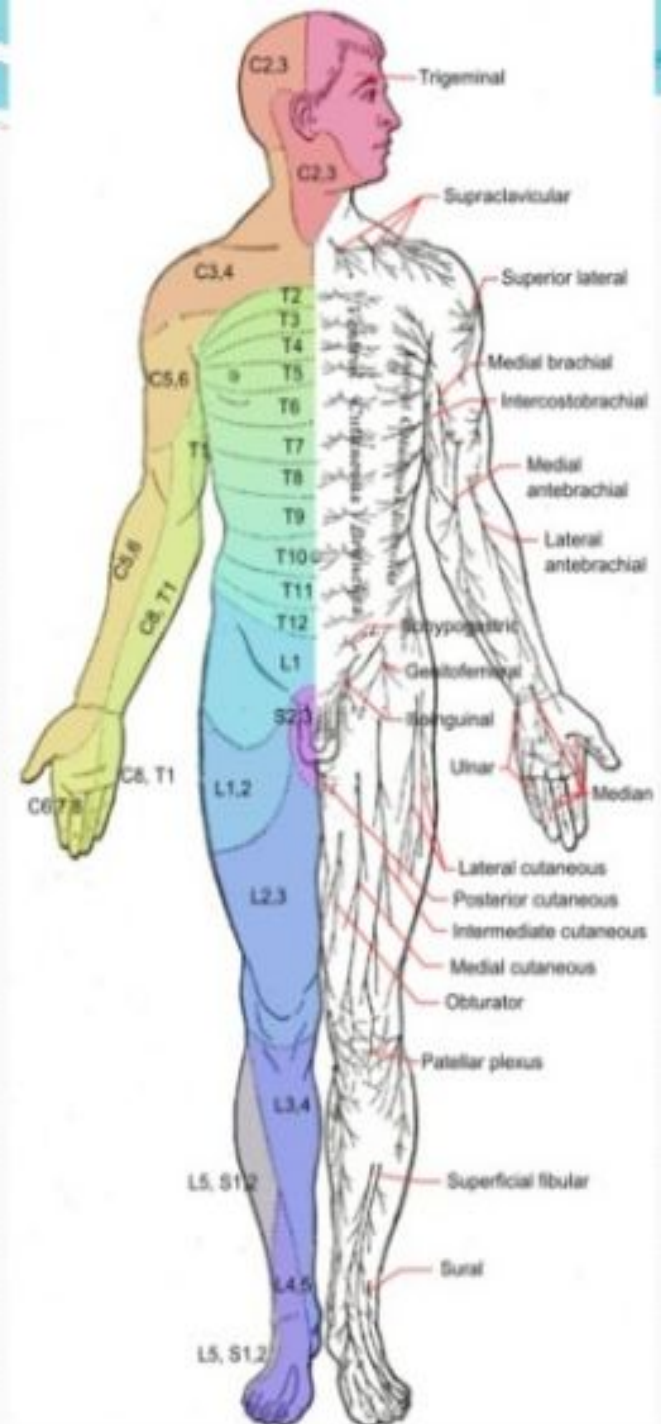
abductor pollicis longus

extensor pollicis brevis

superficial radial nerve (sensory)

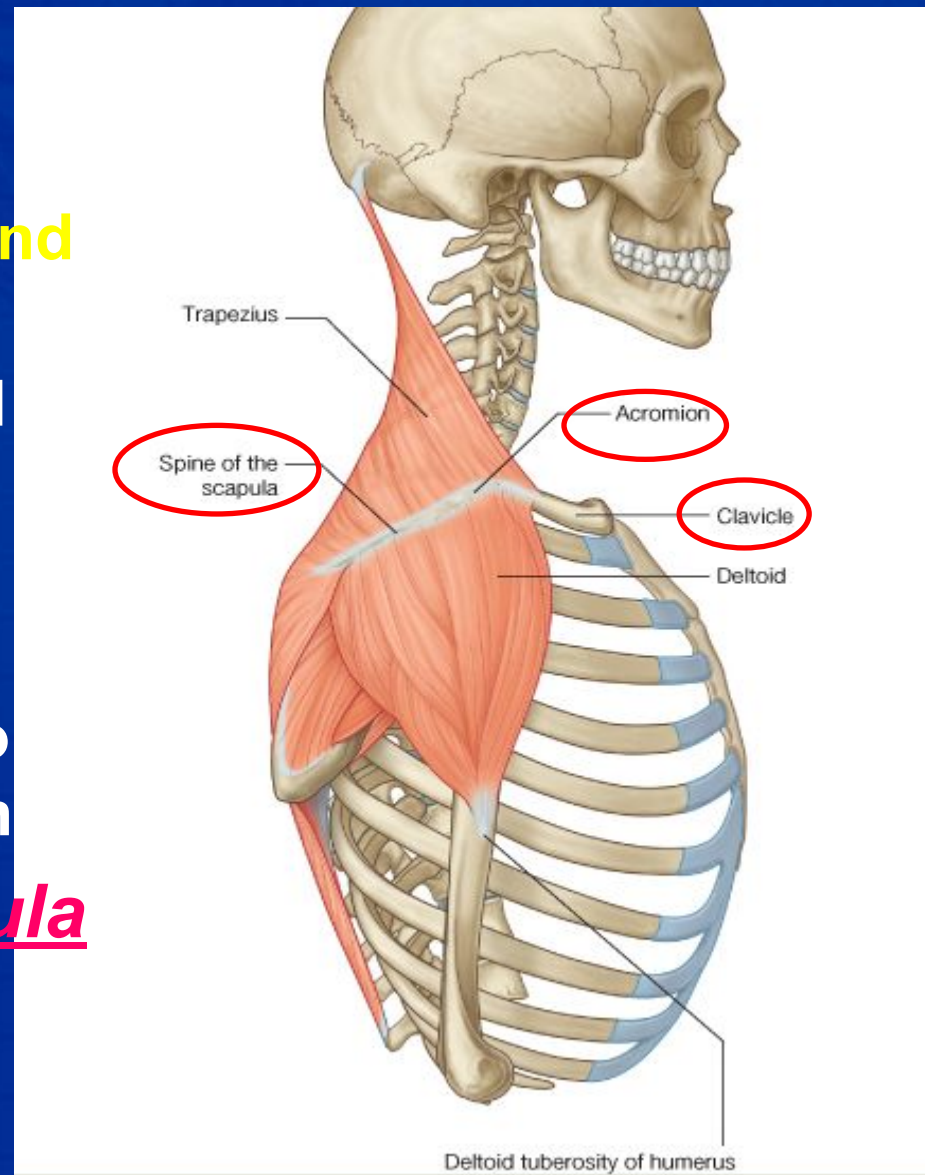
Dermatomes

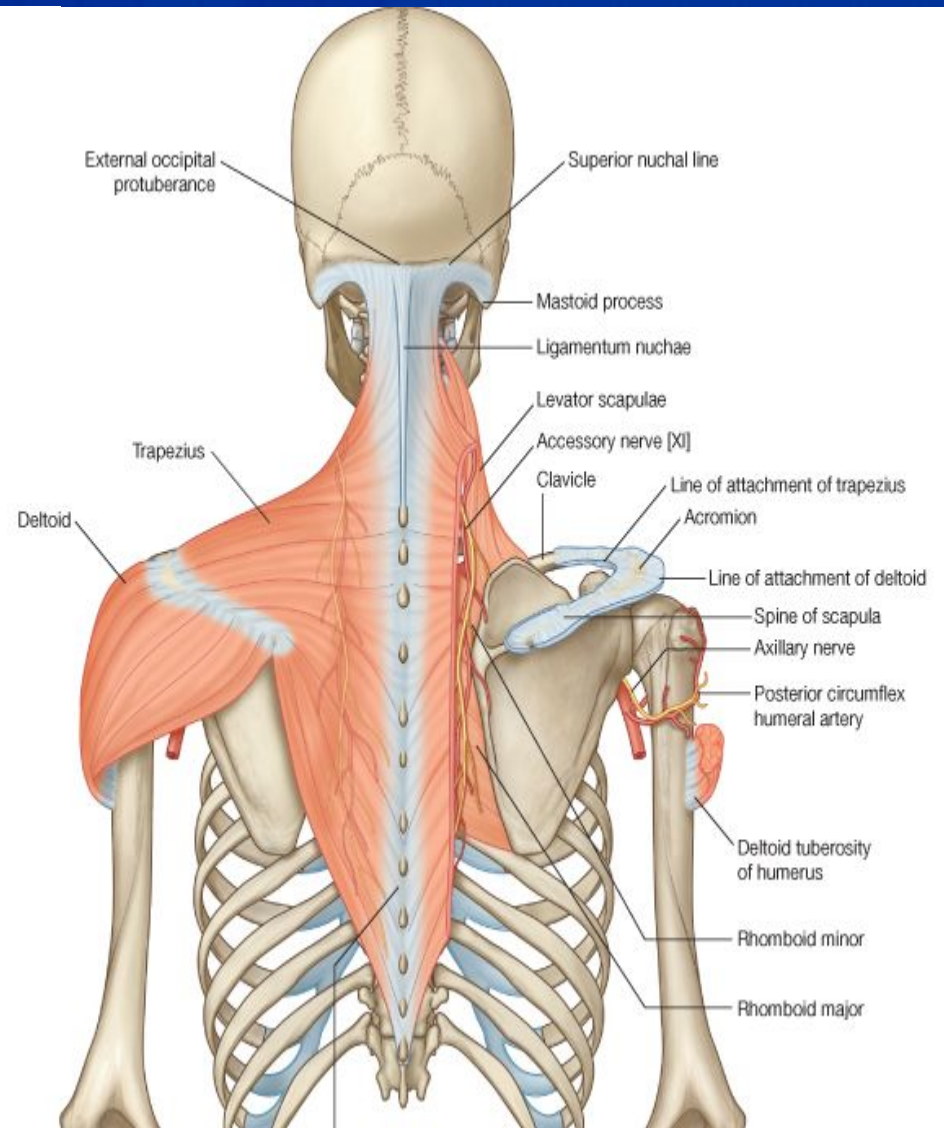
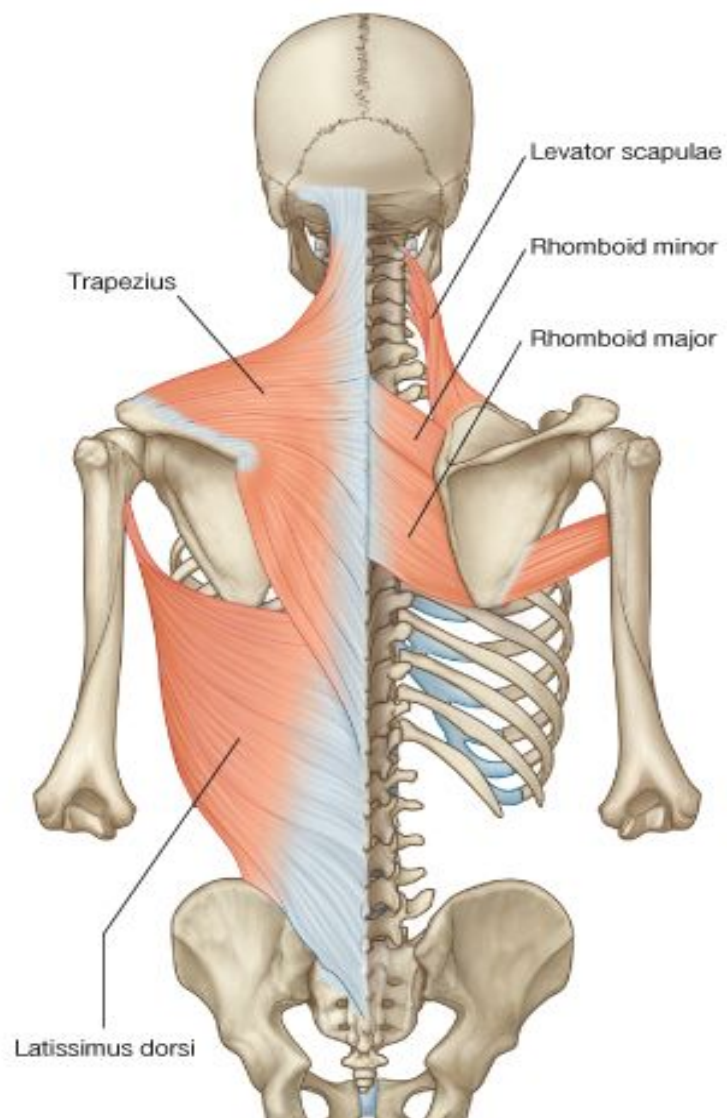
- Area of the skin that supplied by single spinal nerve.
- the area of the skin that provides sensory input to the dorsal roots of a pair of spinal nerves
- There are 8 cervical, 12 thoracic, 5 lumbar and 5 sacral spinal nerves that relays cutaneous sensation (pain, thermal, itch, touch etc) from particular region of the body to the brain
- Dermatomes are useful in neurology for finding the site of damage to the spine



Muscles of shoulder region

- Two superficial muscles of shoulder region are **deltoid** and **trapezius** muscles.
- Trapezius attach scapula and clavicle to trunk.
- Deltoid attach scapula and clavicle to humerus.
- Both muscles are attached to opposing surface and margin of acromion, spine of scapula and clavicle.





Posterior muscles

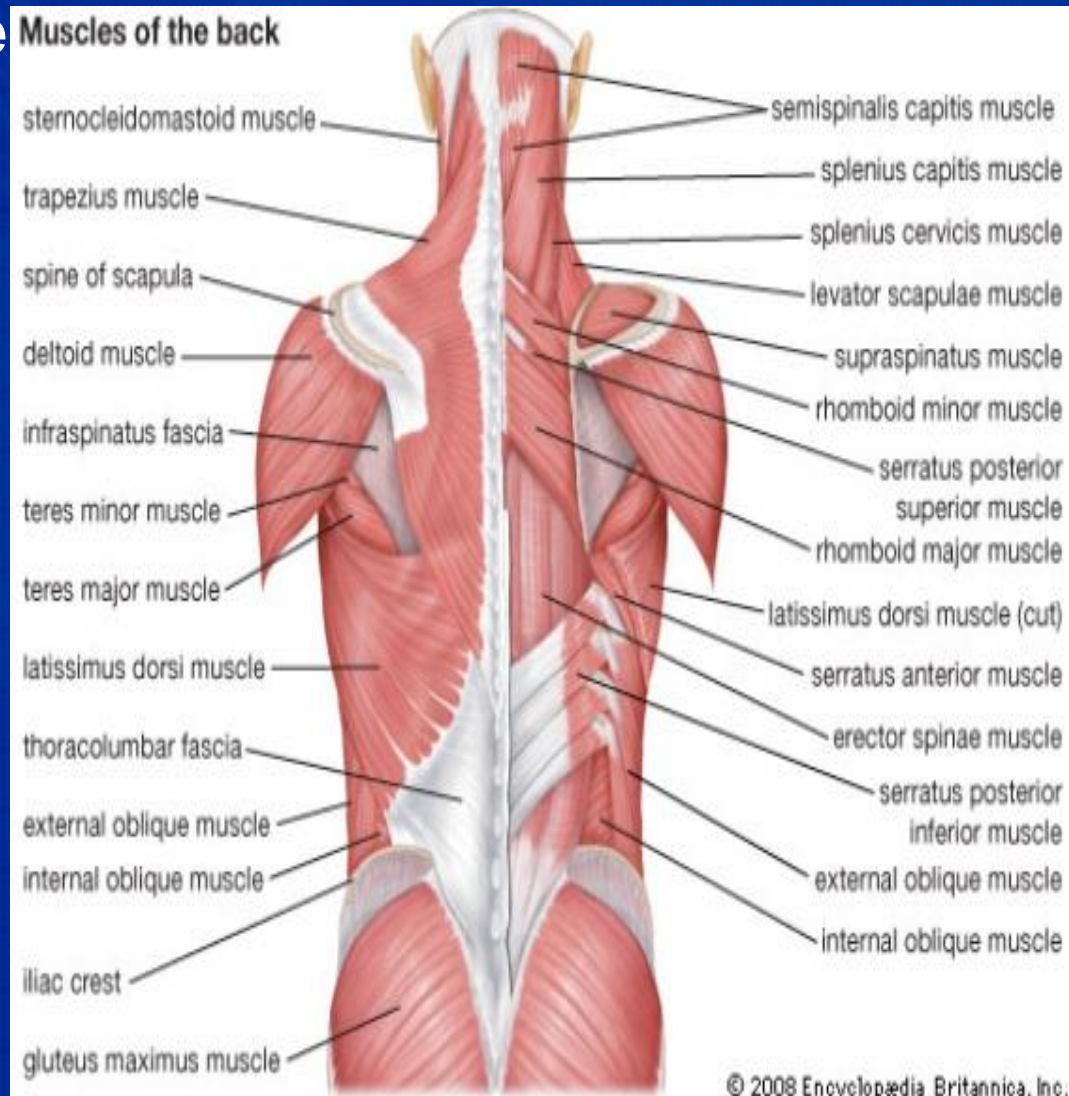
Trapezius: most superficial muscle of the back of the neck, and upper trunk.

Origin: occipital bone of skull, back of neck back of chest.

Insertion: scapular spine acromion, and clavicle.

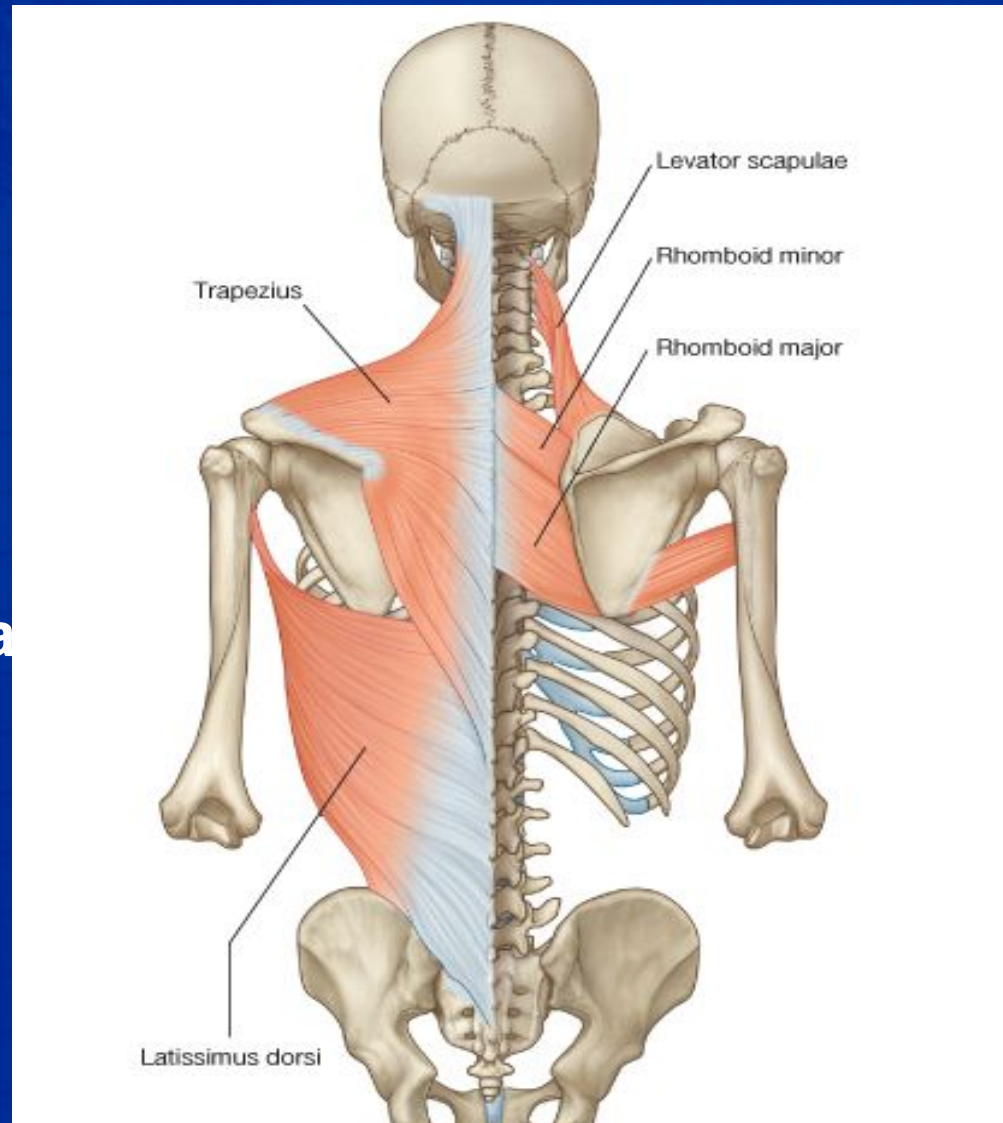
N S: Spinal accessory, C3-C4 proprioception

Action: extend the head, elevate, and depress the shoulder adduct arm.



Deep muscles of the back of shoulder

- Levator scapulae.
- Rhomboids major.
- Rhomboid minor.
- All are elevators of scapula
rhomboids retract scapula
as well



Latissimus dorsi:

large, flat muscle.

Important muscle in swimming

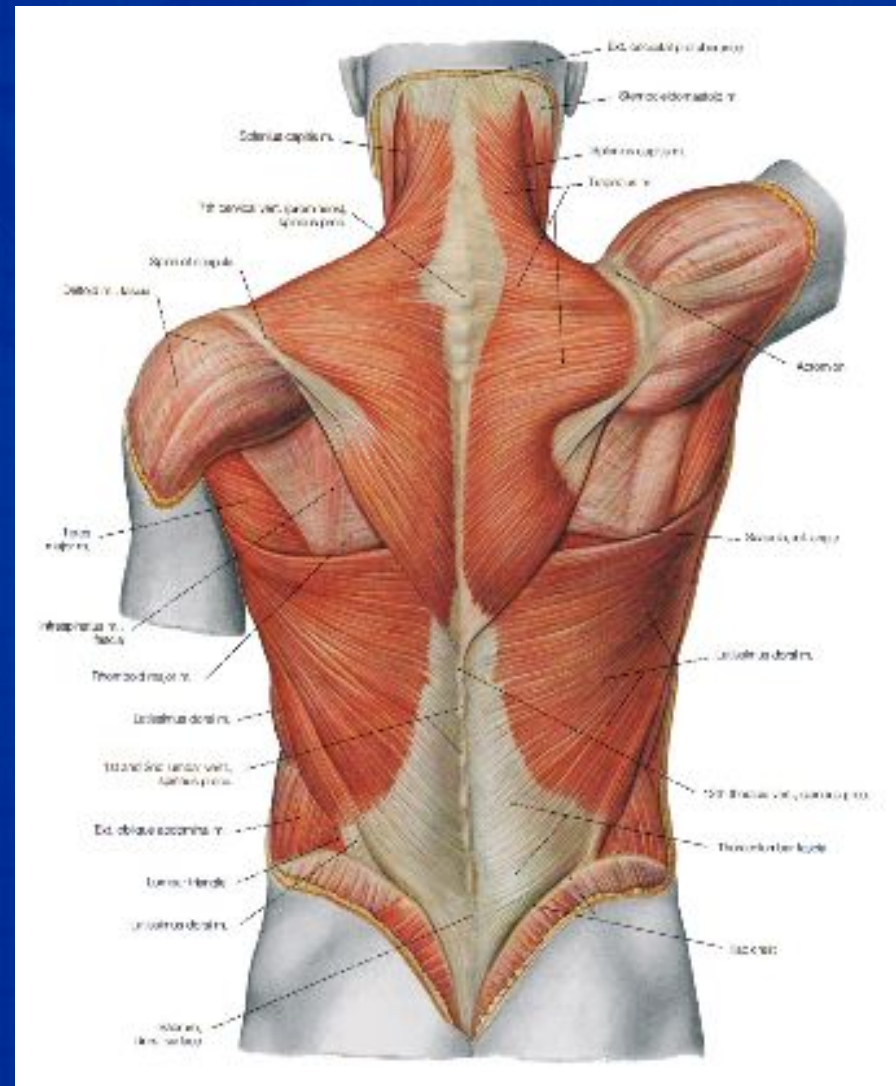
Origin: lower 6 thoracic spines, and ilium.

Insertion: upper humerus (floor of bicipital groove)

NS: C6-C7-C8 thoraco dorsal n

Action: Extend and adduct and medially rotate the arm.

Pulls the trunk upwards in climbing.



Muscles of The Arm

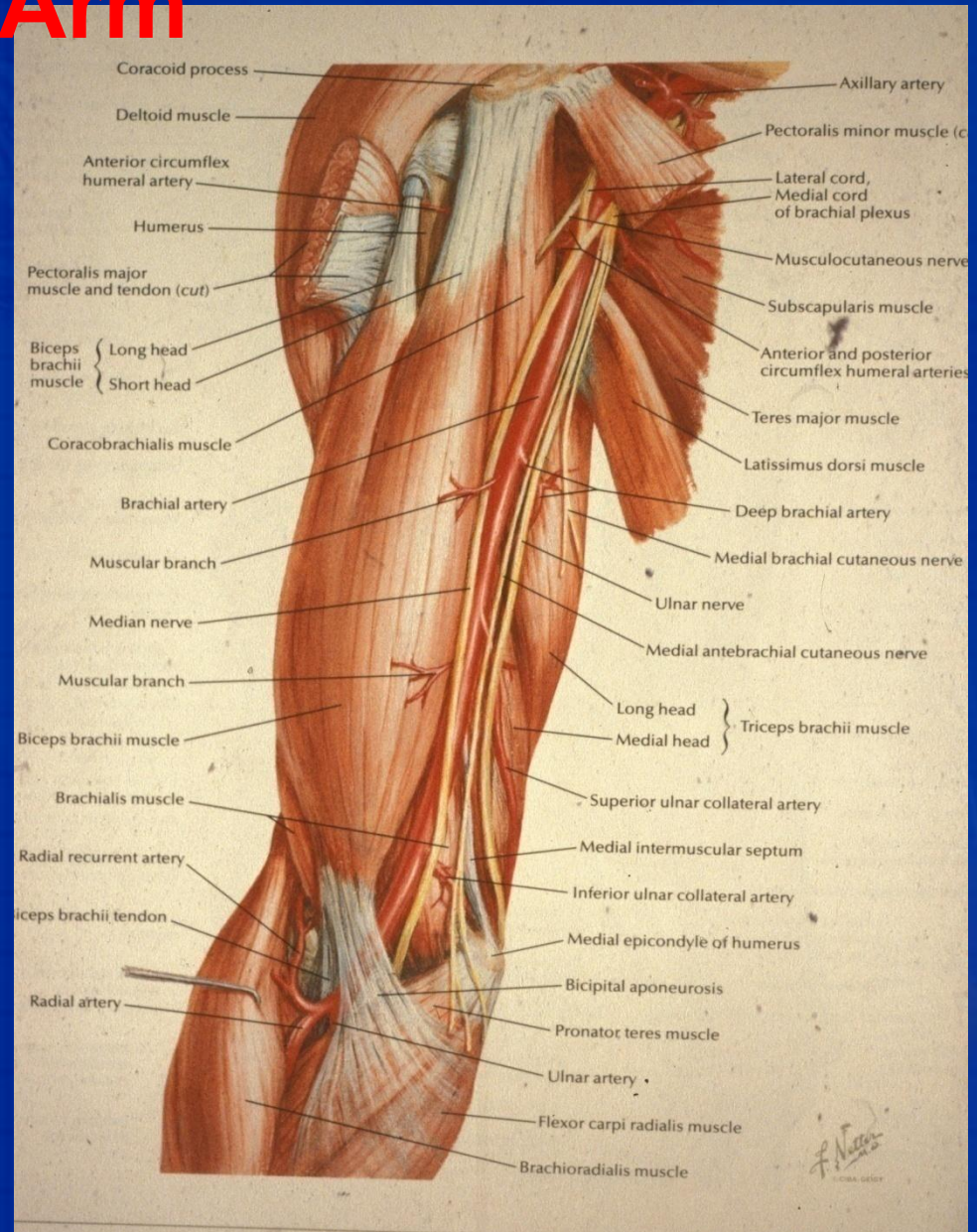
Anterior:

- **Biceps Brachii**
- **Brachialis m.**
- **Coracobrachialis**

Posterior:

Triceps m.:

Long
Lat.
Med.



Biceps Brachii Muscle

Origin (2 heads)

Short: coracoid process

Long: supraglenoid tubercle of scapula

Insertion

Radial tuberosity

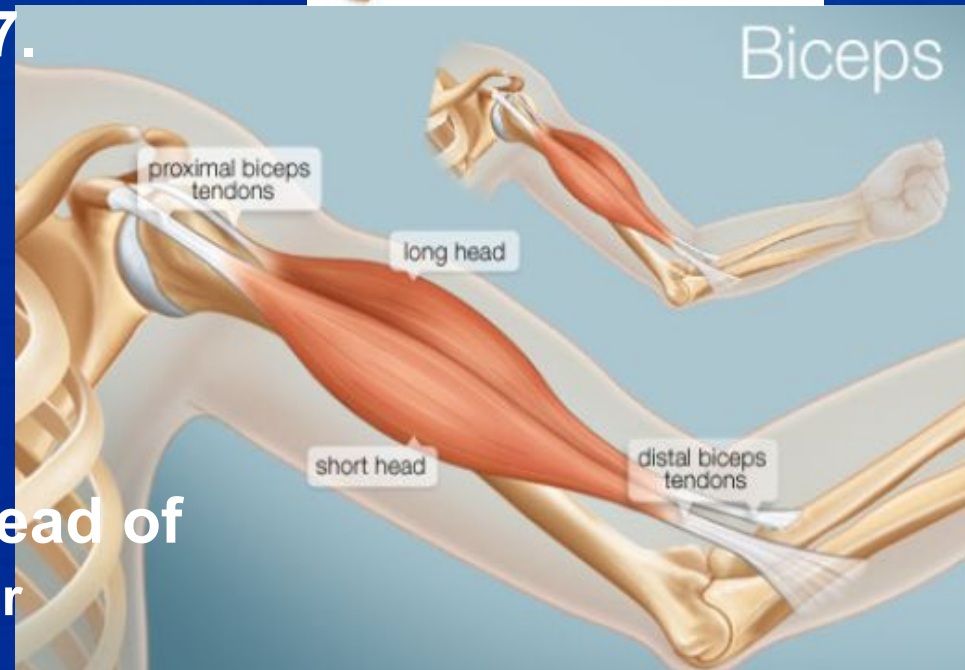
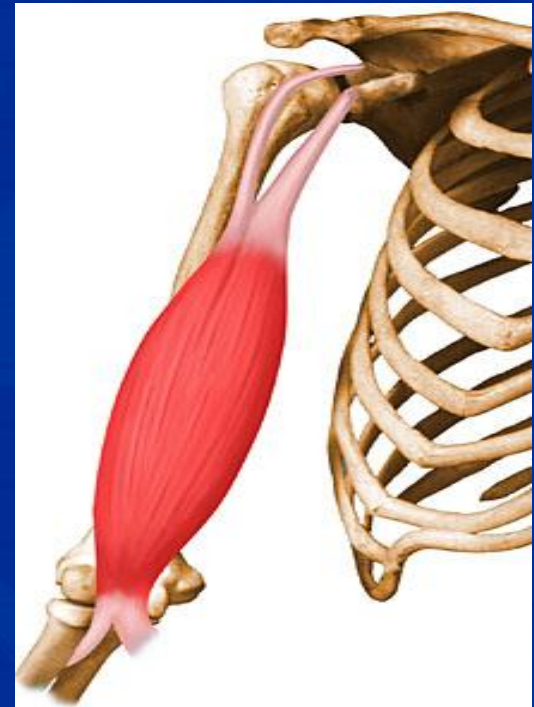
Bicipital aponeurosis (to deep fascia)

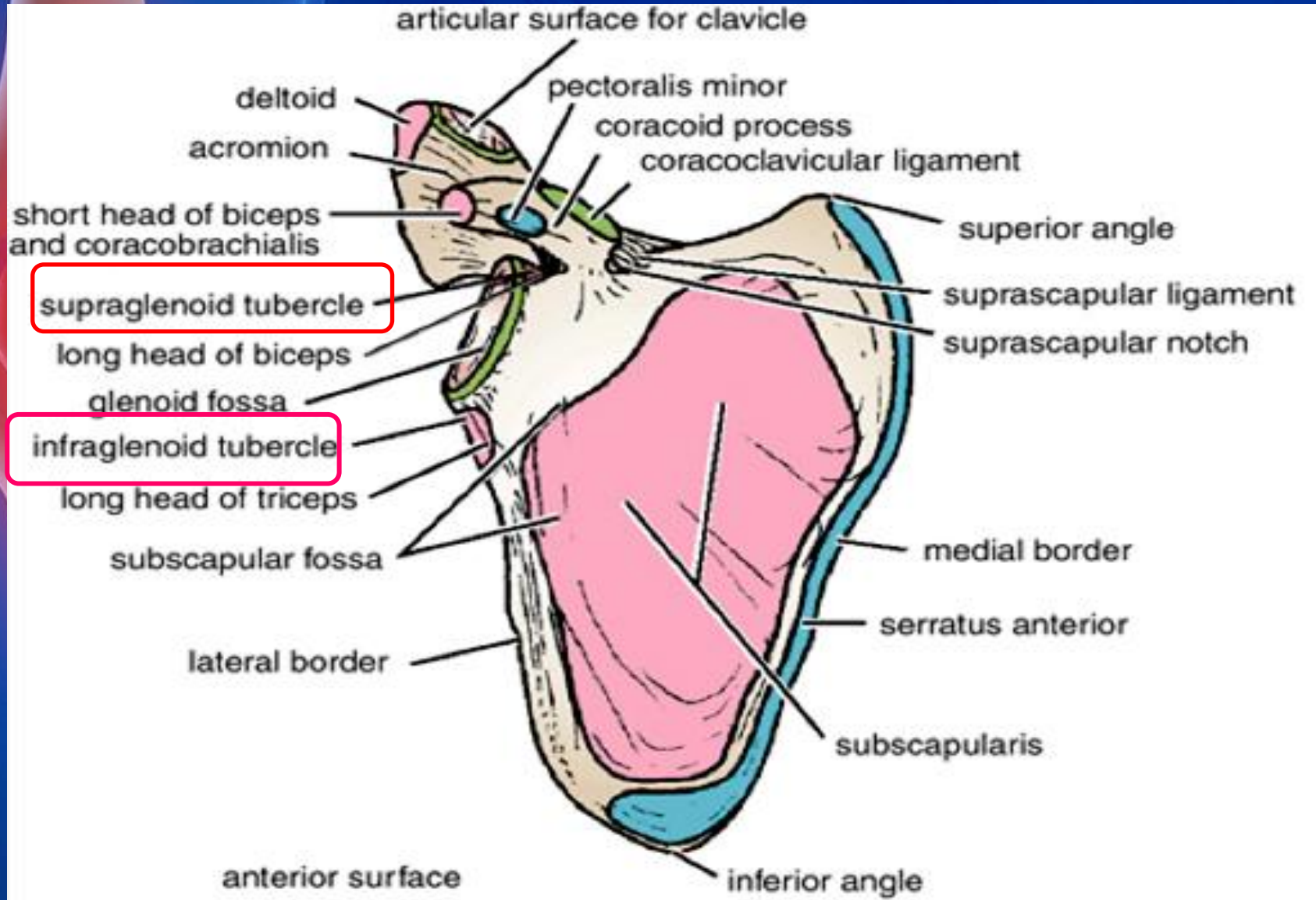
Innervation

Musculocutaneous n C5-C6-C7.

Action

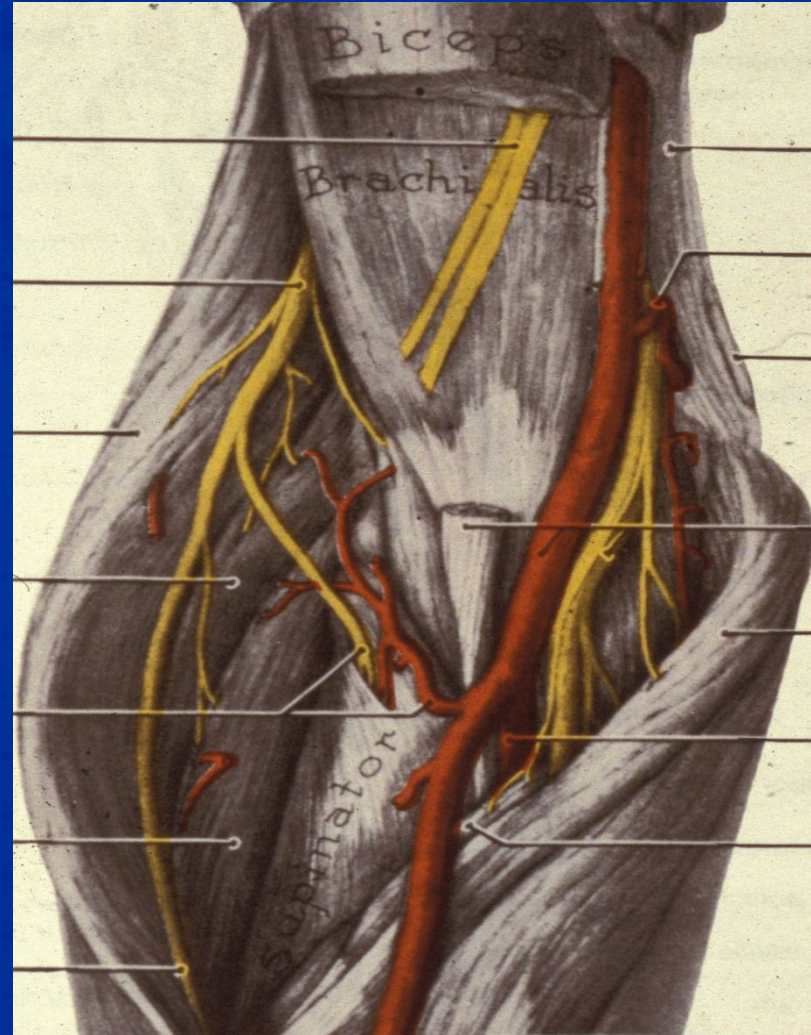
- Flexion of forearm,
- Supination of forearm
- Flexion of shoulder
- Tendon of long head keep head of humerus in place in shoulder movements





Brachialis Muscle

- **Arises** from the anterior aspect of the shaft of the humerus below the deltoid tuberosity
- It is **inserted** into the anterior aspect of the coronoid process of the ulna and the capsule of the elbow joint
- It lies directly anterior to the elbow joint and is **only a flexor of the elbow**
- The musculocutaneous nerve C5,6,7 supplies it



Triceps Muscle

Origin (3 heads)

Long: infraglenoid tubercle of scapula
Stretch over two joints

Lat.: sup. 1/2 of post. aspect of humerus **shaft**

Med: inf. 1/2 of post. aspect of humerus **shaft**

Insertion

Olecranon process of ulna

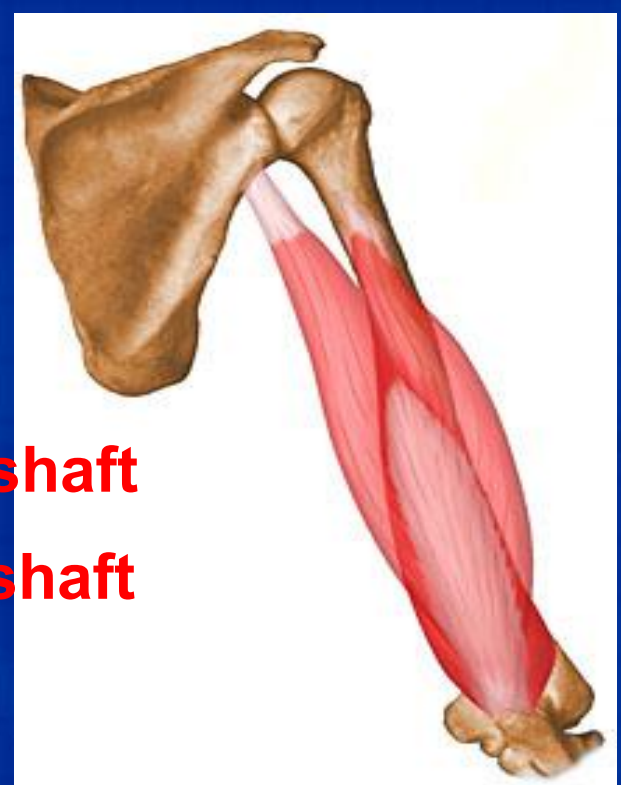
Innervation

Radial n.

Action

Extension of forearm

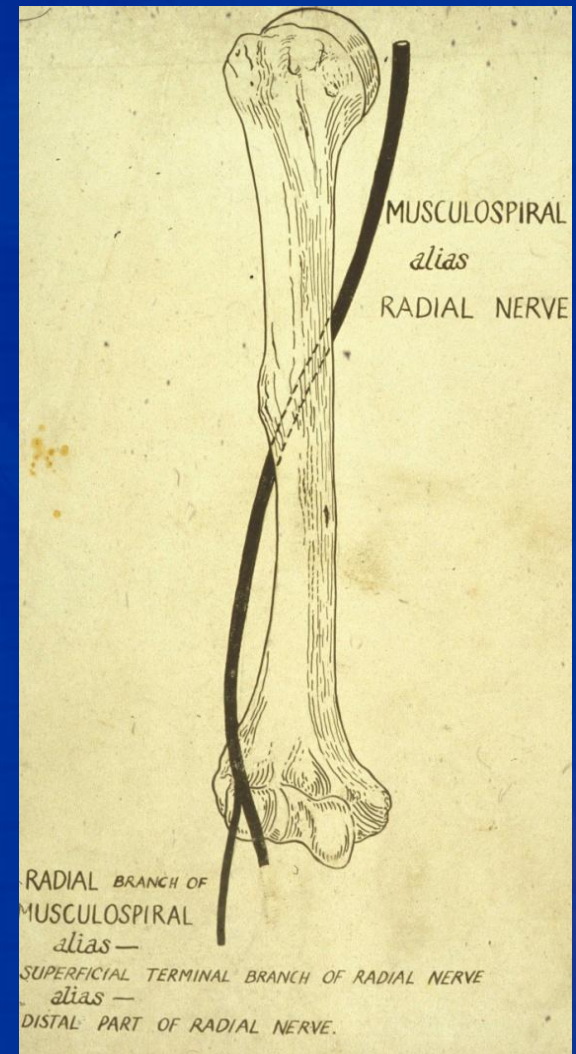
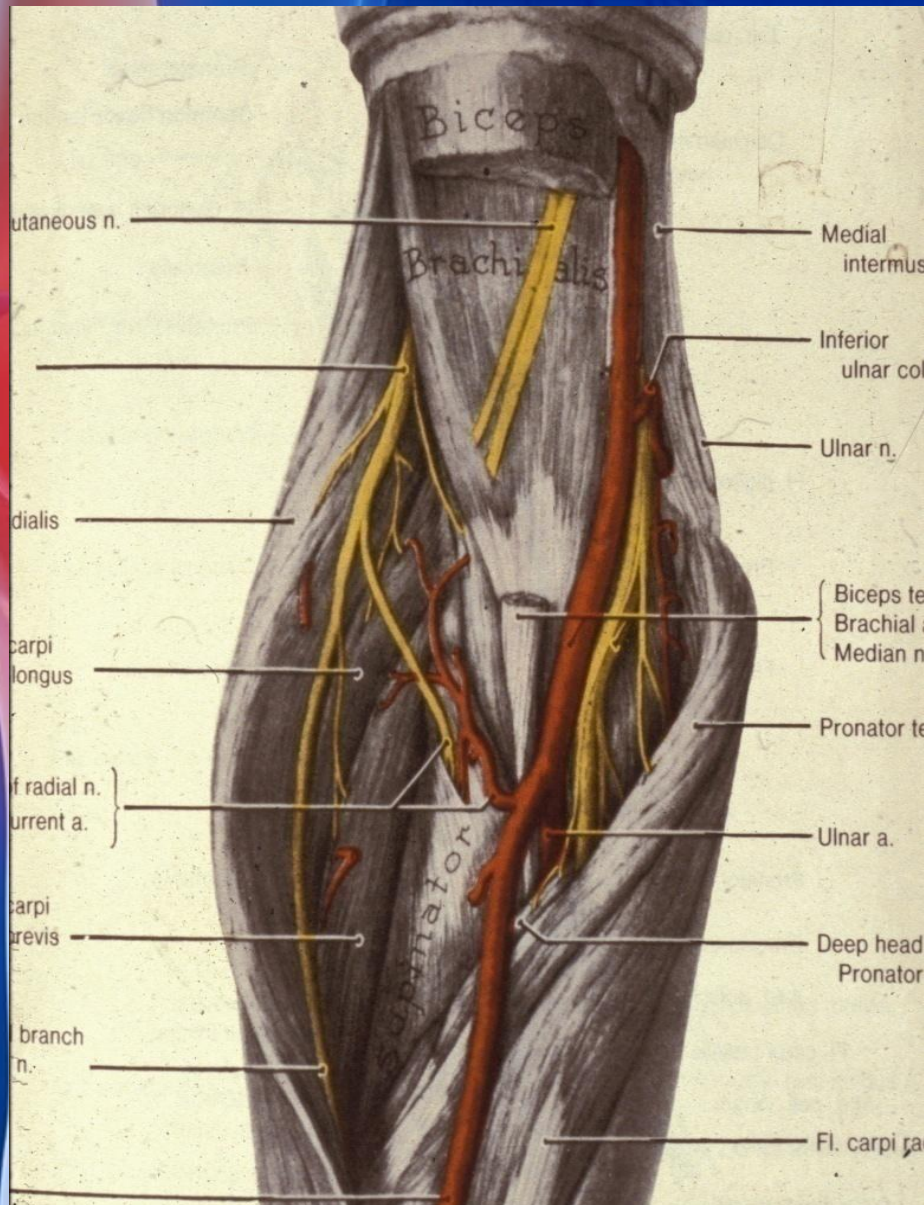
Extension of shoulder long head



Bicipital Groove



Radial nerve in spiral groove



Brachial Artery

Starts:

At lower border of teres major m.

As a continuation of axillary a.

Ends

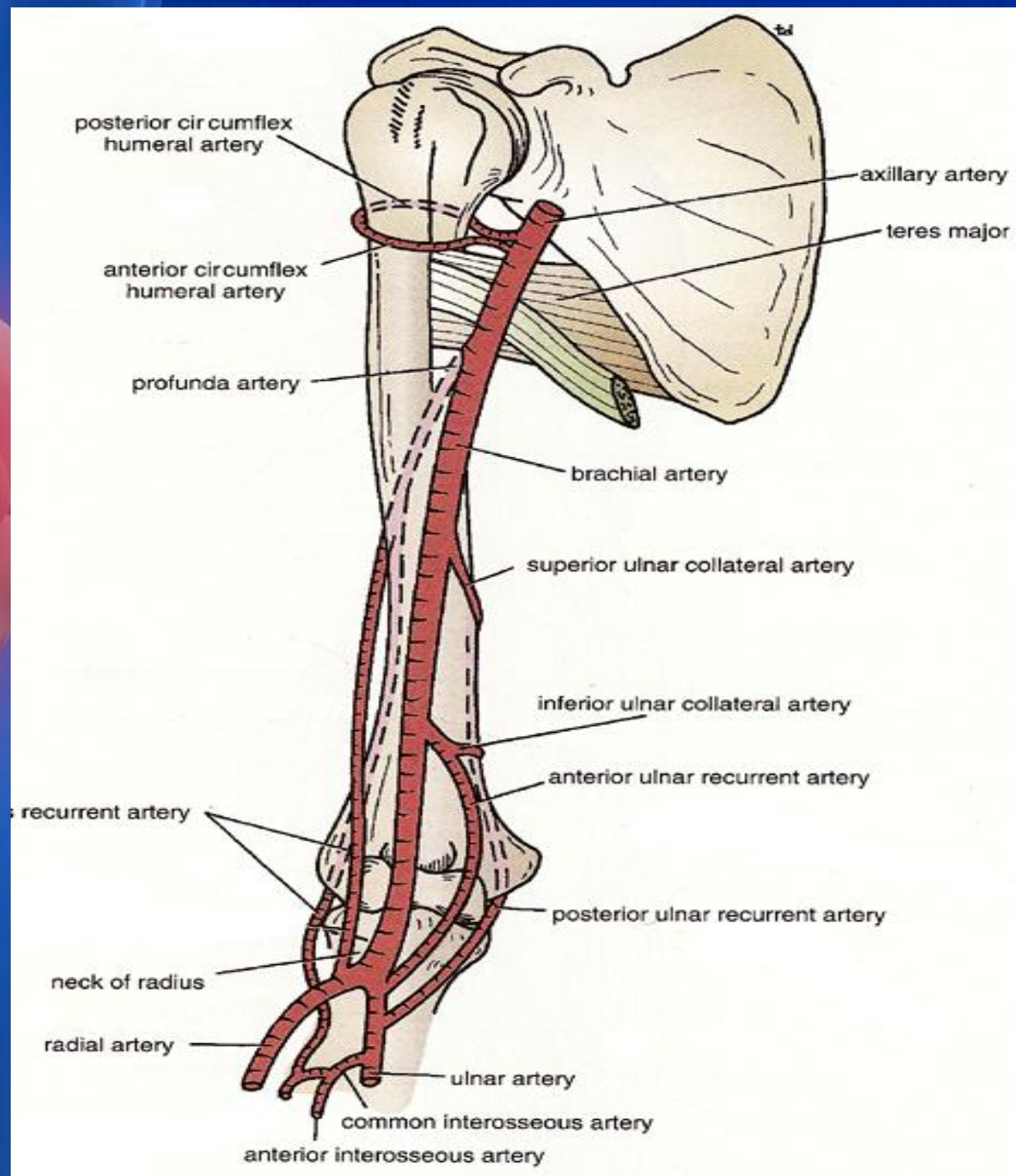
In cubital fossa, 1 cm below elbow joint, opposite to
radial neck

By dividing into:

Radial & Ulnar a.

It is a superficial artery lie below deep fascia in all its
course

Basilic vein lie on its medial side



Pass in bicipital groove

Upper ½ of arm:

Between median & ulnar n.

Medial to humerus bone

At middle of arm:

Crossed by median n. from

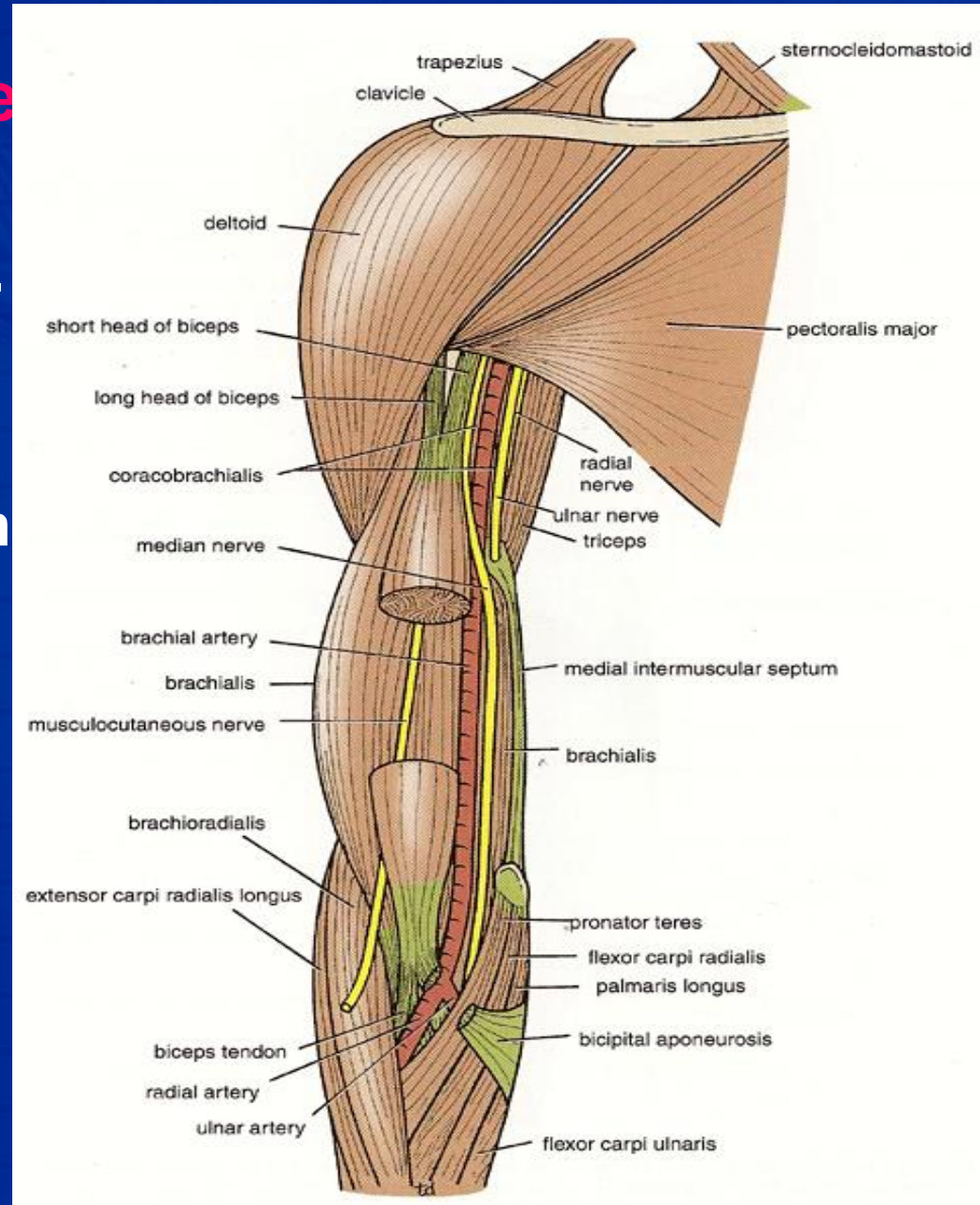
lat. to med. Side

Lie over humerus bone

At elbow:

Enters cubital fossa,

Medial to biceps tendon



Branches of Brachial Artery

Muscular branches

To muscles of ant. compartment

Profunda brachii (Deep a. of the arm)

Pass post. largest branch

Follows radial n. into spiral groove

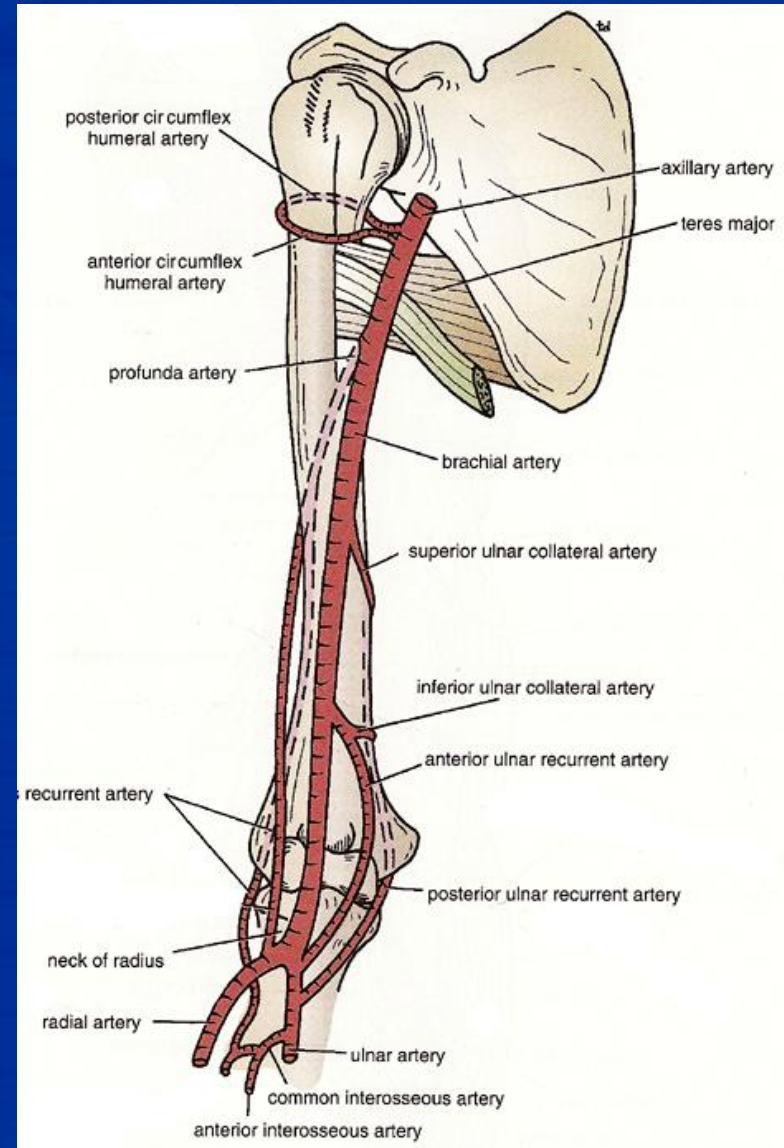
Supply triceps m.

Nutrient a.

To humerus

Sup. & Inf. ulnar collateral a.

Contribute to elbow anastomoses



Veins of The Arm

Superficial Veins:

Cephalic v.

Basilic v.

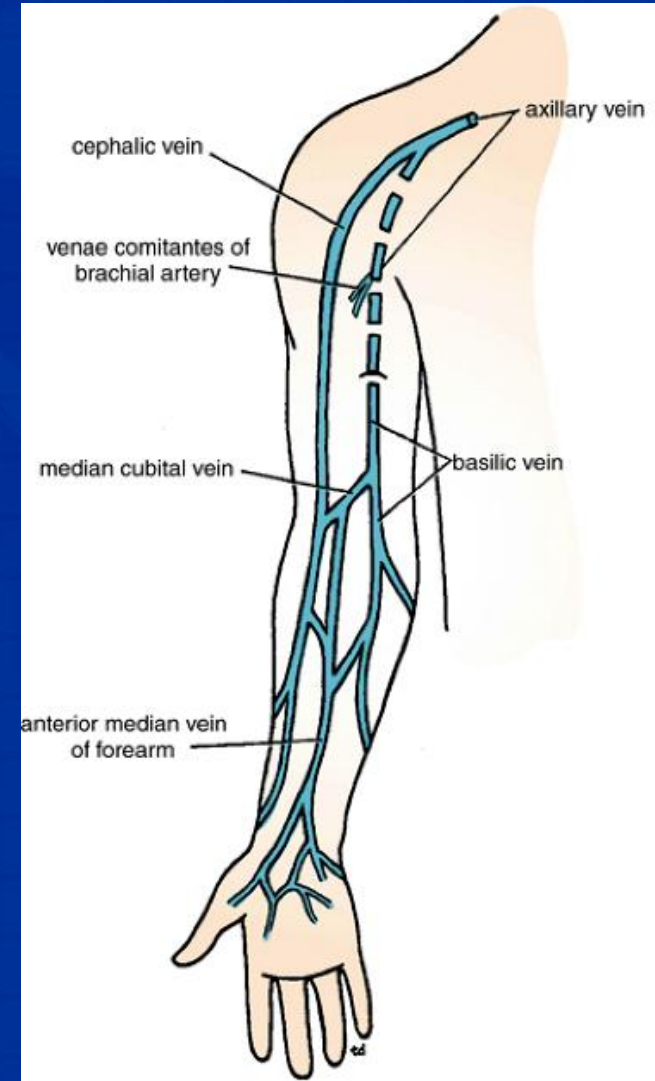
Median cubital vein

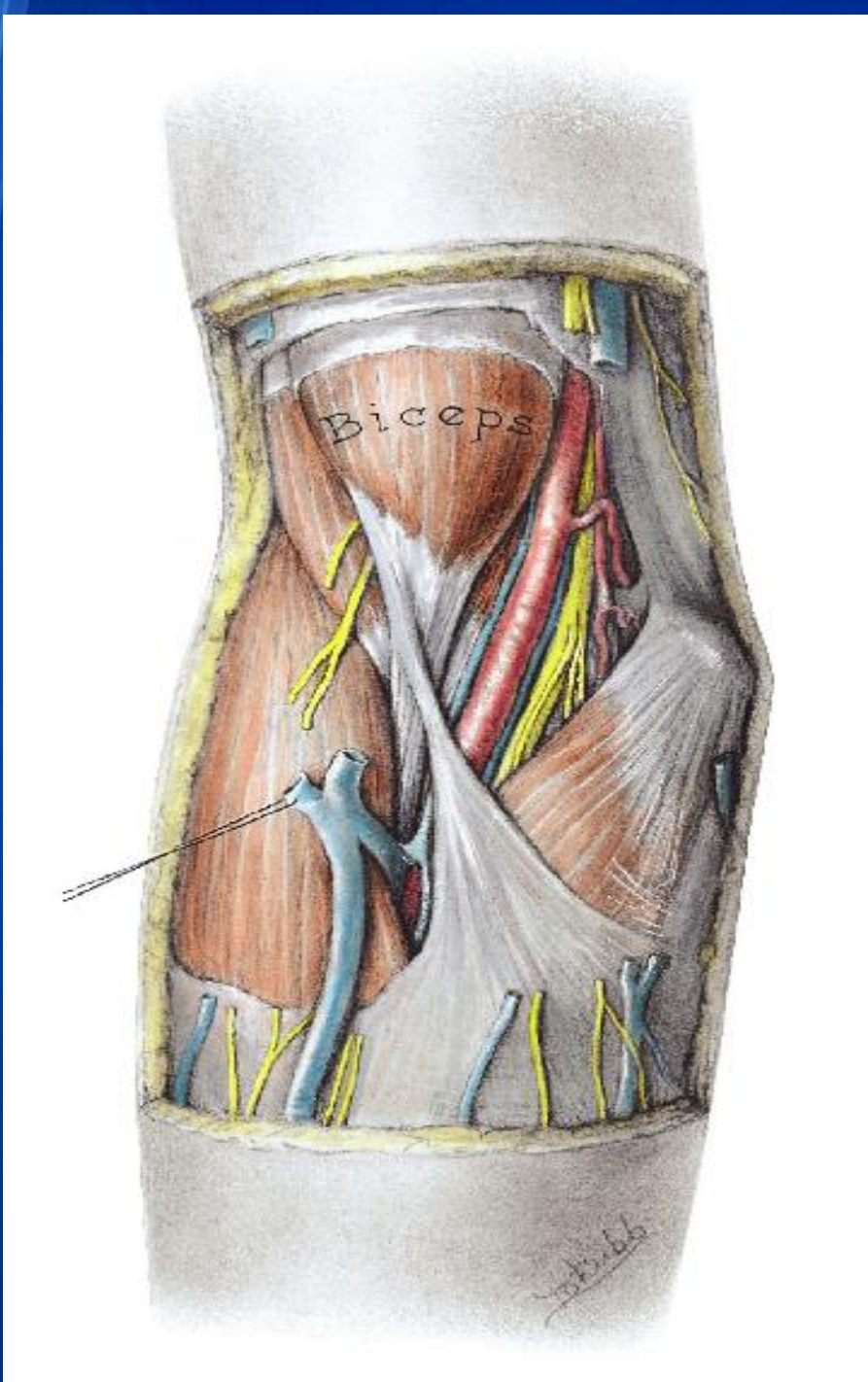
Deep Veins:

Brachial v.

(vena comitans: *accompanying vein*)

pair of veins on the sides of brachial a.





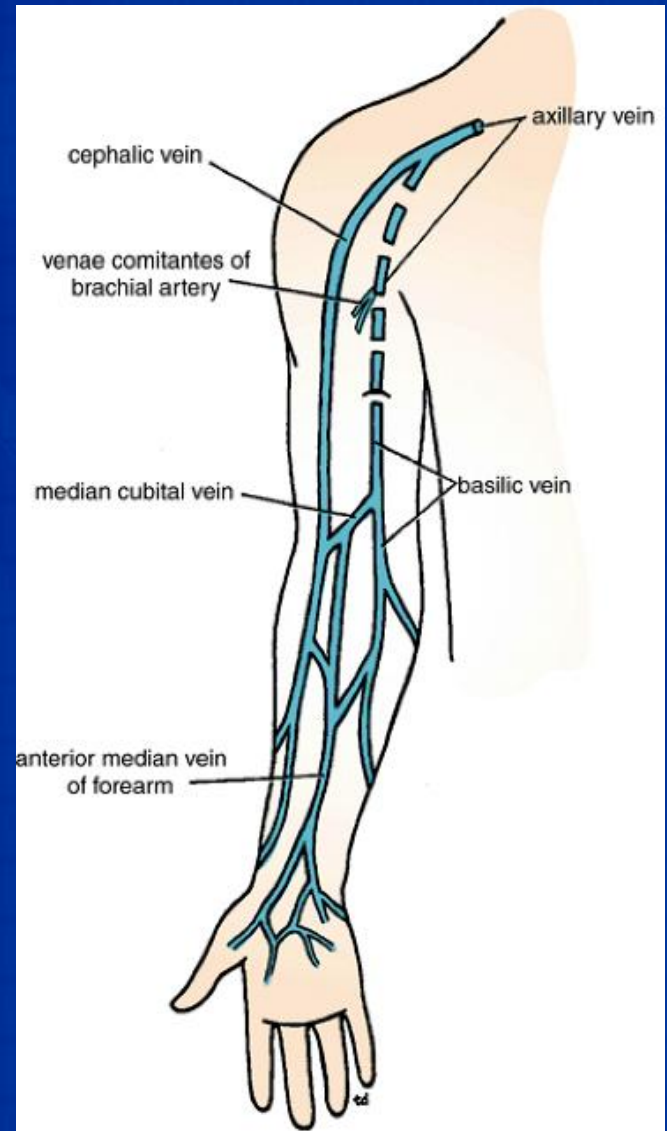
Cephalic Vein

From lat. Side of venous network
on the back of the hand

Ascends in the anterolateral
aspect of forearm

Lat. to biceps m. in the arm

At delto-pectoral triangle:
drains to axillary v.



Basilic Vein

From medial side of venous network on the back of the hand

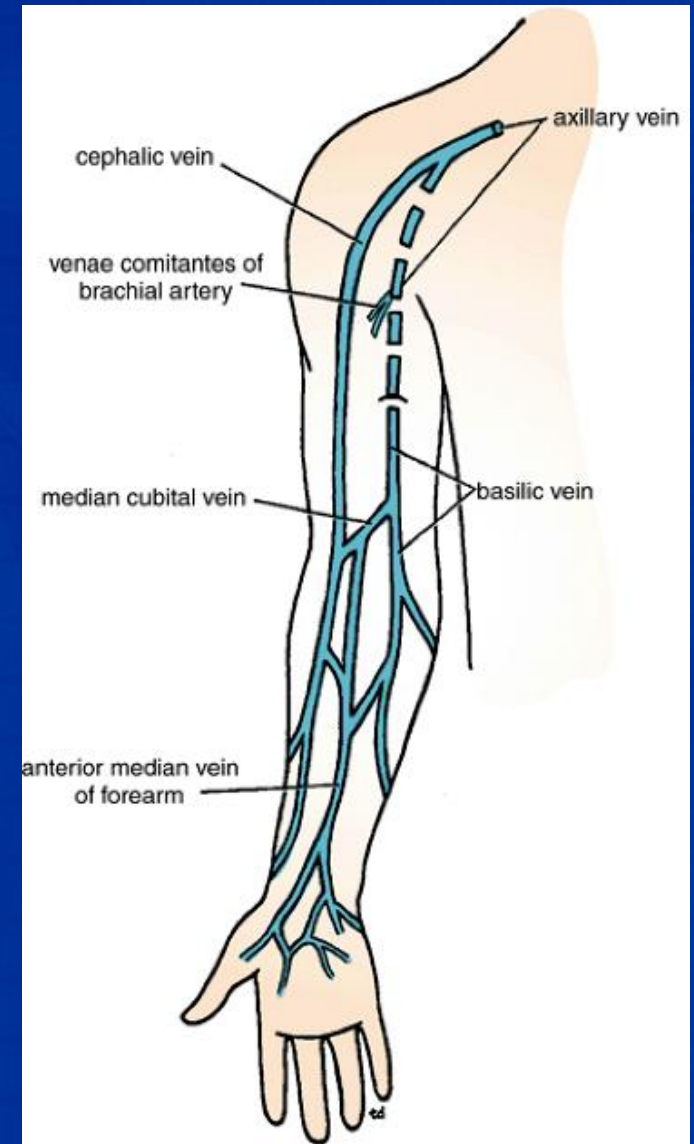
Ascends in posteromedial aspect of forearm

Medial side of biceps m. in the arm

At middle of arm:

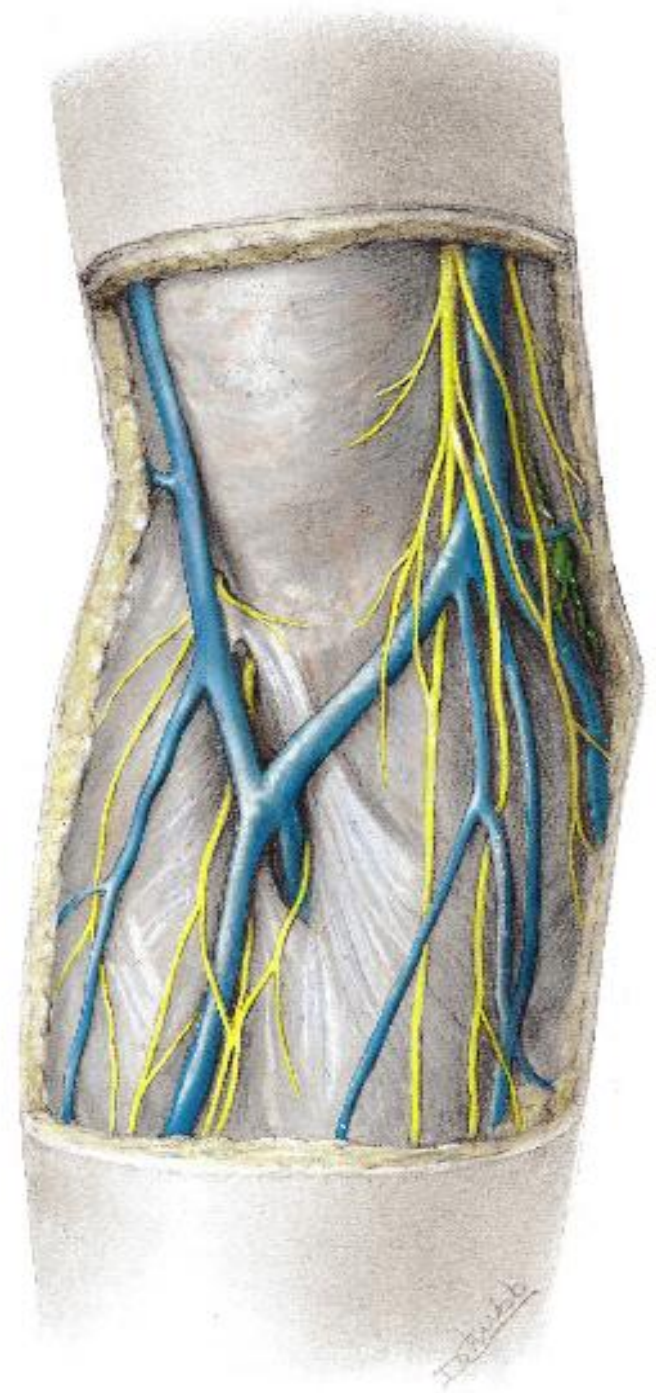
Pierces deep fascia & join brachial vein.

To form: **axillary vein**



Median cubital vein

- Is a branch of cephalic vein
- Lies in cubital fossa
- Joins Basilic vein
- Crosses in front of brachial artery and median nerve
- Separated from them by bicipital aponeurosis.



Scapulo-humeral Muscles

Deltoid

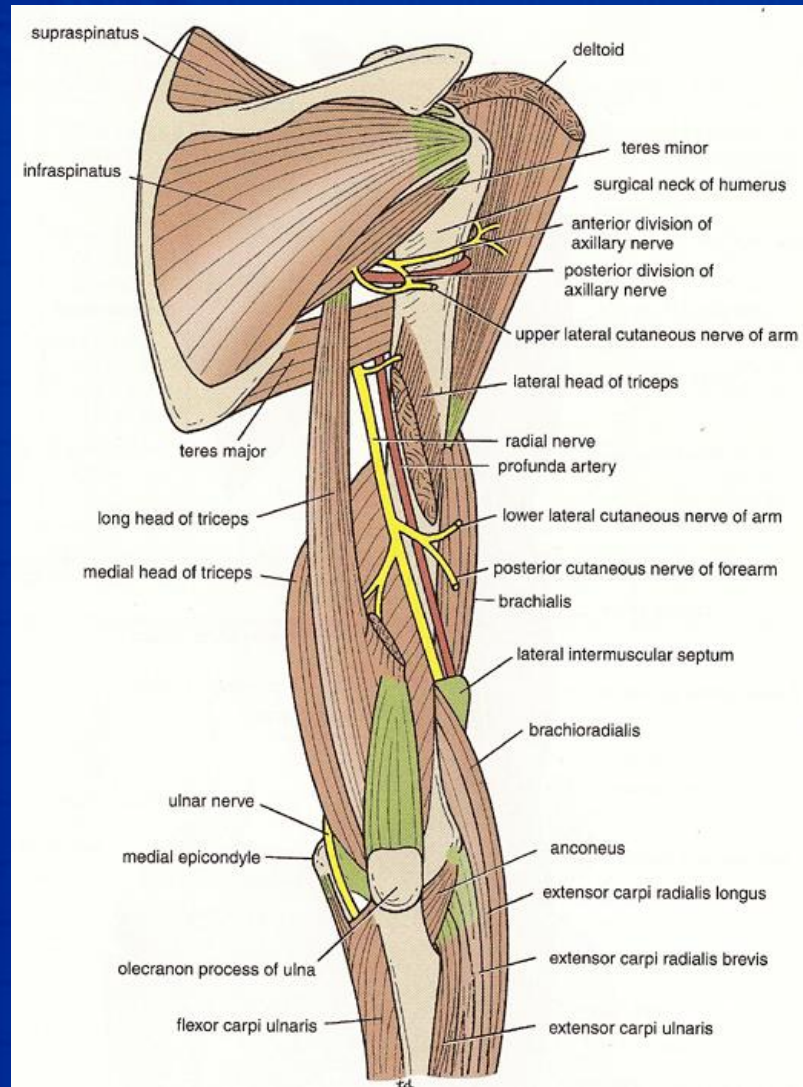
Teres Major

Teres Minor

Supraspinatus

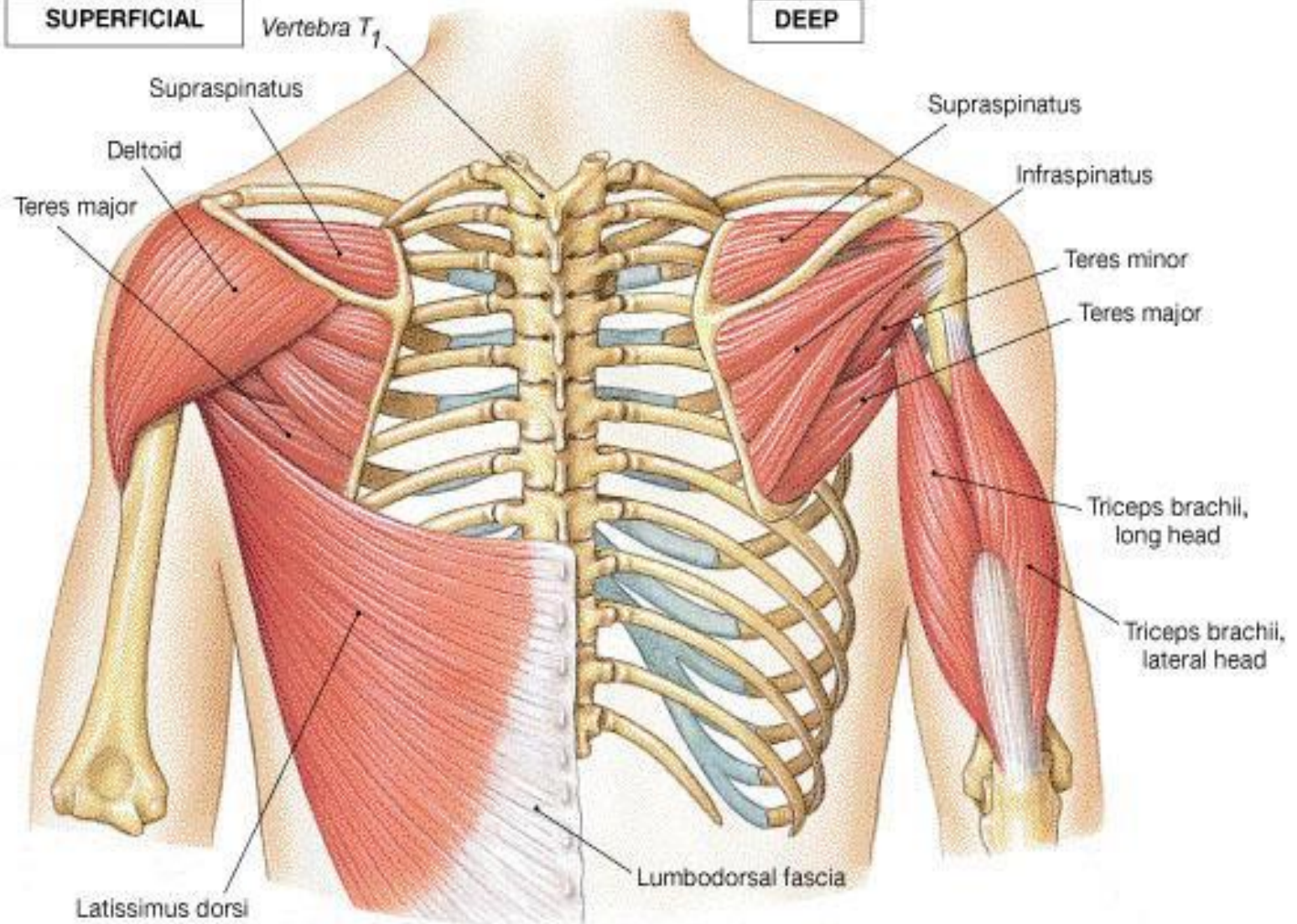
Infraspinatus

subscapularis



SUPERFICIAL

DEEP



(b) Posterior view

Rotator Cuff Muscles

4 Muscles that inserted around shoulder joint & and fuse with underlying capsule of shoulder joint form a musculotendinous cuff

Cover the joint from 3 directions:

- Superior: **Supraspinatus**
- Anterior: **Subscapularis**
- Posterior: **Infraspinatus & teres minor**

Fxn.

Stabilize shoulder joint

Deficit inferiorly that is weak area

Anterior



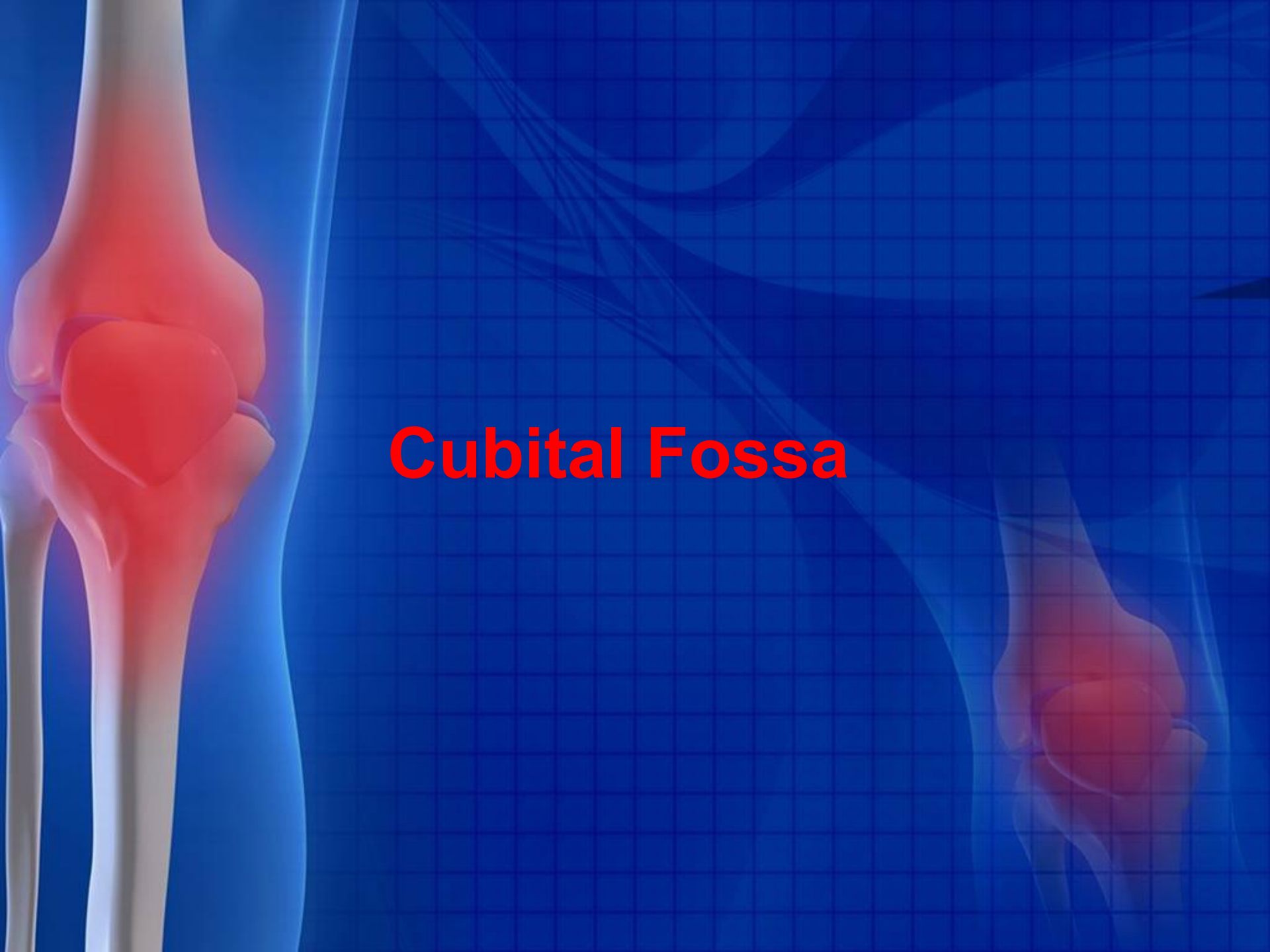
Superior



Posterior



Cubital Fossa



Shallow triangular depression
on the anterior surface of the
elbow joint, and upper 1/3 of
forearm

base above

apex extend a short **distance**

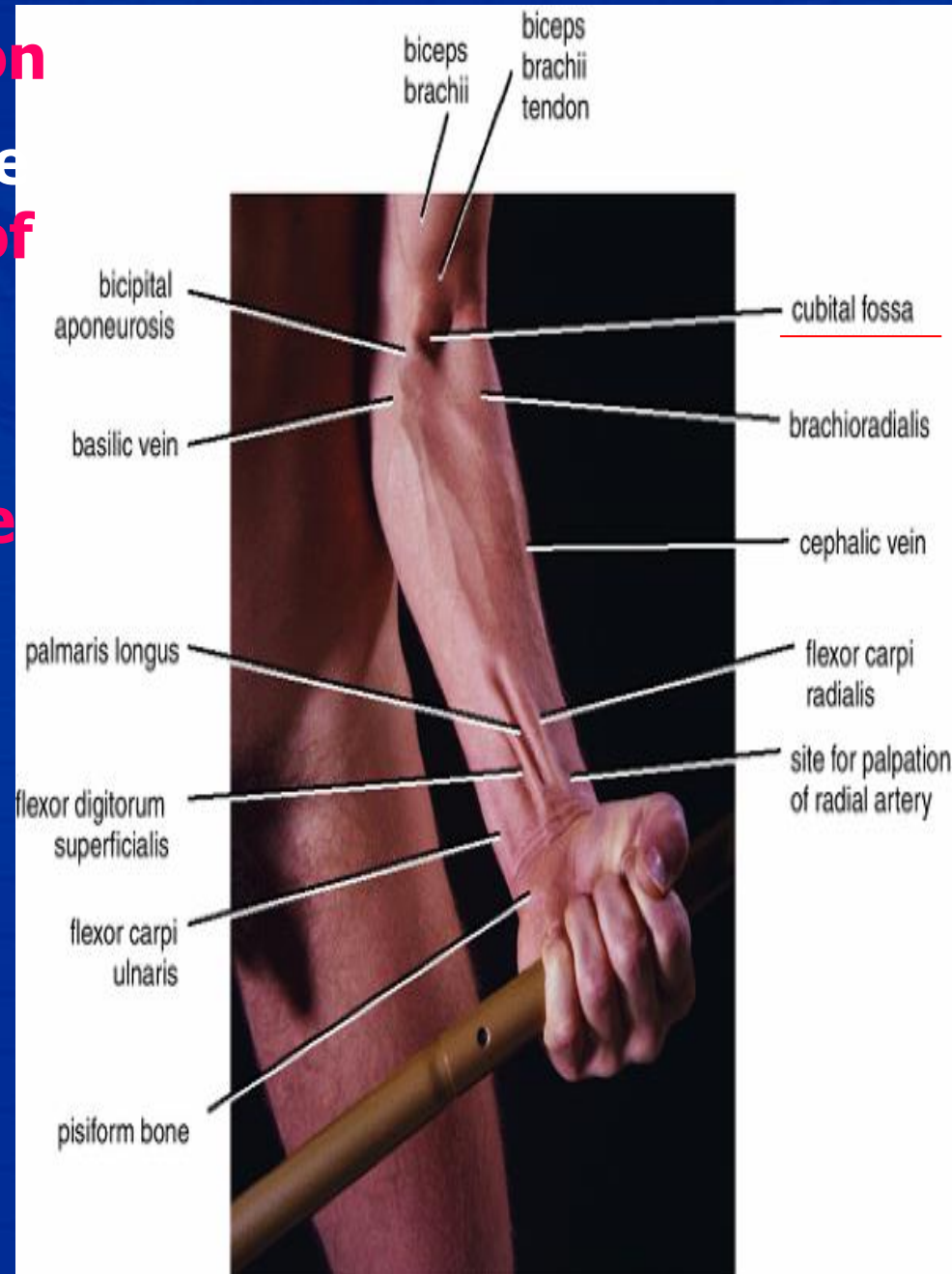
in fore arm, overlapping of
BR over PT muscle

Boundaries

Superiorly: imaginary line
connecting the epicondyles

Laterally: brachioradialis

Medially: Pronator teres



Contents of the cubital fossa

From medial to lateral:

Median n.



Brachial a.



Biceps tendon



Radial nerve



Floor:

Brachialis m. (med and above)

Supinator m. (lat and below)

Roof:

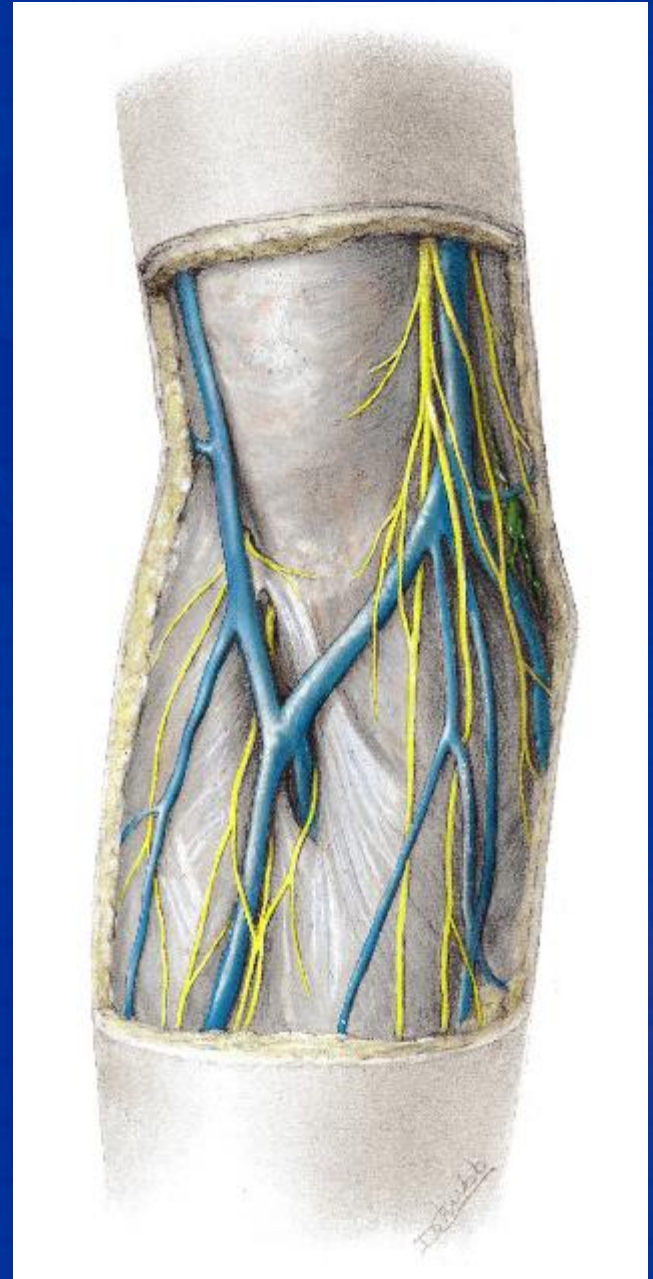
Skin, superficial and deep fascia,
and bicipital aponeurosis

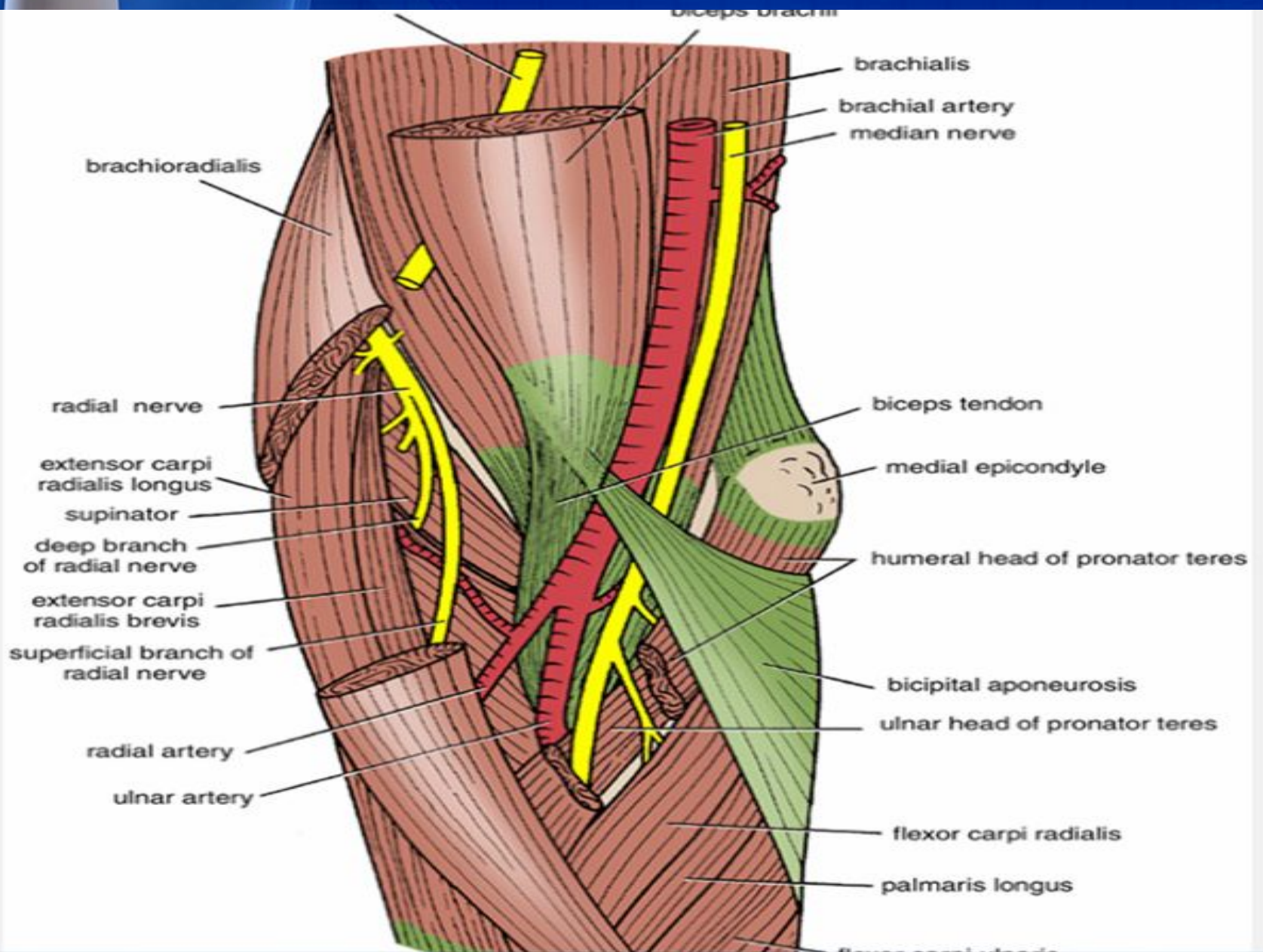
Sup Fascia contains 3 Sup veins,
Supratrochlear LN , lat , med
Cutaneous ns of FA

Fascia:

Superficial (median cubital vein)

Deep (bicipital aponeurosis)





Skin

**Superf. Fascia
(med. Cubital
v.)**

Deep fascia

**Bicipital
aponeuro.**

Median n.

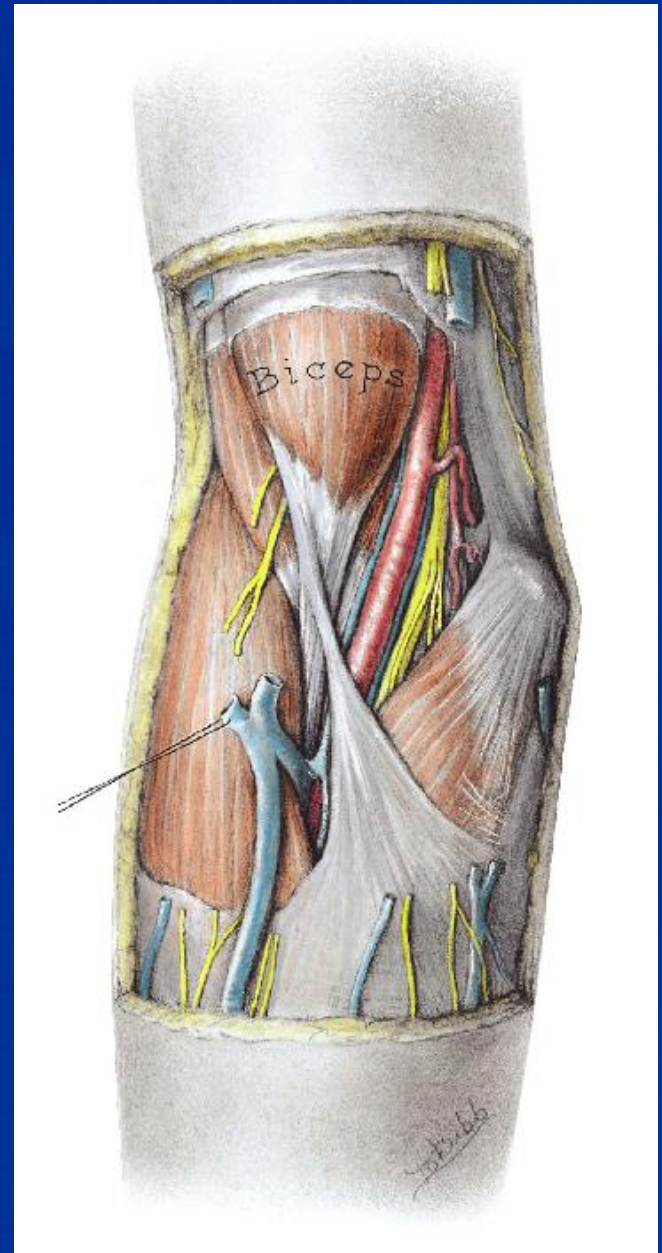
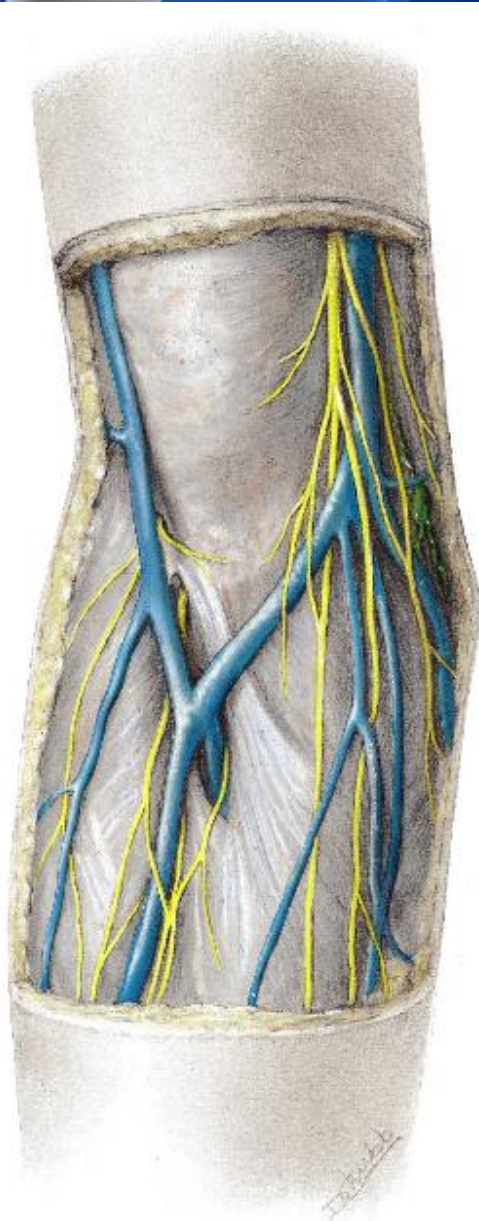
Brachial a

Biceps t.

Radial nerve

Brachialis

supinator



How do these structures leave the cubital fossa?

- **Median nerve** disappear between two heads of pronator teres
- **Ulnar artery** deep to pronator teres
- **Radial artery** overlapped by brachioradialis muscle
- **Biceps tendon** to tuberosity of radius

Supratrochlear LN are present in upper medial part of fossa



Nerves of Arm

4 main nerves:

- **Musculocutaneous n.**
- **Median n.**
- **Ulnar n.**
- **Radial n.**



Gleno-Humeral (Shoulder) Joint

Type: Synovial (*ball & socket*)

Multiaxial joint, wide range of movement

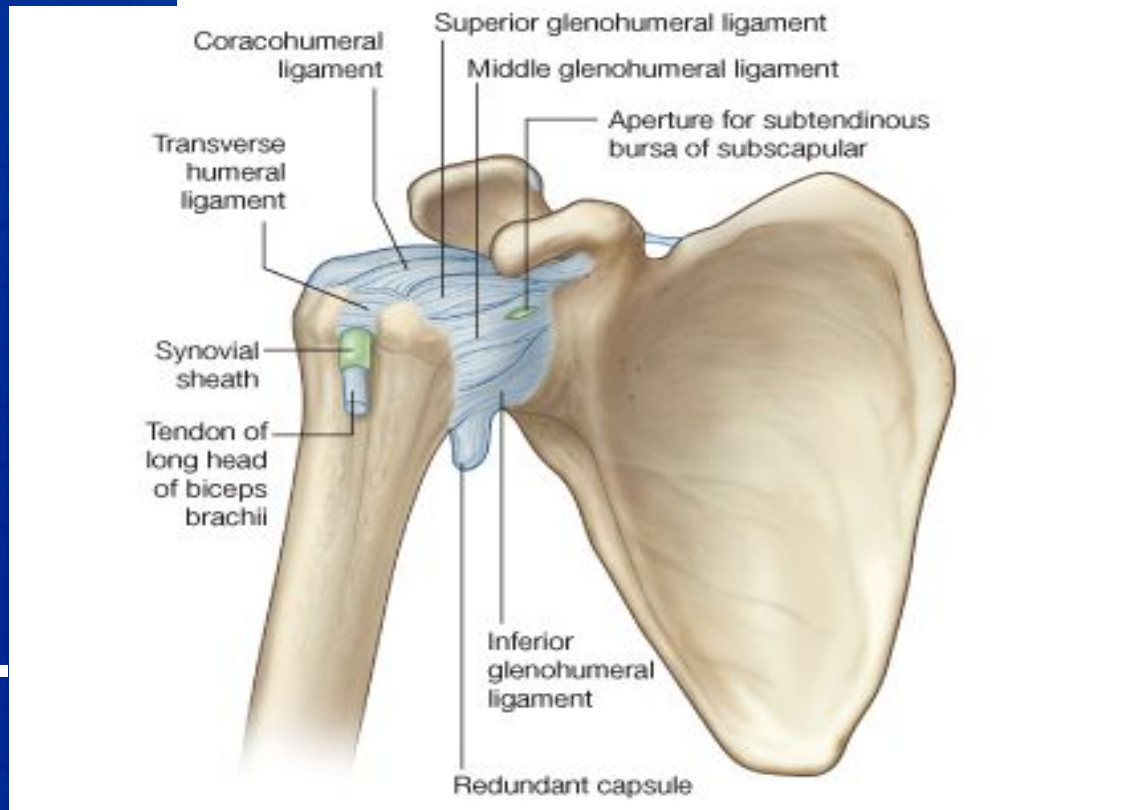
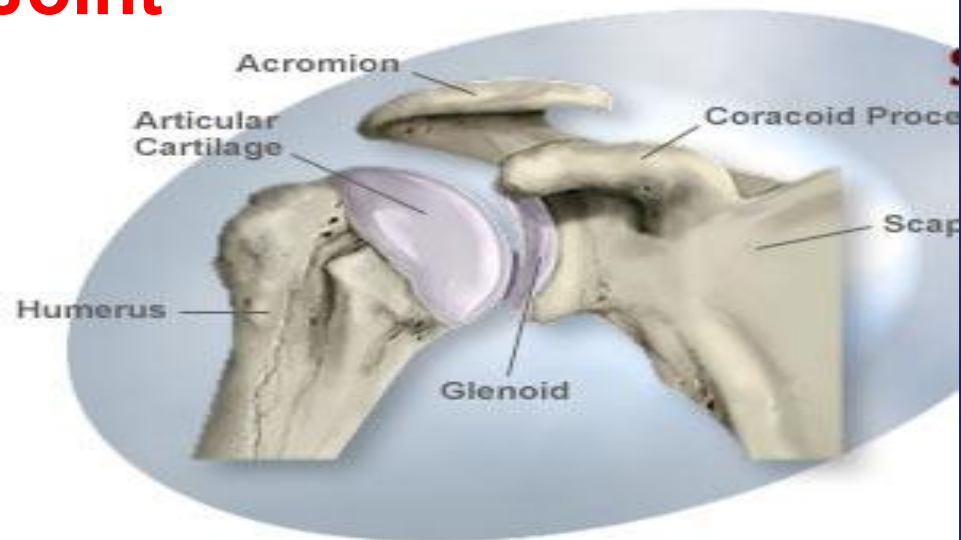
Articulations:

Head of humerus

Glenoid cavity of scapula

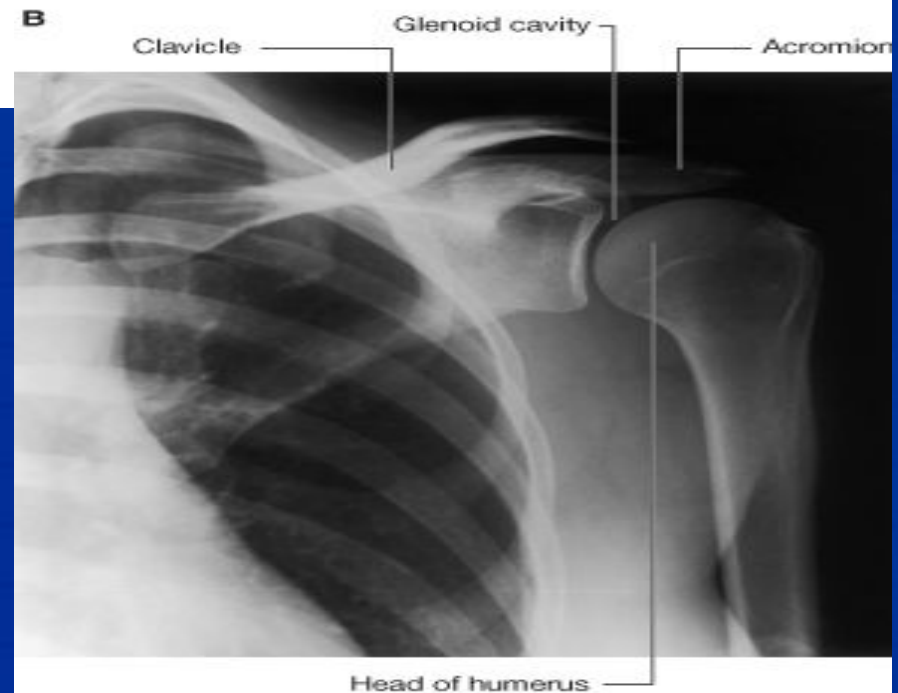
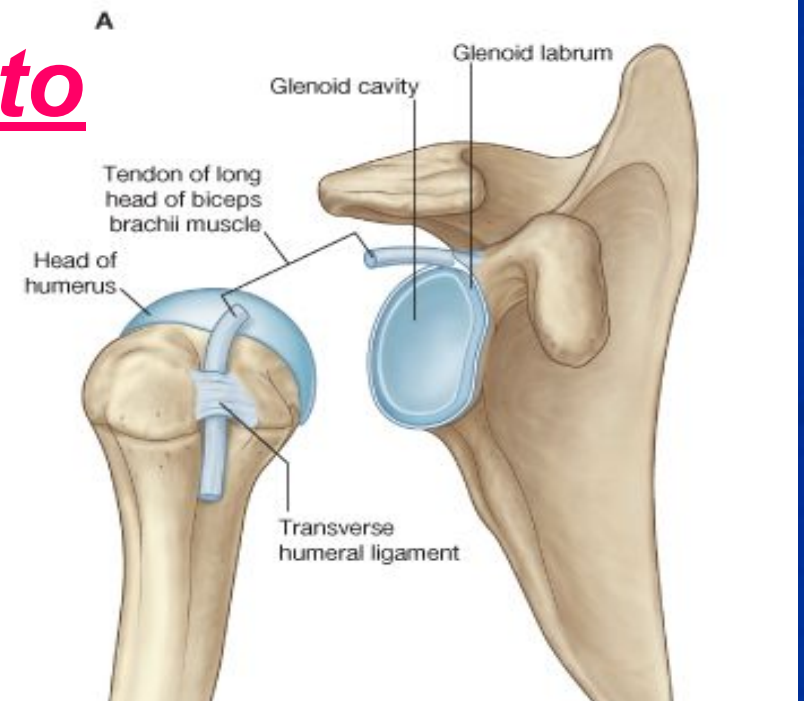
Ligaments:

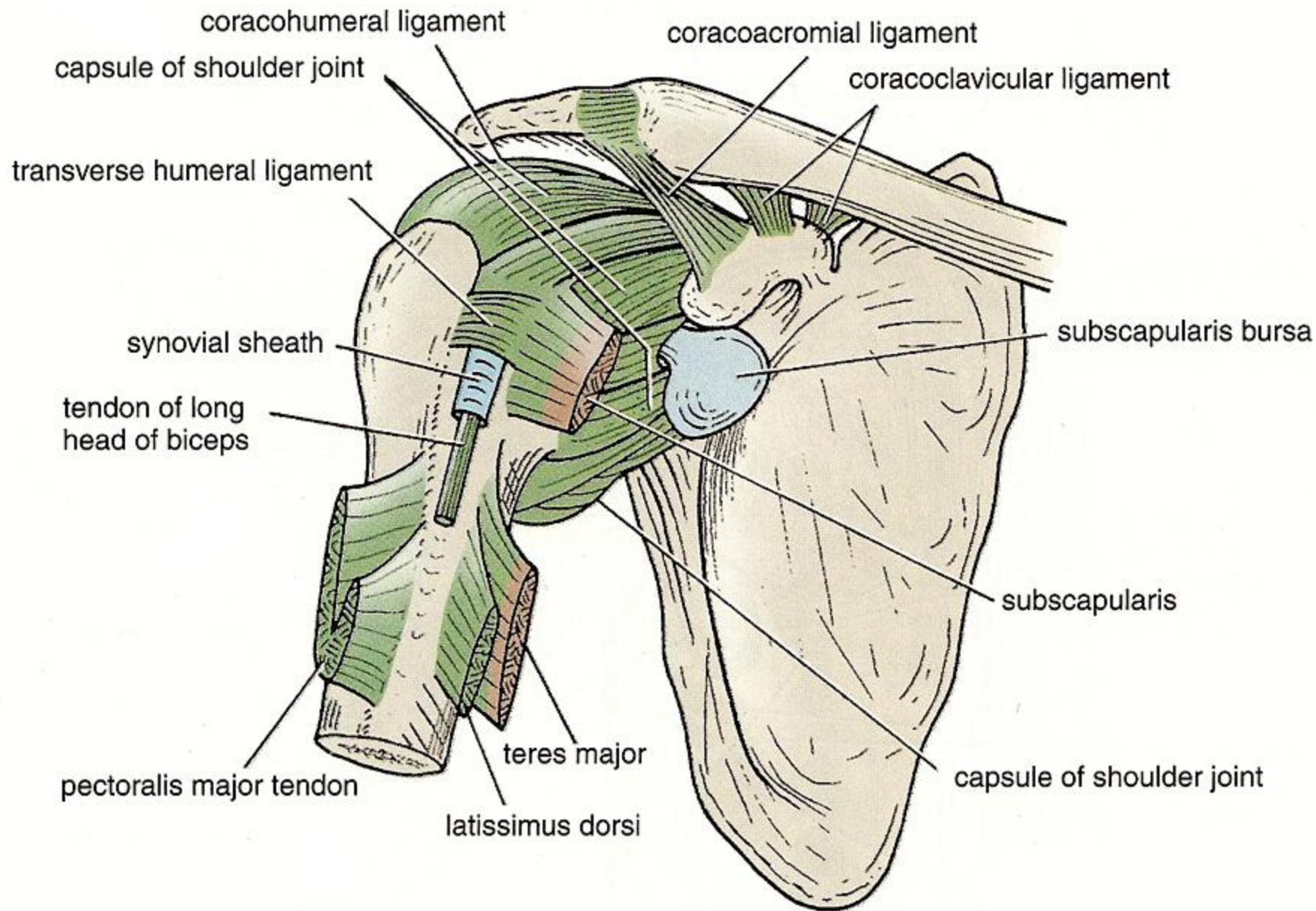
1. Fibrous Capsule
2. Gleno-humeral lig.(3)
thickening of fibrous capsule
3. Coraco-humeral lig.
4. Transverse humeral lig.

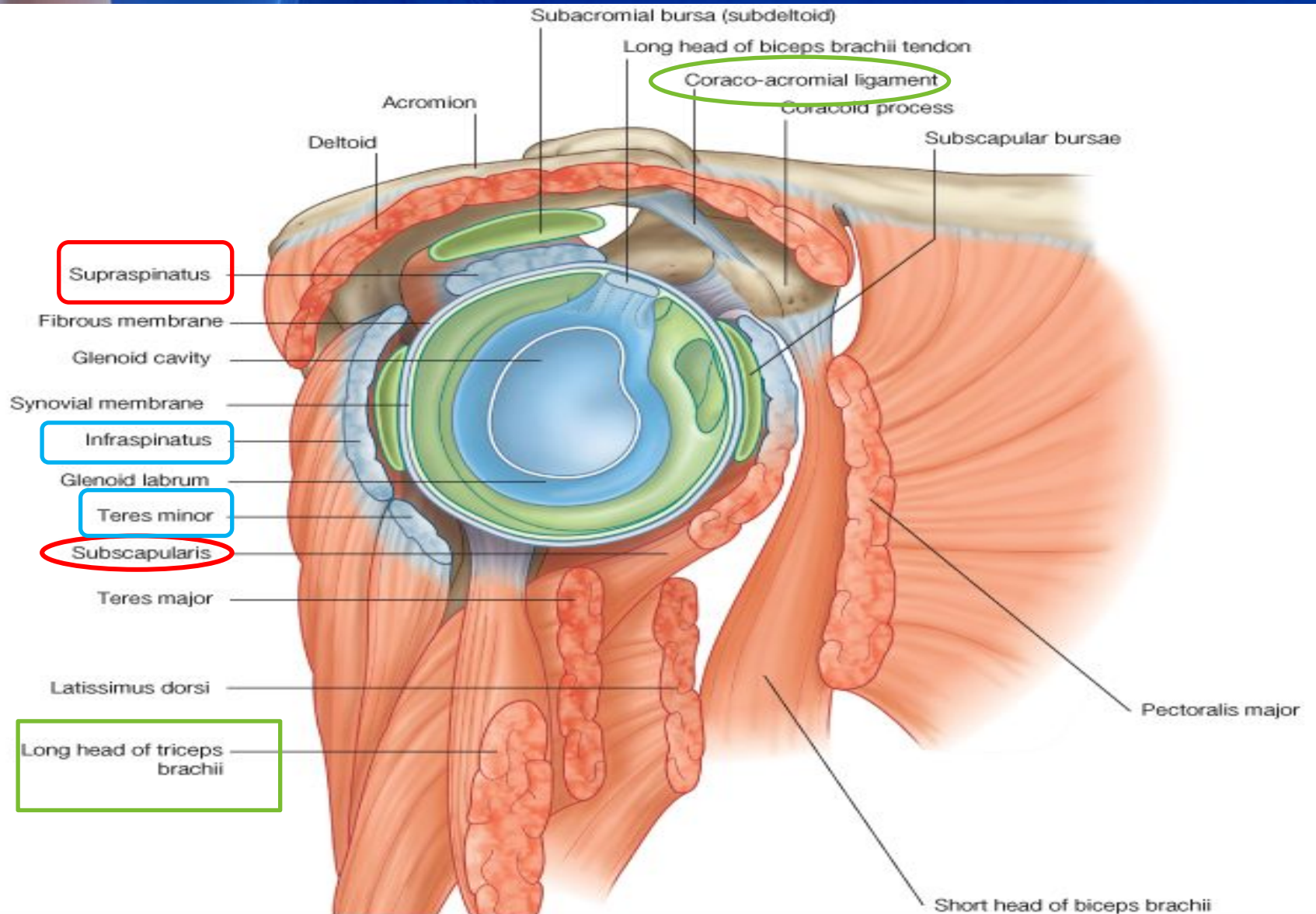


Stability of joint is due to

- Rotator cuff muscles
- Long head of biceps muscle
- Related bony processes
- Extra capsular Lig.







Movement of shoulder region

- **Flexion** :Anterior fibers of deltoid,pectoralis major, long head of biceps
- **Extension**: Posterior fibers of deltoid ,teres major, latissimus dorsi M
- **Abduction**: 0-15° supraspinatus
15°-90° middle fibers of deltoid
above 90° rotation of scapula
- **Adduction** :Pectoralis major muscles,latissimus dorsi and teres major and minor
- **Median rotation**: Subscapularis ,latissimus dorsi, anterior fibers of deltoid teres major
- **Lateral rotation**: Teres minor, infraspinatus Posterior fibers of deltoid

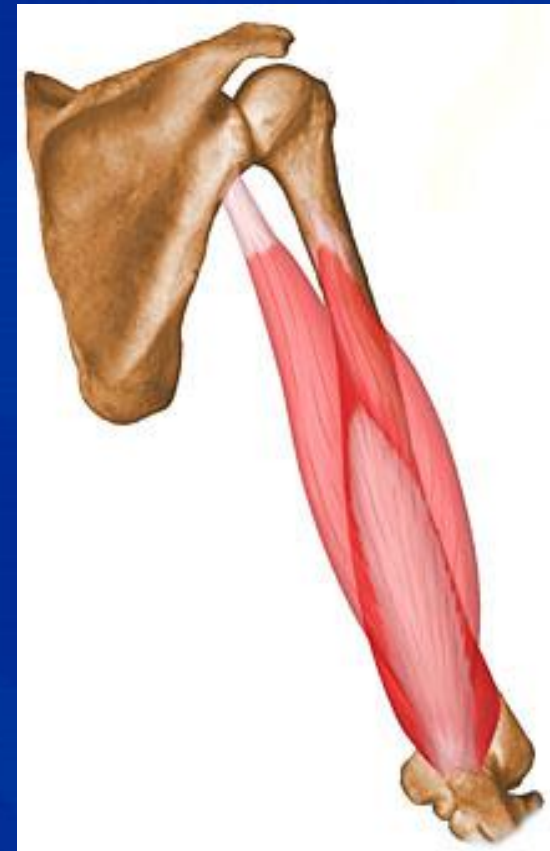
Movements:

Circumduction

Includes all movements together

Characteristics:

- The fibrous capsule is ***Weak inferiorly*** due to:
 - 1. Penetrated inferiorly by tendon of long head of triceps
 - 2. Joint is surrounded (stabilized) by group of muscles called: **Rotator Cuff muscles**
****except inferiorly***



Rotator Cuff Muscles

4 muscles that inserted around shoulder joint & and fuse with underlying capsule of shoulder joint form a musculotendinous cuff

Cover the joint from 3 directions:

Superior: **supraspinatus**

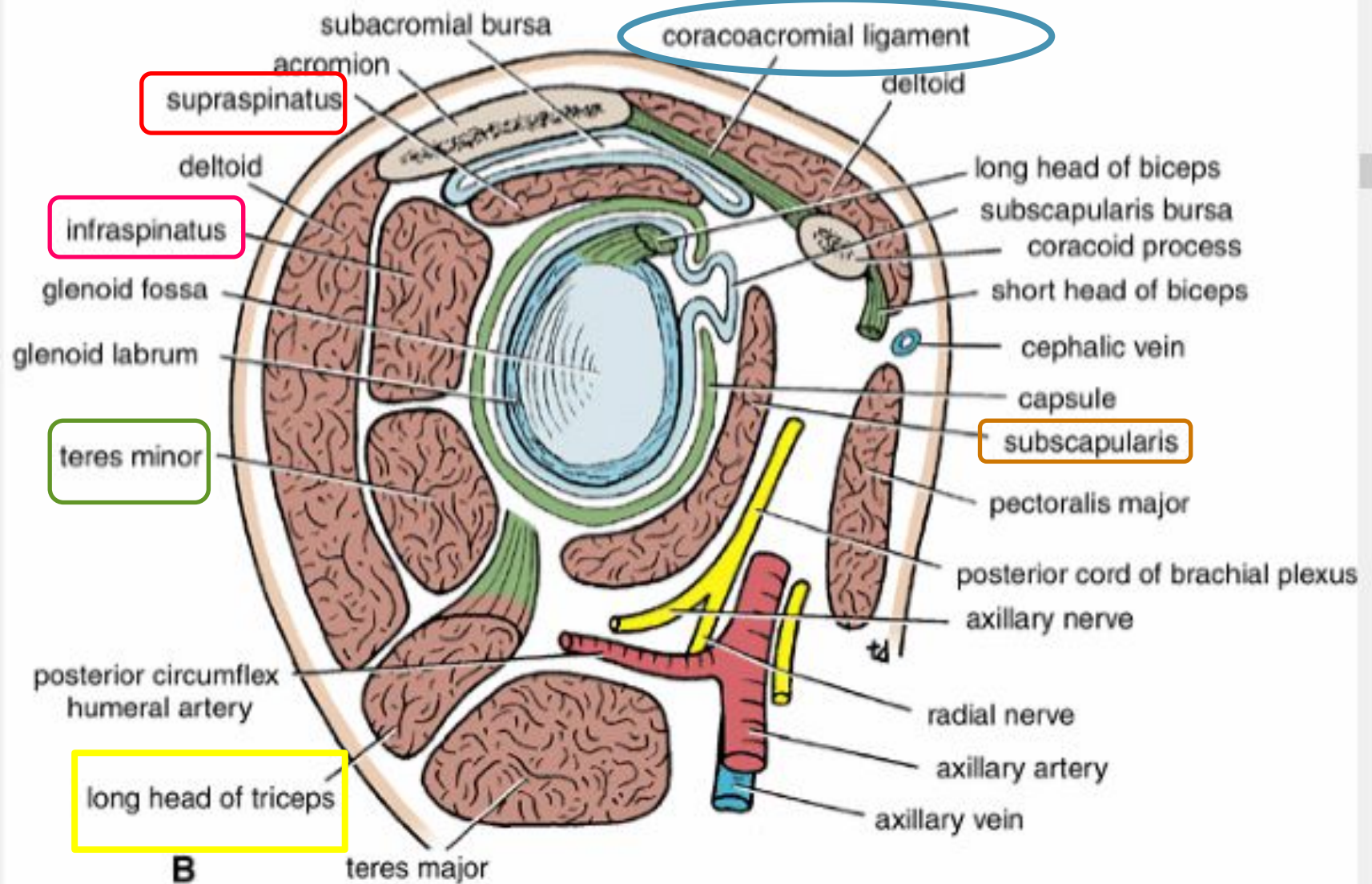
Anterior: **subscapularis**

Posterior: **infraspinatus & teres minor**

Fxn.

Stabilize shoulder joint

Deficit inferiorly that is weak area

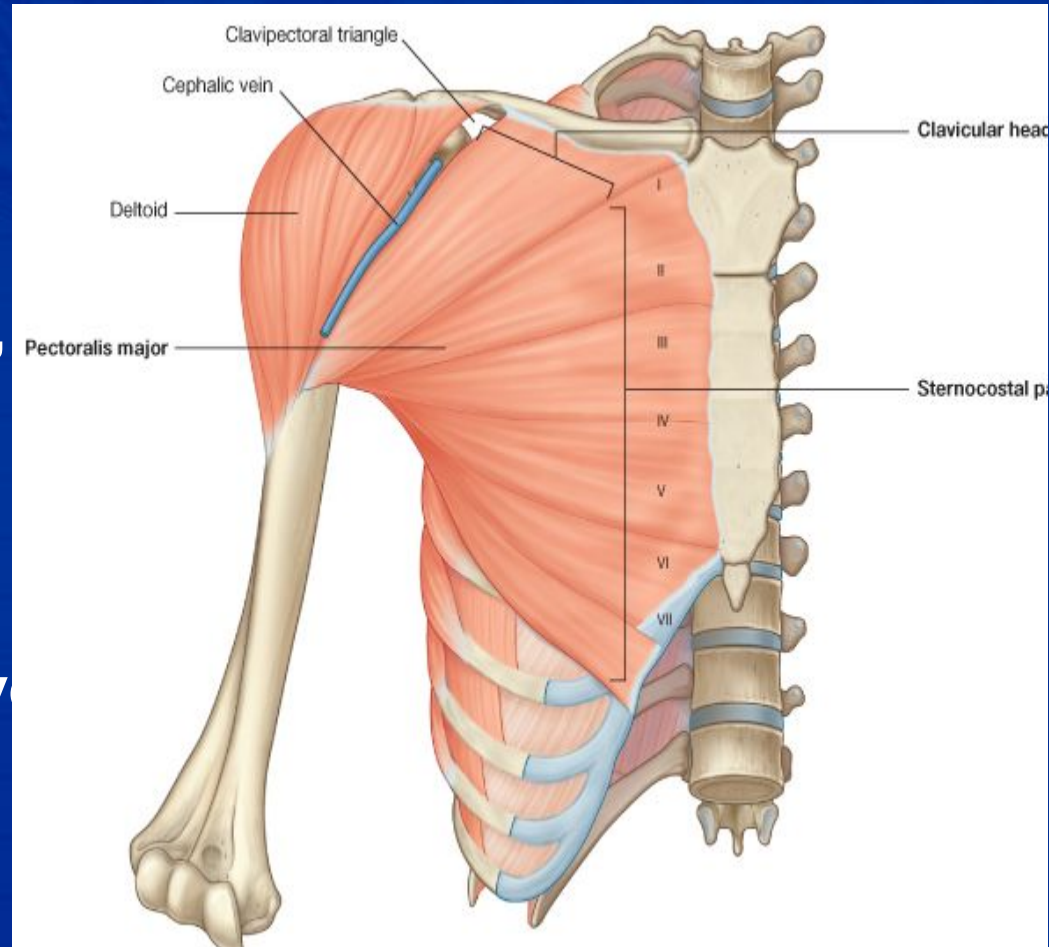


Relation of shoulder joint

- **Anteriorly:** subscapularis muscle, axillary vessels and brachial plexus
- **Posteriorly:** Infraspinatus muscle, and teres minor
- **Superiorly :** supraspinatus muscle, subacromial bursa, coraco acromial lig, deltoid muscle
- **Inferiorly:** long head of triceps muscle, axillary nerve, posterior circumflex humeral vessels

Pectoralis major muscle

- **Origin:** V shaped M
- **Clavicular end :**Anterior surface of medial 1/2 of clavicle
- **Sternocostal head:**
Anterior surface of sternum, first 7 costal cartilages, EOA
- **Insertion:** lateral lip of bicipital aponeurosis
- **NS:** med, lat pectoral nerv
- **Action:** All muscle, adduction of shoulder.
- Medial rotation of arm
- Ant fiber flex shou, pos fiber extend it.



Deltopectoral groove

Not authorized for use in mediation,
deposition, settlement, trial, or any
other litigation or nonlitigation use.

Pectoralis
major muscle

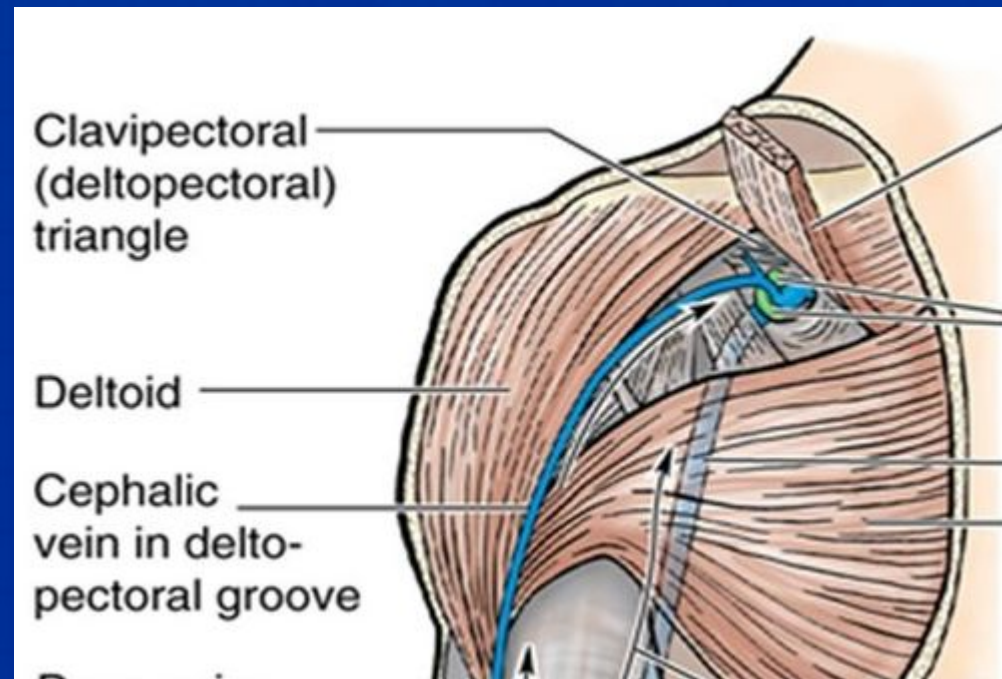
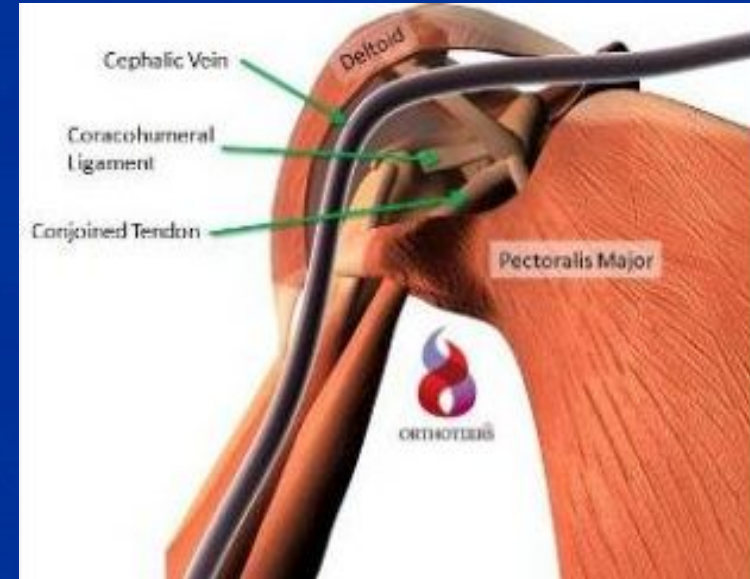
Deltopectoral
groove

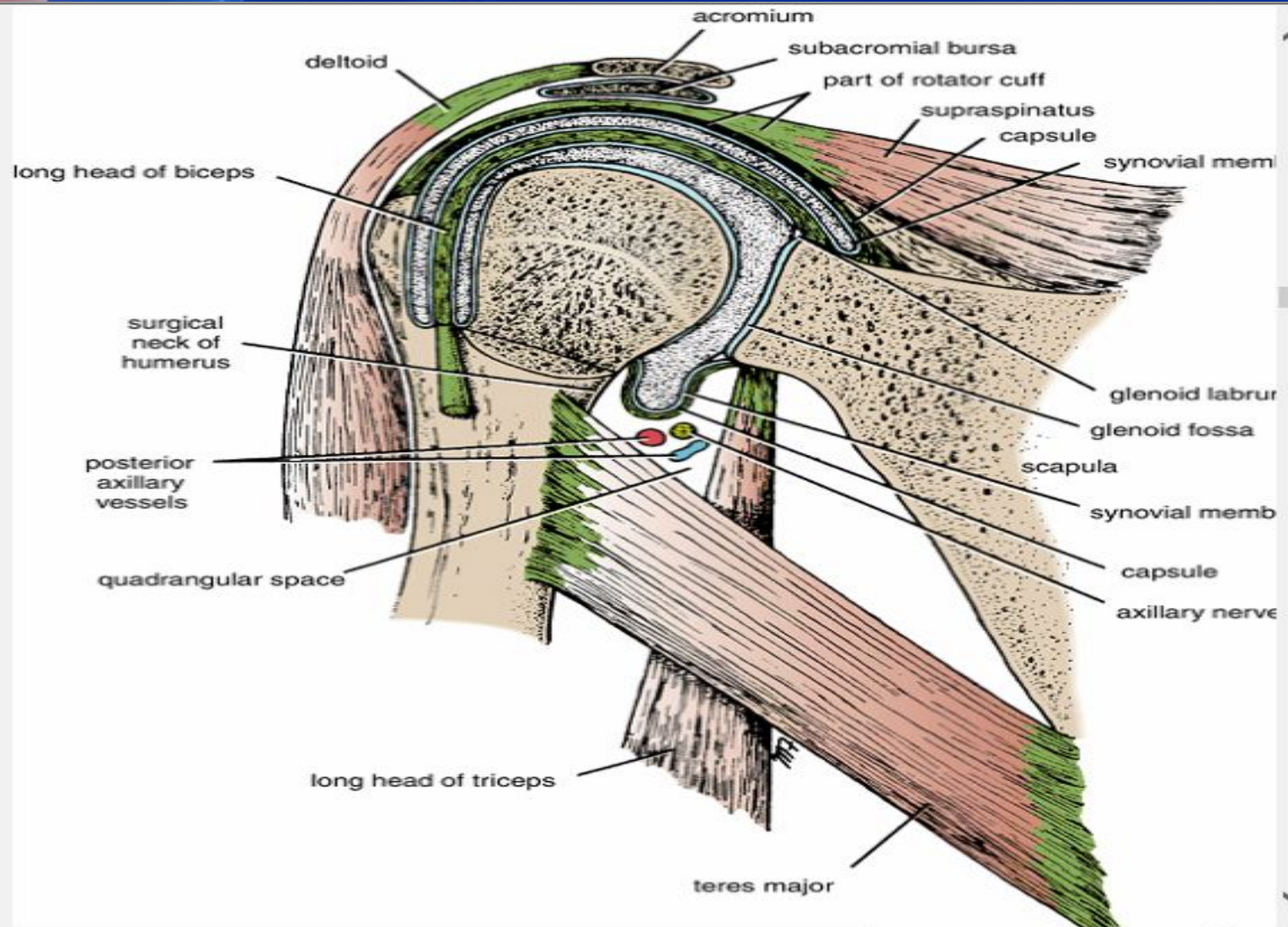
Deltoid
muscle



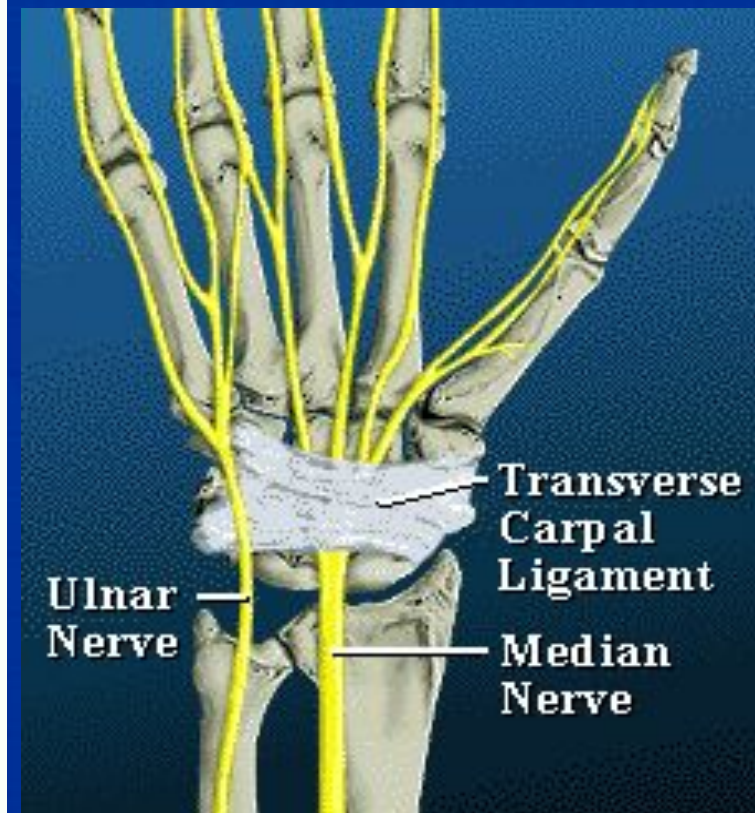
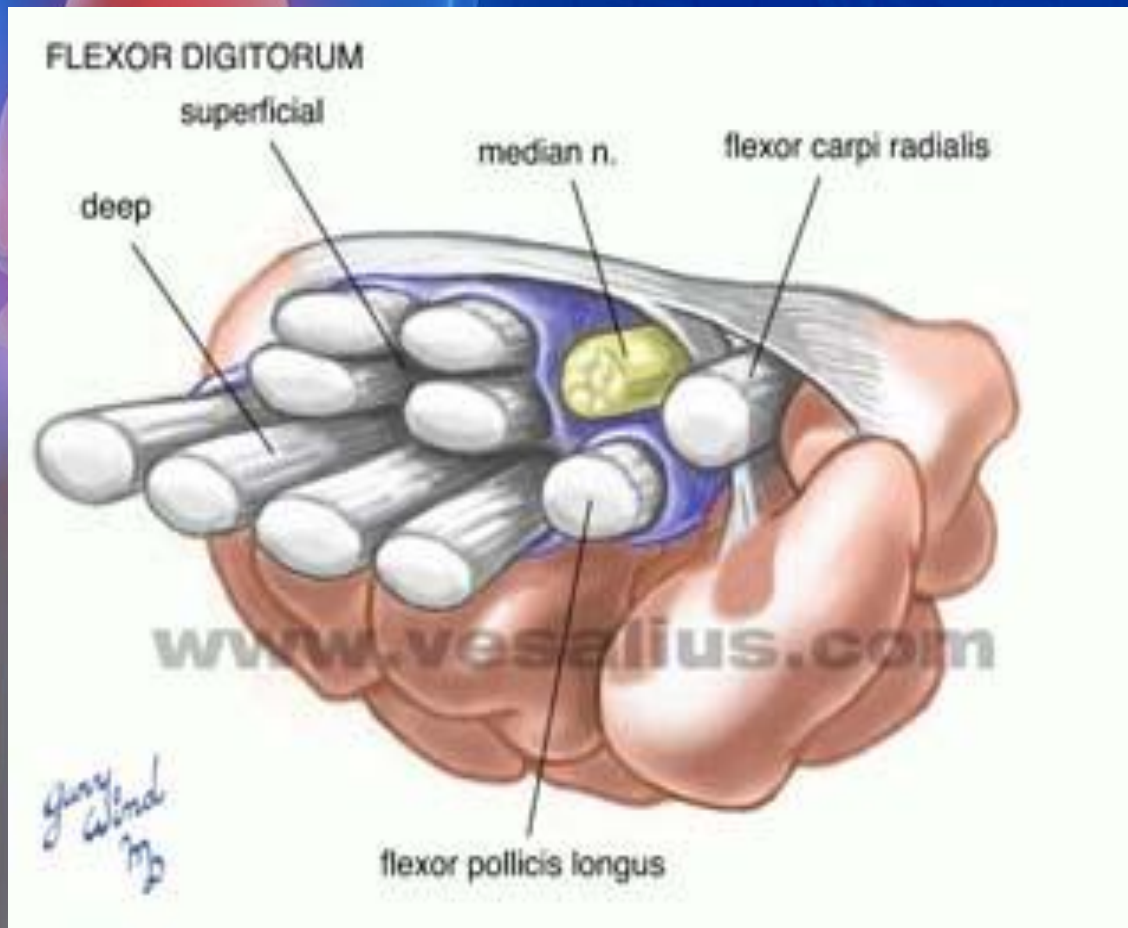
Structures in Deltopectoral groove

- Cephalic vein
- Deltoid branch of thoracoacromial artery
- Coracoid process is most easy Palpable
- Deltopectoral Ln





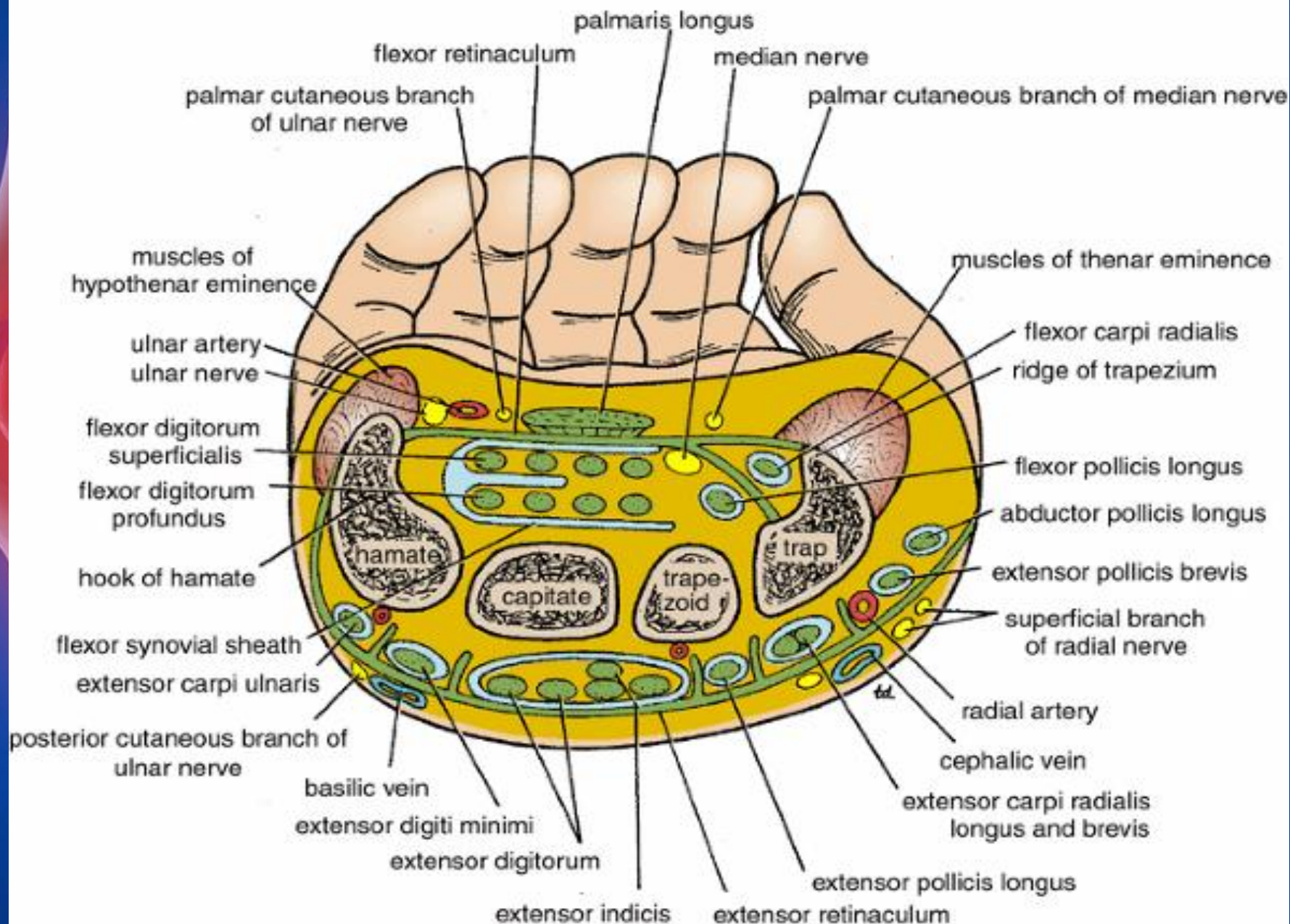
Carpal tunnel



Structures on the surface of FR

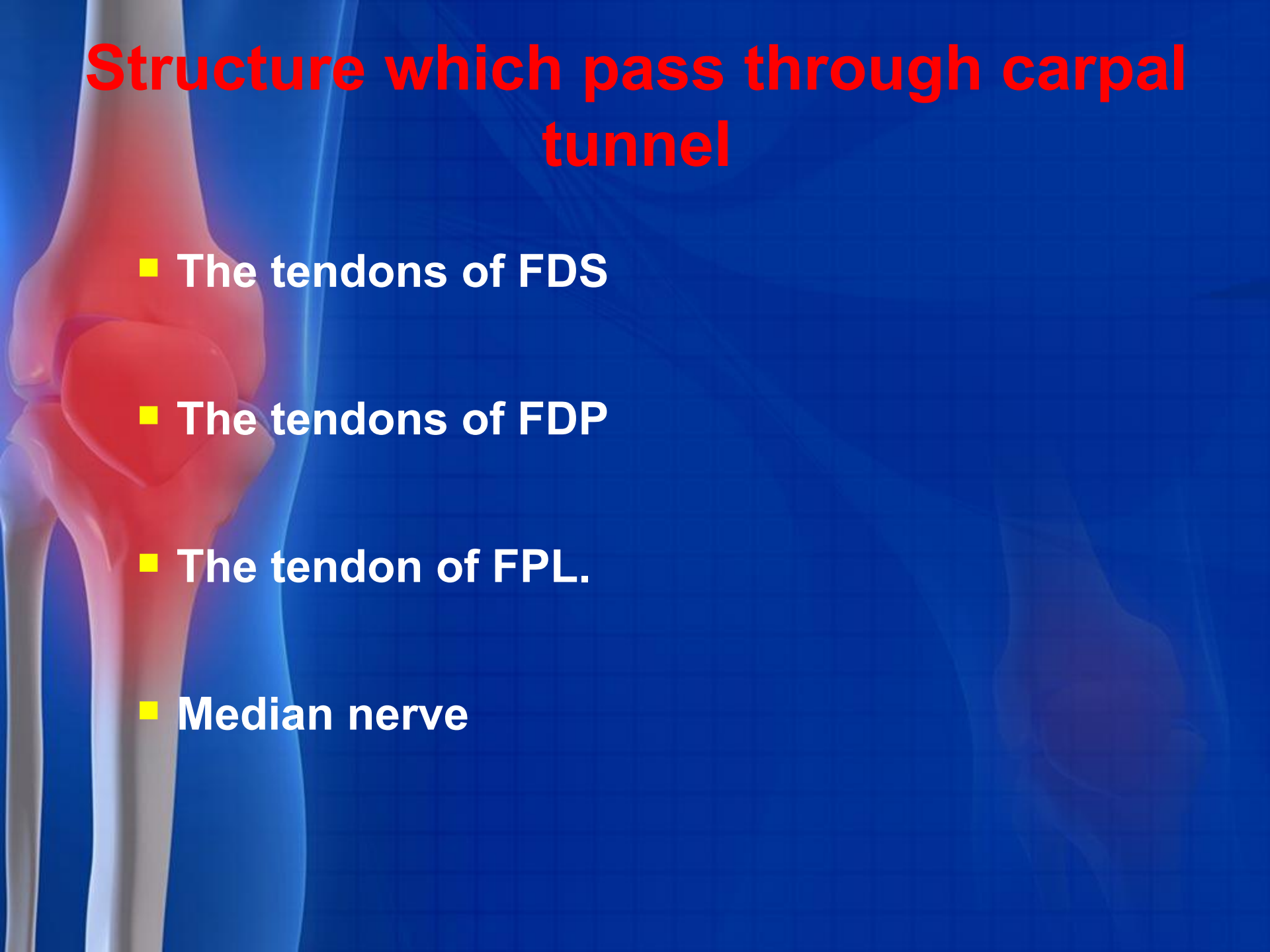
From medial to lateral

- Ulnar nerve close to pisiform bone
- Ulnar vessels lateral to ulnar nerve
- Palmar cutaneous branch of ulnar nerve
- Tendon of palmaris longus
- Palmar cutaneous branch of median nerve



Structure which pass through carpal tunnel

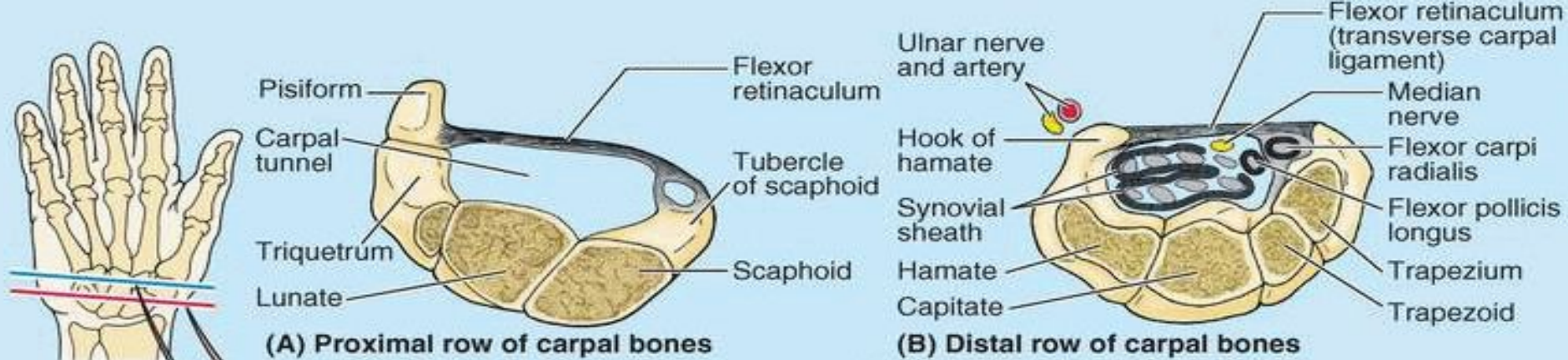
- The tendons of FDS
- The tendons of FDP
- The tendon of FPL.
- Median nerve



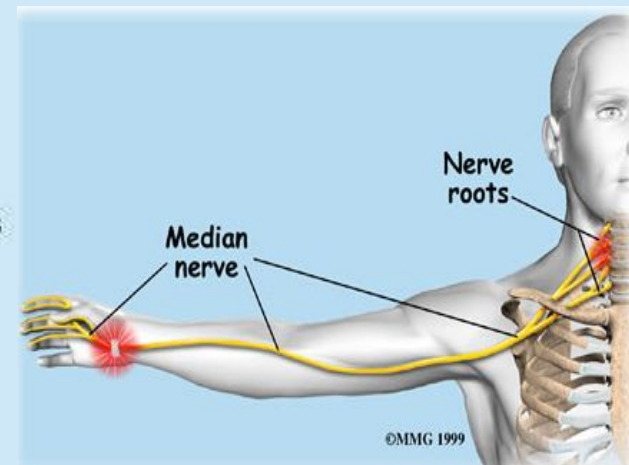
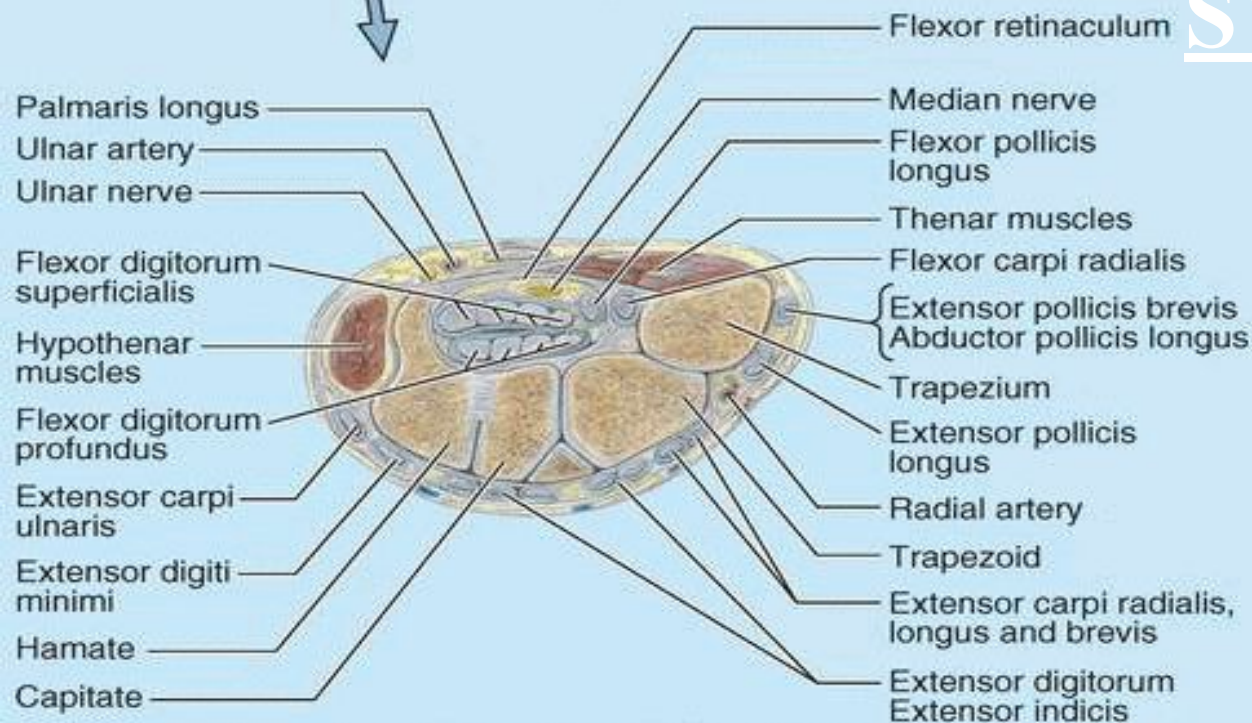
Carpal Tunnel Syndrome

- Compression median nerve at the carpal tunnel
- Patient will experience numbness, tingling, or burning sensation at the thumb, index, middle and radial half of the ring finger.
- If untreated – weakness or atrophy of the thenar muscles.





CARPAL TUNNEL SYNDROME



Transverse carpal ligament lies across the arch of carpal bones and forms the roof of the carpal tunnel

Median nerve

Tendon sheath

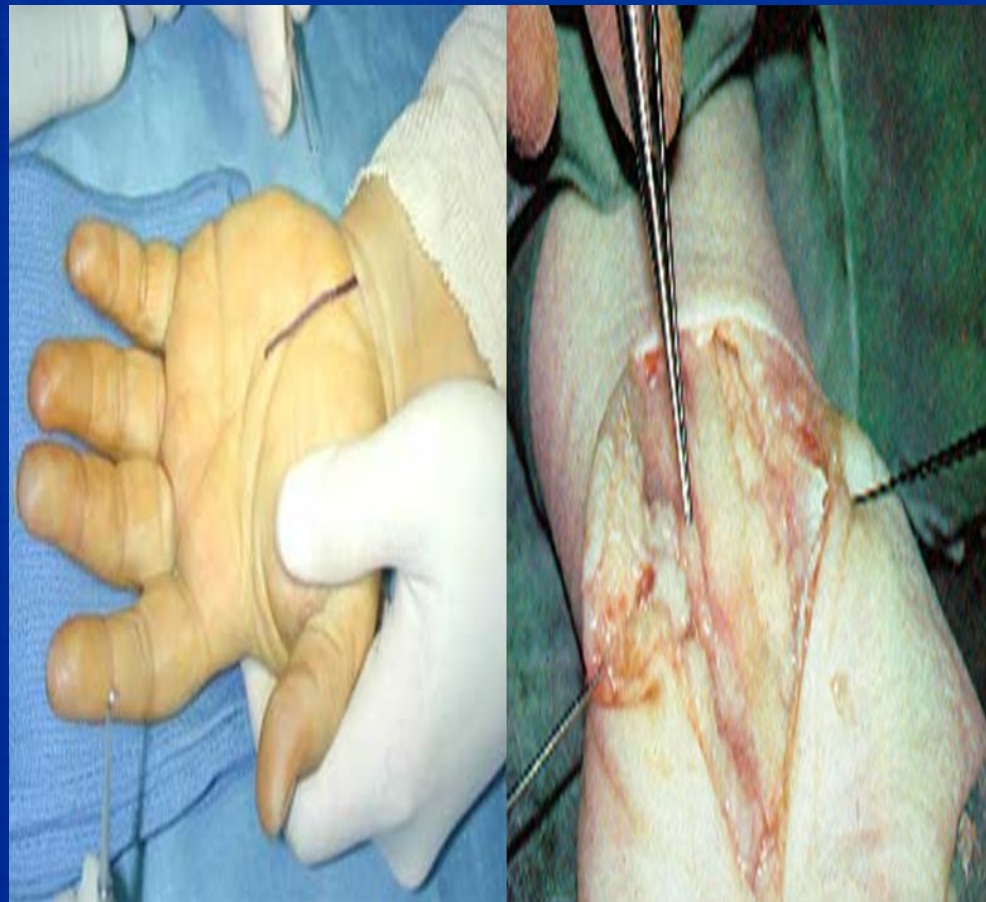
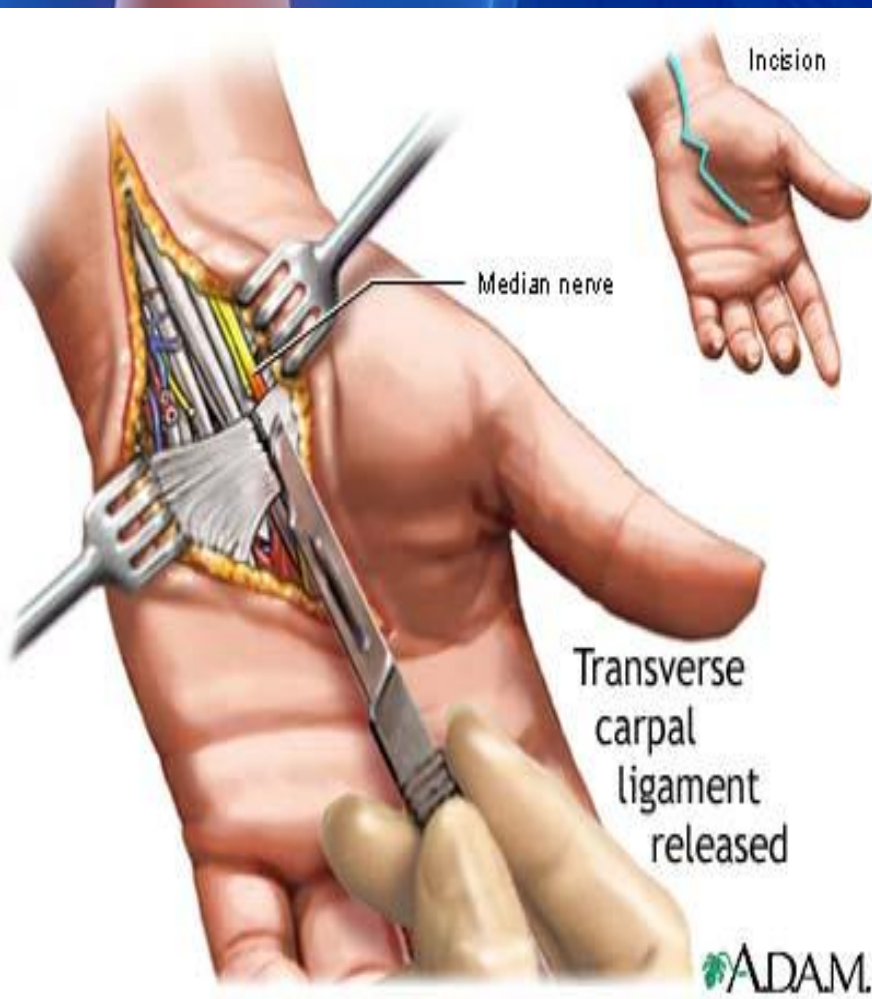
Flexor tendons

Carpal bones



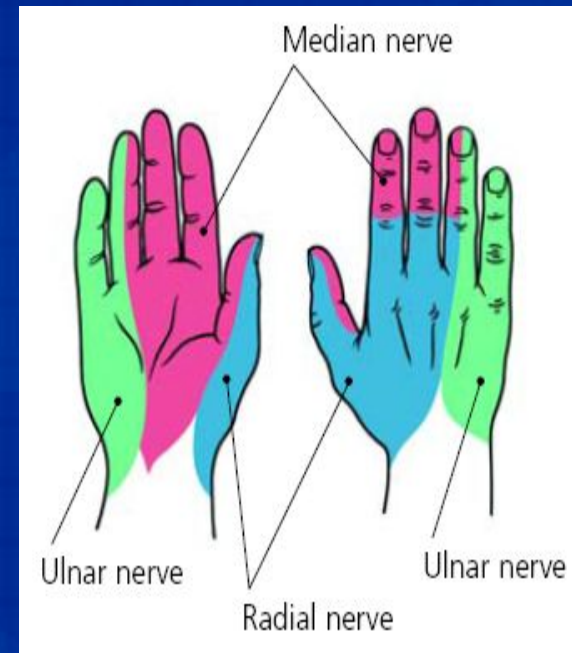
Median nerve is compressed at the wrist, resulting in numbness or pain



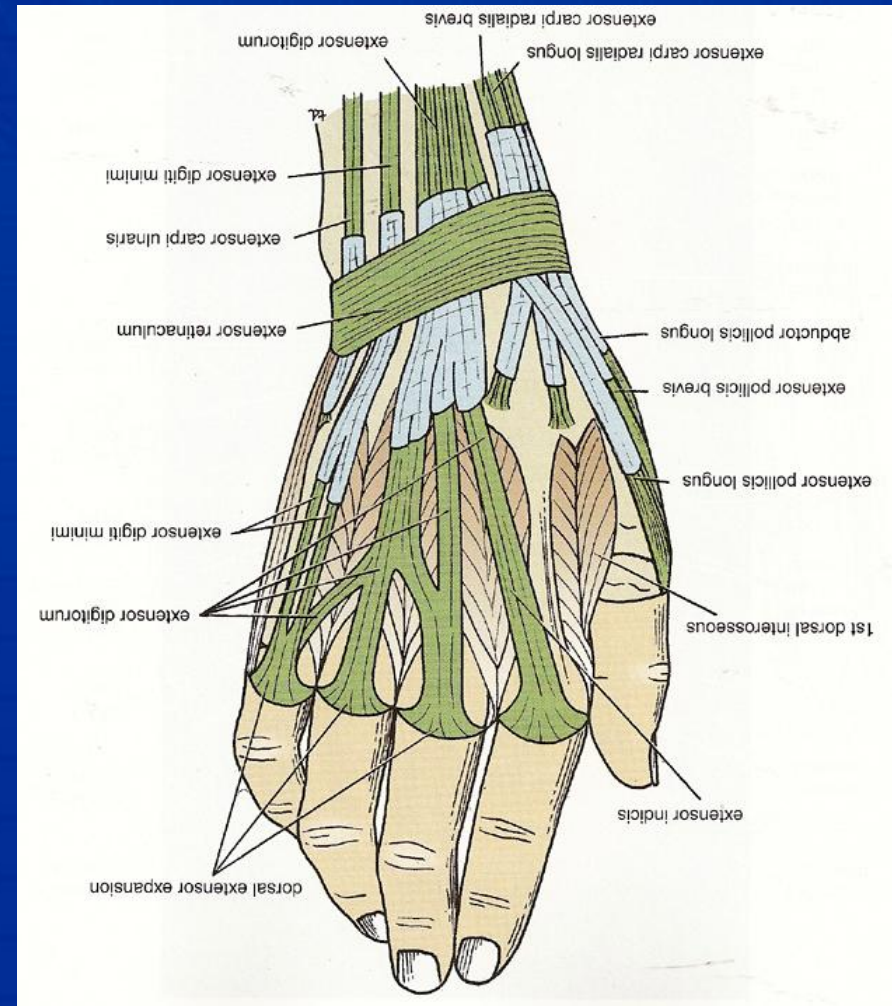
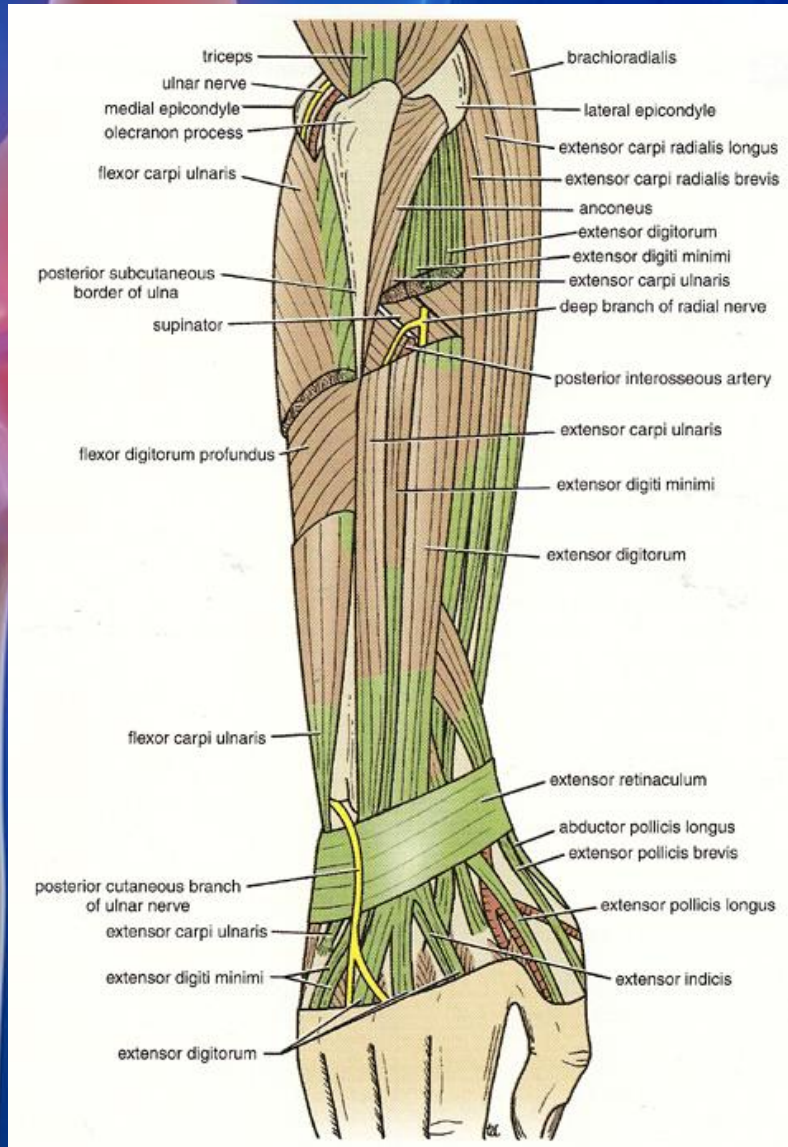


Clinical Features

- Pain
- Numbness
- Tingling
- Symptoms are usually worse at night and can awaken patients from sleep.
- To relieve the symptoms, patients often “flick” their wrist as if shaking down a thermometer (*flick sign*).

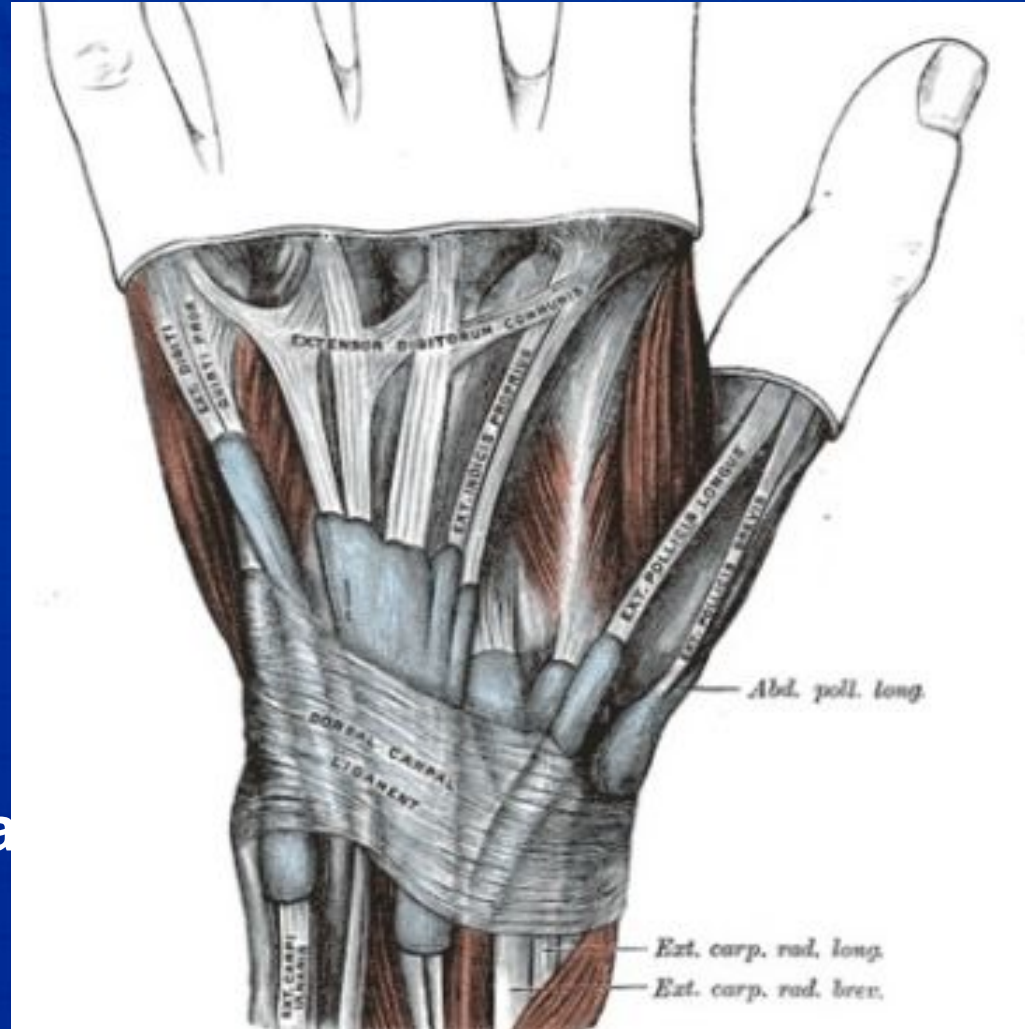


Extensor Retinaculum

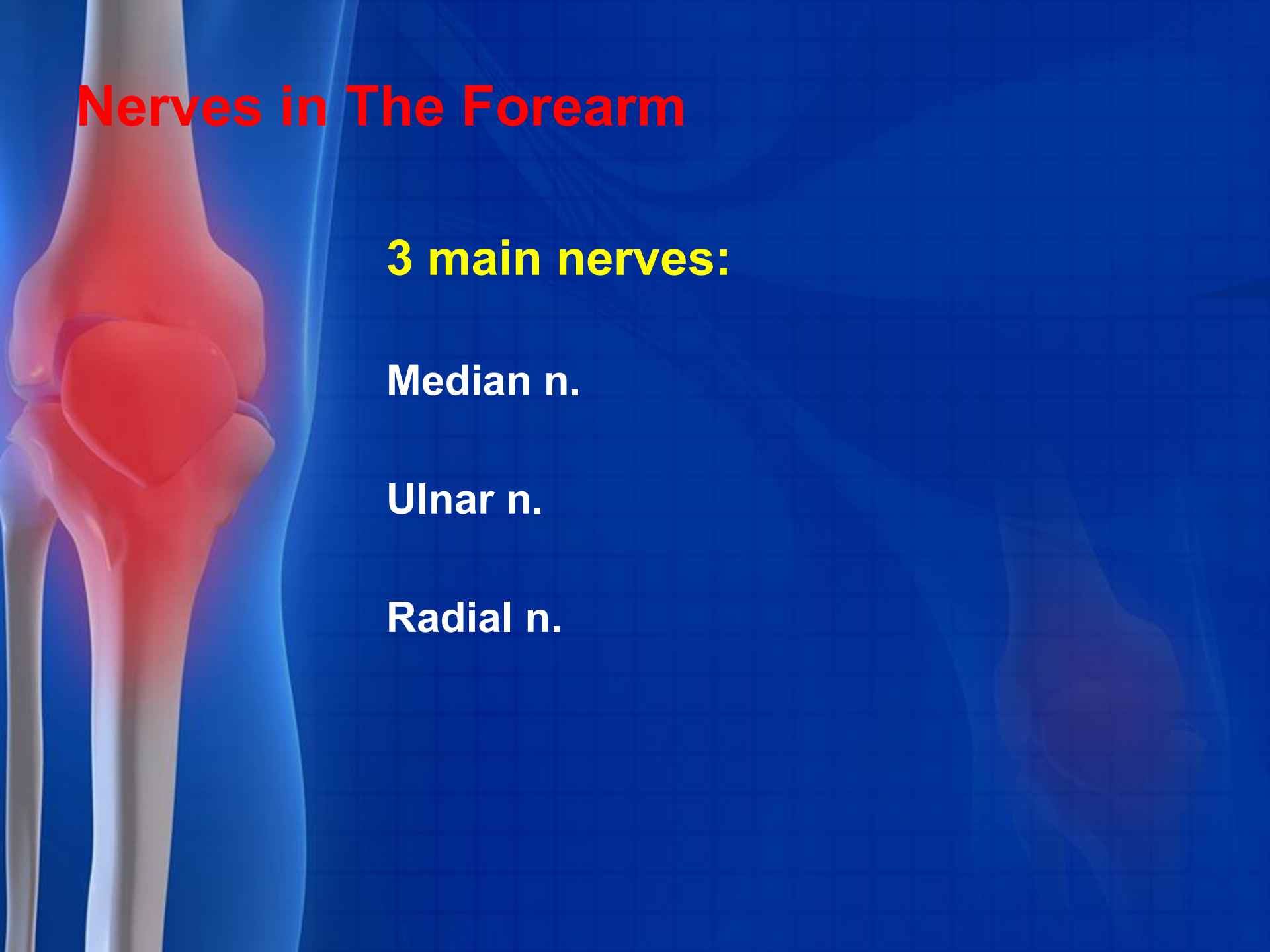


Extensor Retinaculum

- A band of deep fascia less strong and thick **Post.** to wrist joint that holds the tendons of extensor muscles.
- Run obliquely
- Medially attached to Triquetral and pisiform bone
- Laterally attached to sharp edge between lateral and anterior surface of lower end of radius
- Divided into six



Nerves in The Forearm



3 main nerves:

Median n.

Ulnar n.

Radial n.

The Median nerve

- **The Median nerve** : is formed by 2 roots from median and lateral cords of brachial plexus, unite in front third part of Axillary artery.
- **Course:**
 - In upper arm lie lateral to Axillary artery, and upper half of brachial artery, till insertion of brachioradialis
 - Here it crosses in front of brachial artery from lateral to medial
 - It leaves cubital fossa between two heads of pronator teres muscle

Median Nerve

Pass in the middle of forearm Anteriorly

Beneath **FDS** & ant. to **FDP**

At wrist:

beneath flexor retinaculum (in carpal tunnel)

Innervates all ant. muscles **except:**

FCU & medial ½ of **FDP**

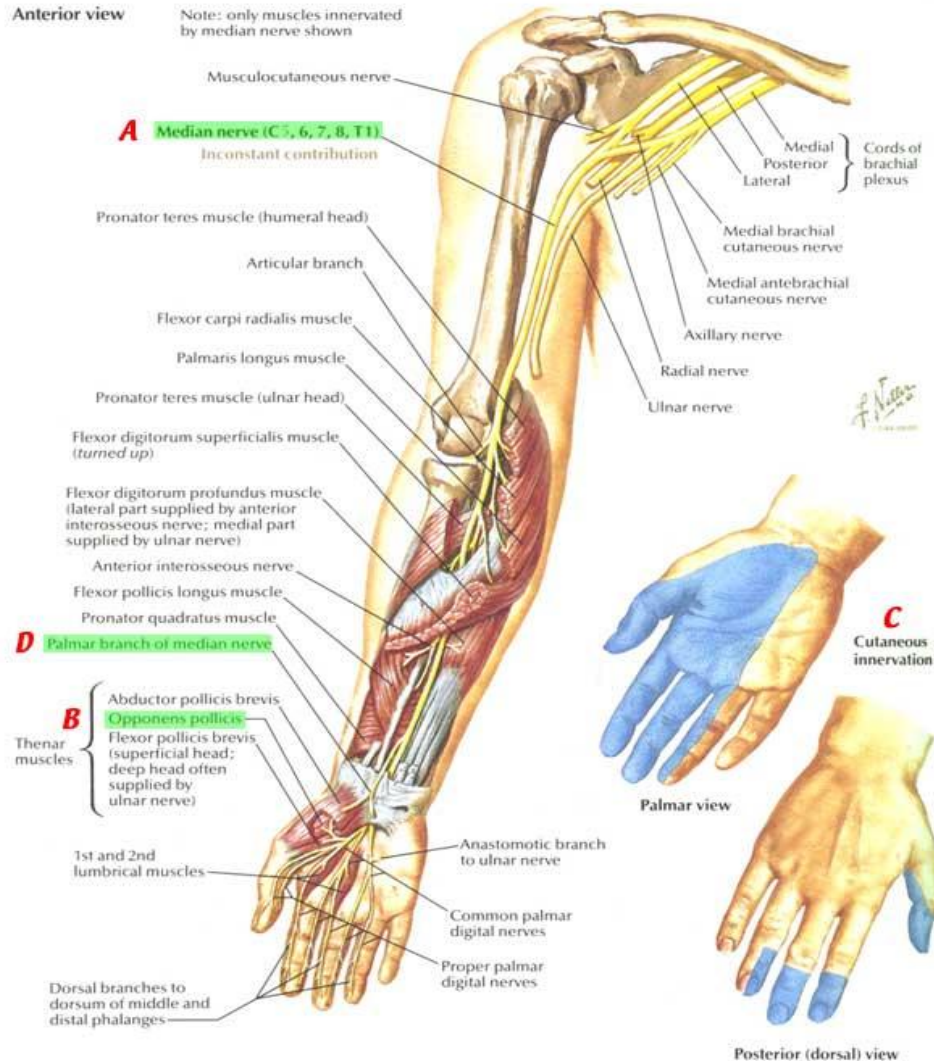
Median nerve

- Motor supply to: ALL muscles of anterior forearm flexors, except FCU, medial half of FDP
- 3 thenar eminence muscles (thumb), lat.2
Lumbricals

Sensory : skin of lateral 2/3 of palm ,lat.
Three & half fingers to back of middle phalanges

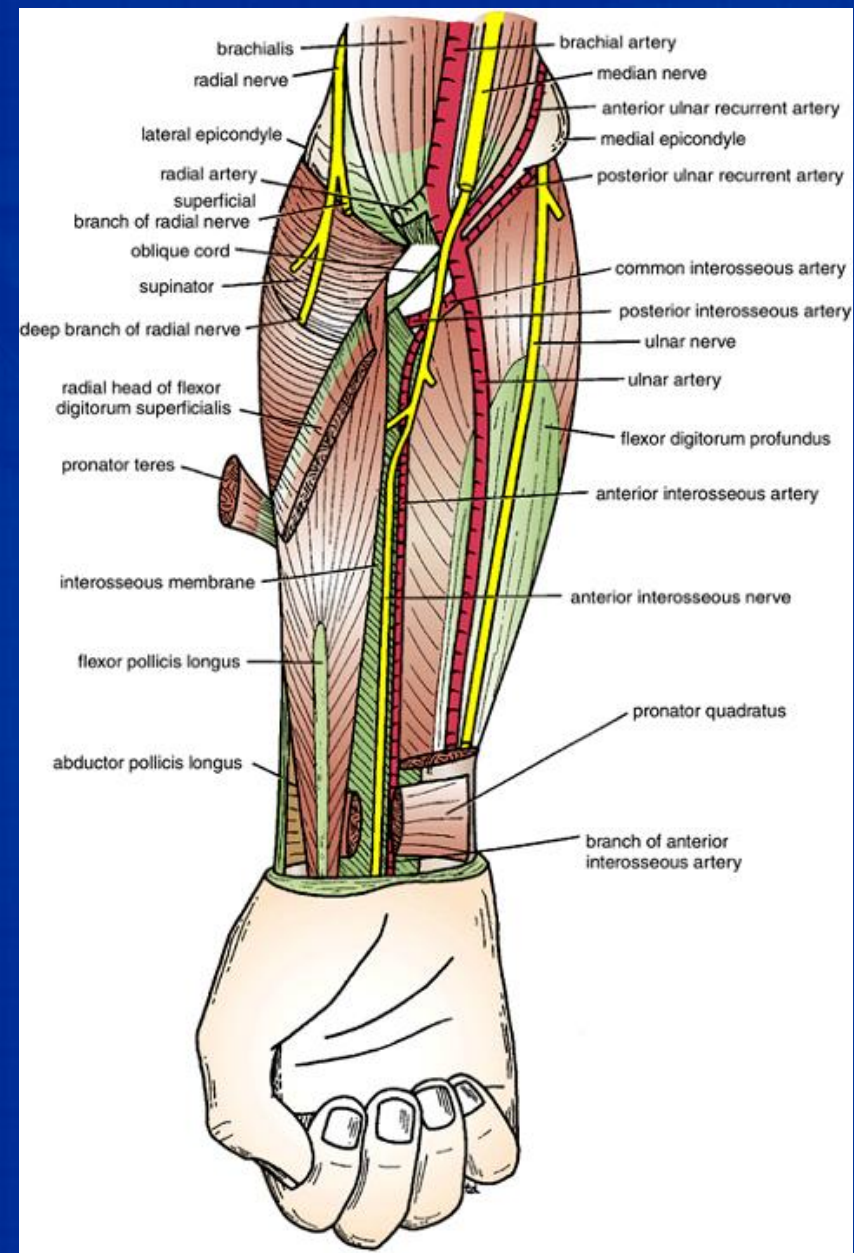
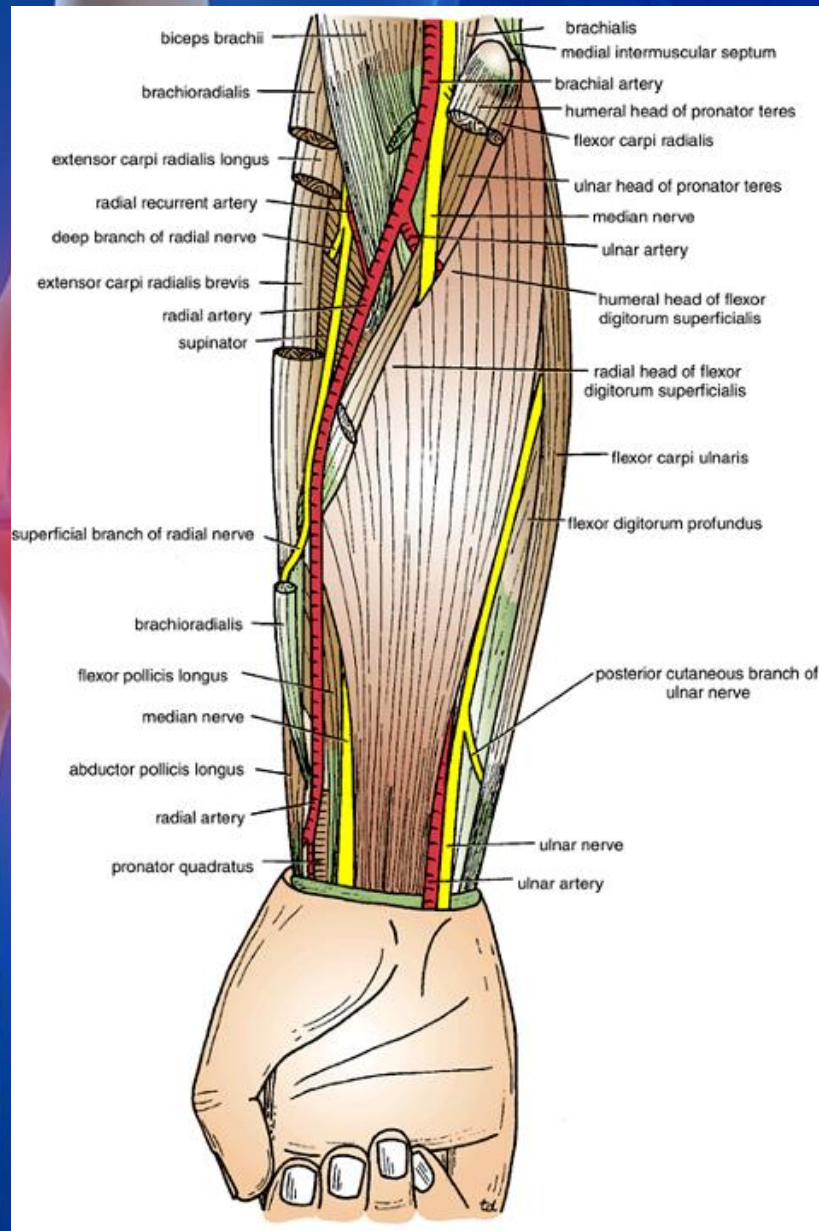
- Nerve Damage = “Ape” Hand
 - Inability to Oppose Thumb

The median nerve



Branches Of Median Nerve

- No branches in axilla, or upper arm
- In cubital fossa 4 muscles ,PT,FCR,FDS,PL.
- As it emerge between two heads of pronator teres it give Anterior interosseus nerve
- 3 cm above wrist it give palmar cutaneous branch of median nerve which pass on surface of FR
- Anterior interosseus nerve supply two and half muscles ,PQ, FPL, lateral half of FDP
- Digital branches three and half fingers





Ulnar Nerve

Post. to medial epicondyle of humerus

Between: **FCU & FDP**

Medial to ulnar artery.

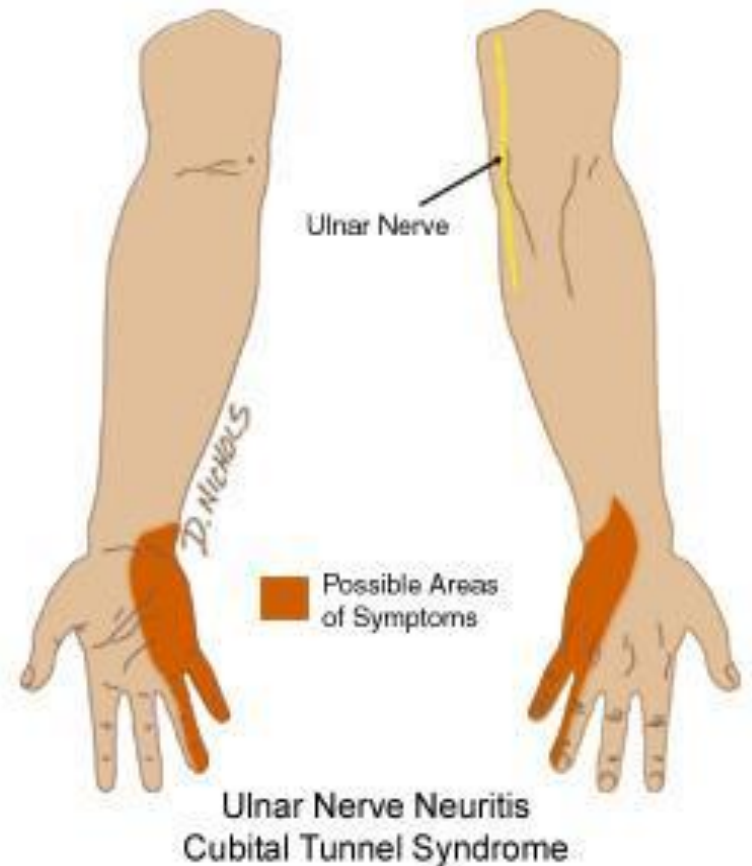
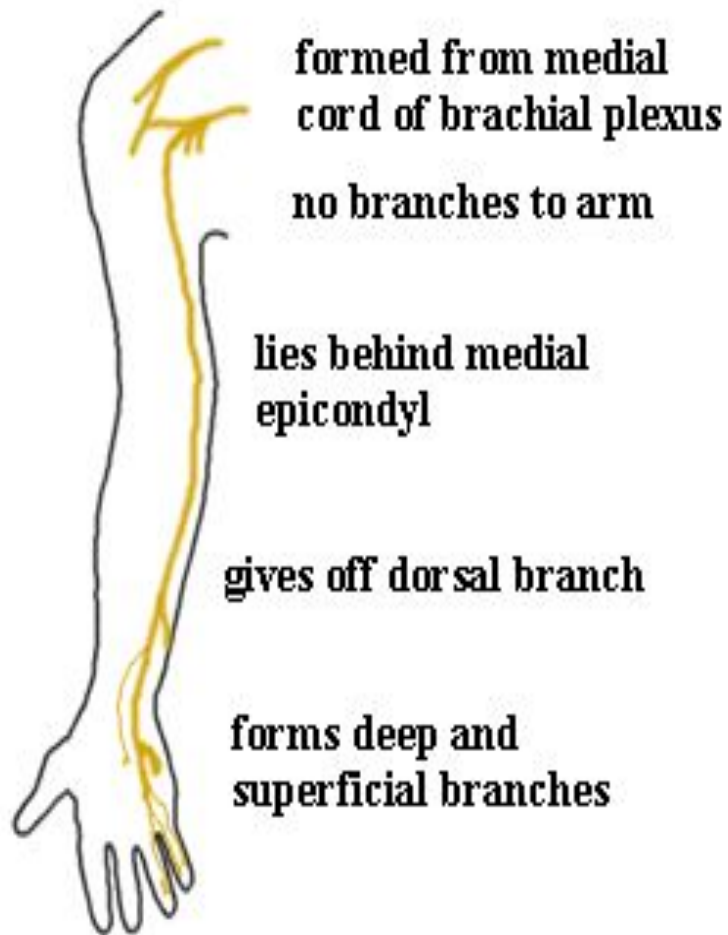
At wrist:

Pass superficial to flexor retinaculum

Innervate: **FCU & medial ½ of FDP**

The Ulnar nerve C7,8,T1

Ulnar Nerve



Radial Nerve

Pass ant. to lat. Epicondyle of humerus

Divides into: **Deep & superficial** branches

Deep branch:

Pierces supinator m.

Winds around radial neck (lat.)
& enters post. compartment of forearm

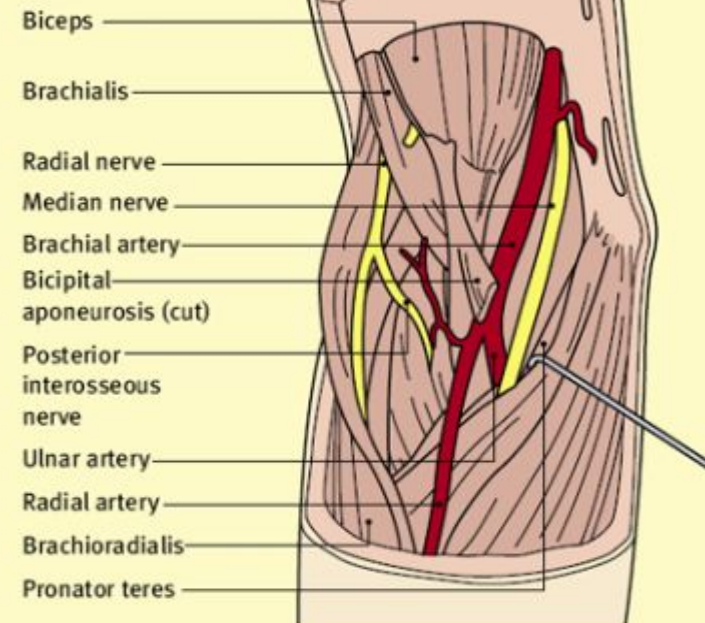
To become: **Post. interosseous Nerve**

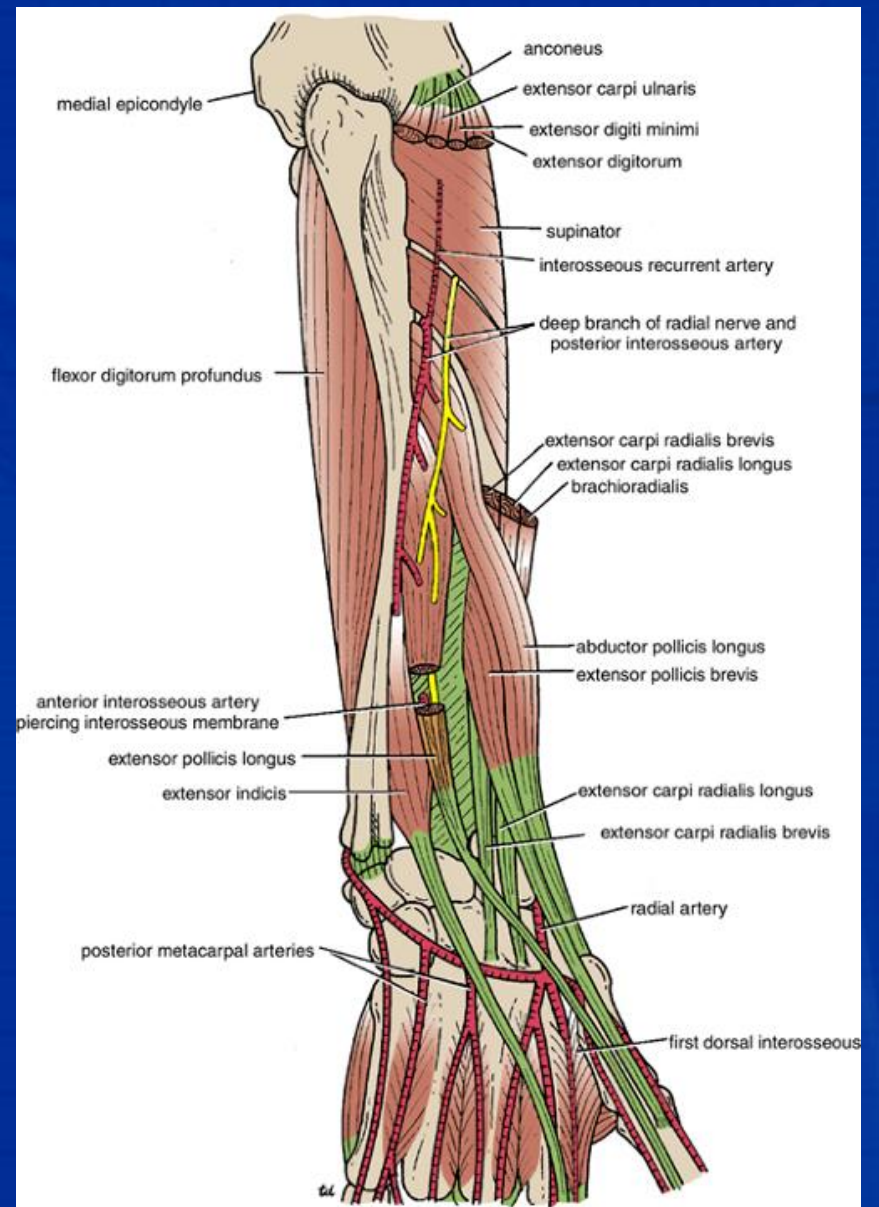
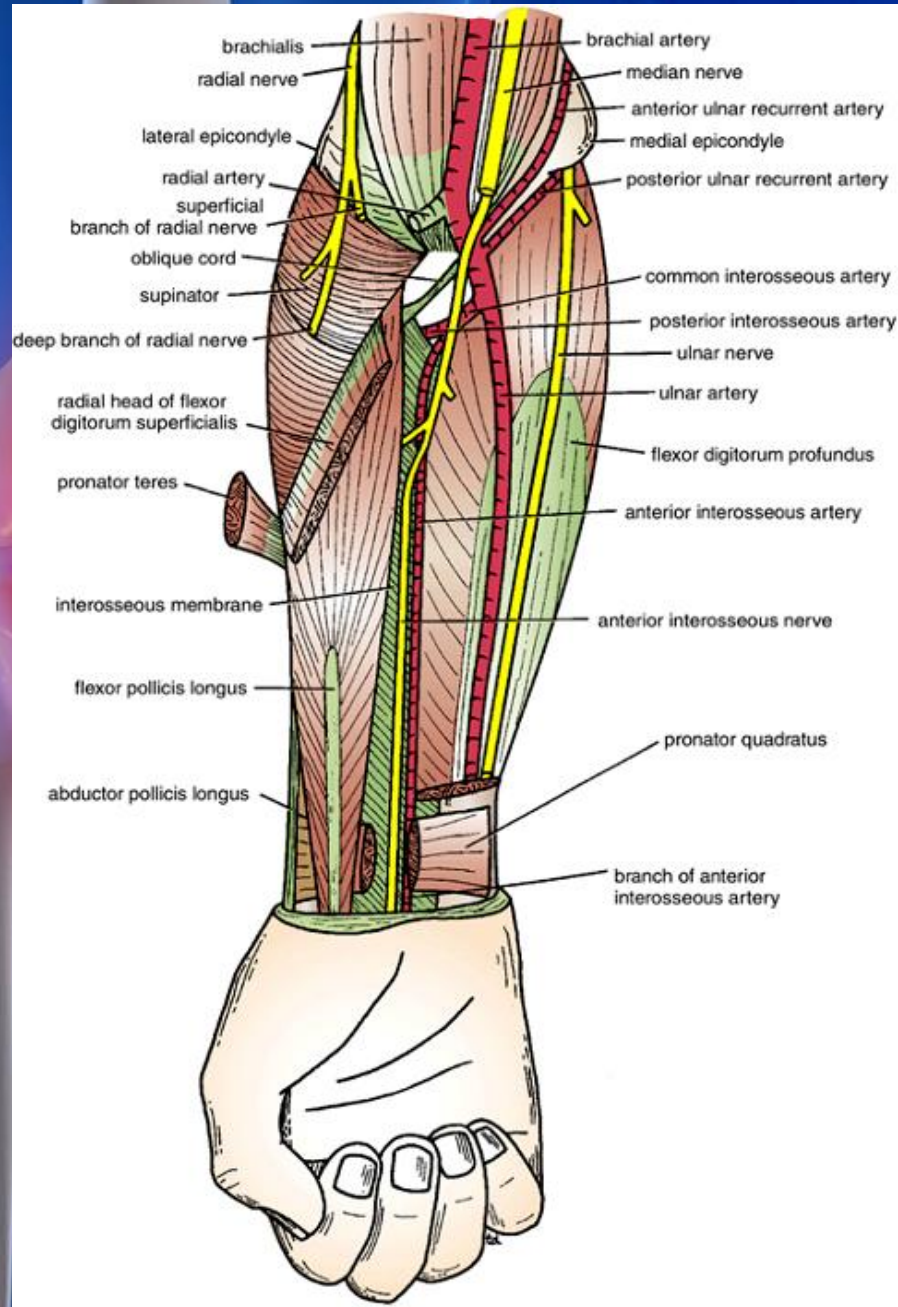
**innervates all post. muscles of forearm*



late

Cubital fossa with superficial veins and deep fascia removed





anterior

posterior

Arteries in Forearm

Radial Artery

Arises from brachial a.

Opposite to neck of radius (*anteriorly*)

End in the palm by becoming deep
Palmar arch

Proximally:

Pass on lat. Aspect of forearm,
Beneath brachioradialis m.

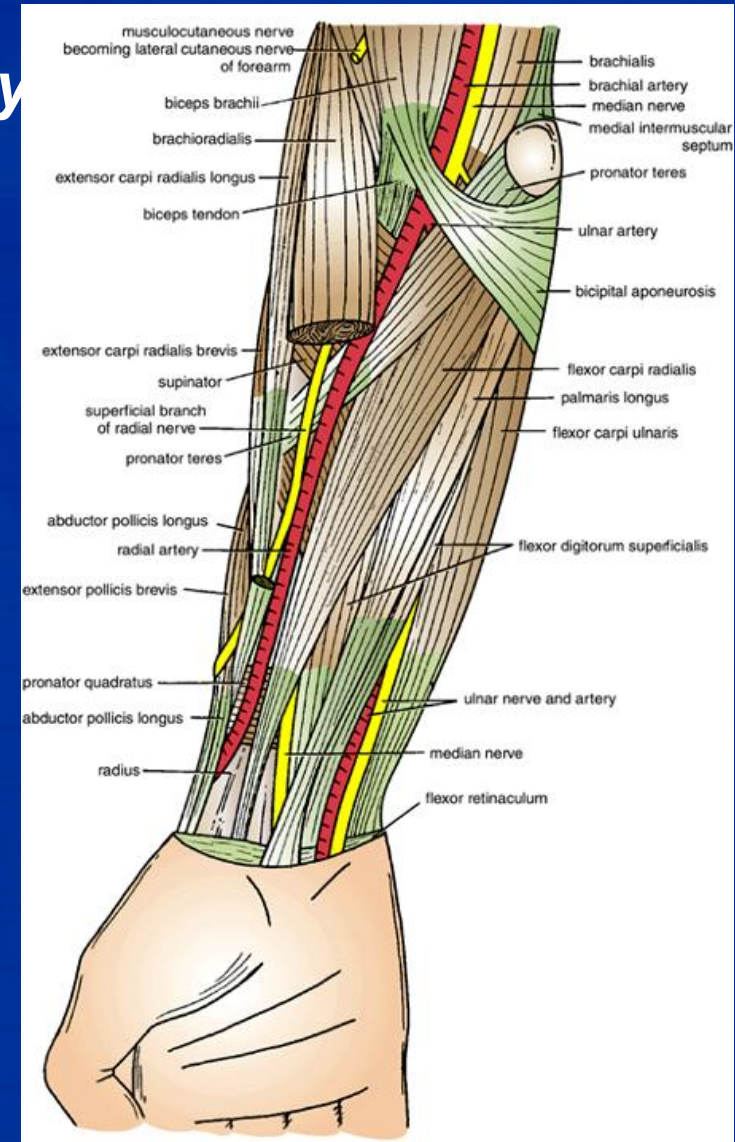
Distally: Pass lat. To tendon of FCR,
medial to tendon of BR

(site for pulsation)

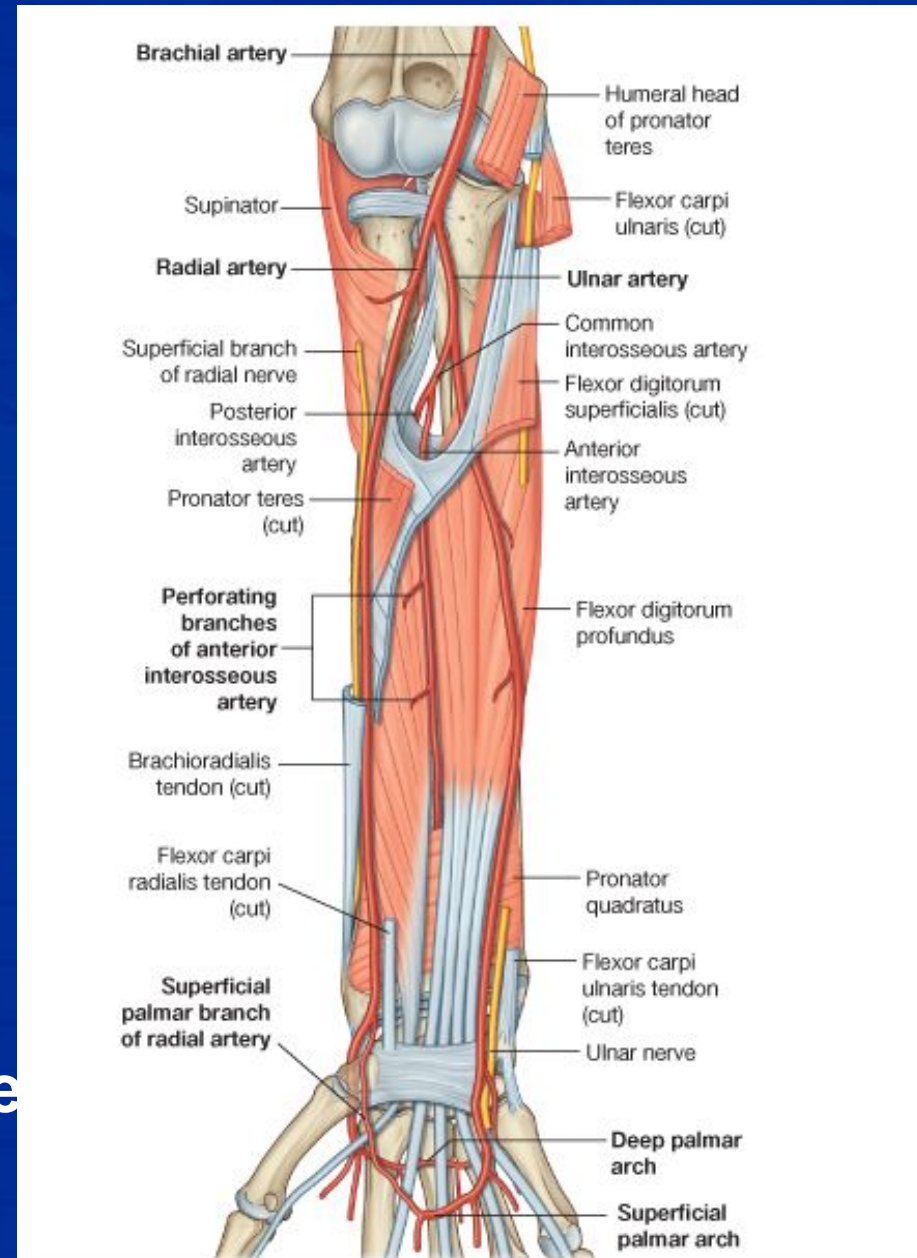
Radial nerve lie lateral to artery

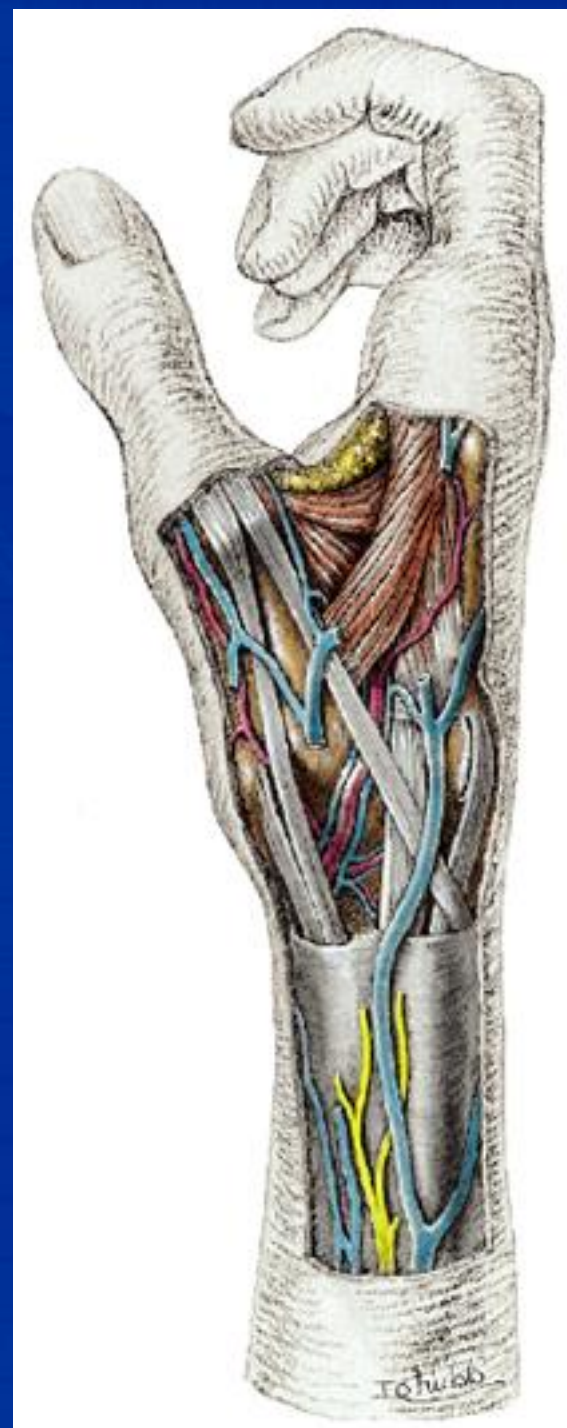
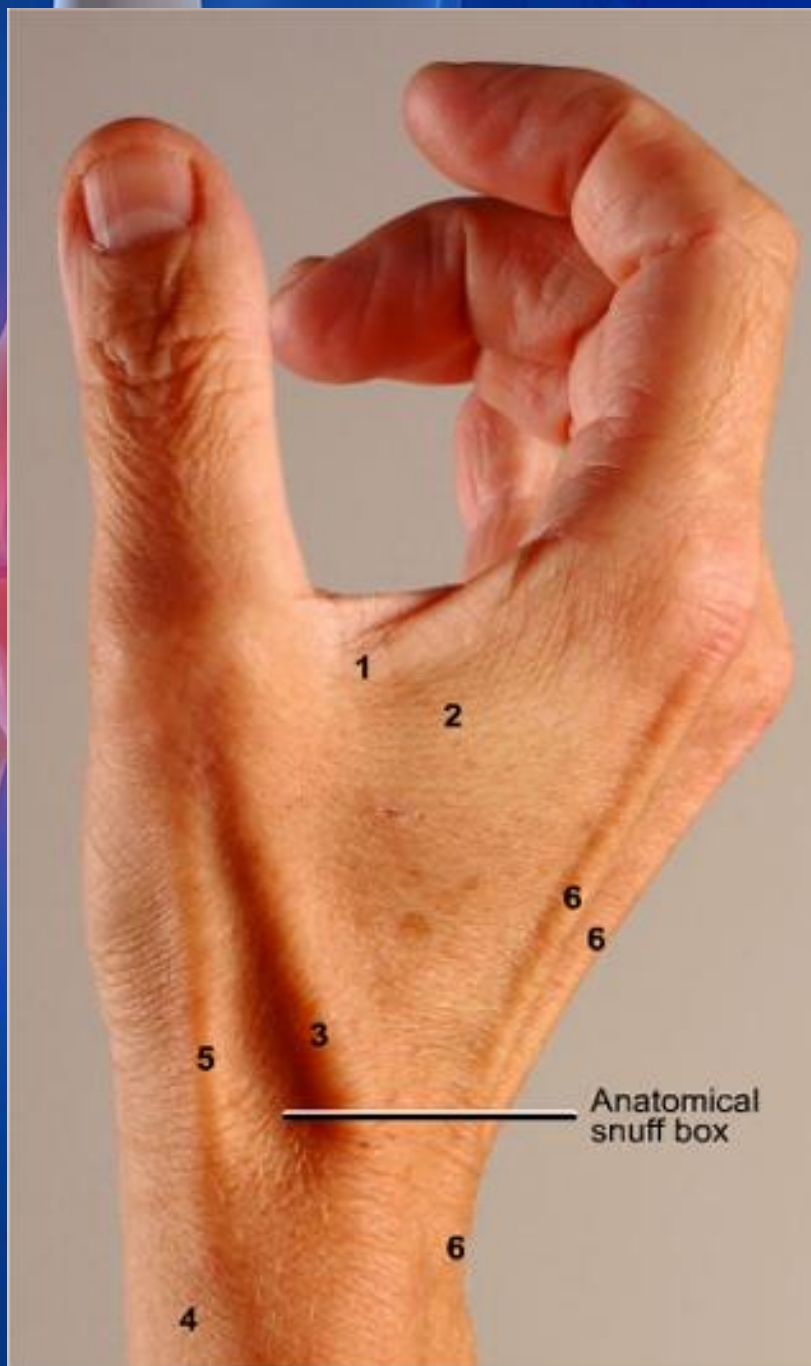
At wrist:

Wind backward to enter the
anatomical snuff box over
scaphoid, trapezium bones



- It pass between two heads of first dorsal interosseus muscle, to enter palm of hand
- It give two branches
- Princeps pollicis to thumb
- Radialis indicis to radial part of index finger.
- It pass through adductor pollicis muscle to become deep Palmar arch.
- Finger breadth nearer to wrist ,its concave course lie deep branch of ulnar nerve





Ulnar Artery

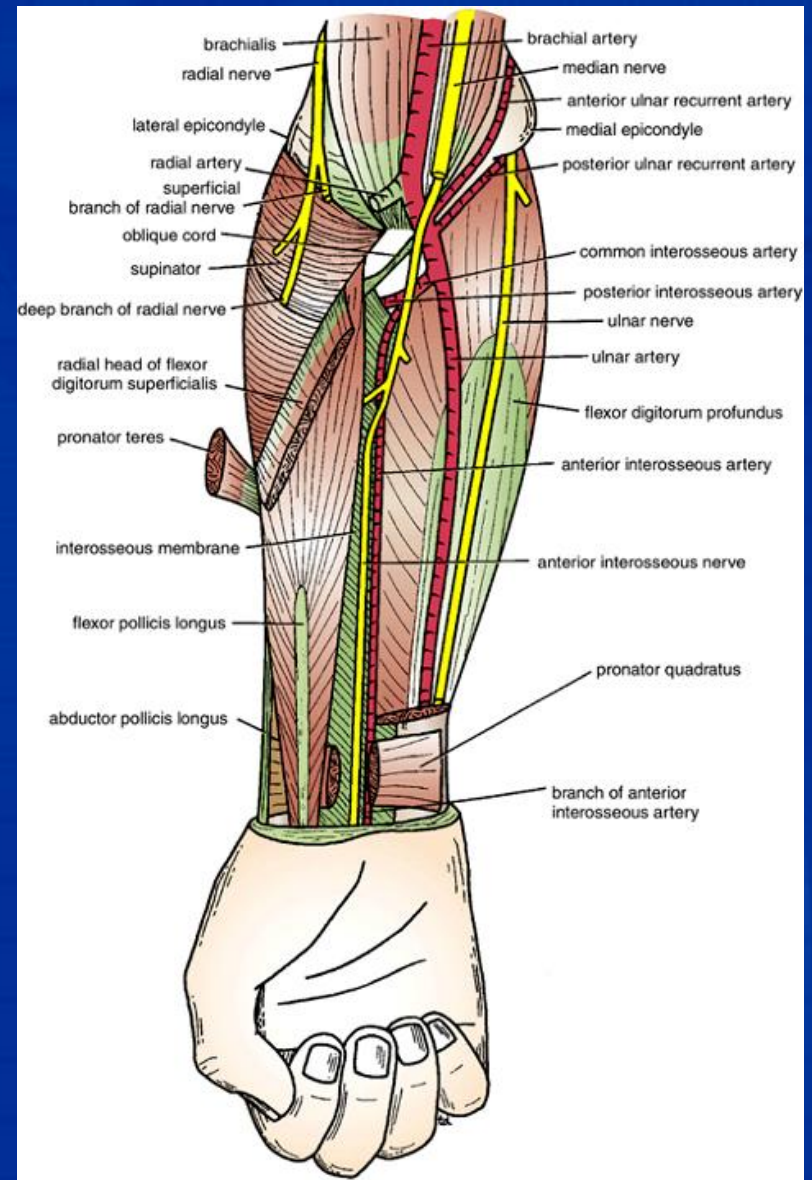
- Larger than radial a.
- Arises from brachial a. opposite to neck of radius
- End in palm by becoming superficial palmar arch

Proximally:

- Pass between FDS & FDP

Distally:

- Pass between FDS & tendon of FCU
- Ulnar nerve lie on medial side of artery.



Fracture of Scaphoid

Most common fracture of the wrist, due to fall on outstretched hand

Symptoms- Pain on lateral side of the wrist

-Deep tenderness in anatomical snuff box

-Any pain in wrist which does not disappear in 24 hour

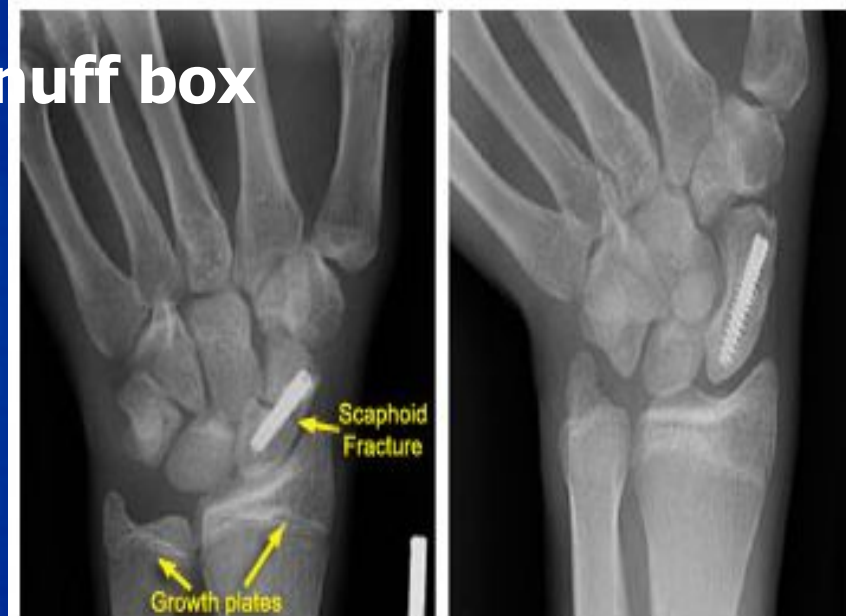
think of fracture Scaphoid

Complications:

Non union

Avascular necrosis of proximal fragment

In 10% of people blood supply to distal segment only from radial artery



(Left) This x-ray shows a scaphoid fracture fixed in place with a screw. (Right) This x-ray was taken 4 months after surgery. The fracture of the scaphoid is healed.

Dupuytren's contraction

- Progressive shortening, of medial part of PA
- Lead to flexion deformity and unable to extend the fingers
- Ring finger, and pinkie finger are the most affected.
- More common in men, north Europe above 40y
- Painless,progerssive,?hereditary.
- Early lump,noudule in palm, later deformity
- Causes unknown manual trauma, smoking, alcohol , epilepsy DM.



Treatment

- Radiation.
- Surgical.
- needle apponeurotomy.

Tenosynovitis

- Is infection of synovial sheath
Due to small penetrating wound(needle- thorn).
- Result in distension of tendon sheath with pus.
- Finger is semiflexed, and swollen, extension cause severe pain
- Infection of thumb and little finger spread to palm
- *Kanavel's sign*





Pulp space infection

- **Definition of pulp space**
- Spaces at tip of fingers and thumb are very tightly packed with fat lobules, that lie between many fibrous septa, extend between skin and periosteum
- The blood supply to the shaft and not the base pass through it
- Base has dual blood supply

