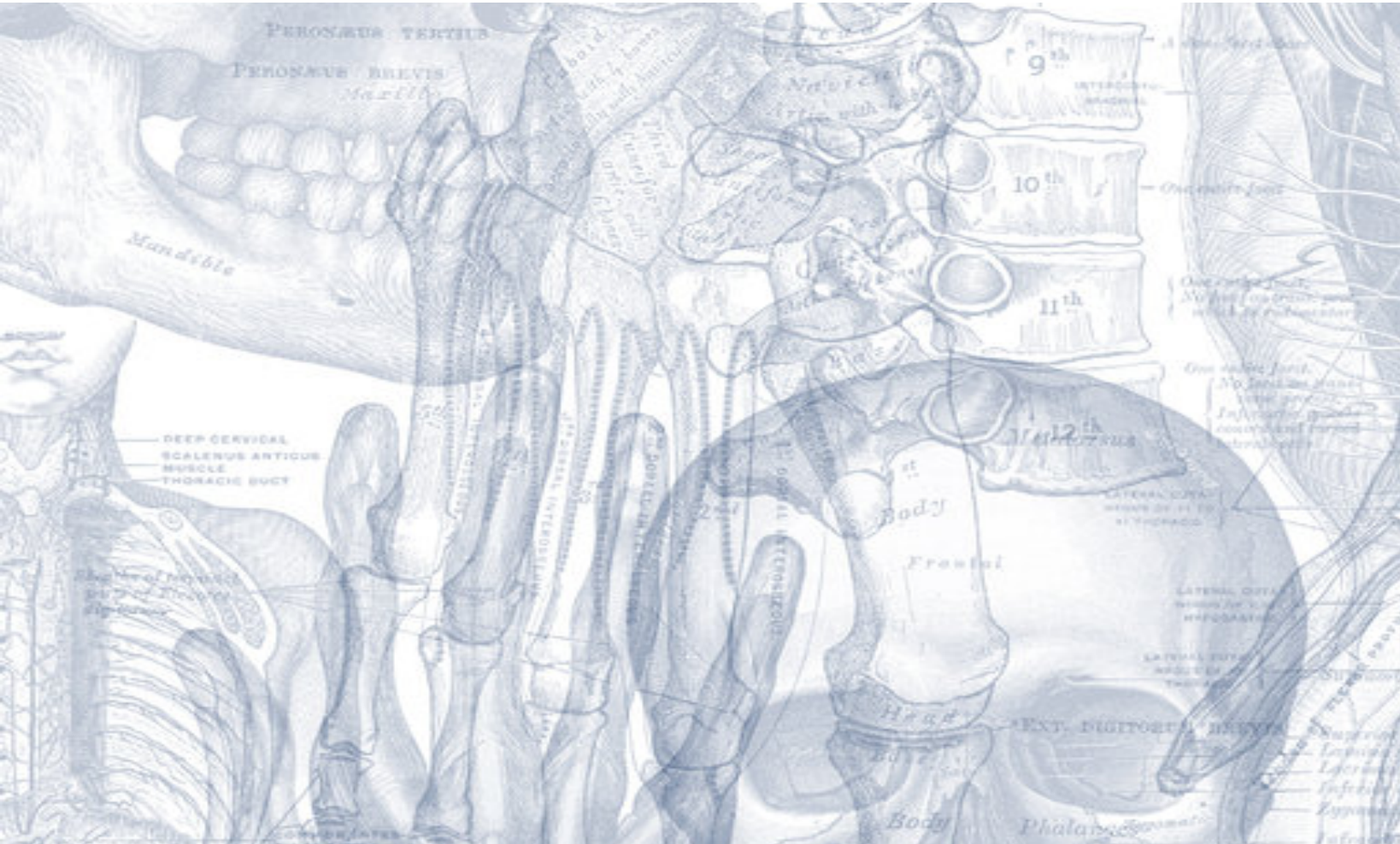


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MEDICINE
KING SAUD UNIVERSITY



ARM AND ELBOW

[Editing file](#)

Color Code

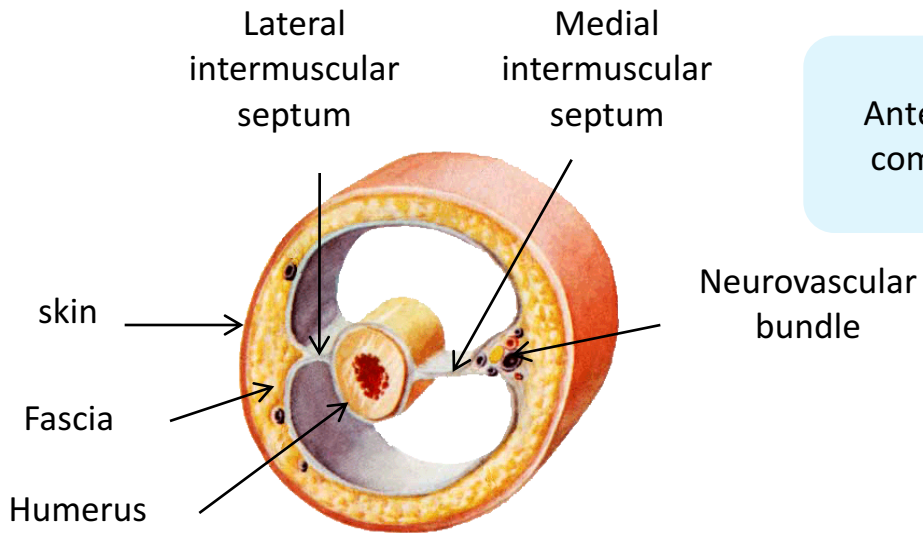
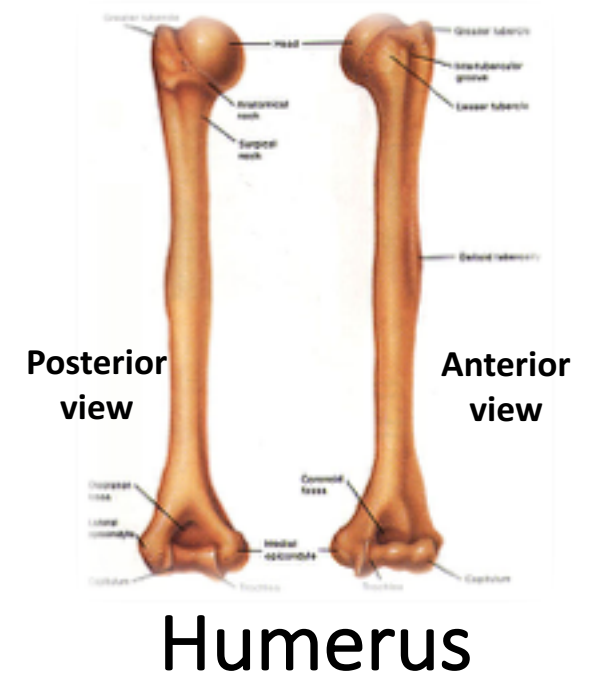
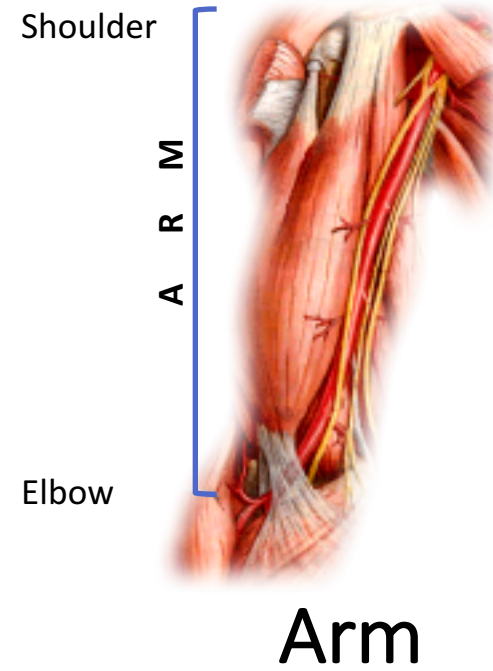
- **Important**
- **Doctors Notes**
- **Notes/Extra explanation**

Objectives

- ✓ Describe the attachments, actions and innervations of:
 - Biceps brachii
 - Coracobrachialis
 - Brachialis
 - Triceps brachii
- ✓ 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.
- ✓ Define the **boundaries of the cubital fossa** and enumerate its contents.

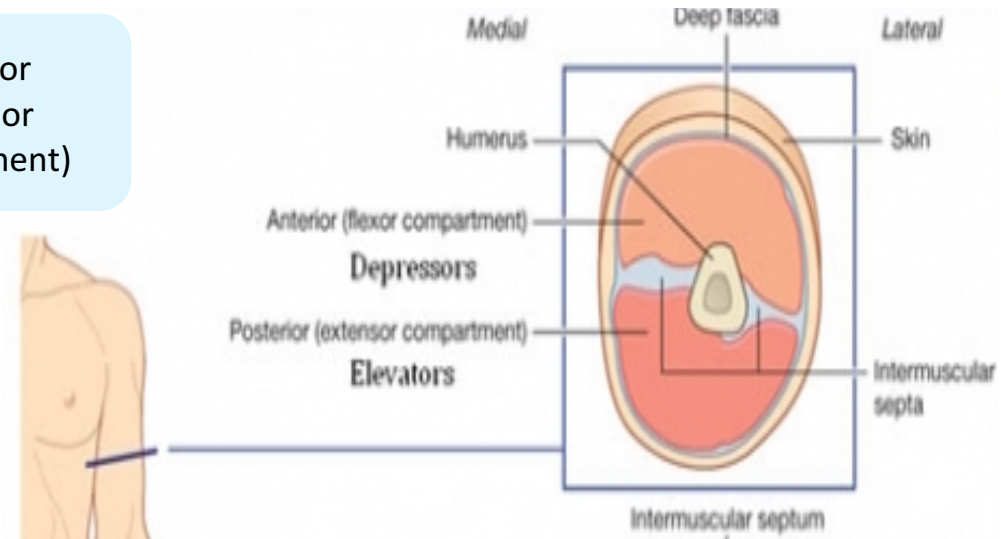
THE ARM:

- An aponeurotic sheet separating various muscles of the upper limbs, including lateral and medial humeral septa.
- The lateral and medial **intermuscular septa** divide the **distal part** of the arm into two compartments:

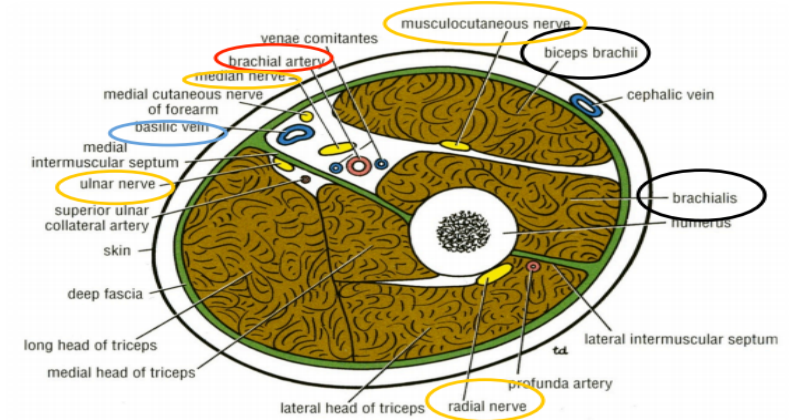


Anterior (flexor compartment)

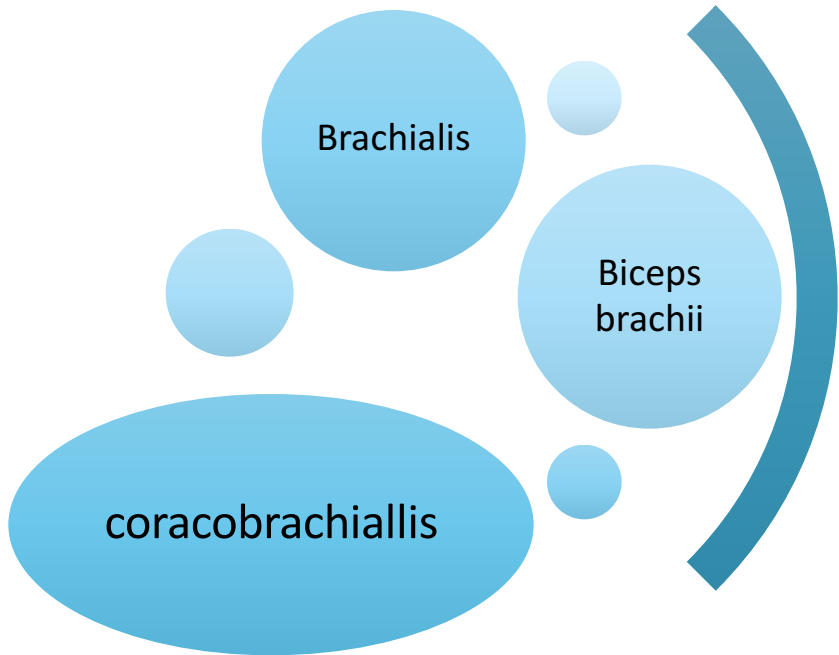
Posterior (extensor compartment)



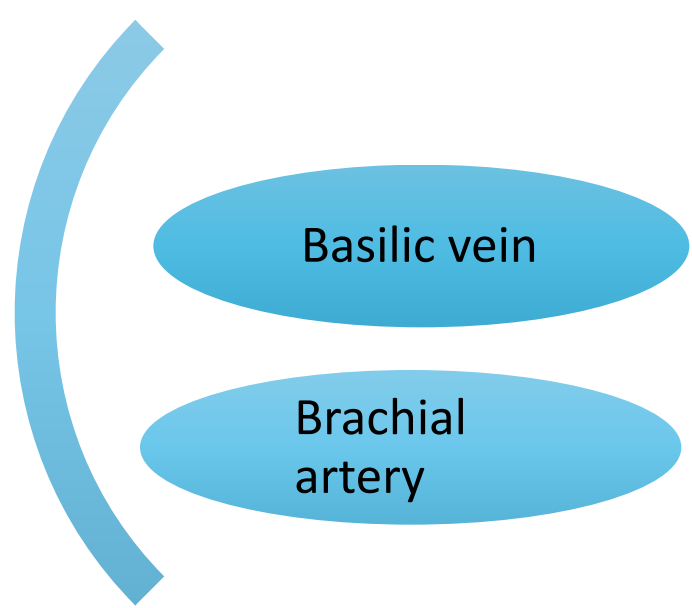
Anterior Fascial Compartment:



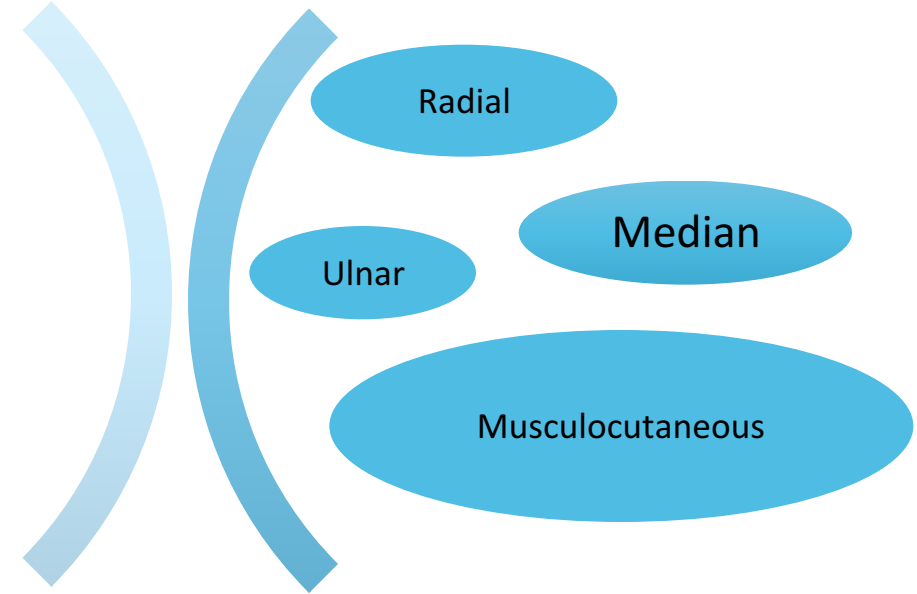
Note: the radial and ulnar nerves begin in the anterior compartment then pierce the intermuscular septum and enter the posterior compartment



muscles



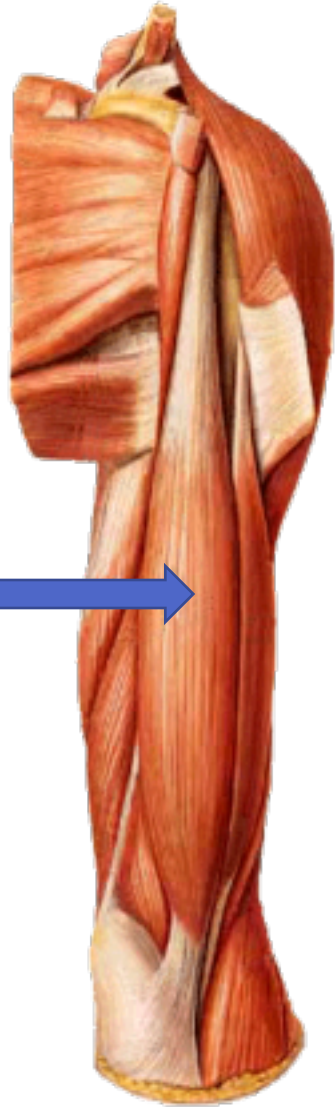
Blood vessels



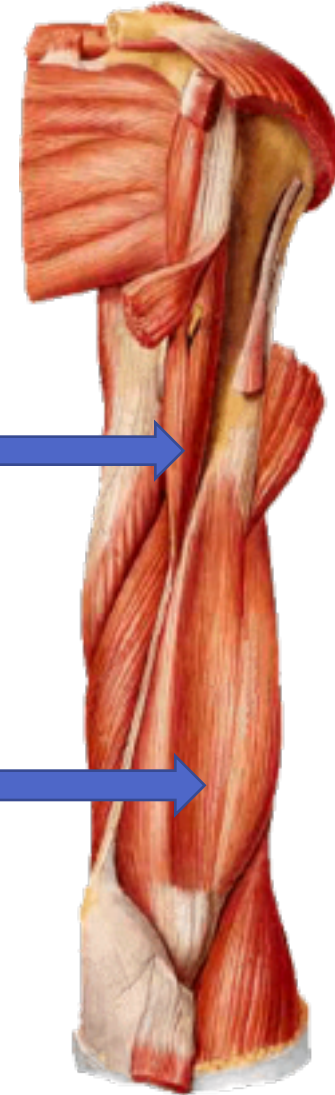
Nerves

Muscles Of Anterior Compartment:

Biceps
Brachii



Coracobrachialis



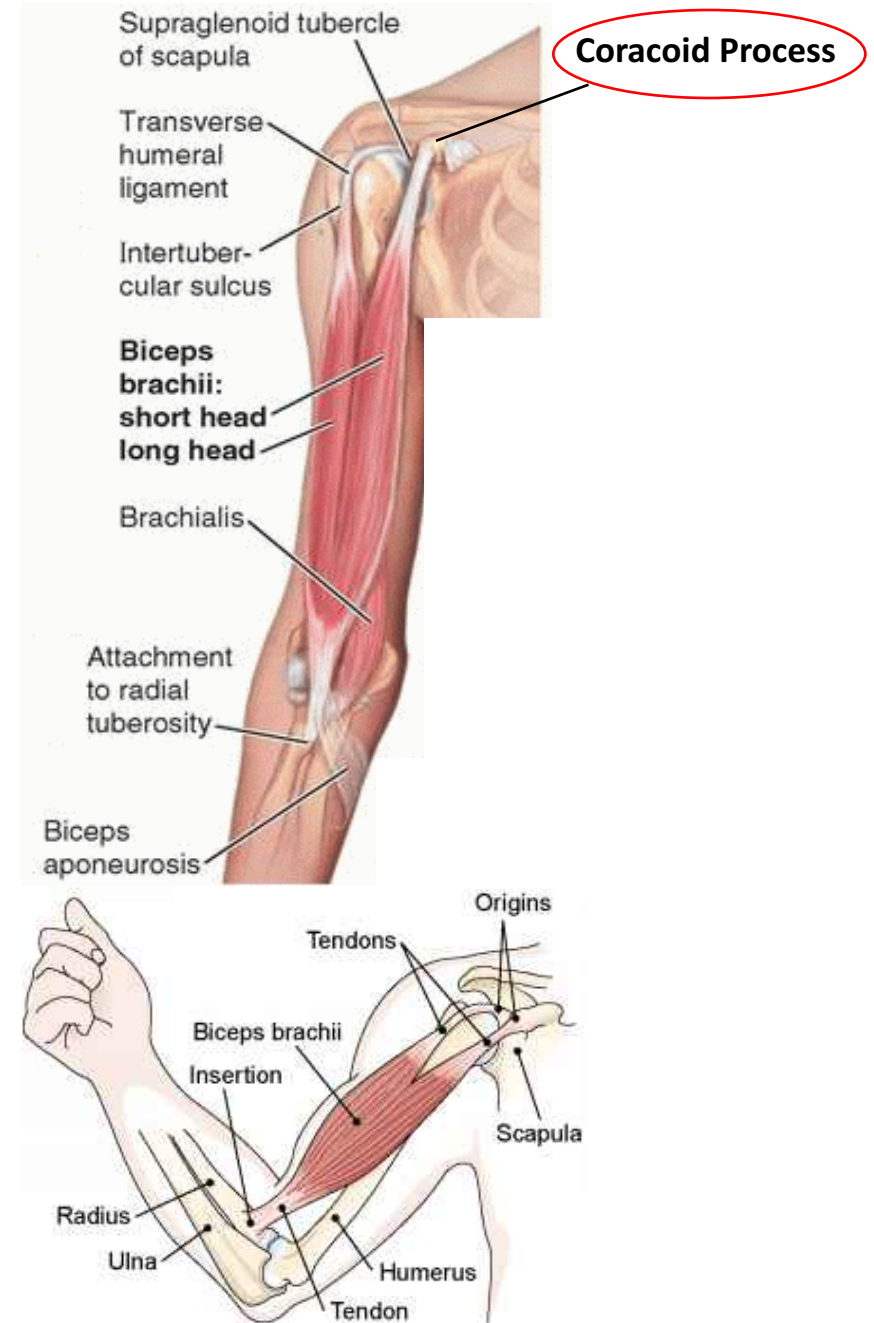
Brachialis



Note: Brachi- means arm so any muscle with brachi in it's name is related to the arm

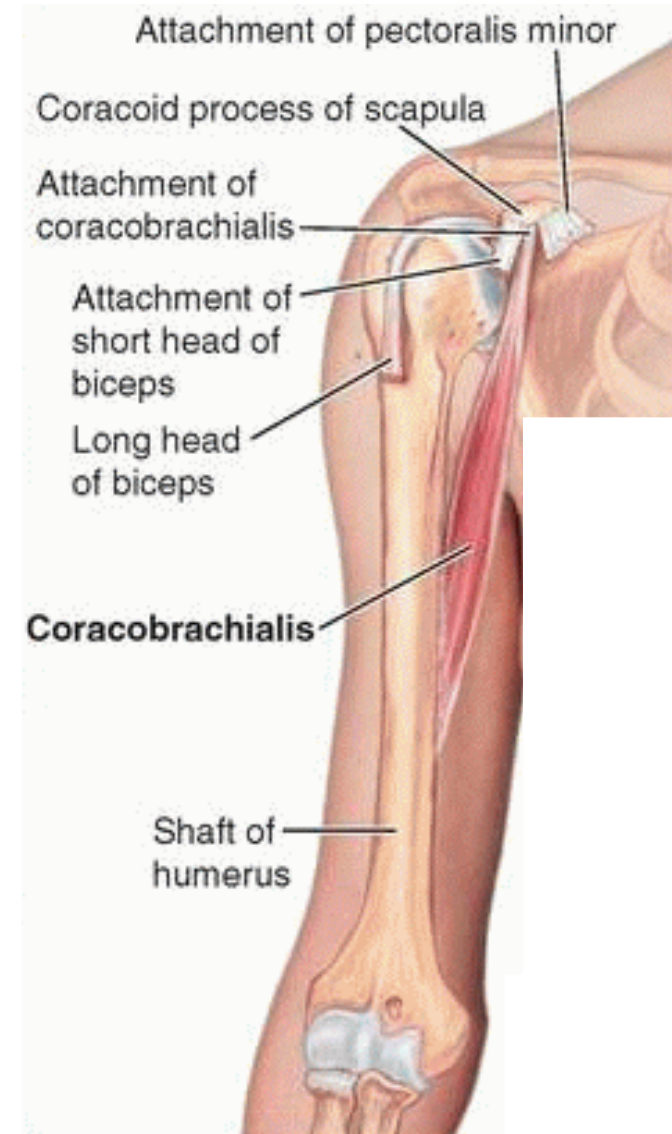
BICEPS BRACHII:

Origin	<ul style="list-style-type: none"> • Long Head from supraglenoid tubercle of scapula (intracapsular) • Short Head from the tip of coracoid process of scapula <p>The two heads join in the middle of the arm</p>
Insertion	<ul style="list-style-type: none"> • In the posterior part of the radial tuberosity. • Into the deep fascia of the medial aspect of the forearm through bicipital aponeurosis.
Nerve Supply	Musculocutaneous
Action	<ul style="list-style-type: none"> • Strong supinator of the forearm ✓ used in screwing. • Powerful flexor of elbow • Weak flexor of shoulder



CORACOBRACHIALIS:

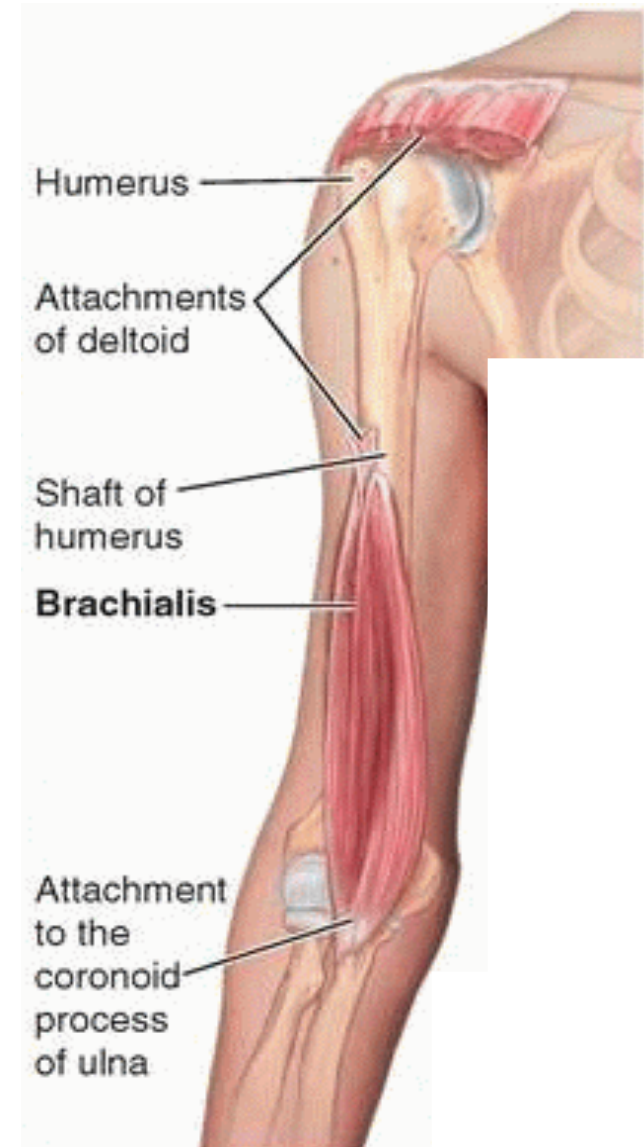
Origin	<ul style="list-style-type: none">• Tip of the coracoid process of scapula (with short head of biceps brachii)
Insertion	Middle of the medial side of the shaft of the humerus
Nerve Supply	Musculocutaneous
Action	<ul style="list-style-type: none">• Flexor &• Weak adductor of the arm



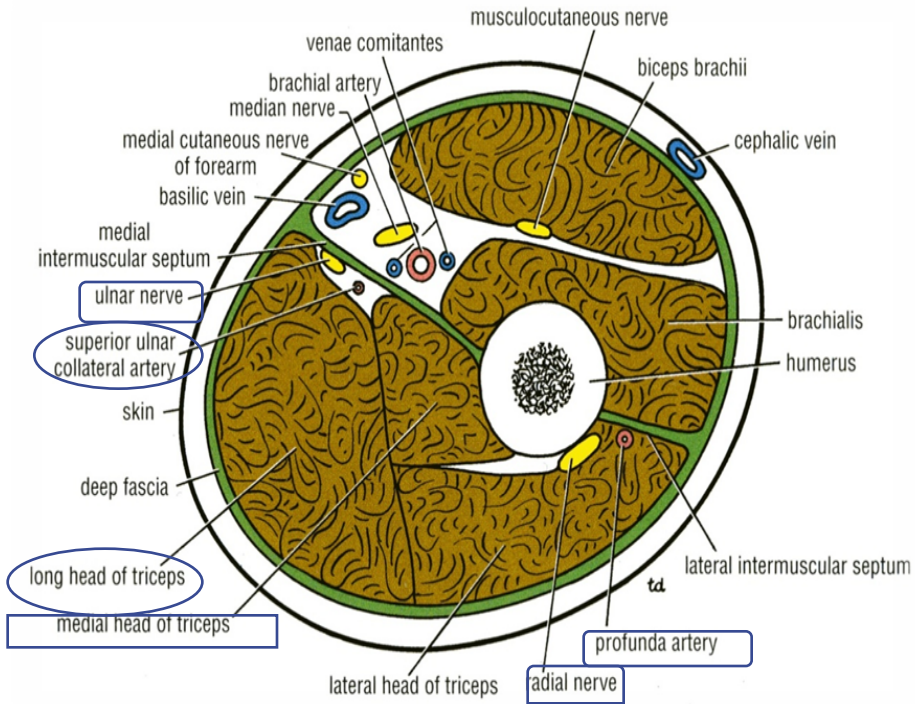
BRACHIALIS:

Origin	<ul style="list-style-type: none">• Front of the lower half of humerus
Insertion	<ul style="list-style-type: none">• Anterior surface of coronoid process of ulna
Nerve Supply	<ul style="list-style-type: none">• Musculocutaneous (medial)• Radial (lateral)
Action	<ul style="list-style-type: none">• <u>Strong flexor</u> of the forearm

The brachialis is innervated by 2 NERVES



Posterior Fascial Compartment:



Nerves:
Radial & ulnar nerves

Vessels :
Profunda brachii (branch from brachial artery) & ulnar collateral arteries

Muscles :
Triceps brachii

TRICEPS BRACHII:

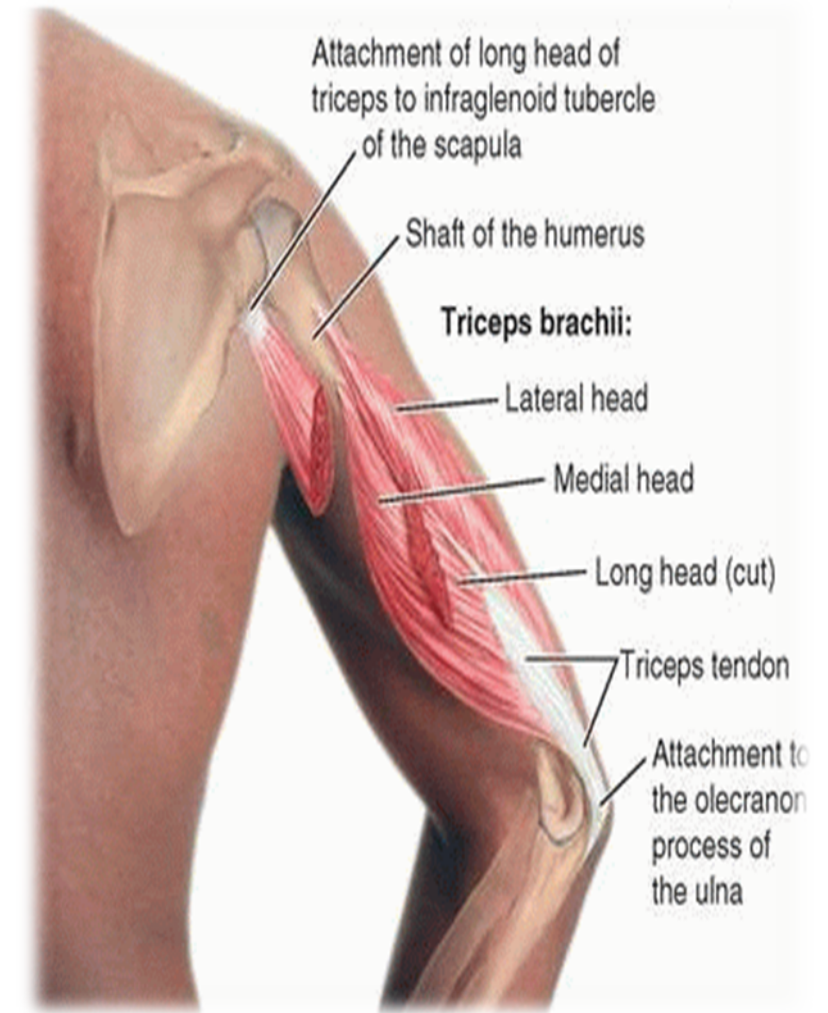
Origin : three heads

- * 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

Action : **Strong extensor** of the elbow joint

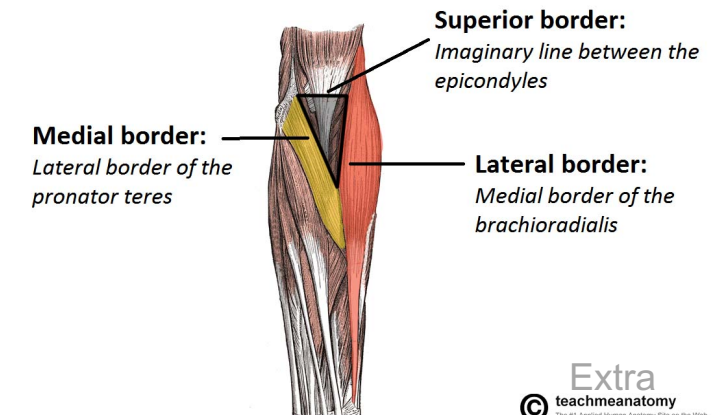
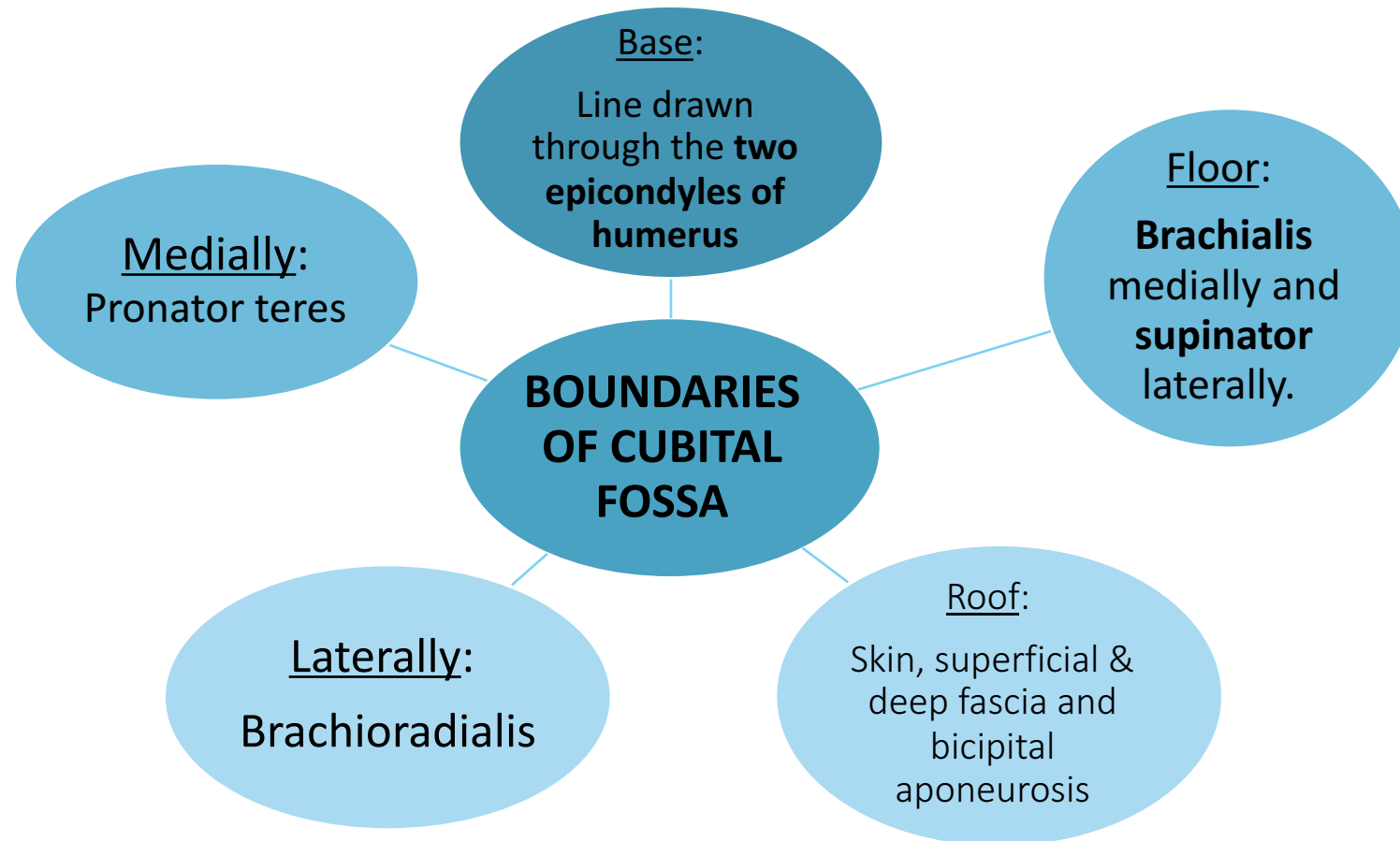
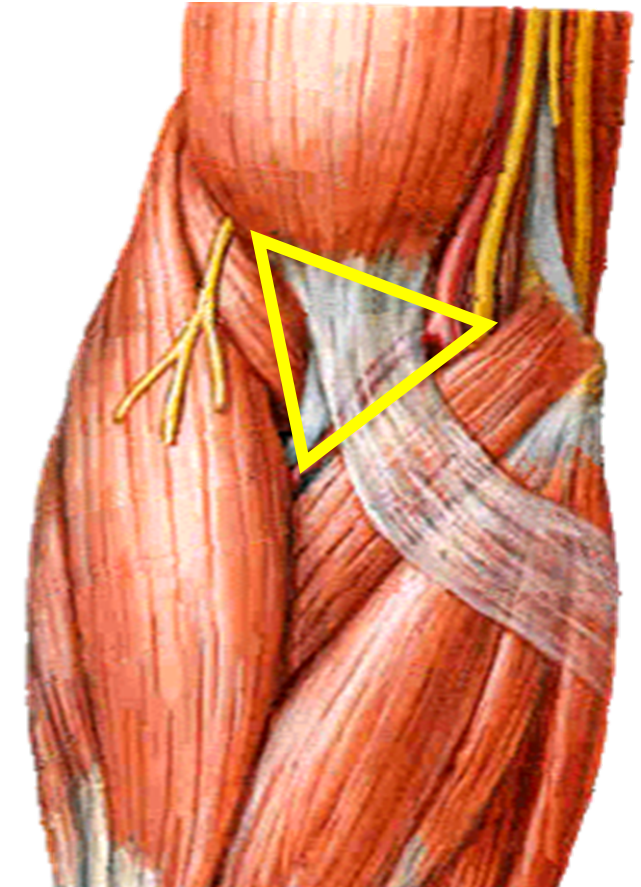
Nerve supply : **Radial nerve**



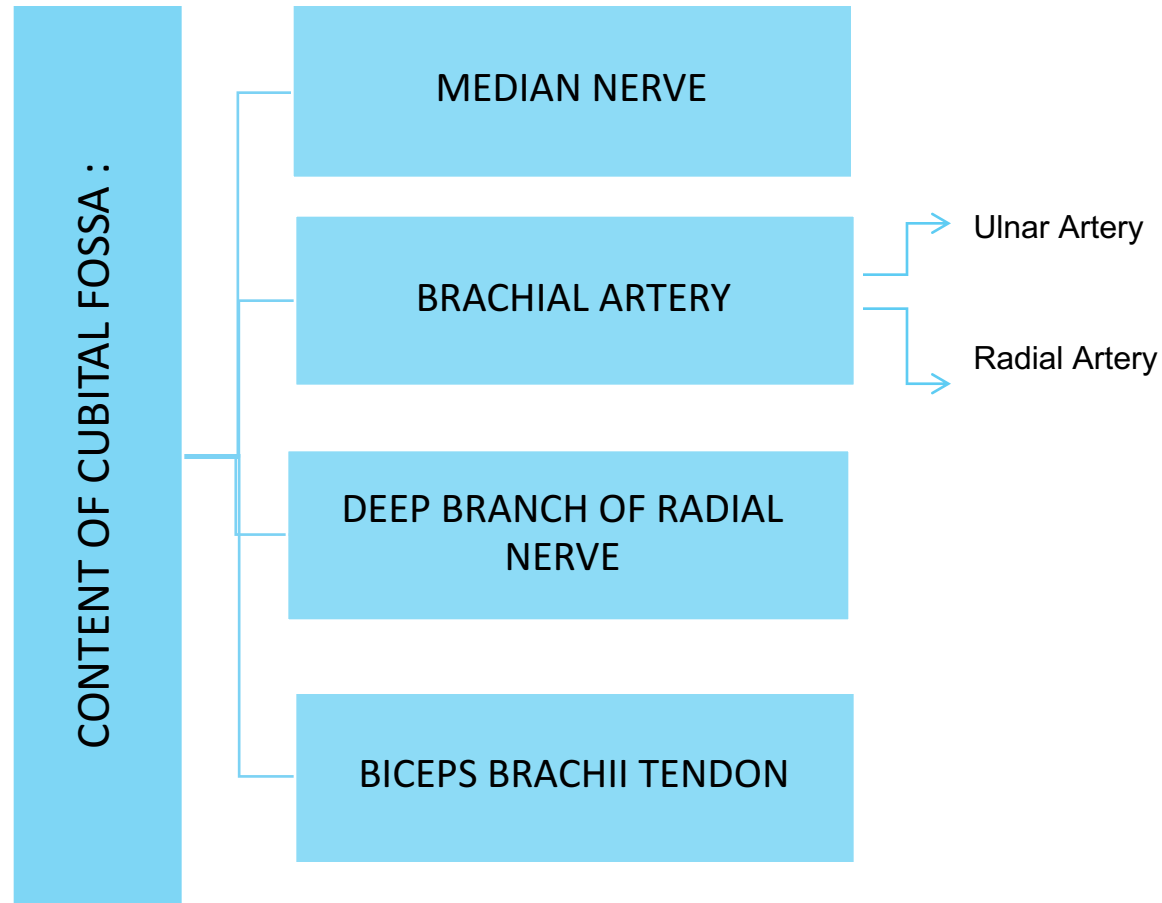
Cubital Fossa:



The cubital fossa is a **triangular depression** that lies in front of the **elbow**.

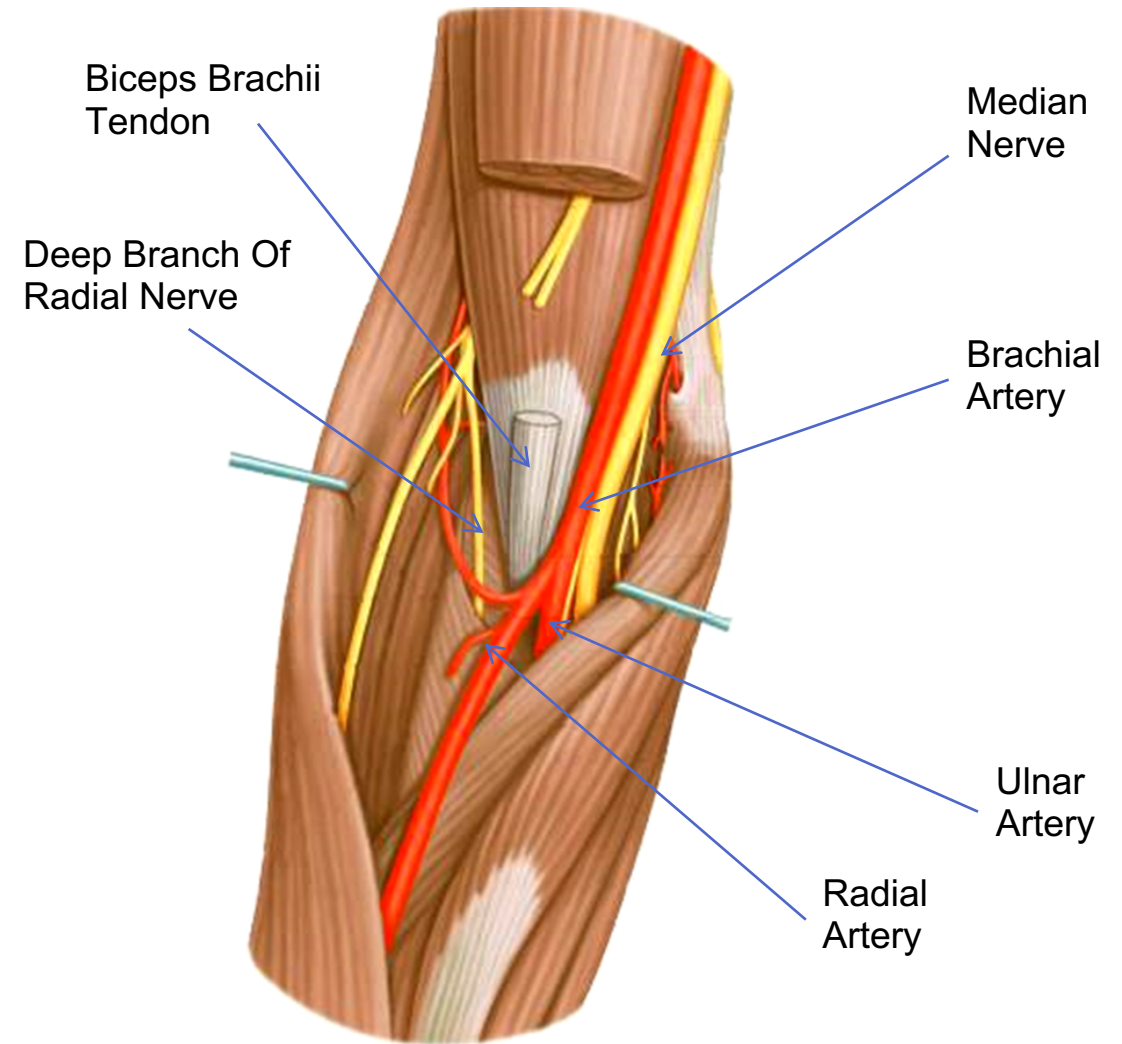


Content Of Cubital Fossa:

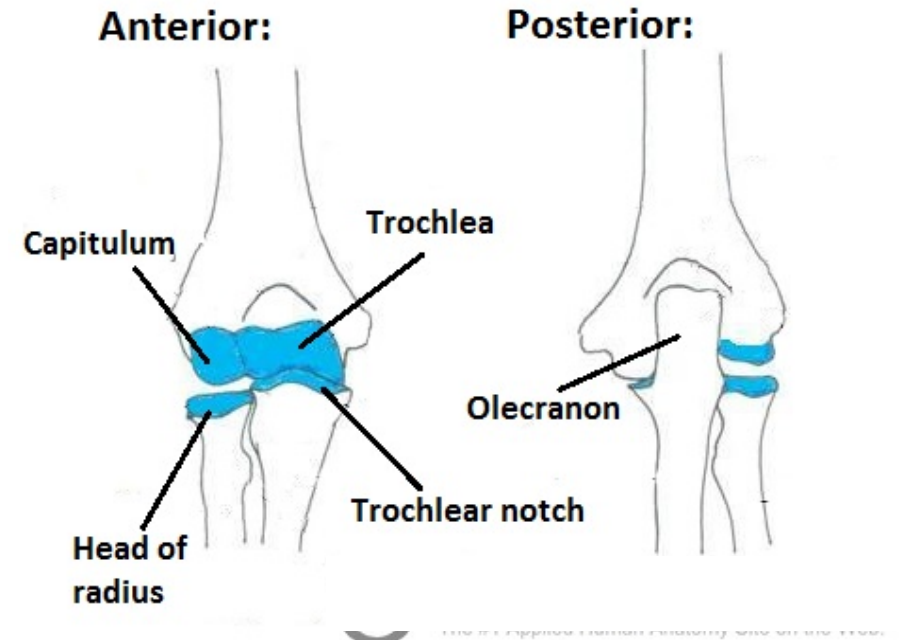
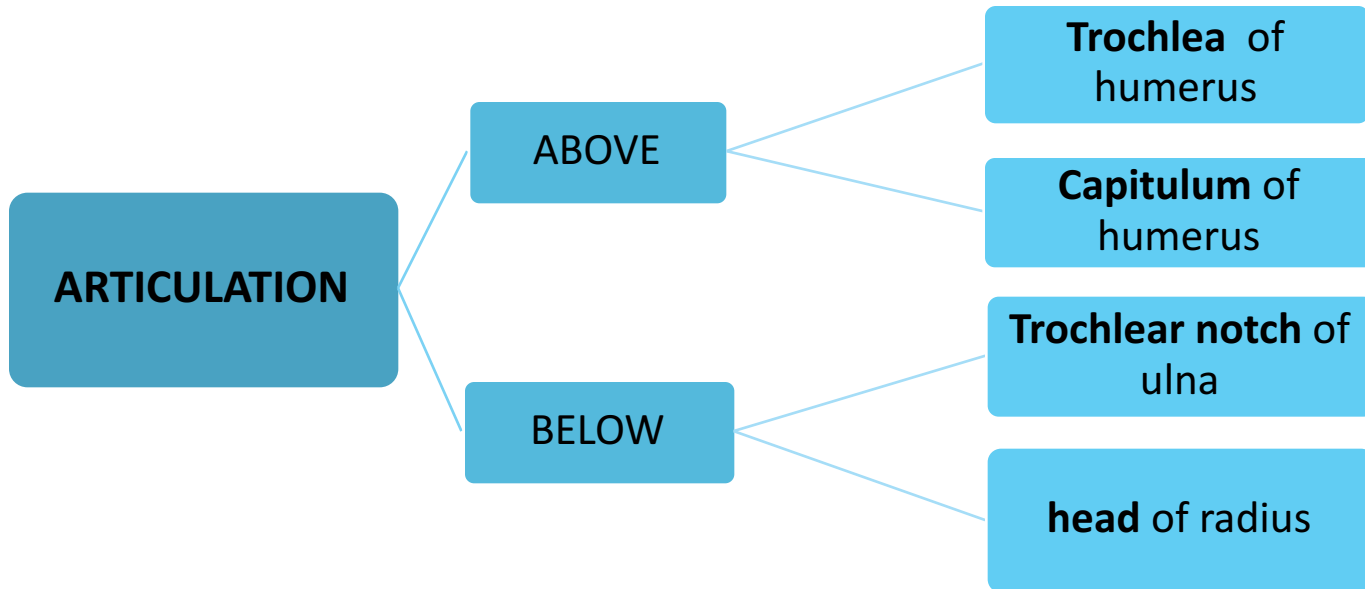


Starts with a Nerve (median nerve) and ends with one (deep branch of radial nerve)

From medial to lateral



Elbow Joint:



▪ Elbow joint is sorted as **Uniaxial, Synovial Hinge Joint**

▪ The articular surfaces are covered with **articular (hyaline) cartilage.**



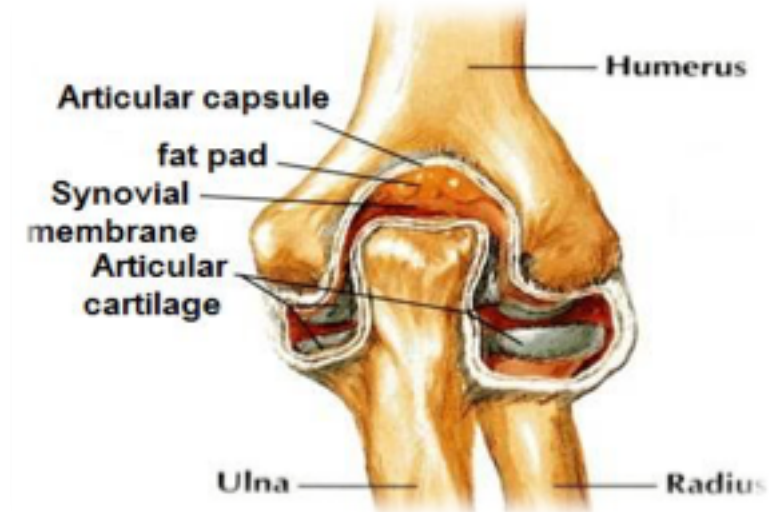
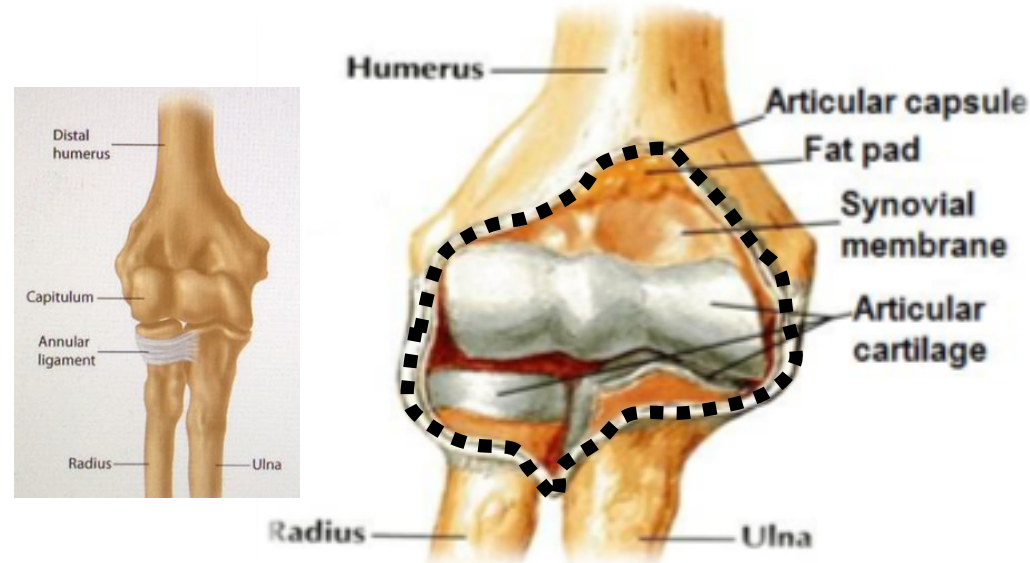
Elbow Joint Capsule:

-ANTERIORLY: Attached

Above:	To the <u>humerus</u> along the upper margins of the coronoid and radial fossa and to the <u>front of the medial and lateral epicondyles</u> .
Below:	To the margin of the coronoid process of the <u>ulna</u> and to the anular ligament , which surrounds the head of the radius.

-POSTERIORLY: Attached

Above	To the margins of the olecranon fossa of the <u>humerus</u> .
Below	To the upper margin and sides of the olecranon process of the <u>ulna</u> and to the anular ligament .



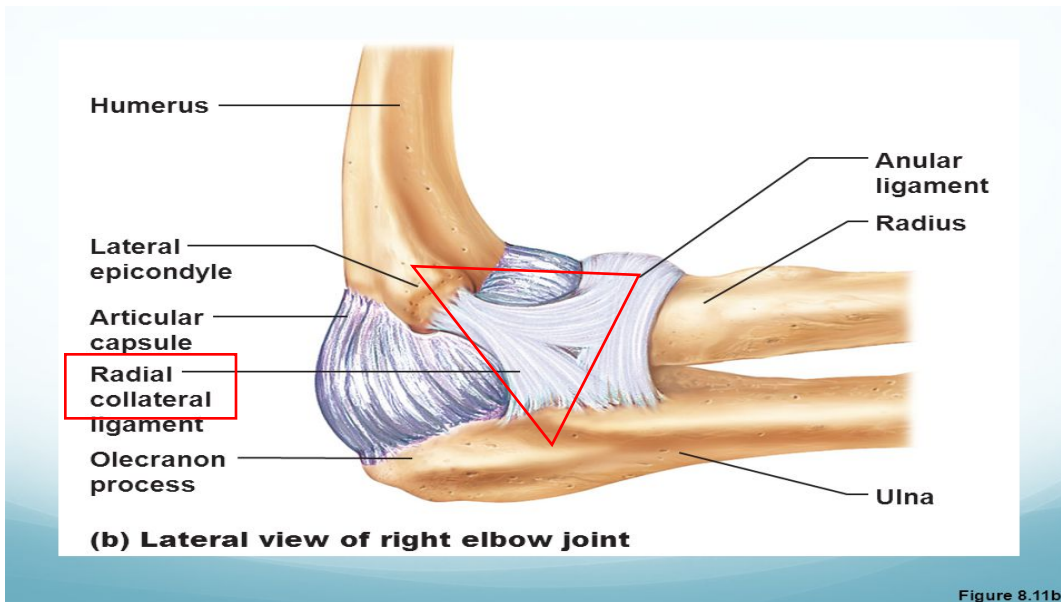
Elbow Joint Ligaments

Lateral ligament (radial collateral ligament)

Shape: triangular.

Apex: attached to the lateral epicondyle of humerus.

Base: attached to the upper part of the annular ligament.



Medial ligament (ulnar collateral ligament)

Divided into three bands:

- **Anterior strong cord-like band:**

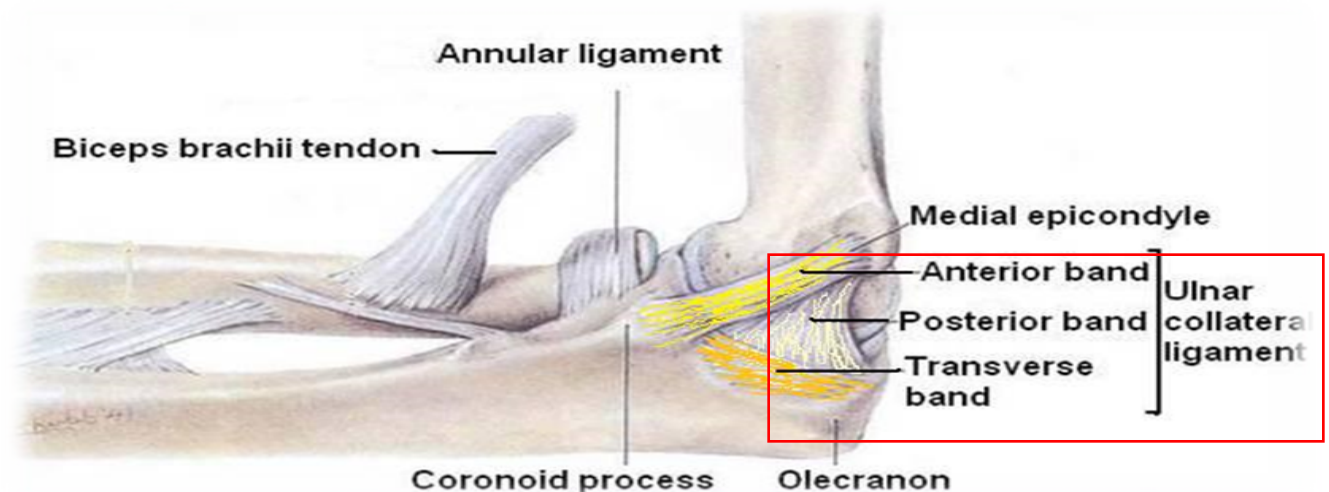
Between medial epicondyle and the coronoid process of ulna.

- **Posterior weaker fan-like band:**

Between medial epicondyle and the olecranon process of ulna.

- **Transverse band:**

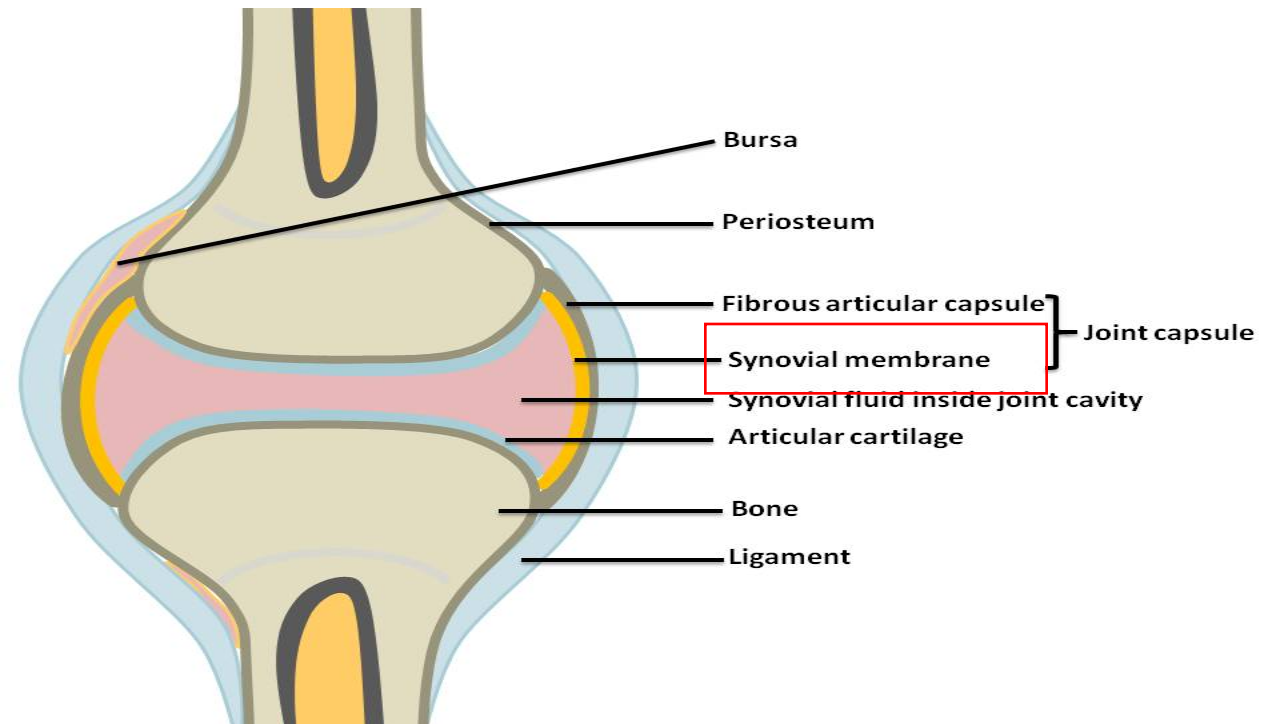
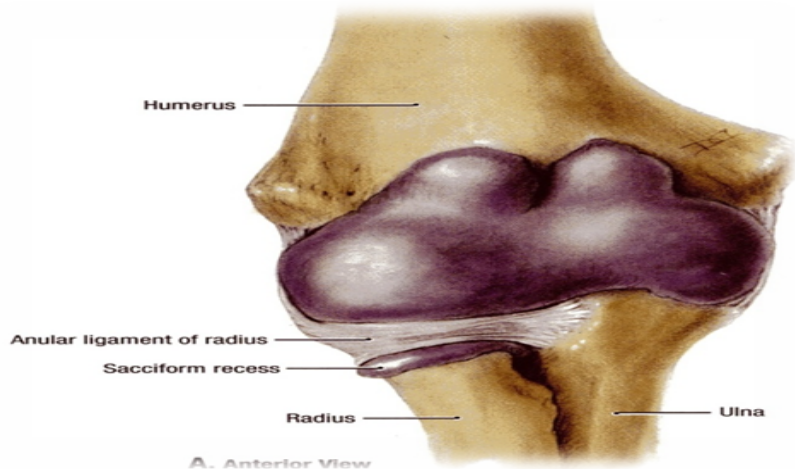
Passes between the anterior and posterior bands.



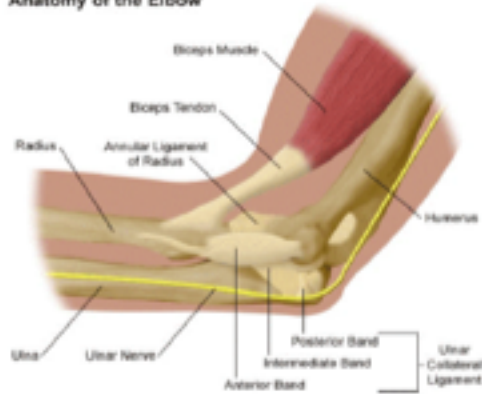
Elbow Joint

Synovial Membrane:

- This lines the capsule and covers fatty pads in the floors of the coronoid, radial, and olecranon fossae.
- Is continuous below with synovial membrane of the superior (proximal) radio-ulnar joint.
- Contains the synovial fluid.



Anatomy of the Elbow



Relation

TEAM 435

This slide is NOT extra

Relation يعني نوصف المفصل ايش الي قريب منه من ٤ جهات مثل الجدول الي تحت

Anterior	Posterior	medial	lateral
<ul style="list-style-type: none"> - Brachialis - Tendon of biceps - Brachialis artery - Median nerve 	<ul style="list-style-type: none"> - Triceps muscle - Small bursa intervening 	<ul style="list-style-type: none"> - Ulna nerve (Under the medial epicondyle, directly related to the skin "subcutaneous") 	<ul style="list-style-type: none"> - Common extensor tendon. (Originating from lateral epicondyle) - Supinator

Burse around elbow joint:

- **Subtendinous** olecranon bursa.
- **Subcotanous** olecranon bursa.

Considered as the largest nerve that is **unprotected** by muscles or bones.

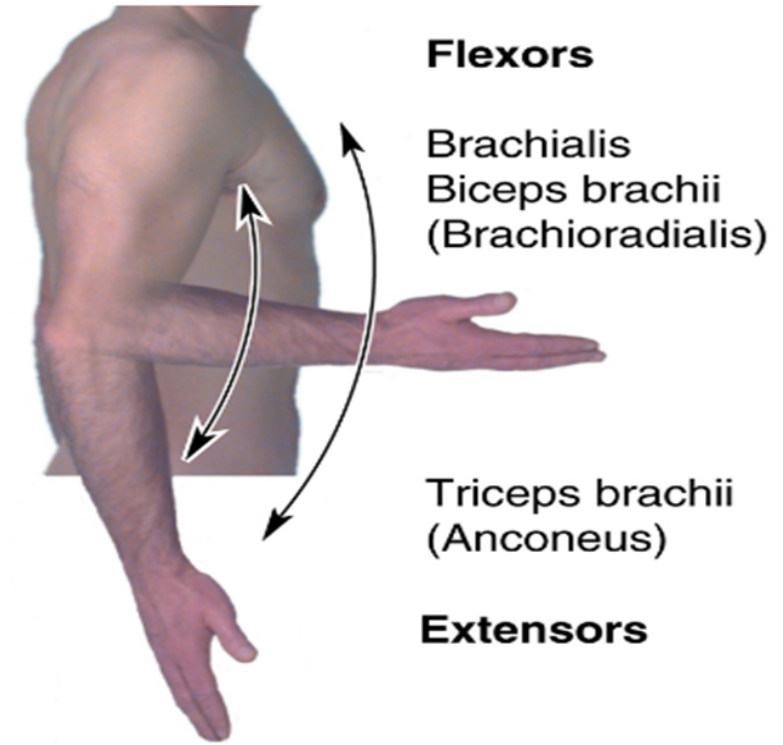
Bursa: Sac filled with synovial fluid countering friction at a joint

لهذا السبب عند حدوث ضربة عند الكوع نشعر بالمشا وبكأنها كهرباء

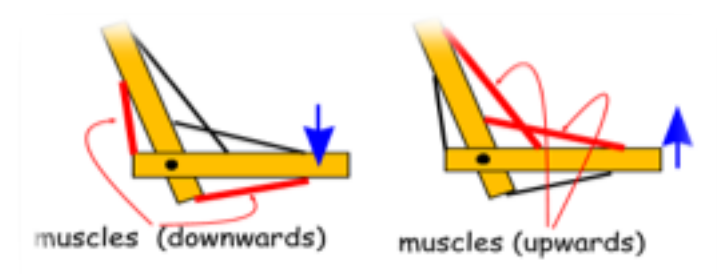


Elbow Joint Movement:

Flexion	Extension
is limited by the anterior surfaces of the forearm and arm coming into contact.	is limited by the <u>tension</u> of the anterior ligament (medially) and brachialis muscle.

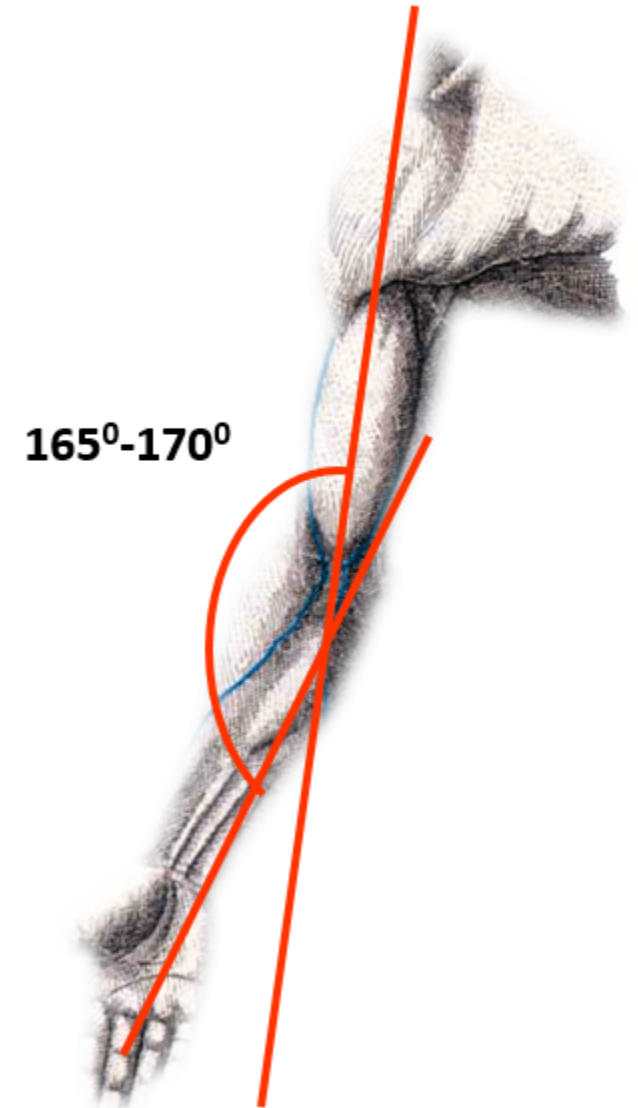


The joint is supplied by branches from:



Carrying Angle:

- Is the angle between the **long axis of the extended forearm** and **the long axis of the arm**.
- It opens **laterally**.
- It is **170** degrees in male and **167** degrees in females.
- It disappears when the elbow joint is **flexed**.
- It allows The **forearms** to clear the **hips** in **swinging movements** during walking and is important when **carrying objects**.



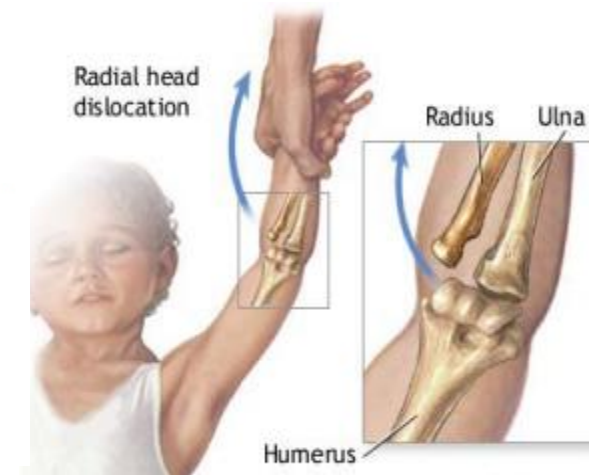
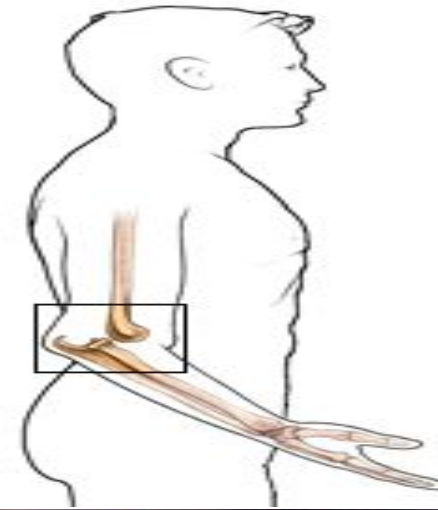
Elbow Joint Articulations

The elbow joint is **stable** because of the:

- **Wrench-shaped articular surface** of the **olecranon** and the **pulley-shaped*** **trochlea** of the humerus.
- **Strong** medial and lateral **ligaments**.

Elbow dislocations are common & most are **posterior****.

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



شکل البكرة = Pulley-shaped *

**The radius/ulna is dislocated posteriorly NOT the humerus

Elbow Joint:

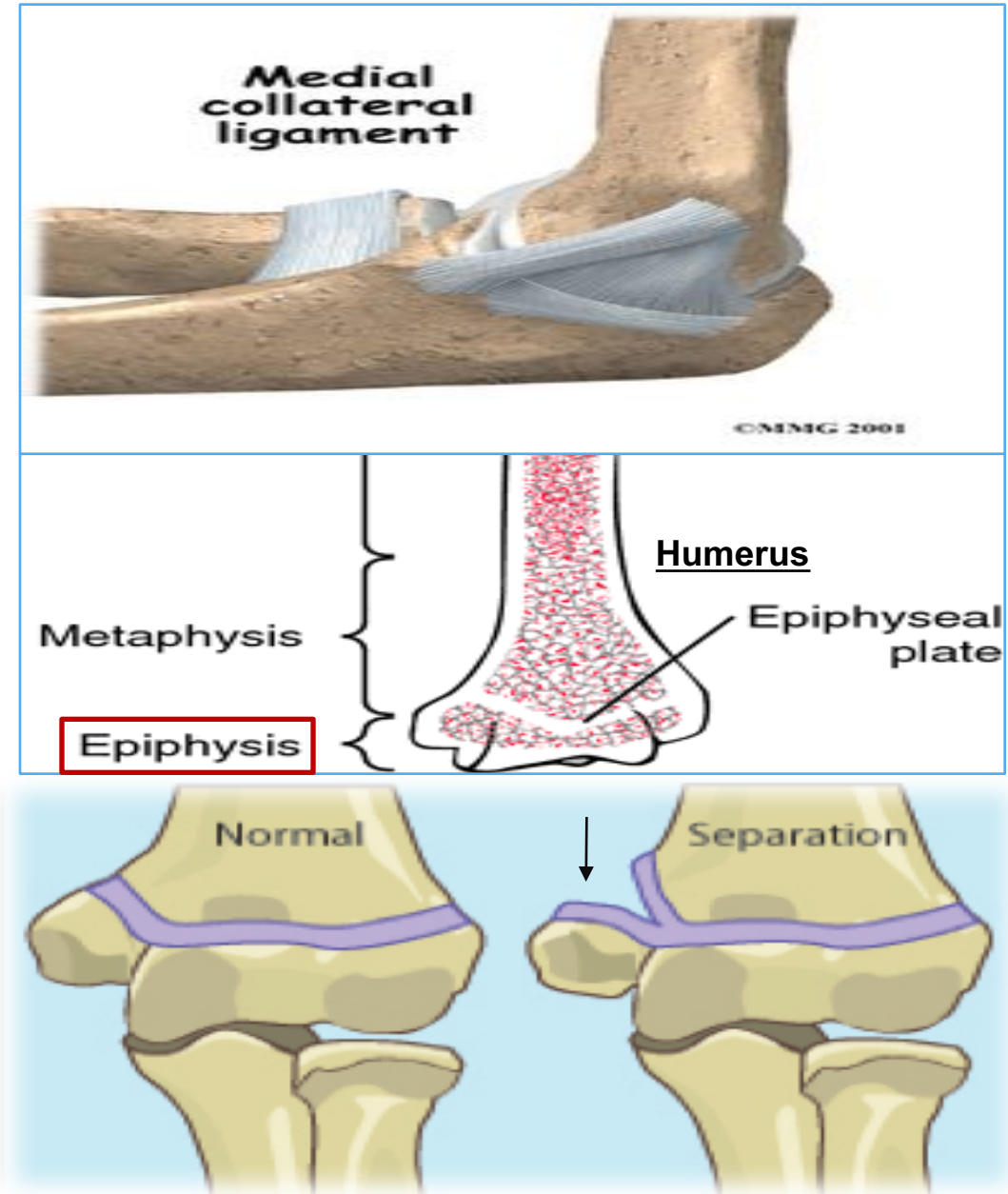
Avulsion of the epiphysis of the medial epicondyle is also **common in childhood** because then the **medial ligament is much stronger** than the bond of union between the **epiphysis** and the **diaphysis**.

*Only on girls slides

They are usually a result from an **avulsion (pull off) injury** caused by a valgus* stress at the elbow and contraction of the flexor muscles as in :

- falling on an outstretched hand with the elbow in full extension
- direct blow
- posterior elbow dislocation

*valgus : a deformity involving oblique displacement of part of a limb away from the midline.



Blood Circulation:

Only in the boys' slides

The upper limb (upper extremity) is the region extending from deltoid to the hand, including :

shoulder

Axilla

Arm

Elbow joint

Forearm

Wrist joint

ARTERIES OF UPPER LIMB :

1. Axillary
2. Brachial
3. Ulnar
4. Radial
5. Palmar arches

SUBCLAVIAN ARTERY :

- Left subclavian arises from aortic arch
- Right subclavian arises from brachiocephalic trunk

Main Branches :

Vertebral artery

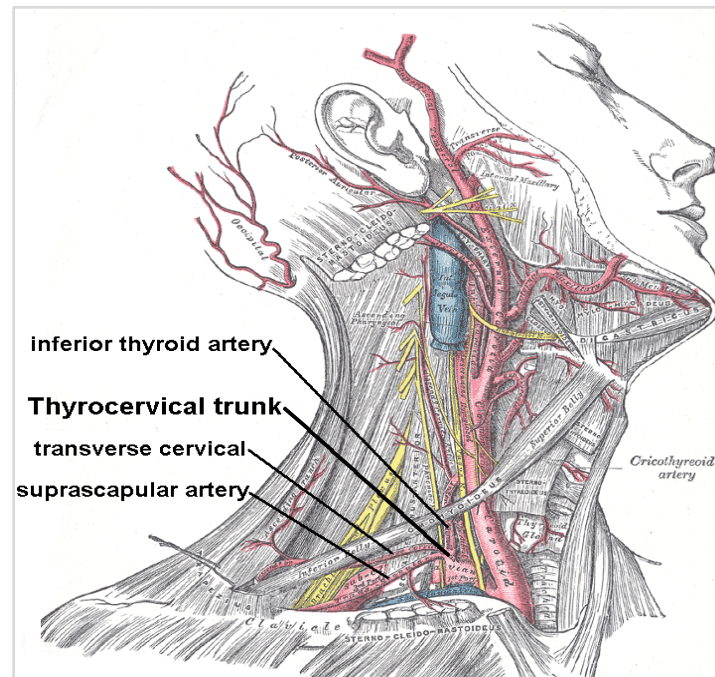
to supply CNS

Internal thoracic artery

to supply mammary gland & the thoracic wall.

Thyrocervical trunk

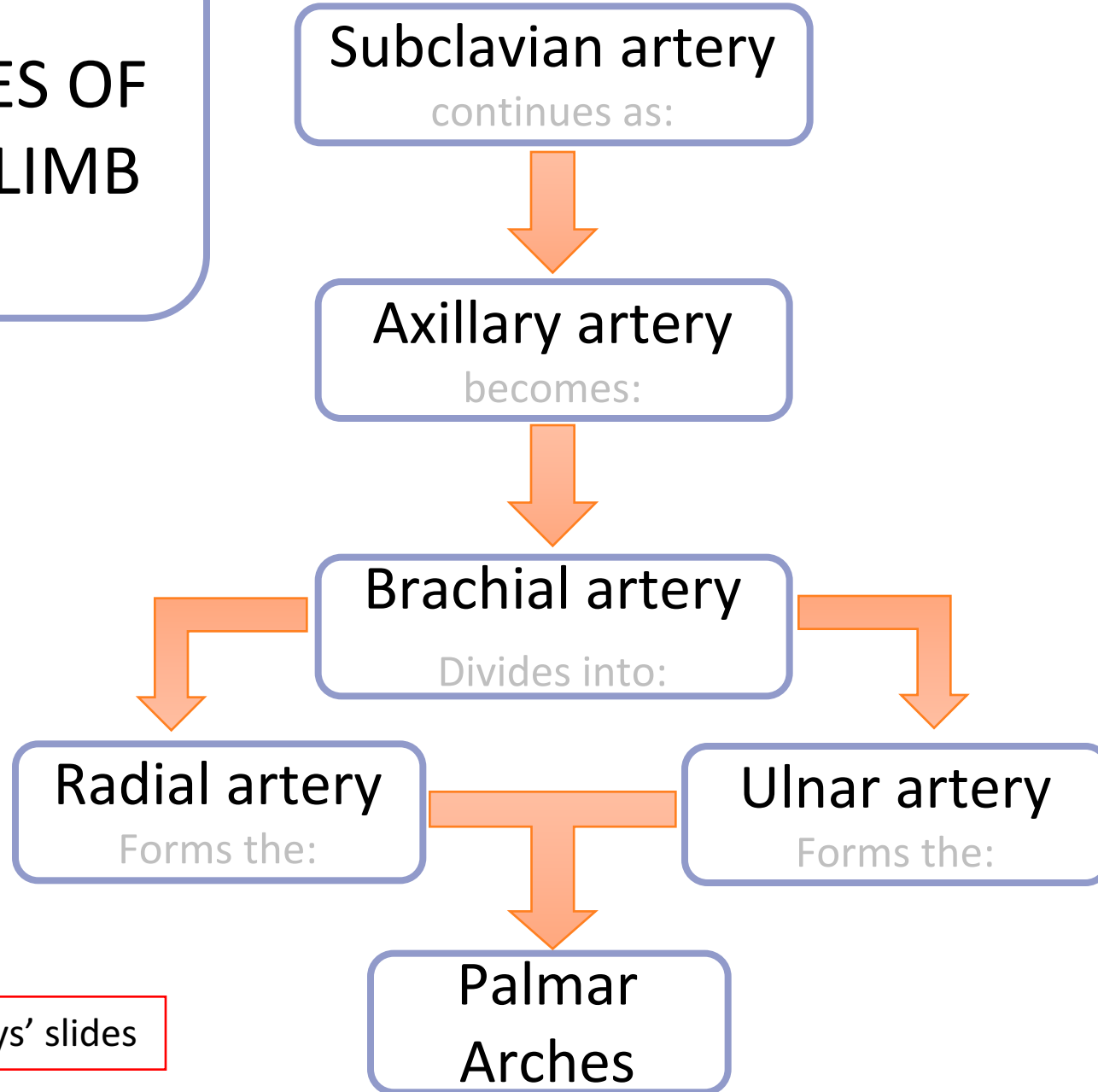
to supply thyroid gland and scapula.



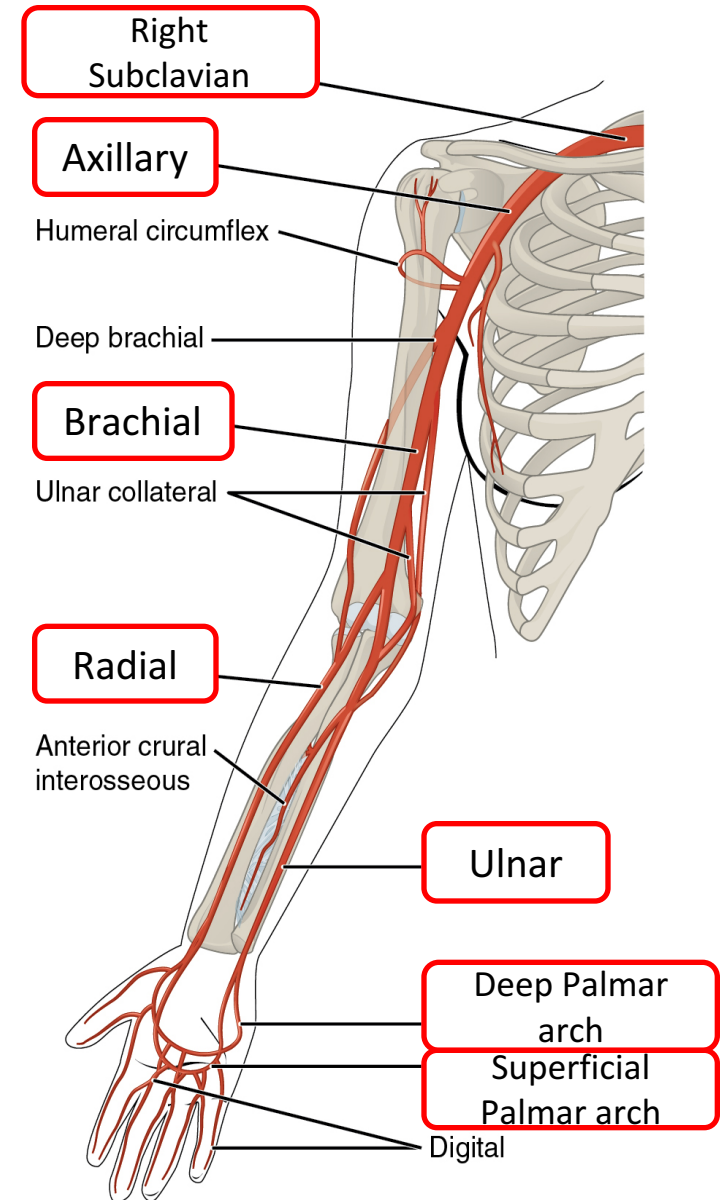
At lateral border of the **1st rib**, it continuous in the axilla as the **Axillary artery**

It is the source of the **arterial supply** of the **upper limb**.

ARTERIES OF UPPER LIMB

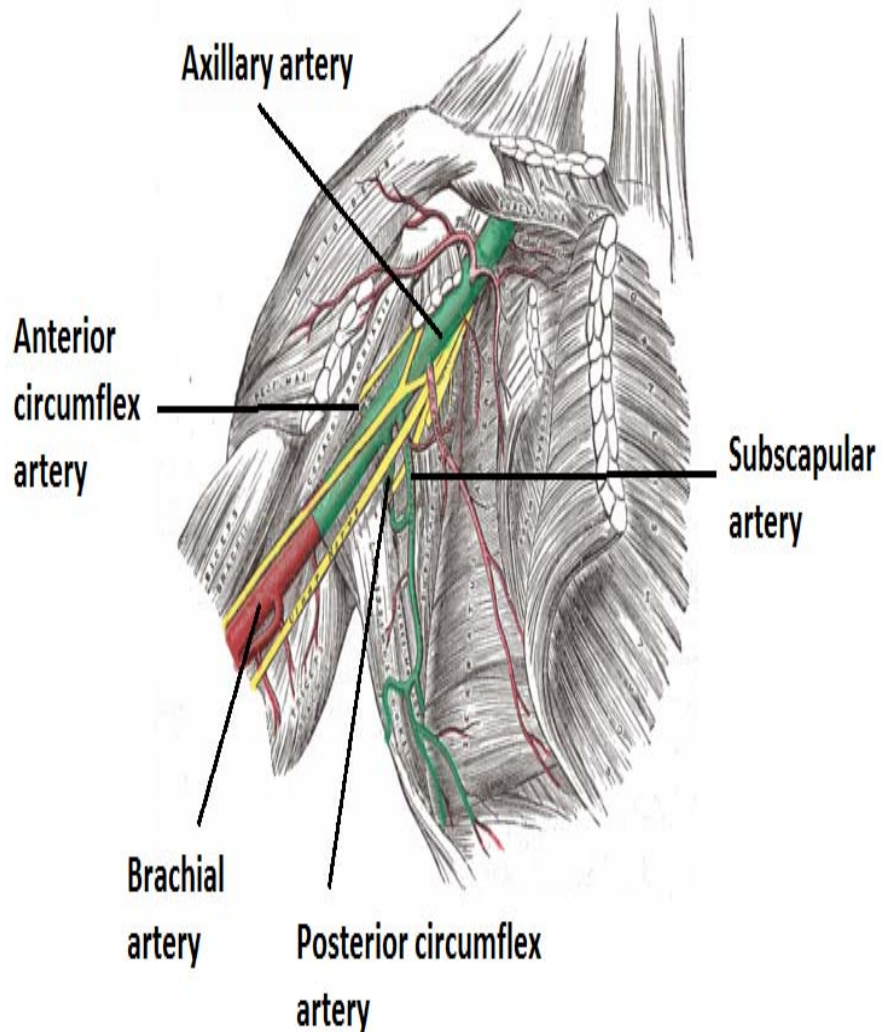


Only in the boys' slides



Only in the boys' slides

Axillary Artery



This artery arises from the subclavian artery , it passes through the **axilla**, just underneath the pectoralis minor muscle, enclosed in axillary sheath .

At the level of the humeral surgical neck, the **posterior and anterior circumflex humeral arteries** arise .

They circle posteriorly around the humerus to supply the **shoulder region**.

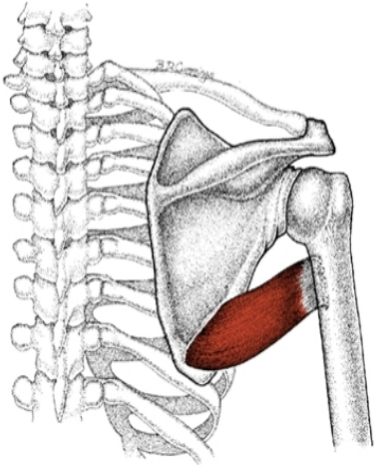
The largest branch of the axillary artery is called **Subscapular artery**.

The axillary artery becomes the **Brachial artery** at the level of the **Teres major** muscle.

Only in the boys' slides

Brachial Artery

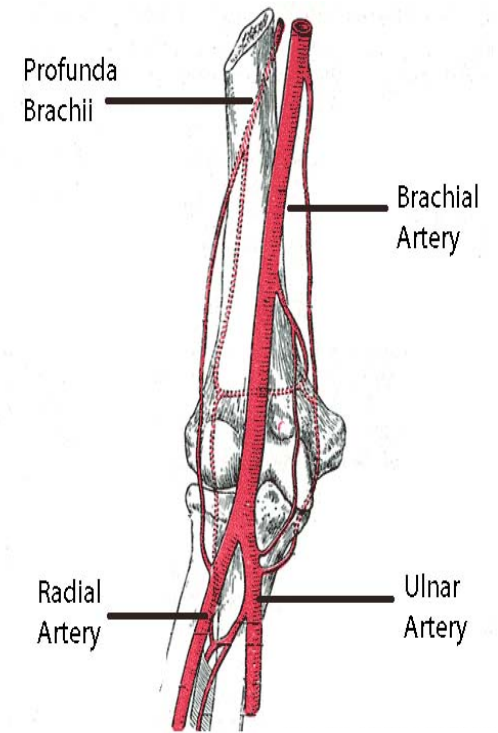
Teres Major



The **main** source of blood for the **arm**.

Distal to the teres major, the brachial artery gives rise to the **profunda brachii** (the deep artery of the arm).

- It travels along the posterior surface of the humerus, running in the radial groove to supply structures in the posterior aspect of the arm like triceps brachii.
- Terminates by contributing to a network of vessels at the elbow joint.



The pulse of the brachial artery is **palpable** (محسوس) on the anterior aspect of the elbow, medial to the tendon of the biceps.

The brachial artery descends down the arm immediately posterior to the median nerve.

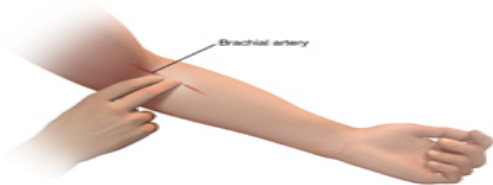
As it crosses the **cubital fossa**, underneath the brachialis muscle, the brachial artery bifurcating into the **radial and ulnar arteries**.

Other branches:

Superior ulnar collateral artery



Inferior ulnar collateral artery



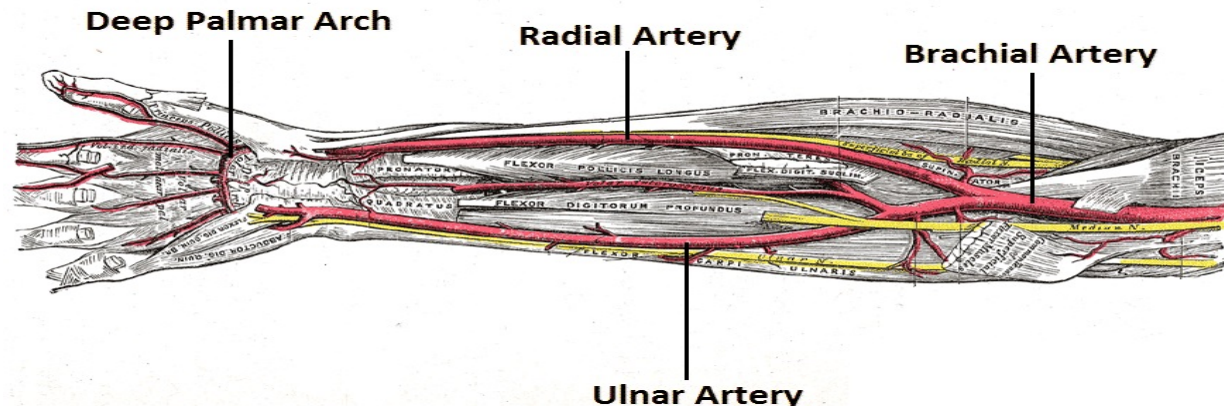
Ulnar & Radial Arteries

The main source of blood for the forearm.

The ulnar artery supplies the anterior aspect.

The radial artery supplies the posterior aspect of the forearm.

The two arteries anastomose (تتشعب) in the hand, by forming two arches, the **superficial palmar arch**, and the **deep palmar arch**.



Superficial Veins:

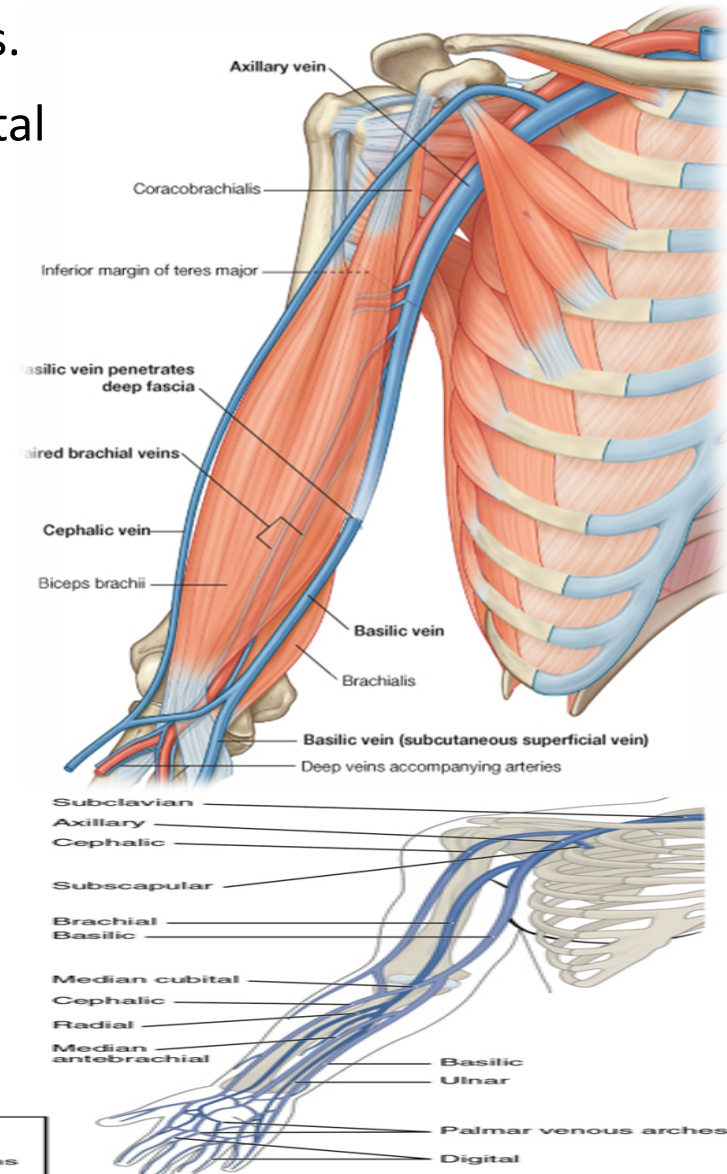
- The major superficial veins of the upper limb are the cephalic and basilic veins.
- At the elbow, the cephalic and basilic veins are connected by the median cubital vein.

Basilic vein

- Originates from the dorsal venous network of the hand.
- It ascends the medial aspect of the upper limb.
- At the border of the teres major, the vein moves deep into the arm.
- It then combines with the brachial veins to form the axillary vein..

Cephalic vein

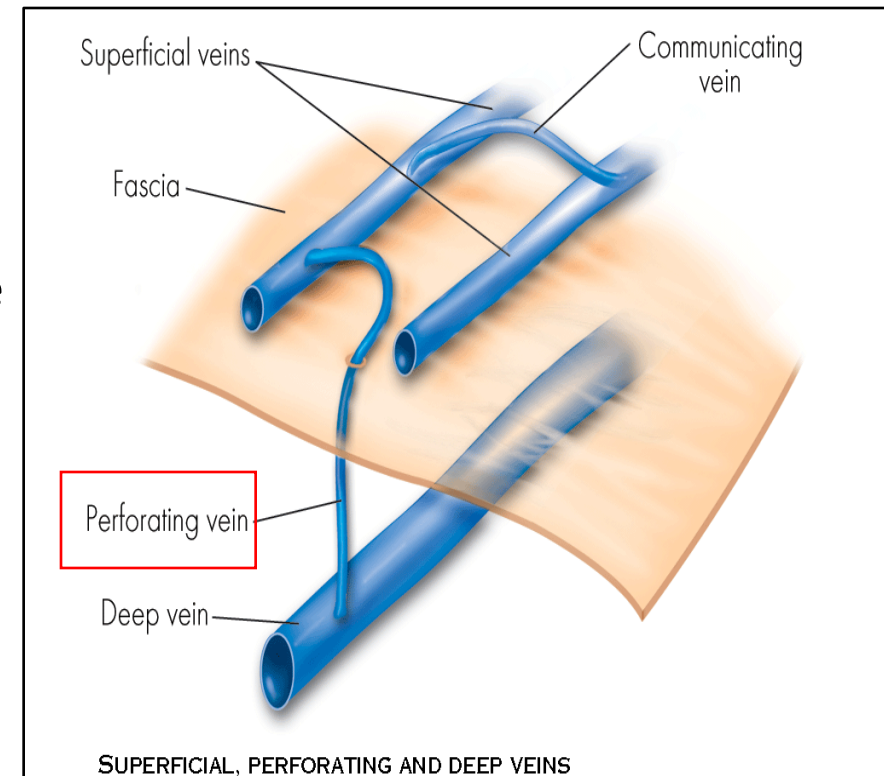
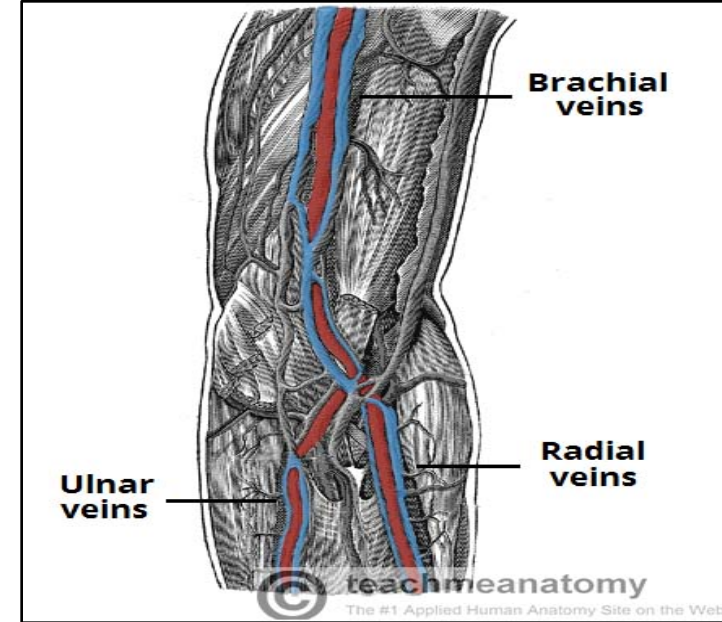
- Arises from the dorsal venous network of the hand.
- It ascends the antero-lateral aspect of the upper limb, passing anteriorly at the elbow.
- At the shoulder, the cephalic vein travels between the deltoid and pectoralis major muscles to enter the axilla region via the clavipectoral triangle.
- Within the axilla, the cephalic vein terminates by joining the axillary vein.



Deep Veins:

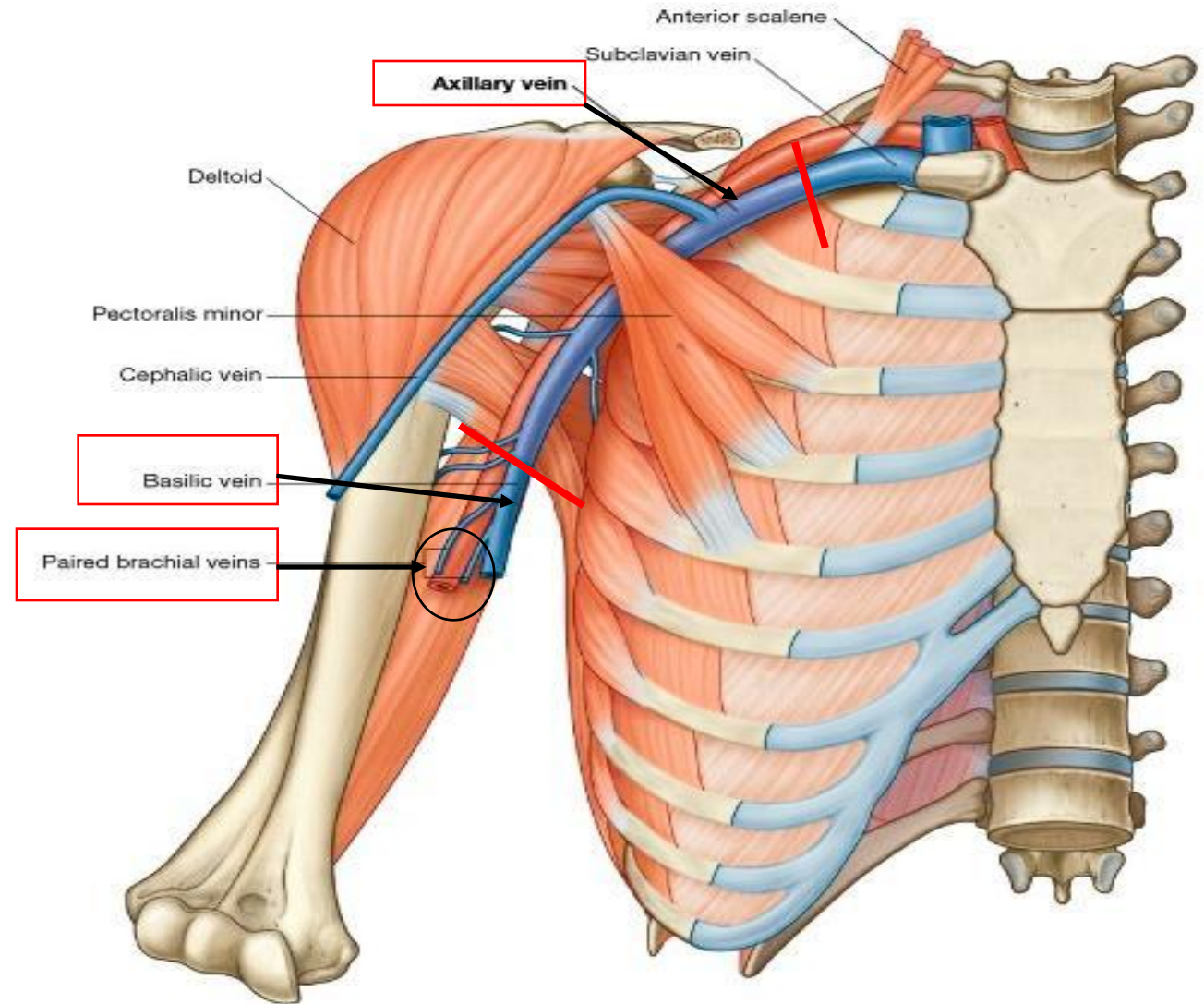
Only in the boys' slides

- They are underneath the deep fascia.
- They are known as **venae comitantis**: a pair of veins that accompany one artery.
- The **brachial veins** (venae comitantis of the brachial artery) on both sides of brachial artery (largest in size).
- **Ulnar veins** (known as venae comitantis of ulnar artery) on both side of ulnar artery.
- **Radial veins** (known as venae comitantis of radial artery) on both side of radial artery.
- Pulsation* from the brachial artery helps in venous return. (*pulsation: expansion of the artery because of blood flow)
- Perforating veins run between the deep and superficial veins of the upper limb, connecting the two systems together.(they help in maintaining correct blood draining).



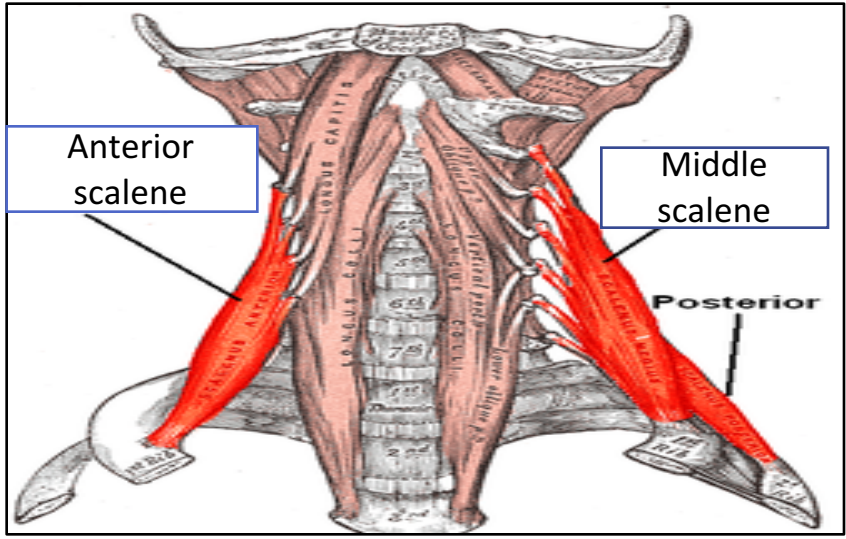
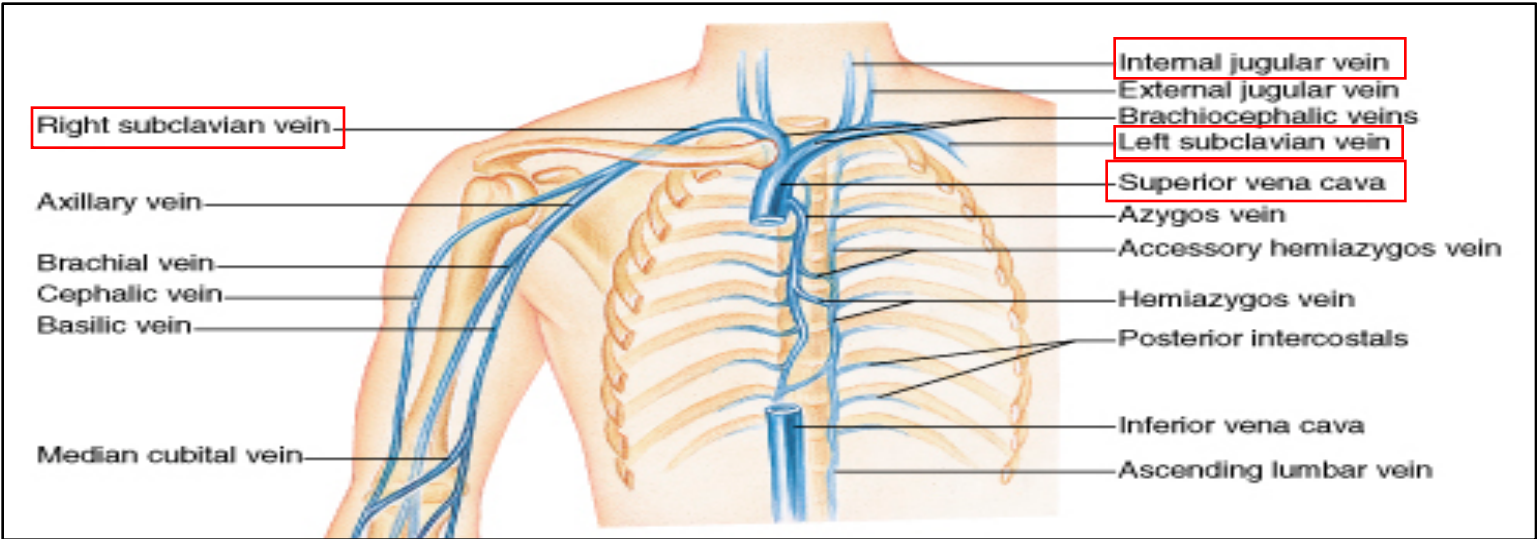
Axillary Vein:

- From lower border of Teres major muscle to the outer border of the first rib (between red lines shown on the picture).
- Formed by the union of basilic vein and brachial veins.(the brachial veins are known as venae comitantes of the brachial artery)



Subclavian Vein:

- Continuation of **axillary vein**
- From outer border of first rib to medial border of anterior scalene muscle (or the sternal end of the clavicle).
- The subclavian vein follows the subclavian artery
- Joins **internal jugular vein** to form **brachiocephalic vein**.
- Right and left brachiocephalic veins join forming the **superior vena cava** that enters the right atrium anterior to middle scalene.



MCQs

1- Which of the following is not a part of the flexor compartment ?

- A- Biceps
- B- median nerve
- C- brachial artery
- D- triceps

2- What is the muscle that is responsible in “screwing” ?

- A- coracobrachialis
- B- biceps brachii
- C- brachialis
- D- triceps

3- The capsule attached to the margins of the of the coronoid process of the ulna from:

- A- Anteriorly above.
- B- Posteriorly above.
- C- Anteriorly below.
- D- Posteriorly below

4- Why do children have posterior dislocation more often than adults ?

- A- Weak bones
- B- Incomplete developed bones
- C- Osteoporosis

5- At which site the basilic vein moves deep into the arm ?

- A- At the shoulder
- B- At the border of teres minor
- C- At the border of teres major
- D- between the head of biceps muscle

6- The subclavian vein is a continuation of which vein?

- A- Axillary
- B- Cephalic
- C- Basilic
- D- Vena comitantis of brachial artery

7- Which is **not** one of contents Cubital fossa :

- A. Median Nerve
- B. Brachial Artery
- C. Deep Branch Of Radial Nerve
- D. Triceps Brachii Tendon

Answers:

- 1-D
- 2-B
- 3-C
- 4-B
- 5-C
- 6-A
- 7-D

MCOs

8- Which one of these is not a branch of the brachial artery :

- A. Profunda brachii
- B. Radial artery
- C. Superior ulnar collateral artery
- D. Subscapular artery

9- The axillary artery arises from :

- A. Brachial artery
- B. Vertebral artery
- C. Subclavian artery
- D. Suprascapular artery

10- Which of the following is bi-innervated?

- A. Biceps brachii
- B. Brachialis
- C. Coracobrachialis

Answers:

8- D

9- C

10- B

SAQ

1. What articulates the elbow joint from above?

2. What covers the articular surfaces of elbow joint?

3. What are the superficial veins ?

4. What are the boundaries of the axillary vein?

1ST Answer: Trochlea of humerus & Capitulum of humerus

2ND Answer: Hyaline cartilage

3rd Answer: 1-Basilic vein
2-Cephalic vein

4th Answer: It starts from the lower border of Teres major muscle to the outer border of the first rib



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