REGIONAL STRATEGIES IN FOR UPPER LIMB SURGERIES





Mahatma Gandhi
Medical College & Research Institute

REGIONAL STRATEGIES FOR UPPER LIMB SURGERIES

PRESENTED BY Dr. GOPAN. G (FUGRA 2014)

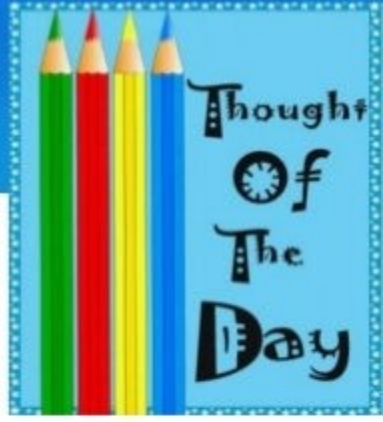
BIRD'S EYE VIEW

- INTRODUCTION
- ANATOMY OF SPINAL NERVE
- BRACHIAL PLEXUS



- NERVE SUPPLY TO DERMATOMES, MUSCLES AND BONES
- STRATEGY – CLAVICLE, AROUND SHOULDER, UPPER ARM, AROUND ELBOW, FOREARM & HAND.

INTRODUCTION



- *"Doctors without anatomy are like moles.They work in the dark and the work of their hands are mounds".*

Tiedemann:Heidelberg,1781–1861

- In a recent online poll, 94% of the public thought that doctors should have practical experience of real human anatomy
- http://www.channel4.com/science/microsites/A/anatc /
- expectation and reality……

learnt?

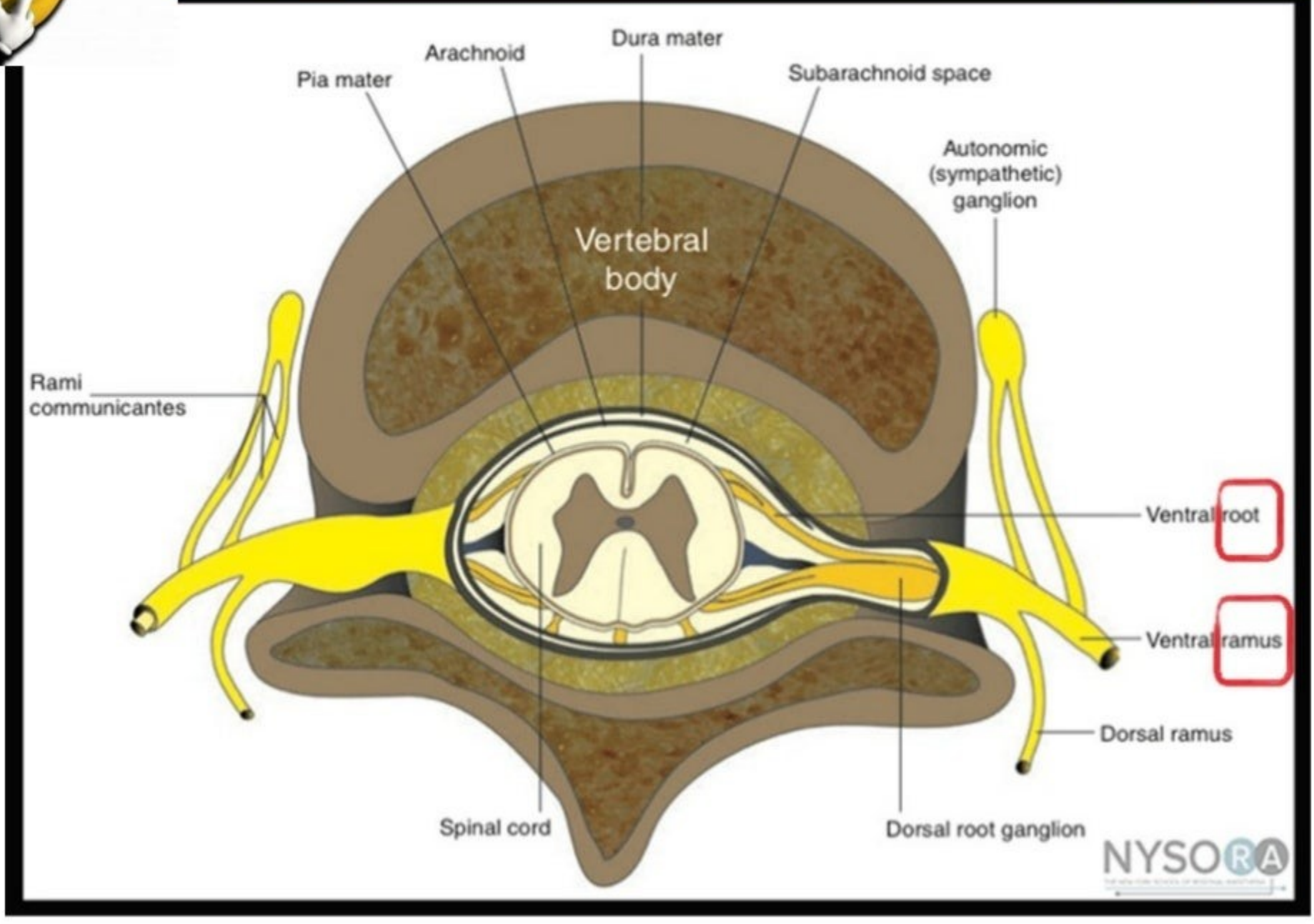
- provide relevant anatomy at an appropriate level of detail to the stage in training.
- problem-based learning (PBL), rather than memory-based learning

- Article information:Ann R Coll Surg Engl. Mar 2007; 89(2): 104–107 .

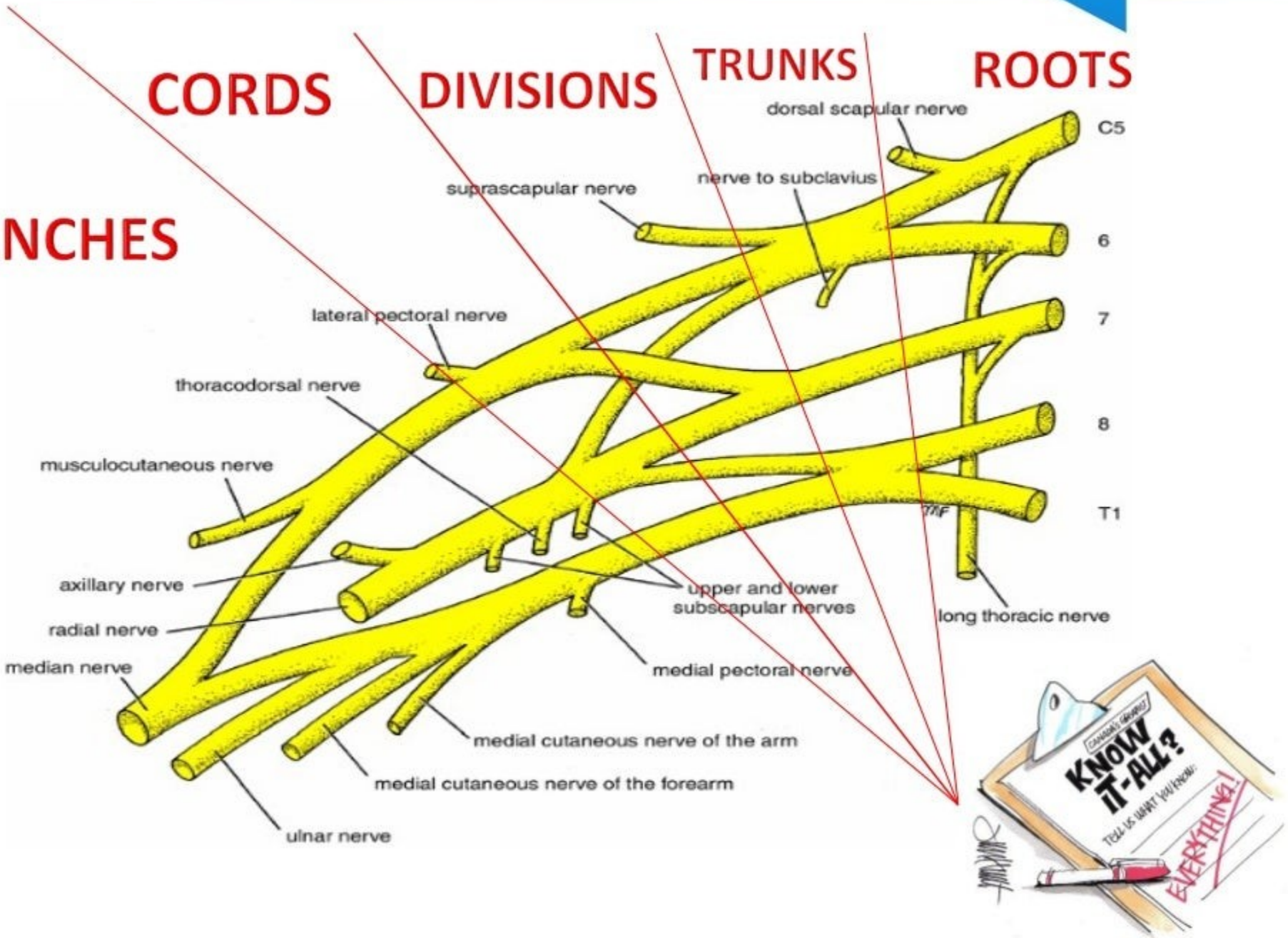



I Am
Confused

Basics

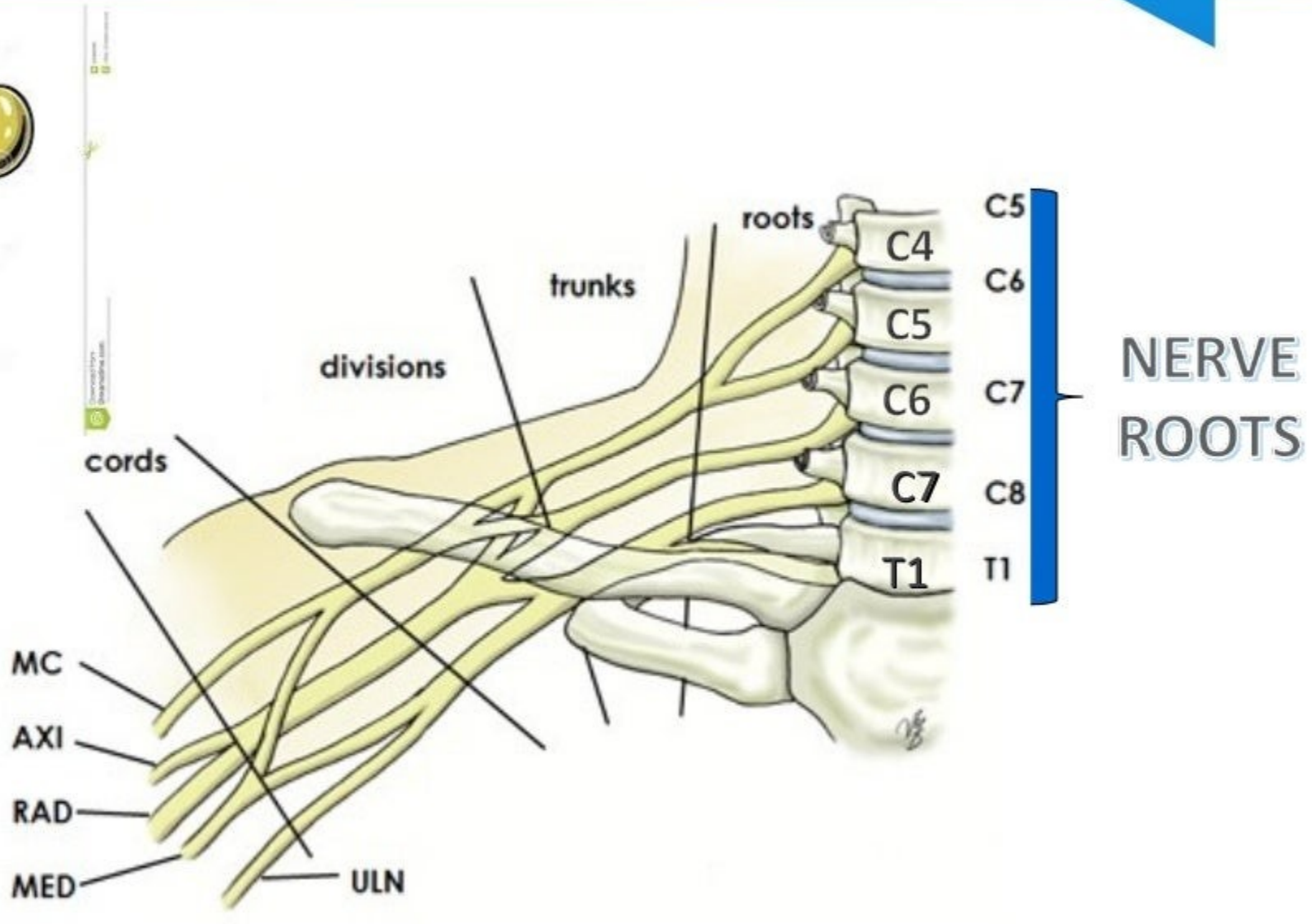

Dura mater
Arachnoid
Pia mater
Subarachnoid space
Autonomic
(sympathetic)
ganglion
Vertebral
body
Rami
communicantes
Ventral root
Ventral ramus
Dorsal ramus
Spinal cord
Dorsal root ganglion
NYSORA

Schematic representation

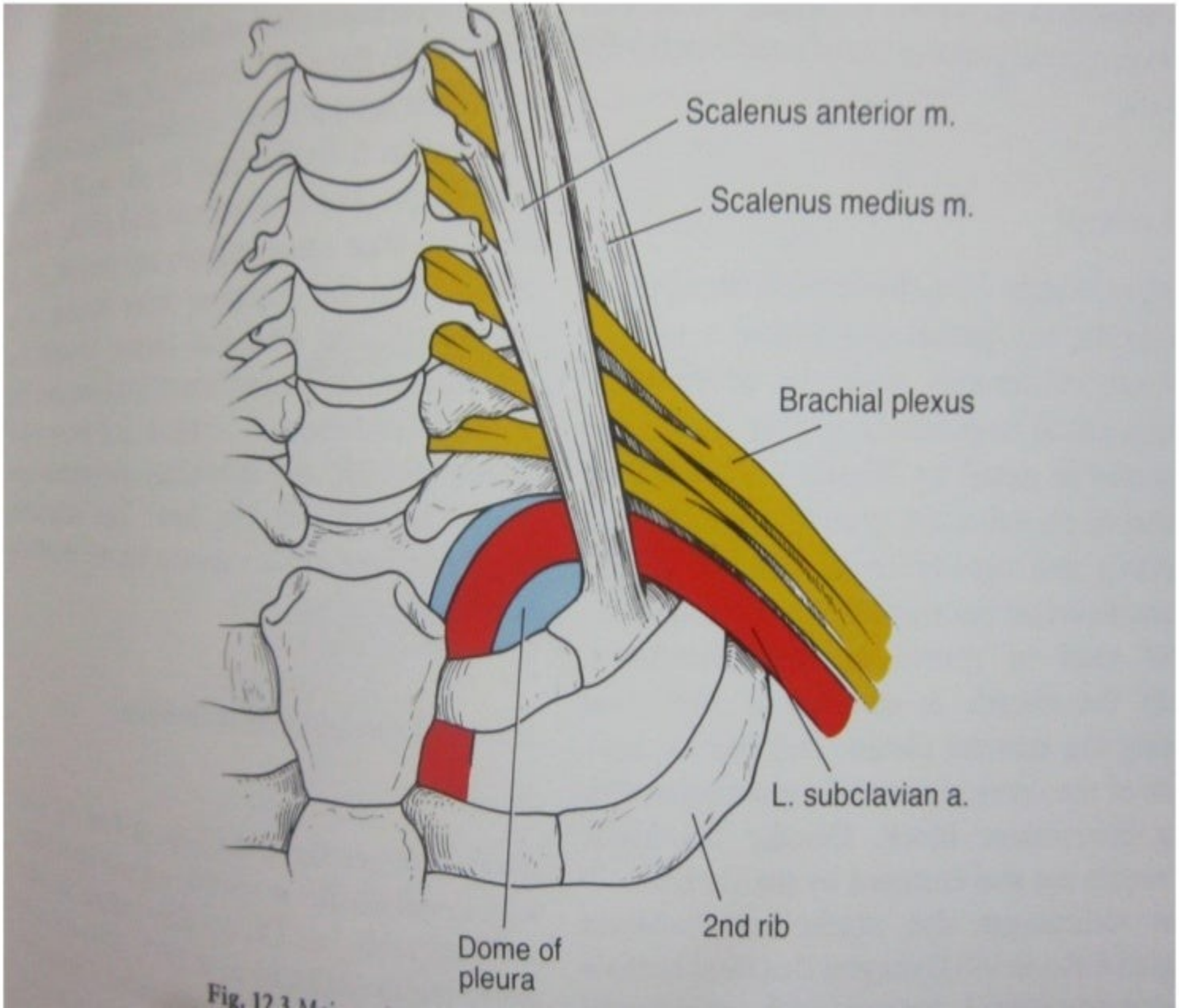


Bony relationship



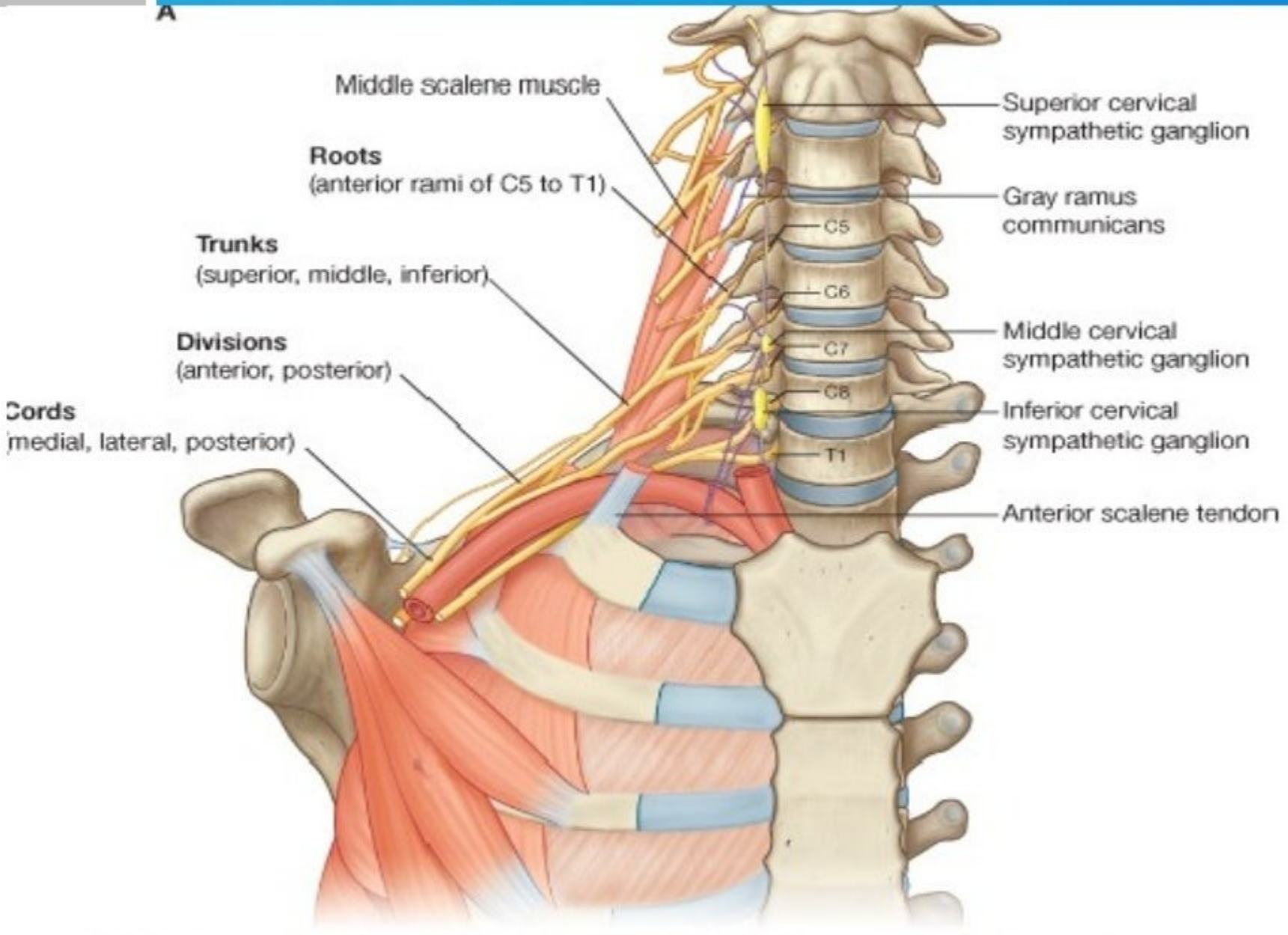


RELATION WITH SCALENE MUSCLES



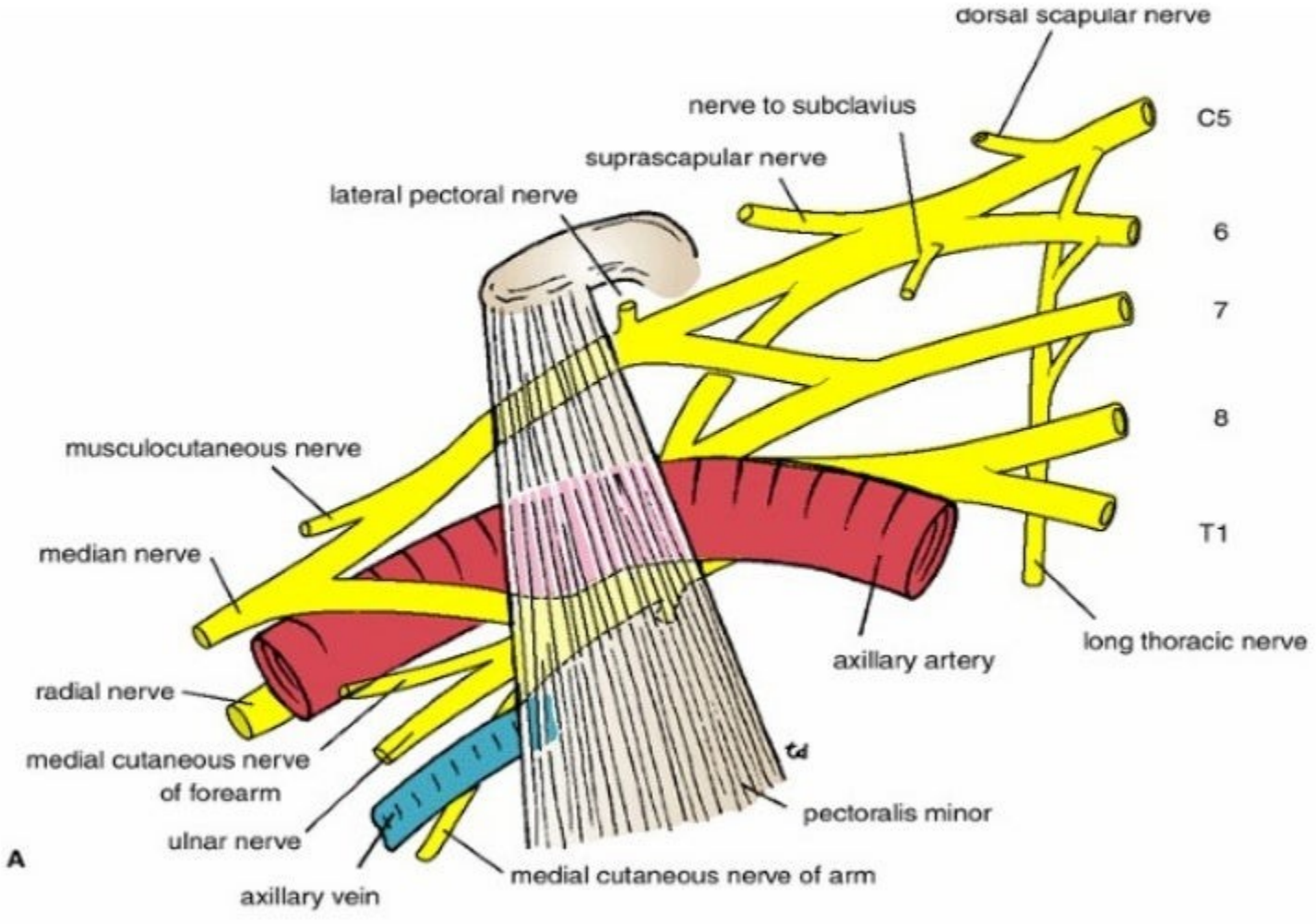


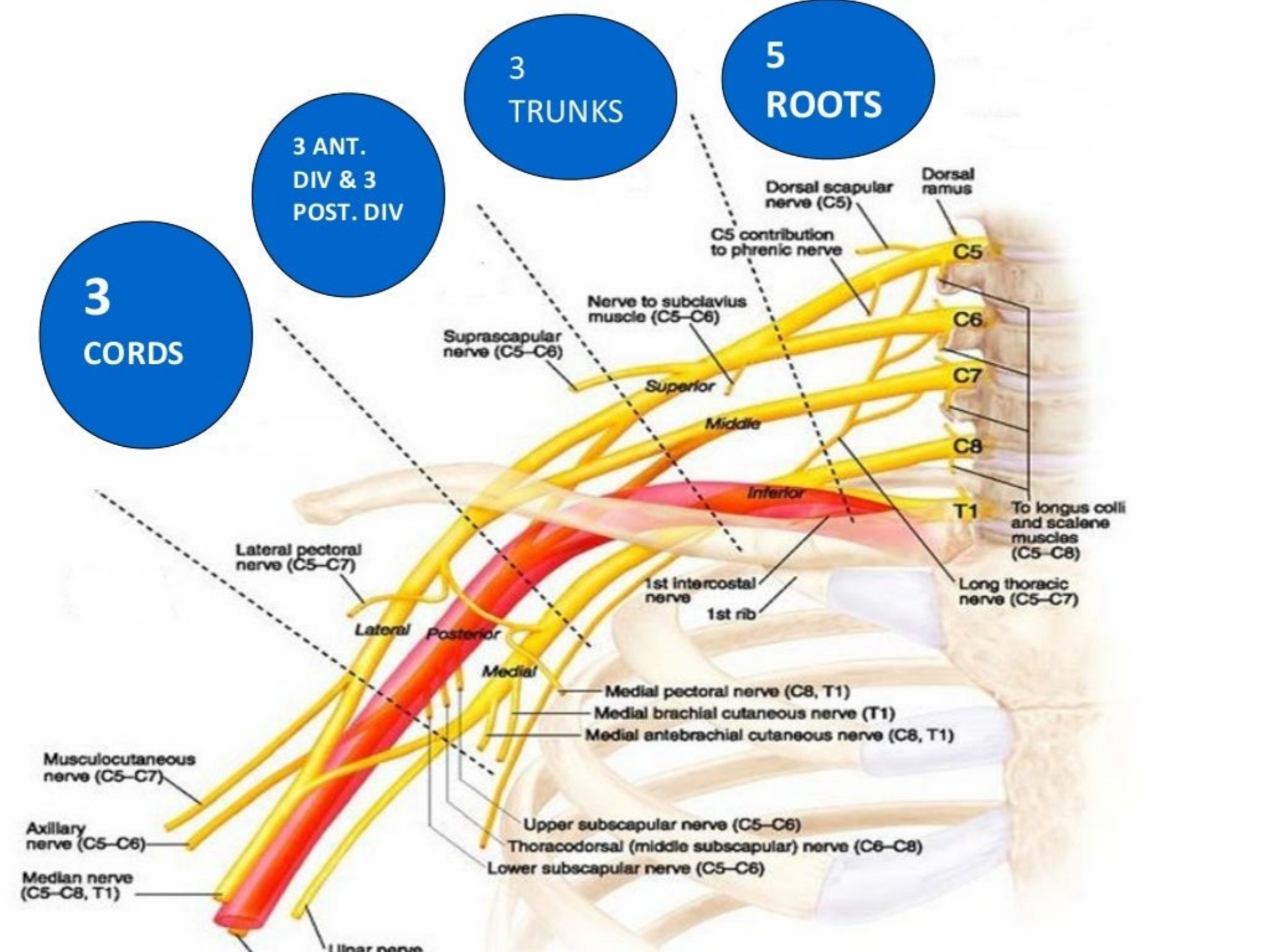
Relation with artery



© Elsevier. Drake et al: Gray's Anatomy for Students - www.studentconsult.com

Relation with artery



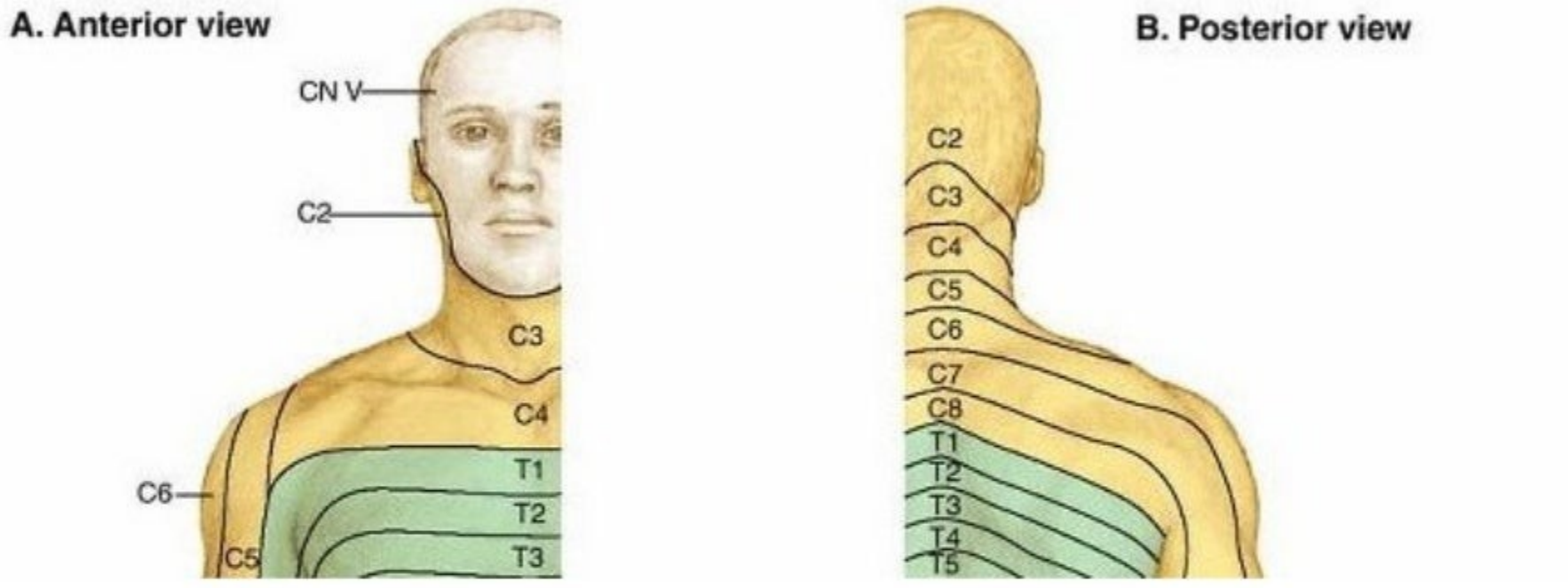

5
ROOTS
3
TRUNKS
3 ANT.
DIV & 3
POST. DIV
3
CORDS
Dorsal scapular nerve (C5)
Dorsal ramus
C5 contribution to phrenic nerve
C5
Nerve to subclavius muscle (C5–C6)
C6
Suprascapular nerve (C5–C6)
Superior
C7
Middle
C8
Inferior
T1
To longus colli and scalene muscles (C5–C8)
Lateral pectoral nerve (C5–C7)
1st intercostal nerve
1st rib
Long thoracic nerve (C5–C7)
Lateral
Posterior
Medial
Medial pectoral nerve (C8, T1)
Medial brachial cutaneous nerve (T1)
Medial antebrachial cutaneous nerve (C8, T1)
Musculocutaneous nerve (C5–C7)
Upper subscapular nerve (C5–C6)
Axillary nerve (C5–C6)
Thoracodorsal (middle subscapular) nerve (C6–C8)
Lower subscapular nerve (C5–C6)
Median nerve (C5–C8, T1)
Ulnar nerve

SURGERY OF CLAVICLE / SHOUDER



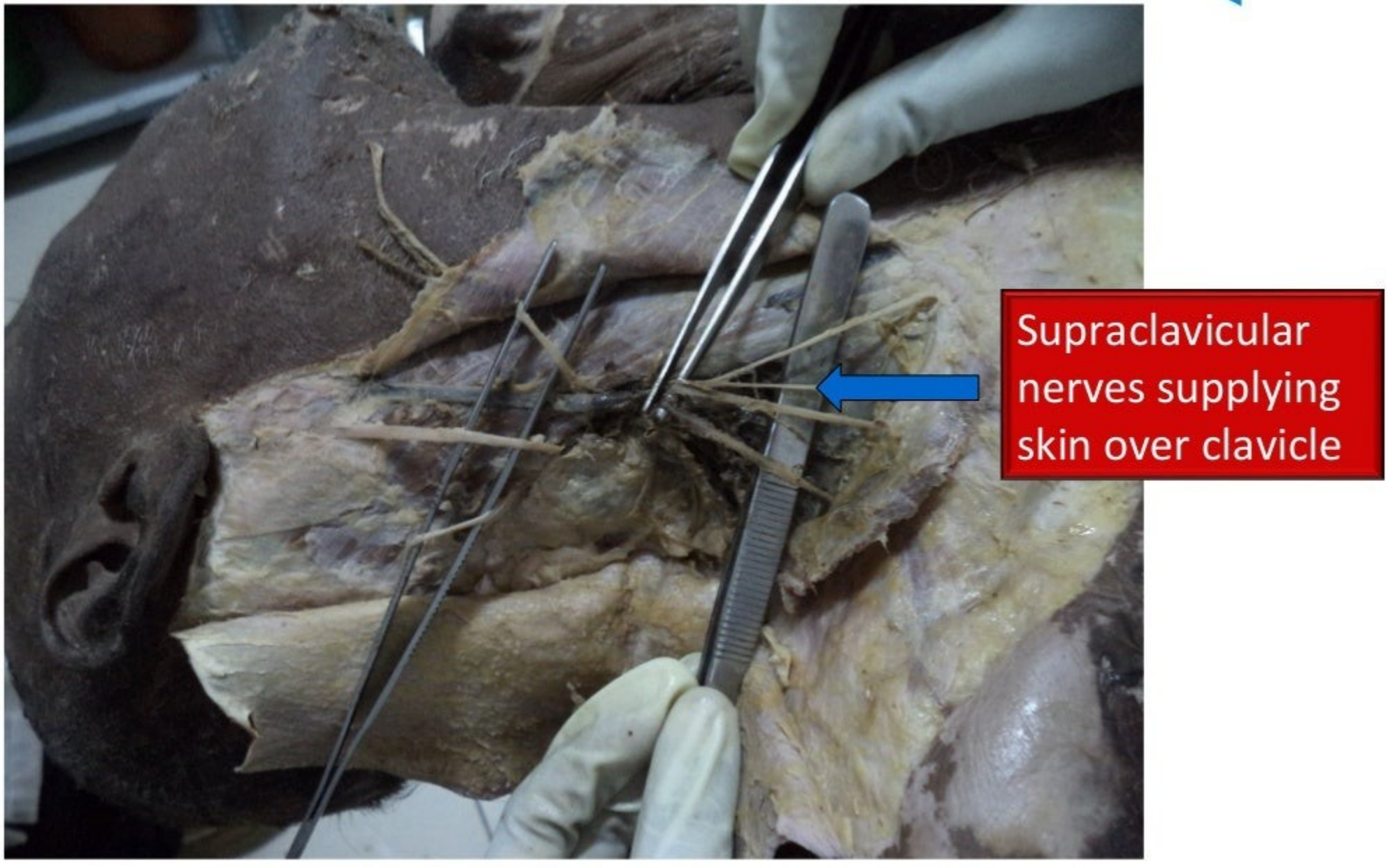


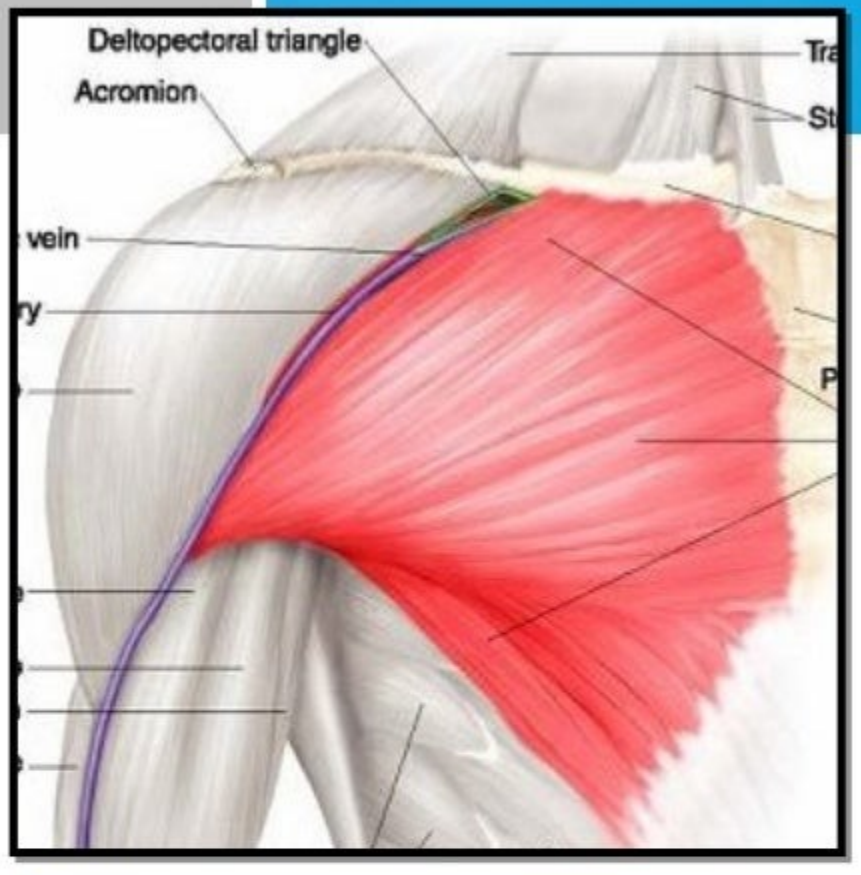
Dermatomal supply over the clavicle



Skin is supplied by the supraclavicular nerves arising from C3 & C4 roots can be blocked at the level of the superficial cervical plexus.

Cadaver dissection



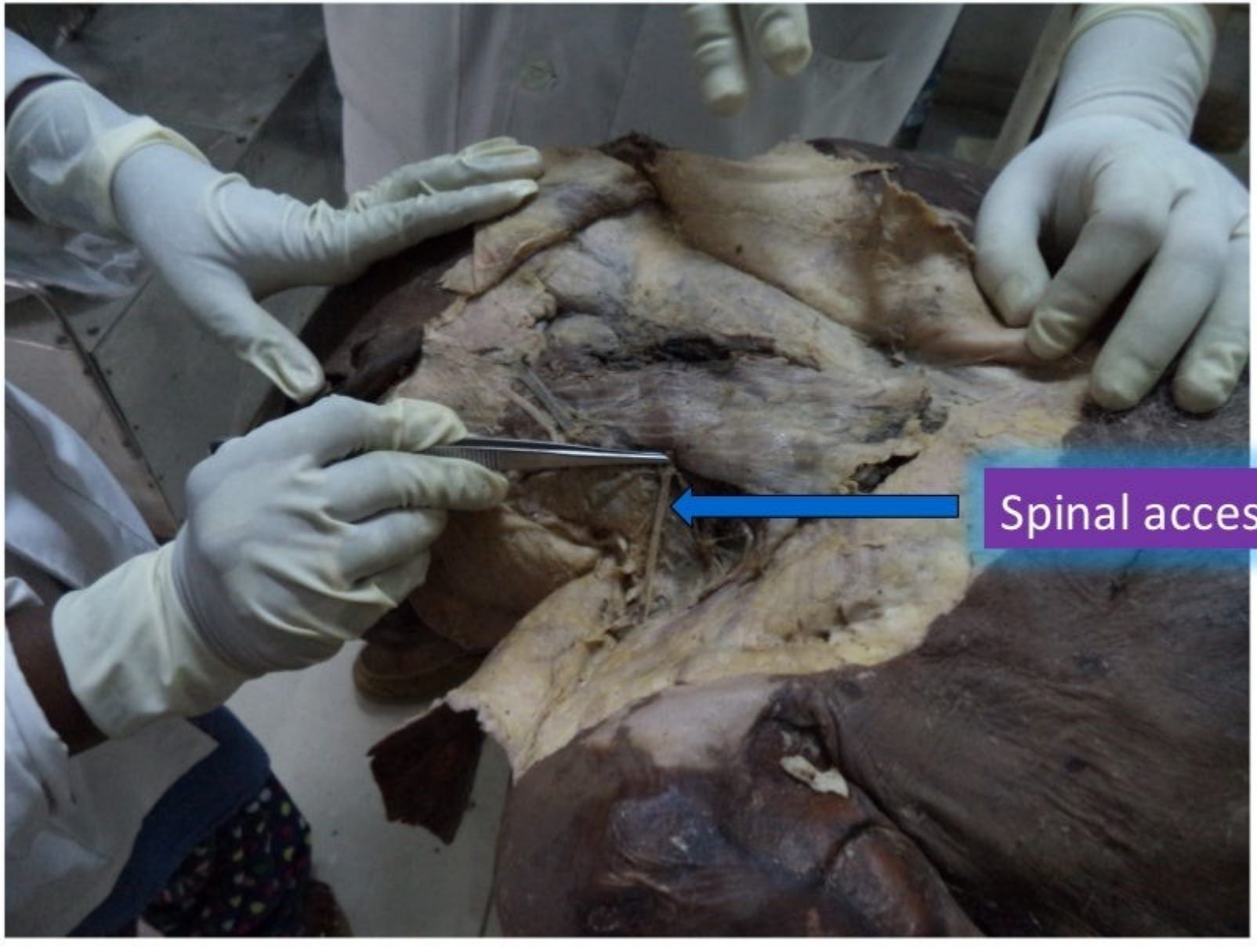


Muscles related to clavicle

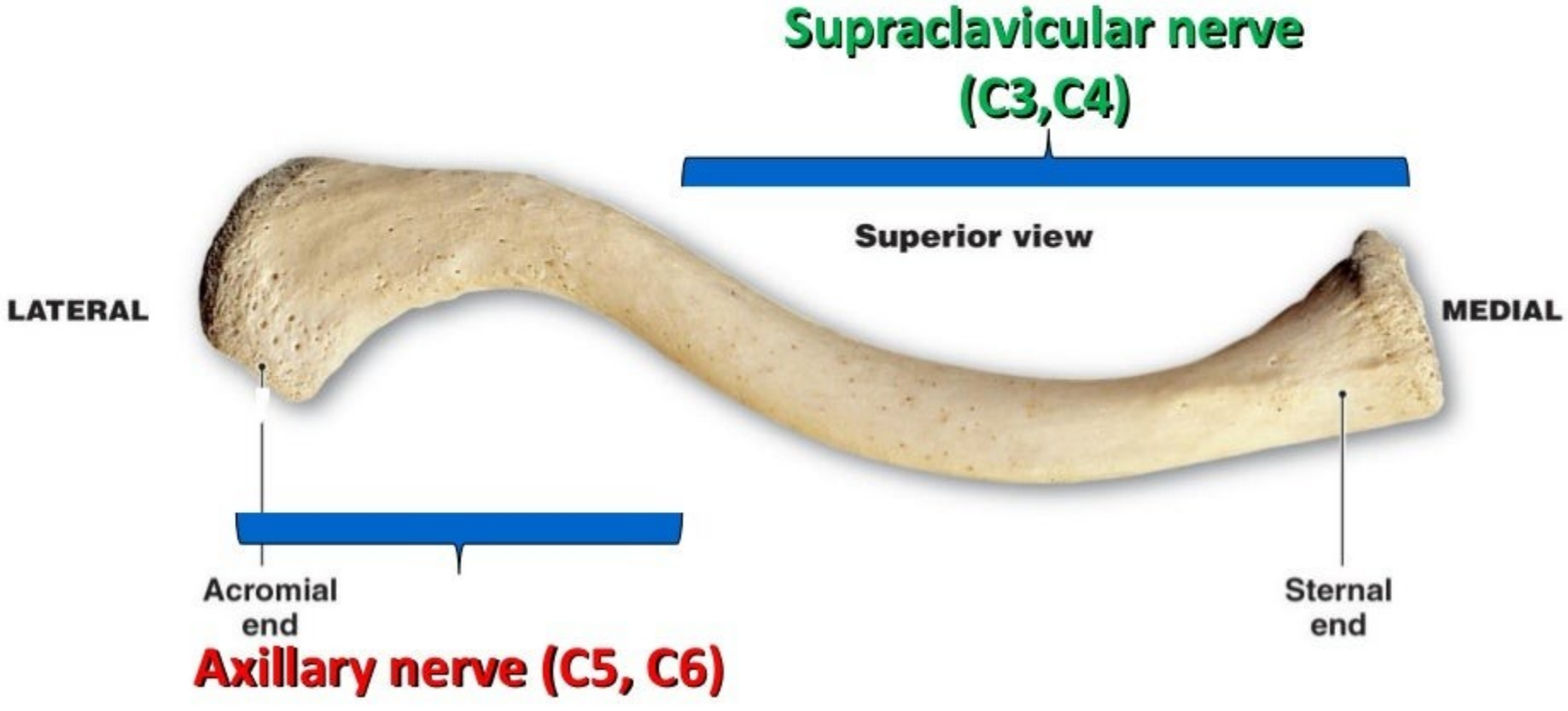
Muscles to be anaesthetized

1. Subclavius. - nerve to subclavius from upper trunk.
2. Pectoral muscles. – M/L pectoral nerve from M/L cords
3. Deltoid. – Axillary nerve from posterior cord.
4. Sternocleido mastoid. – sensory C3 & C4 / motor XI
5. Trapezius. – sensory and motor from XI.

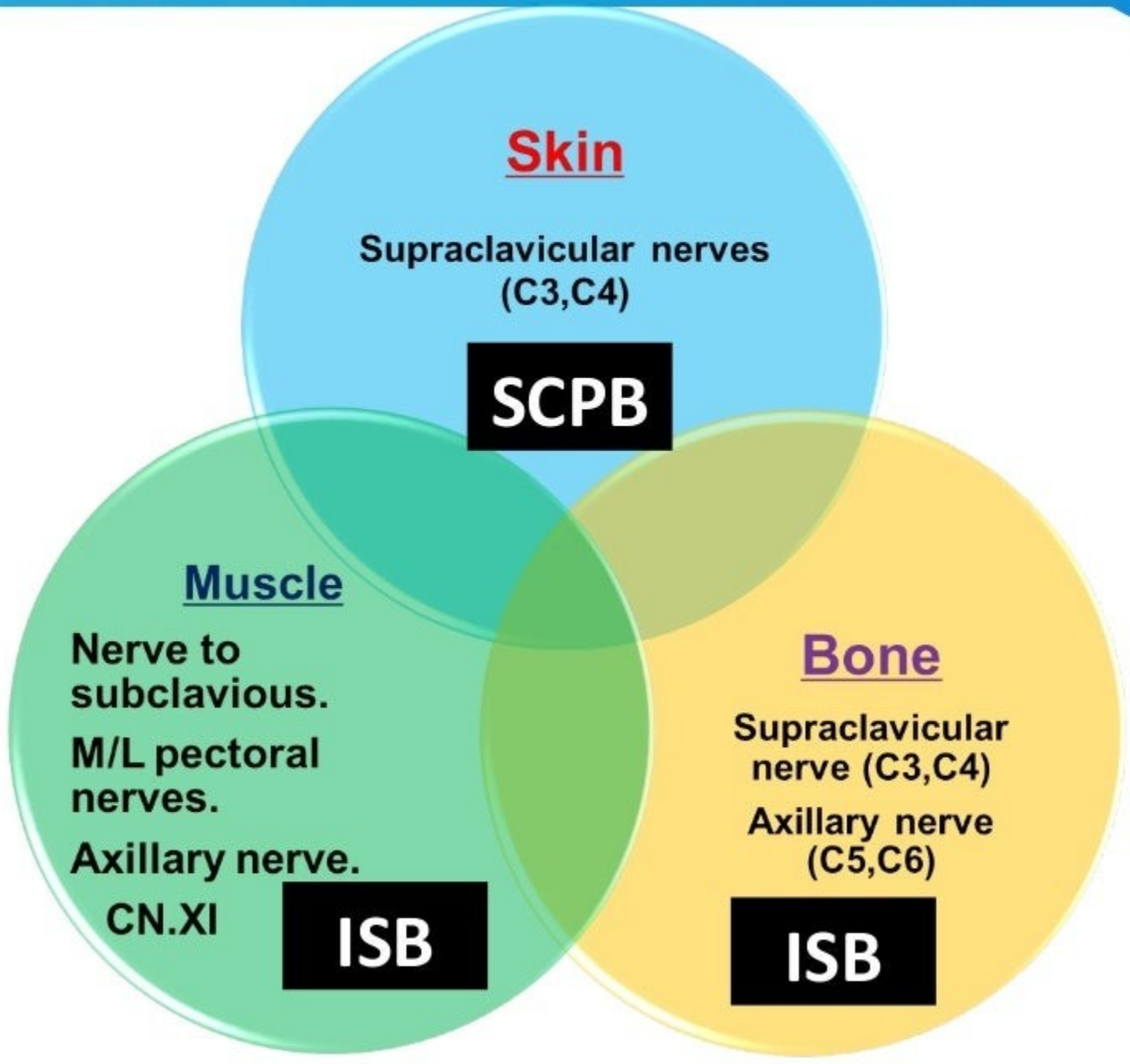
Cadaver dissection



Osteotomal supply of clavicle



Strategy for clavicle sx



Surgeries around shoulder joint & upper arm

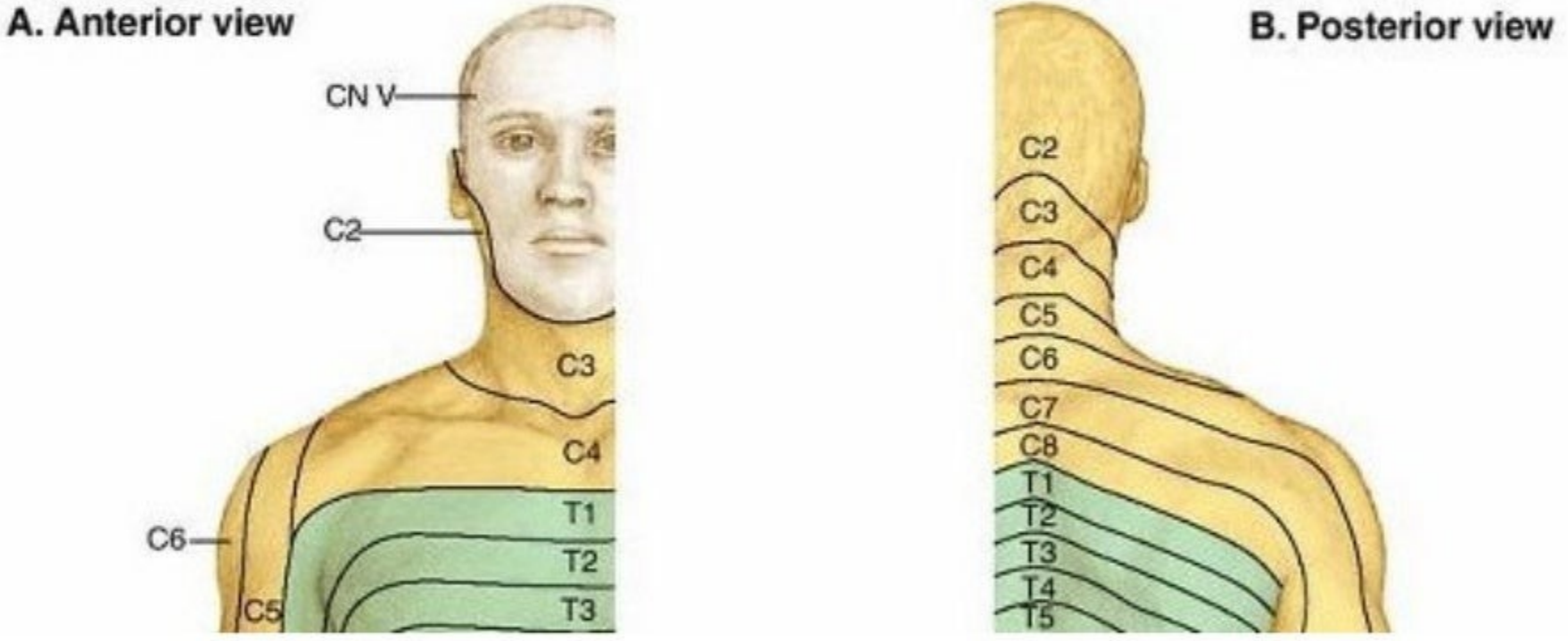




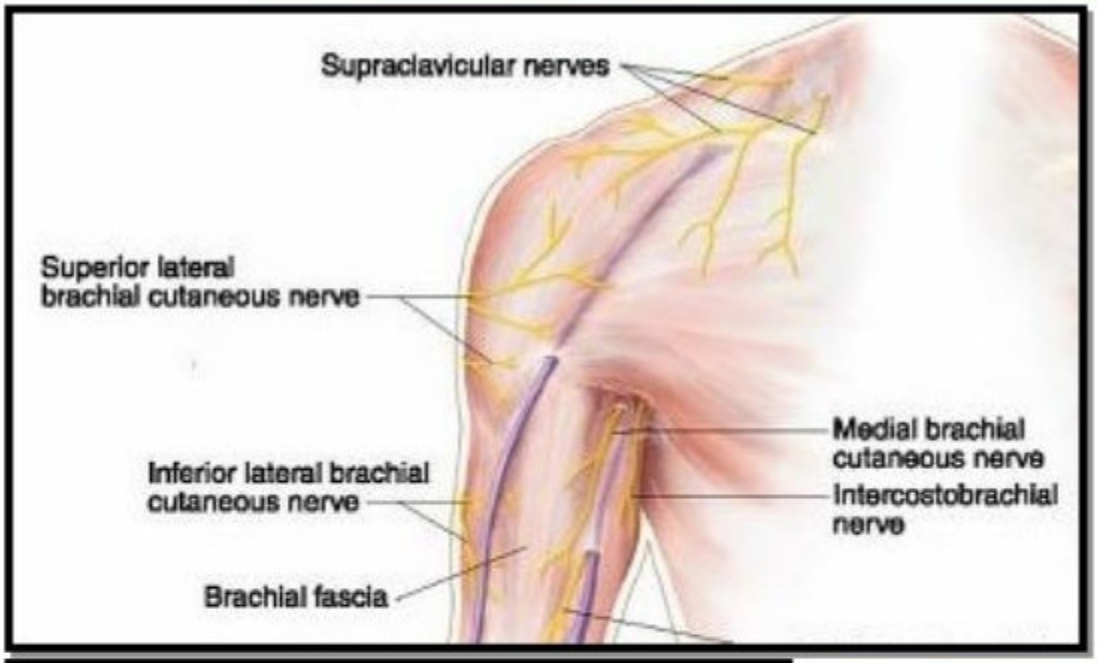




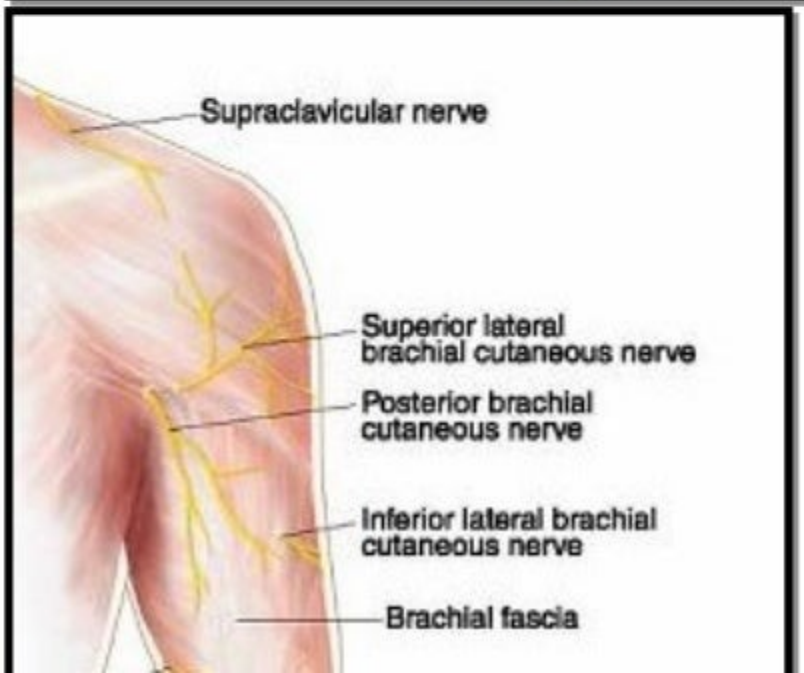
Dermatomal supply around shoulder



Dermatomal supply of shoulder & upper arm



The dermatomal supply around the shoulder joint receives contribution from C5 to T2.



Laterally by Supero-lateral cutaneous nerve of arm (Terminal branch of Axillary.N **C5 -6**)

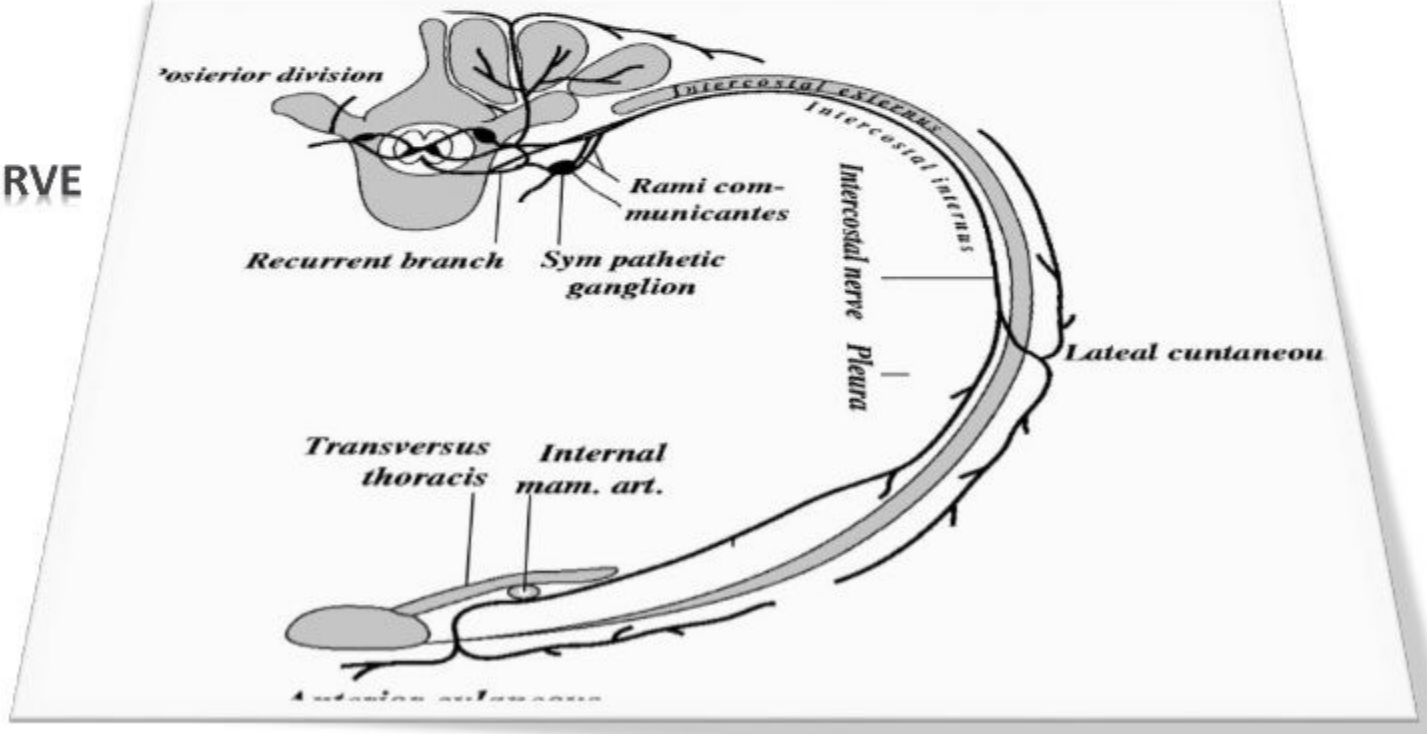
Medially by ICBN & Medial cutaneous nerve of arm (Branch form T2 & Medial cord) **C8, T1, T2.**

Posteriorly by posterior cutaneous nerve of arm (Branch from Radial nerve) (**C5 to T1**)

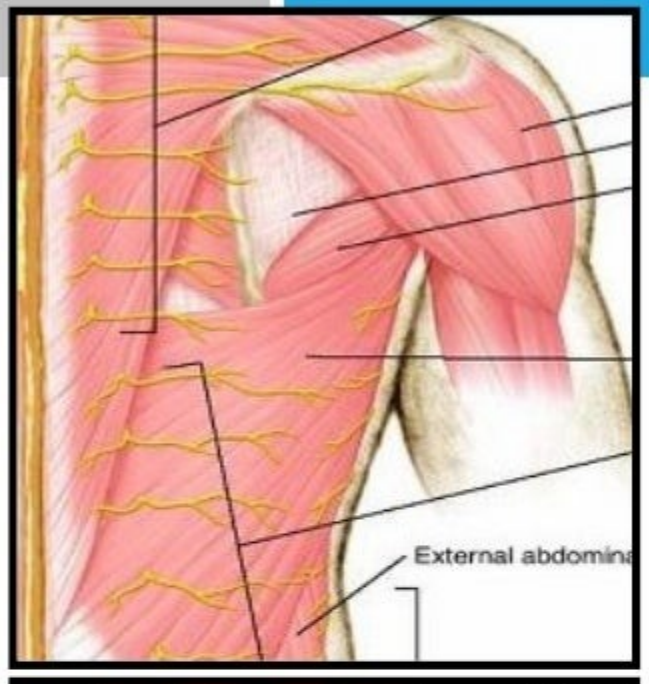
A Little more about intercostobrachial nerve

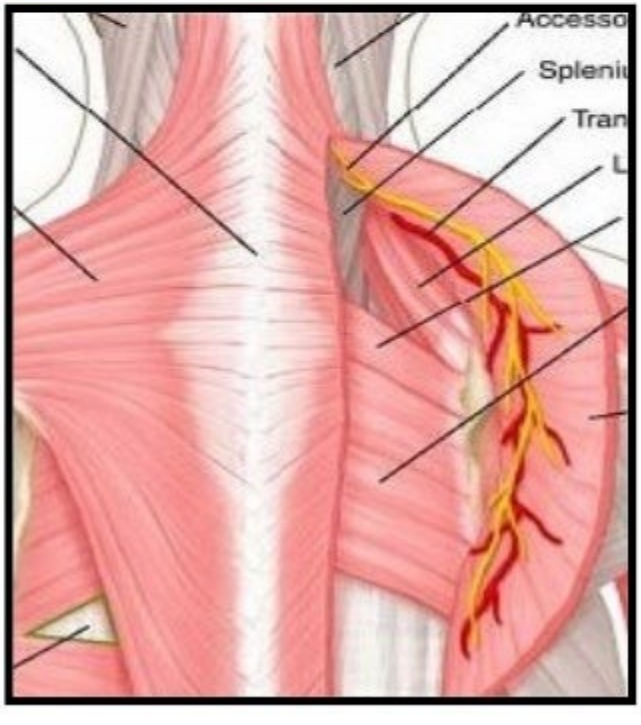
- Intercostobrachial nerve arises from second intercostal nerve and courses through the superficial axilla to innervate skin of axilla and upper arm.

A TYPICAL INTERCOSTAL NERVE



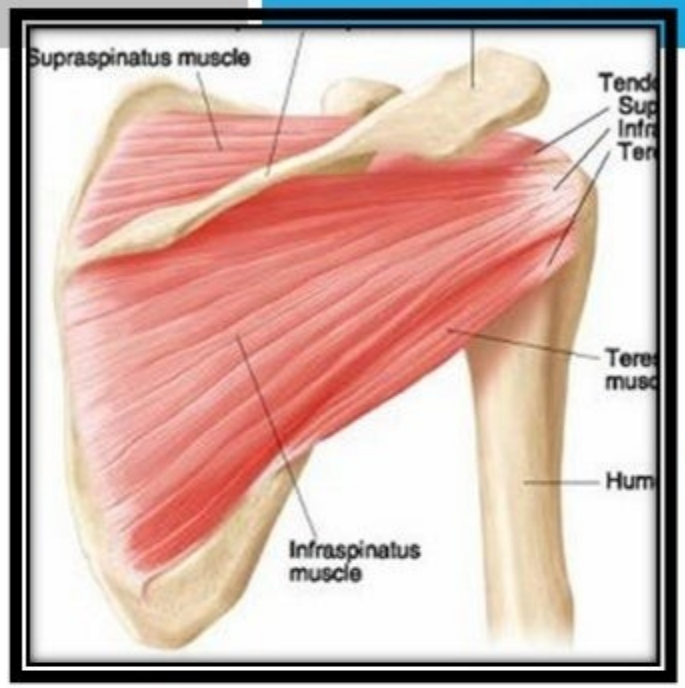
Muscles related posteriorly





1) **Latissimus dorsi-** thoraco-dorsal nerve
2) **Teres major-** lower subscapular nerve
3) **Levator scapulae**- dorsal scapular nerve
4) **Rhomboid Major-** dorsal scapular nerve
5) **Rhomboid minor**- dorsal scapular

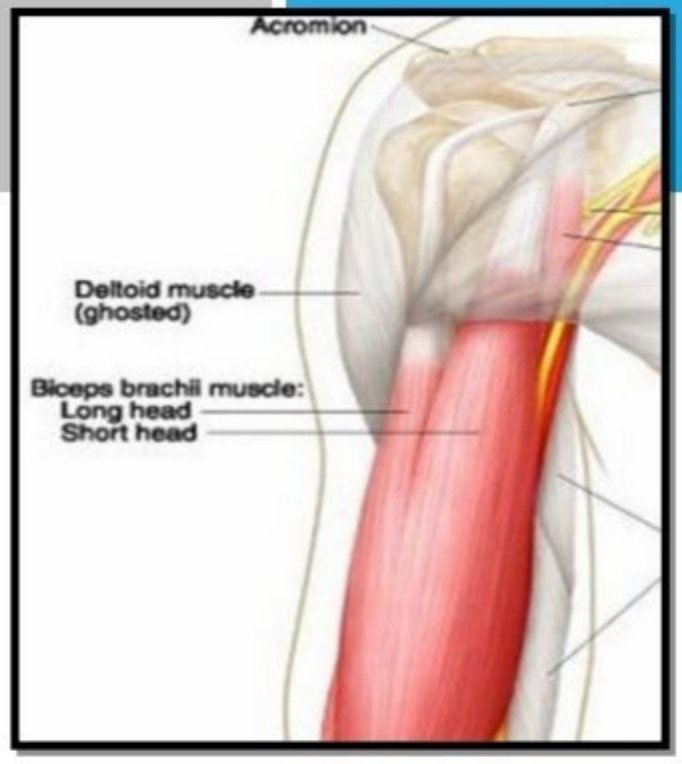
Rotator cuff muscles





1) Supra-spinatus supplied by suprascapular nerve
2) Infra-spinatus –suprascapular nerve
3) Subscapularis – subscapular nerve
4) Teres minor- axillary nerve

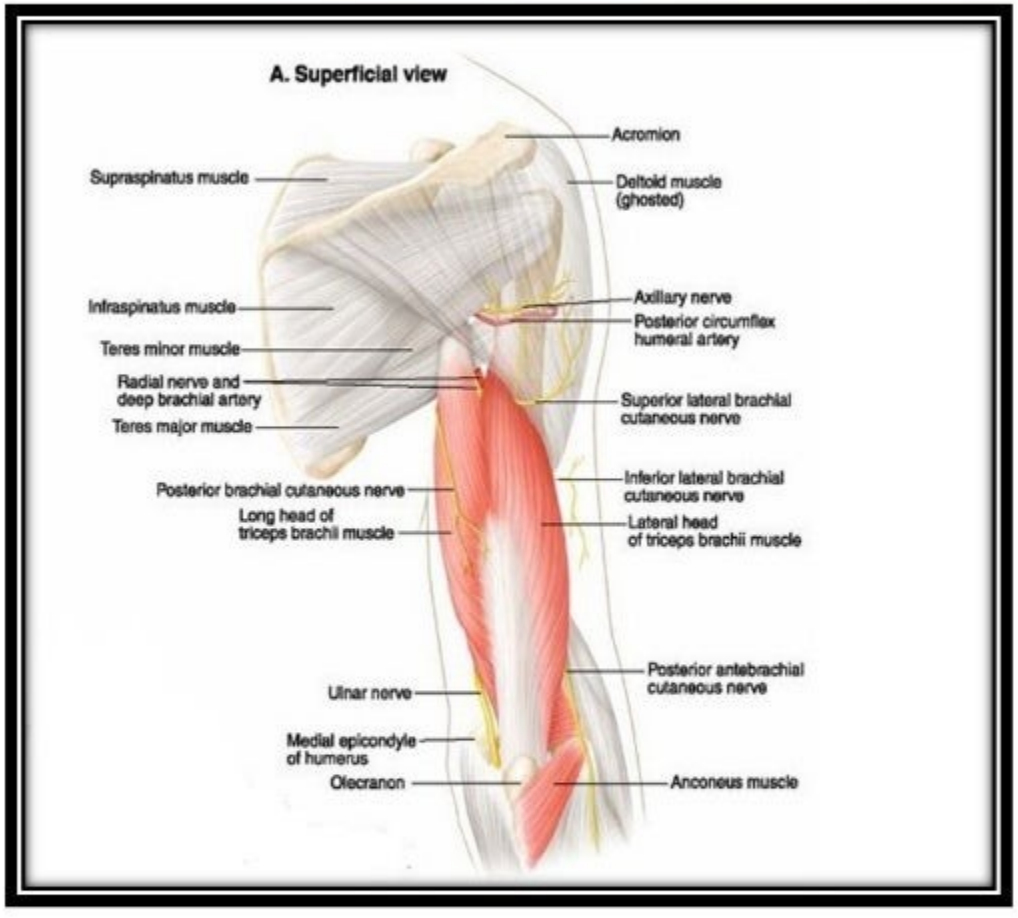
Muscles of upper arm

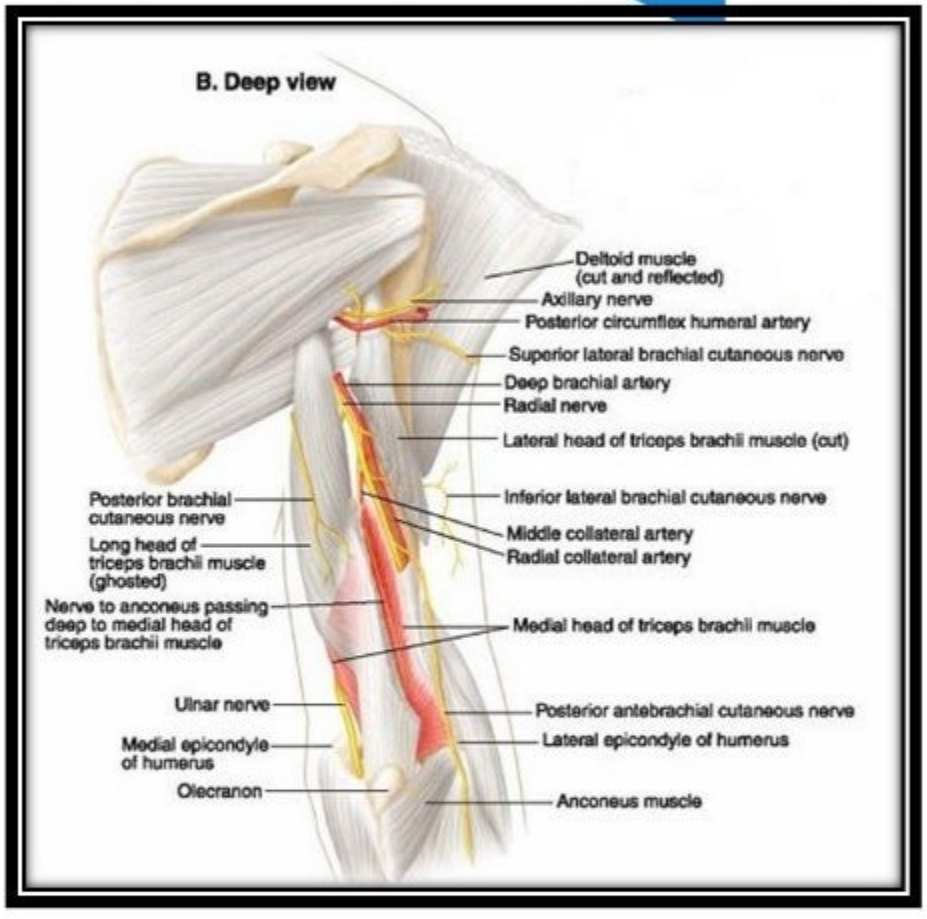




1) Biceps supplied by musculocutaneous nerve
2) Corocobrachialis- musculocutaneous nerve
3) Brachialis- musculocutaneous nerve

Muscles on the posterior aspect of arm

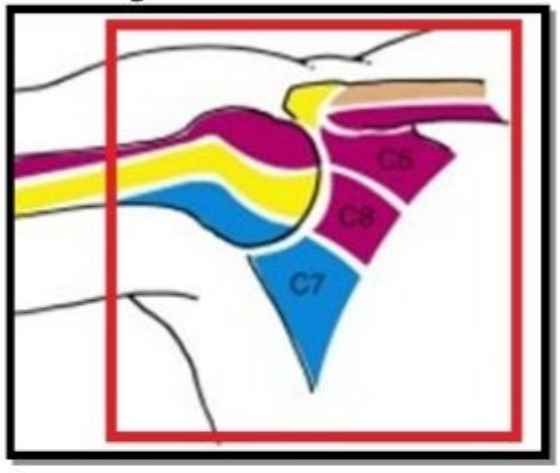




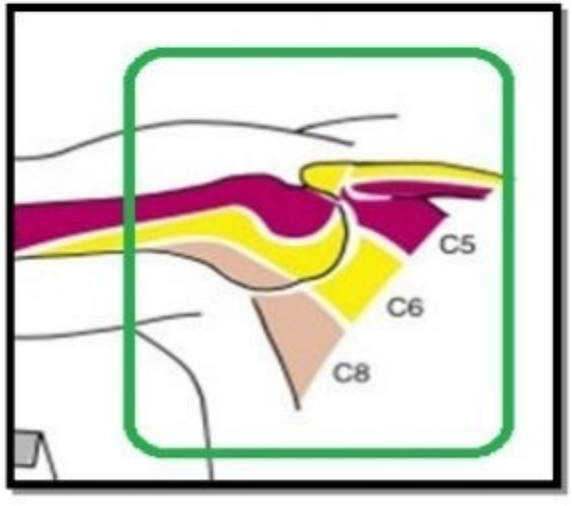
Triceps supplied by radial nerve

Osteotomal supply around shoulder joint

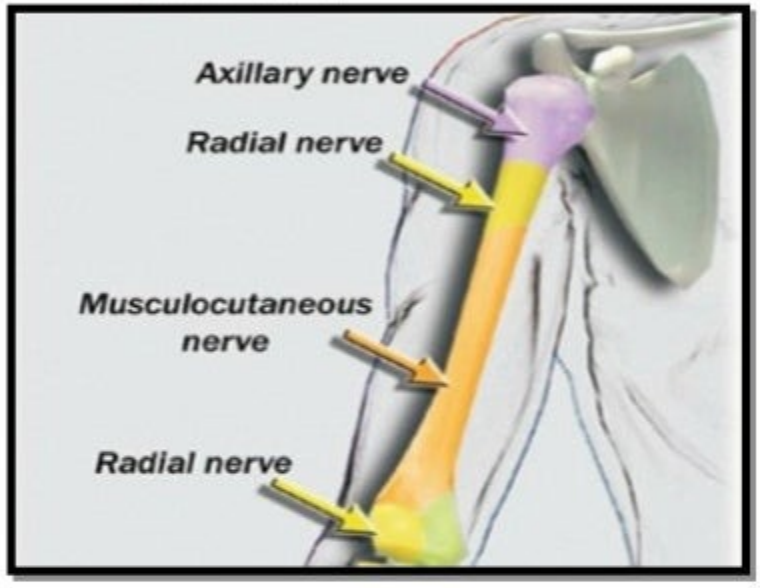
supination

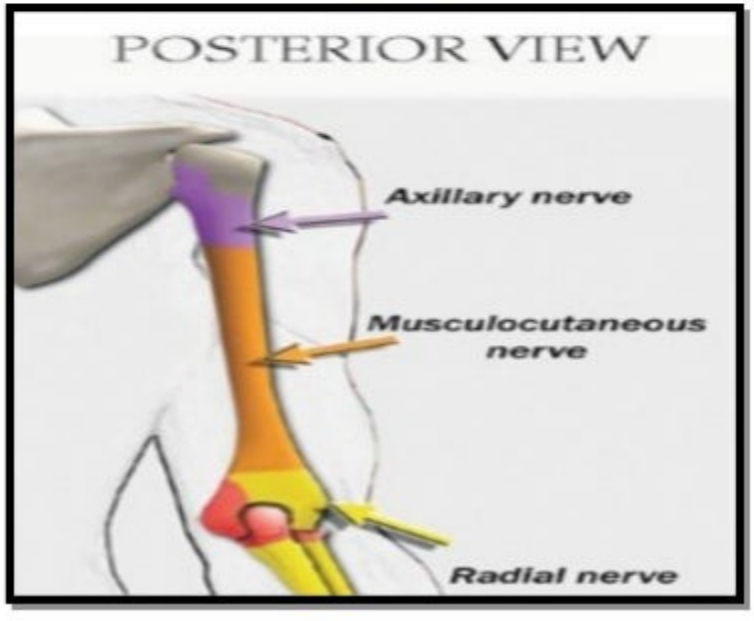


pronation

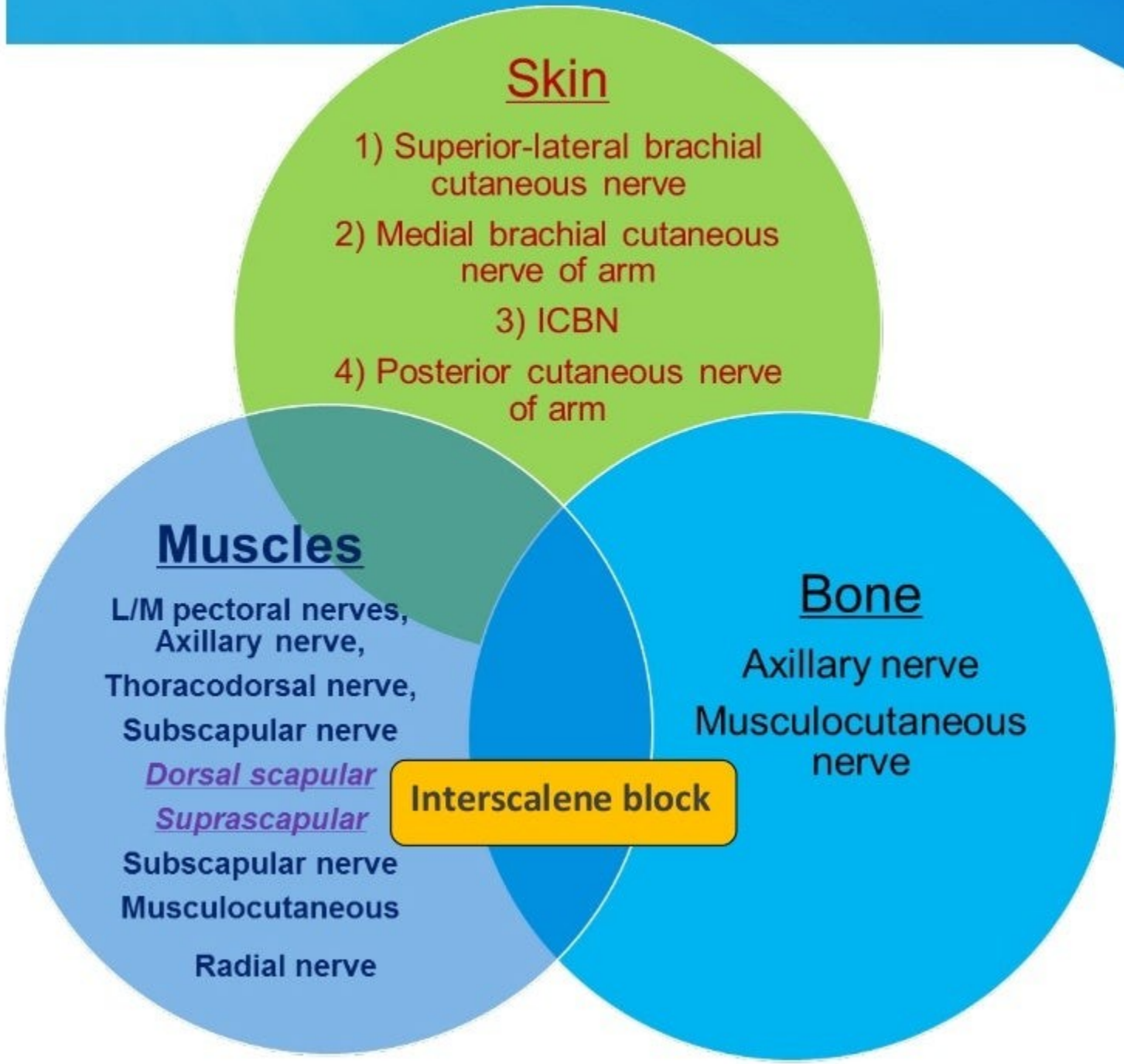


ANTERIOR





Strategy for shoulder & upper arm surgery



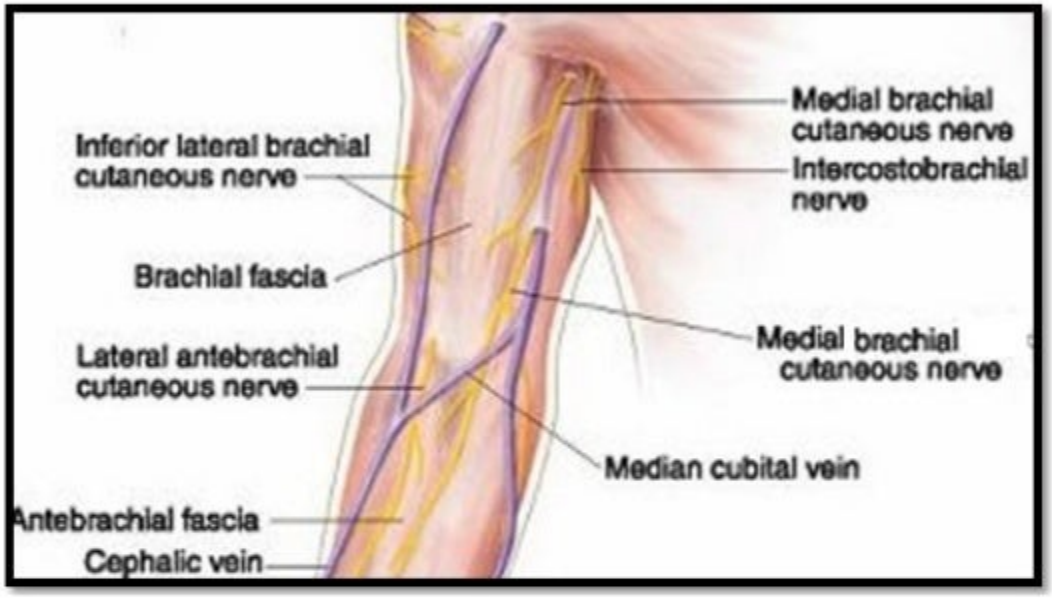
Surgeries on lower arm and elbow



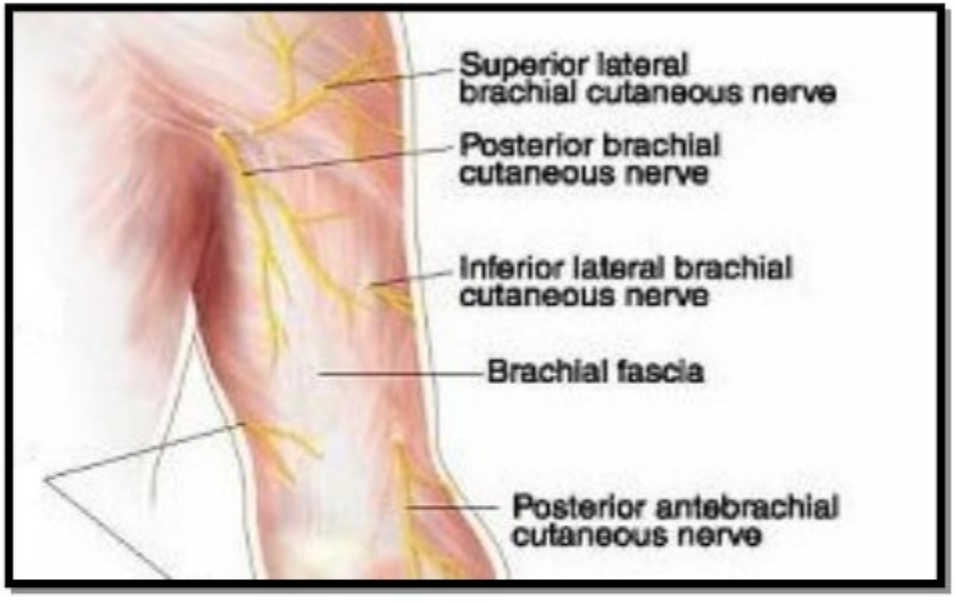


DERMATOMAL SUPPLY LOWER ARM

ANTERIOR



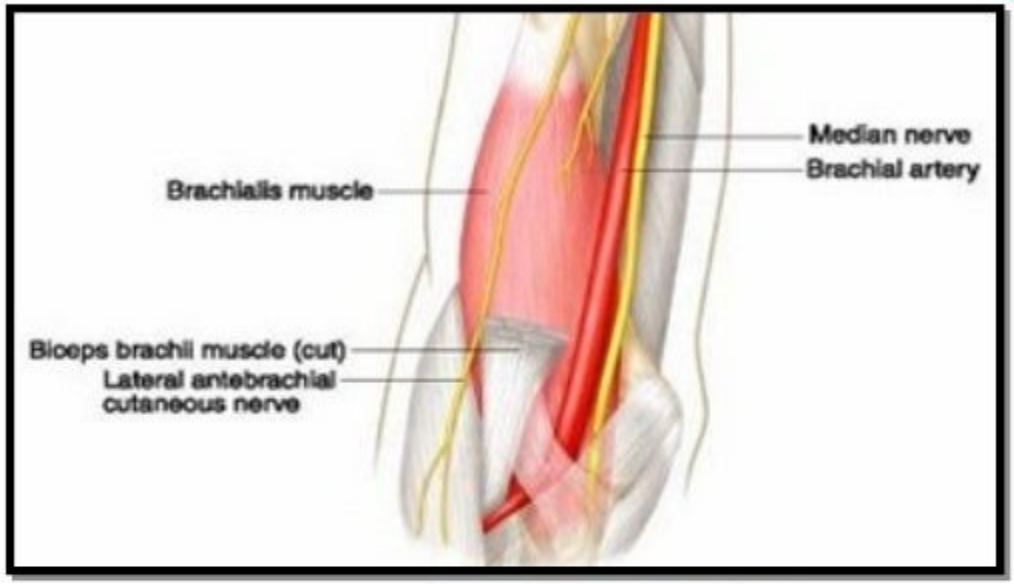
POSTERIOR



Laterally- inferior lateral brachial cutaneous nerve (Radial)
Medially- medial brachial cutaneous nerve
Posteriorly- posterior brachial cutaneous nerve

Muscles around elbow and lower arm



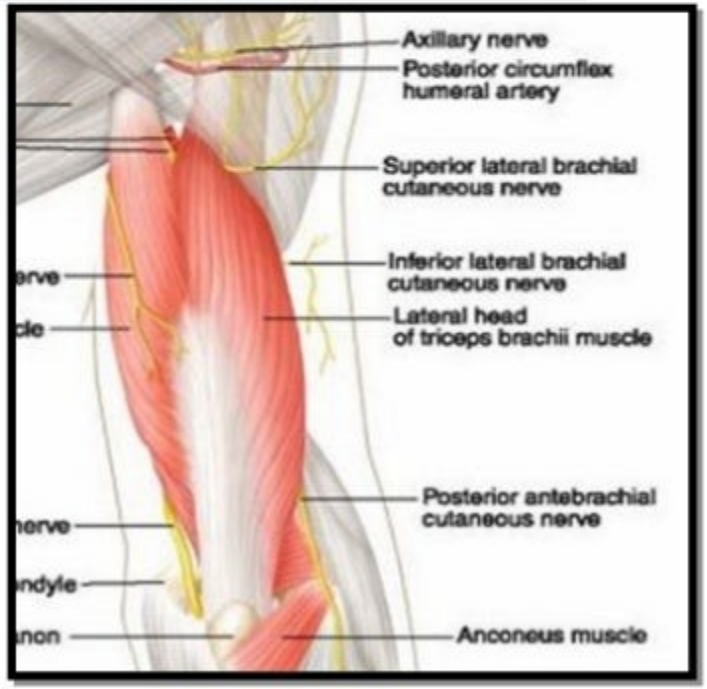


ANTERIORLY

Biceps
Brachialis
} **Musculocutaneous nerve**

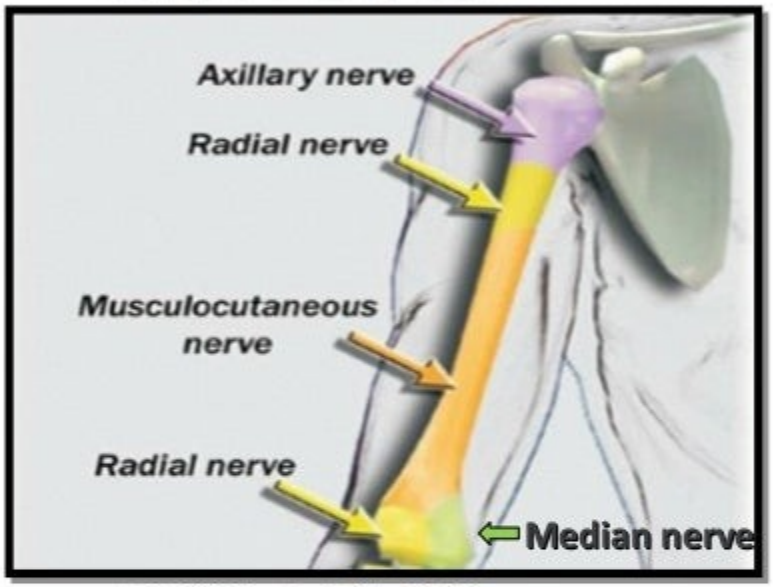
POSTERIORLY

Triceps – **radial nerve**



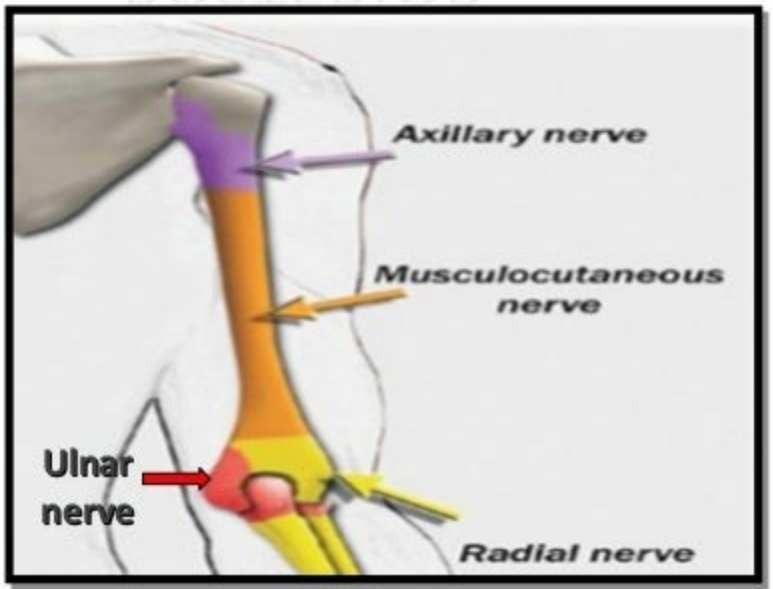
Osteotomal supply above elbow

ANTERIOR



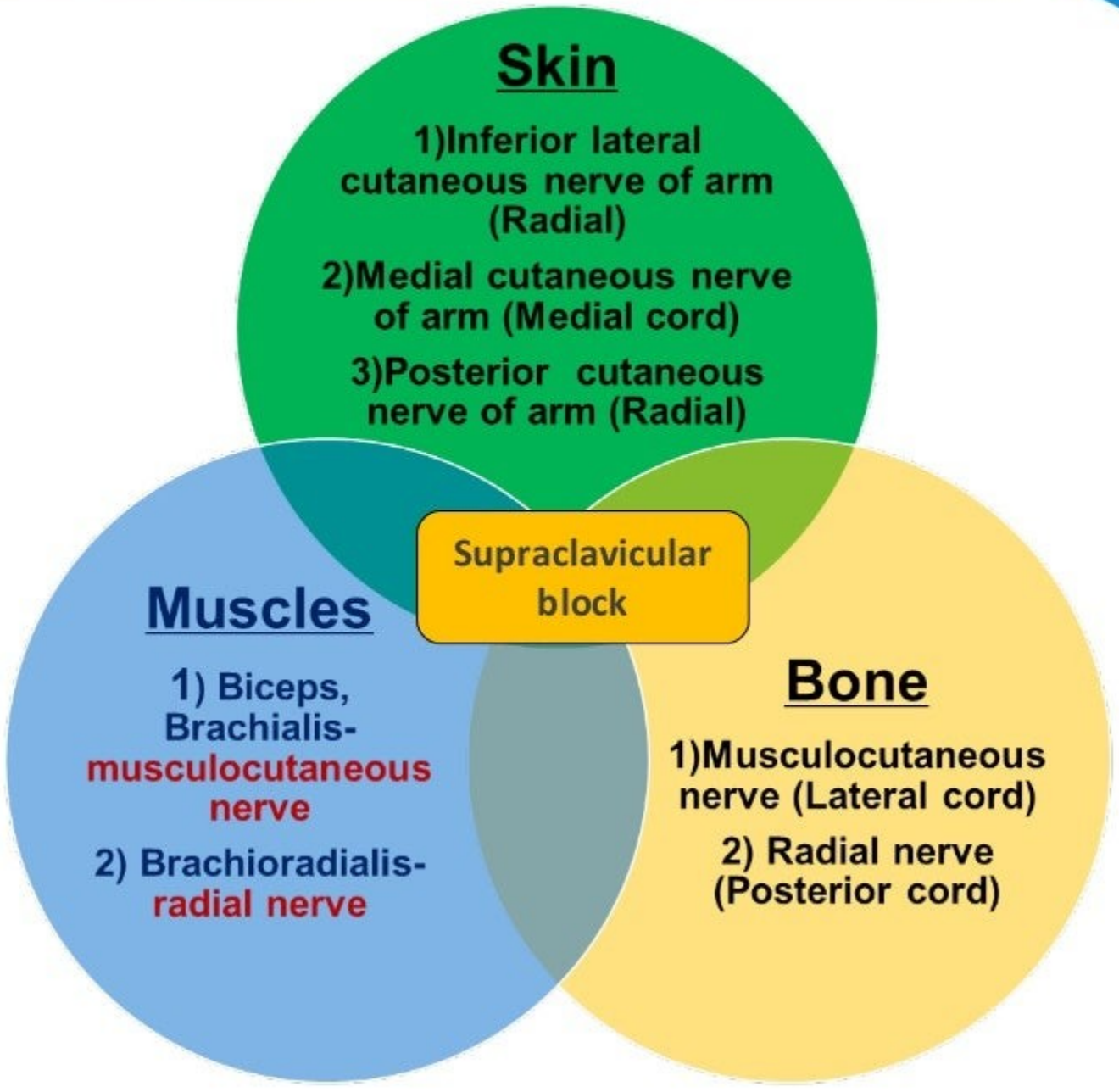
Anteriorly supplied by
1)Musculocutaneous nerve
2)Radial nerve
3)Median nerve

POSTERIOR



Posteriorly supplied by
1)Musculocutaneous nerve
2)Radial nerve
3)Ulnar nerve

Strategy for surgeries above elbow??



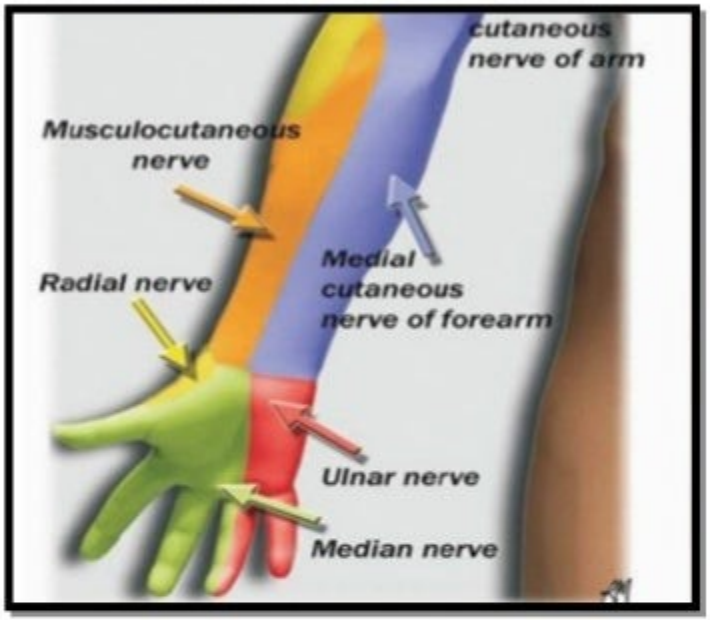
Surgeries below elbow/ forearm

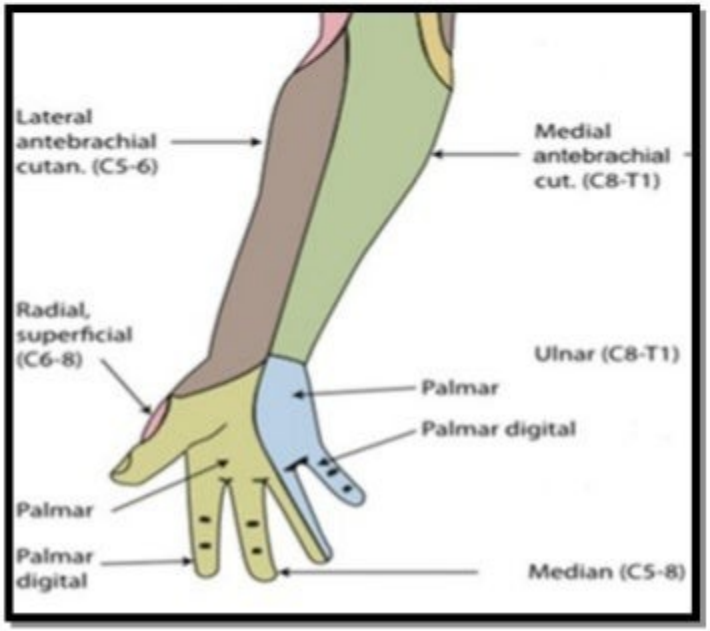




Dermatomal supply of forearm

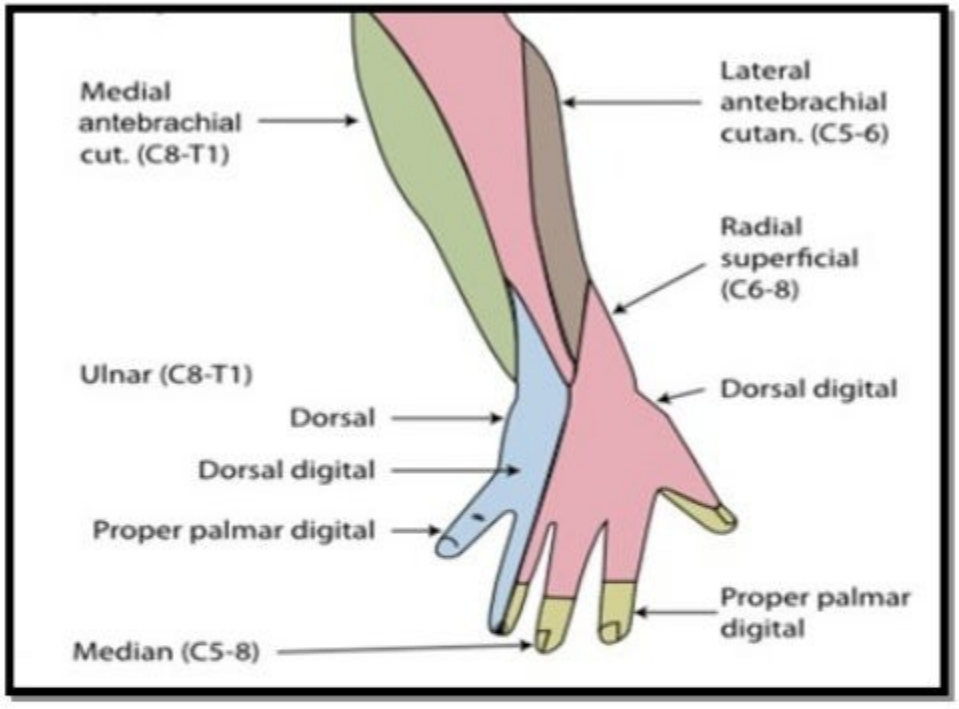
ANTERIOR FOREARM

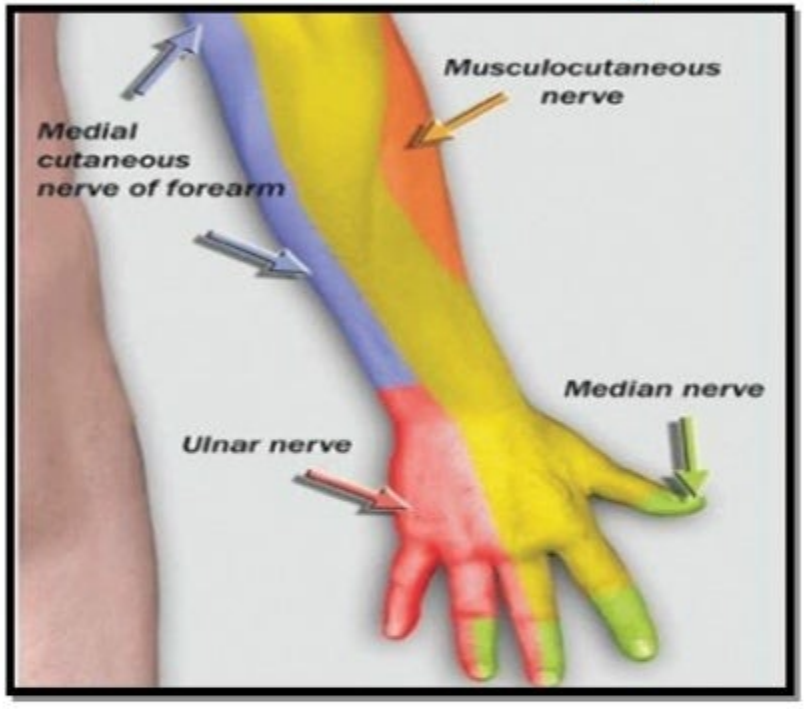




- Laterally supplied by lateral cutaneous nerve of forearm (Musculocutaneous)
- Medially- medial cutaneous nerve of forearm (medial cord)

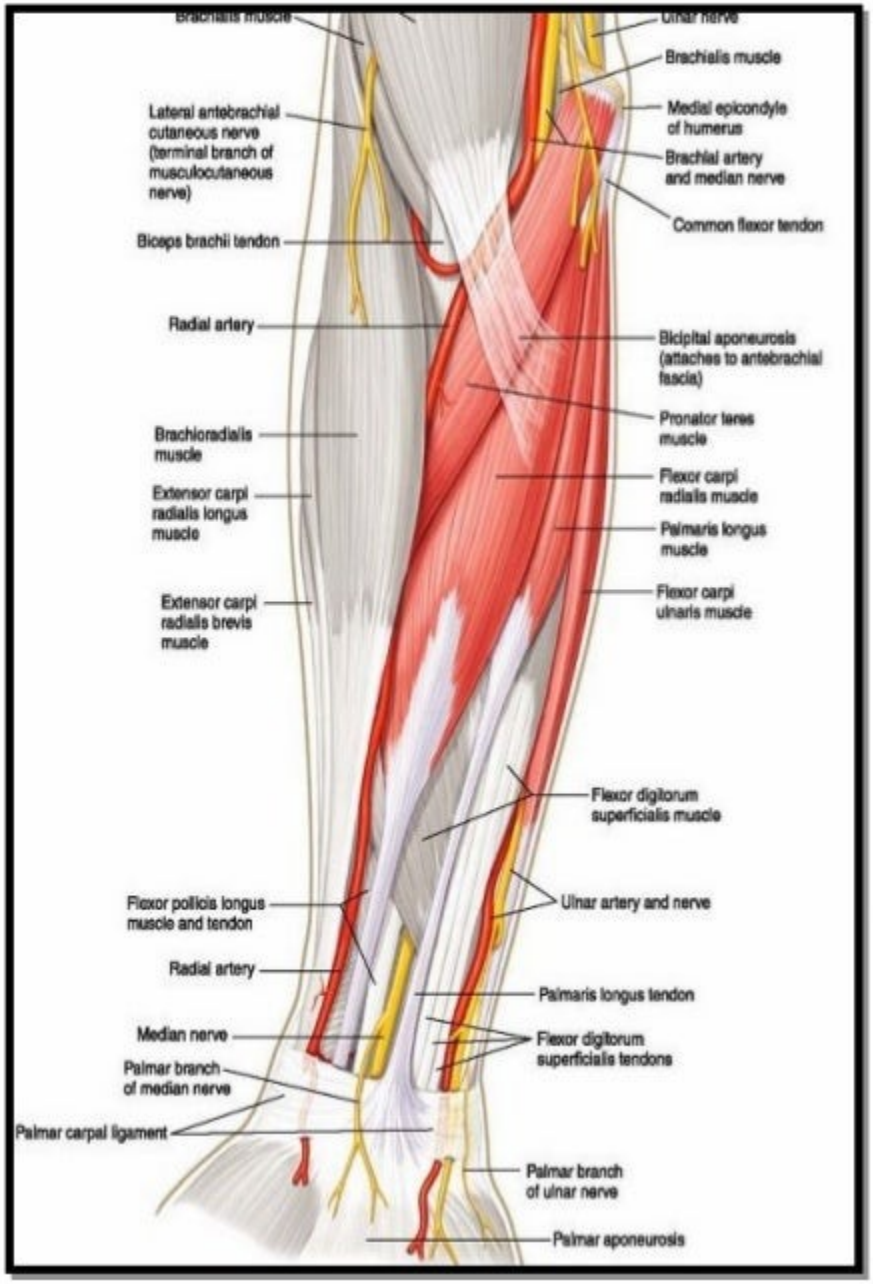
Dermatomal supply of posterior forearm

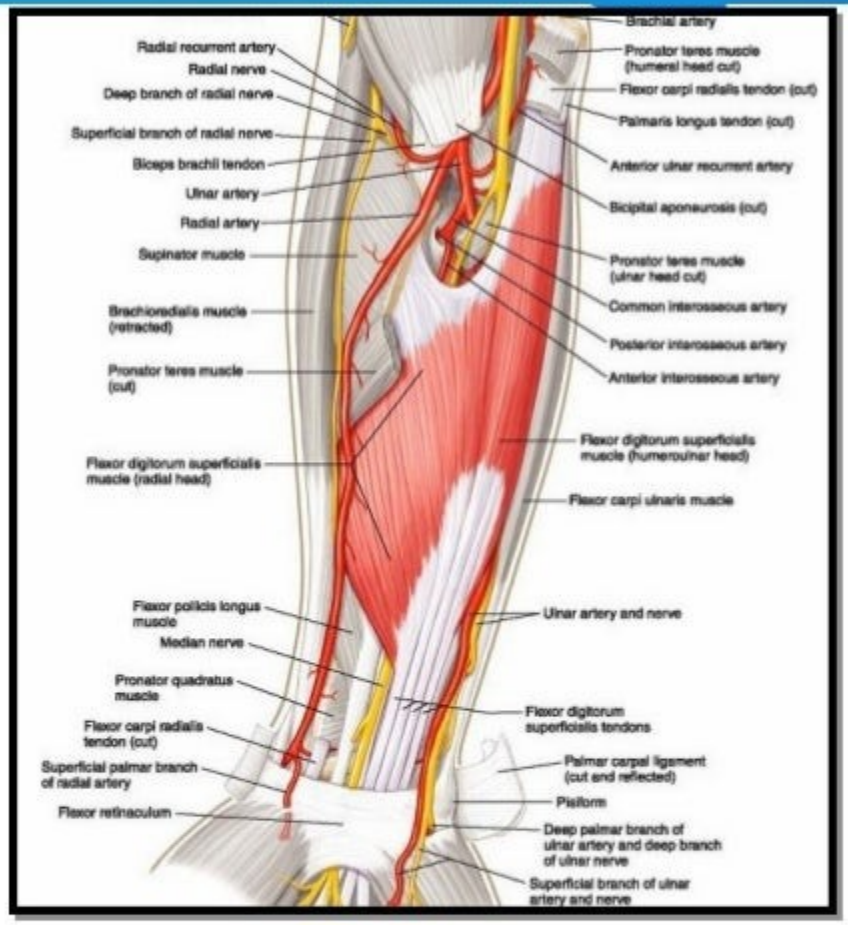




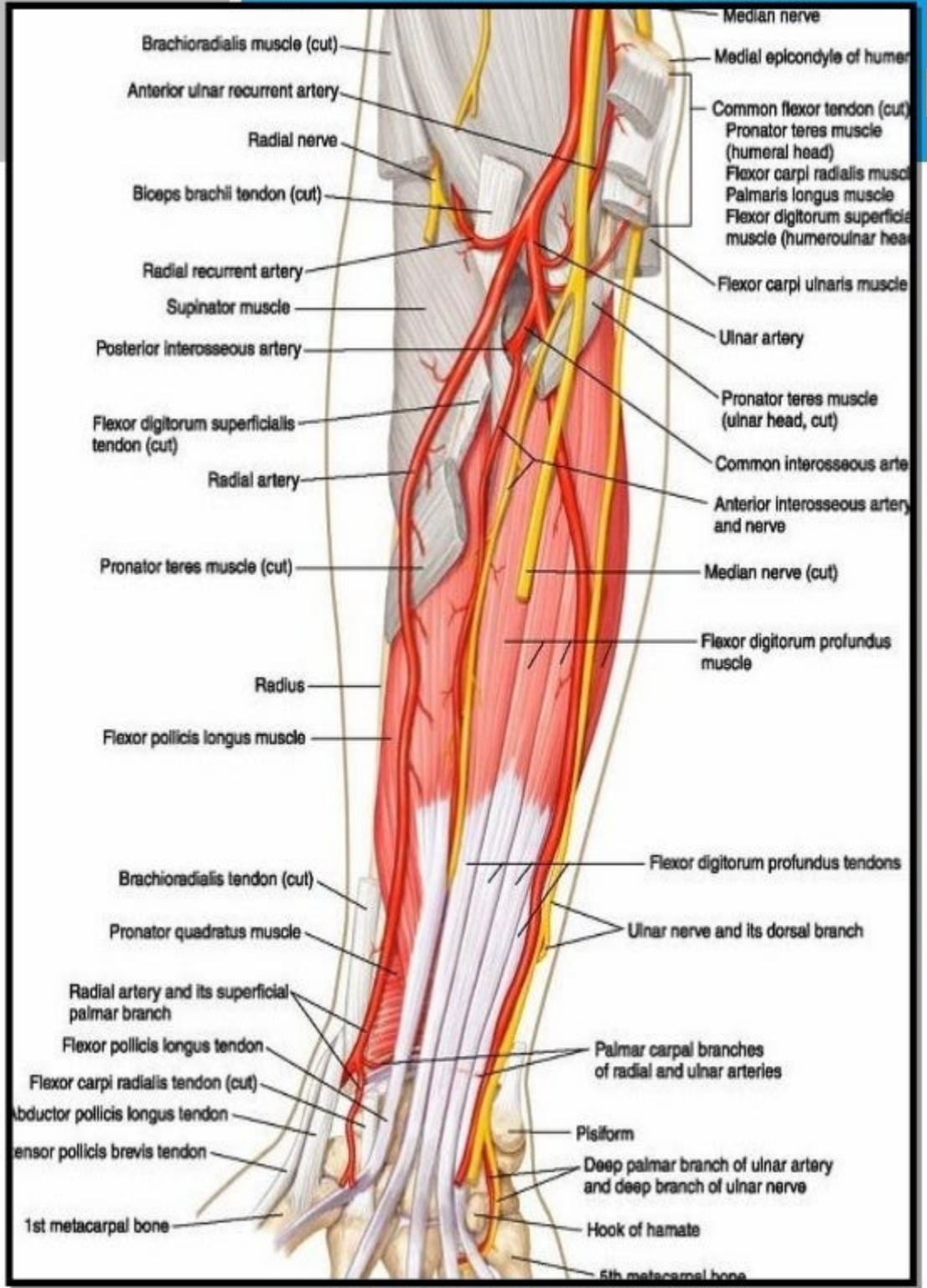
- Medially supplied by Medial cutaneous nerve of forearm (Medial cord)
- Laterally by lateral cutaneous nerve of forearm (Musculocutaneous nerve)
- Posteriorly by posterior cutaneous nerve of forearm (Radial nerve).

Superficial muscles of forearm





1) Pronator teres- Median nerve
2) Flexor carpi radialis- Median nerve
3) Palmaris longus- Median nerve
4) Flexor carpi ulnaris- Ulnar nerve
5) Flexor digitorum superficialis- Median nerve



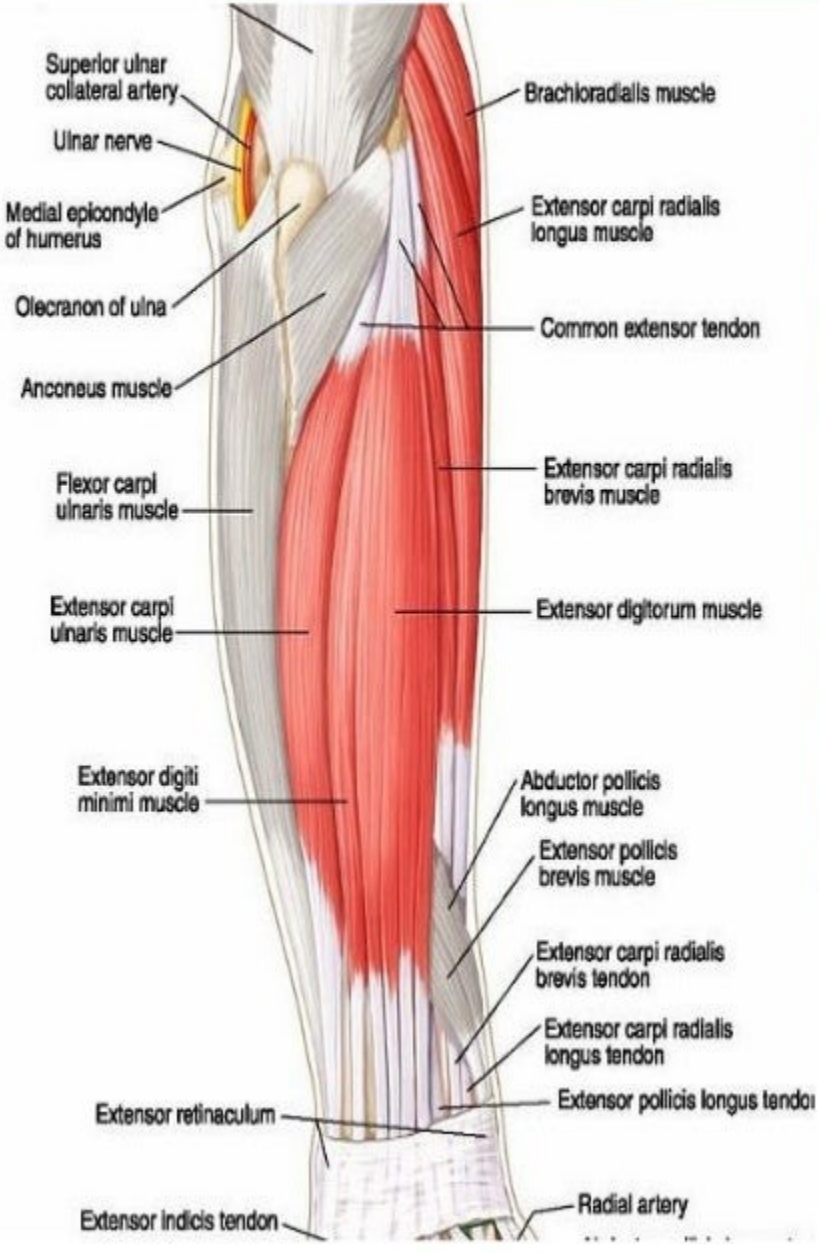
Deep flexor compartment

1) Flexor digitorum profundus- Median + Ulnar

2) Flexor pollicis longus- Anterior interosseous branch of the median nerve

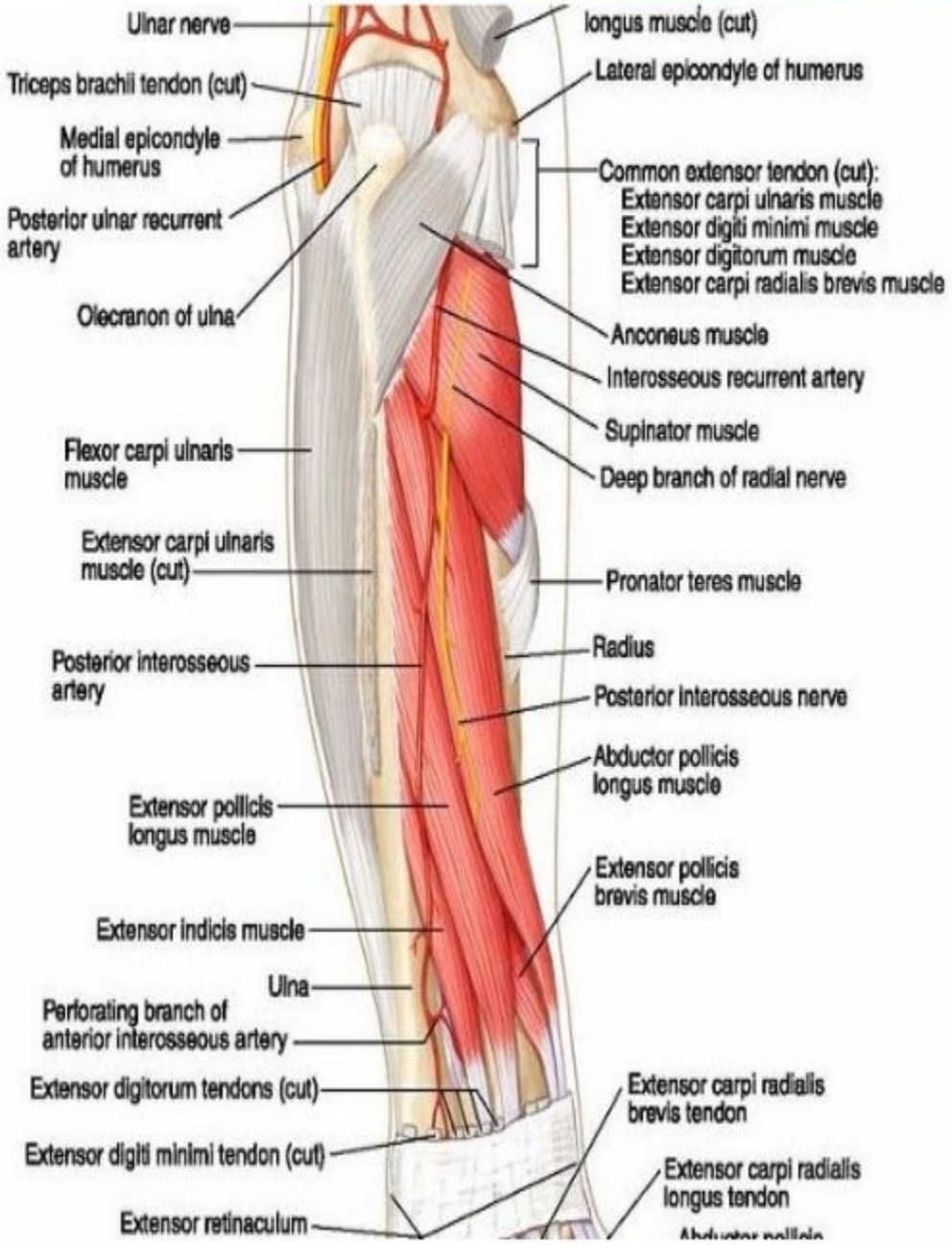
3) Pronator quadratus- Anterior interosseous branch of the median nerve

Superficial extensor compartment



1) Brachioradialis- **radial nerve**
2) Extensor carpi radialis longus-radial nerve
3) Extensor carpi radialis brevis-**posterior interosseous nerve**
4) Extensor digitorum- posterior interosseous nerve
5) Extensor digiti minimi - posterior interosseous nerve
6) Extensor carpi ulnaris- posterior interosseous nerve
7) Anconeus- radial nerve

Deep extensor compartment



1) Abductor pollicis longus- posterior interosseous nerve

2) Extensor pollicis longus- posterior interosseous nerve

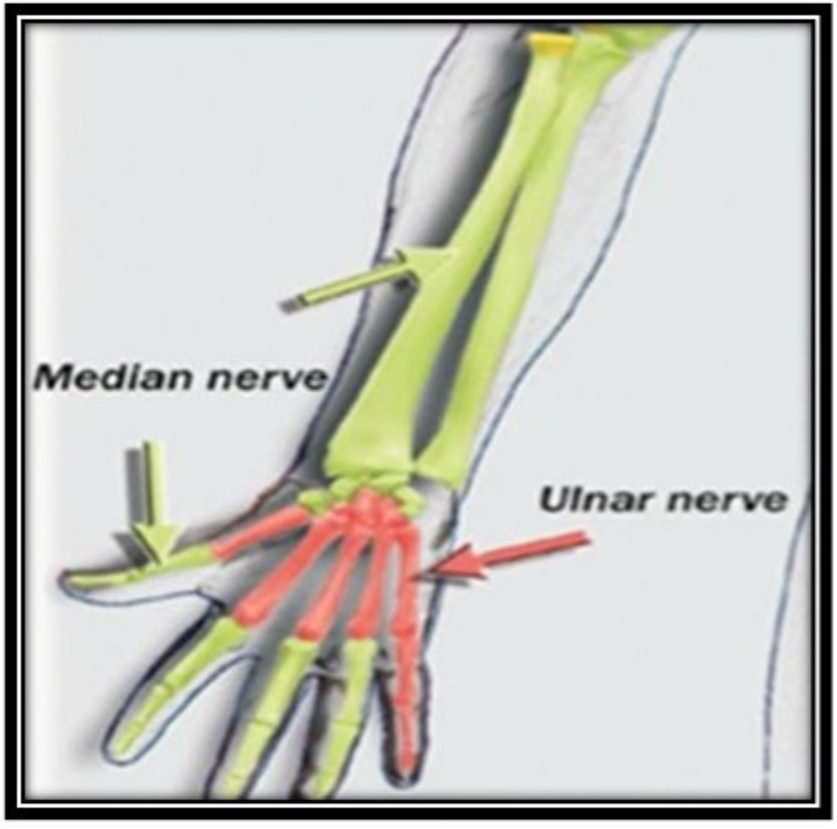
3) Extensor pollicis brevis- posterior interosseous nerve

4) Extensor indicis- posterior interosseous nerve

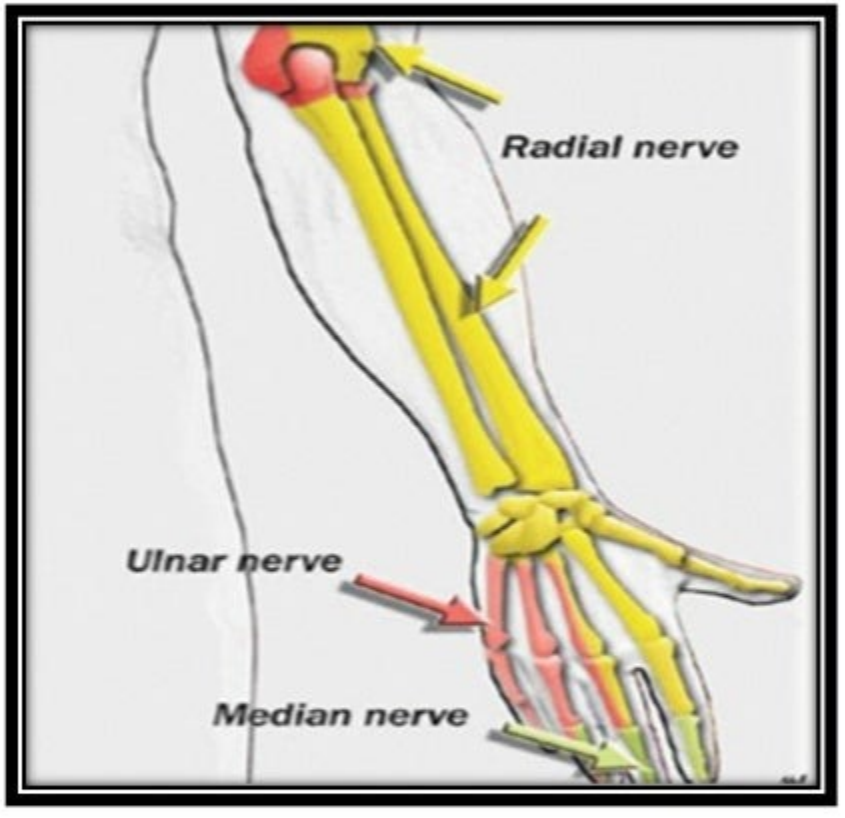
5) Supinator- posterior interosseous nerve

Osteotomal supply of forearm

ANTERIOR



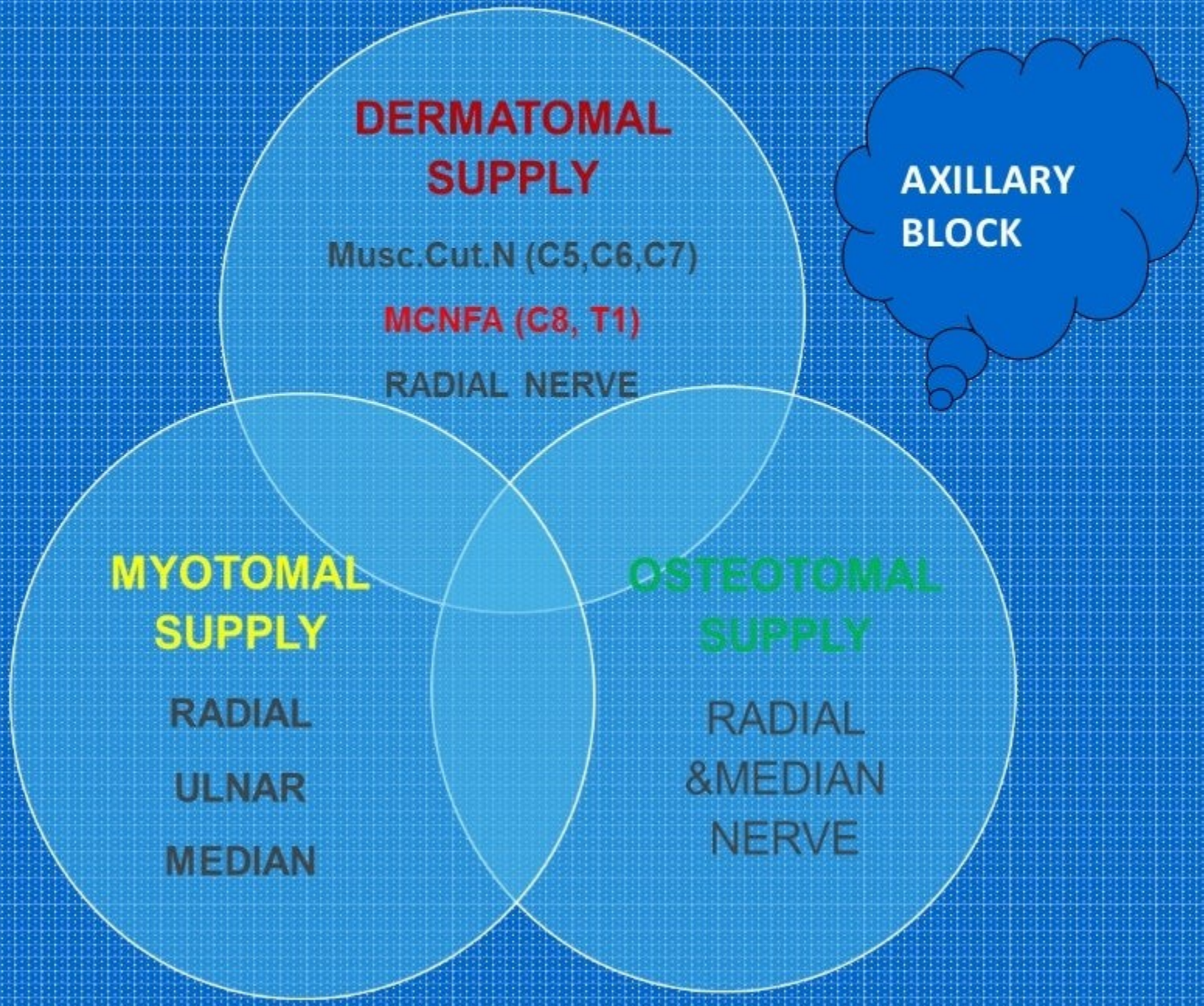
POSTERIOR



Anteriorly supplied by Median nerve

Posteriorly supplied by Radial nerve

Strategy for forearm/ both bones is……

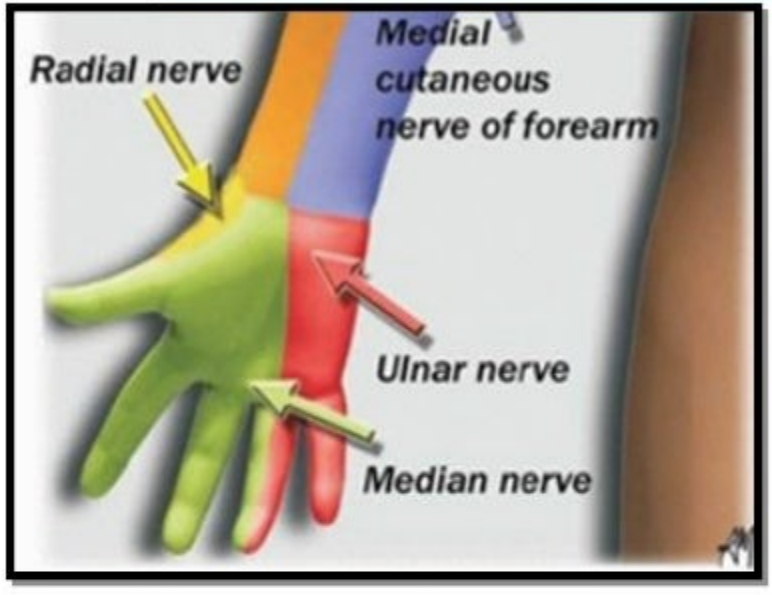


SURGERIES ON HAND

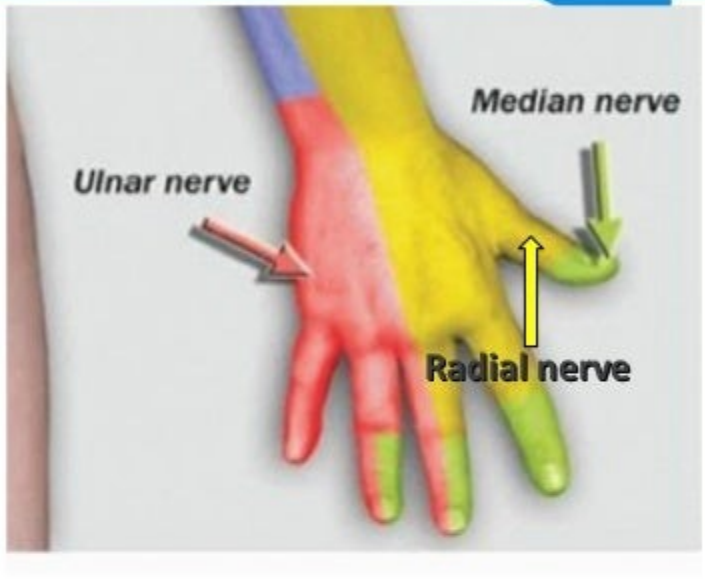




Dermatomal supply of hand



Anterior view



POSTERIOR VIEW

Anteriorly supplied by

1)Ulnar nerve

2)Median nerve

3)Radial nerve

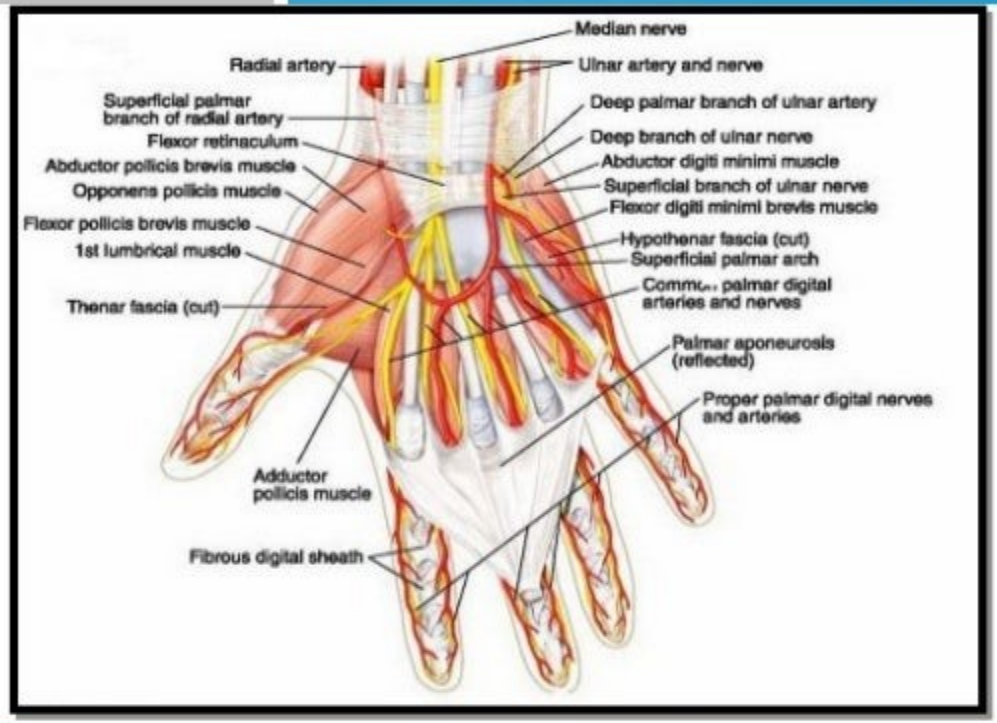
Posteriorly supplied by

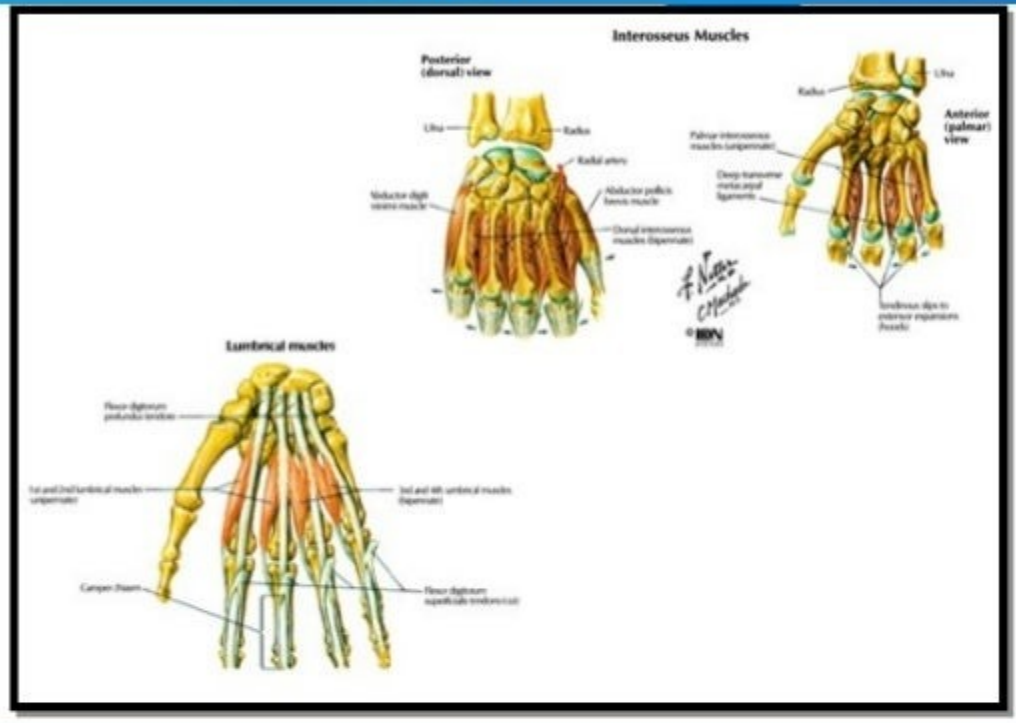
1)Ulnar nerve

2)Median nerve

3)Radial nerve

Myotomal supply of hand

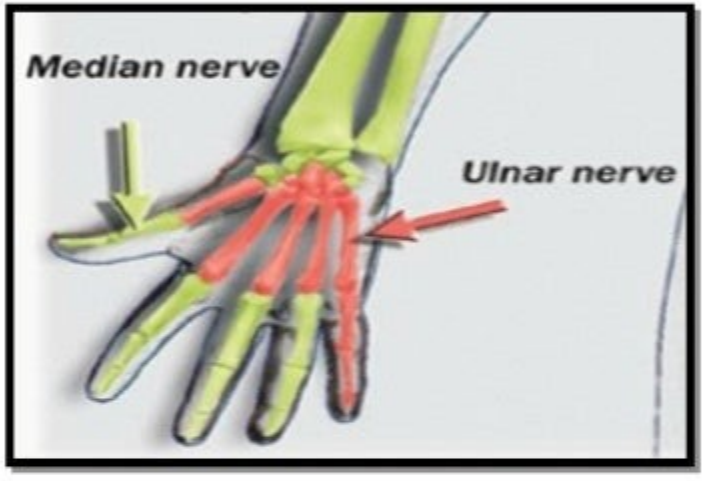




- Thenar muscles except adductor pollicis & I & 2 lumbricals are supplied by **Median nerve**
- Hypothenar muscles, Adductor pollicis, Interossei & 3,4 lumbricals are supplied by **Ulnar nerve**

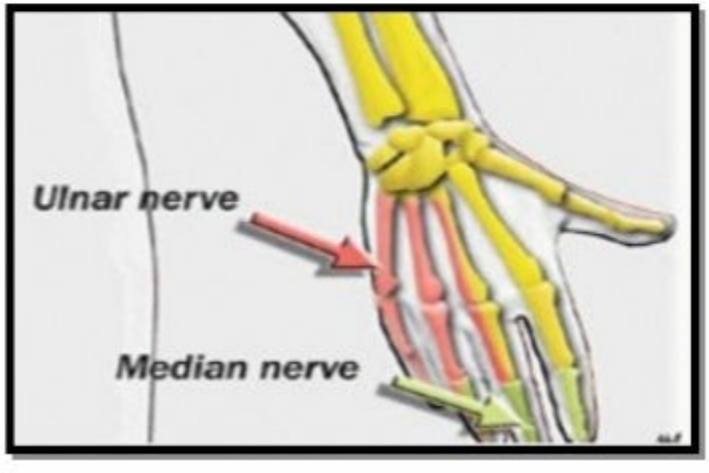
Osteotomal supply of hand

Anterior



Anteriorly supplied by
1)Median nerve
2)Ulnar nerve

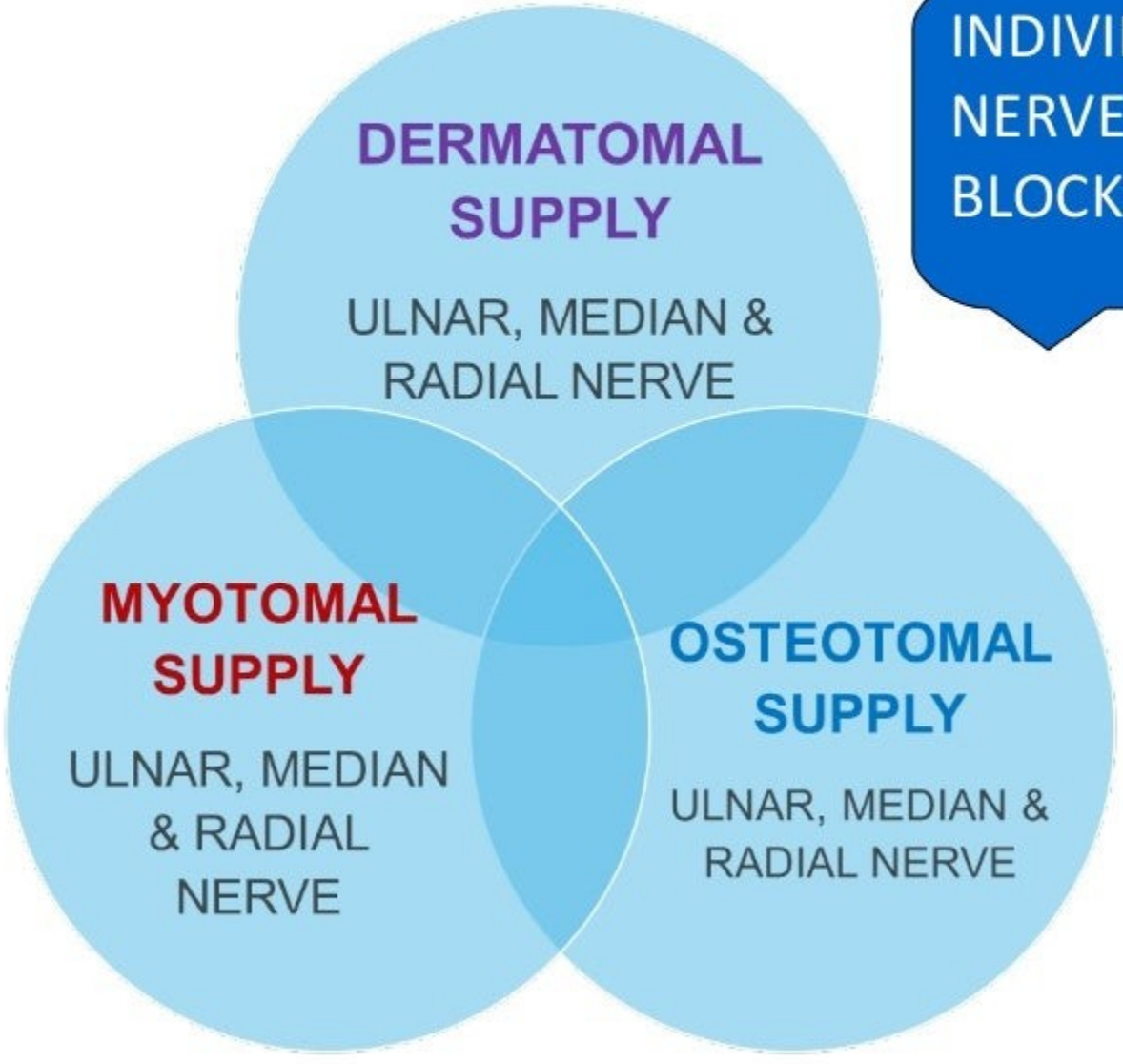
Posterior



Posteriorly supplied by
1)Radial nerve
2)Median nerve
3)Ulnar nerve

REGIONAL STRATEGY FOR HAND SURGERY..

INDIVIDUAL NERVE BLOCKS

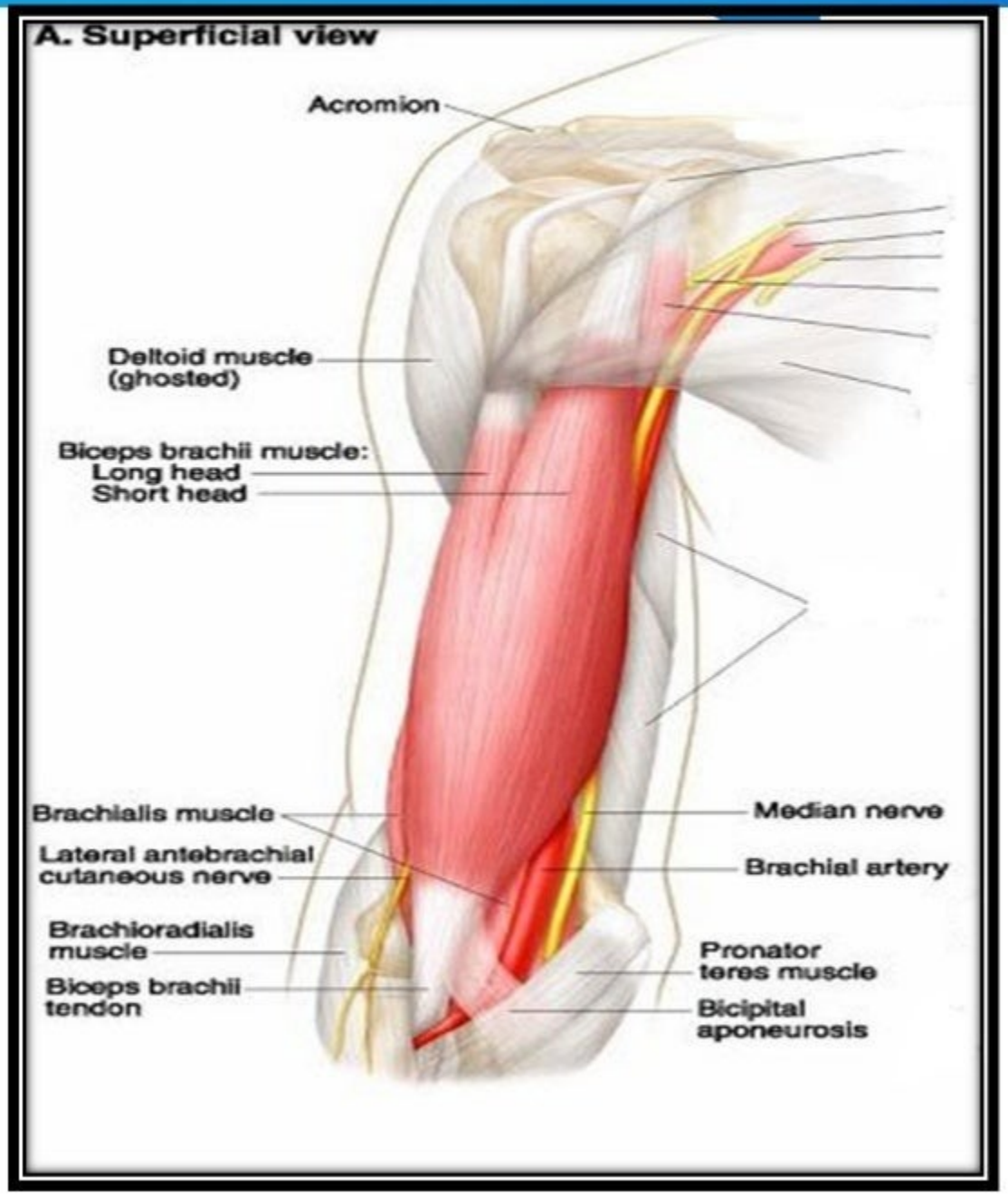


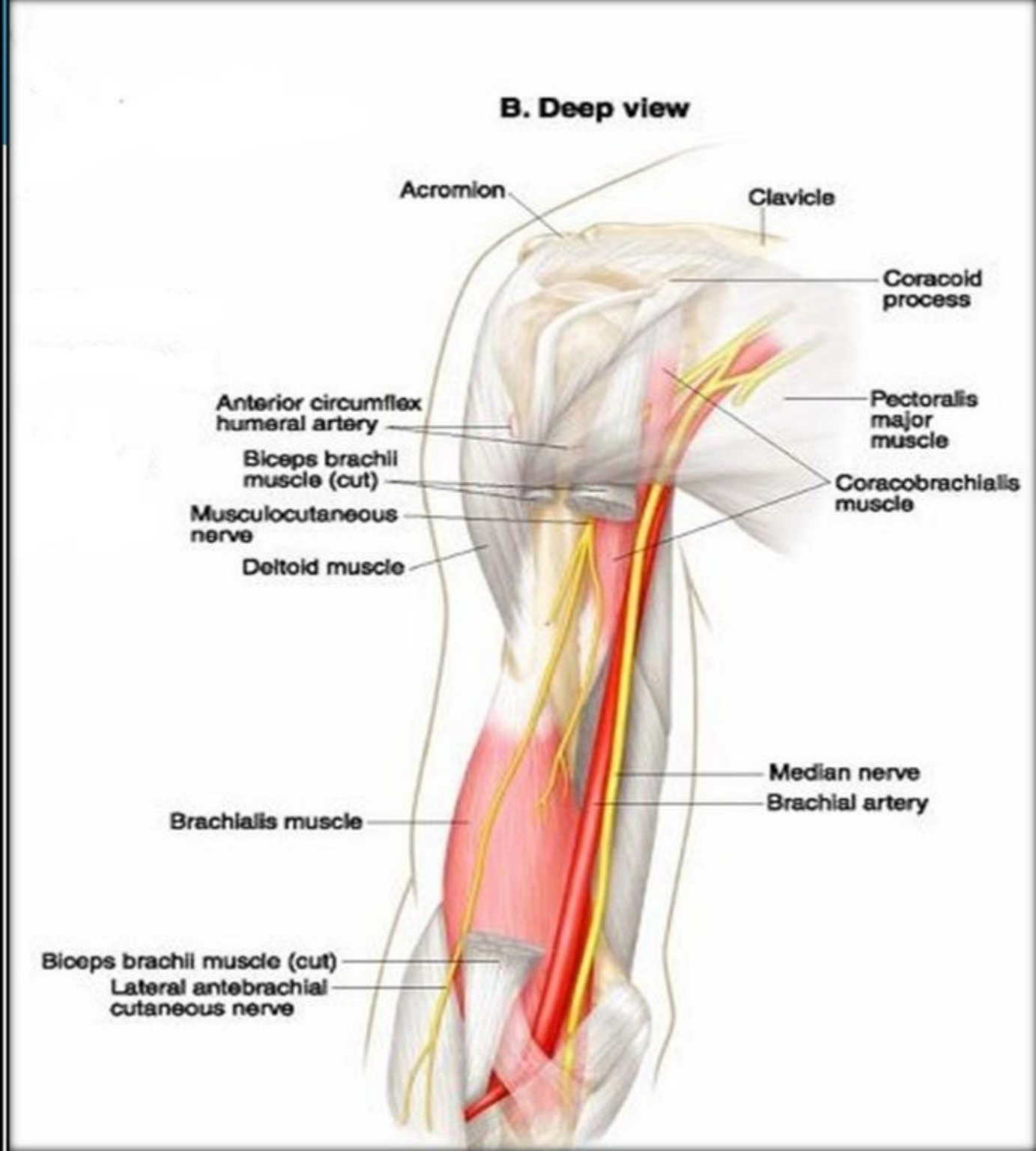
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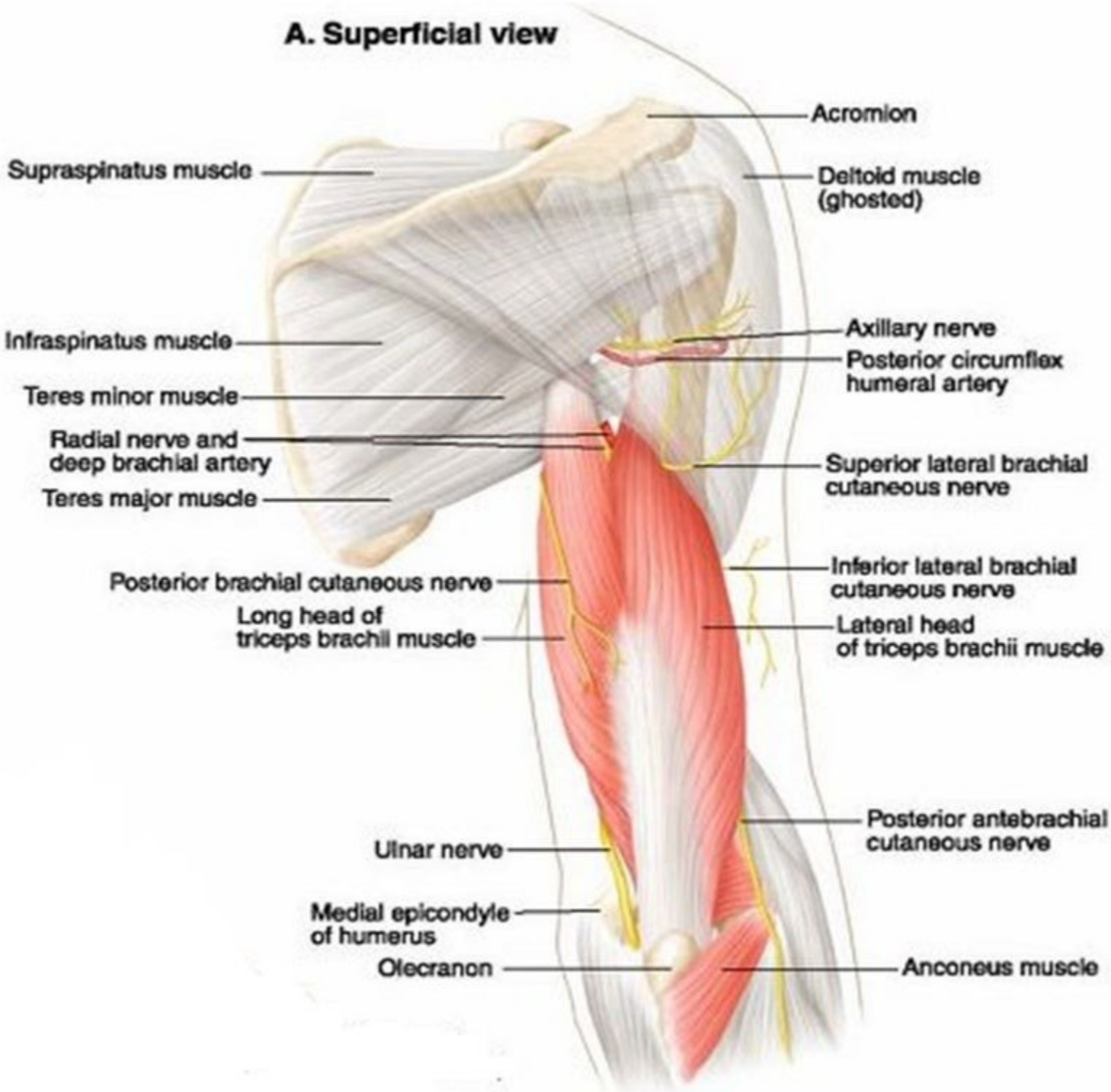
- Atlas of anatomy- Patrick W Tank
- Gray's anatomy
- Netter's atlas of orthopaedic anatomy
- Snell's clinical anatomy by regions
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- Nysora.com

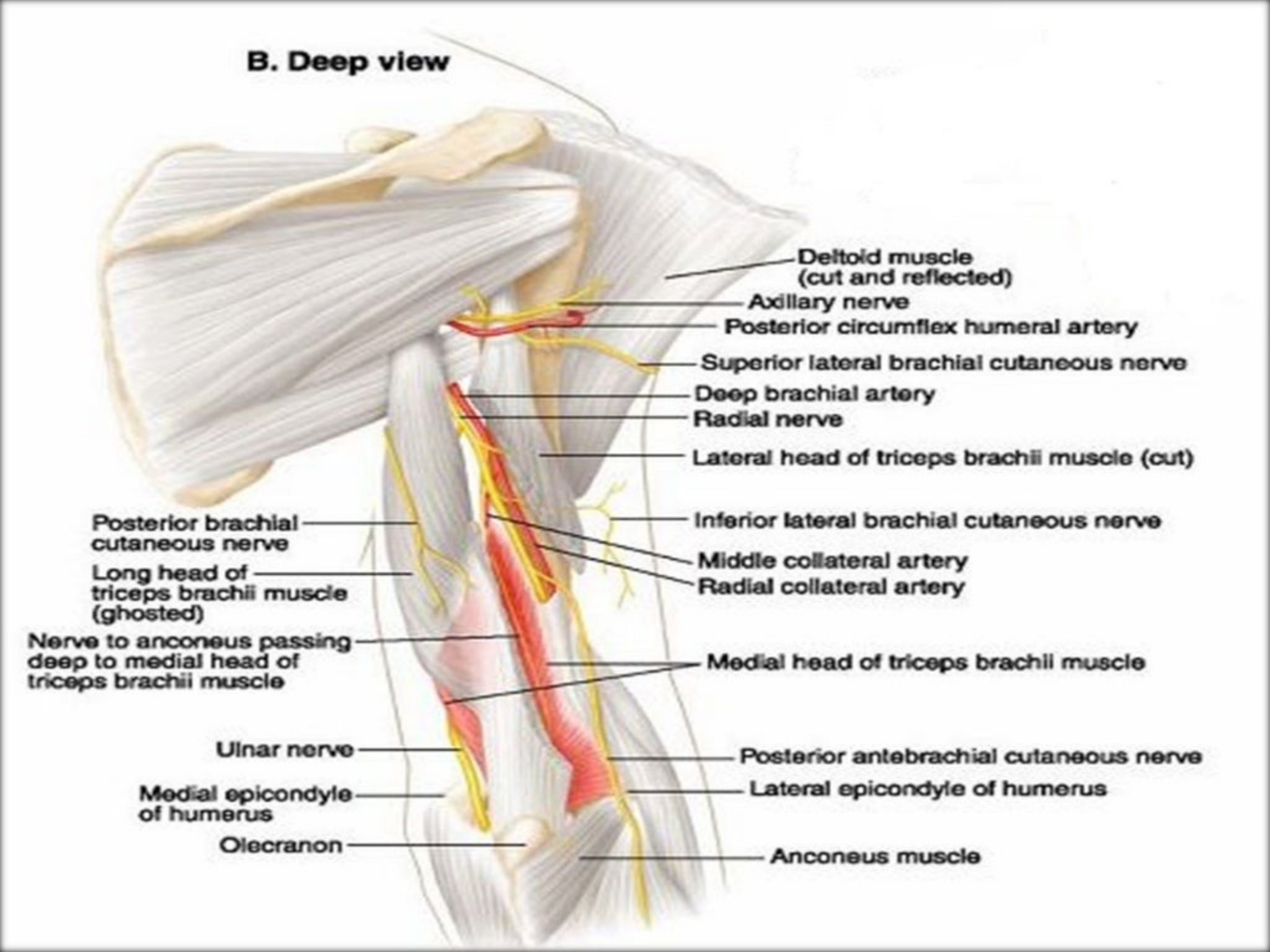
THANK YOU….

TEXT BOOK DIAGRAMS




B. Deep view
Acromion
Clavicle
Coracoid process
Anterior circumflex humeral artery
Biceps brachii muscle (cut)
Musculocutaneous nerve
Deltoid muscle
Pectoralis major muscle
Coracobrachialis muscle
Median nerve
Brachial artery
Brachialis muscle
Biceps brachii muscle (cut)
Lateral antebrachial cutaneous nerve


A. Superficial view
Acromion
Supraspinatus muscle
Deltoid muscle (ghosted)
Axillary nerve
Infraspinatus muscle
Posterior circumflex humeral artery
Teres minor muscle
Radial nerve and deep brachial artery
Superior lateral brachial cutaneous nerve
Teres major muscle
Inferior lateral brachial cutaneous nerve
Posterior brachial cutaneous nerve
Long head of triceps brachii muscle
Lateral head of triceps brachii muscle
Posterior antebrachial cutaneous nerve
Ulnar nerve
Medial epicondyle of humerus
Olecranon
Anconeus muscle


B. Deep view
Deltoid muscle (cut and reflected)
Axillary nerve
Posterior circumflex humeral artery
Superior lateral brachial cutaneous nerve
Deep brachial artery
Radial nerve
Lateral head of triceps brachii muscle (cut)
Inferior lateral brachial cutaneous nerve
Middle collateral artery
Radial collateral artery
Posterior brachial cutaneous nerve
Long head of triceps brachii muscle (ghosted)
Nerve to anconeus passing deep to medial head of triceps brachii muscle
Medial head of triceps brachii muscle
Ulnar nerve
Posterior antebrachial cutaneous nerve
Medial epicondyle of humerus
Lateral epicondyle of humerus
Olecranon
Anconeus muscle