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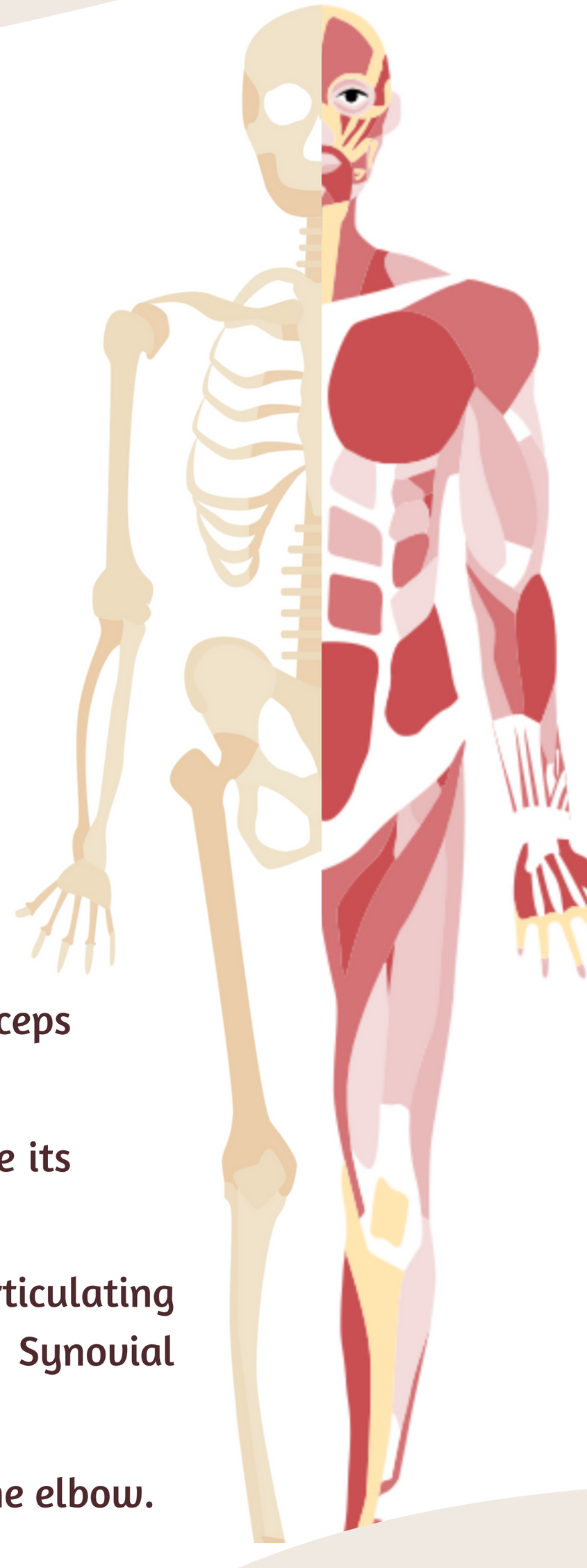
Lecture 7

ARM & ELBOW



OBJECTIVES

- Describe the attachments, actions and innervations of Biceps brachii, Coracobrachialis, Brachialis, Triceps brachii
- Define the boundaries of the cubital fossa and enumerate its contents.
- Demonstrate the following features of the elbow joint: Articulating bones, Capsule, Lateral & medial collateral ligaments, Synovial membrane
- Demonstrate the movements : flexion and extension of the elbow.
- List the main muscles producing the above movements.
- Mention the applied anatomy.

Color Index:

- Main text
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- Important
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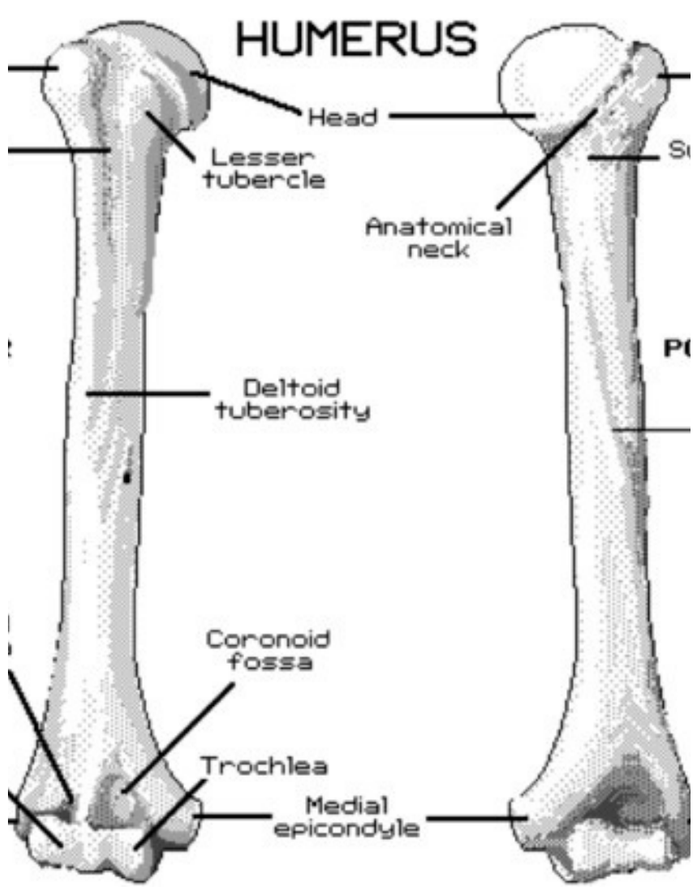
Editing File

The Arm

The Arm: the region from the shoulder to the elbow.



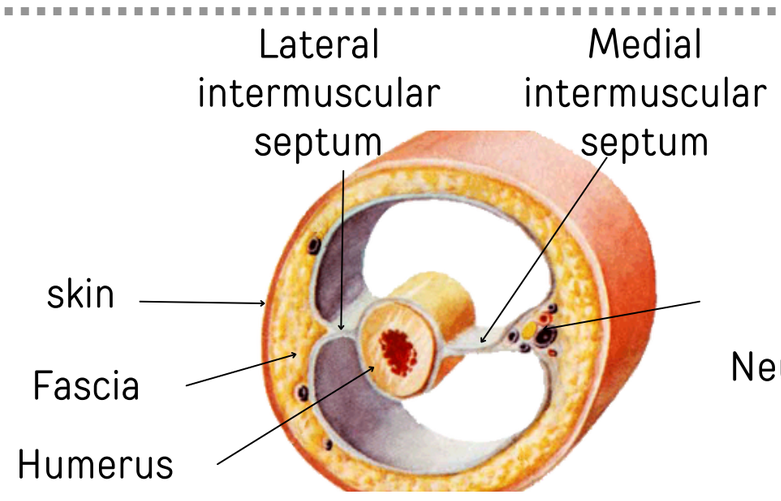
Anterior view **Posterior view**

Transverse section

The lateral and medial intermuscular septa divide the arm into two compartments:

-Anterior (**Flexor compartment**)

-Posterior (**Extensor compartment**)

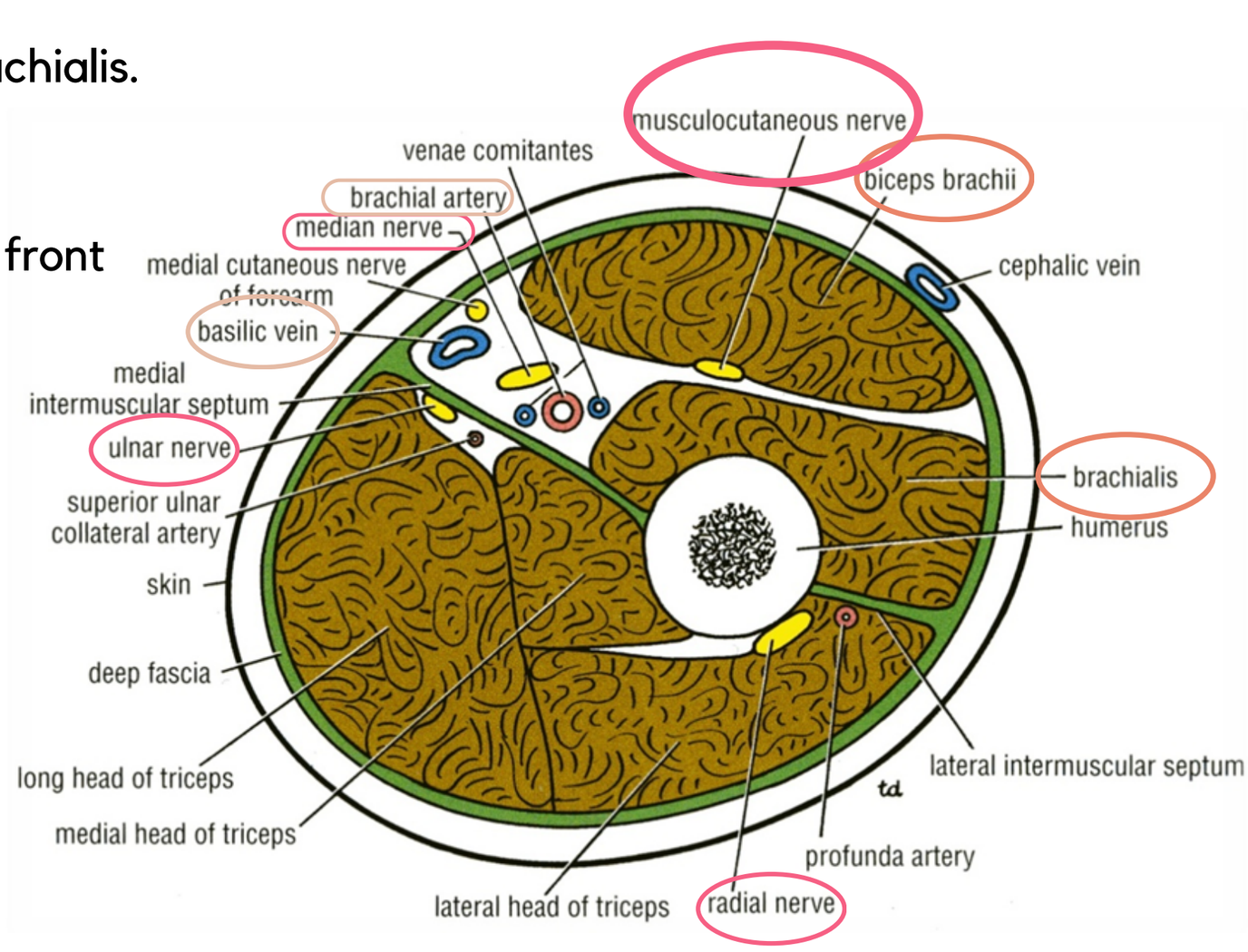


Contents of anterior compartment

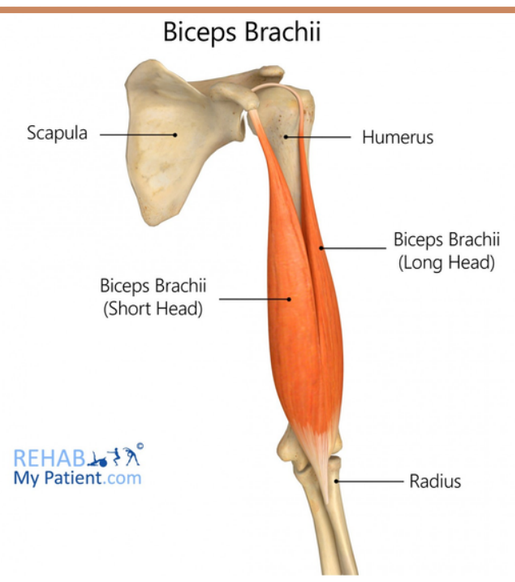
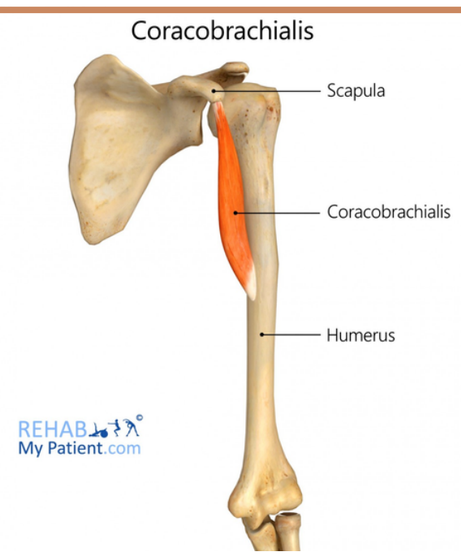
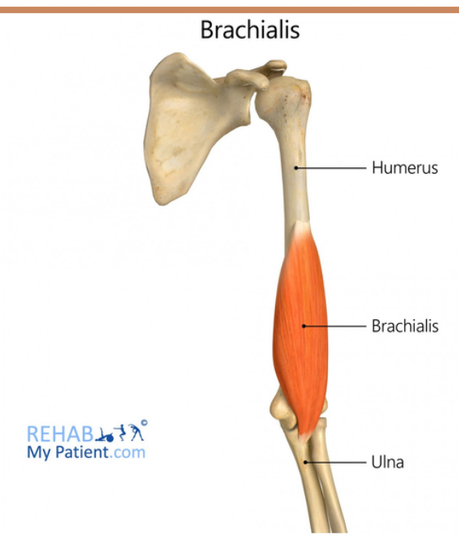
-**Muscles:** Biceps brachii, Coracobrachialis &Brachialis.

-**Blood Vessels:** Brachial artery & Basilic vein.

-**Nerves:** Musculocutaneous (supplies the Ms of front of arm), Other Nerves Median, Radial & Ulnar.

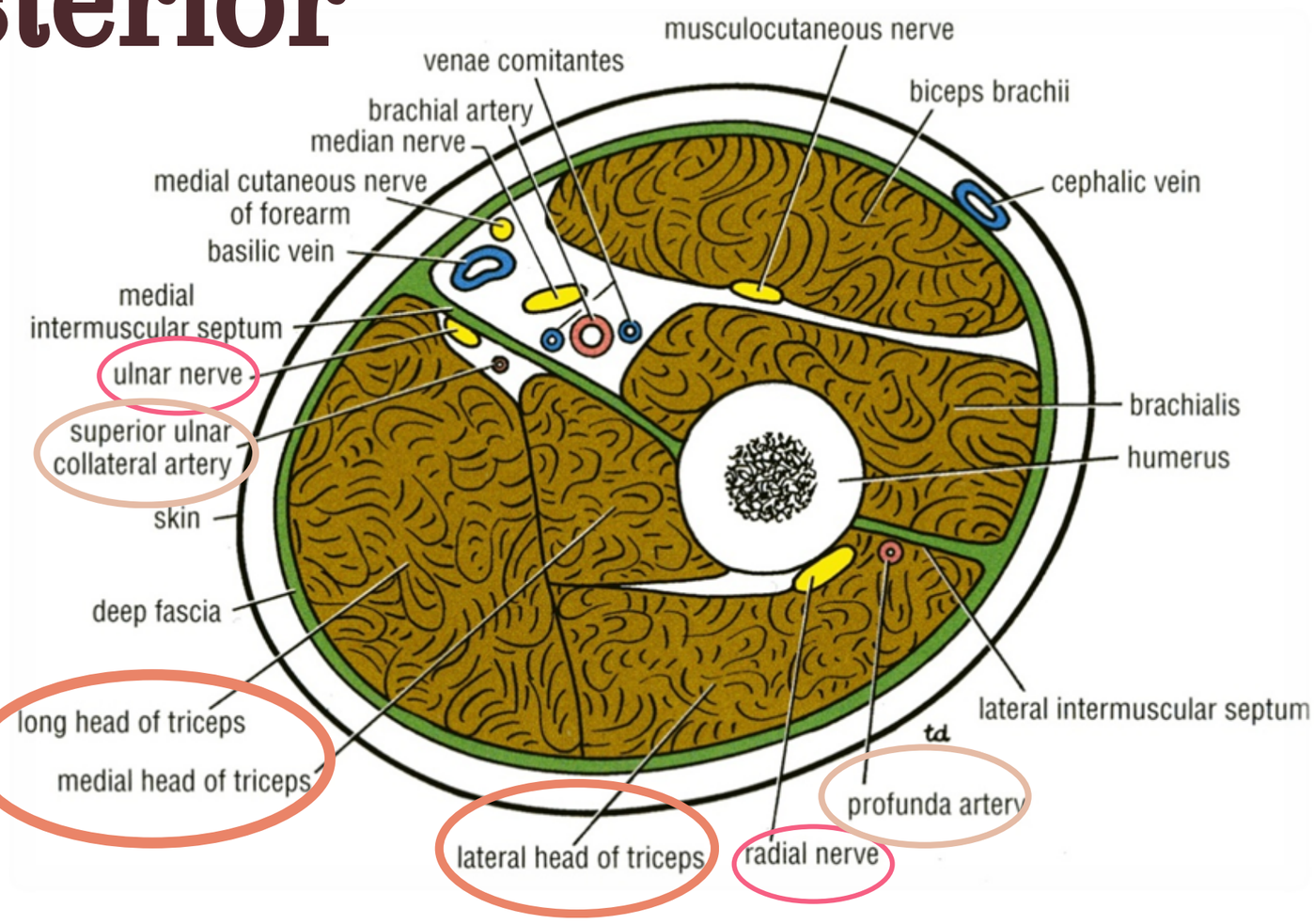


Muscles of the anterior compartment

Muscles	biceps brachii	Coaracobrachialis	brachialis
origin	-Long head (Lateral head): from supraglenoid tubercle of scapula (intracapsular). -Short head: the tip of coracoid process of scapula. The two heads join in the middle of the arm.	Tip of the coracoid process of scapula (with short head of biceps brachii).	Front of the lower half of humerus.
insersion	into the posterior part of **radial tuberosity** **by tendon.** into the **deep fascia** of the medial aspect of forearm through bicipital aponeurosis.	Middle of the medial side of the shaft of the humerus.	Anterior surface of coronoid process of ulna.
nerve supply	**Musculocutaneous**		-Musculocutaneous (medial part). -Radial (lateral part).
action	• **Strong supinator** of the forearm used in screwing. • **Powerful flexor** of elbow (the main elbow flexor). • **Weak flexor** of shoulder	• **Flexor.** • **Weak adductor** of the arm.	**Strong flexor** of the forearm.
pictures			

Contents of posterior compartment

- Muscles: Triceps.
- Vessels: Profunda brachii & Ulnar collateral arteries.
- Nerves: Radial & Ulnar.



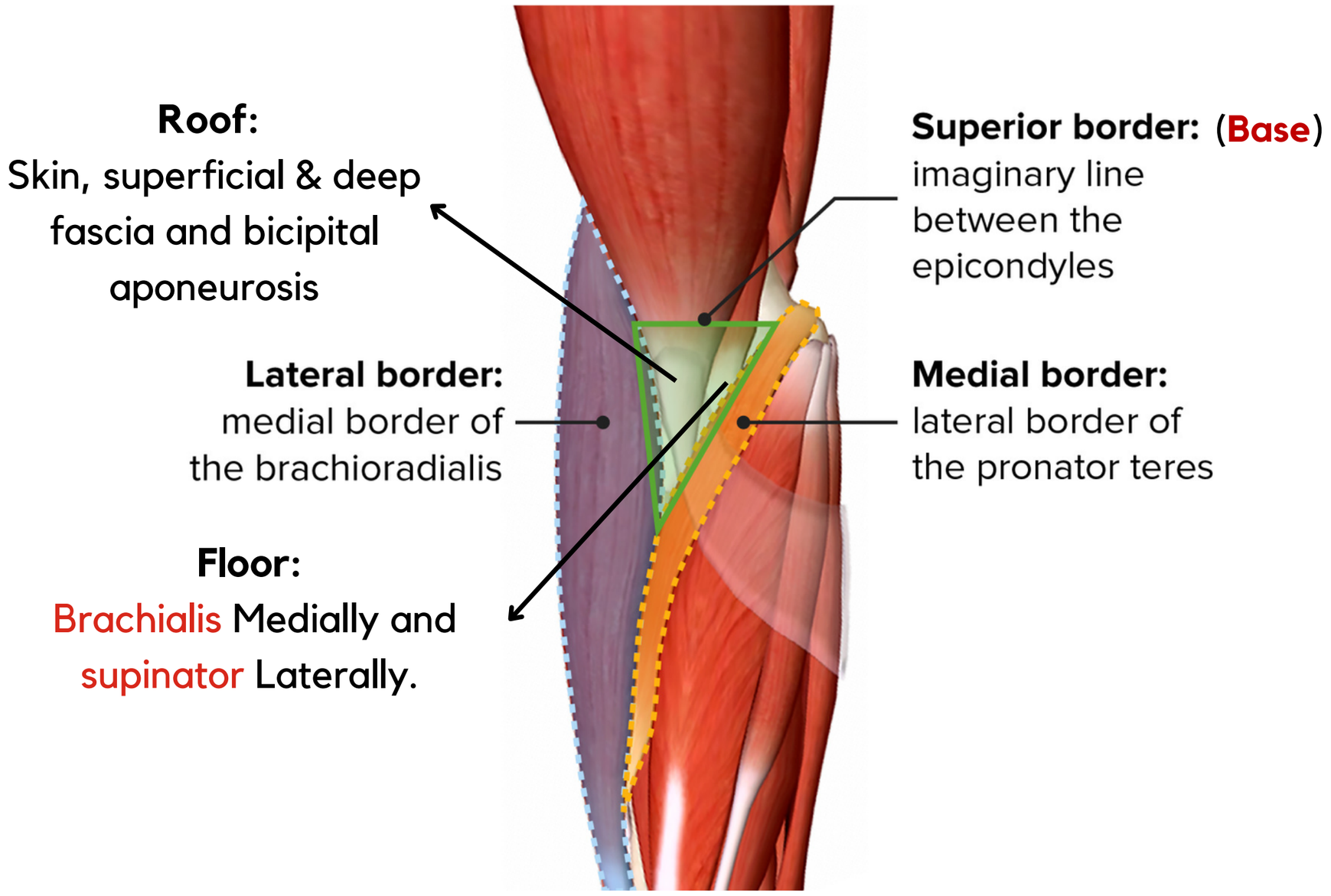
Triceps brachii:

origin	• **Long Head:** from infraglenoid tubercle of the scapula. • **Lateral Head:** from the upper half of the posterior surface of the shaft of humerus above the spiral groove. • **Medial Head:** from the lower half of the posterior surface of the shaft of humerus below the spiral groove
insertion	Common tendon inserted into the upper surface of the olecranon process of ulna.
nerve supply	Radial nerve.
action	Strong extensor of the elbow joint.

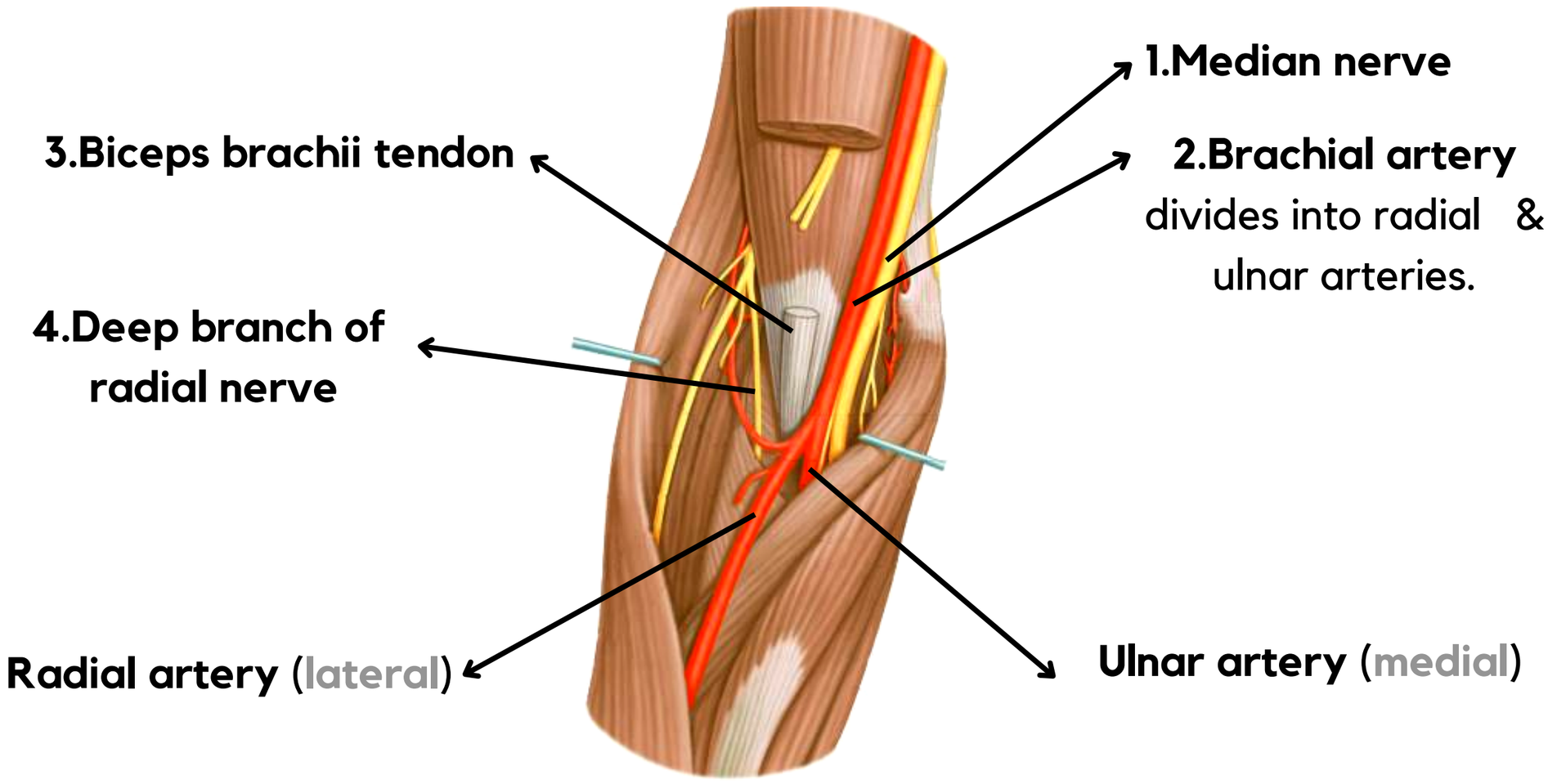
Cubital Fossa

- It is an area of transition between the anatomical arm and the forearm.
- is a triangular depression that lies in front of the elbow

Boundaries of cubital Fossa



Contents of cubital Fossa



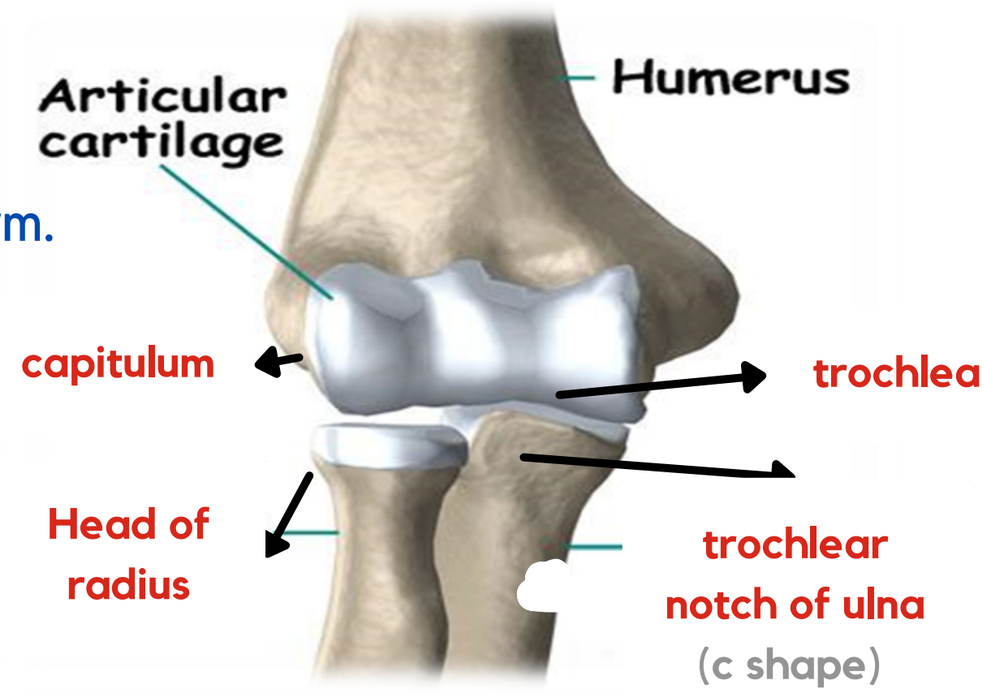
(From medial to lateral side)

Elbow joint

- The elbow is the joint connecting the upper arm to the forearm.
- **class:** Uniaxial, Synovial Hinge joint
- **consists** of two separate articulations:

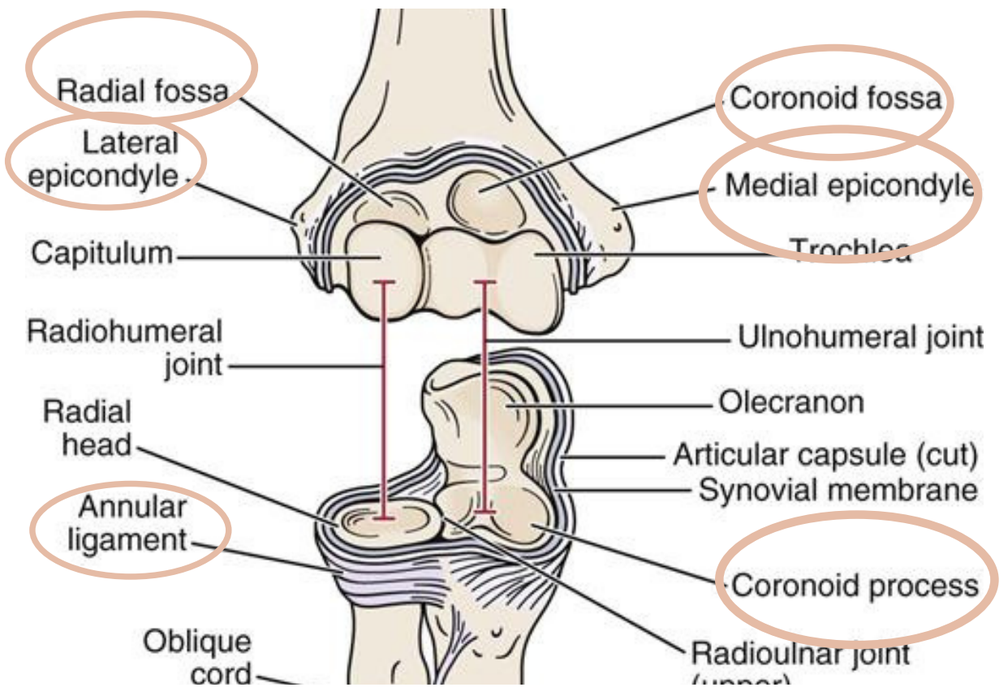
1. Trochlea and capitulum of the humerus above.
2. Trochlear notch of ulna and the head of radius below.

- The articular surfaces are covered with articular (hyaline) cartilage.

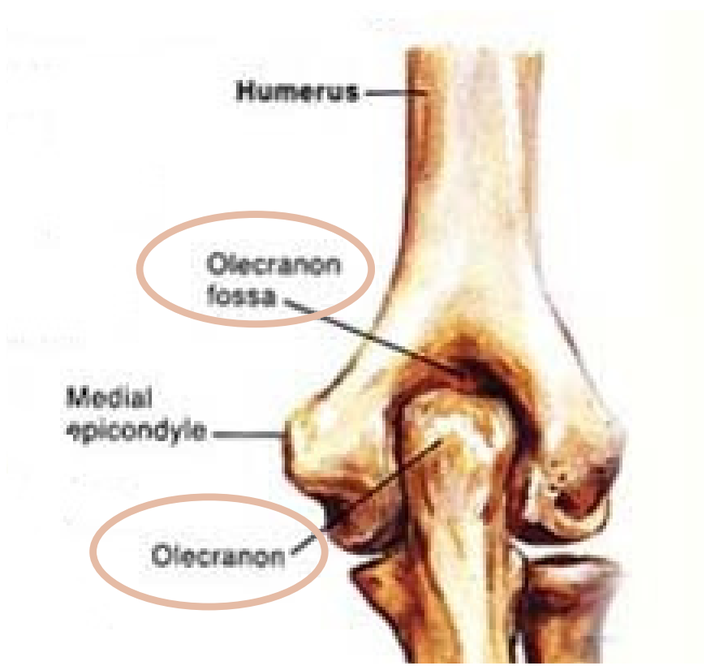


Capsule

capsule	above	below
anteriorly	To the humerus along the upper margins of the coronoid and radial fossa and to the front of the medial and lateral epicondyles.	To the margin of the coronoid process of the ulna and to the annular ligament, which surrounds the head of the radius.
posteriorly	To upper margins of the olecranon fossa of the humerus.	To the upper margin and sides of the olecranon process of the ulna and to the annular ligament.



(Anterior)



(Posterior)

Boys' Slides

Bursae

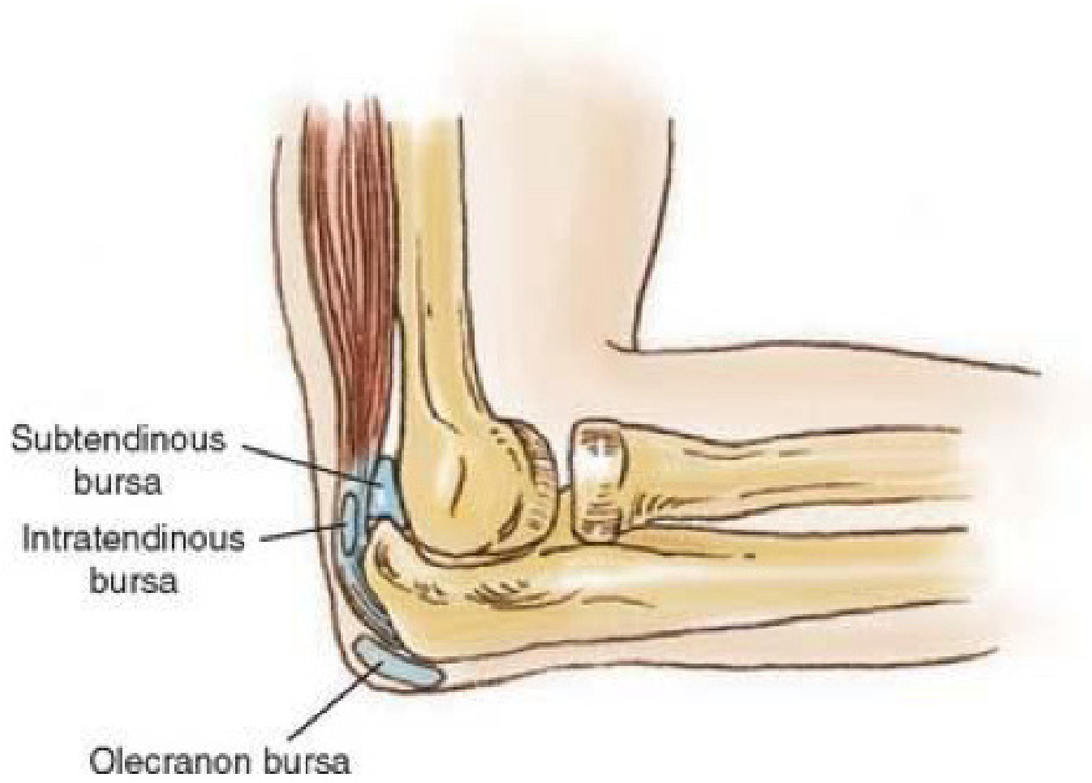
A bursa is a membranous sac filled with synovial fluid.

- It acts as a cushion to reduce friction between the moving parts of a joint, limiting degenerative damage.
- There are many bursae in the elbow, but only a few have clinical importance:

1. **Intratendinous** located within the tendon of the triceps brachii.

2. **Subtendinous** between the olecranon and the tendon of the triceps brachii, reducing friction between the two structures during extension and flexion of the arm.

3. **Subcutaneous** (olecranon) between the olecranon and the overlying connective tissue (implicated in olecranon bursitis).



Ligaments

Lateral (radial collateral) ligament:

Shape
- Triangular

Apex
- Attached to the lateral epicondyle of humerus.

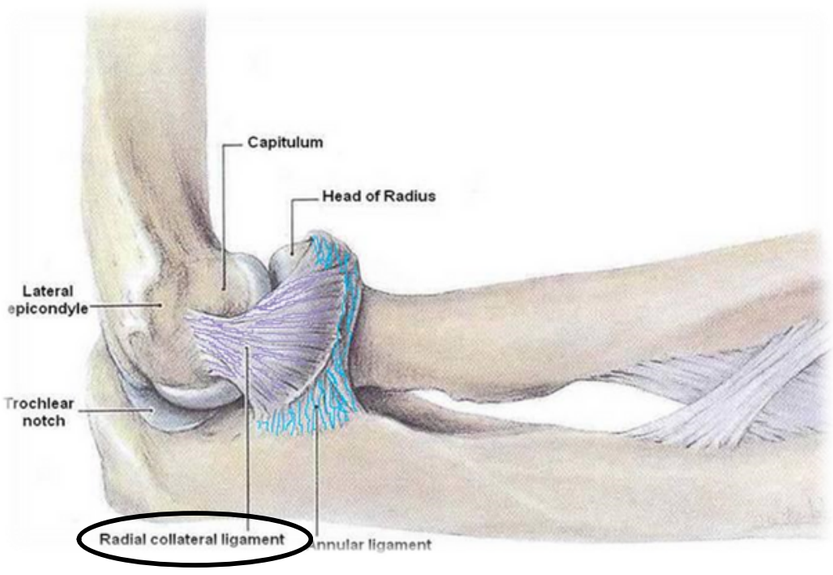
Base
- Attached to the upper part of the annular ligament.

Medial (ulnar collateral) ligament:

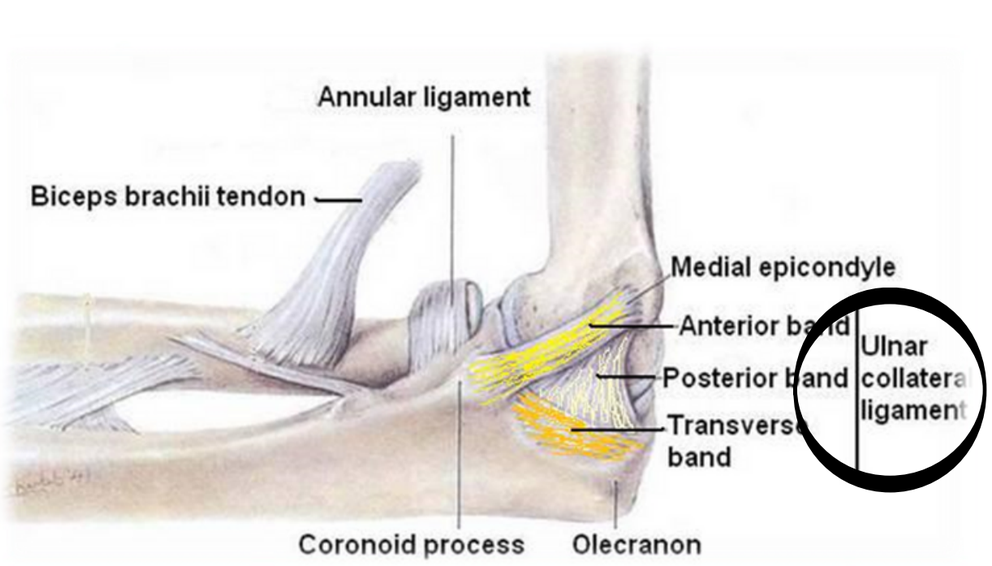
Anterior
- Strong cord-like band Between medial epicondyle and the coronoid process of ulna.

Posterior
- Weaker fan-like band, Between medial epicondyle of humerus and the olecranon process of ulna.

Transverse
- A band passes between the anterior and posterior bands.



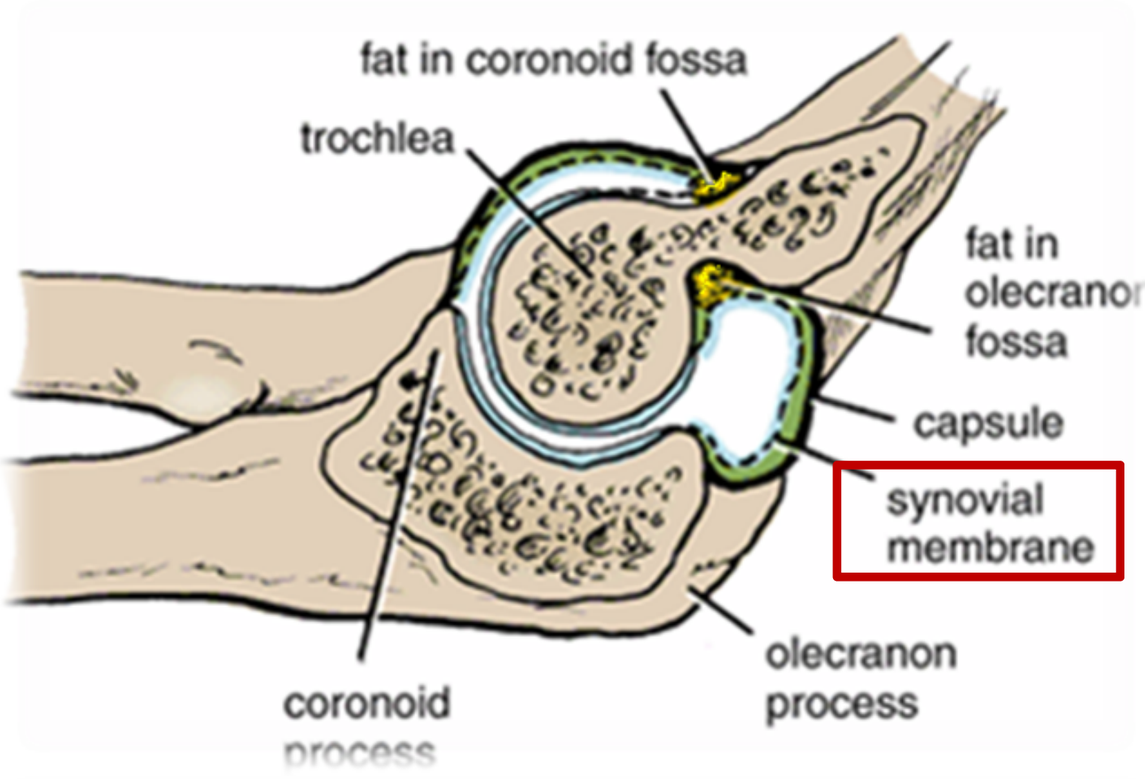
(Lateral)



(medial)

Synovial Membrane

- This lines the inner surface of the capsule and covers fatty pads in the floors of the coronoid ,radial (ant.in humerus) and olecranon fossa (Post. In humerus).
- Is continuous below with synovial membrane of the superior radioulnar joint



Relations

Bursae around the elbow joint:

- Subcutaneous olecranon bursa
- Subtendinous olecranon bursa

N.B : **Median N**. Lies in front of lateral epicondyle.

Anterior

- Brachialis
- Tendon of biceps.
- median nerve
- brachial artery

Posterior

- Triceps muscle
- Small bursa intervening. (between elbow joint and tendon of triceps)

Medial

- Ulnar nerve

Considered the largest unprotected nerve by muscle or bone (lies behind medial epicondyle).

Lateral

- Common extensor tendon (attached to lateral epicondyle of the humerus) & supinator

Movements

types of movements

Extension → Is limited by the tension of the anterior cord ligament (medial collateral lig.) and the brachialis muscle.

Flexion → Is limited by the anterior surfaces of the forearm and arm coming into contact.

The joint is supplied by branches from the:

1- Median

2- Ulnar

3- Musculocutaneous

4- Radial nerves

Carrying Angle

Angle: Between the long axis of the extended forearm and the long axis of the arm

Opens: Laterally

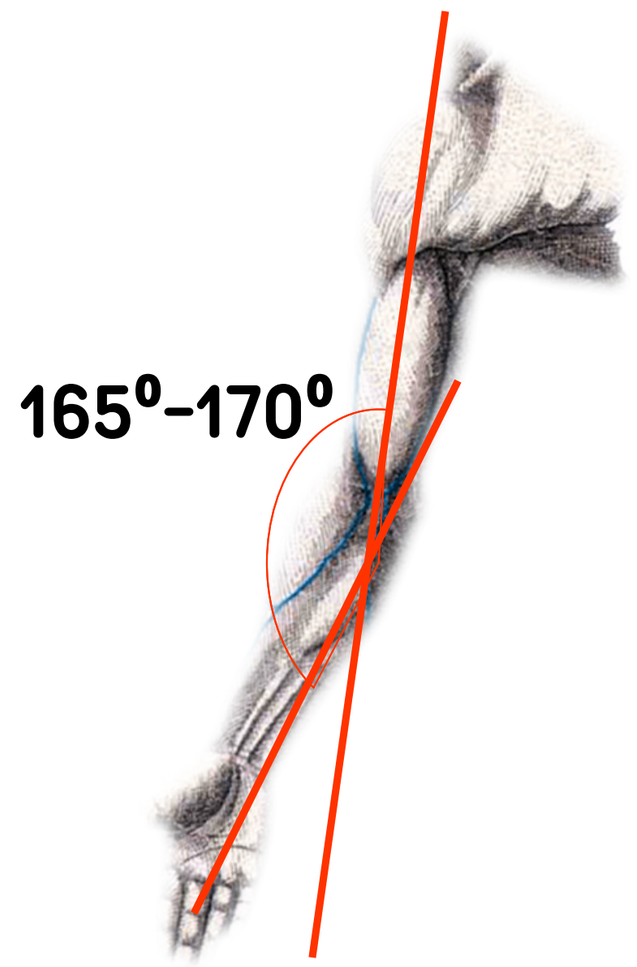
Degree: 170 degrees in male /and 167 degrees in females

Disappears: When the elbow joint is flexed

Permits:

-The forearms to clear the hips in swinging movements during walking,

-it is important when carrying objects.



Applied Anatomy

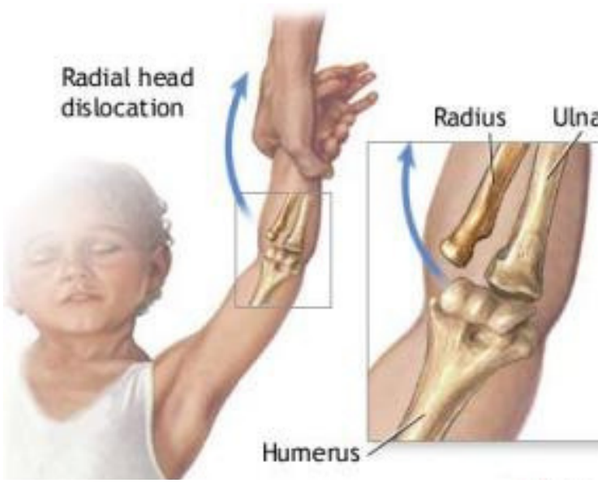
The elbow joint is stable because of the:

- Wrench-shaped articular surface of the olecranon and the pulley-shaped trochlea of humerus
- Strong medial ligament and lateral ligaments. (Esecially medial)

Elbow dislocations

are common & mostly Posterior

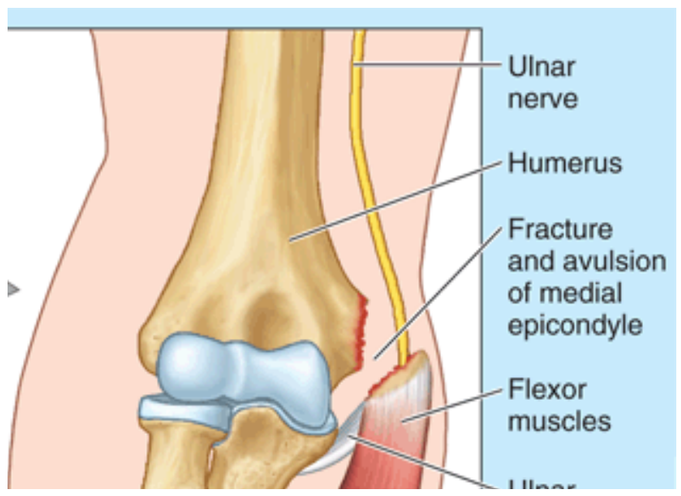
- **Posterior dislocation** usually follows **falling on the outstretched hand** with the elbow in **full extension**.
- **Posterior dislocations** of the joint are **common in children** because the parts of **the bones** that stabilize the joint are **incompletely developed.**

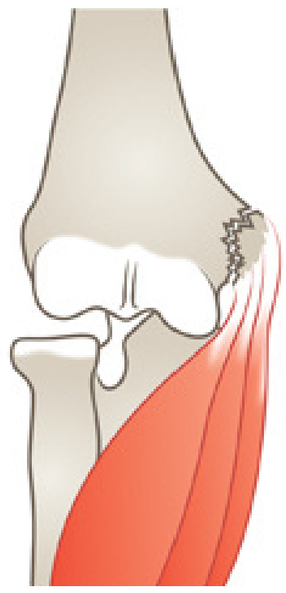


Avulsion fracture of the epiphysis of the medial epicondyle of humerus

is also common in **childhood** because the **medial ligament** is much **stronger** than the bond of union between the epiphysis and the diaphysis.

- They are usually **<u>result from</u>** an avulsion (pull off) injury <u>caused by :</u> a <u>valgus stress at the elbow</u> and contraction of the flexor muscles **<u>as in</u> :**
- fall on an outstretched hand with the elbow in full extension.
- posterior elbow dislocation.
- direct blow.

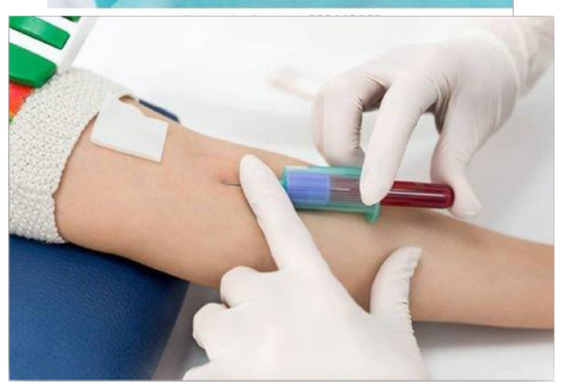




Applied Anatomy

Boys' Slides

Clinical Notes



- The brachial pulse can be felt by palpating immediately medial to the biceps tendon in the cubital fossa.
- The median cubital vein is located superficially within the roof of the cubital fossa.
- It connects the basilic and cephalic veins and can be accessed easily – this makes it a common site for venipuncture.

Bursitis

- Subcutaneous bursitis

• Repeated friction and pressure on the bursa can cause it to become inflamed.

• Because this bursa lies relatively superficially, it can also become infected (example, cut from a fall on the elbow)

- Subtendinous bursitis

• This is caused by repeated flexion and extension of the forearm, commonly seen in assembly line workers.

• Usually, flexion is more painful as more pressure is put on the bursa.

MCQs

1 which of the following muscles has a double nerve supply ?

A-Brachialis	B-Biceps brachii	C-Triceps	D-Coracobrachialis

2 The weakness of biceps brachii muscle can indicate trauma to which of the following nerves?

A-Radial nerve	B-Musculocutaneous	C-Ulnar nerve	D-Median nerve

3 Which of the following muscles is responsible of screwing action?

A-Triceps brachii	B-Biceps brachii	C-Brachialis	D-Coracobrachialis

4 Which of the following nerves supply the elbow joint?

A-Median nerve	B-Ulnar nerve	C-Radial nerve	D-A,B and C

5 Which of the following nerves is largest unprotected nerve by muscles or bones?

A-Ulnar nerve	B-Median nerve	C-Radial nerve	D-Musculocutaneous

1-A 2-B 3-B 4-D 5-A

MCQs

6 **Which of the following is the type of elbow joint?**

A-Saddle joint	B- Pivot joint	C-Hinge joint	D-Ball-and socket joint

7 **It extends from the medial epicondyle to the coronoid process and the olecranon of the ulna?**

A-Annular ligament	B-Ulnar collateral ligament	C-Radial collateral ligament	D-Transverse ligament

8 **The carrying angle is formed____by the axis of the arm and the axis of the extended forearm**

A- Anteriorly	B- Posteriorly	C- Laterally	D- Medially

9 **Which of the following muscles is a strong extensor of the elbow joint?**

A-Triceps brachii	B- Biceps brachii	C- Brachialis	D-Coracobrachialis

10 **Which of the following is included in the floor of the cubital fossa?**

A- Pronator teres	B-Brachioradialis	C- Coracobrachialis	D-Brachialis

6-C 7-B 8-C 9-A 10-D

SAQs

1

Which nerve is medial to the brachial artery in the cubital fossa?

🔑 Median nerve

2

Which nerve is most at risk of injury from an avulsion fracture of the medial epicondyle of the humerus?

🔑 Ulnar nerve

3

A boy dislocated his elbow posteriorly, what could be the possible cause?

🔑 Falling on his outstretched hand.

ANATOMY
TEAM 444

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