Muscles of Upper Limb

I) Muscles connecting upper limb to axial steleton

1)Muscles of Pectoral Region : include pectoralis major , pectoralis minor & subclavius.

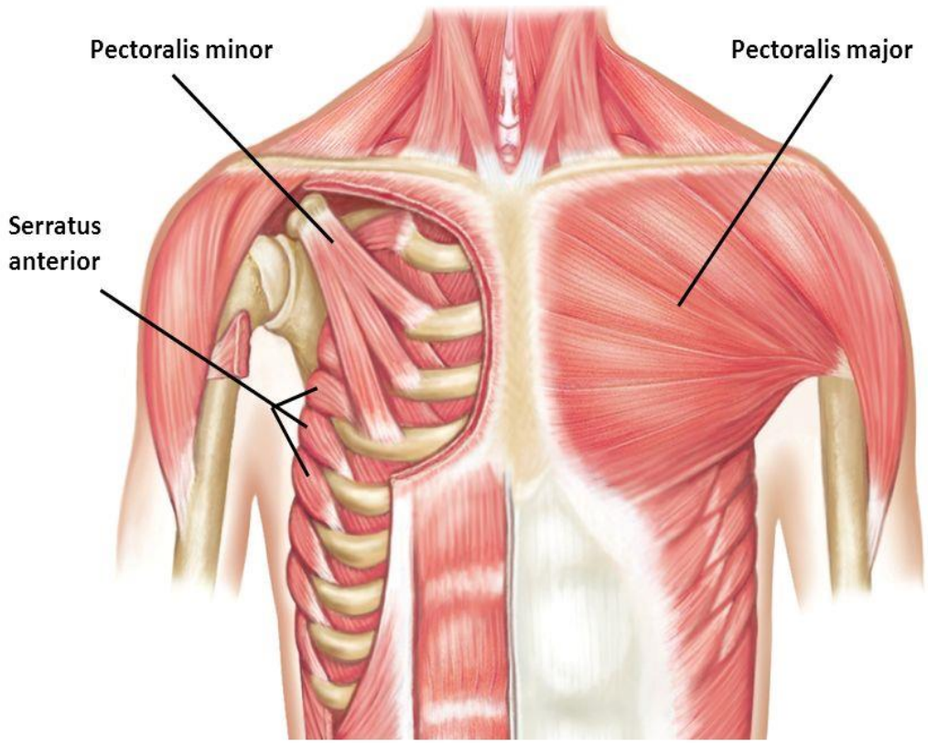
2) Muscles connecting upper limb to thoracic wall: include pectoral muscles & serratus anterior.

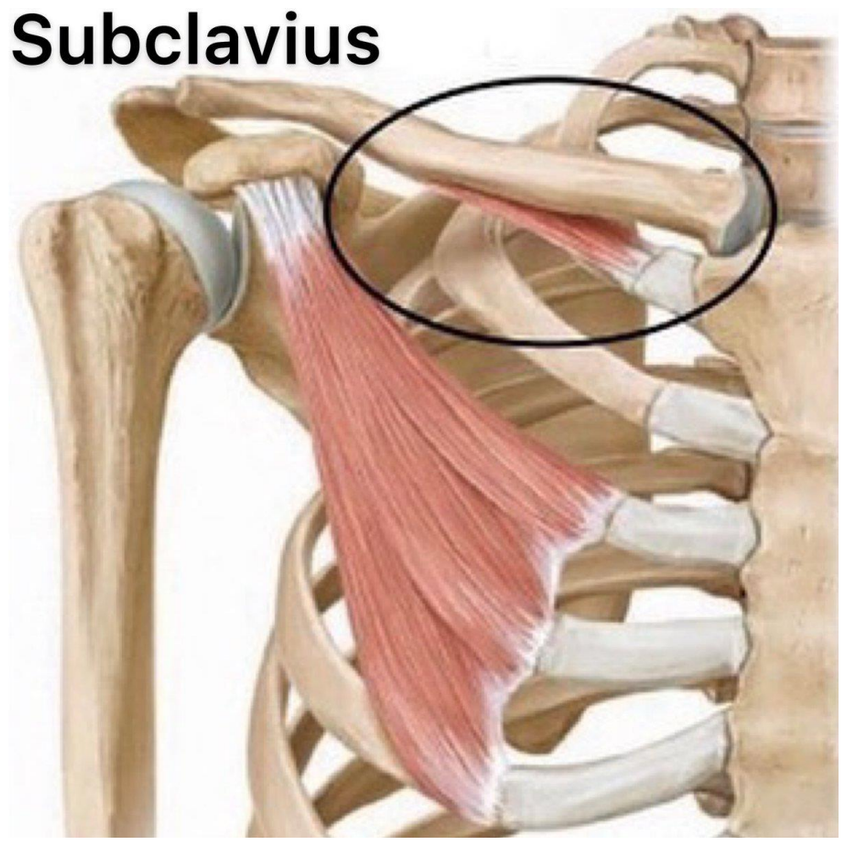
3) Muscles connecting upper limb to vertebral column (Muscles of the back).

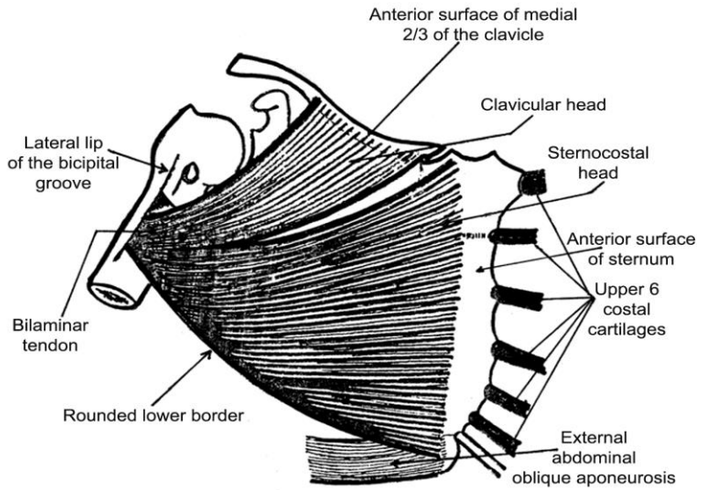
1) Muscles of Pectoral Region

	Origin	Insertion	Nerve supply	Action
1. Pectoralis major	**a) Clavicular head: front of medial ½ of clavicle.** **b) Sterno-Costal head: front of sternum, upper 6 costal cartilages and external abdominal oblique aponeurosis .**	• **By U shaped bilaminar tendon into lateral lip of bicipital groove . (TLP)** • **The anterior lamina is formed by clavicular head .** • **The poserior lamina is formed by Sterno-Costal head .** • **The 2 laminae are continuous at the lower border of the muscle.**	• **Lateral and medial pectoral nerves.**	• **Adduction and medial rotation of arm.** • **Clavicular head :Flexion of arm .** • **Sternocostal head :Extend flexed arm→. play important role in swimming , rowing & climbing.** • **Accessory muscle of respiration.**
2. Pectoralis minor	• **Outer surface of 3,4,5 ribs** *** N.B: 1. It is deep to perctoralis major**	• **Upper surface & medial border of coracoid process.**	• **Medial Pectoral nerve**	• **Protraction of scapula by pulling it anterior and inferior.** • **Depresion of shoulder .** • **Accessory muscle of respiration.**

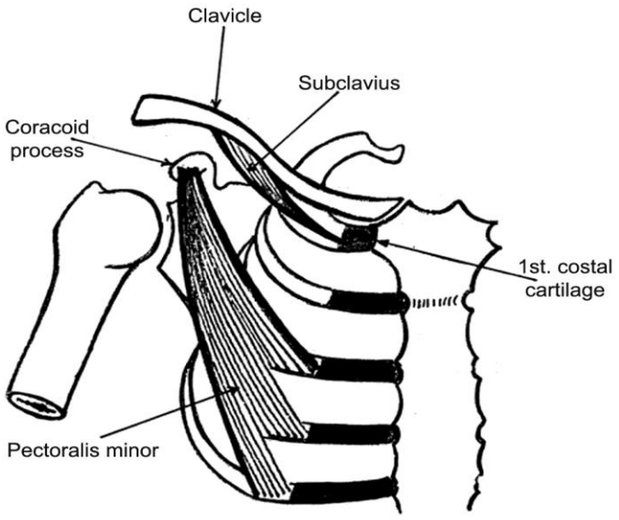
3. Subclavius	• **Upper surface of 1st. costo-chondral junction .**	• **Groove on the inferior surface of middle 1/3 of clavicle .**	• **Nerve to subclavius .**	• **Depress & Prevent excessive upward movement of the clavicle .**



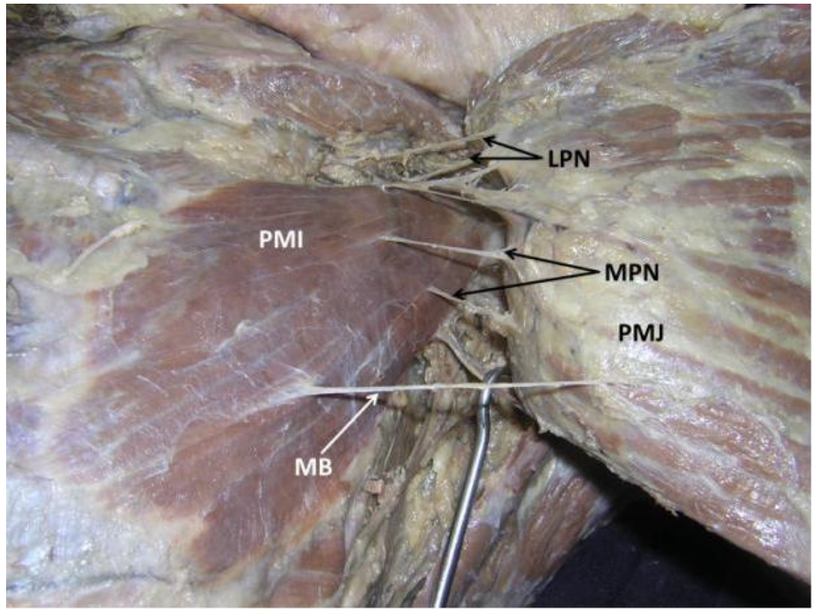


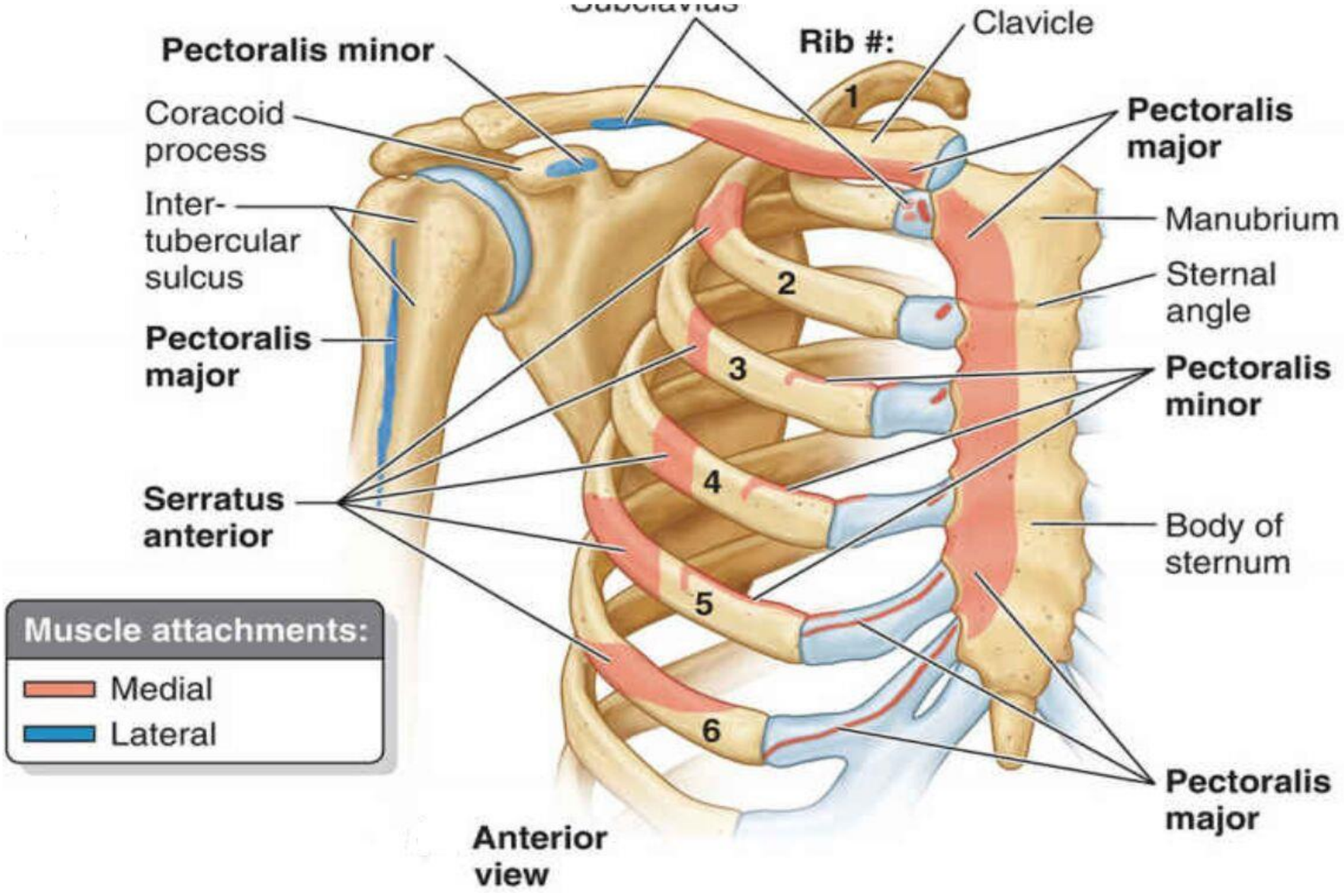


Pectoralis major muscle



Pectoralis minor and subclavius muscles

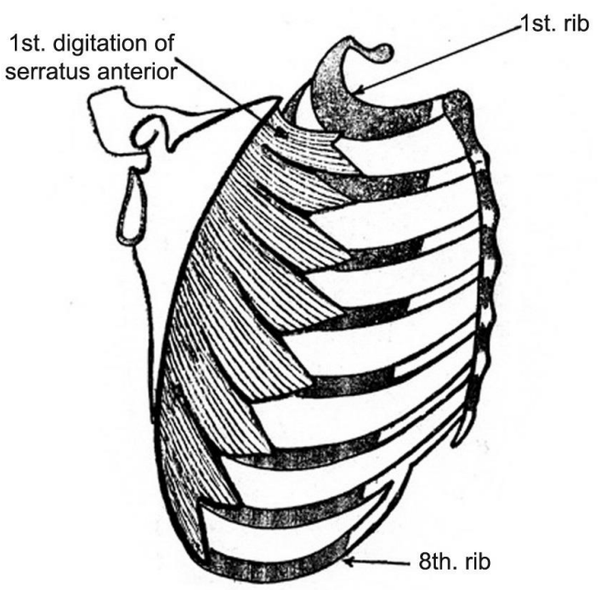



Pectoralis minor
Coracoid process
Inter-tubercular sulcus
Pectoralis major
Serratus anterior
Rib #:
Clavicle
1
2
3
4
5
6
Pectoralis major
Manubrium
Sternal angle
Pectoralis minor
Body of sternum
Pectoralis major
Muscle attachments:
Medial
Lateral
Anterior view

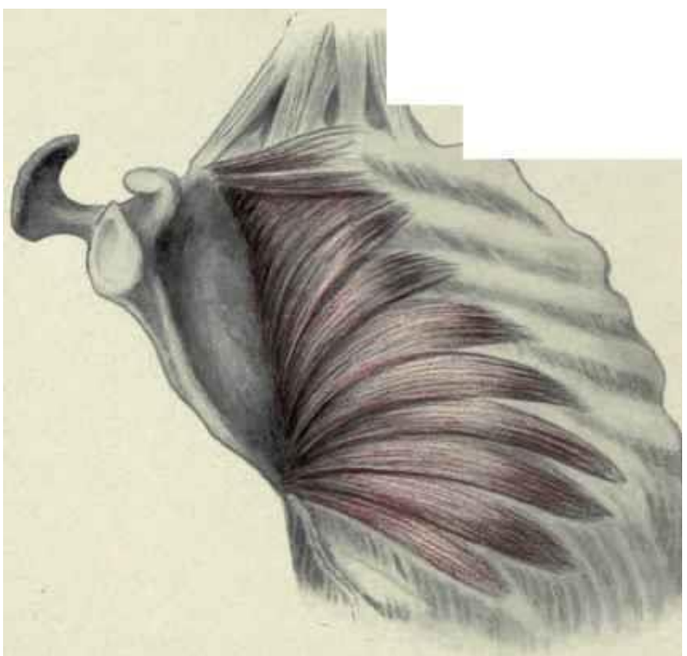
2) Muscles connecting upper limb to thoracic wall

* **These muscles include pectoral muscles and serratus anterior**

	Origin	Insertion	Nerve supply	Action
Serratus Anterior	• Lateral part of outer surface of upper 8 ribs	• Anterior surface of medial border of scapula.	• Long thoracic nerve (nerve to serratus anterior)	• Keep the scapula in contact with the chest wall (its paralysis leading to winging of scapula) • Protraction of scapula . • Rotates the glenoid cavity upwards during abduction of shoulder joint.



Serratus anterior muscle



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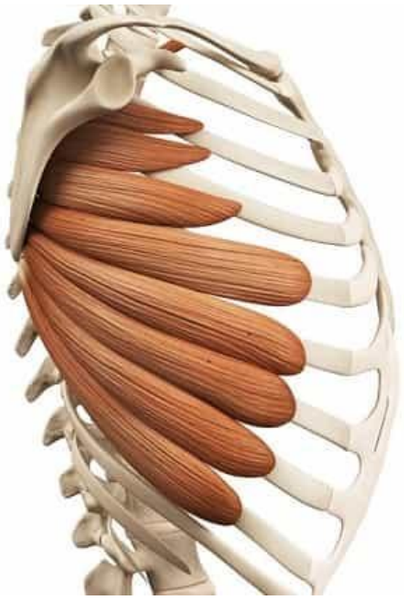

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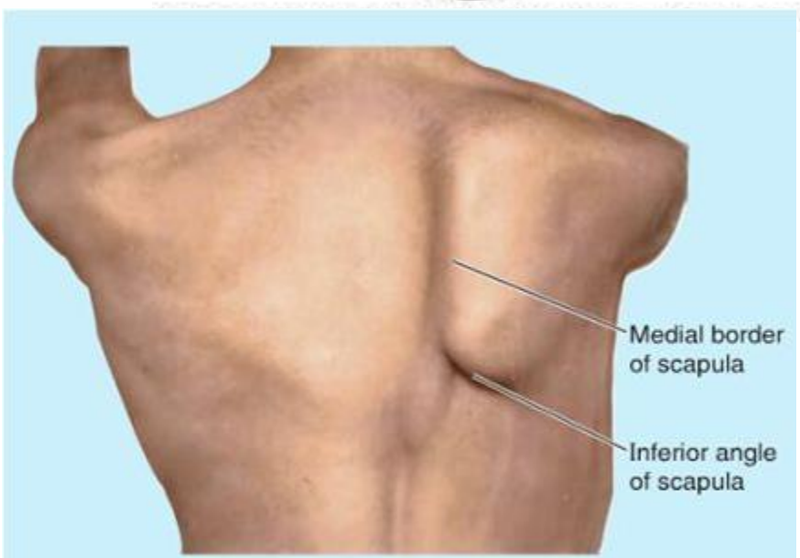
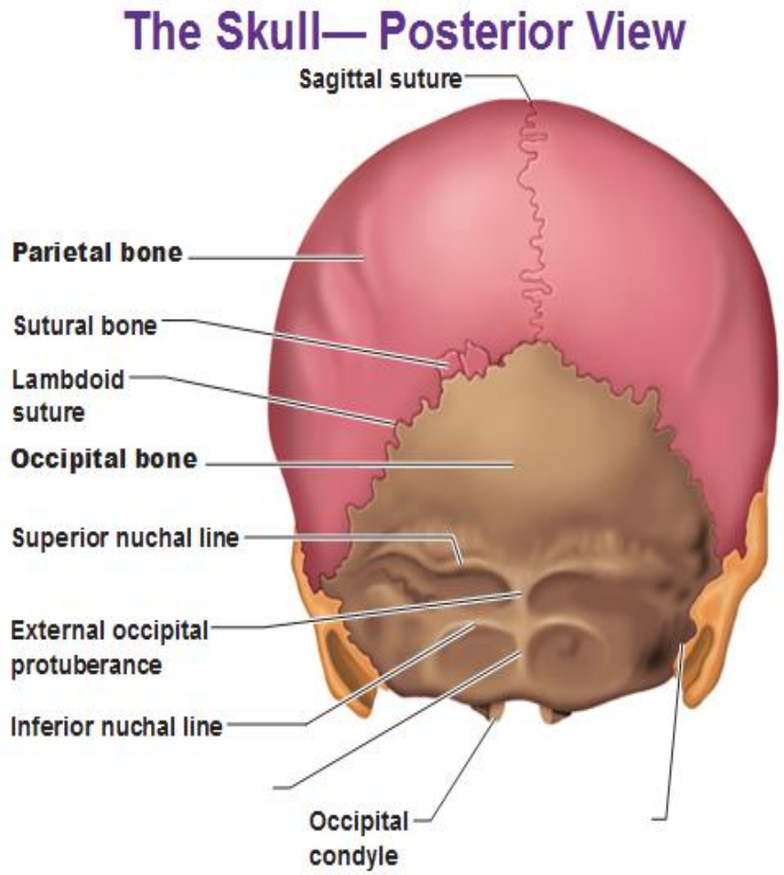


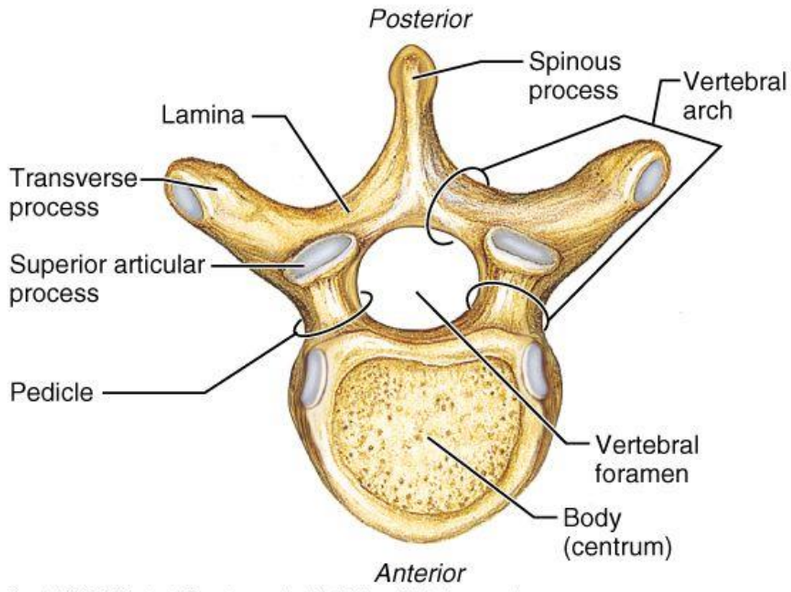
FIGURE B6.5. Right winged scapula

3) Muscles Connecting Upper Limb to the vertebral Column

* These are part of muscle of back of trunk and include **superficial layer** (trapezius & latissimus dorsi) and **deep layer** (levator scapulae , rhomboids minor & major).

Muscle	Origin	Insertion	Nerve Supply	Action
1. Trapezius • The 2 muscles form **trapezium**	• **Medial 1/3 of superior nuchal line.** • **External occipital protuberance.** • **Ligamentum nuchae** • **Spine of C7.** • **Spines & supra-spinous ligaments of all thoracic vertebrae**	• **Upper fibers : Posterior border of lateral 1/3 of clavicle.** • **Middle fibers : Medial border of acromion process & the upper lip of crest of spine of scapula** • **Lower fibers: Tubercle of crest of spine of scapula.**	• **Spinal accessory nerve.** • **Nerves C3&4 .**	• **Maintain level & elevation of shoulder by upper fibres → their paralysis → shoulder drop .** • **Retraction of the scapula by middle fibers.** • **Rotation of glenoid cavity upwards during abdction of shoulder by upper & lower fibres.**
2. Latissimus dorsi	• **Posterior 1/3 outer lip of iliac crest** • **Spines of lower 6 thoracic vertebrae.** • **Thoraco-lumbar fascia** • **Lower 4 ribs.** • **Dorsal surface of inferior angle of scapula**	• **Floor of bicipital groove.** • **Remember TLP (Muscles inserted in bicipital groove from medial to lateral)** • **It has triple relation to teres major forming posterior fold of axilla .**	•**Nerve to latissimus dorsi (thoraco-dorsal nerve)**	• **Adduction, extension and medial rotation of shoulder (play an important role in swimming & rowing).** • **Pull the trunk upwards as is climbing.** • **Accessory muscle of respiration .**
3. Levator scapulae	• **Transverse processes of upper 4 cervical vertebrae .**	• **Medial border of scapula above the root of spine of scapula.**	• **C3&4 nerves.** • **Dorsal scapular nerve (C5)**	• **Elevate the scapula .** • **Rotate the scapula so that the glenoid cavity looks downwards.**
4. Rhomboid minor	• **Lower part of ligamentum nuchae , spine of C7 & T1 .**	• **Medial border of scapula opposite the root of spine of scapula.**	• **Dorsal scapular nerve (C5) which is also called nerve to rhomboids .**	• **Rotate the scapula so that the glenoid cavity looks downwards.** • **Retration of the scapula .**
. Rhomboid major	• **Spines & supra-spinous ligaments from T2 to T5 vertebrae .**	• **Medial border of scapula from below the root of spine of scapula to its inferior angle.**		


The Skull— Posterior View
Sagittal suture
Parietal bone
Sutural bone
Lambdoid suture
Occipital bone
Superior nuchal line
External occipital protuberance
Inferior nuchal line
Occipital condyle


Posterior
Spinous process
Vertebral arch
Lamina
Transverse process
Superior articular process
Pedicle
Vertebral foramen
Body (centrum)
Anterior
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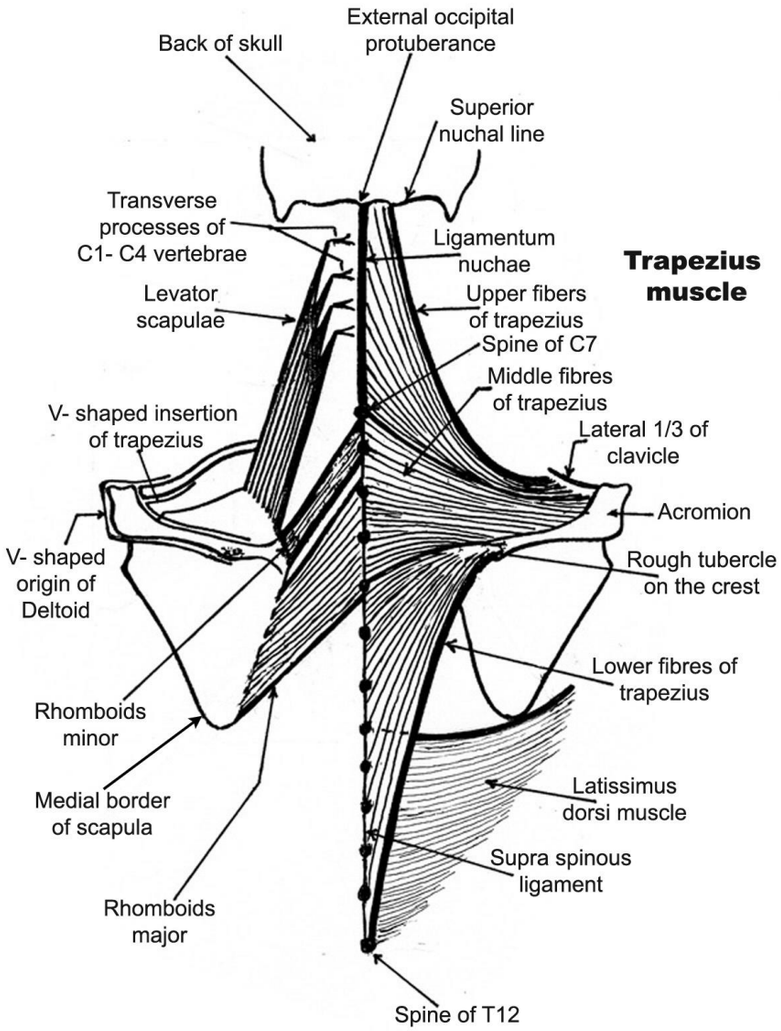
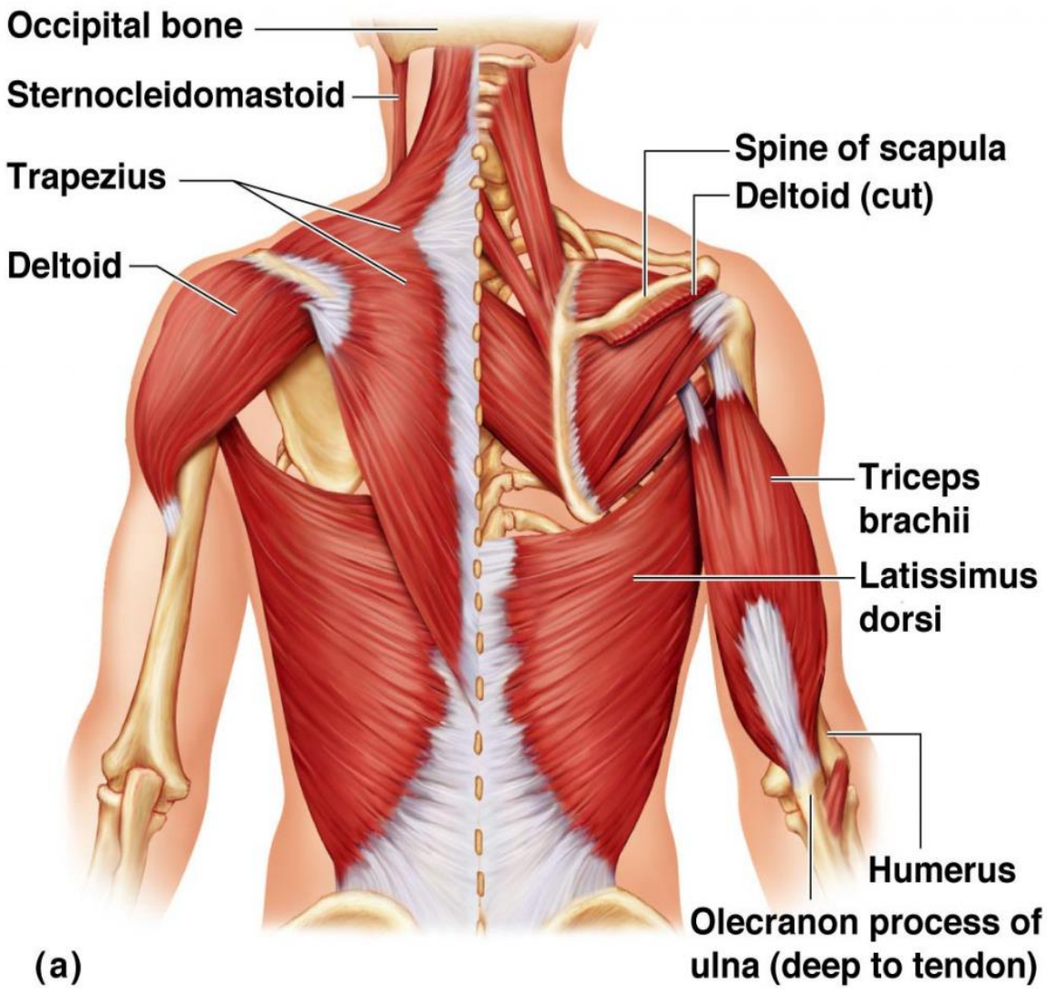
Vertebra



Muscles of the back



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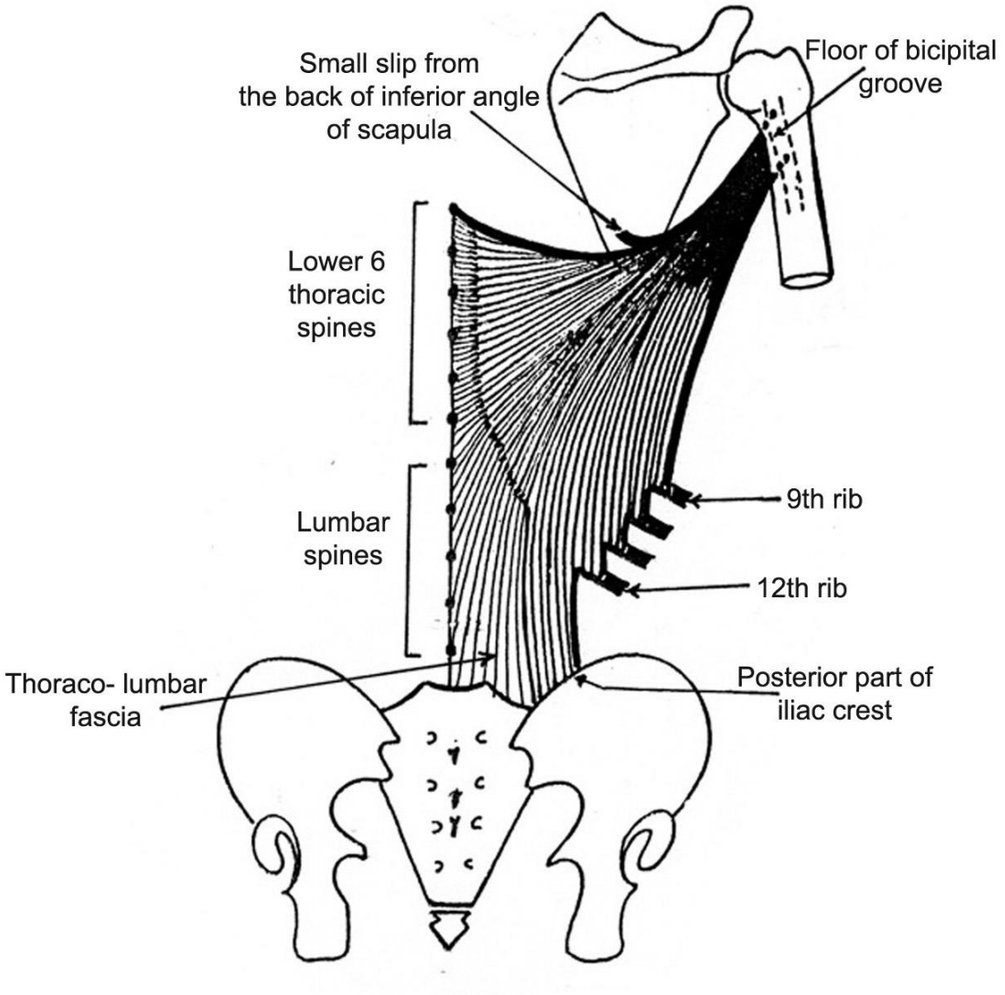
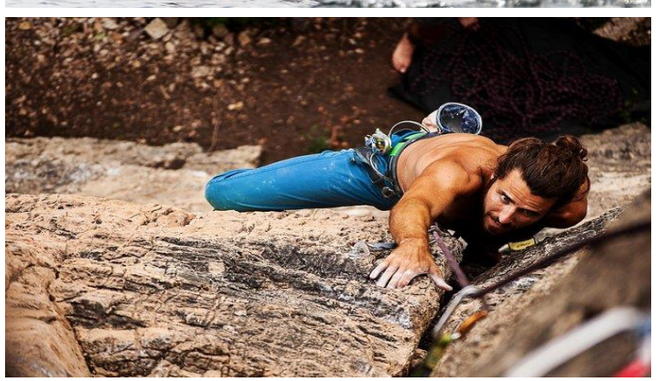


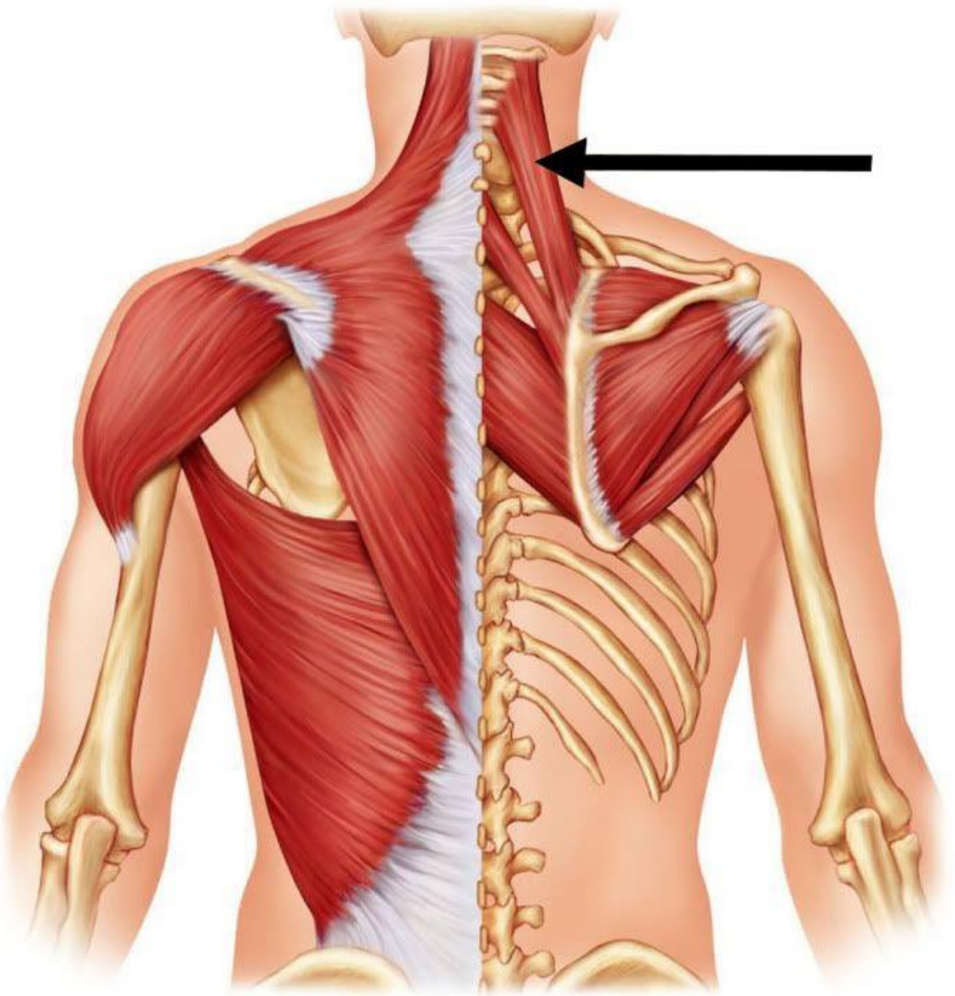
Latissimus dorsi muscle
(posterior view)



N.B: Triangle of auscultation : Between lower part of lateral border of trapezius , medial border of scapula and upper border of latissimus dorsi and its floor is rhomboid major .Breath sound in this triangle is clearly auscultated .

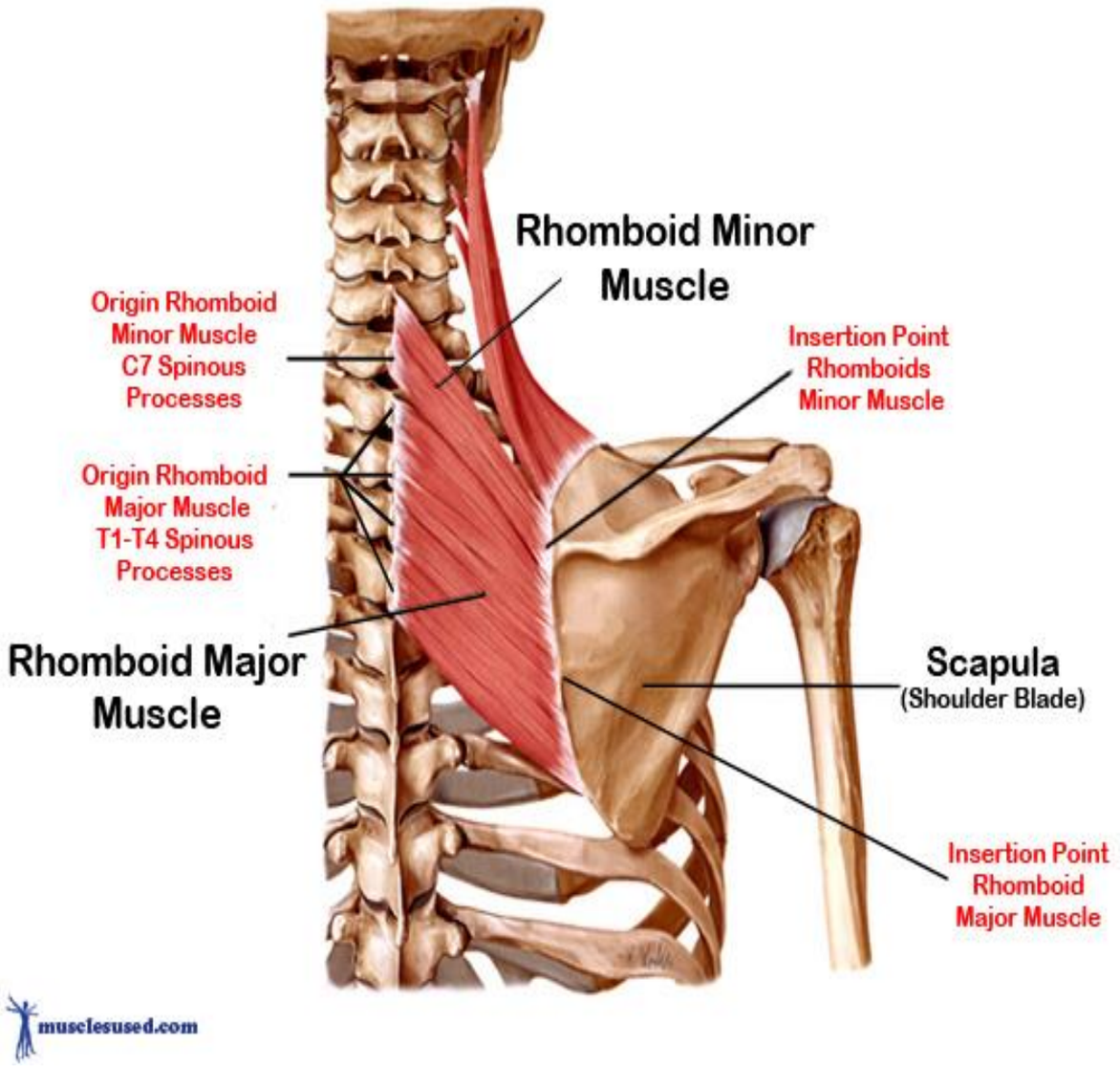
boi

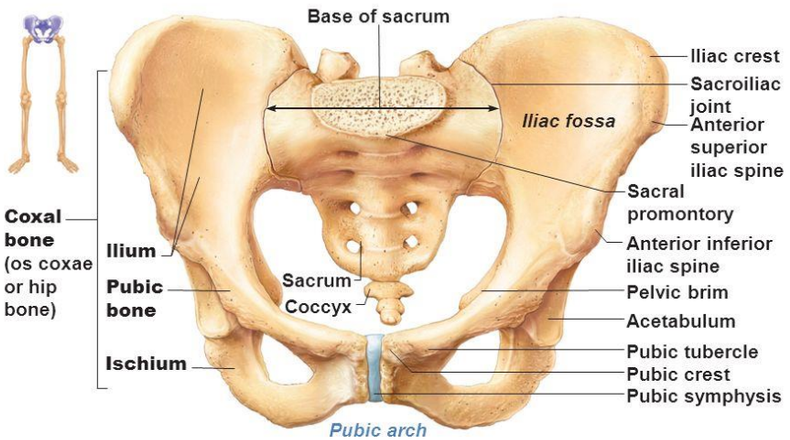
Muscles of Back

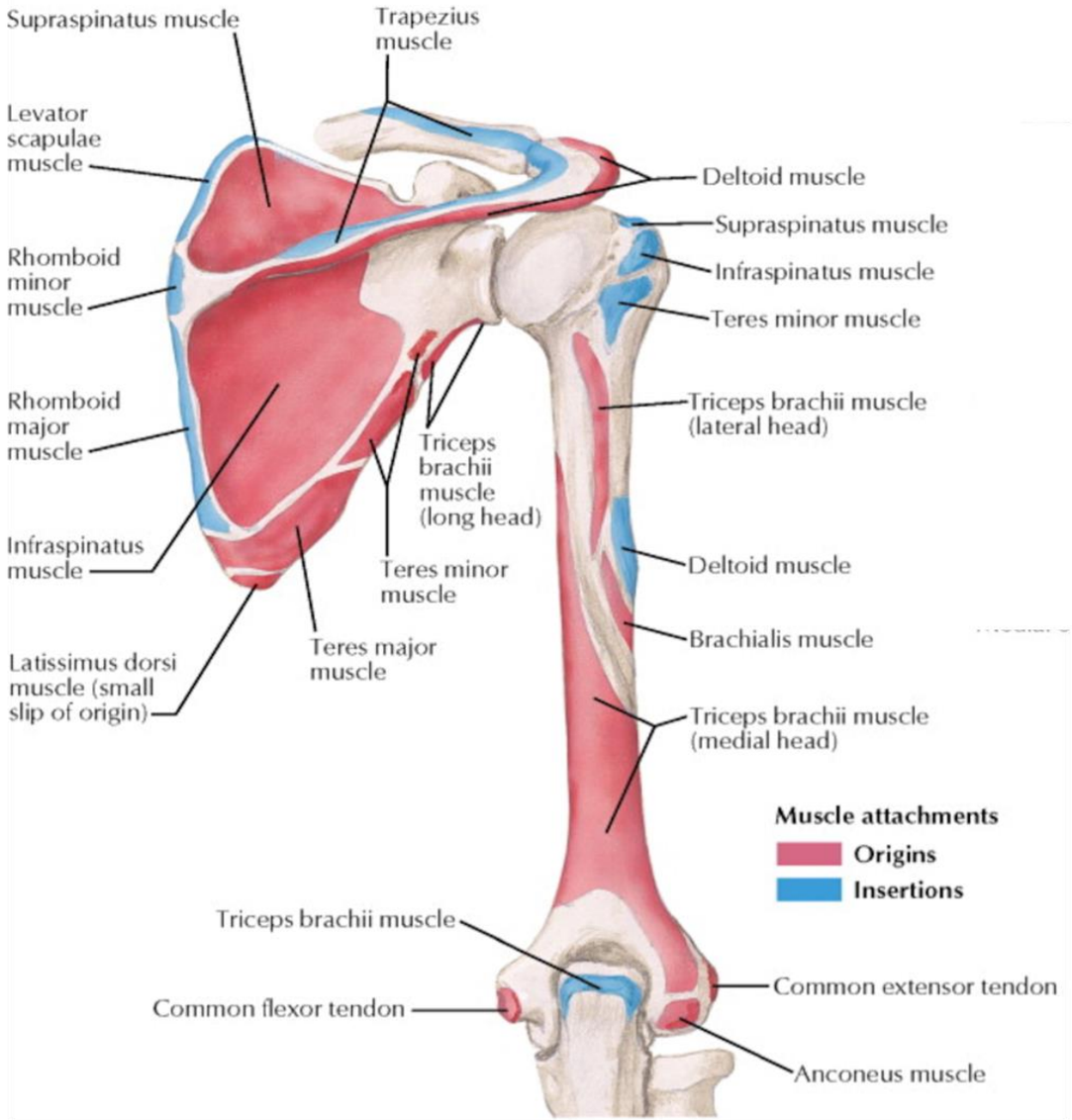


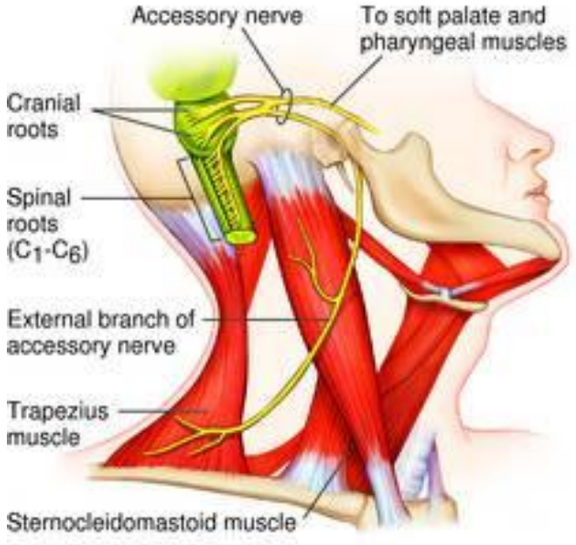
(b)

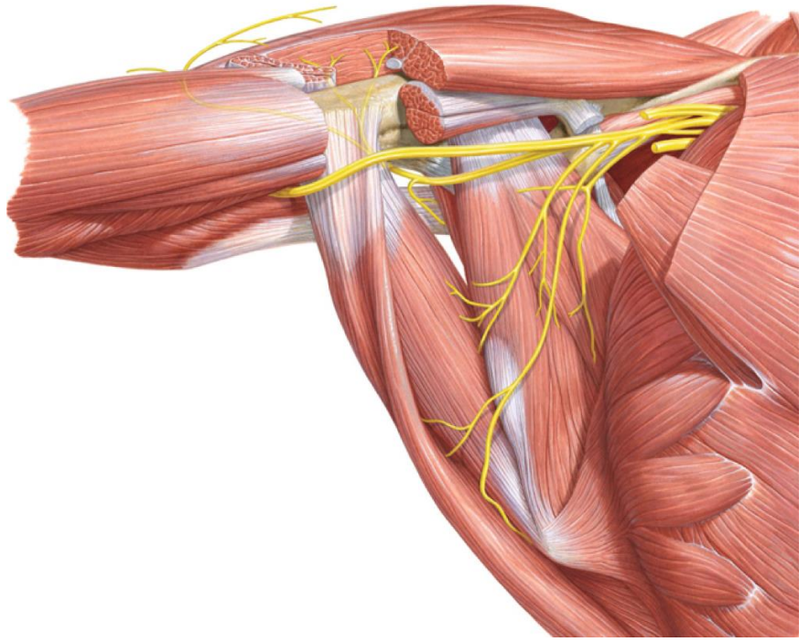
Levator scapulae
&
Rhomboids

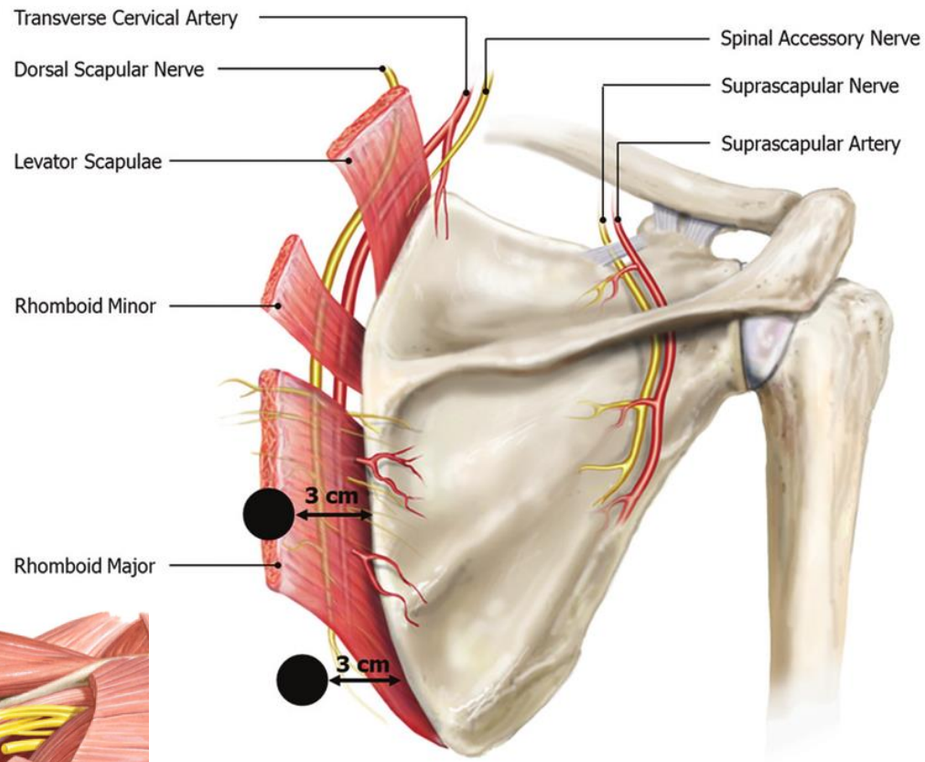



Base of sacrum
Iliac crest
Sacroiliac joint
Iliac fossa
Anterior superior iliac spine
Sacral promontory
Anterior inferior iliac spine
Pelvic brim
Acetabulum
Pubic tubercle
Pubic crest
Pubic symphysis
Pubic arch
Coxal bone (os coxae or hip bone)
Ilium
Pubic bone
Ischium
Sacrum
Coccyx

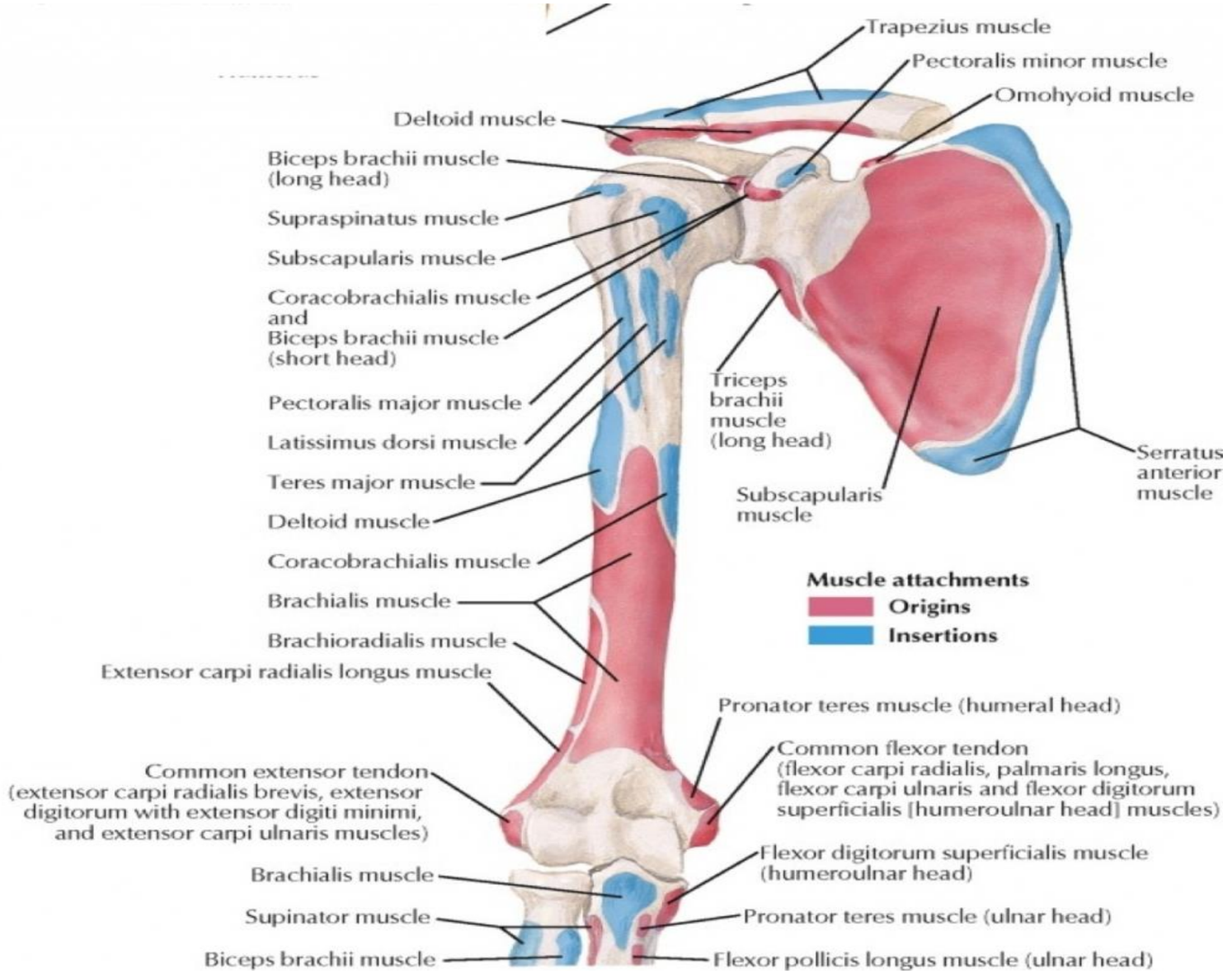

Supraspinatus muscle
Trapezius muscle
Levator scapulae muscle
Deltoid muscle
Supraspinatus muscle
Infraspinatus muscle
Rhomboid minor muscle
Teres minor muscle
Triceps brachii muscle (lateral head)
Rhomboid major muscle
Triceps brachii muscle (long head)
Deltoid muscle
Infraspinatus muscle
Teres minor muscle
Brachialis muscle
Teres major muscle
Latissimus dorsi muscle (small slip of origin)
Triceps brachii muscle (medial head)
Muscle attachments
Origins
Insertions
Triceps brachii muscle
Common extensor tendon
Common flexor tendon
Anconeus muscle







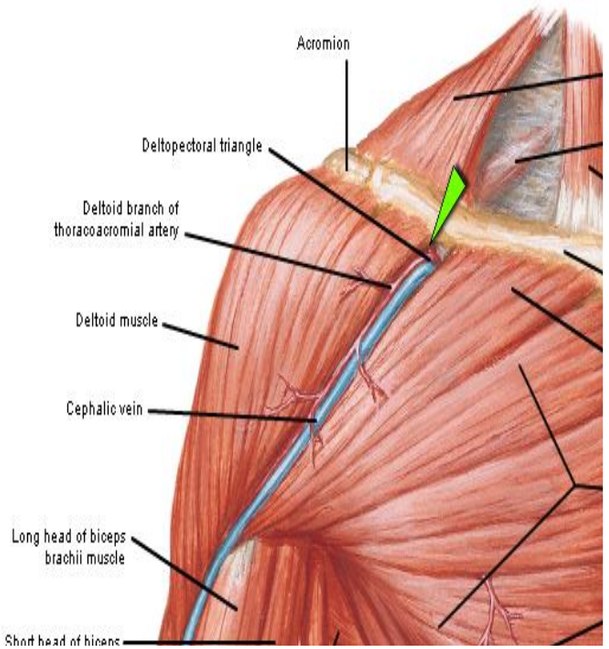
Nerve Supply of Muscles of Back

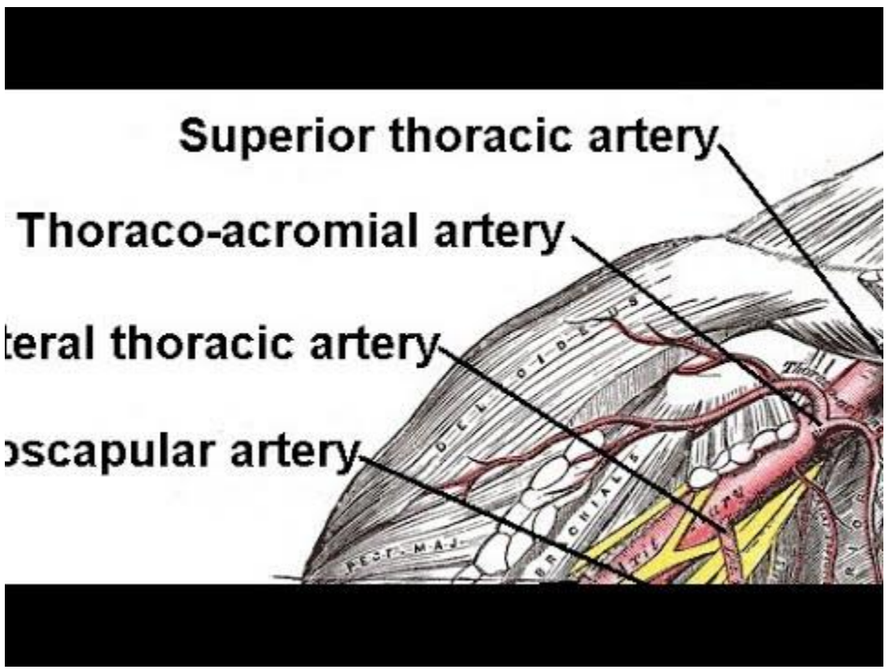

Trapezius muscle
Pectoralis minor muscle
Omohyoid muscle
Deltoid muscle
Biceps brachii muscle (long head)
Supraspinatus muscle
Subscapularis muscle
Coracobrachialis muscle and Biceps brachii muscle (short head)
Pectoralis major muscle
Latissimus dorsi muscle
Teres major muscle
Deltoid muscle
Coracobrachialis muscle
Brachialis muscle
Brachioradialis muscle
Extensor carpi radialis longus muscle
Common extensor tendon (extensor carpi radialis brevis, extensor digitorum with extensor digiti minimi, and extensor carpi ulnaris muscles)
Brachialis muscle
Supinator muscle
Biceps brachii muscle
Triceps brachii muscle (long head)
Subscapularis muscle
Serratus anterior muscle
Muscle attachments
Origins
Insertions
Pronator teres muscle (humeral head)
Common flexor tendon (flexor carpi radialis, palmaris longus, flexor carpi ulnaris and flexor digitorum superficialis [humeroulnar head] muscles)
Flexor digitorum superficialis muscle (humeroulnar head)
Pronator teres muscle (ulnar head)
Flexor pollicis longus muscle (ulnar head)

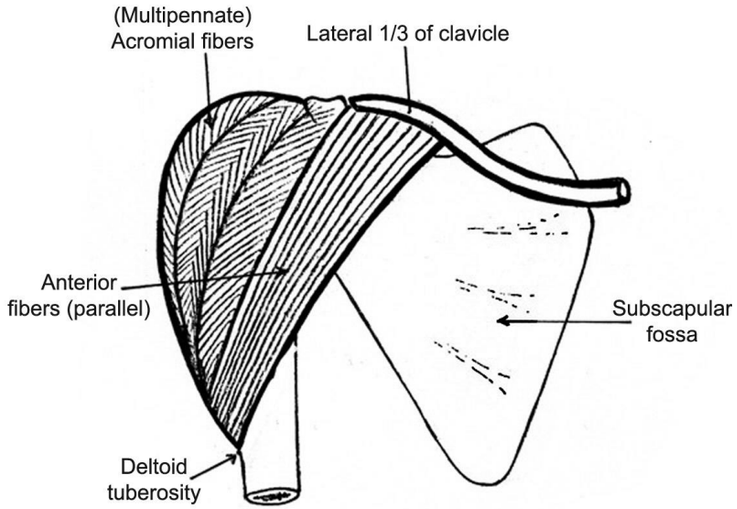
II) Muscles of Scapular region

Muscle	Origin	Insertion	Nerve Supply	Action
1- Deltoid	• **Anterior fibers :Anterior border of lateral 1/3 of clavicle .** • **Middle fibers :Lateral border of acromion process.** • **Posterior fibers :Lower border of crest of spine of scapula.**	• **Deltoid tuberosity of humerus**	•**Circumflex (axillary) nerve** • **Injury of axillary nerve leading to flat shoulder & loss of abduction of shoulder (15 -90 degree) .**	**a) Anterior fibres : flexion & medial rotation of shoulder.** **b) Posterior fibres: extension & lateral rotation of shoulder.** **c) Middle fibres: Abduction of shoulder (15 -90 degree)**
⁎ **Relations of deltoid :** **I) Delto-pectoral groove: related to upper part of cephalic vein , deltopectoral lymph nodes & deltoid branch of thoraco-acromial vessels .** **II) Deep relations : It envelop the anterior , lateral and posterior aspect of shoulder joint therefore it is related to the followings :** **1) Bones : Upper end of humerus & coracoids process. 2) Coraco-acromial ligament 3) Subacromial bursa & capsule of shoulder joint,** **4) Muscles :** • **Tendons inserted in upper part of humerus (subscapularis , supra-spinatus, infra-spinatus , teres minor)** • **Muscles attached to coracoids process (coracobrachialis , short head of biceps and pectoralis minor).** • **2 heads of biceps (long & short) & 2 heads of tricepts (long and lateral).** **5) Vessels and nerves around surgical neck of humerus (circumflex nerve & circumflex humeral vessels)**				
2- Subscapularis	• **Medial 2/3 of Subscapular fossa .** *** N.B. Anterior surface of this muscle is related to subscapular vesseles , nerves & lymph nodes.**	• **Lesser tubercle of humerus**	• **Upper and lower subscapular nerves .**	• **Adduction and medial rotation of shoulder.**
3- supraspinatus.	• **Medial 2/3 of Supraspinous fossa.**	• **Upper facat of greater tubercle of humerus**	• **Suprascapular nerve .**	• **Initiation of abduction of shoulder (0 – 15 degree).**
4- Infraspinatus.	• **Medial 2/3 of Infraspinous fossa.**	• **Middle facet of greater tubercle.**		• **Adduction & Lateral rotation of shoulder.**

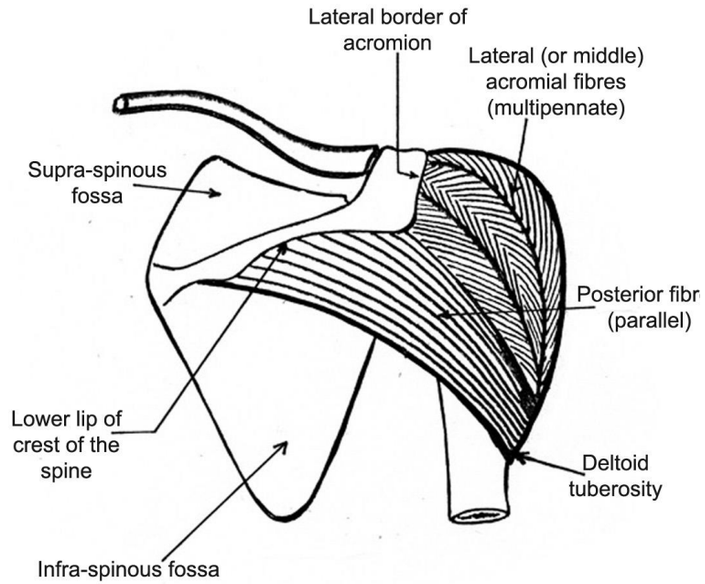
5- Teres minor	• **Upper 2/3 of dorsal surface of lateral border of scapula.**	• **Lowest facet of the greater tubercleosity**	• **Circumflex (axillary) nerve .**	• **Adduction & lateral rotation of shoulder.**
* **Subscapularis , supraspinatus , Infraspinatus & Teres minor : Tendons of these muscles blends with the capsule of the shoulder joint , steady the head of the humerus inside the glenoid cavity and called the rotator cuff muscles .**				
6- Ters major	• **Dorsal surface of inferior angle and and adjoining part of lower 1/3 of lateral border of scapula.**	• **Medial lip of bicipital groove (TLP)**	• **Lower subscapular nerve .**	• **Adduction , extension and medial rotation of shoulder (play an important role in swimming like latissmus dorsi) .**





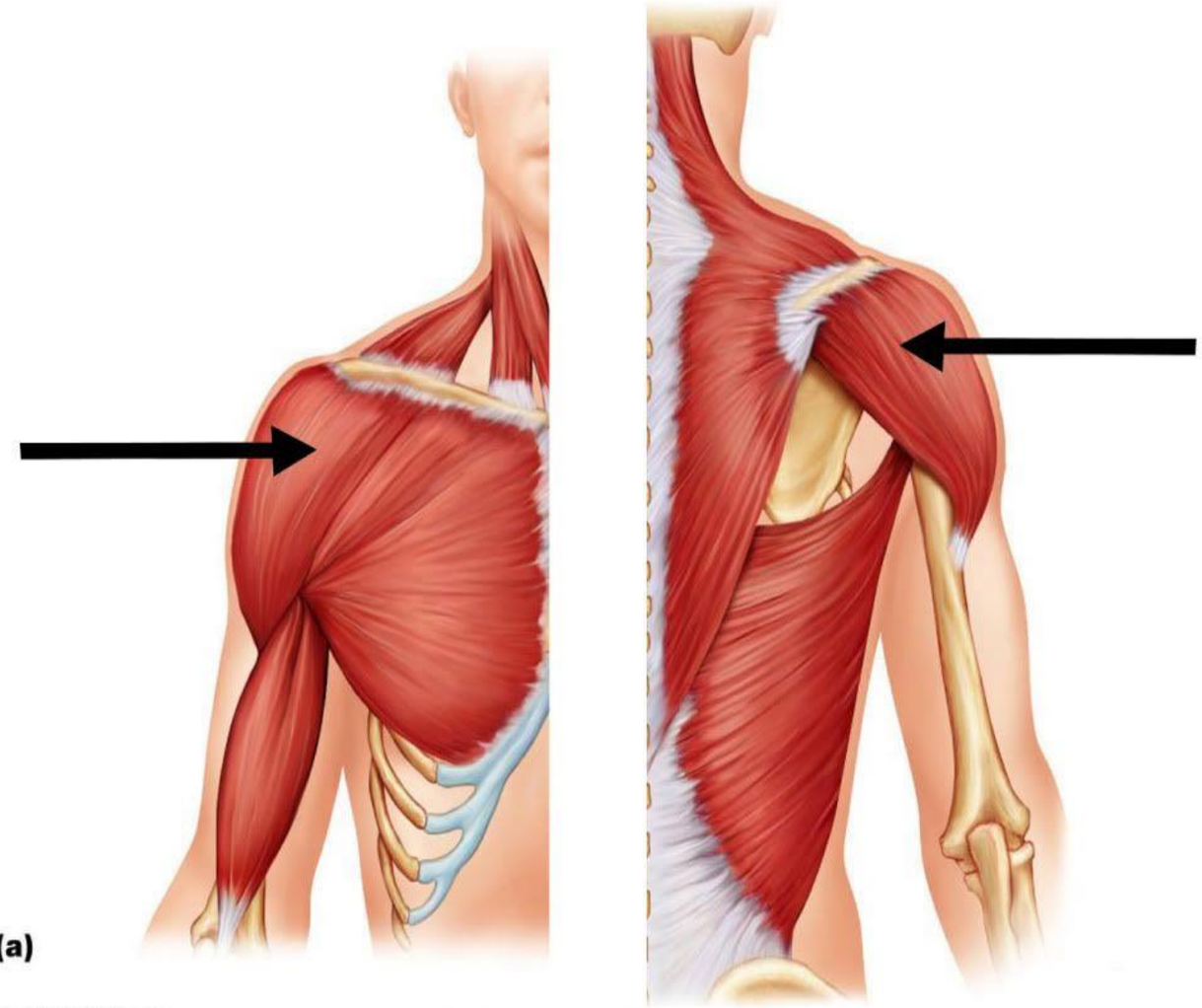


Deltoid Muscle (Anterior view)

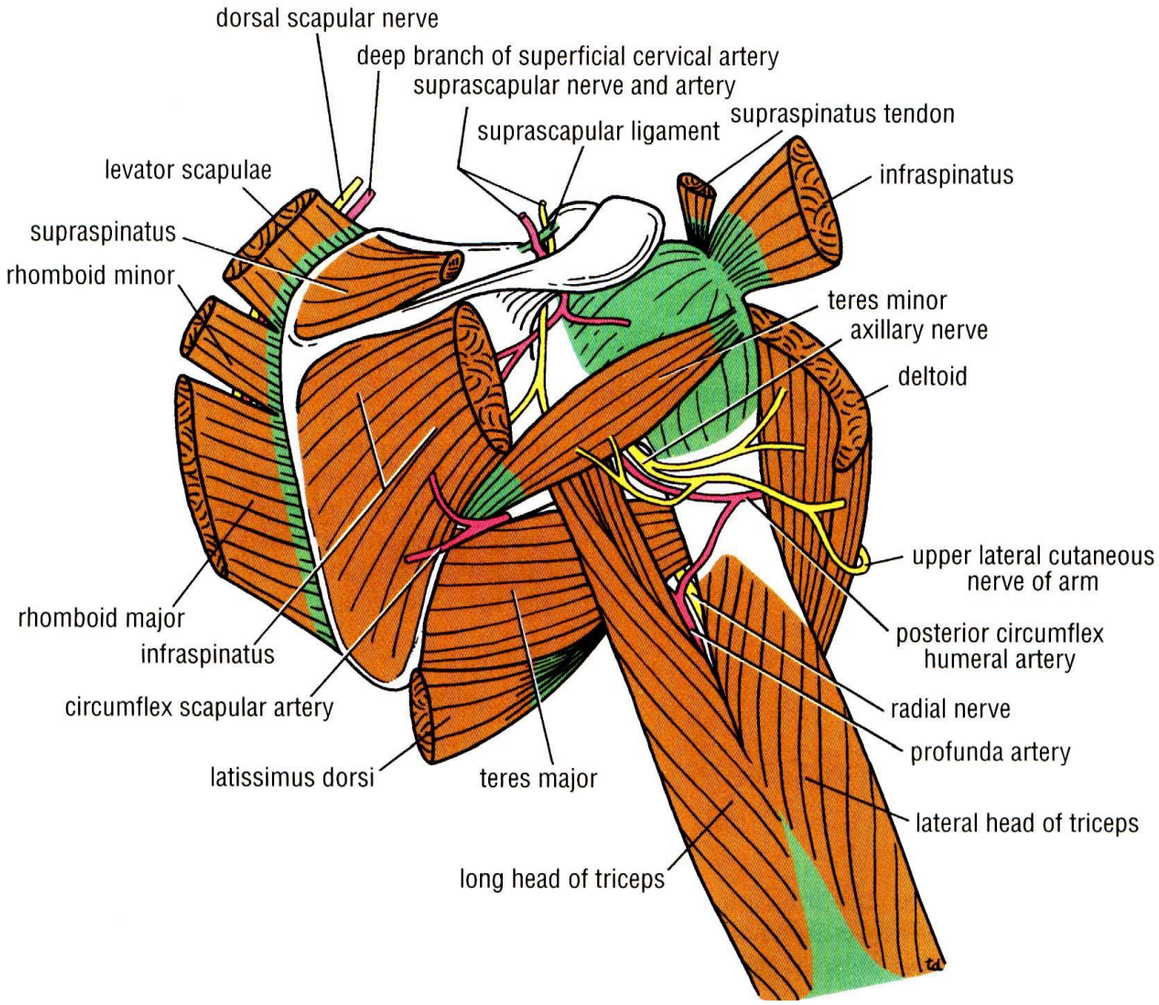


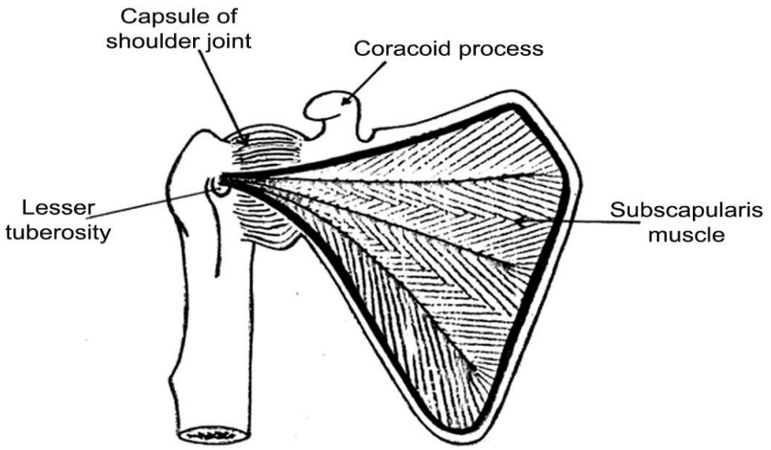
DELTOID MUSCLE

(Posterior view)

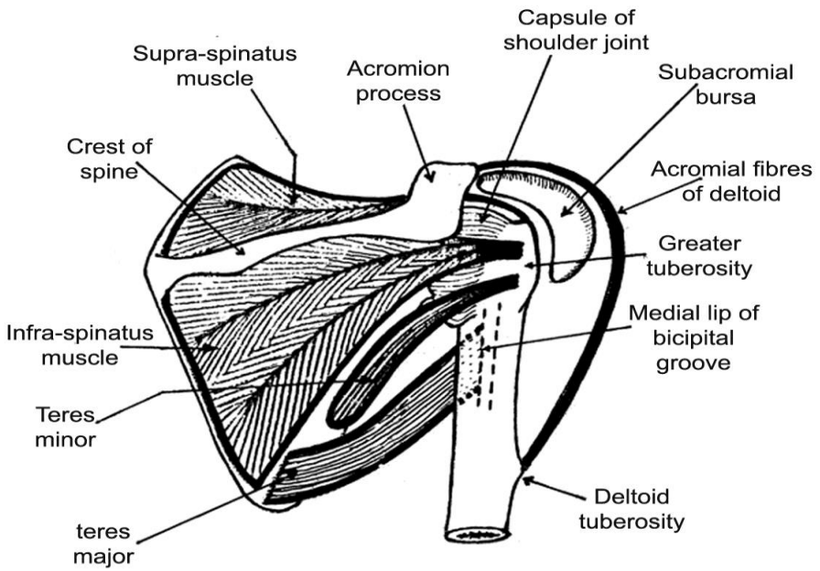


Deep relations of deltoid (Post. view)



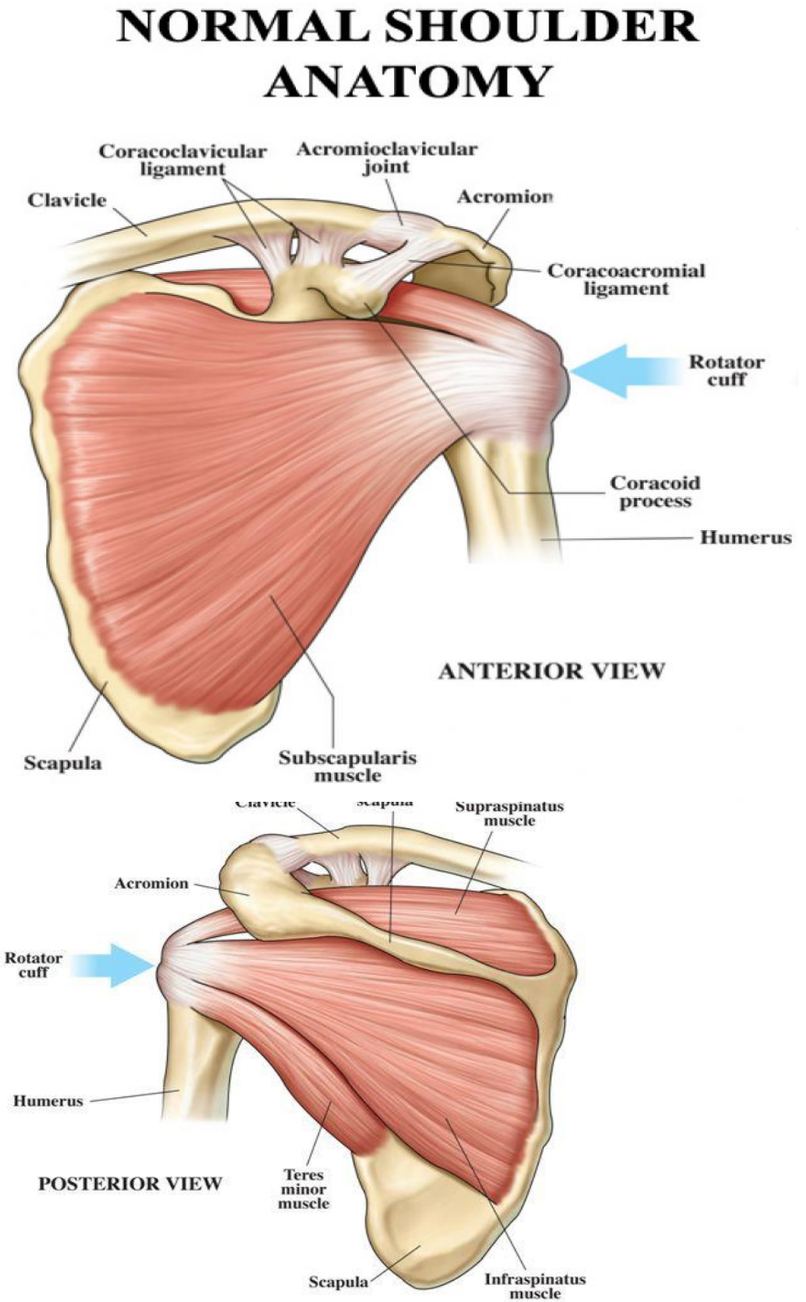


*** Anterior view subscapularis**

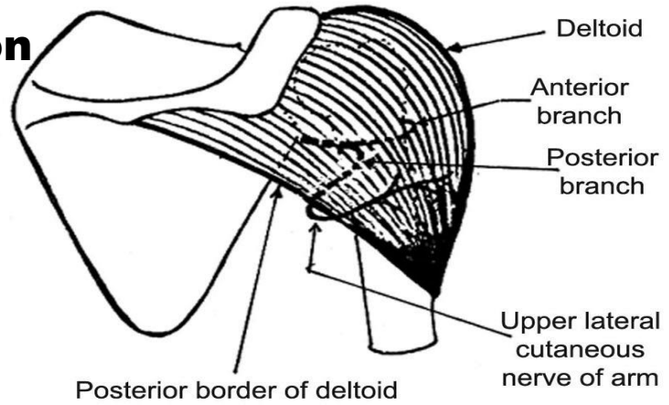


*** Posterior view**

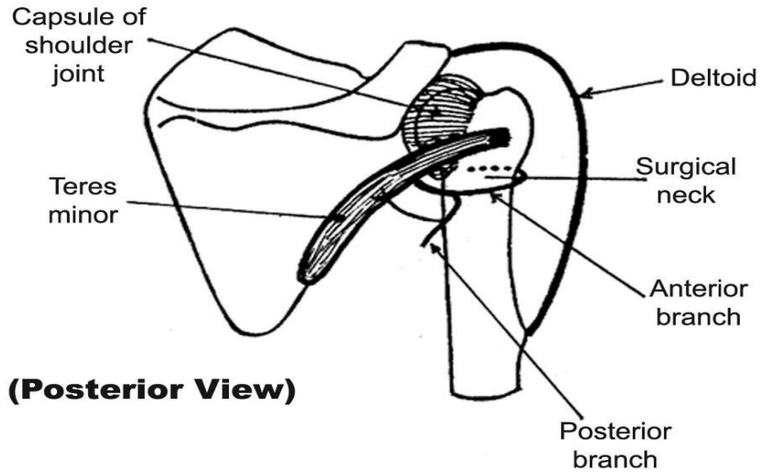
Muscles of scapular (shoulder) region



Nerve Supply of Muscles of Scapular Region

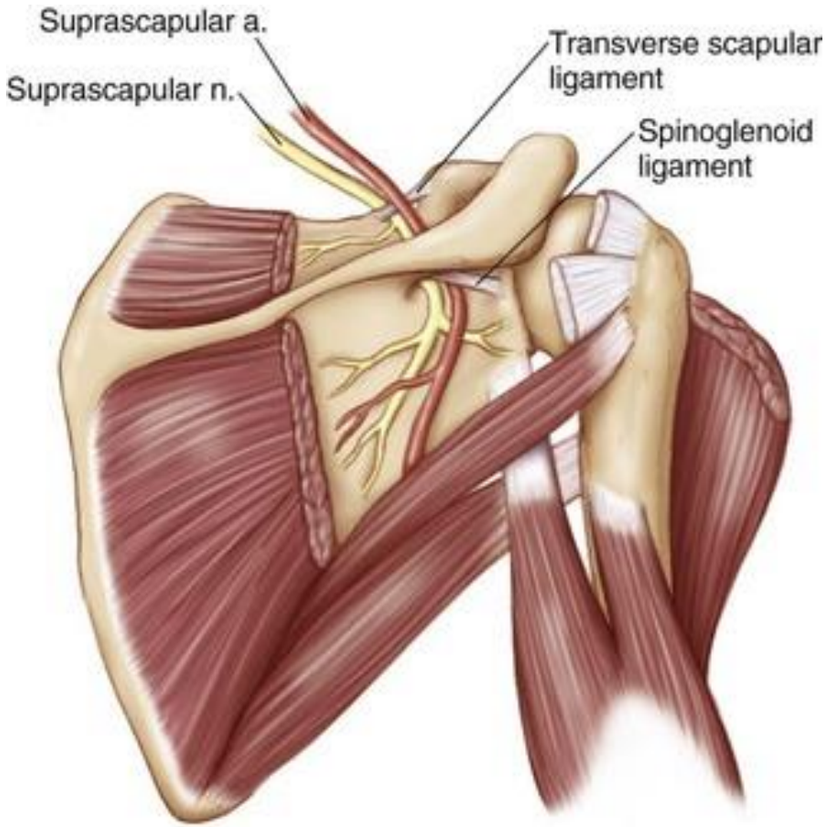


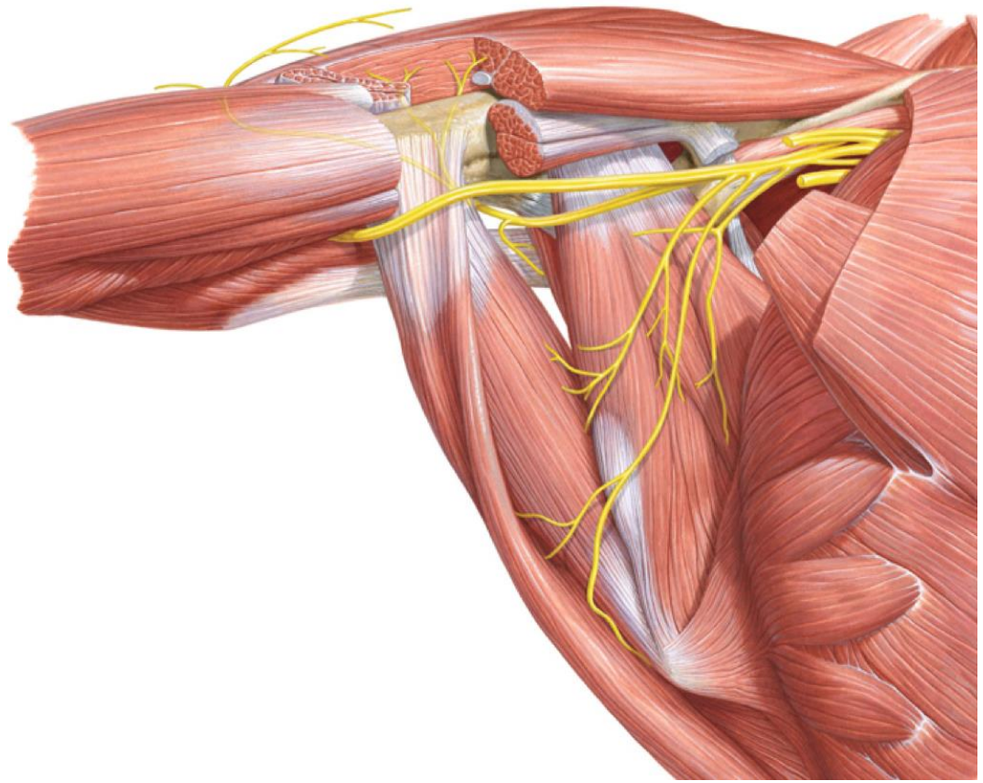
(Posterior view)



(Posterior View)

AXILLARY (CIRCUMFLEX) NERVE
(end)


Suprascapular a.
Suprascapular n.
Transverse scapular ligament
Spinoglenoid ligament

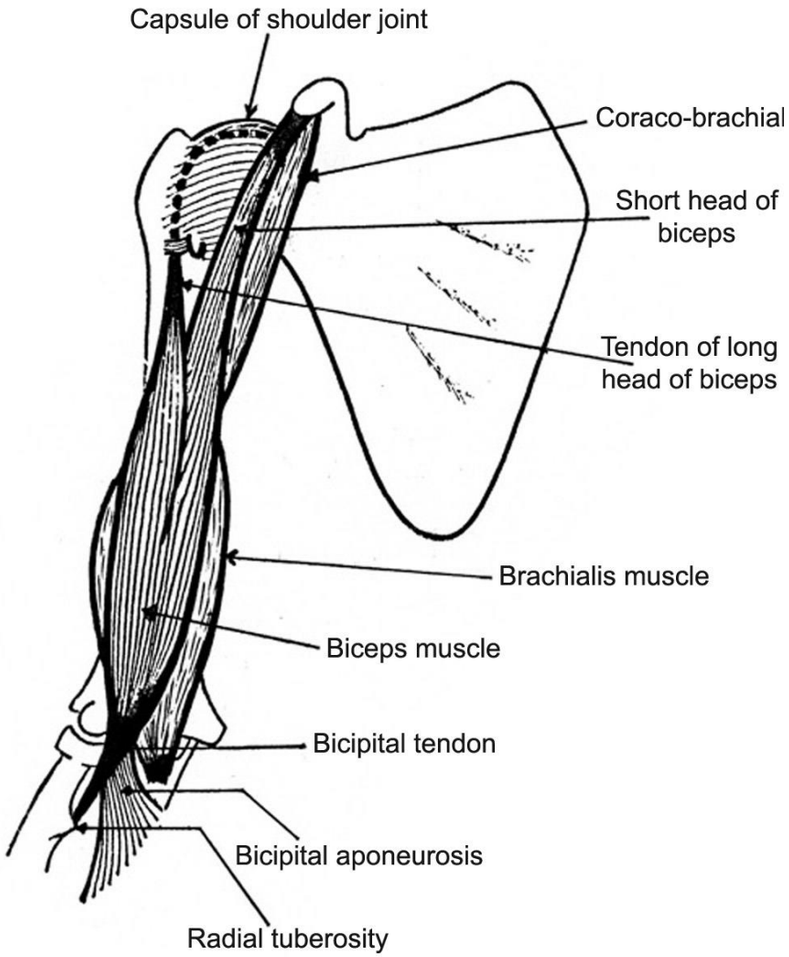


III) Muscles of front of Arm

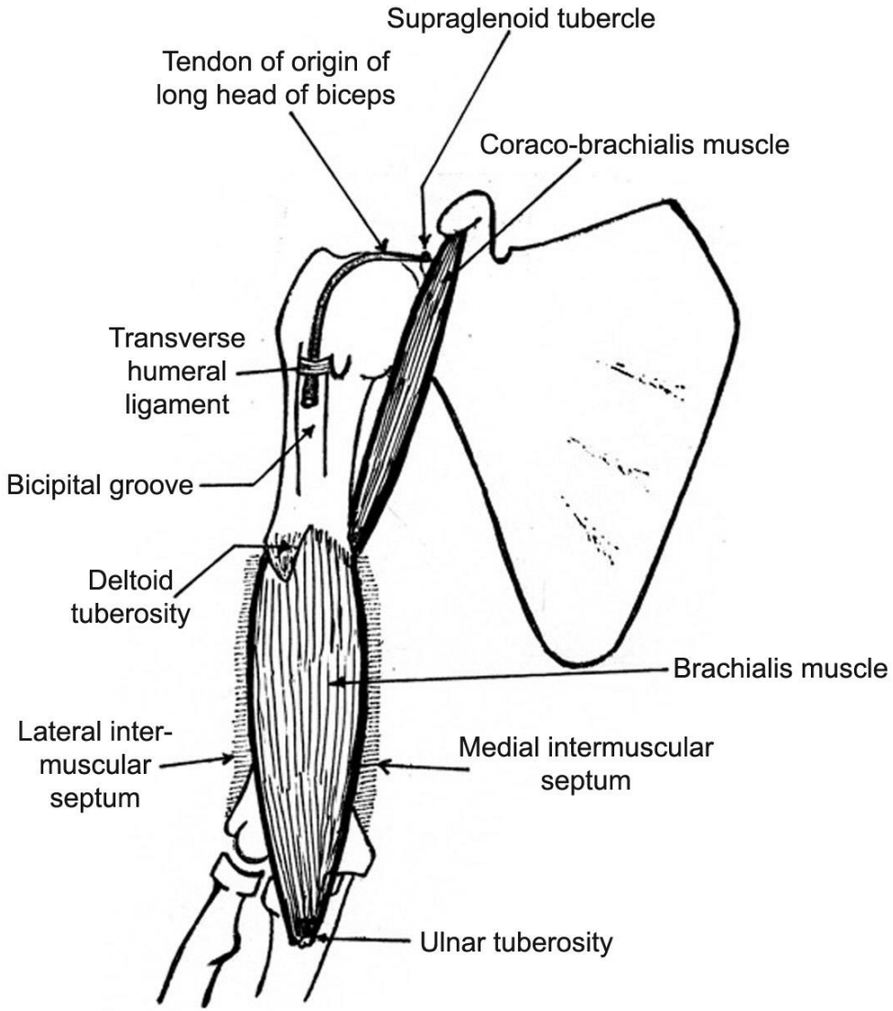
Muscle	Origin	Insertion	Nerve supply	Action.
1-Bicepe Brachii	a. Long head: arises from the supraglenoid tubercle , runs in the shoulder joint (intra-bcapsular extra- synavial) and leave the joint by passing in the bicipital groove behind transverse humeral ligament. b. Short hesd: arises from tip of coracoid process with coracobrachialis .	• By rounded tendons int postreior part of radial tulerosity . • By bicipital aponeurosis into deep fascia of upper part of medial side of forearm. This aponeurosis separate median cubital vein from brachial artery.	• All muscles of front of arm are supplied by musculo-cutaneous nerve exept lateral part of brachialis which is supplied by radial nerve i.e brachialis has double nerve supply . • Musculo-cutaneous nerve pierces the coracobrachialis then runs between biceps and brachialis.	• Flexion of forearm . • Supination of flexed pronated forearm at radioulnar joints. • Short head:Week flexor of shoulder . • Long head: Support head of humerus from above .
2-Caracobrachialis	•Tip of Coracoid process (with short head of biceps)	•Middle of medial border of humerus		• Flexion & adduction of shoulder.
3- Brachialis	• Lower 1/ 2 of anterior surface of shaft of humerus.	• Ulnar tuberosity.		• Main flexor of elbow.

IV) Muscles of Back of Arm

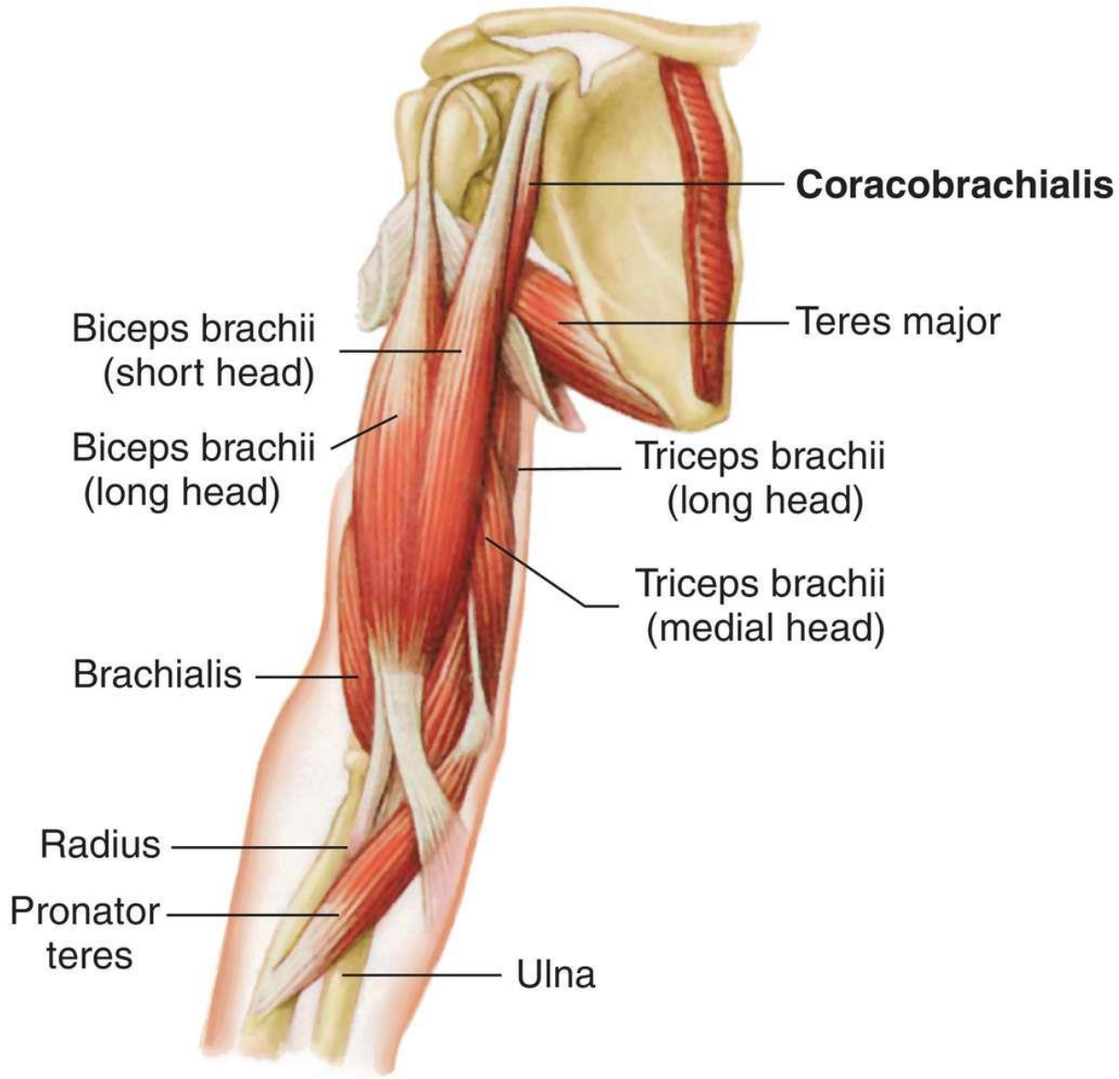
Muscle	Origin	Insertion	Nerve supply	Action.
Triceps Brachii	a. Long head: infra-glenoid tubrcle (extra-capsular) b. Lateral head : Back of shaft of humerus above spiral groove. c. Medial head: Back of shaft of humerus below spiral groove.	• Superior surface of olecranon process of ulna • Articularis cubiti are few fiber inserted in the fibrous capsule of elbow joint .	• Radial nerve (long head is supplied in axilla while lateral & medial heads are supplied in spiral groove).	• Main extensor of elbow. • Articularis cubiti draw up the posterior part of the capsule of elbow during extension.

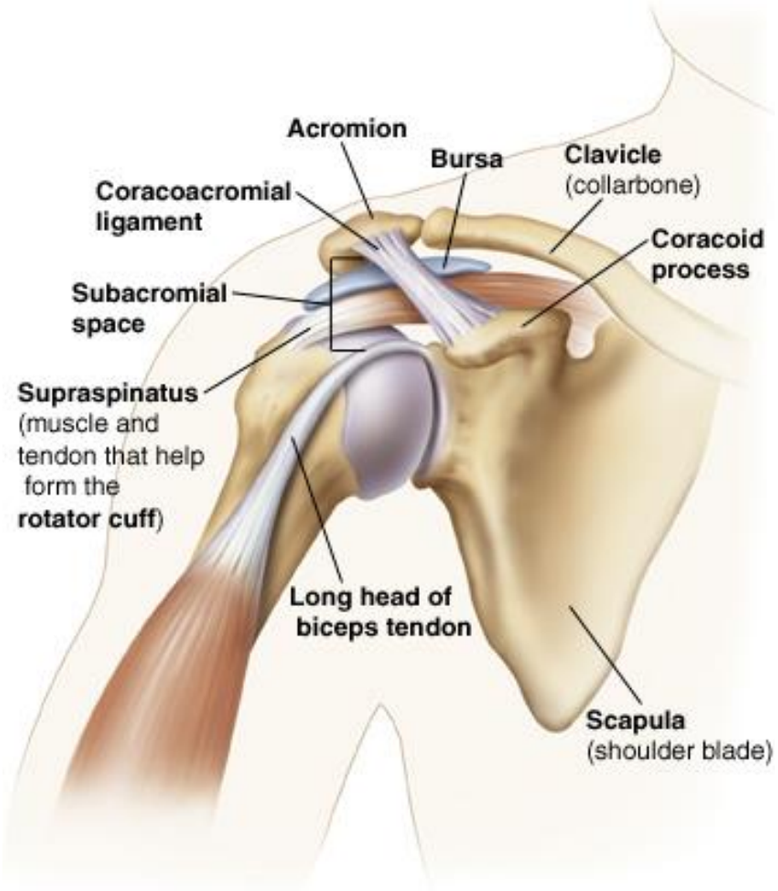


Anterior compartment of Arm (superficial layer)



*** Anterior compartment of arm (deep layer)**


Coracobrachialis
Biceps brachii (short head)
Teres major
Biceps brachii (long head)
Triceps brachii (long head)
Triceps brachii (medial head)
Brachialis
Radius
Pronator teres
Ulna


Acromion
Bursa
Clavicle (collarbone)
Coracoacromial ligament
Coracoid process
Subacromial space
Supraspinatus (muscle and tendon that help form the rotator cuff)
Long head of biceps tendon
Scapula (shoulder blade)

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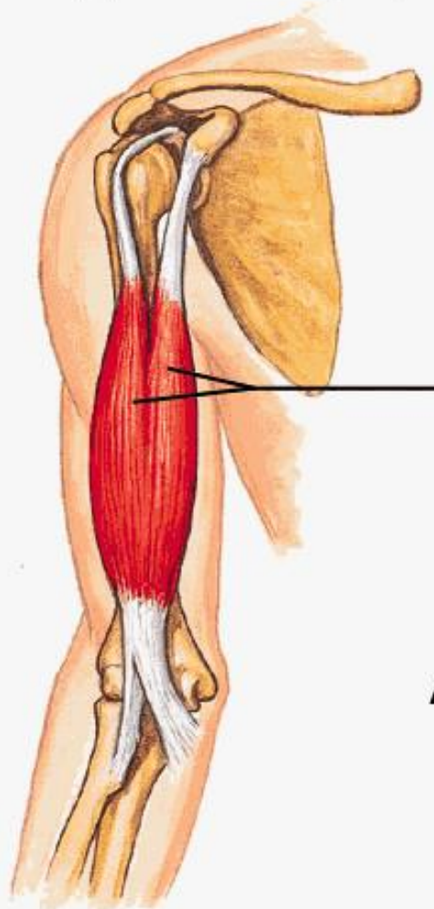

Biceps brachii (short and long heads)

Anterior Arm Muscles (1)

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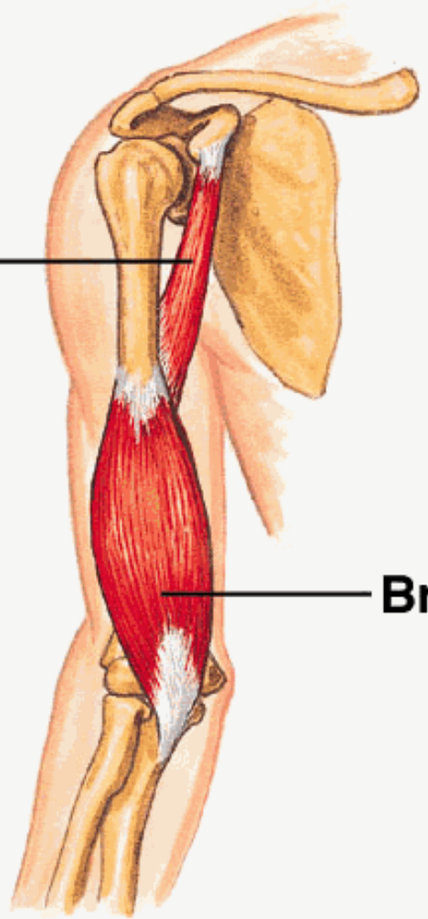
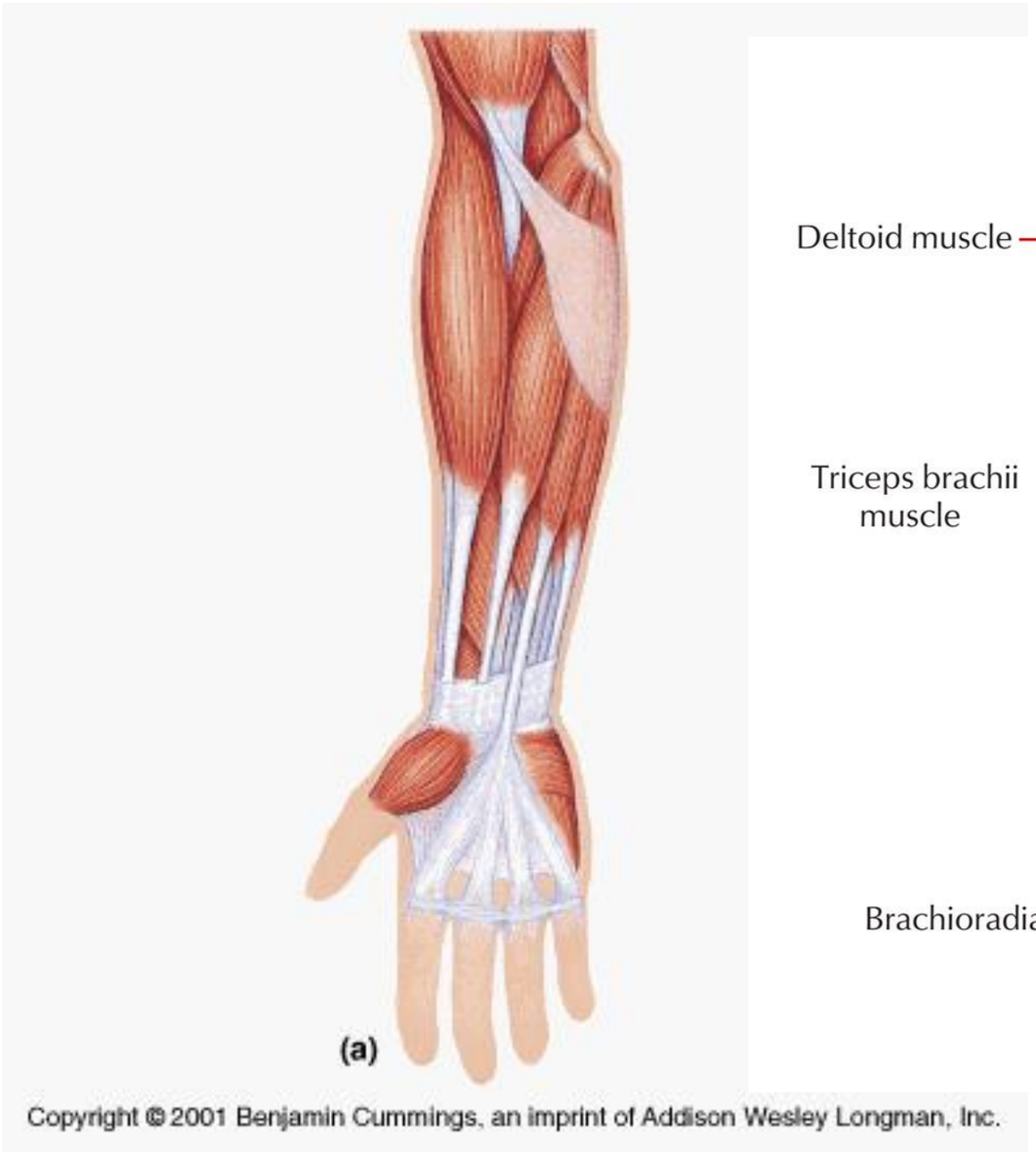
Coracobrachialis

Anterior Arm Muscles (3)



Brachialis



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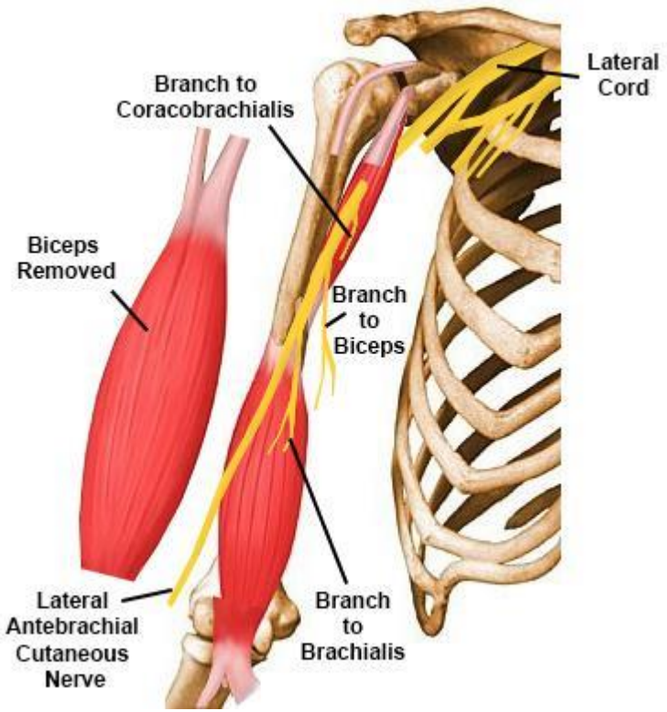
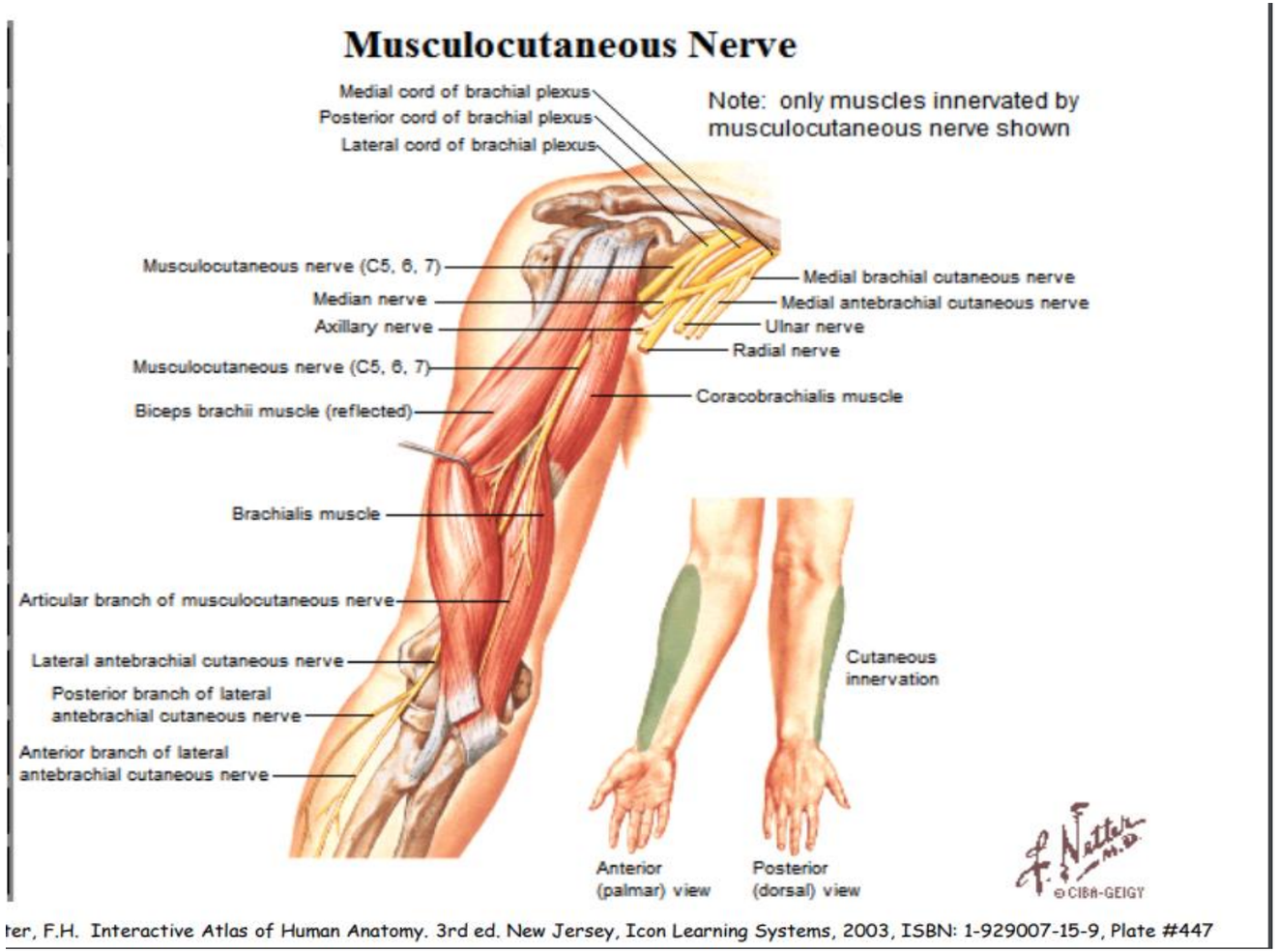
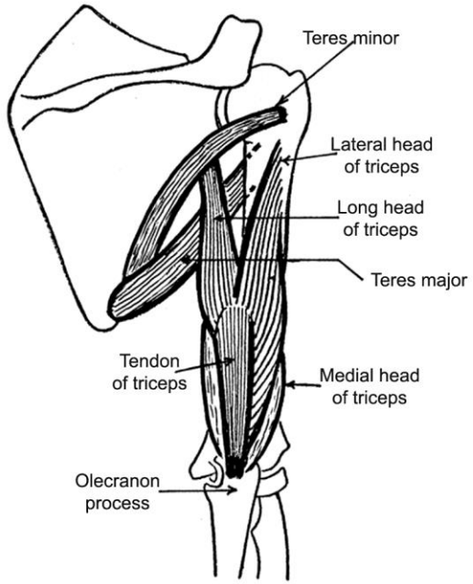
Nerve Supply of Muscles of Front of Arm

(Musculo-cutaneous Nerve)

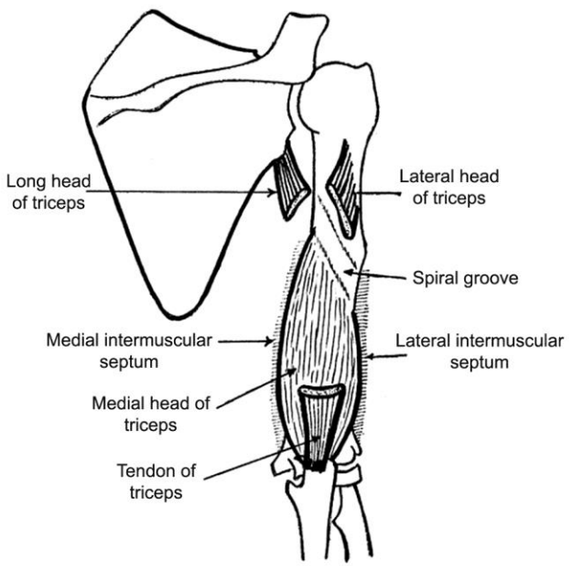




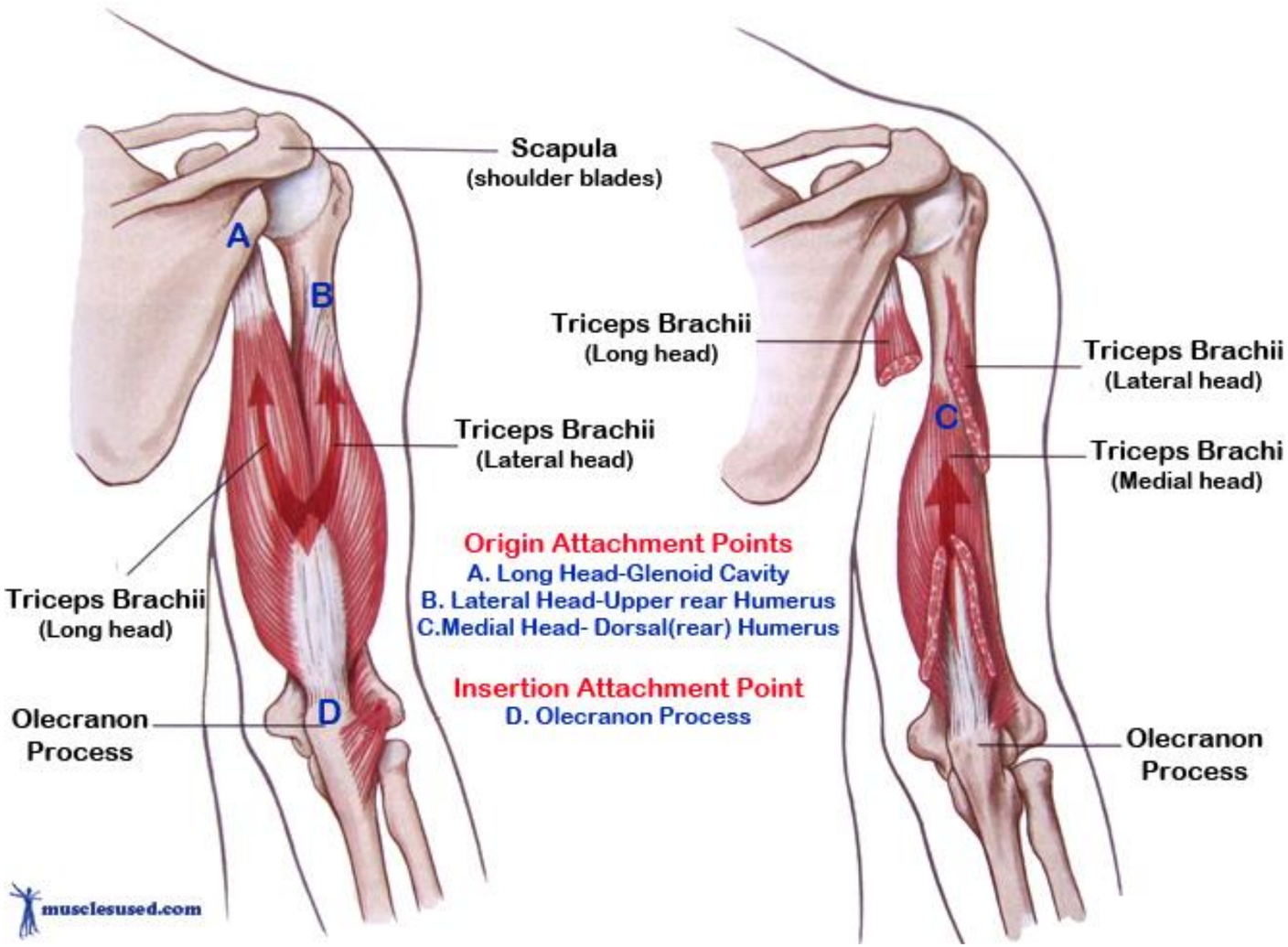
ter, F.H. Interactive Atlas of Human Anatomy. 3rd ed. New Jersey, Icon Learning Systems, 2003, ISBN: 1-929007-15-9, Plate #447



Posterior compartment of arm (superficial layer)



*** Posterior compartment of arm (deep layer)**



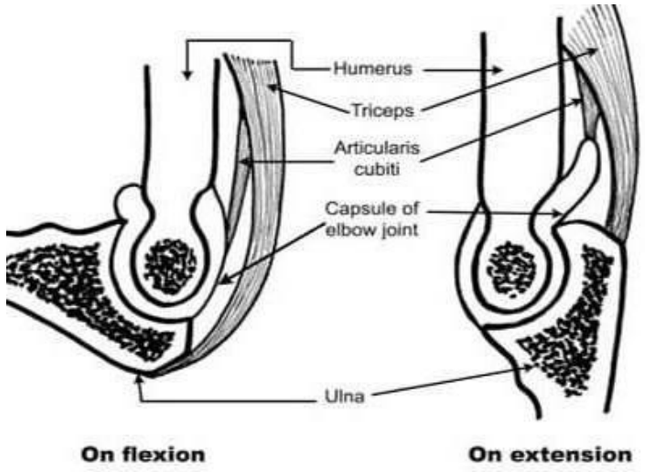
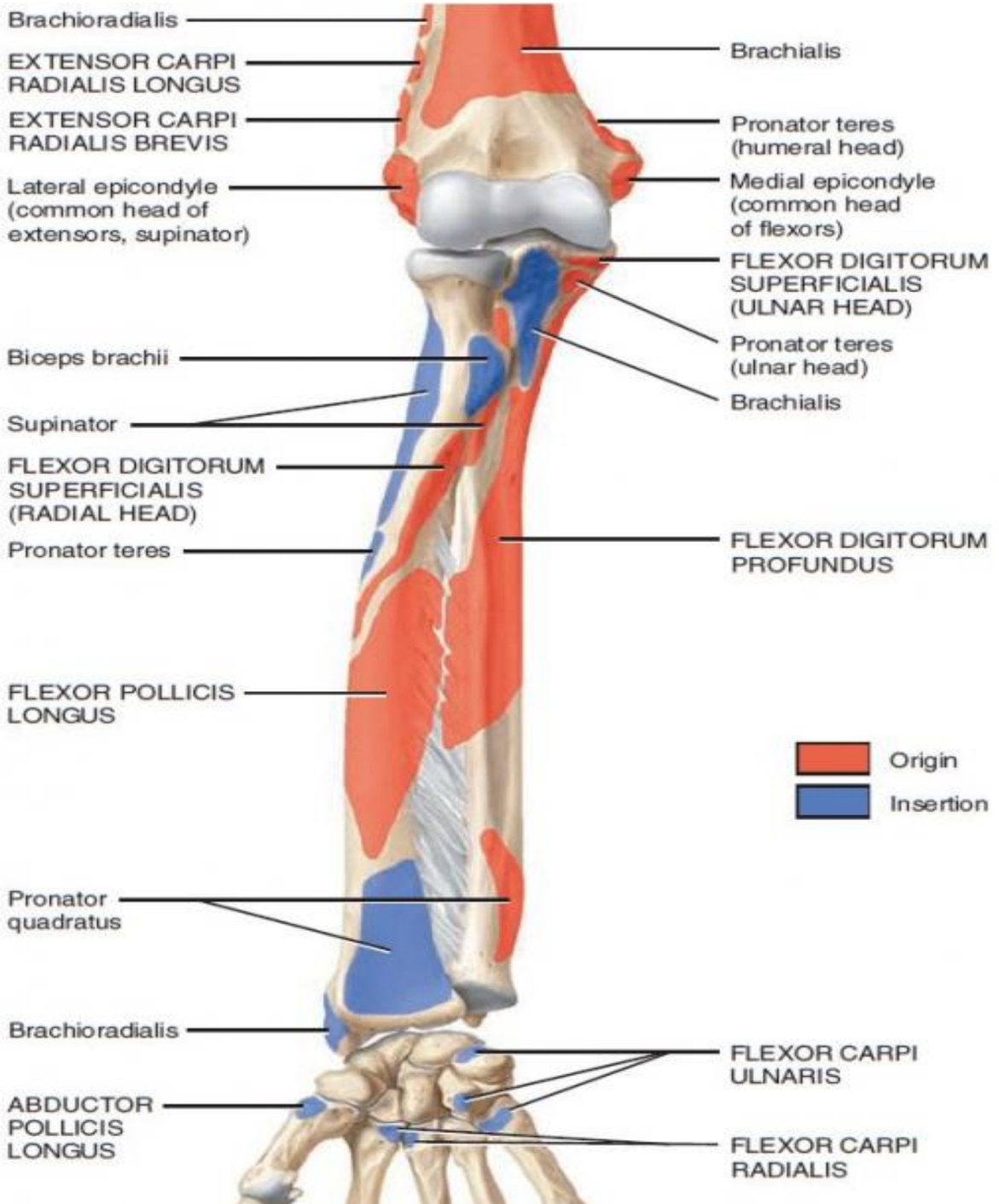
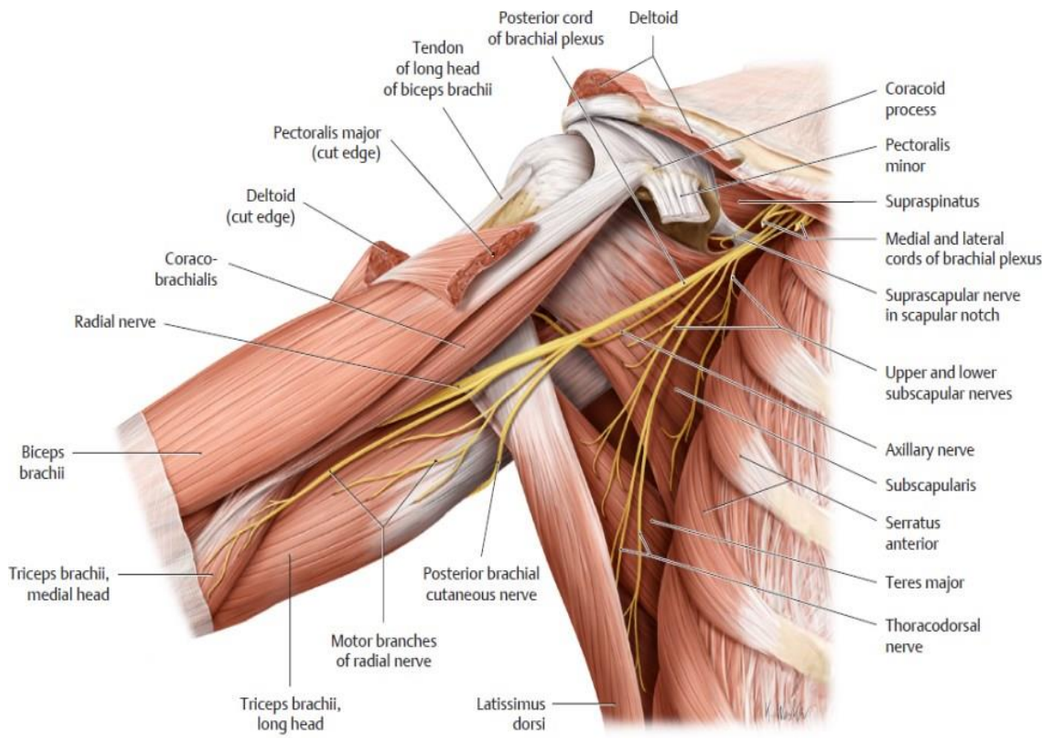
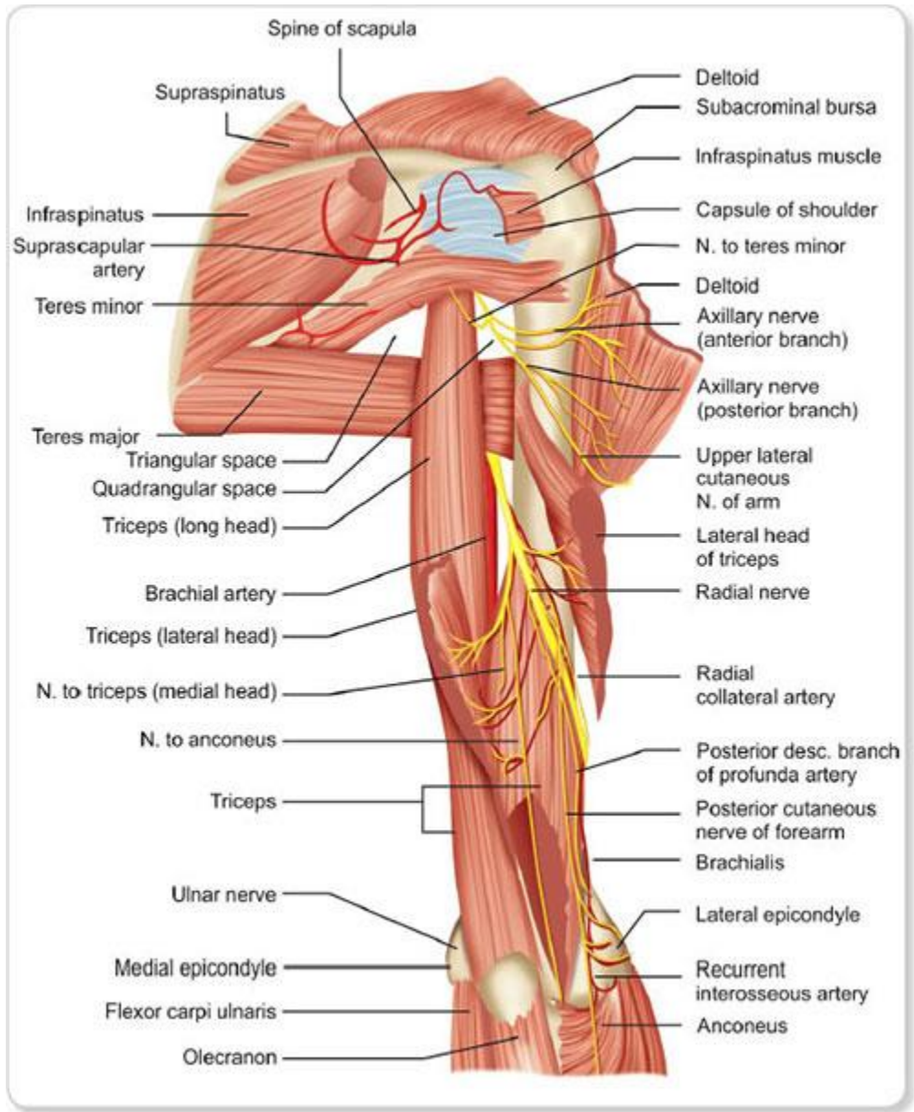


Fig. 72: Articularis cubiti muscle (Sagittal section at elbow)



Nerve Supply of the Triceps





Quadrangular and Triangular Spaces

★ The ***long head of triceps*** descends ***between*** teres minor and teres major dividing the space related to these two muscles into 3 spaces:

A. Quadrangular space (laterally): Is bounded:

1. ***Above***: By teres minor (seen from behind) and subscapularis (seen from in front).
2. ***Below:*** By teres major.
3. ***Medially***: By long head of triceps.
4. ***Laterally***: By surgical neck of humerus.

**** It Transmits***: Posterior circumflex humeral vesseles and axillary (circumflex) nerve.

B. upper Triangular space (Medially): Is bounded:

1. ***Above***: By teres minor (seen from behind) and subscapularis (seen from in front).
2. ***Below***: By teres major.
3. ***Laterally***: By long head of triceps.

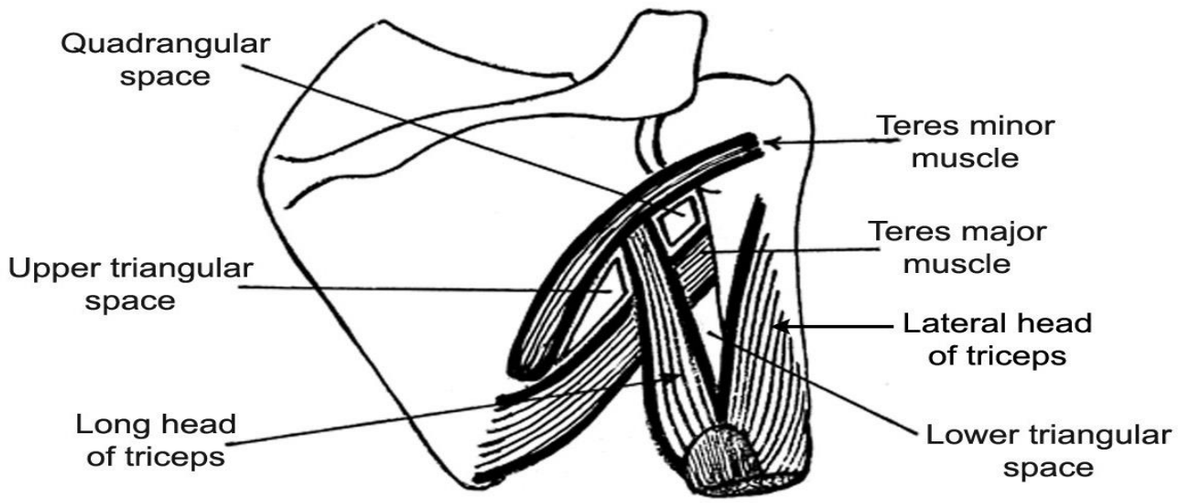
* ***It transmits:*** Circumflex scapular artery.

★ ***Both*** quadrangular and upper triangular spaces lie ***in the posterior wall*** of the axilla and ***connect*** the axilla with the back of the shoulder region.

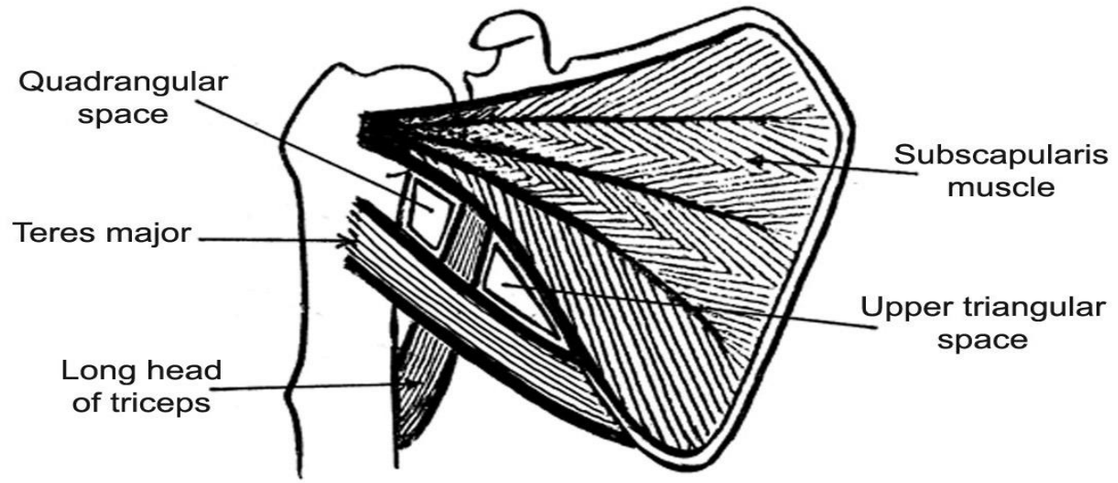
C. Lower triangular space is bounded:

1. ***Above*** by: Teres major.
2. ***Medially*** by: Long head of triceps.
3. ***Laterally*** by: Lateral head of triceps.

* It ***contains*** radial nerve and profunda brachii vessels.

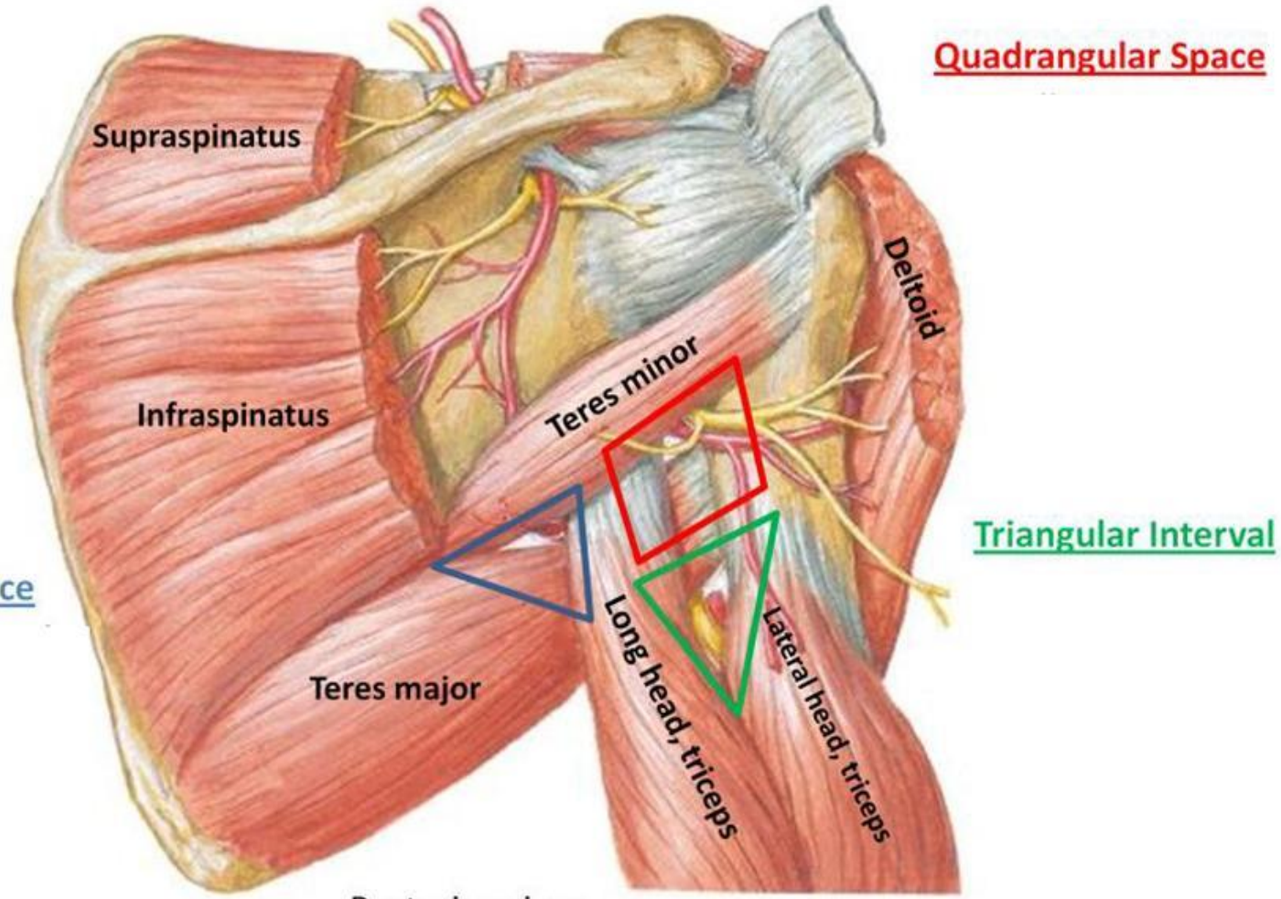


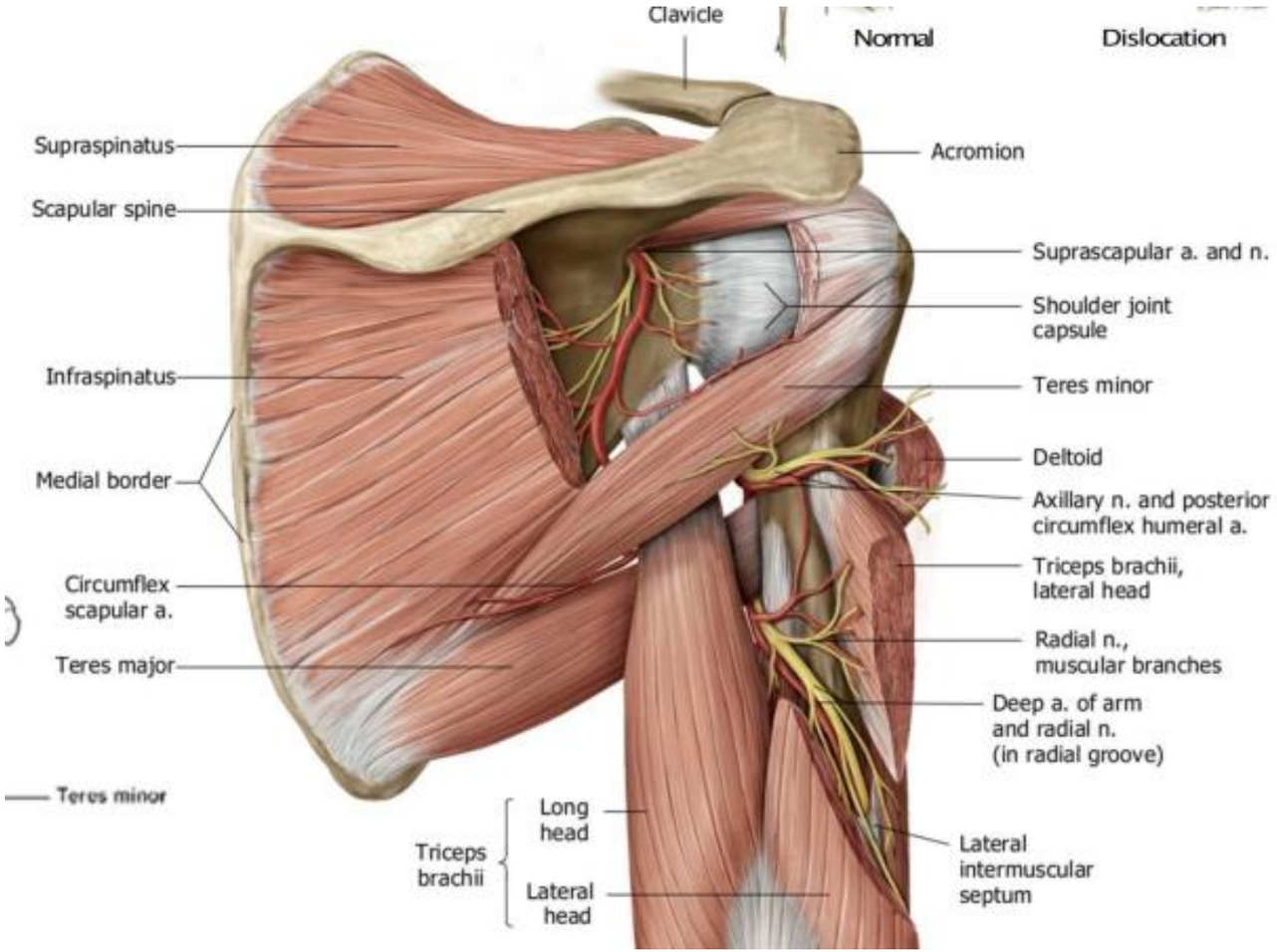
*** Posterior view**

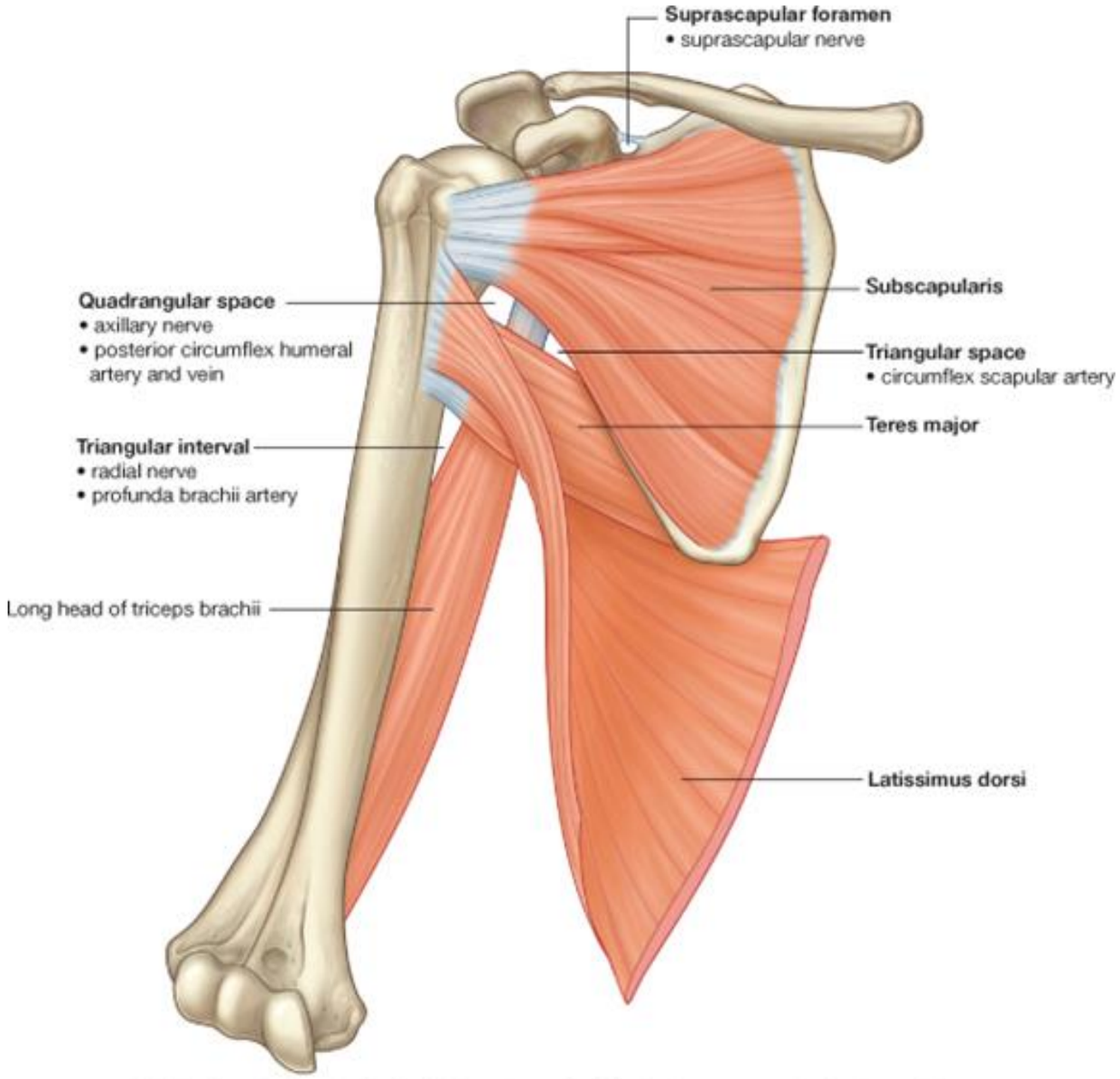


Anterior view

Quadriangular and triangular spaces


Quadrangular Space
Supraspinatus
Deltoid
Infraspinatus
Teres minor
Triangular Interval
Triangular Space
Long head, triceps
Lateral head, triceps
Teres major
Posterior view


Clavicle
Normal
Dislocation
Supraspinatus
Scapular spine
Infraspinatus
Medial border
Circumflex scapular a.
Teres major
Teres minor
Acromion
Suprascapular a. and n.
Shoulder joint capsule
Teres minor
Deltoid
Axillary n. and posterior circumflex humeral a.
Triceps brachii, lateral head
Radial n., muscular branches
Deep a. of arm and radial n. (in radial groove)
Lateral intermuscular septum
Triceps brachii
Long head
Lateral head



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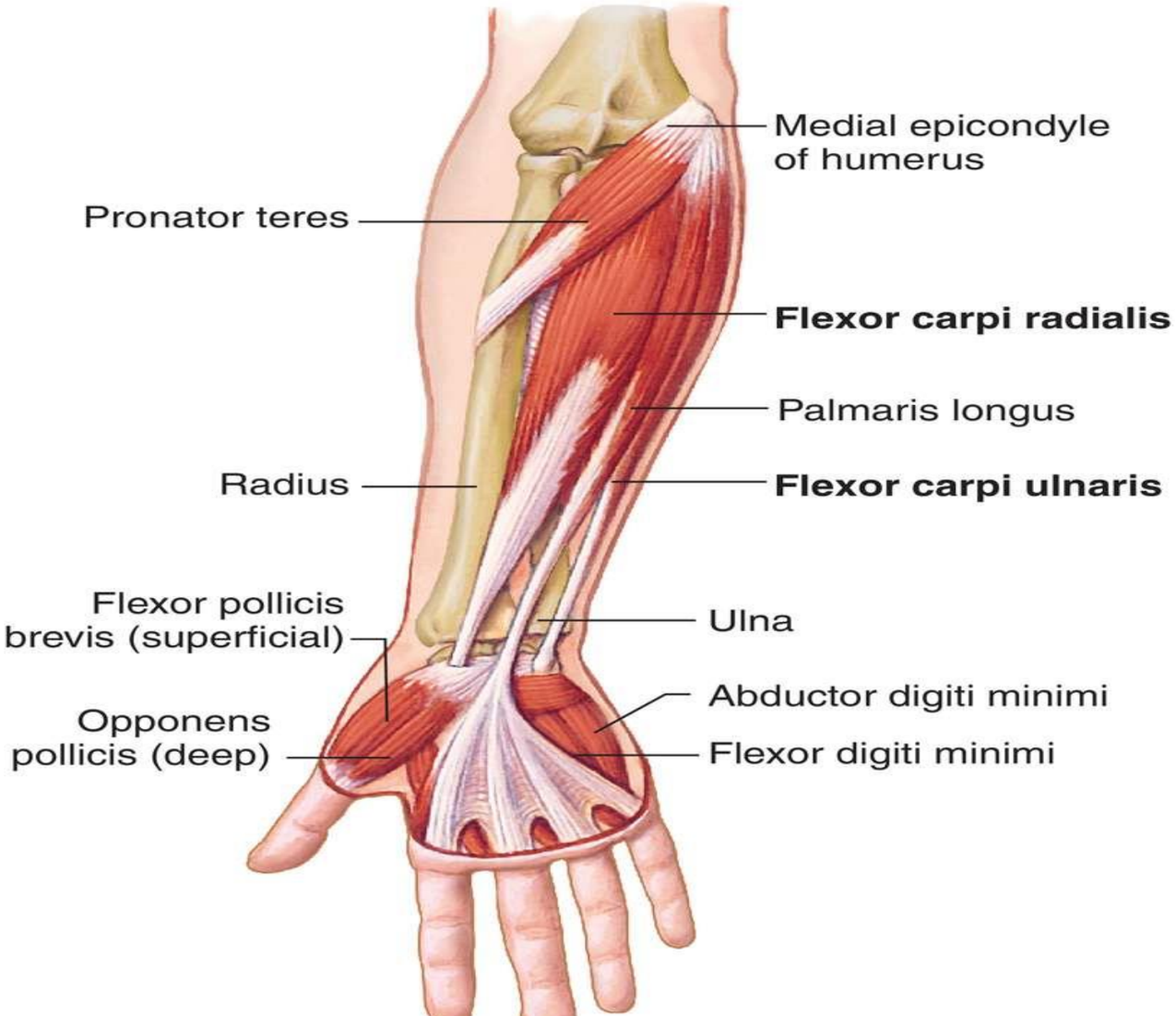
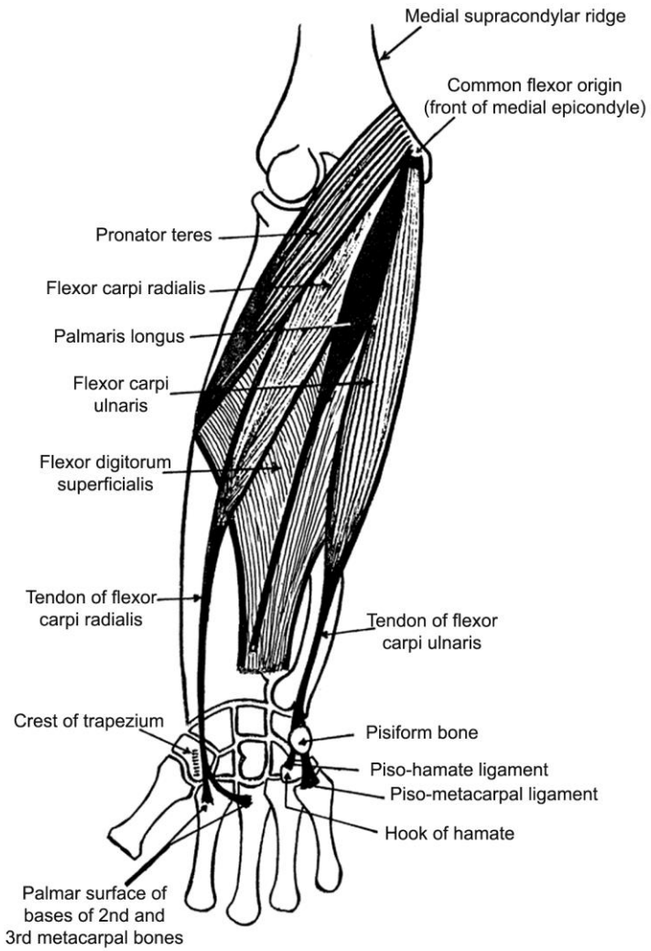
V) Superficial Group of Muscles of Front of Forearm

- **All muscles arise from the front of medial epicondyl of humerus (Common flexor origin i.e. C.F.O.)**
- **All muscles arise by 2 heads except flexor carpi radialis and palmaris longus.**
- **All muscles are supplied by median nerve except flexor carpi ulnaris which is supplied by ulnar nerve .**
- **Common action : week flexors of elbow & flexion of wrist (except pronator teres).•The muscles are arranged from lateral to medial as follows:**

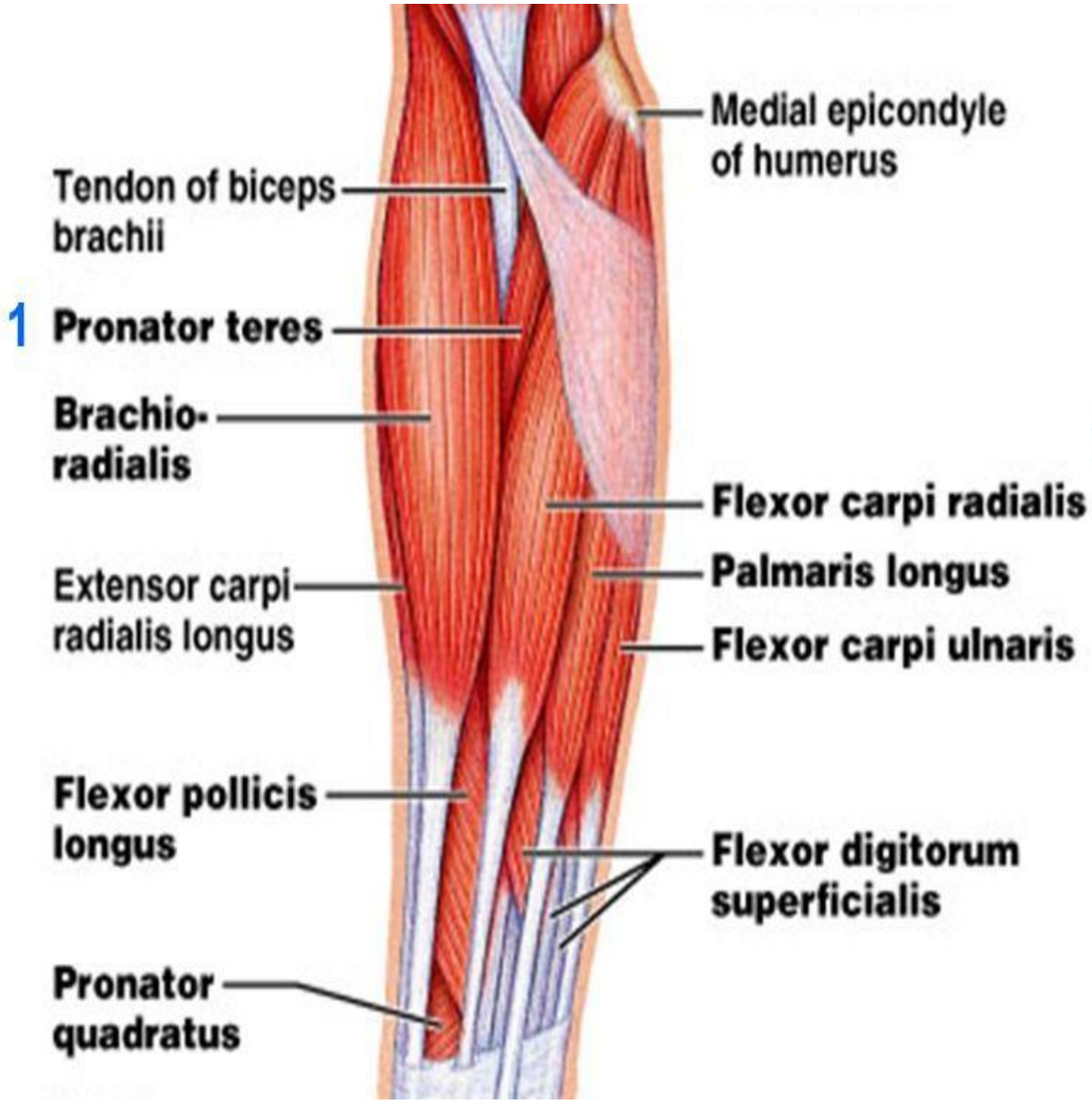
Muscle	Origin	Insertion	Action.
1- Pronator teres	**a) Humeral (superficial) head: from lower part of medial supracondylar ridg & C.F.O.** **b) Ulnar (deep) head: medial side of coronoid process of ulna.**	• **Rough area in the middle of lateral surface of radius (Pronator tuberosity).**	• **Pronation of forearm at radioulnar joints (main action) .** • **Weak Flexor of elbow.**
∗ **Relations : 1)Median nerve enters the forearm between the 2 heads of pronator teres while ulnar artery pass deep to the 2 heads .** **2) Radial artery & superficial radial nerve cross over its insertion 3) It form the medial boundary of cubital fossa .**			
2- Flexor carpi radialis	• **C.F.O.**	• **Base of 2 nd & 3 rd metacarpal bones.**	• **Common action.** • **Abduction (Radial deviation) of hand.**
3- Palmaris longus	• **C.F.O , may be abscent. It has a long tendon**	• **Apex of palmar aponeurosis .**	• **Common action .**
4- Flexor digitorum superficialis	**a) Humero-ulnar head: C.F.O. & medial side of coronoid process.** **b) Radial head: anterior oblique line of radius i.e. it has 2 heads arising from 3 bones.**	• **Into sides of the shaft of middle phalanges of medial 4 fingers.**	• **Common action .** • **Flexion of metacarpo-phalangeal & proximal interphalangeal joints of medial 4 fingers.**
∗**Relations: 1) It is deep to Flexor carpi radialis & Palmaris longus** **2) The 4 tendons passing through carpal tunnel deep to flexor retinaculum .** **3) Median nerve runs deep to the muscle in the forearm then it lies lateral to the tendons in the carpal tunnel.** **4) Radial artery and superficial radial nerve pass superficial to the origin of radial head.** **5) In the hand: The superficial palmar arch & palmar aponeurosis are superficial to the tendons of the muscle.**			

5- Flexor carpi ulnaris	**a) Humoral head: C.F.O.** **b) Ulnar head : From medial border of olecranon & upper 2/3 of posterior border of ulna**	• **Pisiform bone & base. of 5th metacarpal bone**	• **Common action .** • **Adduction (ulnar deviation) of the hand .**
∗ Ulnar nerve and artery is deep to the muscle in the upper 2/3 of forearm then lateral to the tendon of the muscle in the lower 1/3 of forearm .			



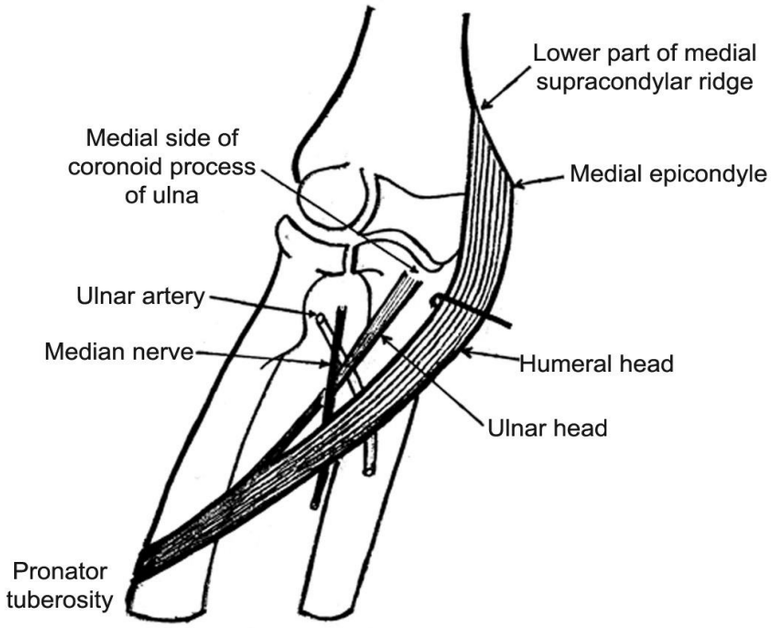


Muscles of front of forearm (superficial group)
(superficial flexors)

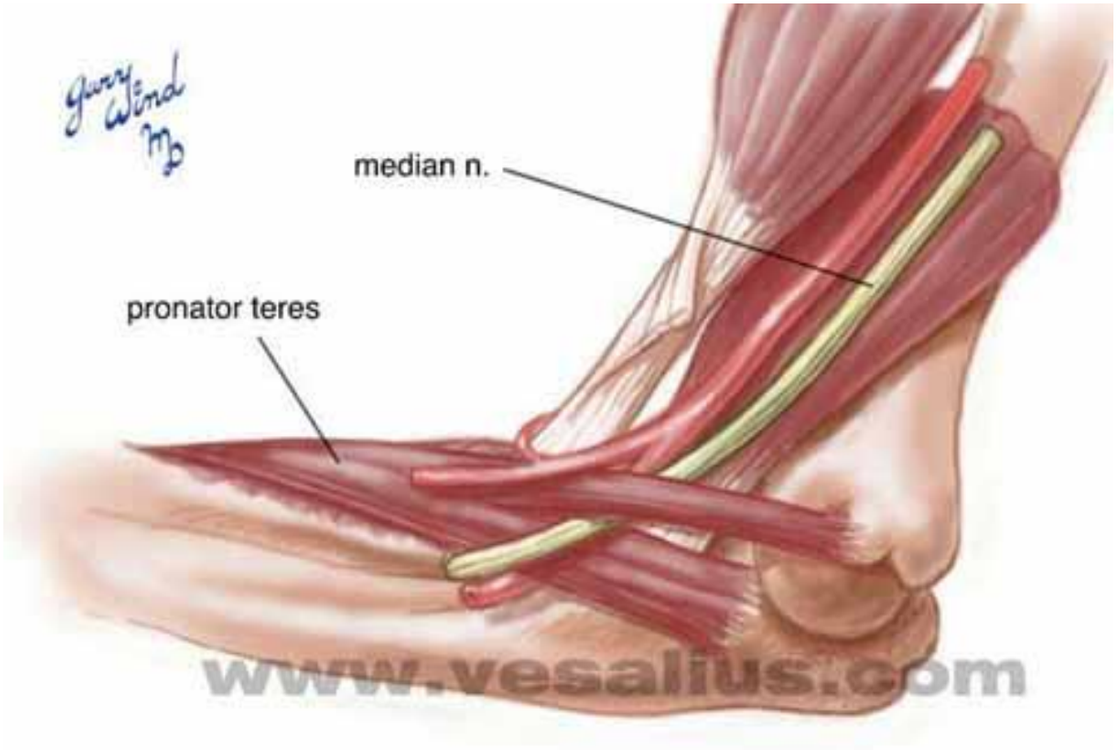


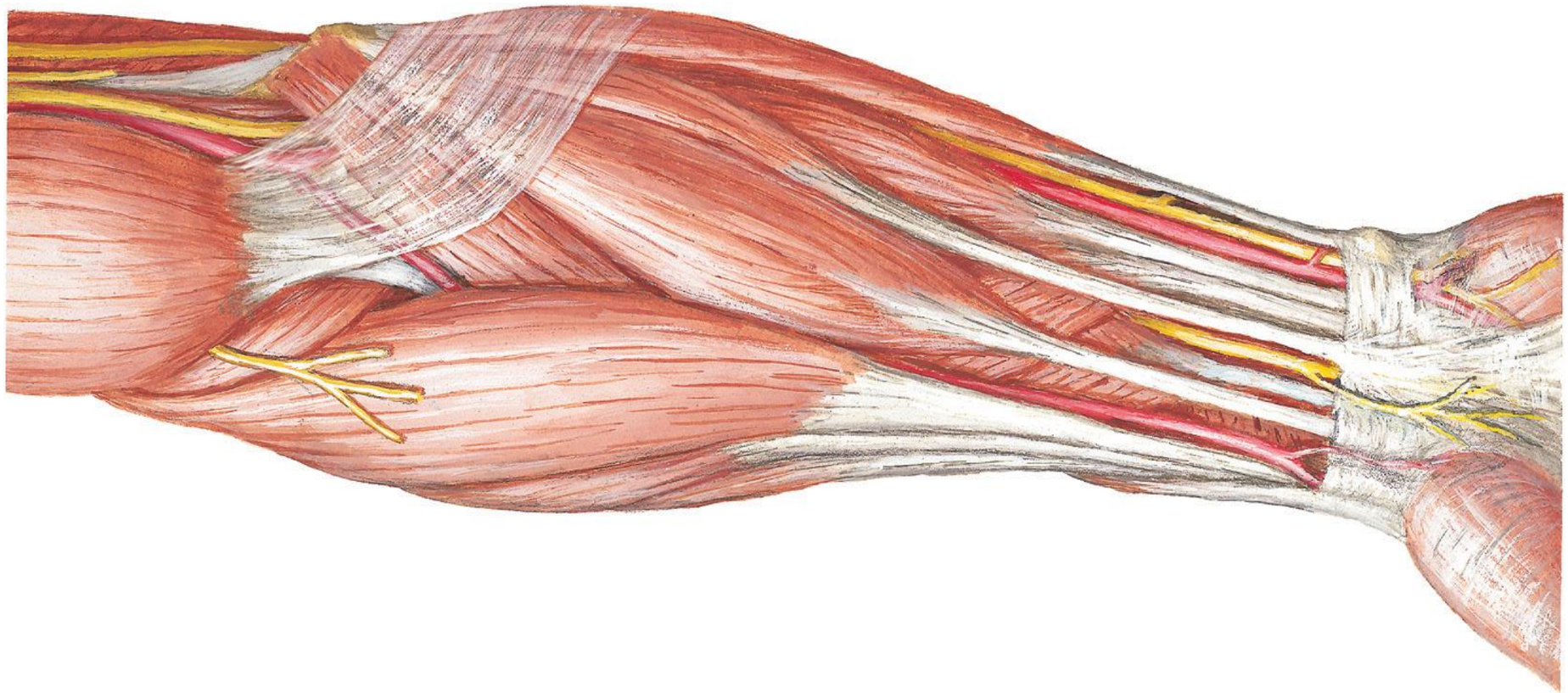
Pronator teres,

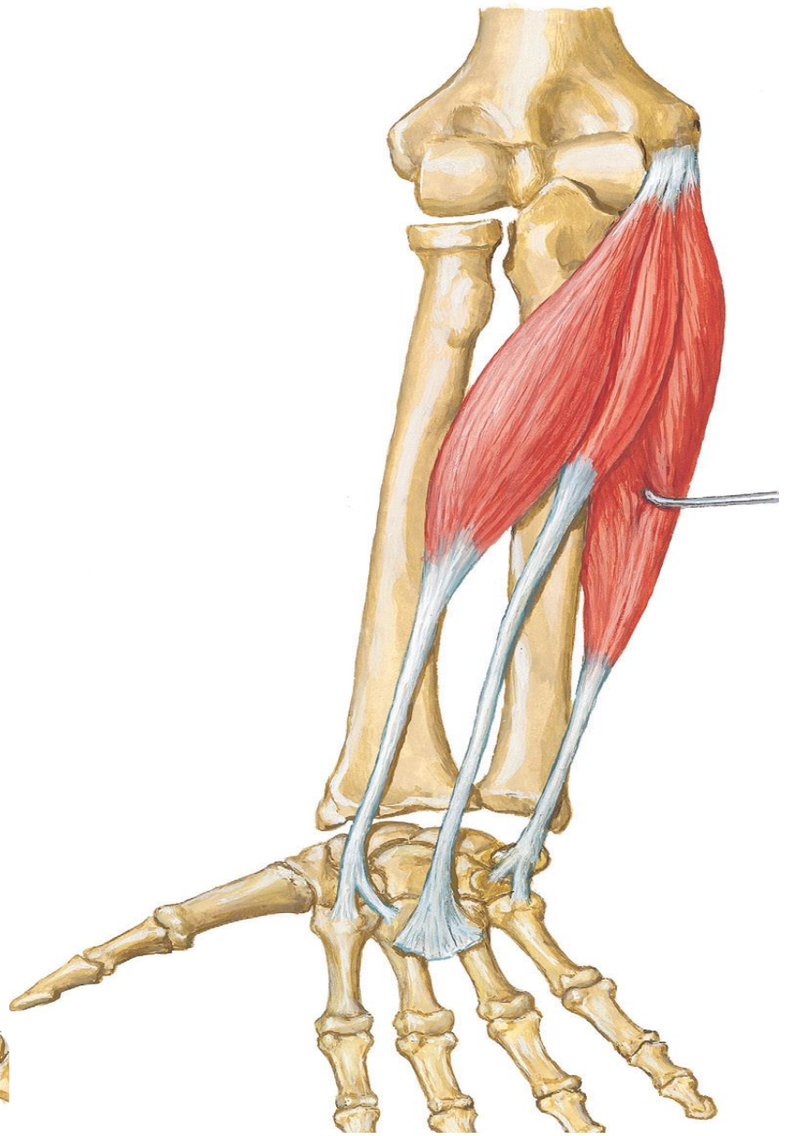
Flexor retinaculum



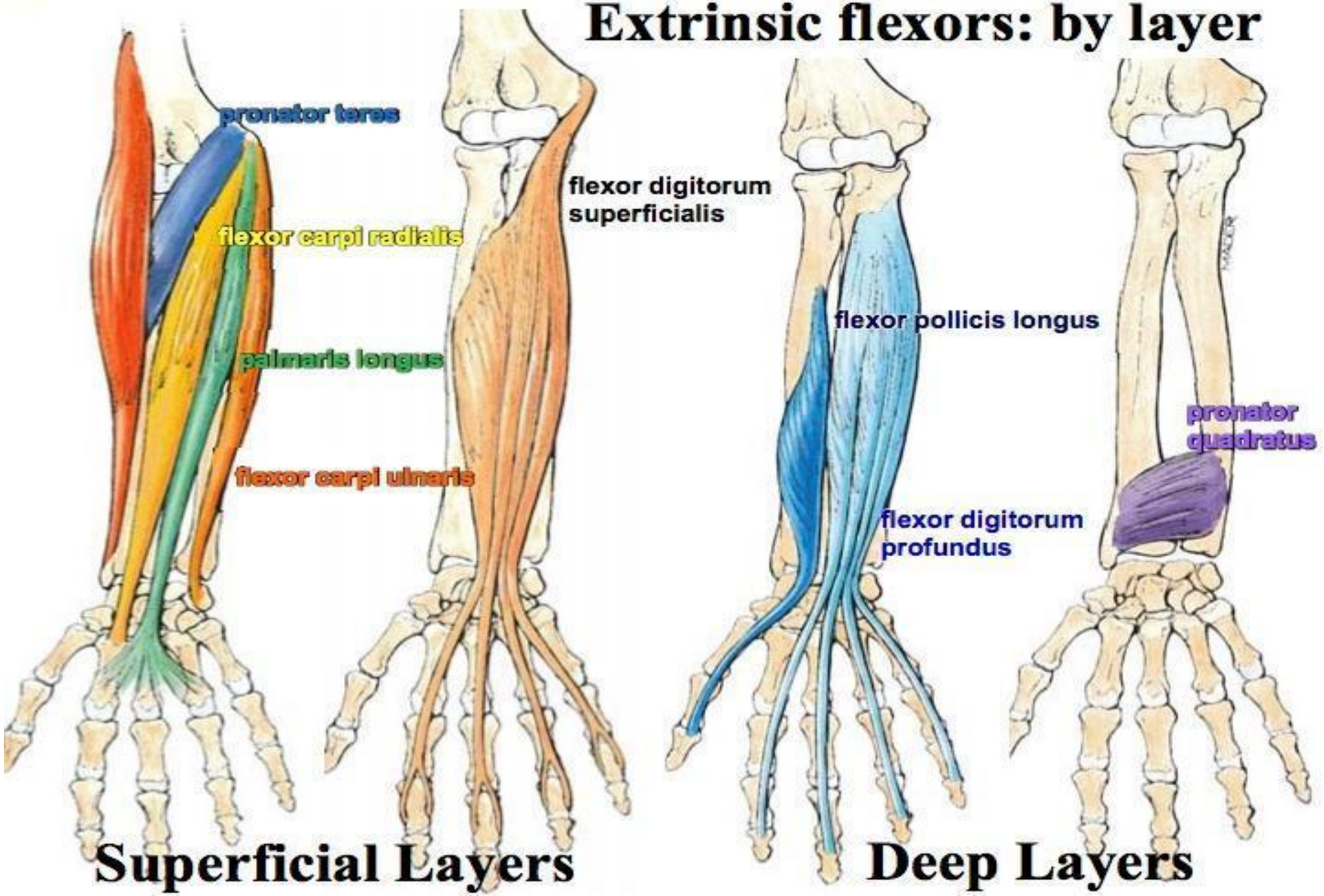
Pronator teres muscle and its relations







Extrinsic flexors: by layer



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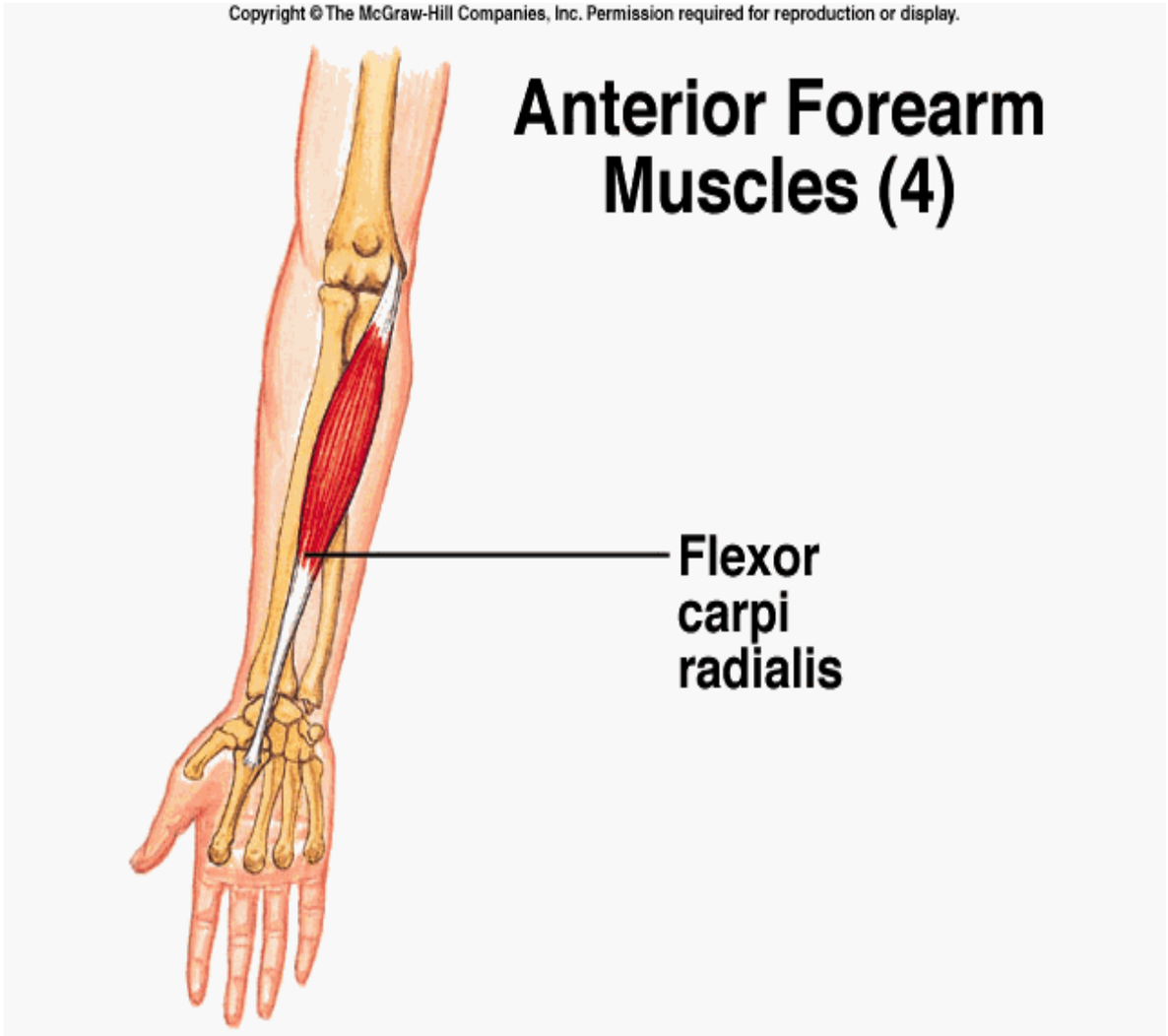
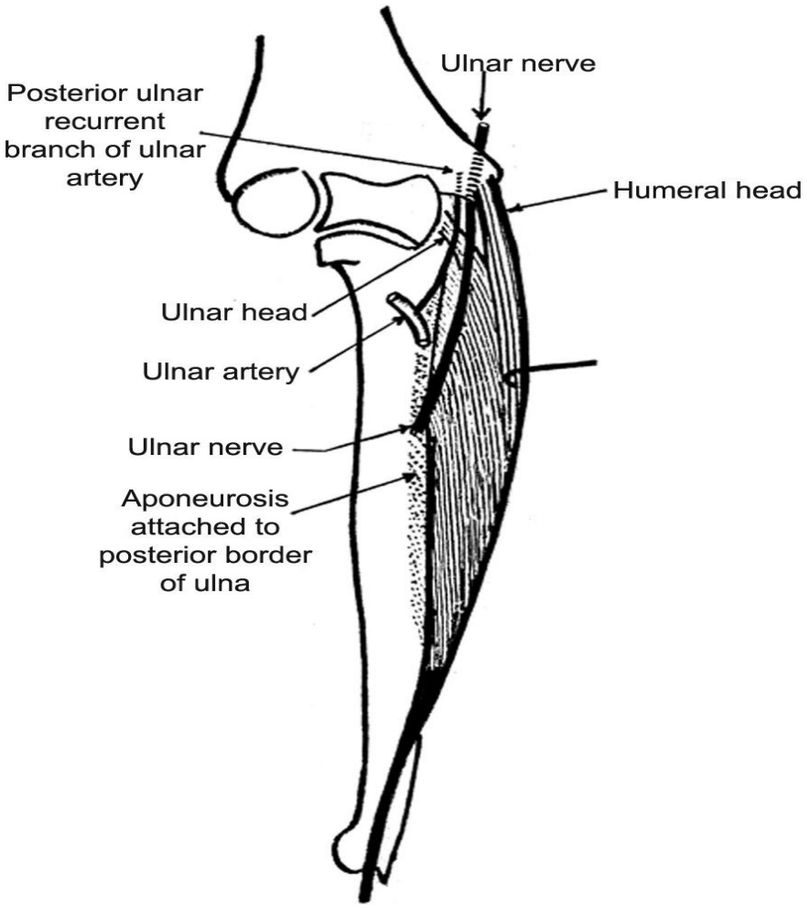
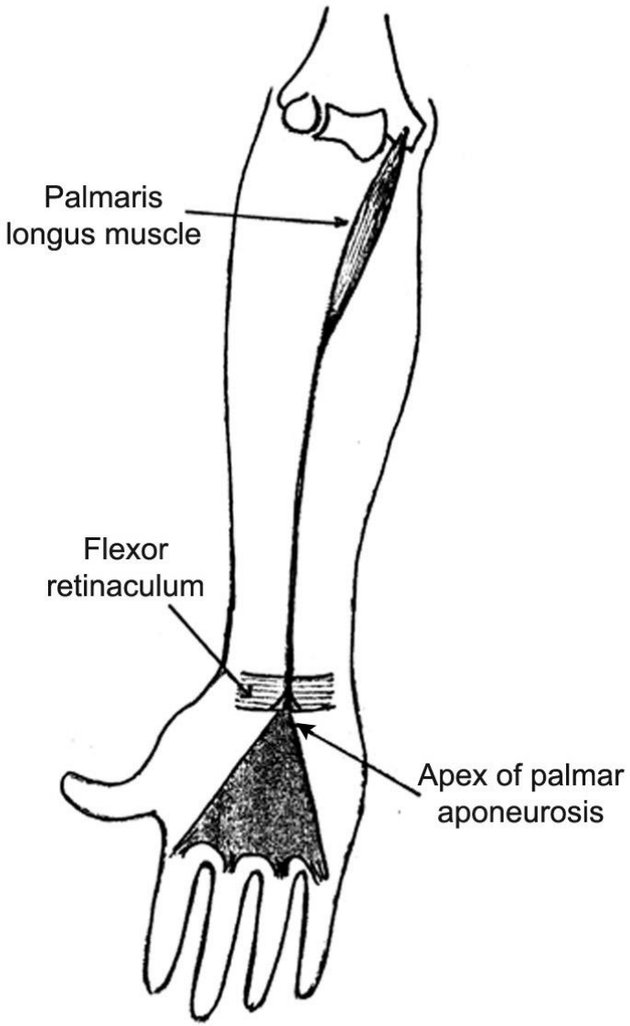
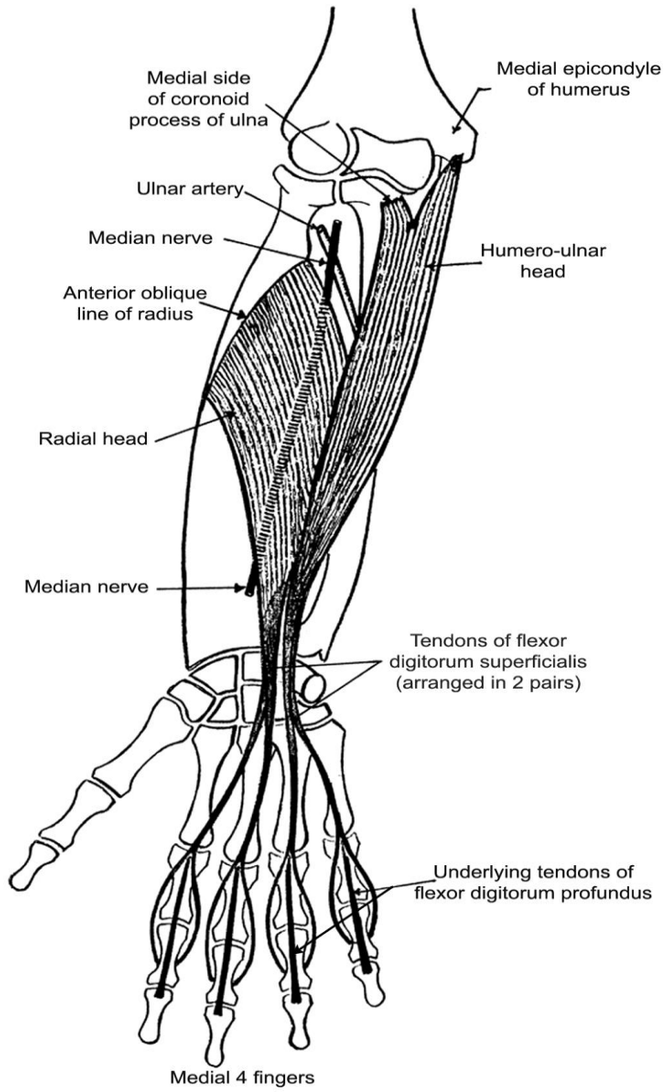




Flexor carpi ulnaris muscle and its relations

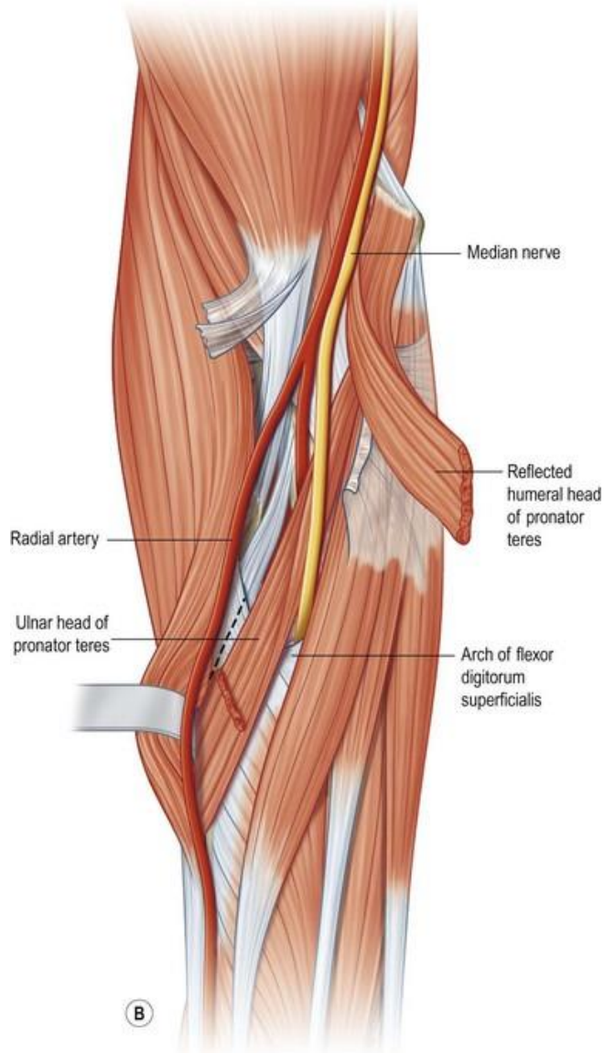


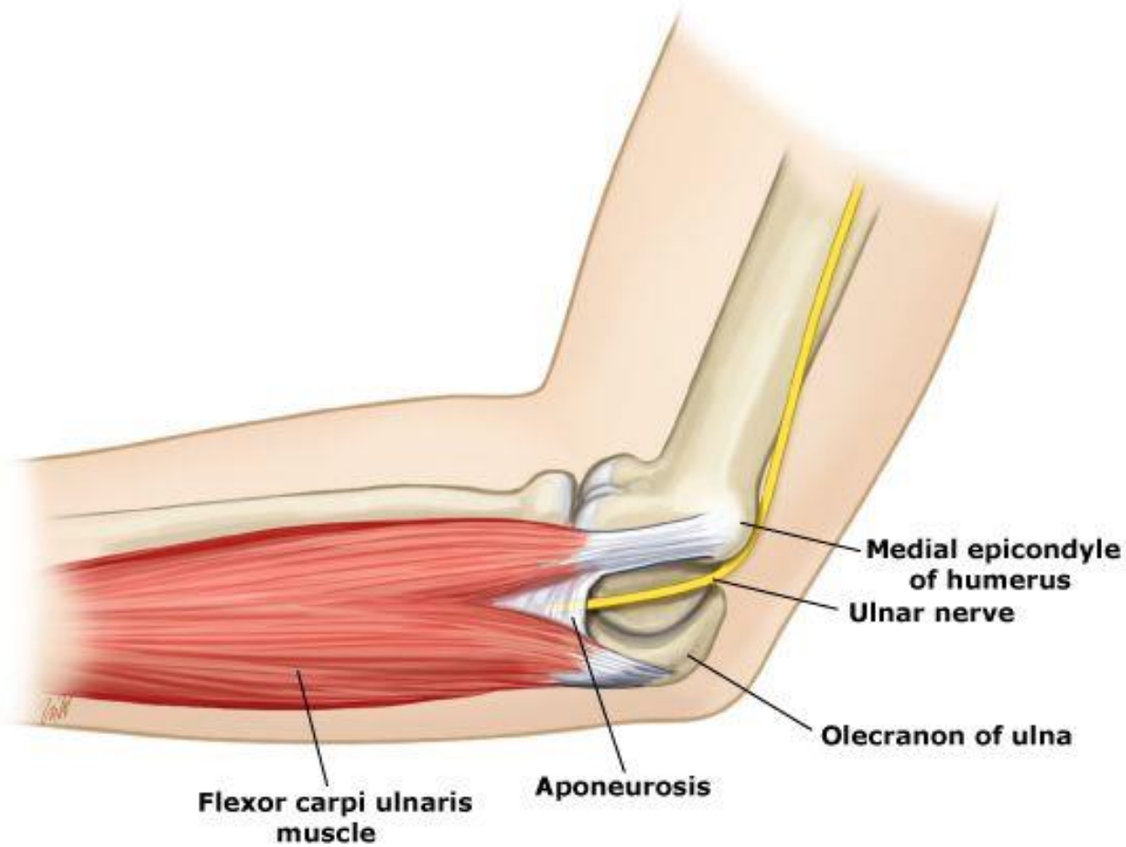
Palmaris longus muscle



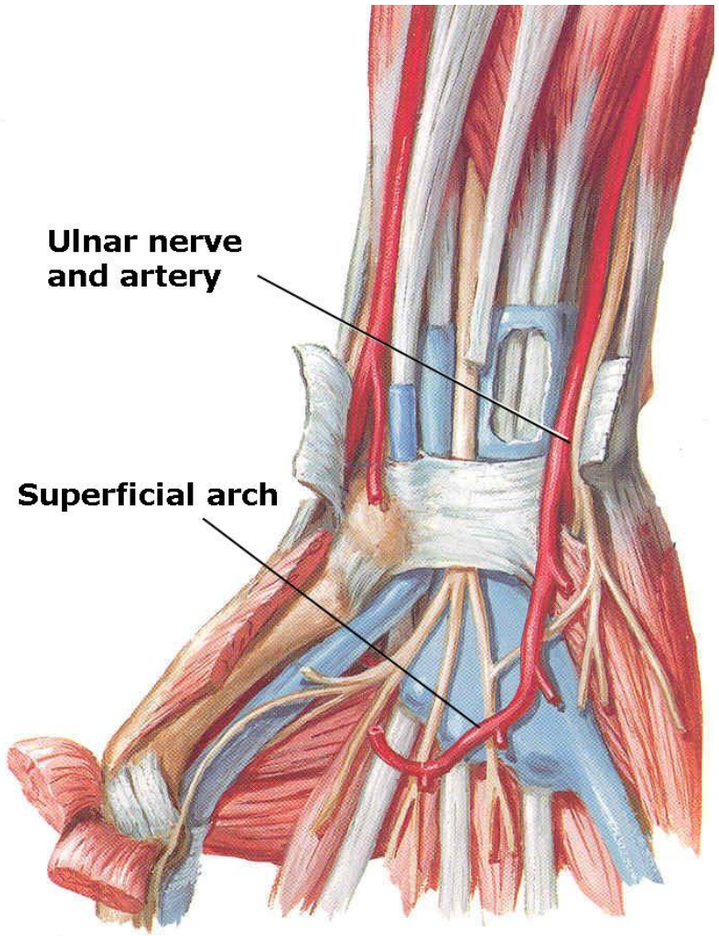
Flexor digitorum superficialis

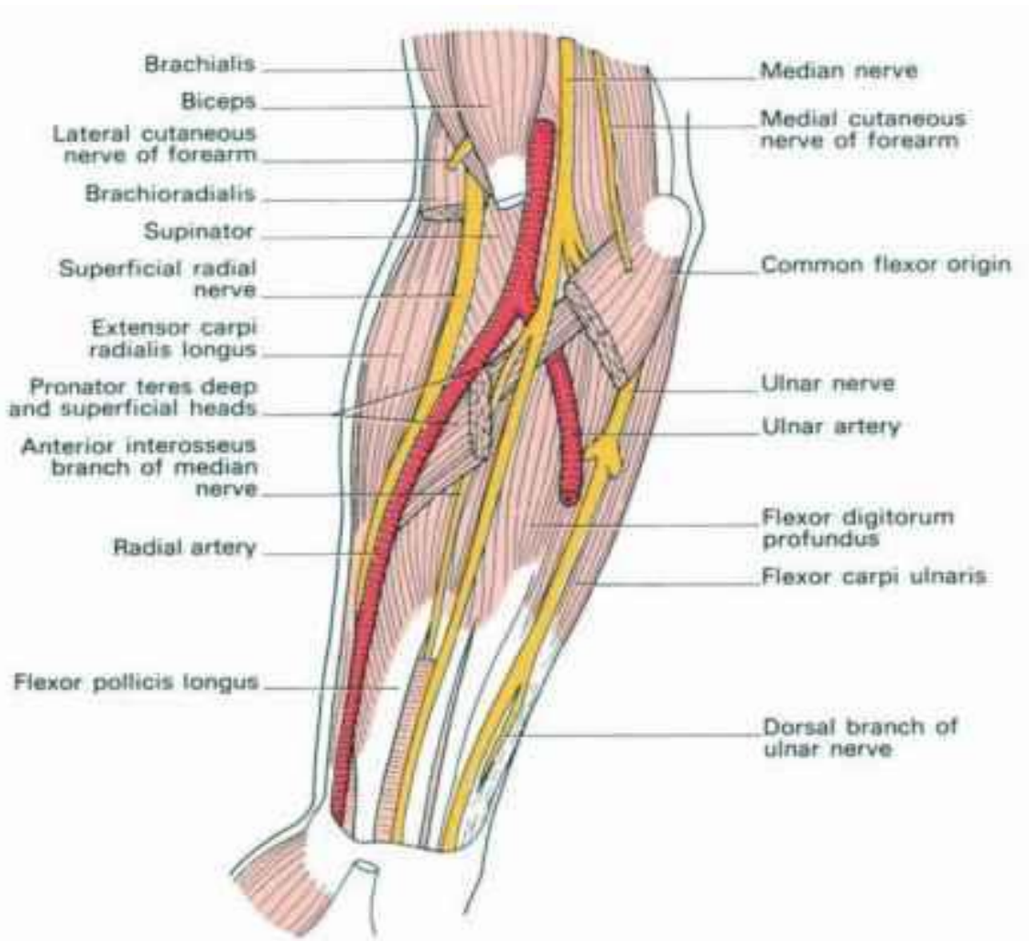
Nerve Supply of Superficial Group of Front of Forearm



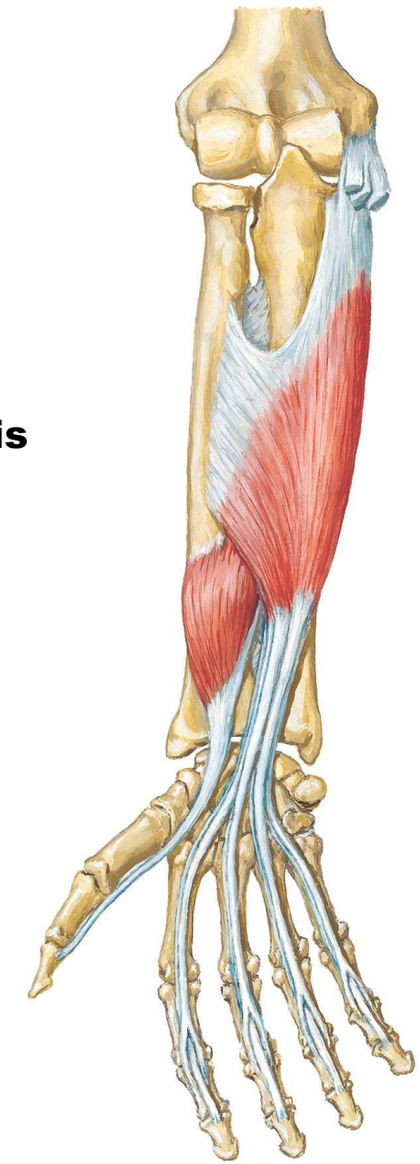


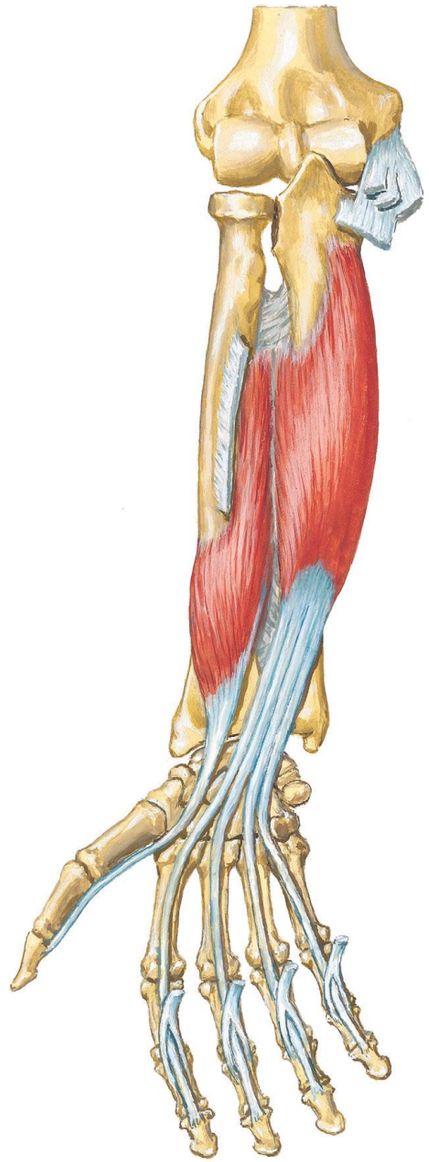
Nerves and Arteries in Front of Forearm





Flexor Digitorum Superficialis



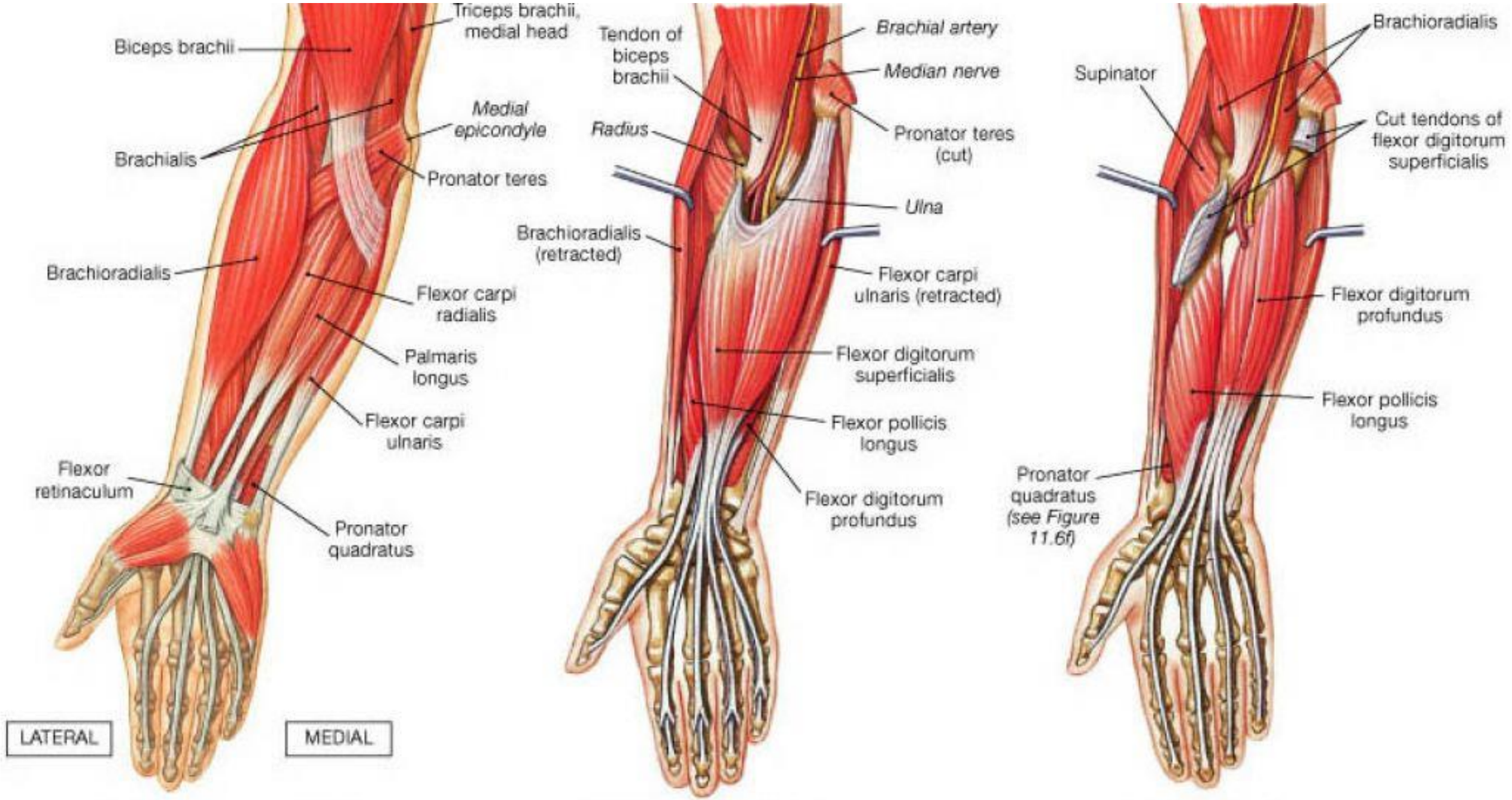


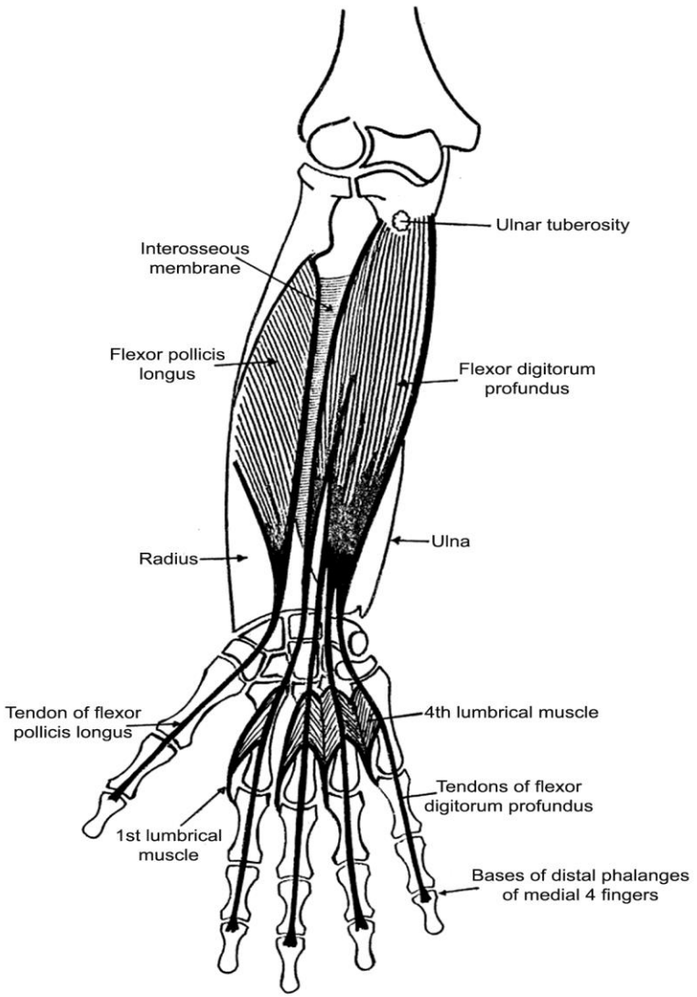
Deep Group of Muscles of Front Of Forearm .

VI) Deep Group of Muscles of Front of Forearm

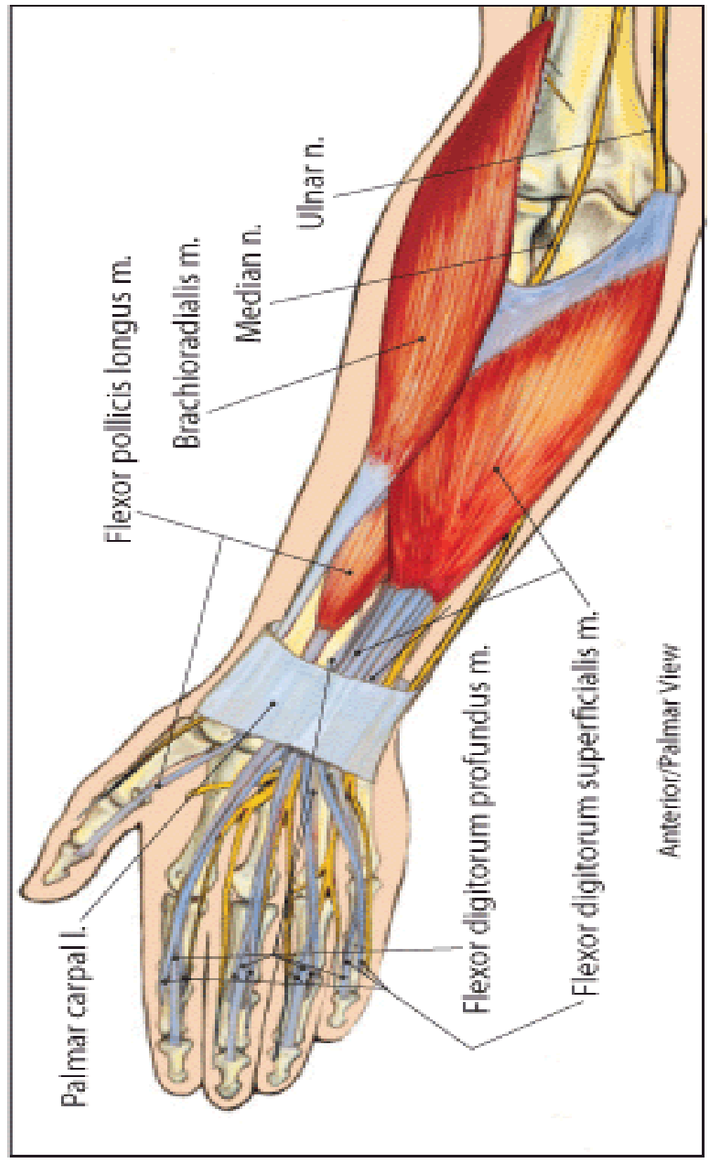
- **Common origin : interosseous membrane and upper 2/3 of corresponding bone (except pronator quadrates)**
- **All muscles are supplied by anterior interosseous nerve (branch of median nerve) except medial 1/2 of Flexor digitorum profundus which is supplied by Ulnar nerve.**
- **Common action : Flexion of wrist and all joints of fingers related(except pronator quadrates) .**

	Origin	Insertion	Action.
1- Flexor digitorum profundus	• **Upper 2/3 of anterior & medial surface of shaft of ulna & interosseous membrane.**	• **By 4 tendons into base of terminal phalanges of medial 4 fingers.**	• **Flexion of wrist & all joints of medial 4 fingers.**
∗ **Relations :** • **Median nerve pass anterior to flexor digitorum profundus and deep to flexor digitorum superficialis .** • **Ulnar nerve and artery pass anterior to medial part of flexor digitorum profundus and deep to flexor carpi ulnaris .** • **Anterior interosseous nerve and artery pass anterior to interosseus membrane between flexor digitorum profundus and flexor pollicis longus.** • **The 4 tendons of flexor digitorum profundus pass in the carpal tunnel deep to the tendons of flexor digitorum superficialis.** • **Each tendon of flexor digitorum profundus gives origin to a lumbaricle muscle .**			
2- Flexor pollices longus.	• **Upper 2/3 of anterior surface of shaft of radius & interosseous membrane .**	• **Its tendon pass deep to flexor retinaculum the curves lateral , medial to muscles of thenar muscles .** • **Base of terminal phalanx of thumb.**	• **Flexion of wrist & all joints of thumb.**
3- Pronator quadratus.	• **Lower 1/4 of front of ulna**	• **Lower 1/4 of front of radius**	• **Pronation at radioulnar joints .** • **Bind radius to ulna .**

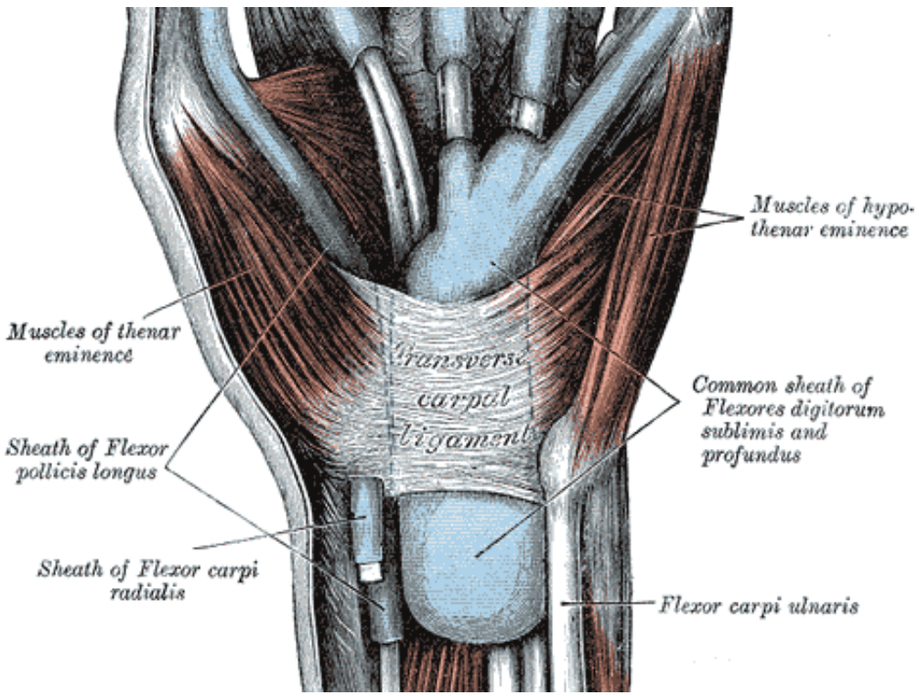

Biceps brachii
Triceps brachii, medial head
Medial epicondyle
Brachialis
Pronator teres
Brachioradialis
Flexor carpi radialis
Palmaris longus
Flexor carpi ulnaris
Flexor retinaculum
Pronator quadratus
LATERAL
MEDIAL
(a) Anterior view, superficial
Tendon of biceps brachii
Brachial artery
Median nerve
Radius
Pronator teres (cut)
Ulna
Brachioradialis (retracted)
Flexor carpi ulnaris (retracted)
Flexor digitorum superficialis
Flexor pollicis longus
Flexor digitorum profundus
(b) Anterior view, middle
Supinator
Brachioradialis
Cut tendons of flexor digitorum superficialis
Flexor digitorum profundus
Flexor pollicis longus
Pronator quadratus (see Figure 11.6f)
(c) Anterior view, deep

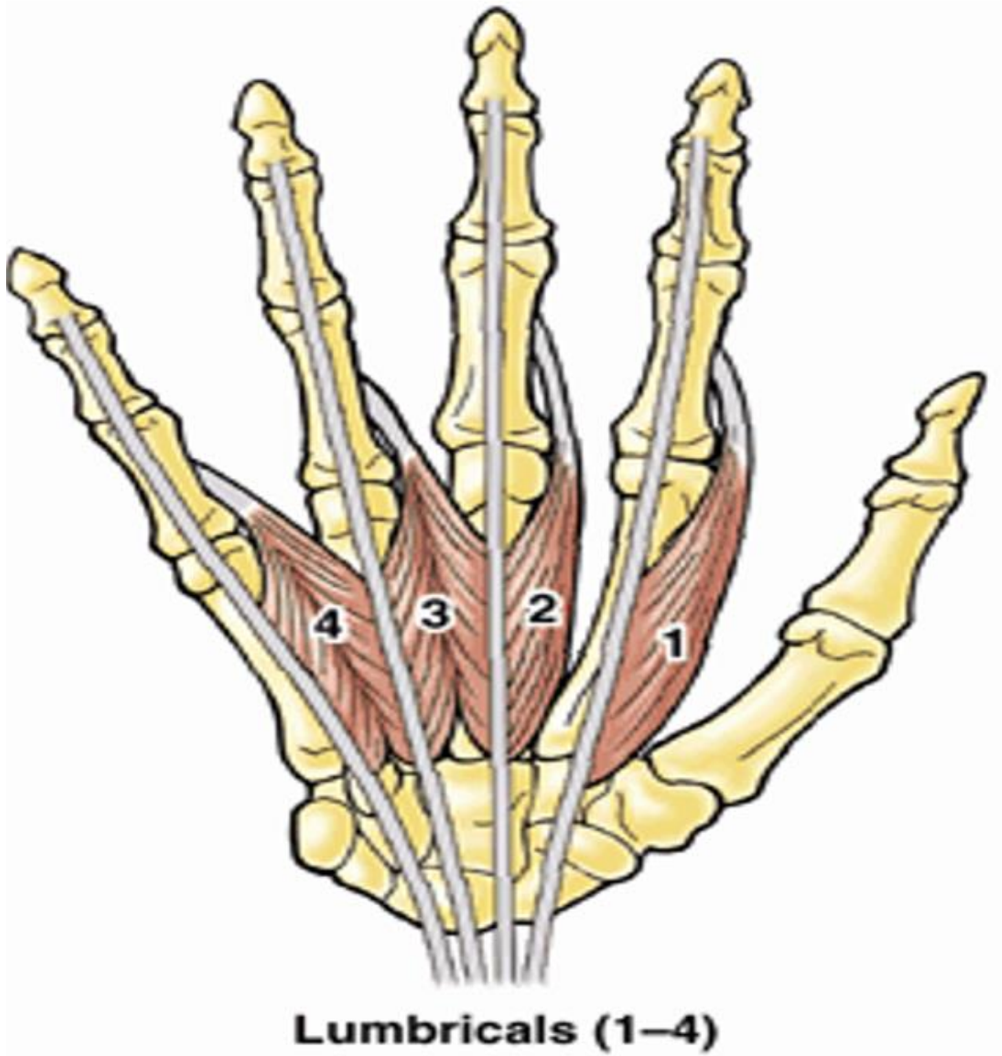


Deep group of muscles of front of forearm (deep flexors)



Tendons of Flexor Digitorum Profundus and Flexor Pollicis Lonus in the Hand

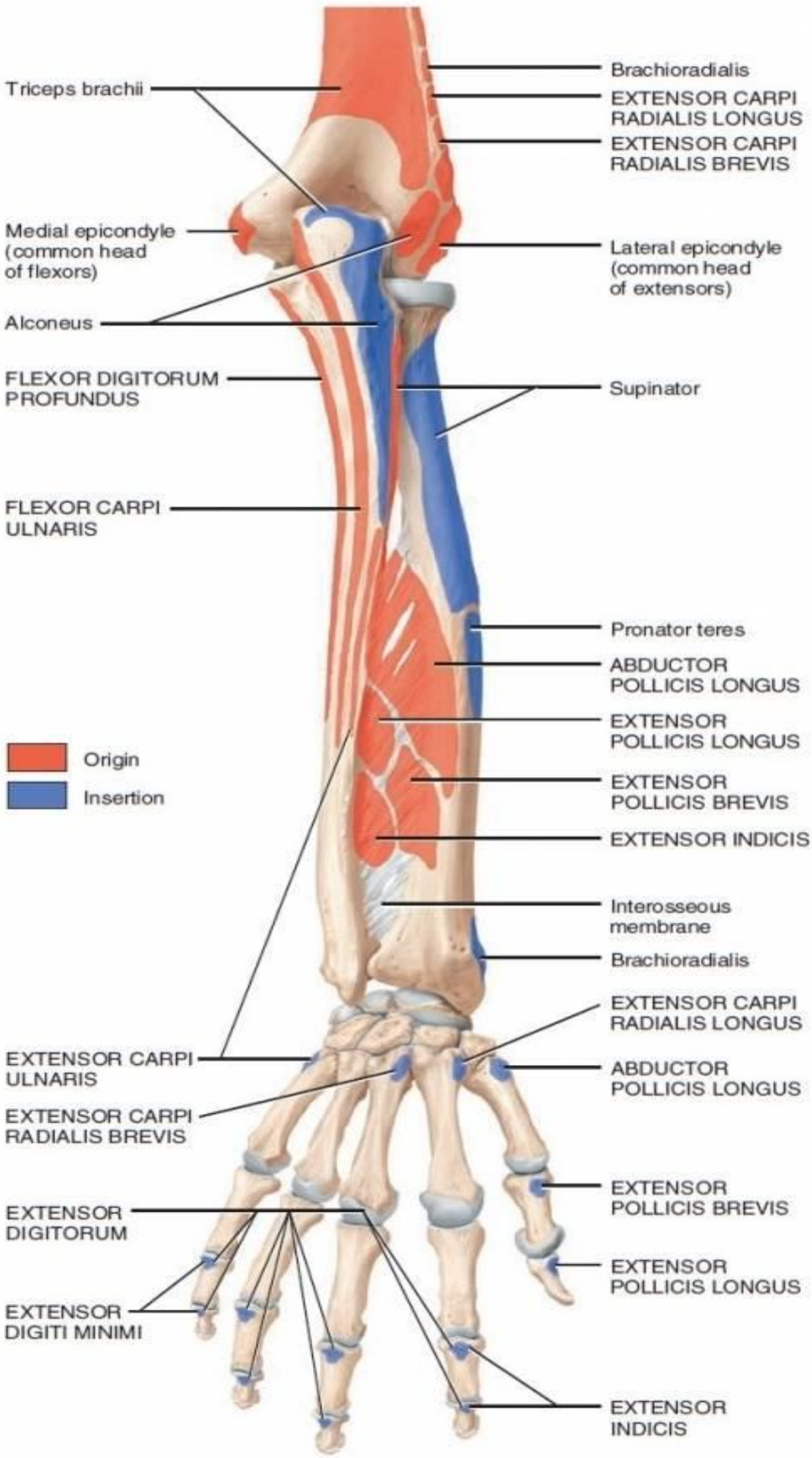


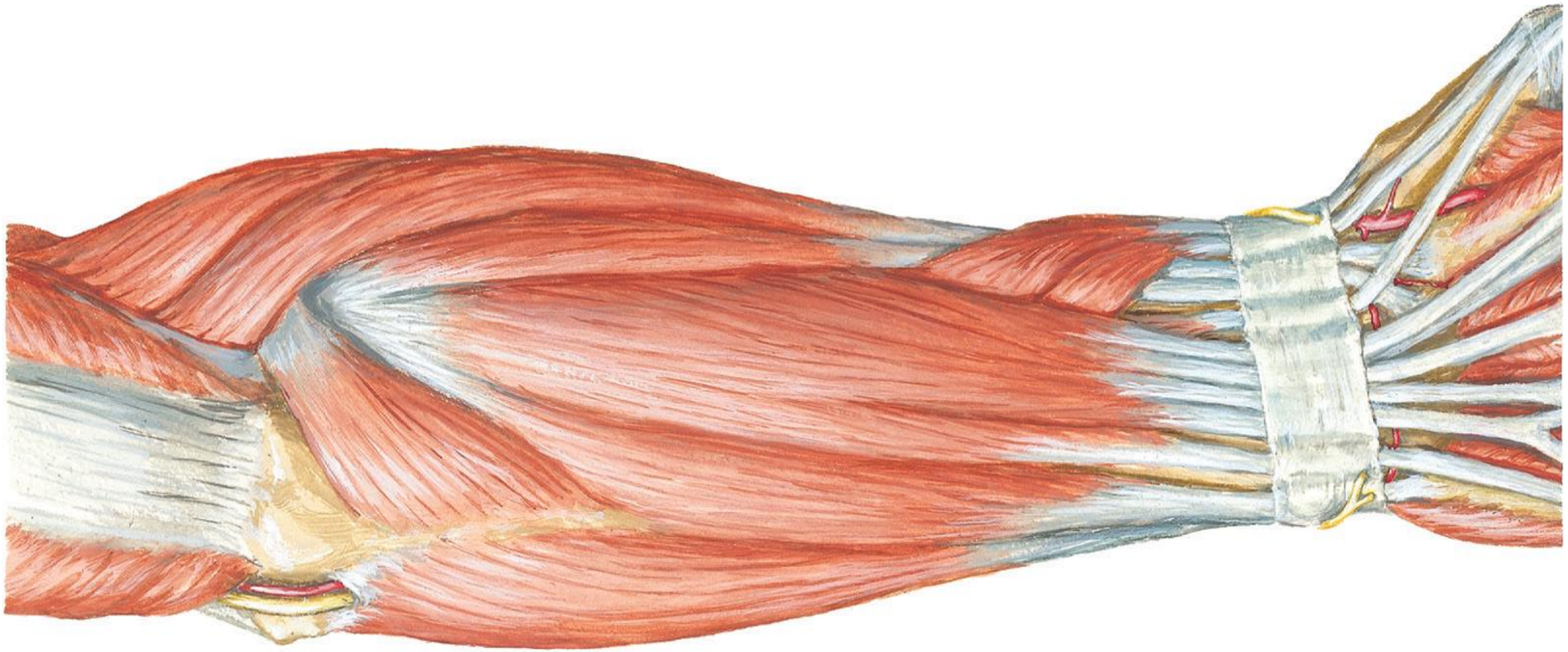


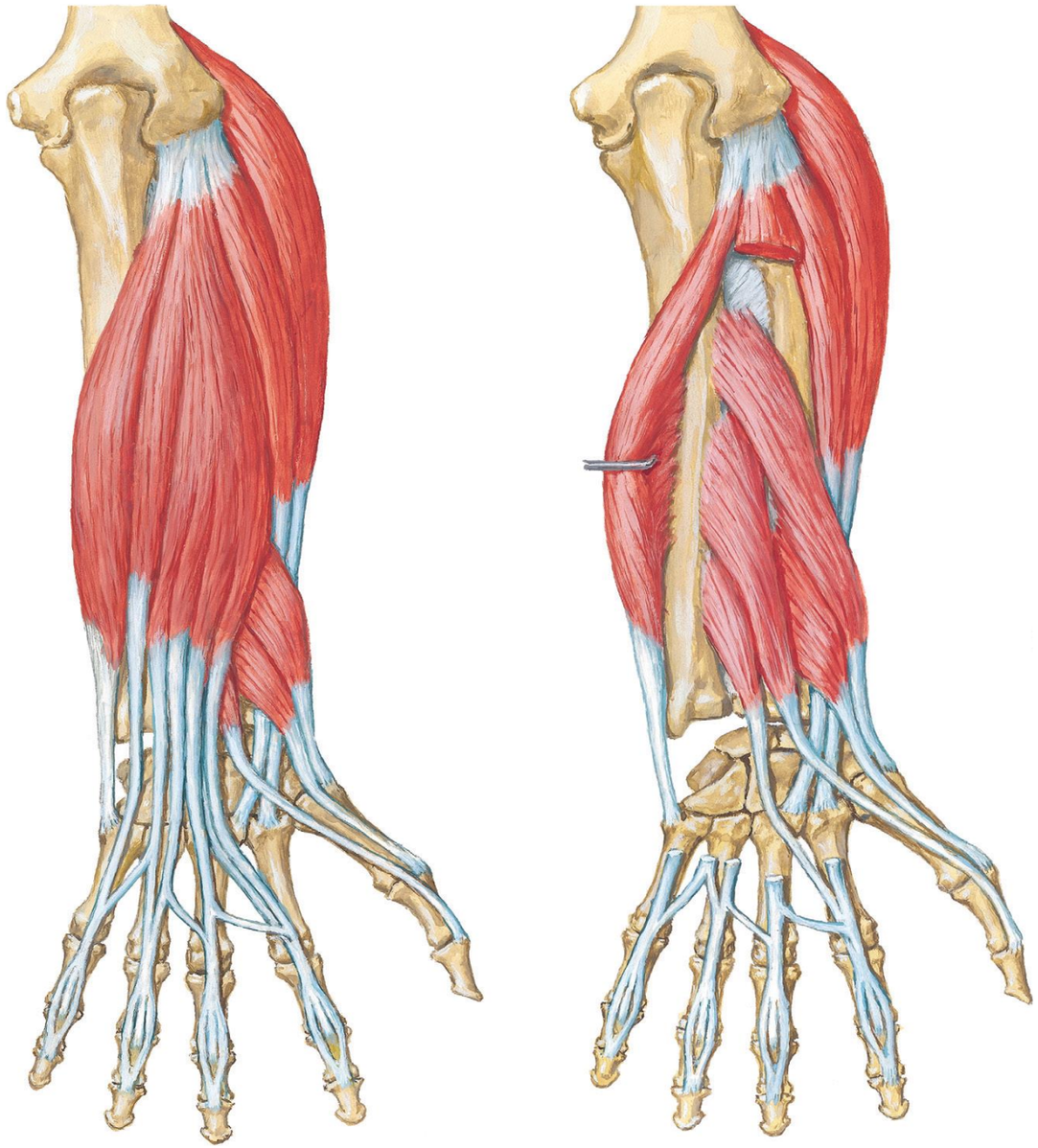
VII) Superficial Group of Muscles of Back of Forearm

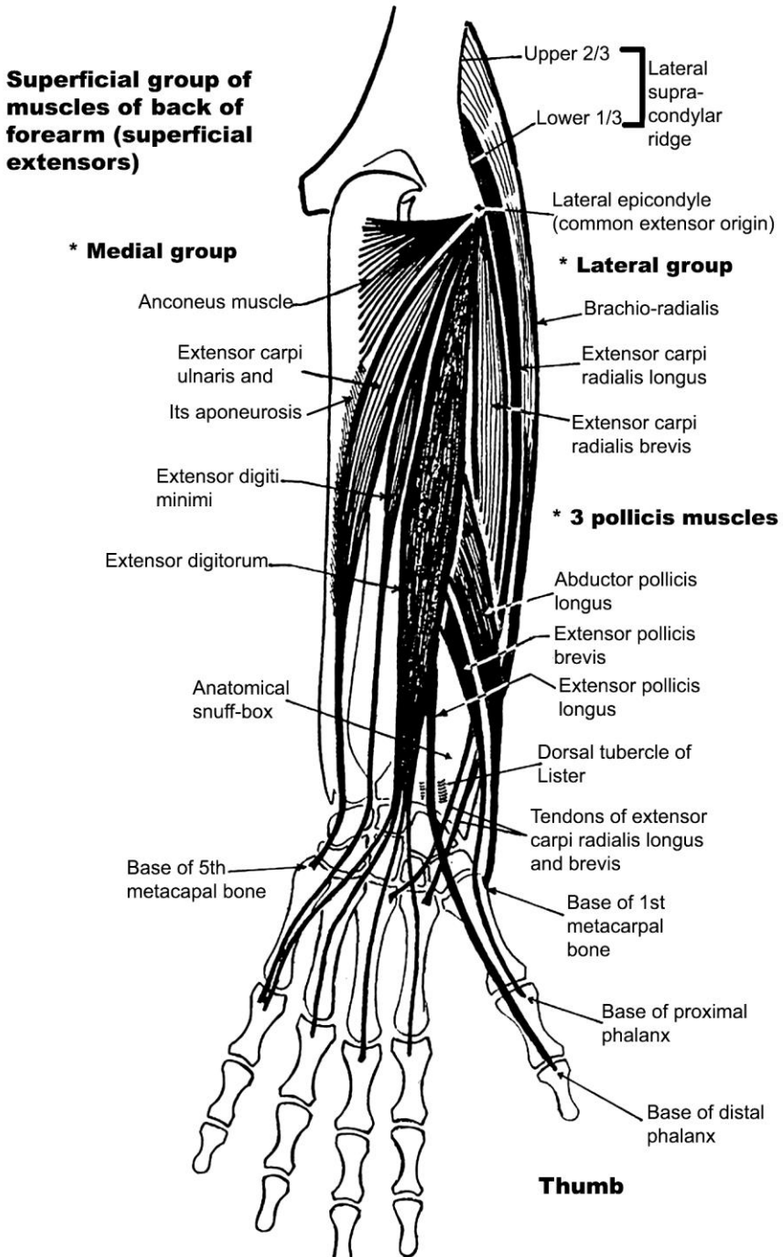
- **Most of these muscles arises from the front of lateral epicondyle of the humerus i.e. common extensor origin (C.E.O) except muscles number 1,2,7.**
- **All these muscles are supplied by posterior interosseous nerve (a branch of radial nerve) except muscles number 1,2&7 which are supplied by radial nerve.**
- **Common action : Extension of wrist (except muscles number 1 & 7)**
- **Extensor carpi radialis longus & brevis and extensor carpi ulnaris are the main extensor of wrist .**
- **These muscles are arranged from lateral to medial as follows:**

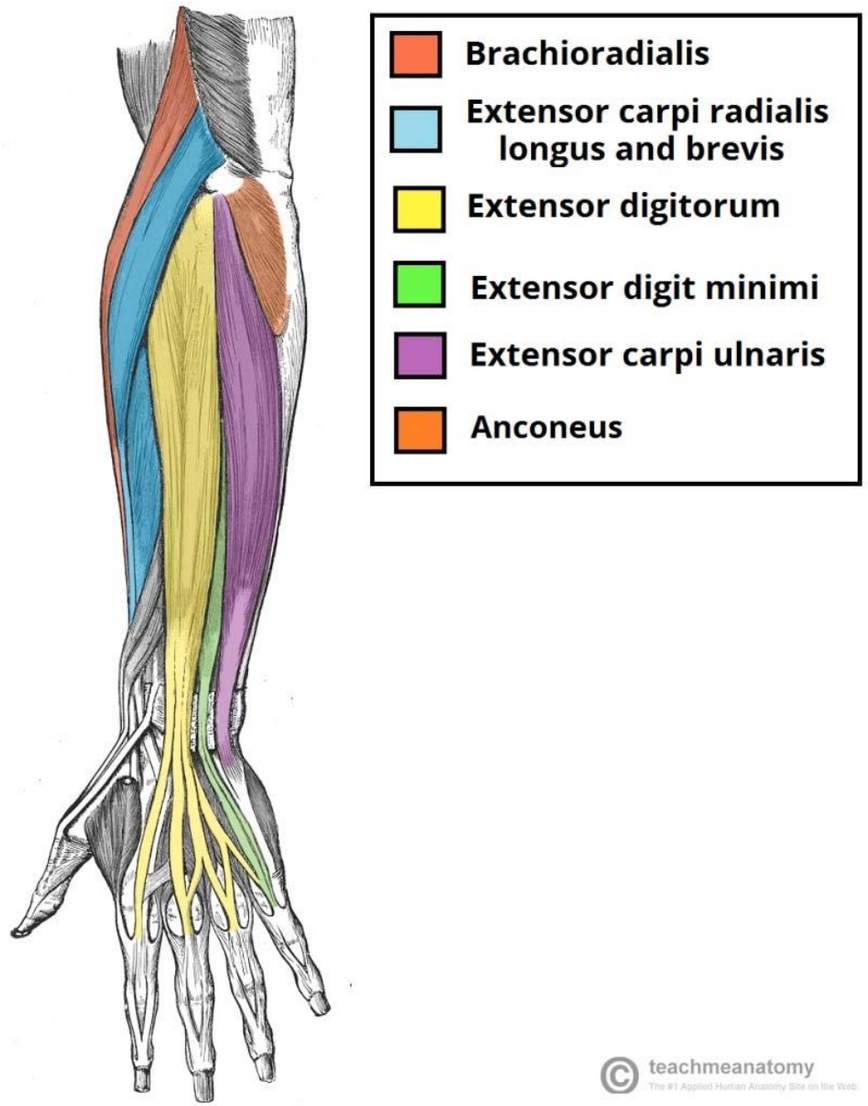
Muscle	Origin	Insertion	Action
1- Brachioradiaslis.	• Upper 2/3 of lateral supracondylar ridge	• Lateral surface of radius above the styloid process .	• Put forearm in midprone position . • Flexion of elbow in the midprone position.
• In the arm it overlap radial nerve and in the forearm it overlap superficial radial nerve & radial artery .			
2- Extensor carpi radiaslis longus	• Lower 1/3 of lateral supracondylar ridge	• Dorsal surface of base of 2 nd. metacarpal bone	• Common action +radial deviation (abduction) of wrist.
3- Extensor carpi radialis brevis.	• C.E.O.	• Dorsal surface of base of 3 rd. metacarpal bone	• As muscle number 2.
4- Extensor digitorum.	• C.E.O.	• By 4 tendons join extensor expansion which attached to base of middle & distal phalanges of medial 4 fingers.	• Common action + extension of metacarpo-phalangeal and interphalangeal joints of medial 4 fingers .
5- Extensor digiti minimi.	• C.E.O.	• Join extensor expension of little finger which attached to base of middle & distal phalanges of little finger .	• Common action + Extensor of metacarpo-phalangeal and and interphalangeal joints of little finger.
6. Extensor carpi ulnaris.	• C.E.O.	• Base of 5 th. matacarpal bone	• Common action + ulnar deviation (adduction) of the wrist.
7. Anconeus	• It arises Separately from lateral epicondyle .	• Lateral aspect of back of olecranon	• Assists triceps in extension of elbow .


Triceps brachii
Medial epicondyle (common head of flexors)
Alconeus
FLEXOR DIGITORUM PROFUNDUS
FLEXOR CARPI ULNARIS
EXTENSOR CARPI ULNARIS
EXTENSOR CARPI RADIALIS BREVIS
EXTENSOR DIGITORUM
EXTENSOR DIGITI MINIMI
Origin
Insertion
Brachioradialis
EXTENSOR CARPI RADIALIS LONGUS
EXTENSOR CARPI RADIALIS BREVIS
Lateral epicondyle (common head of extensors)
Supinator
Pronator teres
ABDUCTOR POLLICIS LONGUS
EXTENSOR POLLICIS LONGUS
EXTENSOR POLLICIS BREVIS
EXTENSOR INDICIS
Interosseous membrane
Brachioradialis
EXTENSOR CARPI RADIALIS LONGUS
ABDUCTOR POLLICIS LONGUS
EXTENSOR POLLICIS BREVIS
EXTENSOR POLLICIS LONGUS
EXTENSOR INDICIS






Superficial group of muscles of back of forearm (superficial extensors)
* Medial group
Anconeus muscle
Extensor carpi ulnaris and
Its aponeurosis
Extensor digiti minimi
Extensor digitorum
Anatomical snuff-box
Base of 5th metacapal bone
Upper 2/3
Lower 1/3
Lateral supra-condylar ridge
Lateral epicondyle (common extensor origin)
* Lateral group
Brachio-radialis
Extensor carpi radialis longus
Extensor carpi radialis brevis
* 3 pollicis muscles
Abductor pollicis longus
Extensor pollicis brevis
Extensor pollicis longus
Dorsal tubercle of Lister
Tendons of extensor carpi radialis longus and brevis
Base of 1st metacarpal bone
Base of proximal phalanx
Base of distal phalanx
Thumb


Brachioradialis
Extensor carpi radialis longus and brevis
Extensor digitorum
Extensor digit minimi
Extensor carpi ulnaris
Anconeus
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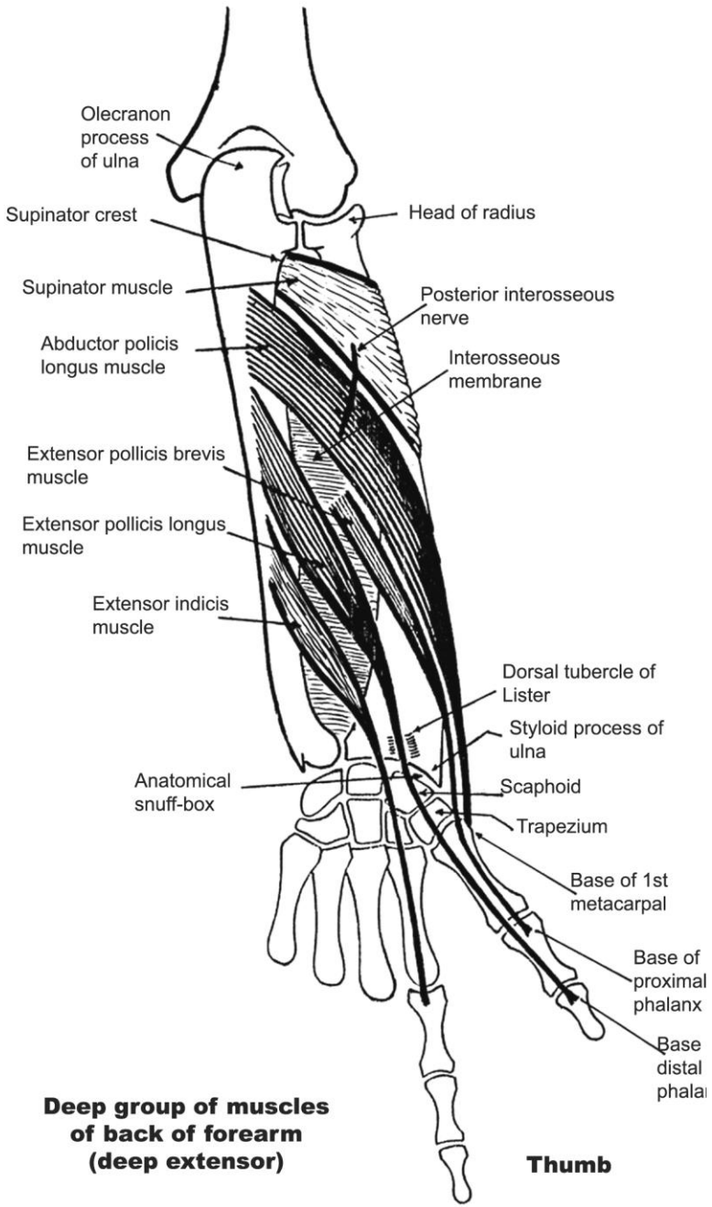
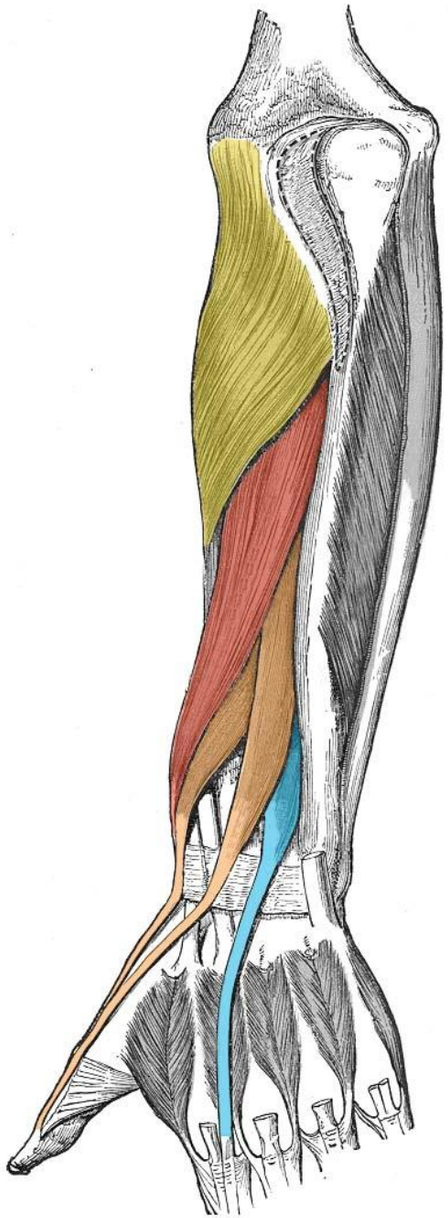
VIII) Deep Group of Muscles of Back of Forearm

- **All these muscles are supplied by posterior interosseous nerve (branch of radial nerve) .**
- **All arises from back of interosseous membrane and back of shaft of radius or back of shaft of ulna (except supinator) .**
- **These muscles are arranged from above downwards as follows :**

Muscles	Origin	Insertion	Action.
1- Supinator	• **Superficial part : from lateral epicondyle and radial collateral ligament of elbow joint.** • **Deep part : from supinator fossa & supinator crest of ulna.**	• **Anterior, lateral & posterior surface of upper 1/3 of radius above anterior and posterior oblique lines of radius and above insertion of pronator teres .**	• **supination of forearm at radio-ulnar joints.**
∗ **Relations : The posterior interosseous nerve pierce the muscle in the floor of cubital fossa , winds inside the muscle around the radius inside the muscle & dividing the muscle into superficial and deep parts , then appears in the back of forearm just above the lower border of the muscle .**			
2- Abductor pollices longus	• **Posterior surface of radius , ulna & interosseous membrane.**	• **Its tendon accompanies the tendon of muscle number 3 to insert into base of 1st . metacarpal bone.**	• **Abduction of carpo-metacarpal joint of thumb .**
3- Extensor pollices brevis	• **Posterior surface of radius & interosseous membrane.**	• **Base of proximal phalanx of thumb.**	• **Extension of proximal phalanx of thumb.**
4- Extensor pollices longus	• **Posterior surface of ulna & interossous membramne.**	• **Base of terminal phalanx of thumb.**	• **Extension of all joints of thumb.**
5- Extensor indicis	• **Posterior surface of ulna & interosseous membrane..**	• **Joint extensor expansion of index finger.**	• **Extension of all joints of index finger.**





- Supinator
- Abductor pollicis longus
- Extensor pollicis longus and brevis
- Extensor indicis

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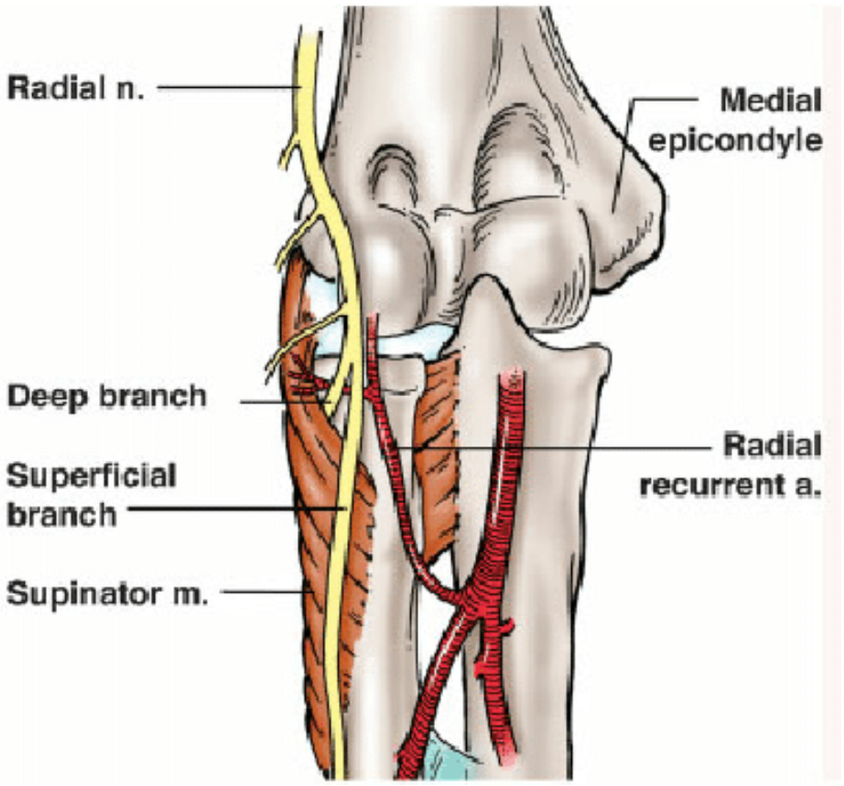
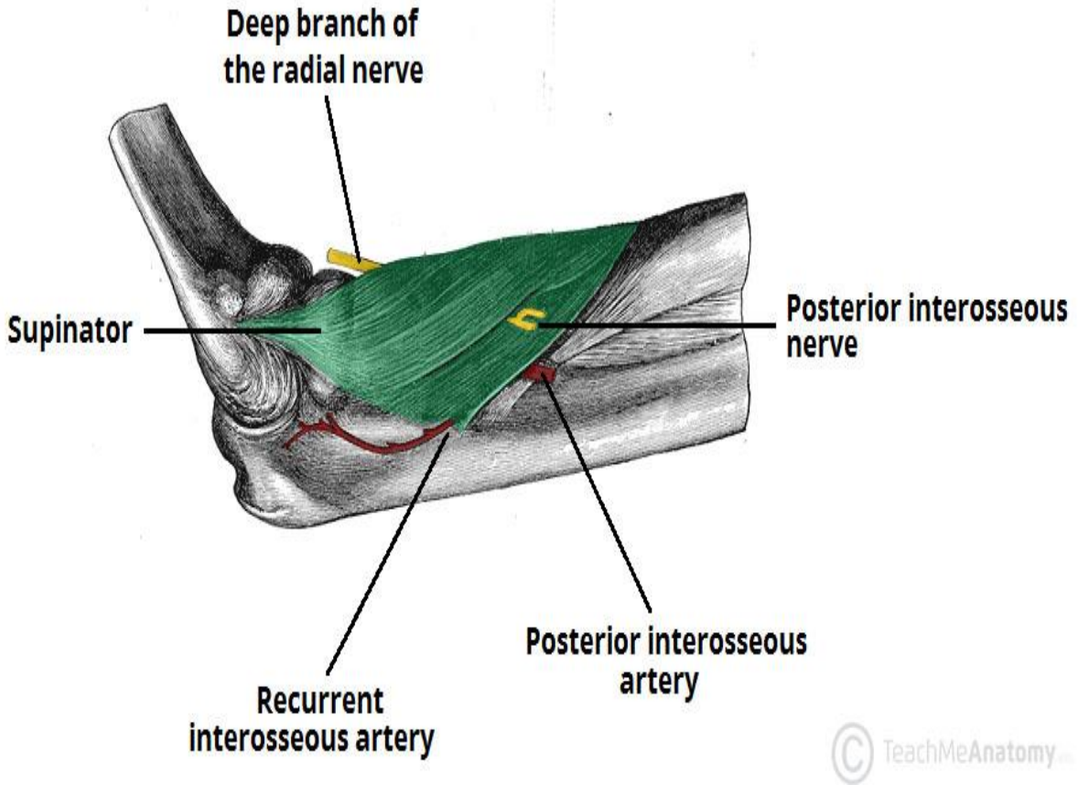
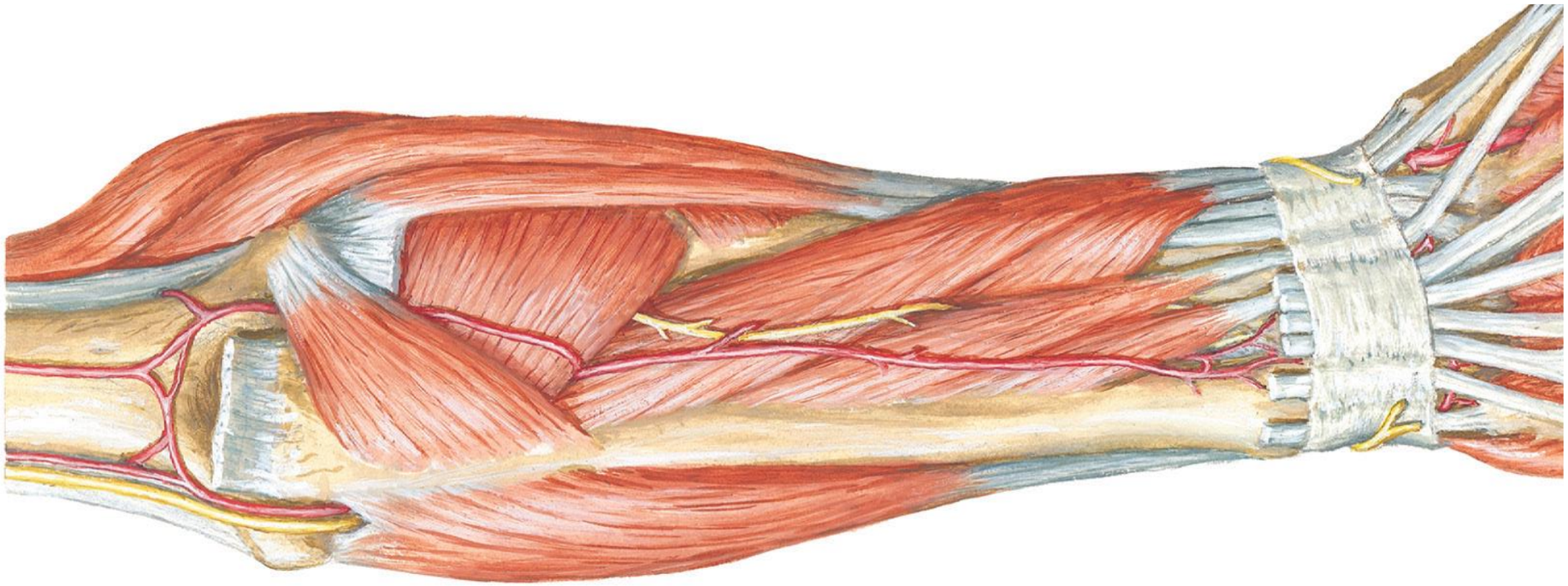
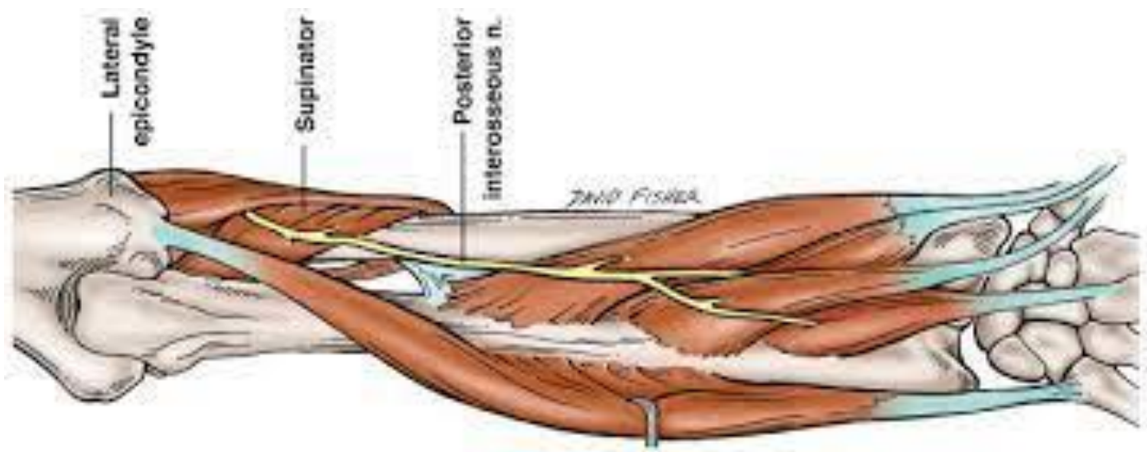
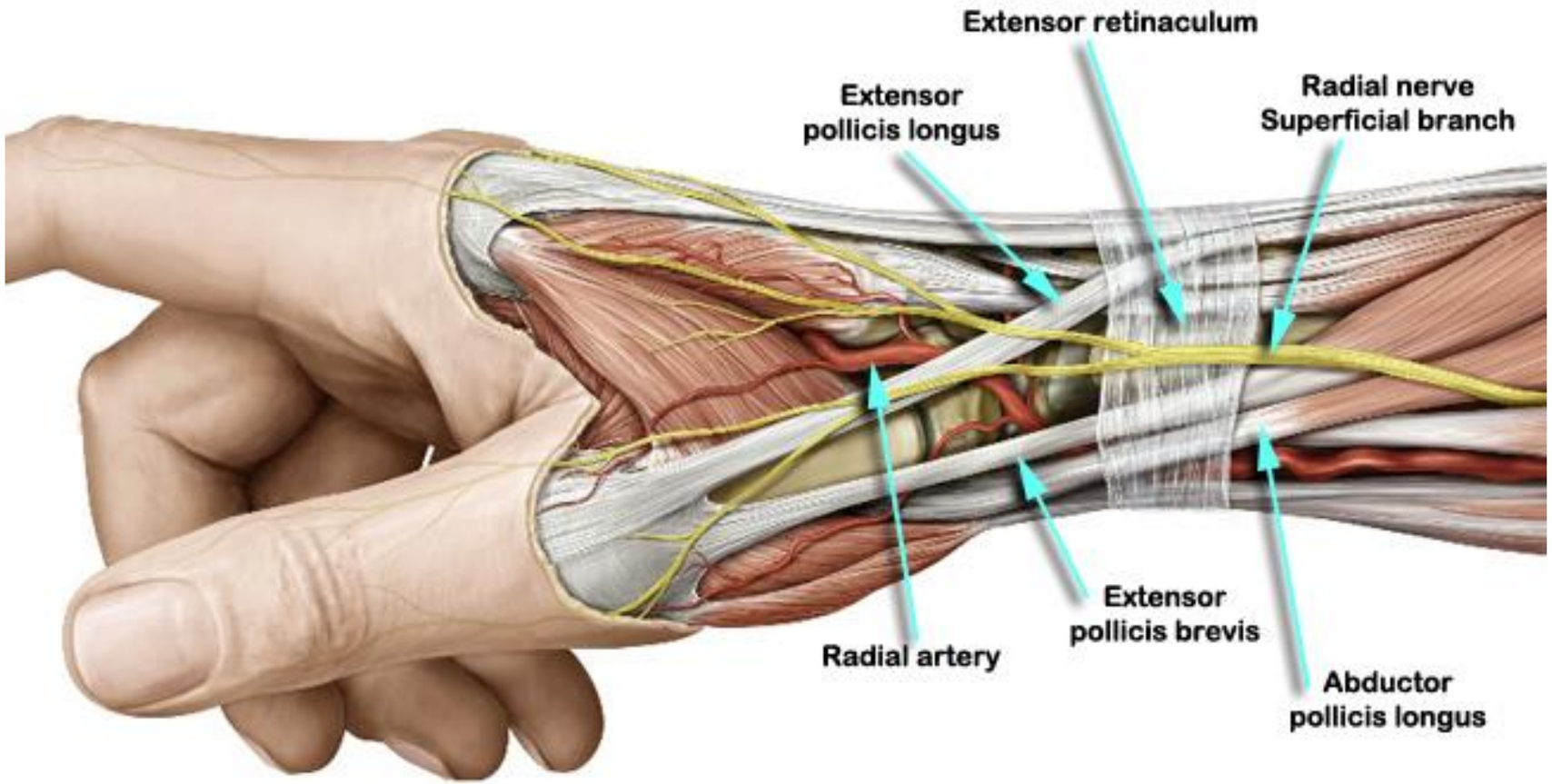
Supinator & Posterior interosseous nerve



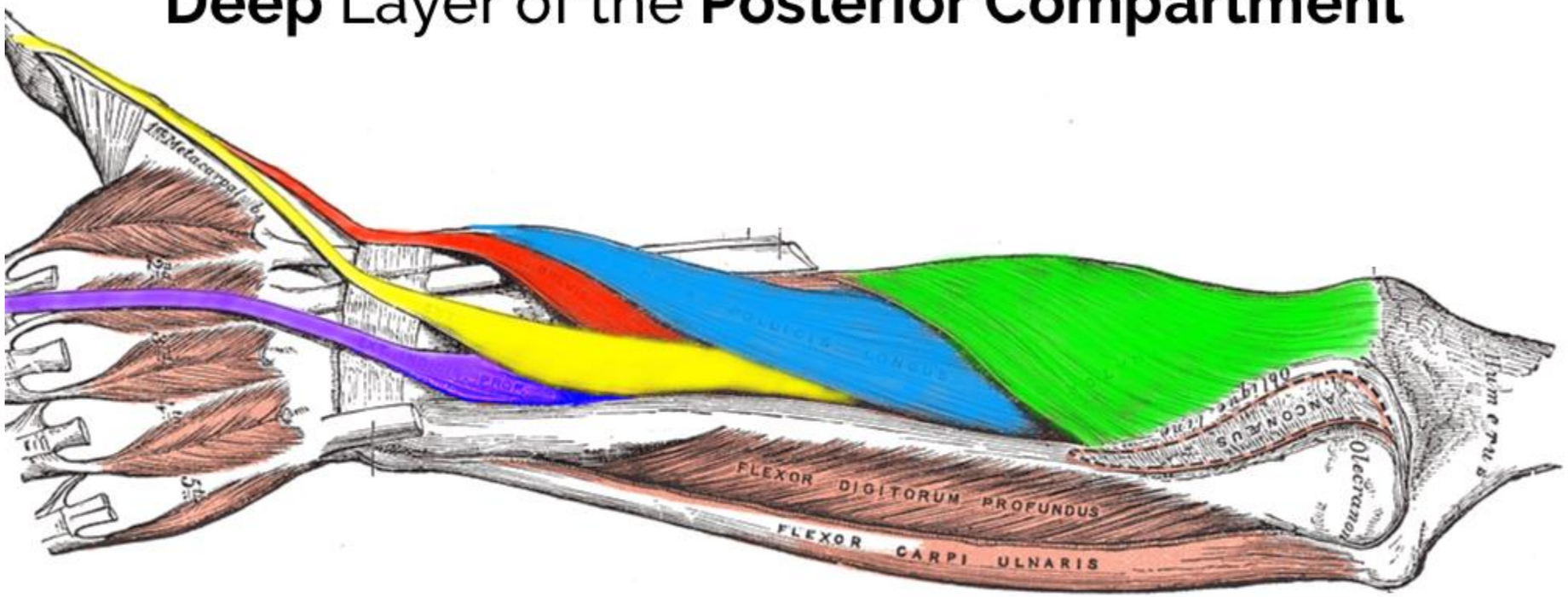





Lateral epicondyle
Supinator
Posterior interosseous n.
JAMES FISHER


Extensor retinaculum
Extensor pollicis longus
Radial nerve Superficial branch
Radial artery
Extensor pollicis brevis
Abductor pollicis longus

Deep Layer of the **Posterior Compartment**



- Supinator
- Extensor pollicis brevis
- Extensor indicis
- Abductor pollicis longus
- Extensor pollicis longus

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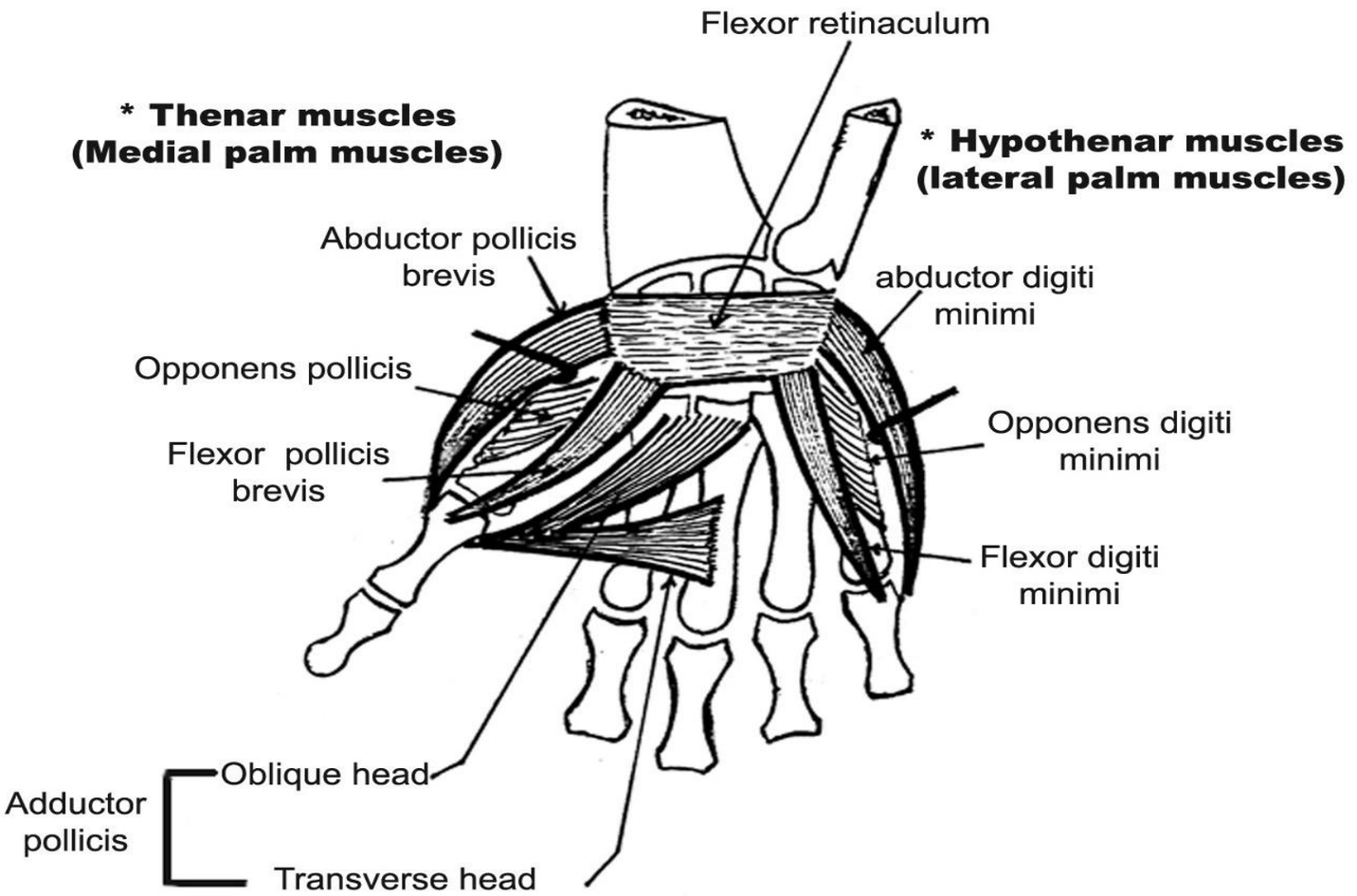
Muscles of the Hand

I) Lateral Muscles of the Palm

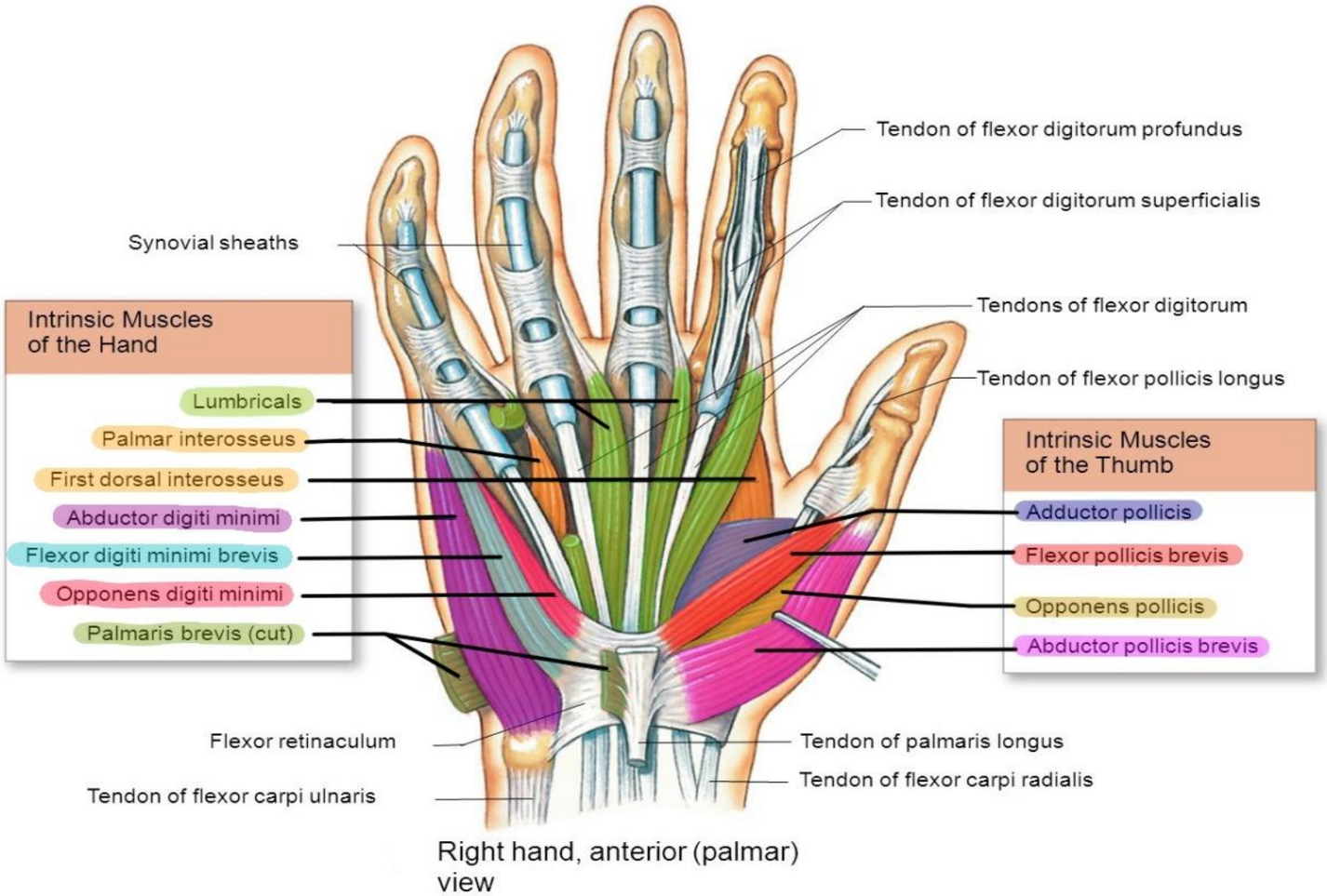
- **These muscles include muscles of thenar eminence (Abductor pollices brevis , Flexor pollices brevis & Opponens polices) and adductor pollices .**
- **Common origin of thenar muscles are lateral part of flexor retinaculum, scaphoid & trapezium.**
- **All these muscles are inserted in proximal plalanx of thumb except opponens pollices .**
- **All are supplied by median nerve except adductor pollices which is supplied by ulnar nerve .**

Muscle	Origin	Insertion	Action.
1- Abductor pollices brevis (Superficial & lateral)	• **Common origin**	• **Common insertion**	• **Abduction of carpo-metacarpal joint of the thumb.**
2- Flexor pollices brevis (Superficial & medial)	• **Common origin**	• **Common insertion**	• **Flexion of carpo-metacarpal & metacarpo-phalangeal joint of the thumb.**
3- Opponens pollices (deep to No. 1 & 2)	• **Common origin**	• **1 st. metacarpal bone.**	• **Opposition of of the thumb against other finger at the carpo-metacarpal joint of the thumb.**
4- Adductor pollices. (Medial to muscles of thenar eminence)	• **It has 2 heads:** **a)Transverse head: from front of shaft of 3rd . metacarpal bone.** **b)Oblique head: from base of 2nd. & 3 rd. metacarpal bone.**	• **Common insertion**	• **Adduction of thumb at the carpo-metacarpal joint .**

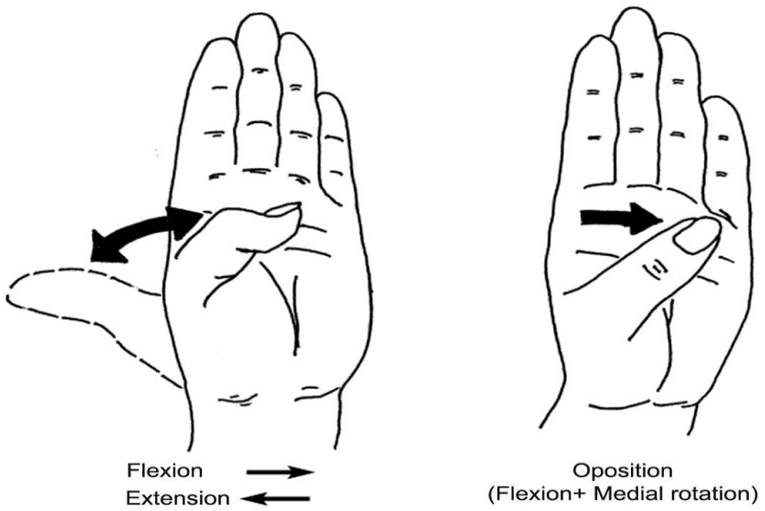


MUSCLES OF THE HAND

Intrinsic Muscles of the Hand

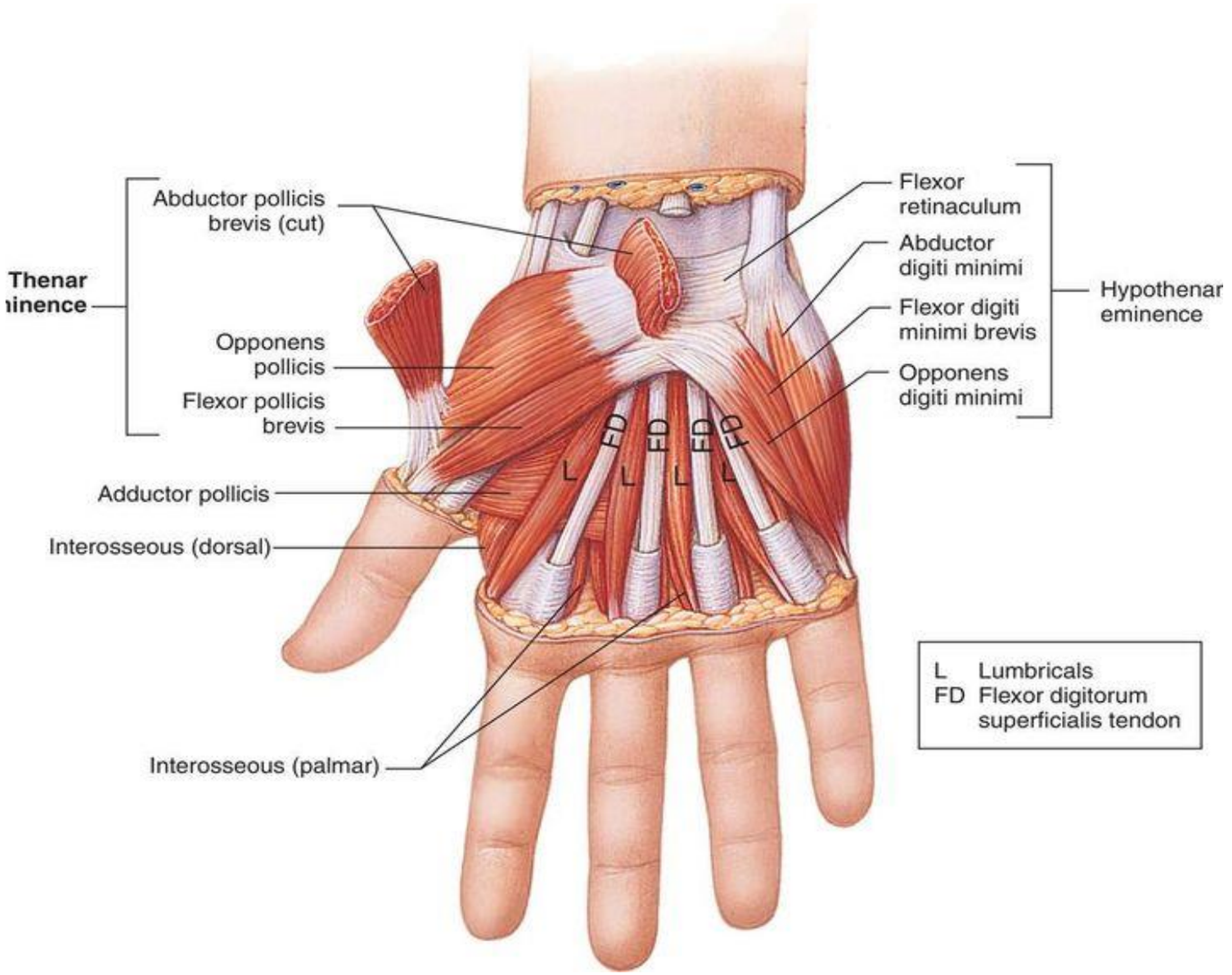


Right hand, anterior (palmar) view



MOVEMENTS OF THUMB

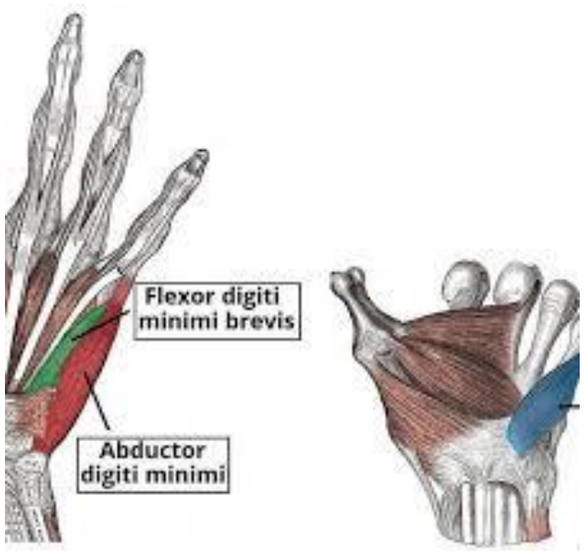

Thenar Muscles of the Hand
Flexor pollicis brevis
Abductor pollicis brevis
Opponens pollicis

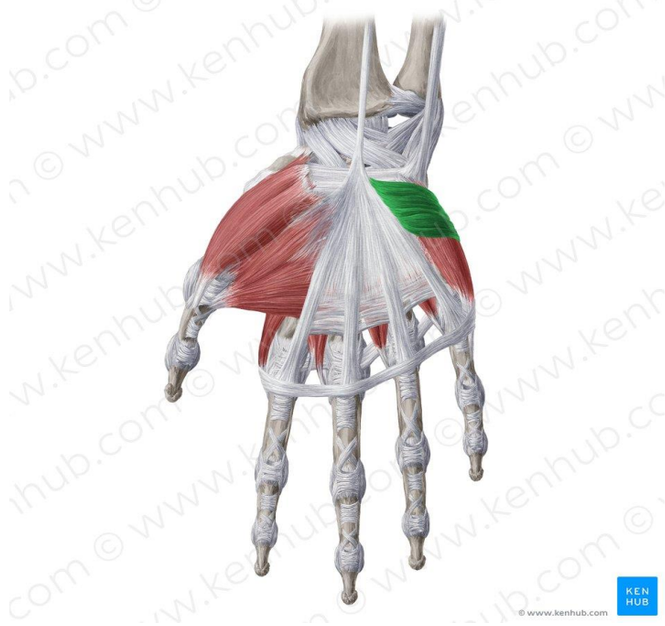

Thenar eminence
Abductor pollicis brevis (cut)
Opponens pollicis
Flexor pollicis brevis
Adductor pollicis
Interosseous (dorsal)
Interosseous (palmar)
Flexor retinaculum
Abductor digiti minimi
Flexor digiti minimi brevis
Opponens digiti minimi
Hypothenar eminence
L
FD
L Lumbricals
FD Flexor digitorum superficialis tendon

II) Medial Muscles of the palm

- **Common origin: Medial part of flexor retiaculum & pisiform bone & hook of hamate.**
- **All are muscles of little fingers .**
- **Common insertion : all inserted in the medial side of the base of proximal phalanx of little finger (except opponens digiti minim) .**
- **All muscles are supplied by ulnar nerve .**

Muscle	Origin	Insertion	Action
1- Abductor digiti minimi	• Common origin	• Common insertion	• Abdution of little finger .
2- Flexor digiti minimi	• Common origin	• Common insertion	• Flexion of proximal phalanx of little finger.
3- Opponens digiti minim	• Common origin	• Medial surface of the shaft of 5 th metacarpal bone	• Opponens little finger against thumb.
4- Palmaris brevis .	• Medial border of palmar aponeurosis	• Skin of medial side of the palm .	• Deepen the hollow of palm of hand .

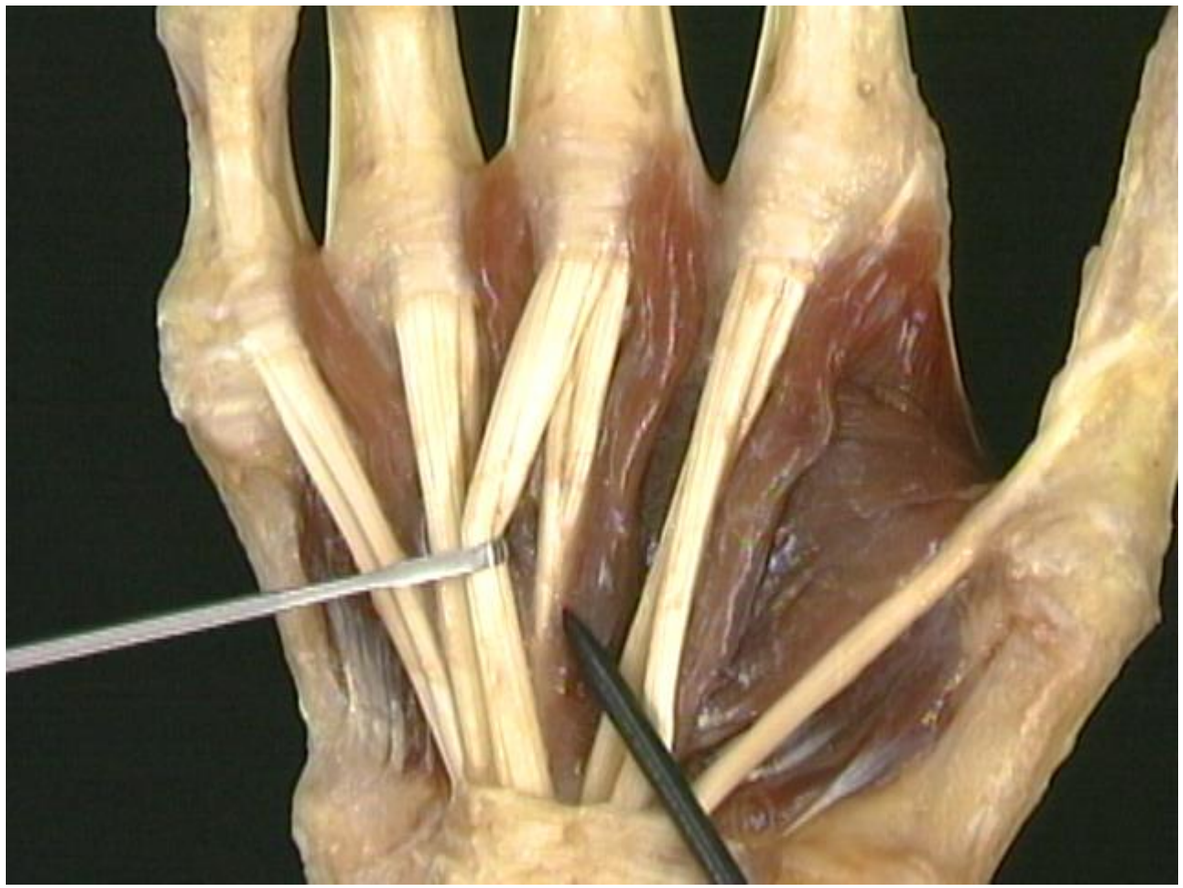


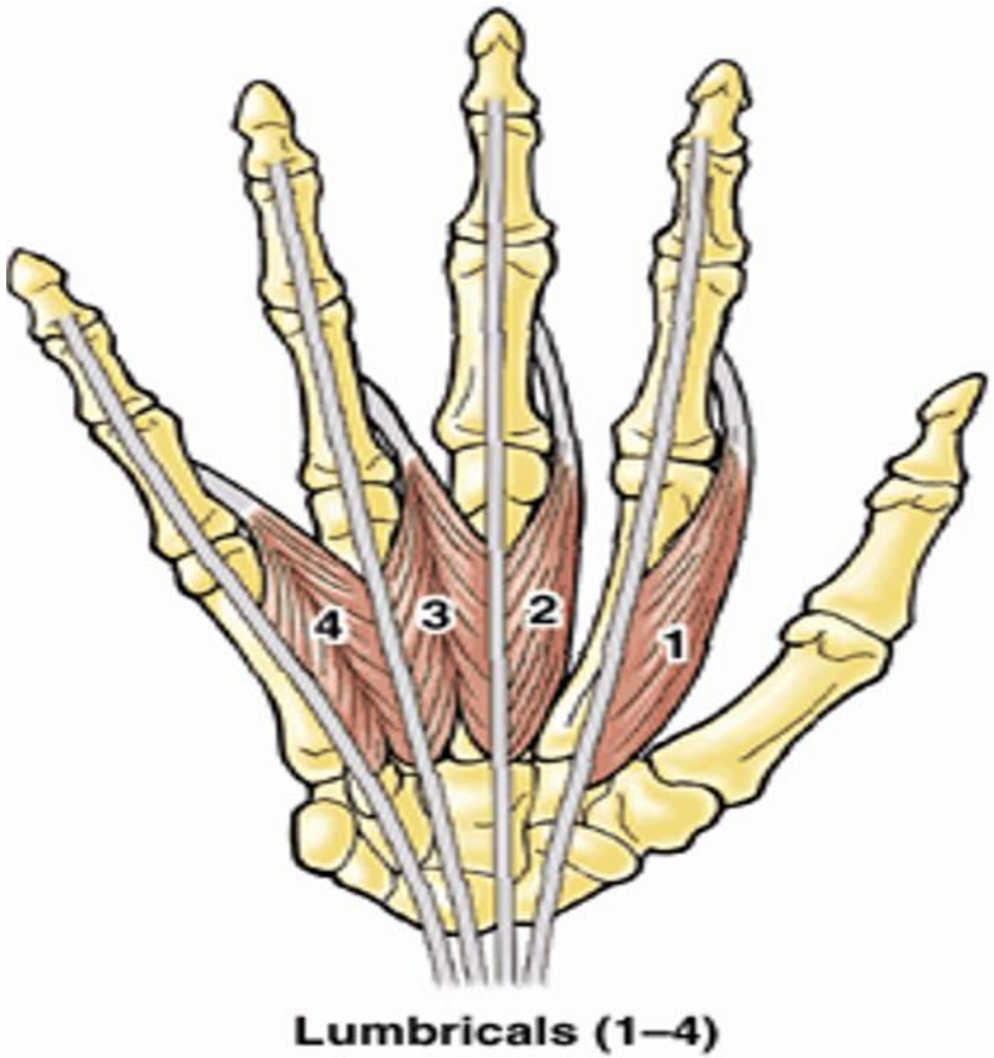


III) Intermediate Muscles of the Palm

- **All muscles are supplied by ulnar nerve except lateral 2 lumbricals are supplied by median nerve .**
- **Common insertion : Extensor expansion of medial 4 fingers then extend to the back of terminal phalanges of medial 4 fingers .**
- **Common action: put the hand in writting position (flexion of metacarpo-phalangeal joint & extension of interphalangeal joints of medial 4 fingers)**

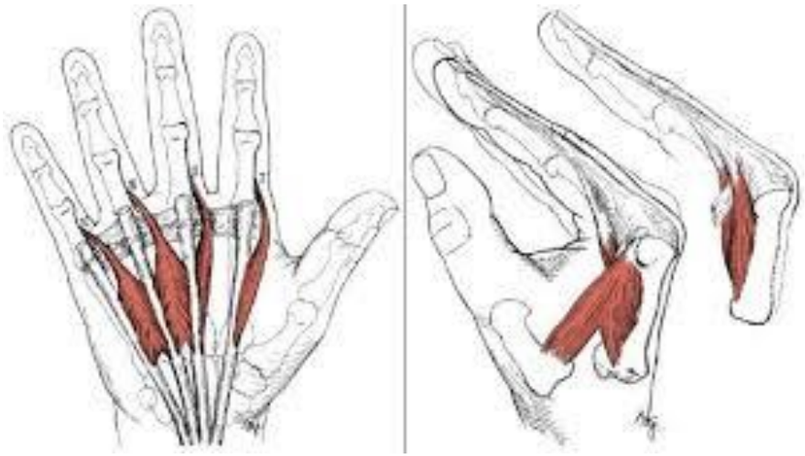
	Origin	Insertion	Action
1. 4 Lumbricals	• **Tendons of flexor digitorum profundus**	• **Tendons pass backwards along lateral side of M/P joints to reach the common insertion.**	• **Common action i.e writing position .**
2. 4 Palmar interossei	• **Each has one head arise from palmar surface of 1,2,4,5 metacarpal bones.**	• **1st muscle inserted in medial side of base of proximal phalanx of the thumb.** • **2nd muscle pass medial while 3rd &4th muscles pass lateral to M/P of corresponding fingers to reach the common insertion.**	• **Common action i.e writing position.** • **Adduction of all fingers towards the center of middle finger .**
3. 4 dorsal interossei	• **Each muscle has 2 heads arises from sides of the related metacarpal bones .**	• **1st & 2nd muscle pass lateral while 3rd &4th muscles pass medial to M/P of corresponding fingers to reach the common insertion.** • **N.B: The middle finger receive the 2nd &3rd muscle .**	• **Common action i.e writing position.** • **Dorsal interossei :abduction of middle 3 fingers from the center of middle finge.**



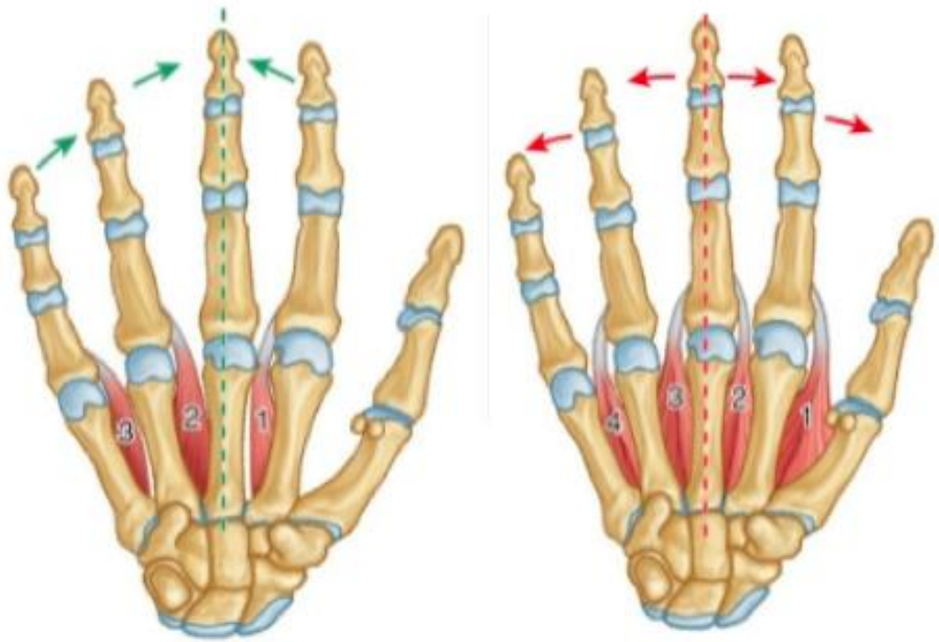


Lumbricals (1–4)

Action of intermediate muscles of palm

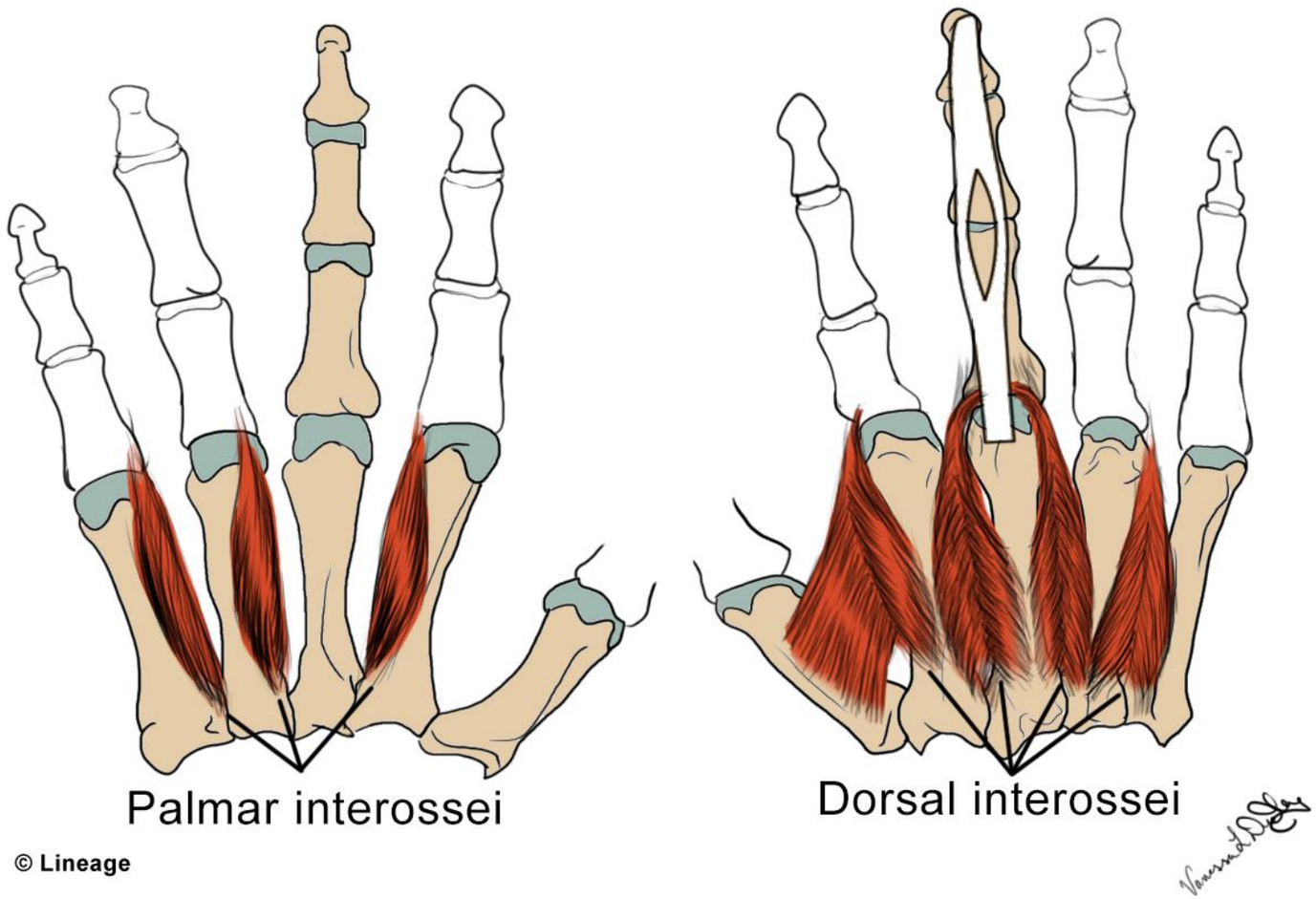


Common Action



Action of interossei

Interossei of the Hand



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