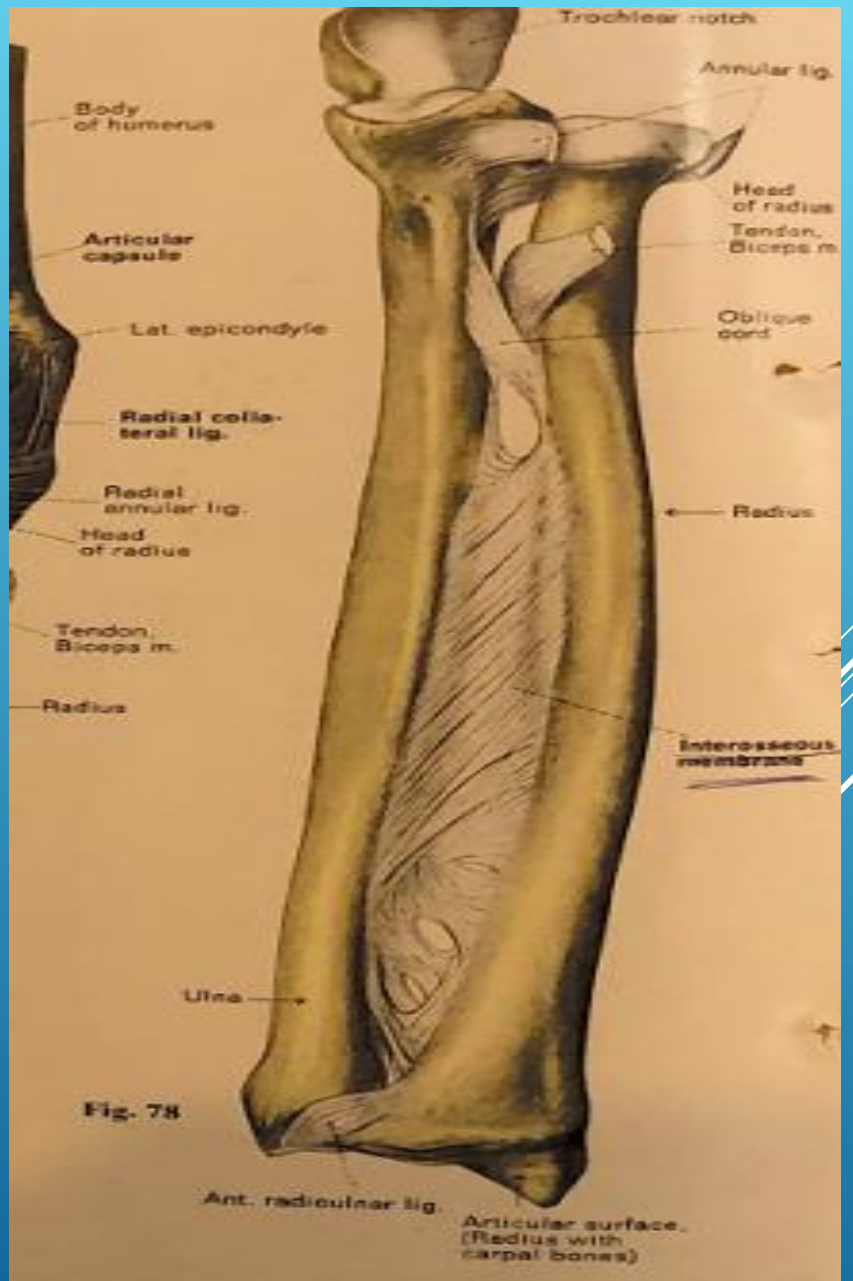
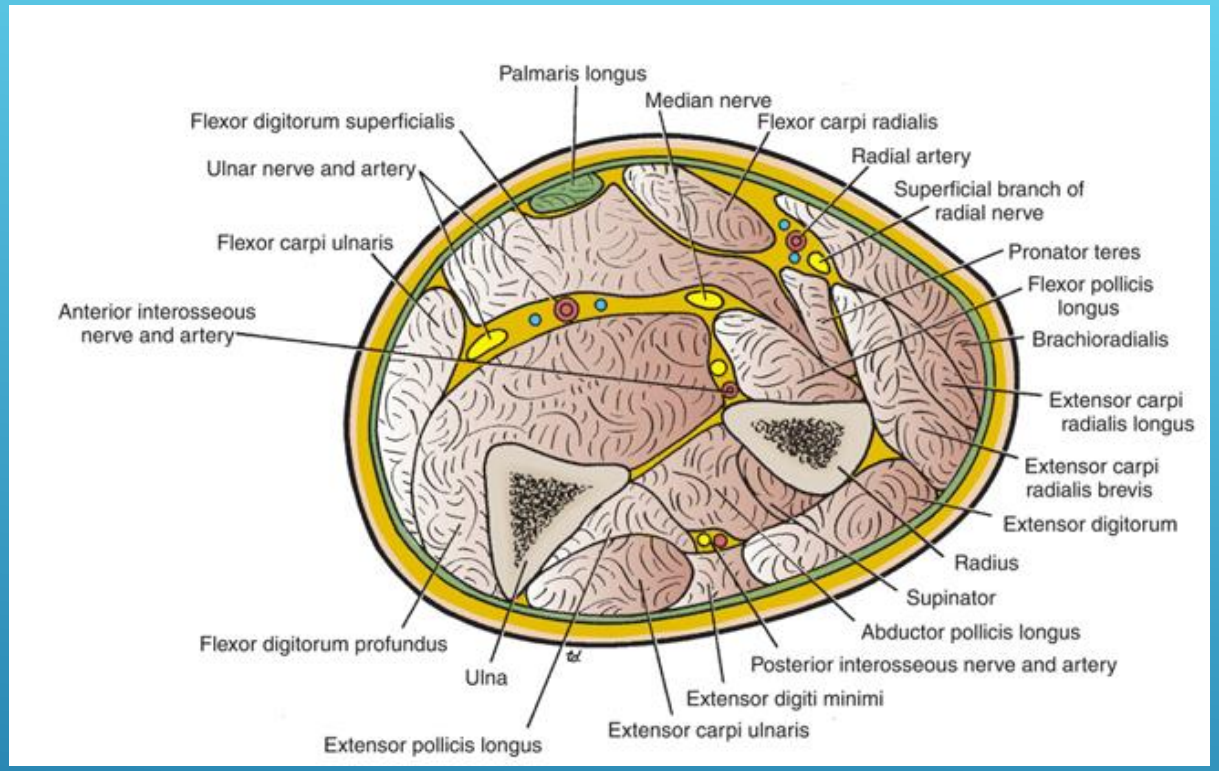
POSTIORER COMPARTMENT OF THE FOREARM

By Dr Iaith Sabeeh Omran

INTEROSSEOUS MEMBRANE

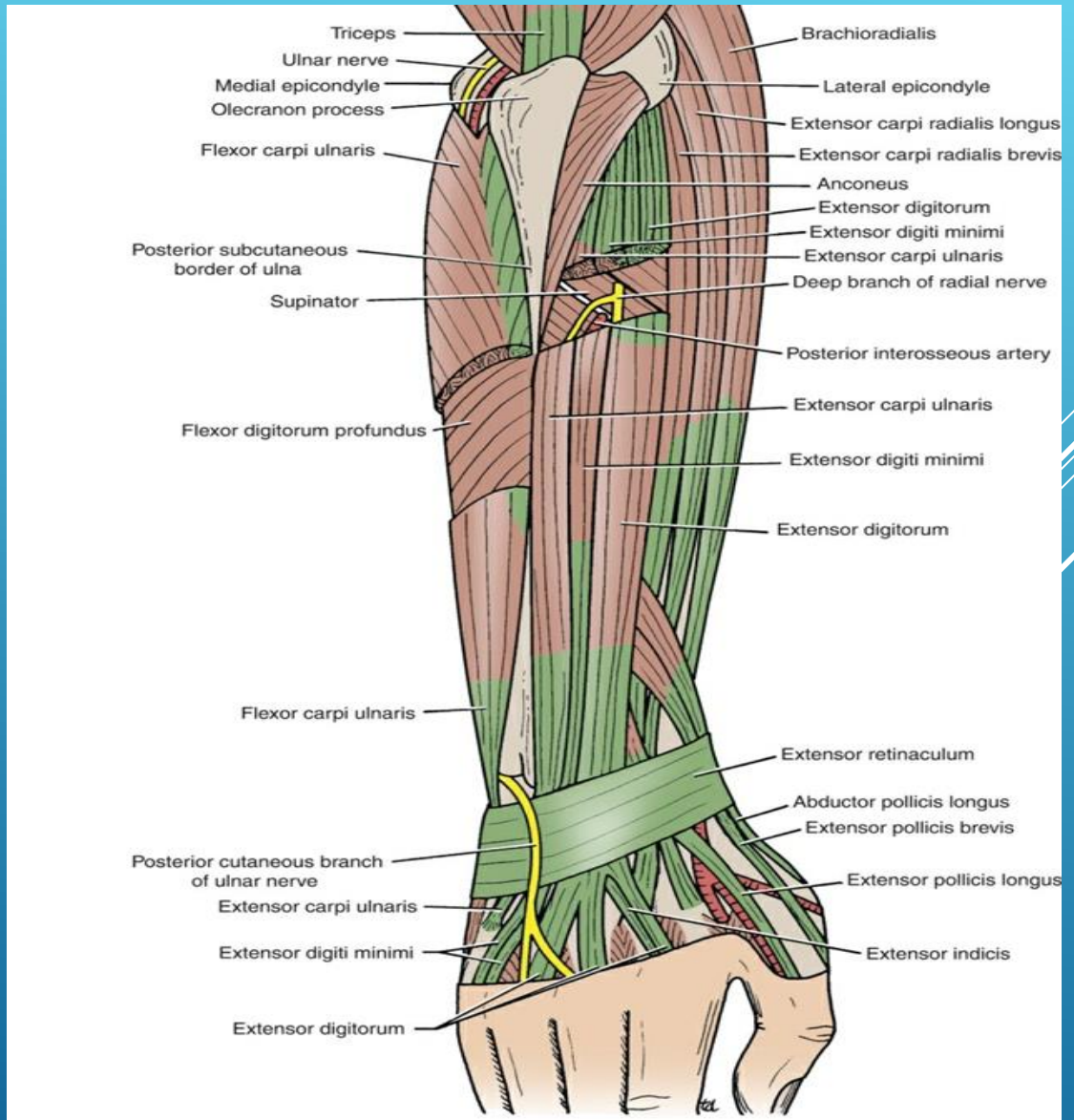
- The interosseous membrane is a strong ligamentous band that unites the shafts of the radius and the ulna and also provides additional surface area for the attachments of neighboring muscles. This wrapping sheet of deep fascia, together with the interosseous membrane and fibrous intermuscular septa, divides the forearm into three osseofascial compartments: anterior, lateral, and posterior. Each compartment contains a set of muscles, nerves, and arteries



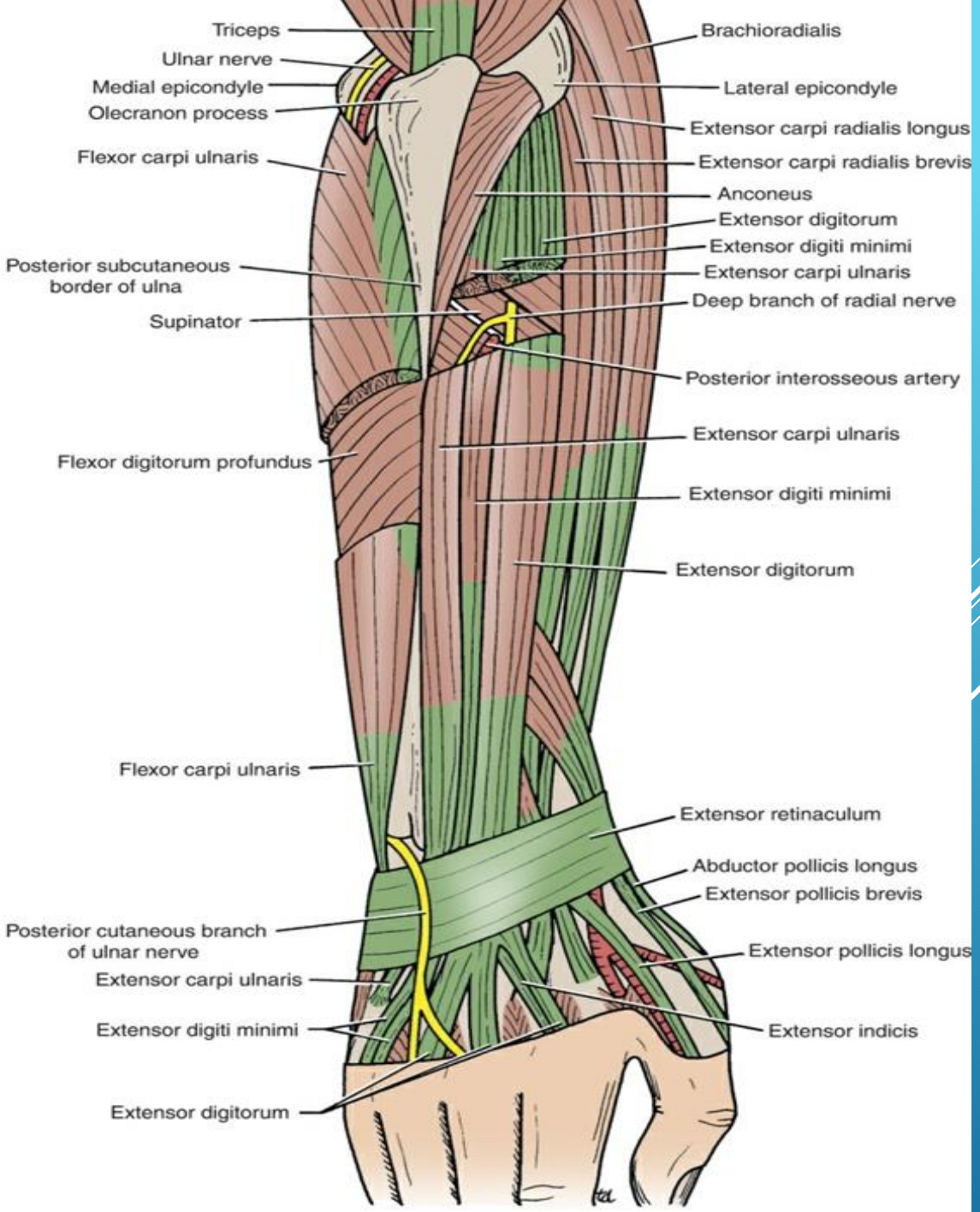

Palmaris longus
Median nerve
Flexor digitorum superficialis
Flexor carpi radialis
Radial artery
Ulnar nerve and artery
Superficial branch of radial nerve
Flexor carpi ulnaris
Pronator teres
Flexor pollicis longus
Anterior interosseous nerve and artery
Brachioradialis
Extensor carpi radialis longus
Extensor carpi radialis brevis
Extensor digitorum
Radius
Supinator
Abductor pollicis longus
Flexor digitorum profundus
Posterior interosseous nerve and artery
Ulna
Extensor digiti minimi
Extensor carpi ulnaris
Extensor pollicis longus

POSTERIOR OSSEOFASCIAL COMPARTMENT MUSCLES

- The muscles of the posterior osseofascial compartment are arranged in two groups: superficial and deep. The superficial group muscles possess a common tendon of origin that is attached to the lateral epicondyle of the humerus.

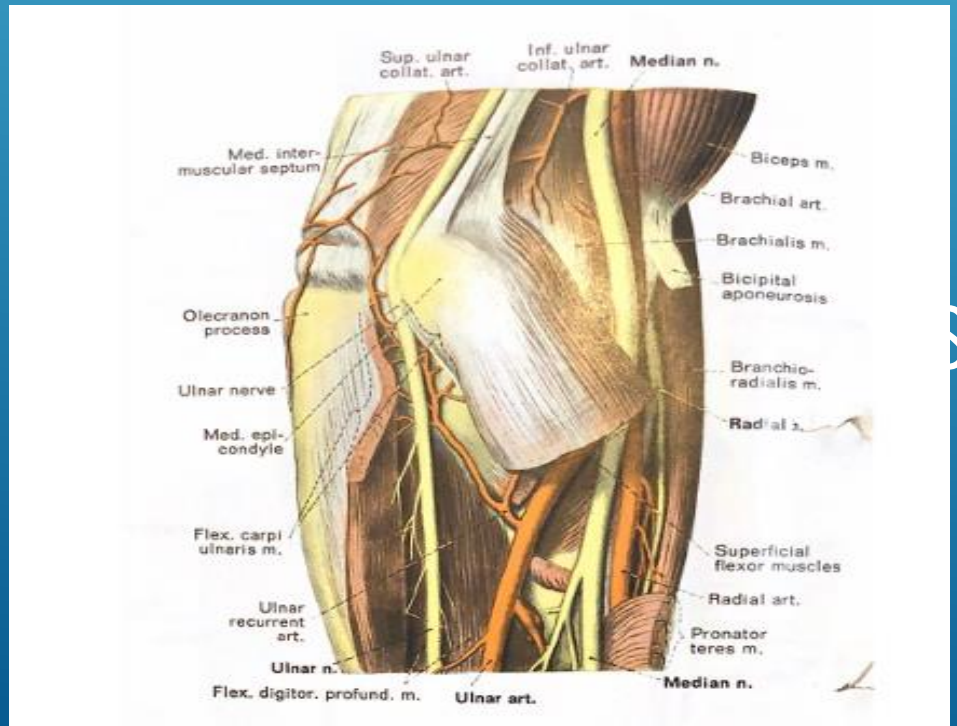


- Superficial group: Extensor carpi radialis brevis, extensor digitorum, extensor digiti minimi, extensor carpi ulnaris, and anconeus
- Deep group: Supinator, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus, and extensor indicis

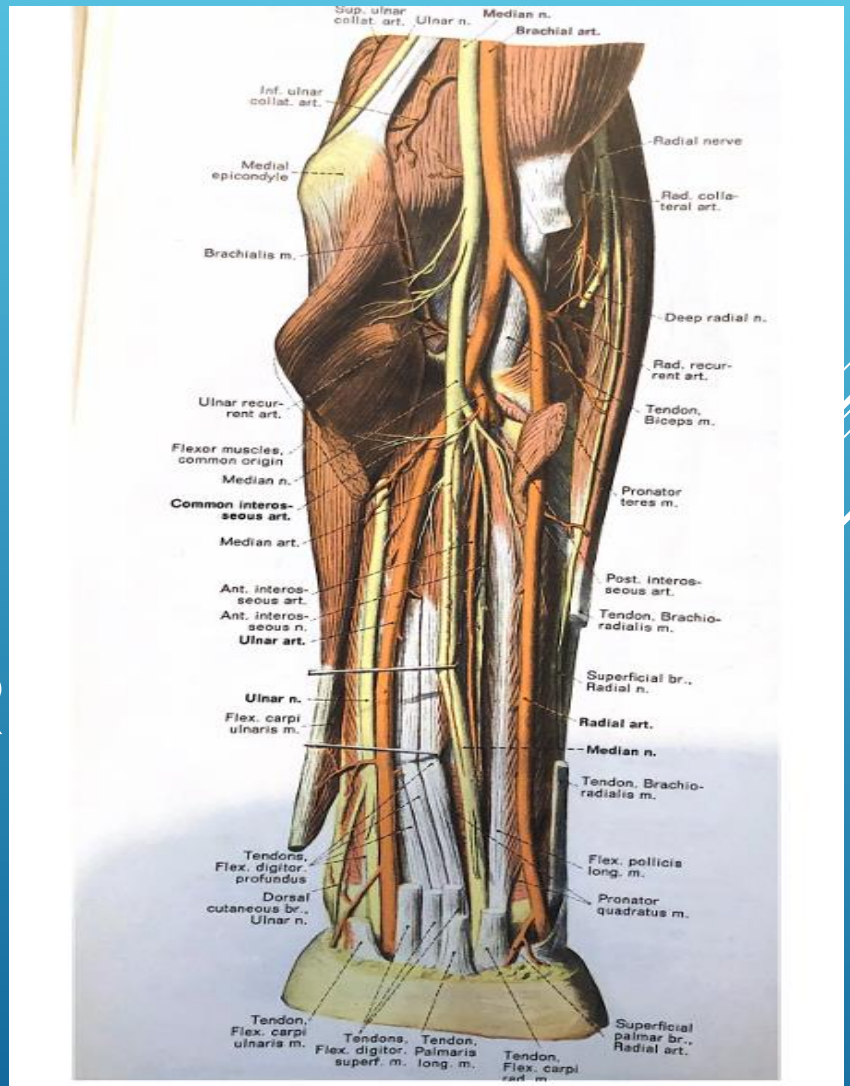


MUSCLE	ORIGIN	INSERTION	NERVE SUPPLY	NERVE ROOTS*	ACTION
Extensor carpi radialis brevis	Lateral epicondyle of humerus	Posterior surface of base of third metacarpal bone	Deep branch of radial nerve	**C7**, 8	Extends and abducts hand at wrist joint
Extensor digitorum	Lateral epicondyle of humerus	Middle and distal phalanges of medial four fingers	Deep branch of radial nerve	**C7**, 8	Extends fingers and hand (see text for details)
Extensor digiti minimi	Lateral epicondyle of humerus	Extensor expansion of little finger	Deep branch of radial nerve	**C7**, 8	Extends metacarpal phalangeal joint of little finger
Extensor carpi ulnaris	Lateral epicondyle of humerus	Base of fifth metacarpal bone	Deep branch of radial nerve	C7, **8**	Extends and adducts hand at wrist joint
Anconeus	Lateral epicondyle of humerus	Lateral surface of olecranon process of ulna	Radial nerve	C7, 8; T1	Extends elbow joint
Supinator	Lateral epicondyle of humerus, anular ligament of proximal radioulnar joint, and ulna	Neck and shaft of radius	Deep branch of radial nerve	C5, 6	Supination of forearm
Abductor pollicis longus	Posterior surface of shafts of radius and ulna	Base of first metacarpal bone	Deep branch of radial nerve	C7, **8**	Abducts and extends thumb
Extensor pollicis brevis	Posterior surface of shaft of radius	Base of proximal phalanx of thumb	Deep branch of radial nerve	C7, **8**	Extends metacarpophalangeal joints of thumb
Extensor pollicis longus	Posterior surface of shaft of ulna	Base of distal phalanx of thumb	Deep branch of radial nerve	C7, **8**	Extends distal phalanx of thumb
Extensor indicis	Posterior surface of shaft of ulna	Extensor expansion of index finger	Deep branch of radial nerve	C7, **8**	Extends metacarpophalangeal joint of index finger

- The divesions of brachial artery
- A radial and ulner aa
- Medain ,radial,and ulner nerves

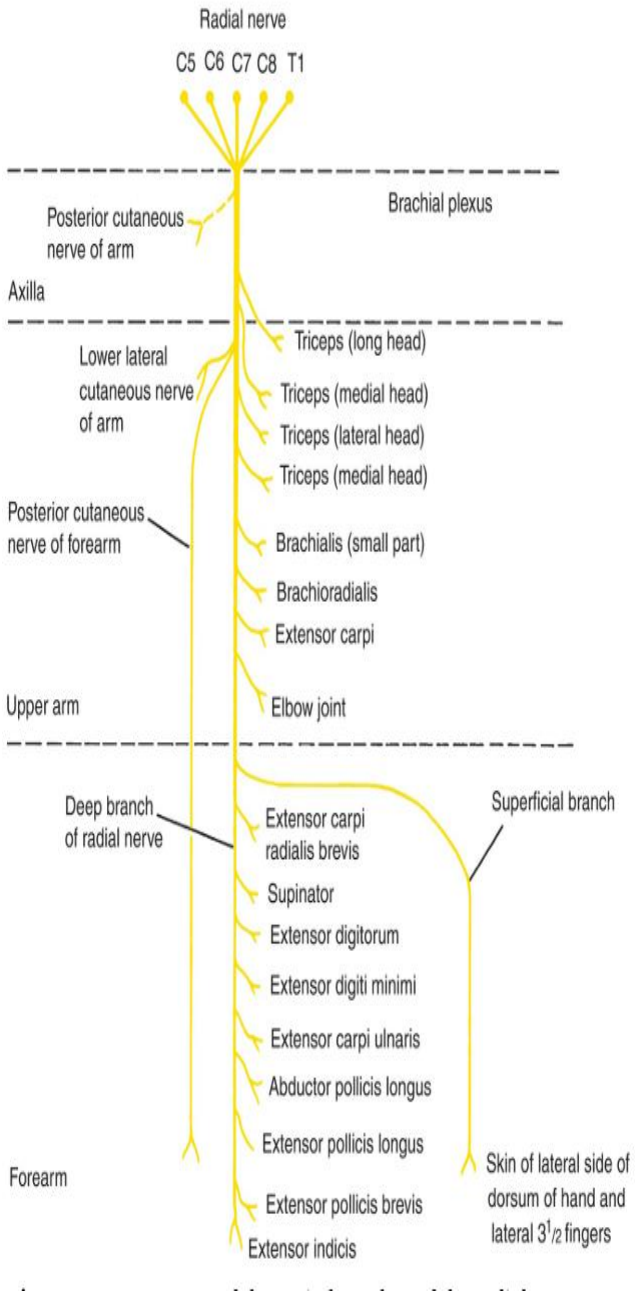


S OF ANTERIOR



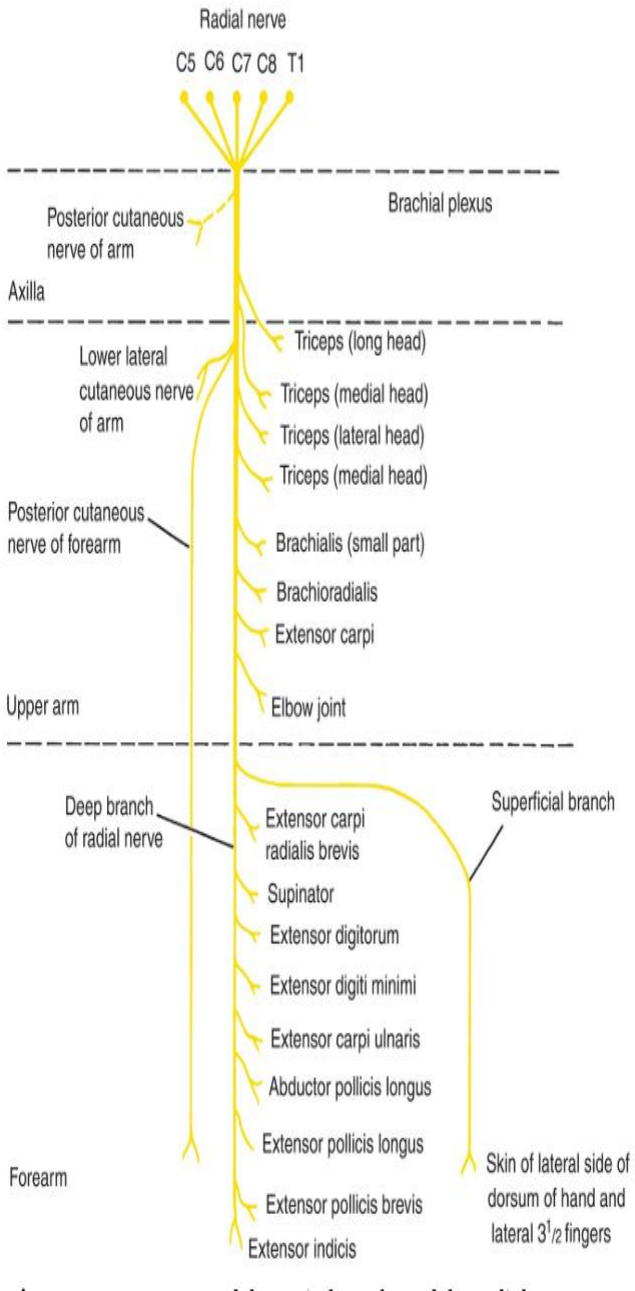
Radial Nerve

The radial nerve (C5 to T1) originates from the posterior cord of the brachial plexus in the axilla . It is named for its pathway along the radial (lateral) side of the upper limb. The radial nerve is the sole motor nerve to the muscles in the posterior compartments of the arm and forearm . It also provides extensive cutaneous innervation along the posterior aspect of the entire limb

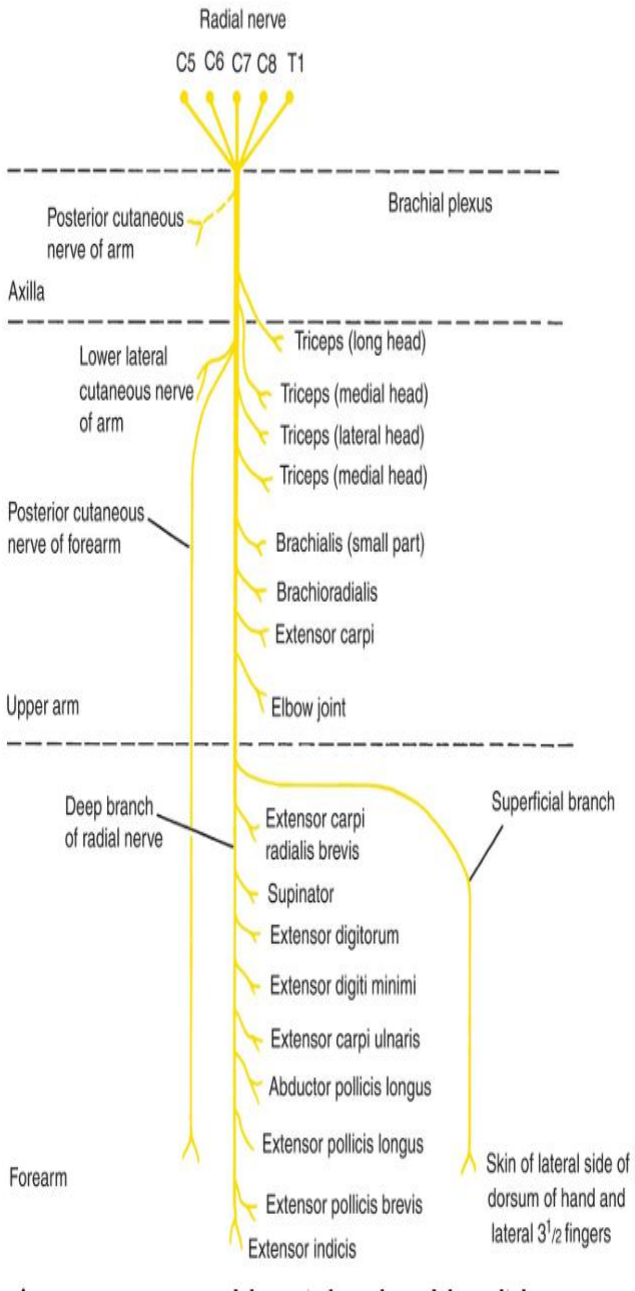


The nerve then pierces the lateral intermuscular septum above the lateral epicondyle of the humerus, enters the anterior compartment of the arm between the brachialis and brachioradialis muscles, and continues into the cubital fossa

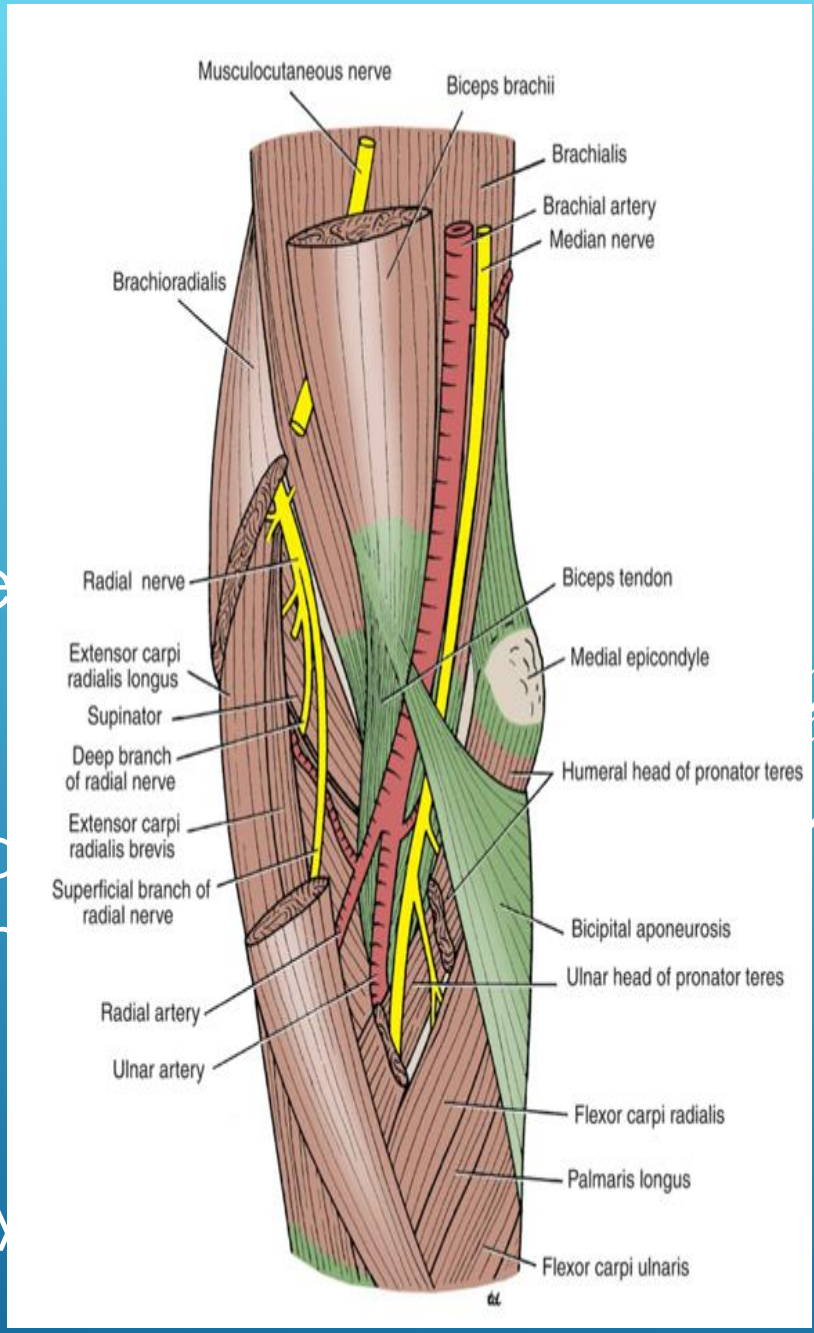
Muscular branches in the spiral groove supply the lateral and medial heads of the triceps and the anconeus. Additional muscular branches in the anterior compartment of the arm, after the nerve has pierced the lateral intermuscular septum, supply the brachialis (a very small branch), brachioradialis, and extensor carpi radialis longus muscles . The lower lateral cutaneous nerve of the arm supplies the skin over the lateral and anterior aspects of the lower part of the arm . The posterior cutaneous nerve of the forearm runs down the middle of the back of the forearm as far as the wrist . Articular branches supply the elbow joint



Cubital Fossa Branches Articular branches supply the elbow joint. Superficial branch of the radial nerve Deep branch of the radial nerve winds around the neck of the radius, within the supinator muscle, and enters the posterior compartment of the

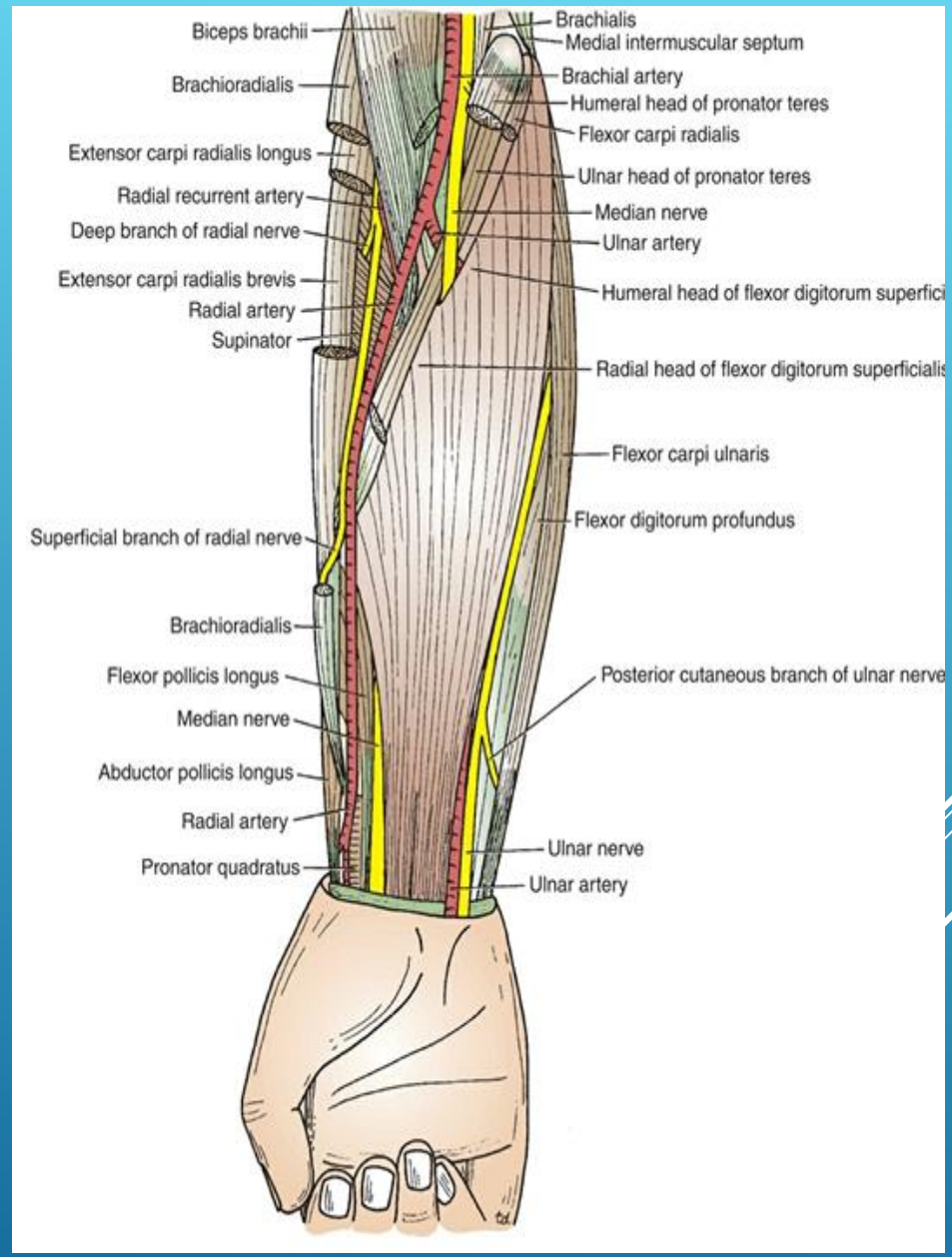


Superficial Branch of Radial Nerve The superficial branch of the radial nerve is a cutaneous nerve to the wrist and hand. It is the direct continuation of the radial nerve after its main stem has given off its deep branch in front of the lateral epicondyle of the humerus . It runs down under cover of the brachioradialis muscle on the lateral side of the radial artery. The nerve leaves the artery in the distal part of the forearm, winds around the radius deep to the brachioradialis tendon, descends superficial to the extensor retinaculum, and divides into several dorsal digital nerves. These terminal branches supply the lateral two thirds of the dorsum of the

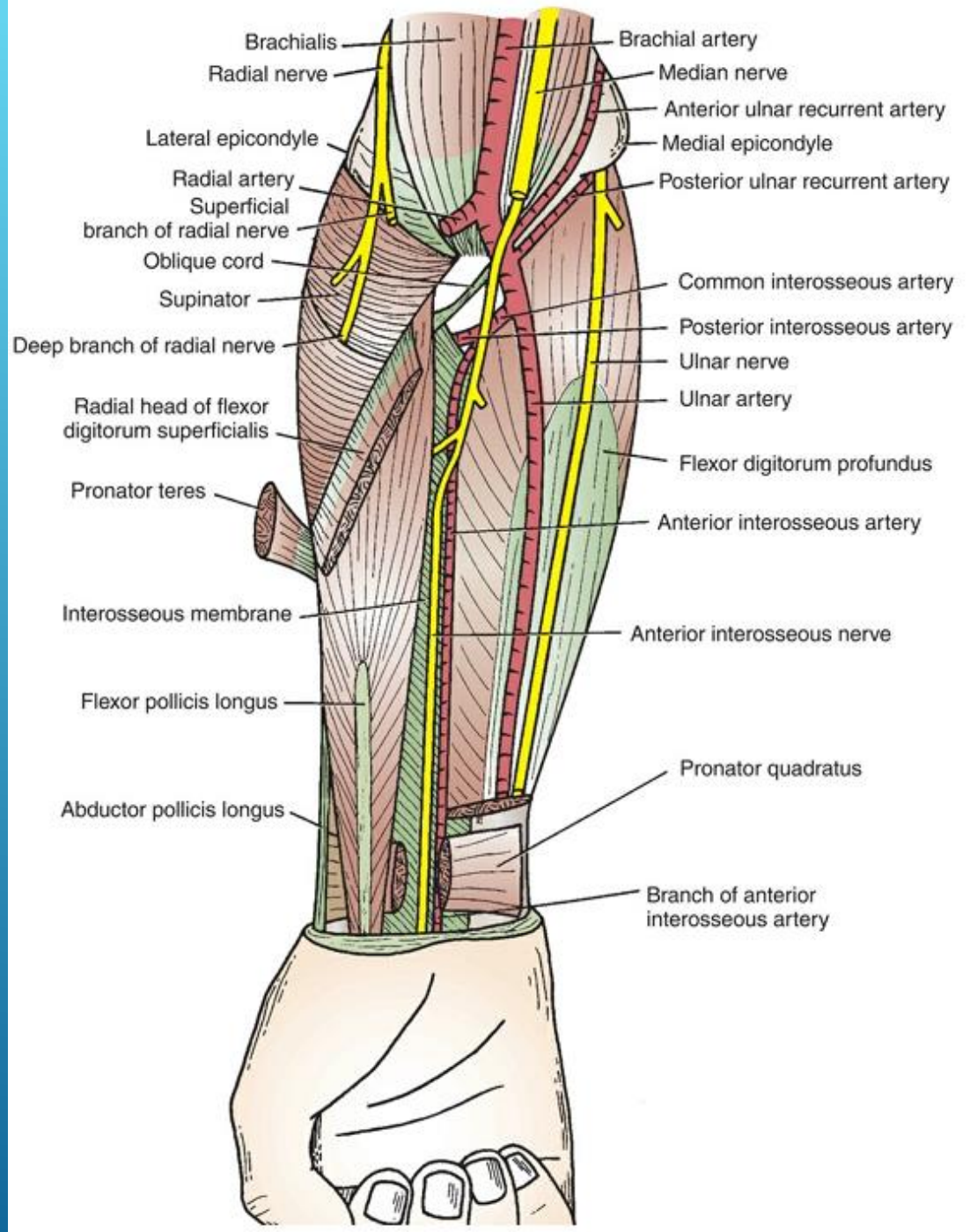


Deep Branch of Radial Nerve

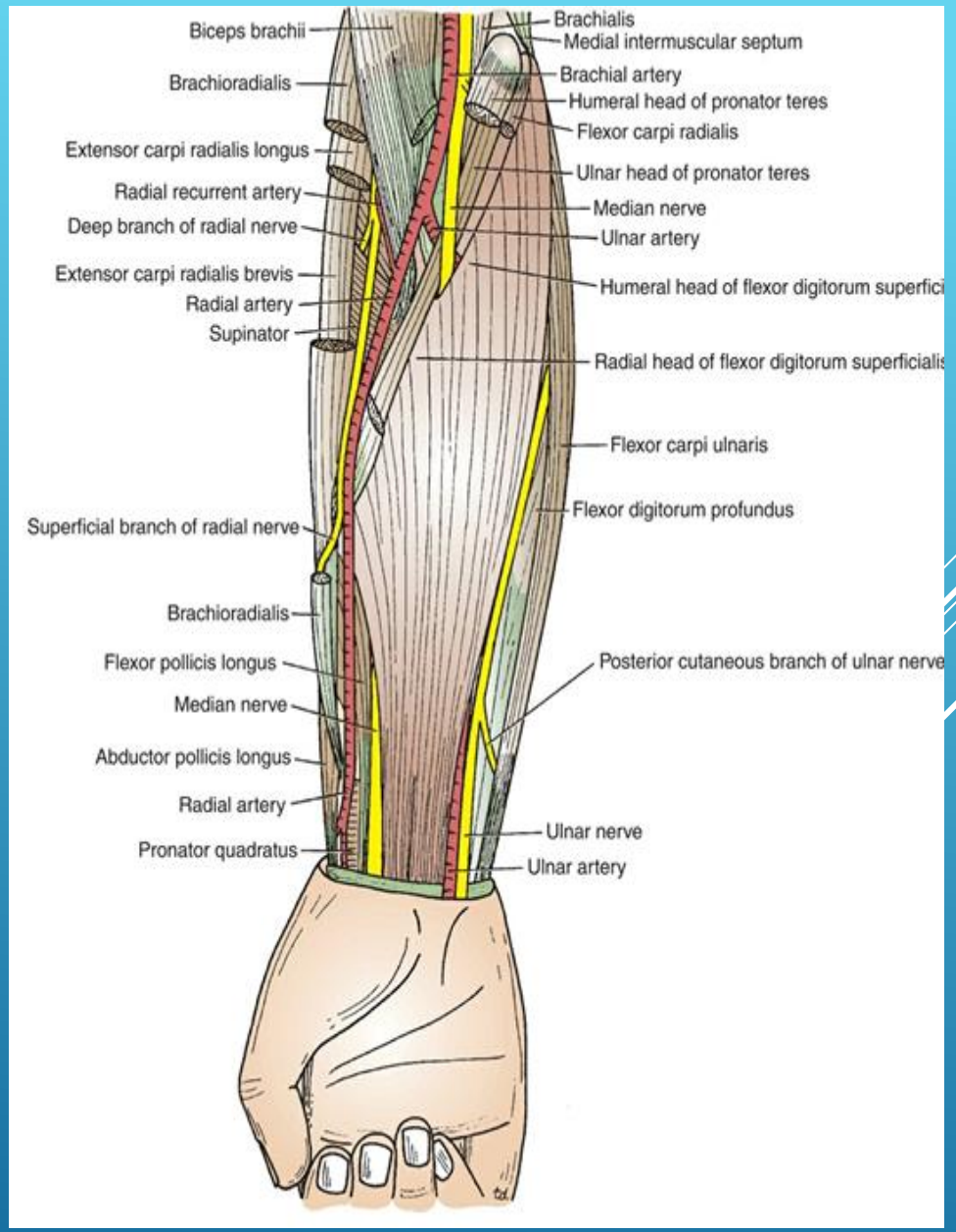
The deep branch arises from the radial nerve in front of the lateral epicondyle of the humerus in the cubital fossa . It pierces the supinator muscle and winds around the lateral aspect of the neck of the radius in the substance of the muscle to reach the posterior compartment of the forearm . When the nerve emerges from the supinator muscle in the posterior compartment, it is commonly referred to as the posterior interosseous nerve. The nerve descends in the interval between the superficial and deep groups of muscles and eventually reaches the posterior surface of the



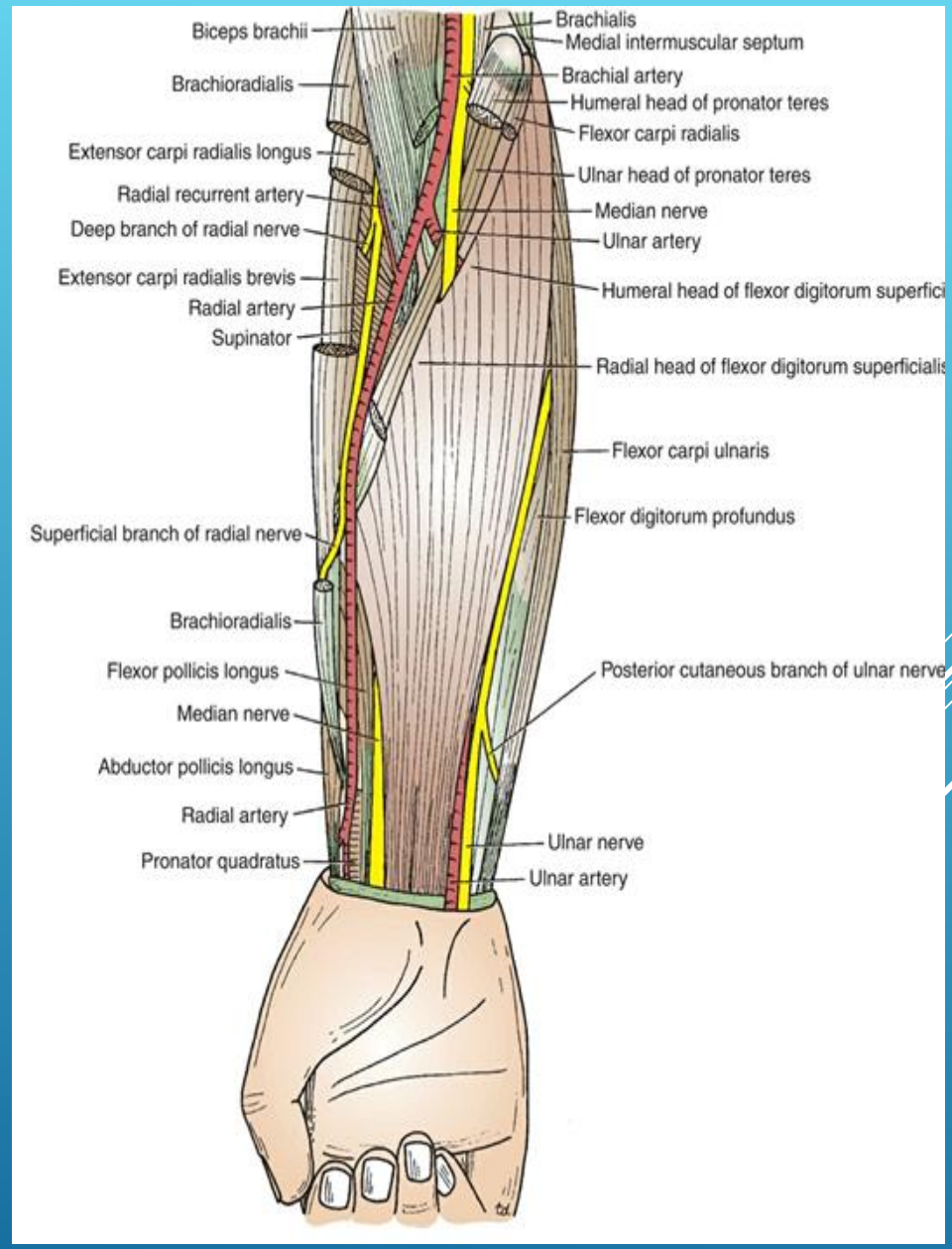
Branches Muscular branches supply the extensor carpi radialis brevis, supinator, extensor digitorum, extensor digiti minimi, extensor carpi ulnaris, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus, and extensor indicis muscles. Articular branches supply the wrist and carpal



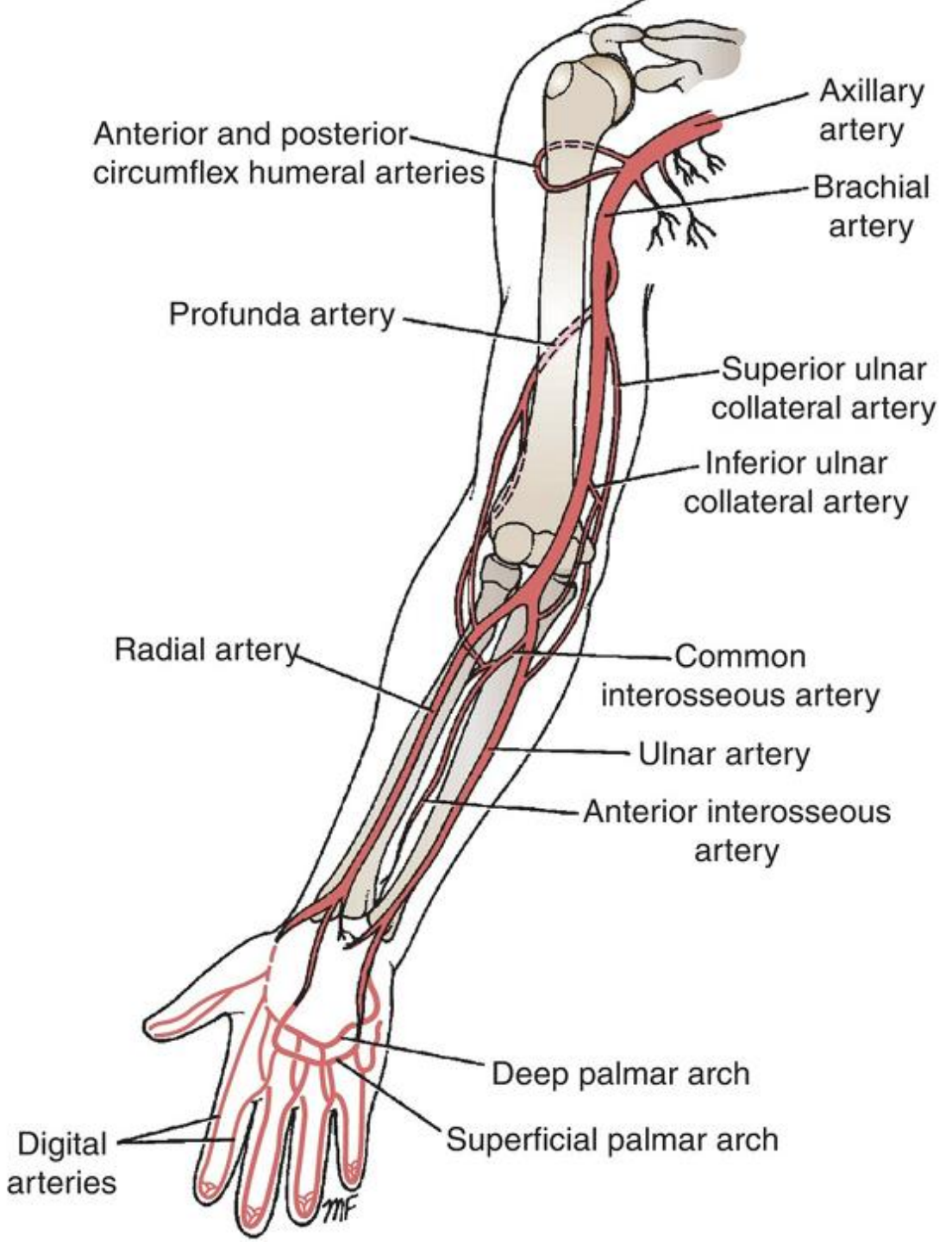
Radial Artery The radial artery is the smaller of the two terminal branches of the brachial artery . It begins in the cubital fossa at the level of the neck of the radius and descends through the lateral (radial) aspect of the anterior compartment of the forearm . It ends by forming the deep palmar arch in the hand, often anastomosing with the deep palmar branch of the ulnar artery .



Radial Artery in Forearm In the proximal forearm, the radial artery lies deep to the brachioradialis muscle . In the middle third of its course, it runs medial to the superficial branch of the radial nerve. In the distal forearm, the radial artery lies on the anterior surface of the radius, between the tendons of the brachioradialis and flexor carpi radialis muscles, and is covered only by skin and fascia. This is the ideal site for taking the radial

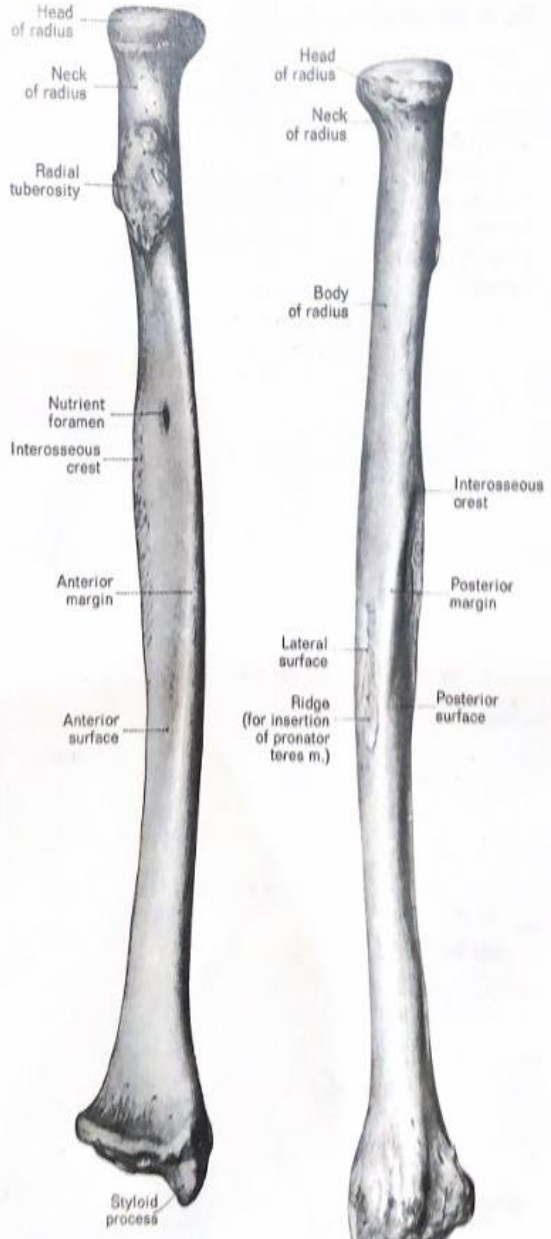


Forearm Branches Muscular branches to neighboring muscles. The radial recurrent artery takes part in the arterial anastomosis around the elbow joint. (See the above description of the profunda brachii artery; The superficial palmar branch arises just proximal to the wrist enters the palm of the hand, and joins the ulnar artery to complete the superficial palmar arch.

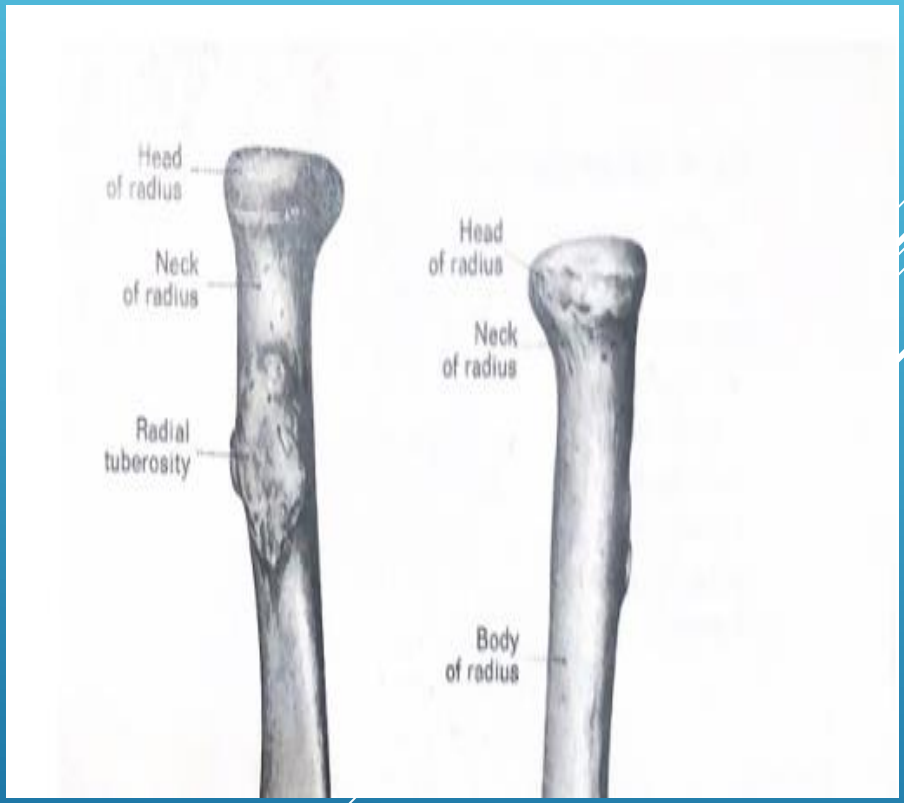


RADIUS

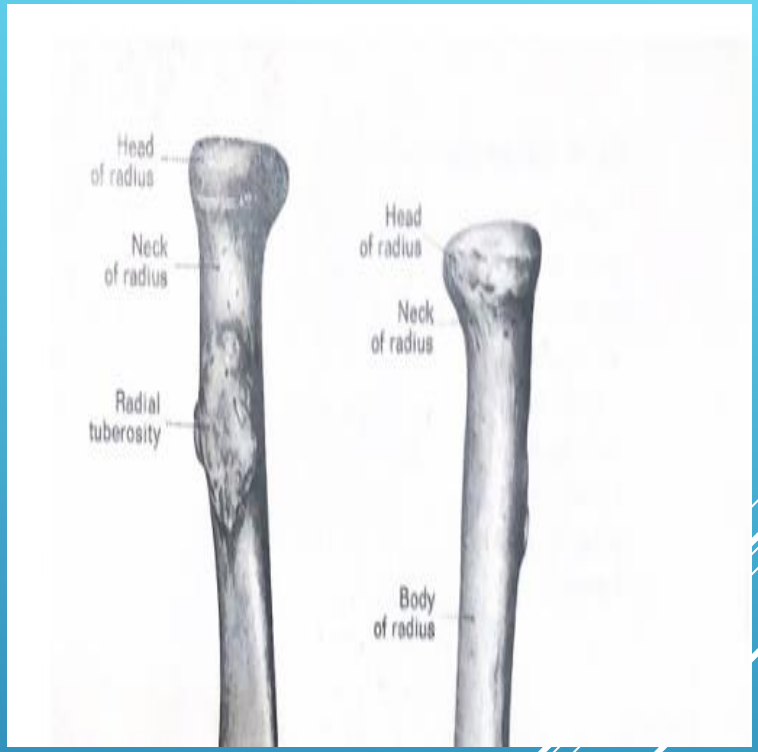
- The radius (radi- is Latin for “spoke” or “ray”) is the bone on the lateral side of the forearm (antebrachium).
- Proximally, it articulates with both the capitulum of the humerus and the radial notch of the ulna, in the elbow joint.
- Distally, it articulates with the head of the ulna and the scaphoid and lunate bones, in the wrist. During pronation and supination, the radius rotates about its long axis at its proximal end and circumducts the ulna at its distal end.



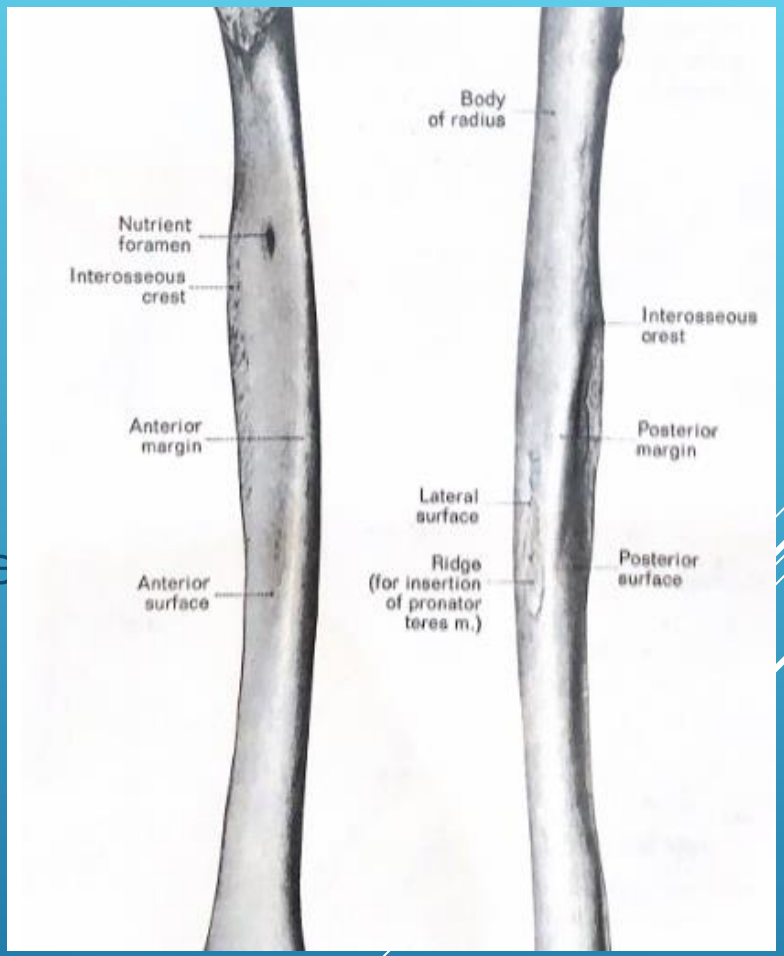
- The head
- is the expanded, round, proximal end of the radius.
- Its proximal surface is a shallow concavity for articulation with the capitulum of the radius. Its periphery articulates with the radial notch of the ulna.
- The head is held in place against the ulna by the encircling anular ligament. Note that the head of the radius is at its proximal end, whereas the head of the ulna is at its distal end.



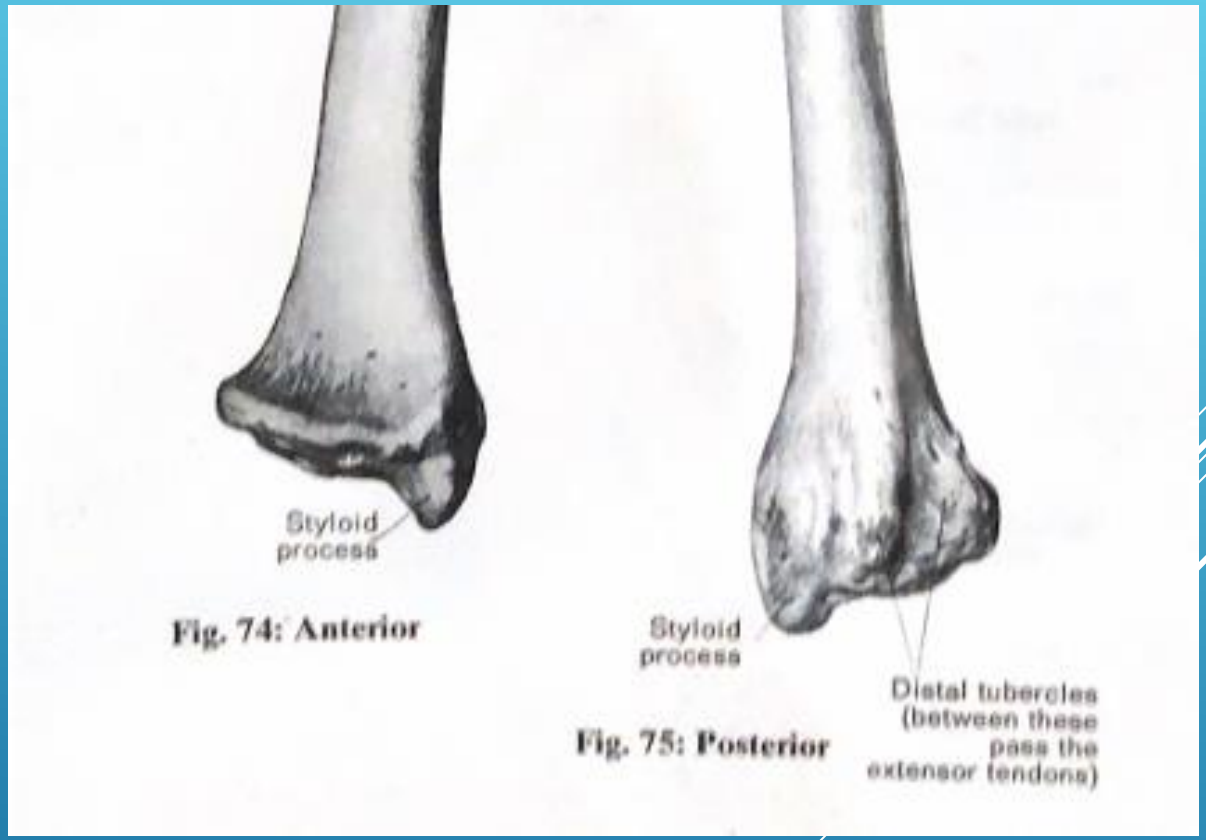
The neck
 is the constricted area immediately distal to the head.
 The radial tuberosity is the raised, mostly roughened area on the anteromedial, proximal aspect of the radius, just distal to the neck.
 This is the insertion site of the biceps brachii muscle.



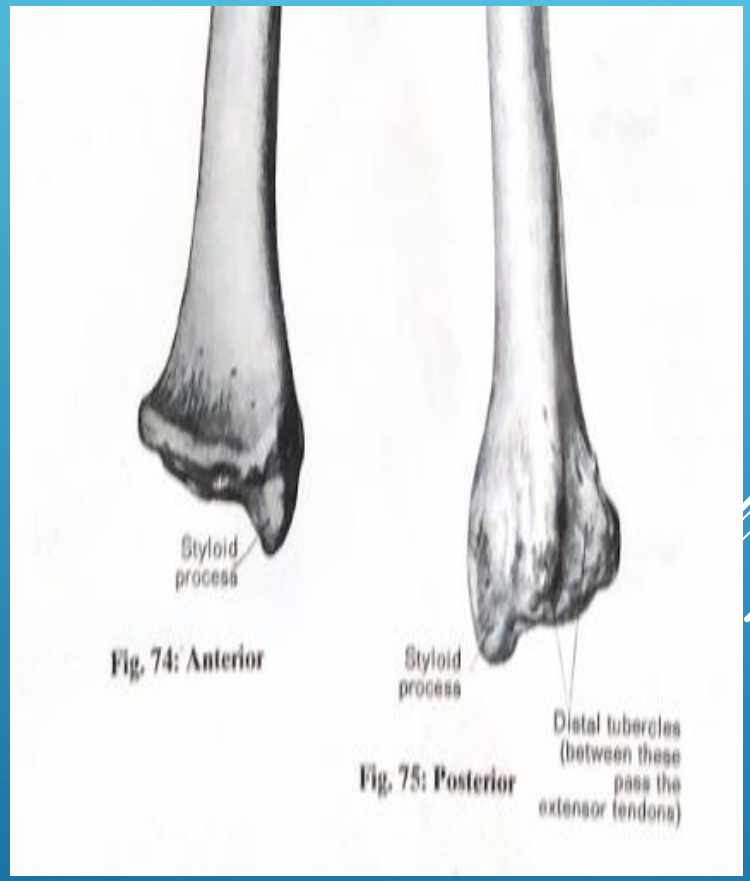
- The body (shaft)
- is the elongated midportion of the radius. It widens along its proximal to distal extent.
- The medial border of the shaft forms a sharp crest (the interosseous border) for the attachment of the interosseous membrane that binds together the radius and ulna.



- The ulnar notch is the shallow depression on the distal, medial aspect of the radius. This is the articular surface for the head of the ulna.



- This is the articular surface for the head of the ulna. The styloid process (styl- is Greek for “pointed instrument”) is the distal projection from the lateral, distal aspect of the radius.



- The carpal articular surface forms the distal surface of the radius. This area articulates with the scaphoid (laterally) and lunate (medially) bones.

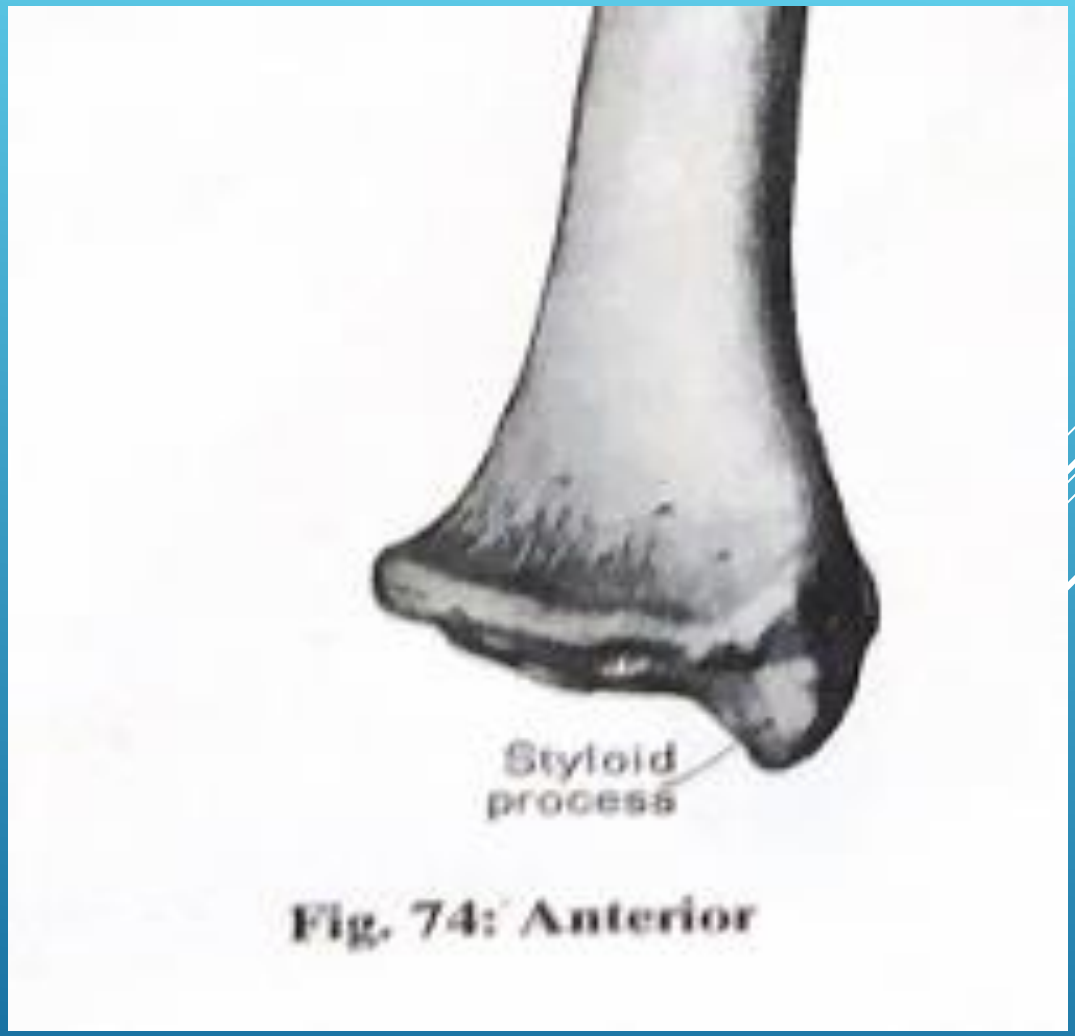
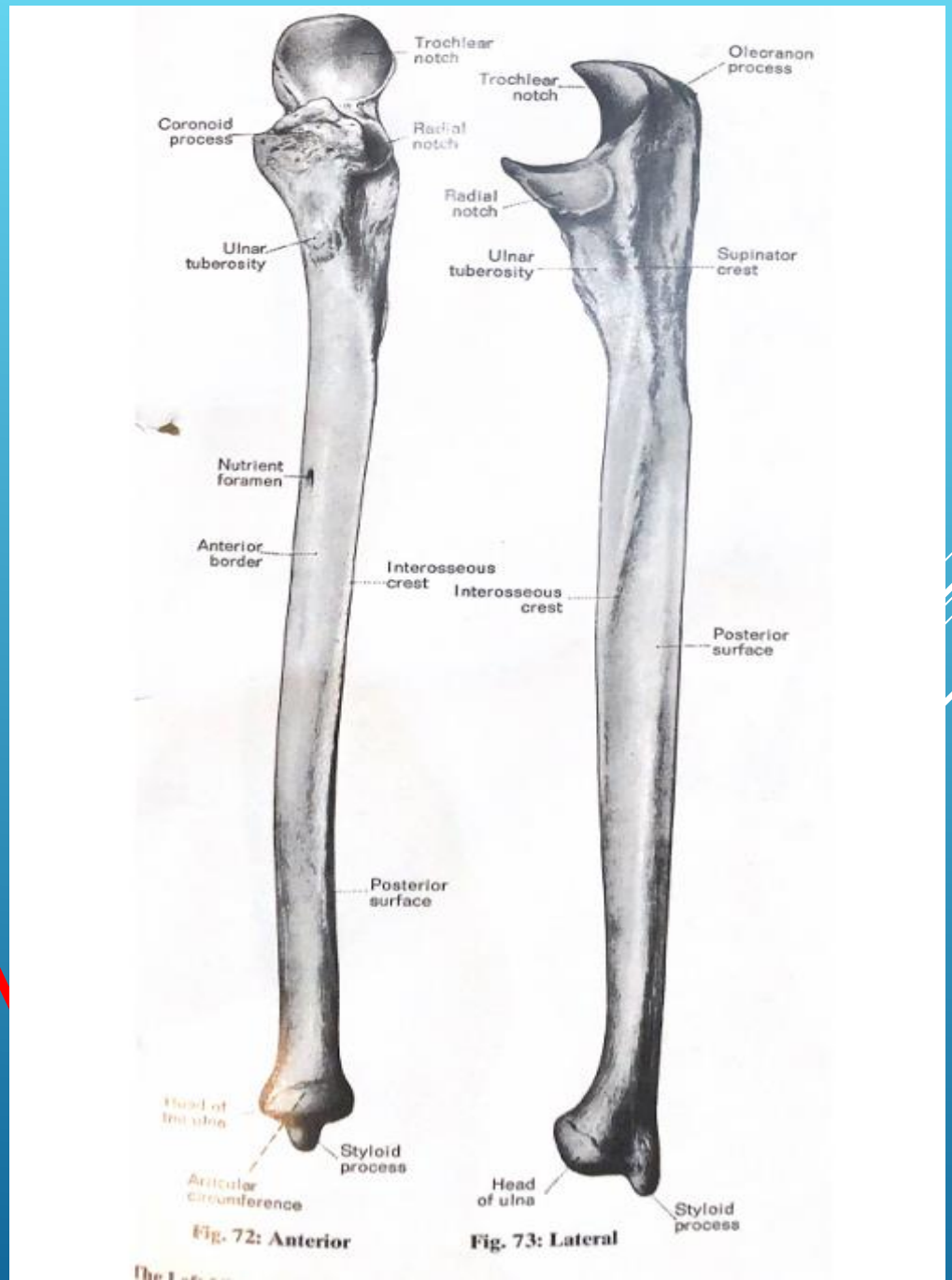


Fig. 74: Anterior

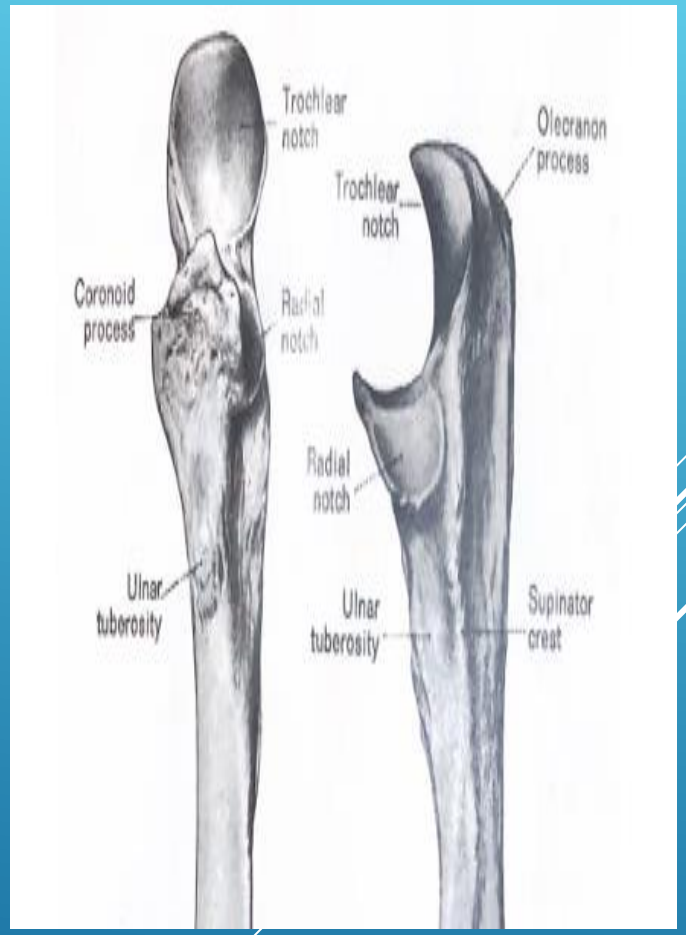
- Ulna The ulna (ulna is Latin for "elbow") lies on the medial side of the forearm (antebrachium). Proximally, the ulna articulates with both the trochlea of the humerus and the head of the radius, in the elbow joint. Distally, it articulates with the ulnar notch of the radius. Its large, hook-shaped proximal end characterizes the bone.

ULNA

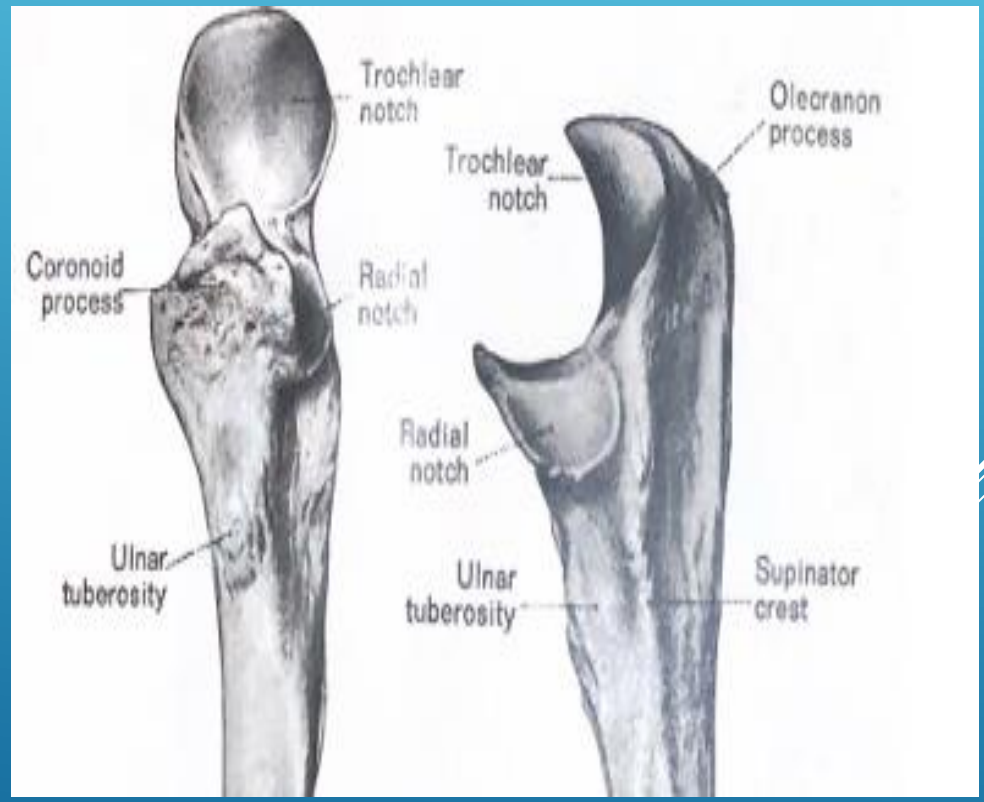


PARTS OF ULNA BONE

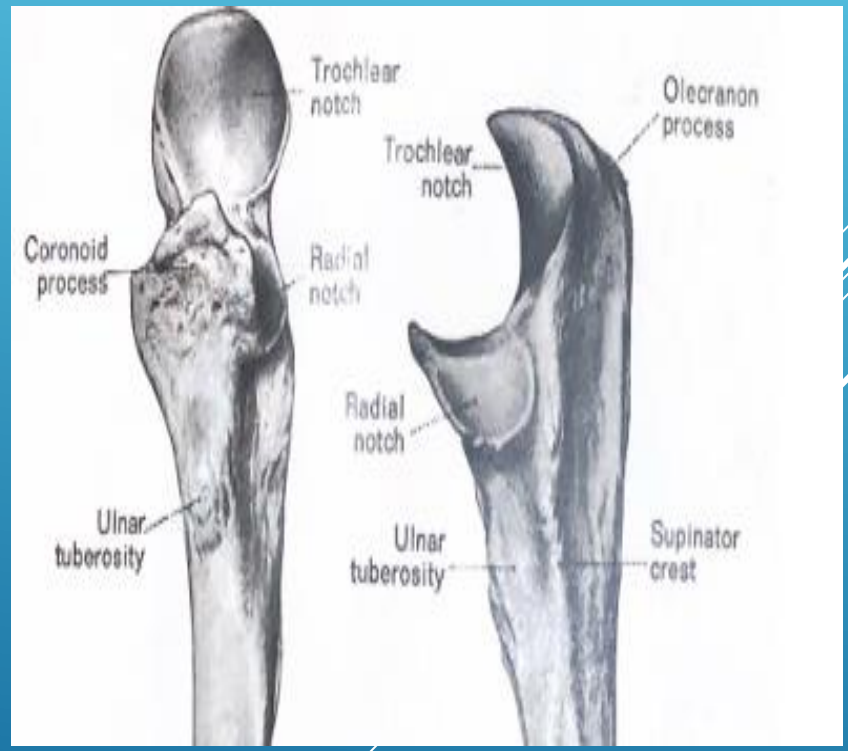
- The olecranon
- (olecran- is Greek for “elbow”) is the easily palpable proximal end of the ulna that forms the “point” of the elbow. It is the insertion site of the triceps brachii muscle. The beaklike tip of the olecranon fits into the olecranon fossa of the humerus when the elbow is extended. The coronoid process (coron- is Greek for “resembling a crow”) is the anterior projection forming the inferior end of the hooklike proximal end of the ulna. It contributes to the formation of the trochlear notch.



- The trochlear notch
- is the large, crescent-shaped notch on the anterior aspect of the proximal end of the ulna. It is formed by the articular surfaces of the olecranon and the coronoid process and articulates with the trochlea of the humerus.



- The radial notch
- is the shallow, smooth notch on the lateral aspect of the coronoid process, immediately distal to the trochlear notch. It is the articular surface for the head of the radius.
- The ulnar tuberosity is the anterior, distal, roughened aspect of the coronoid process. This serves as the insertion area for the brachialis muscle.



- The posterior aspect of the body is rounded and subcutaneous and easily palpable along its entire length. The lateral border of the shaft forms a sharp crest (the interosseous border) for the attachment of the interosseous membrane.
- The head is the small, rounded distal end of the ulna. This has an articular surface on its lateral side for contact with the ulnar notch of the radius. However, the distal end of the head is separated and excluded from the wrist joint by an articular disc. The styloid process is a small projection from the posterolateral, distal end of the ulna.

