"Tell you heart that the fear of suffering is worse than suffering itself. And no heart has ever suffered when it goes in search of its dream."

Musculoskeletal Block

ANATOMY

team 435

COLOR CODES

- IMPORTANT NOTES
- EXTRA NOTES
- DEFINITION

Objectives:

❖*At the end of the lecture, students should:*

➢ *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.

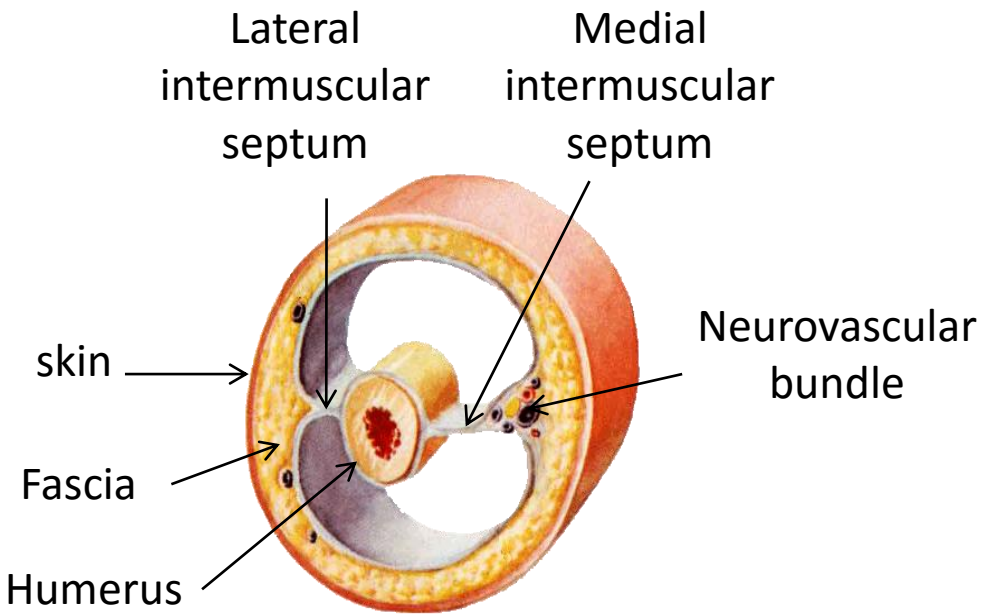
The Arm

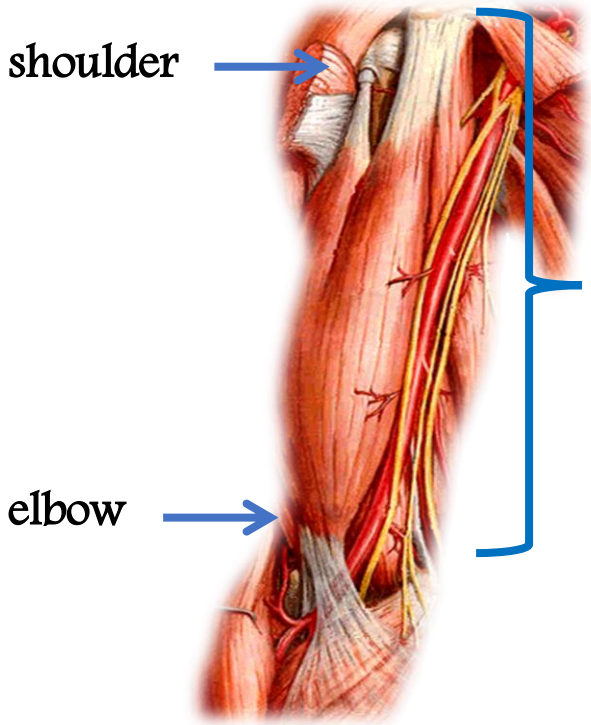
An aponeurotic sheet separating various muscles of the upper limbs, including lateral and medial humeral septa.

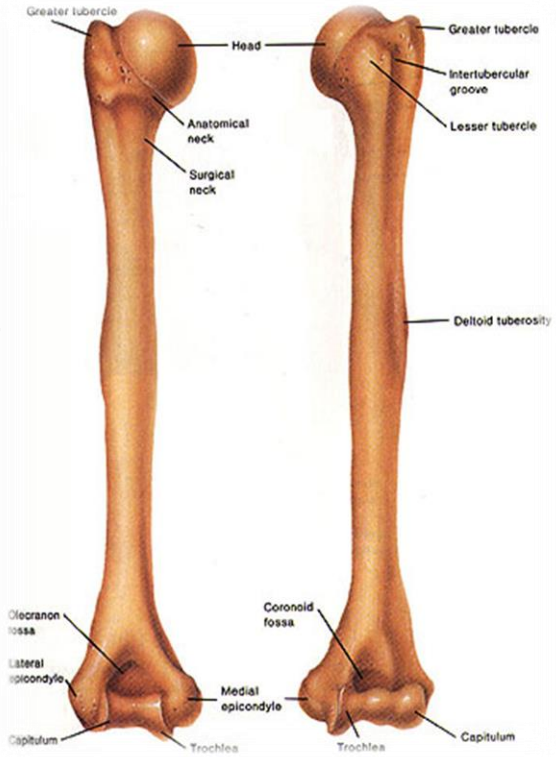
The lateral and medial intermuscular septa divide the distal part of the arm into two compartments:

Anterior (Also known as flexor compartment)

Posterior (Also known as extensor compartment)







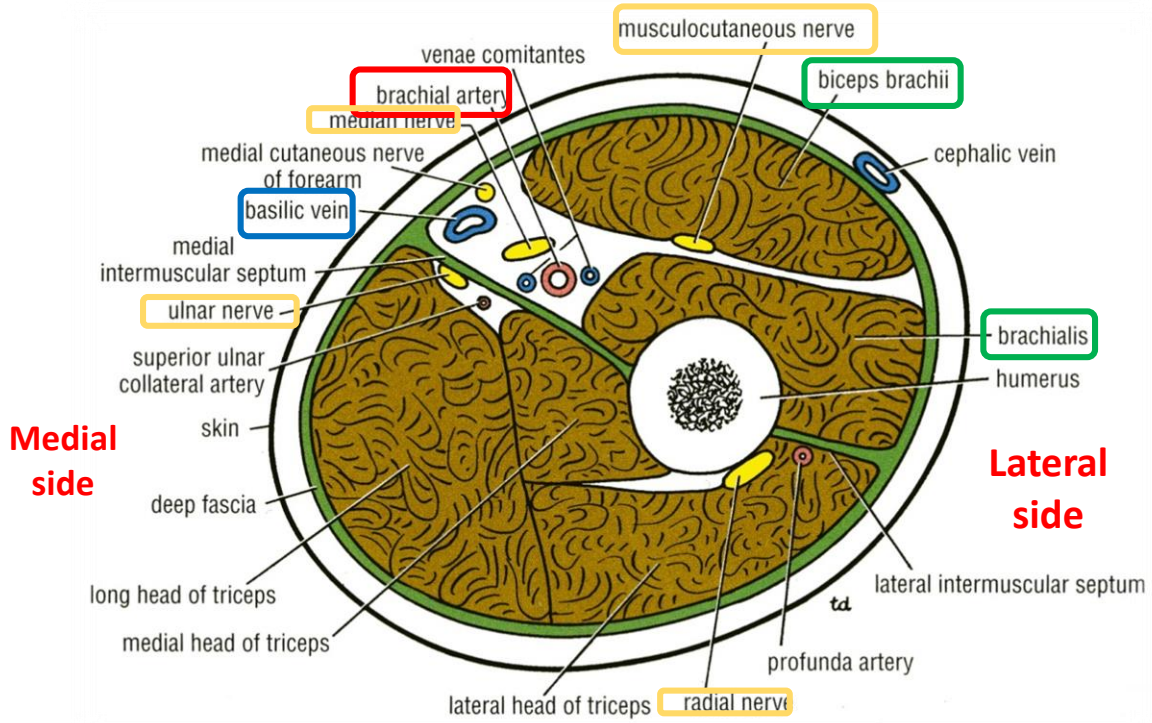
Posterior Anterior

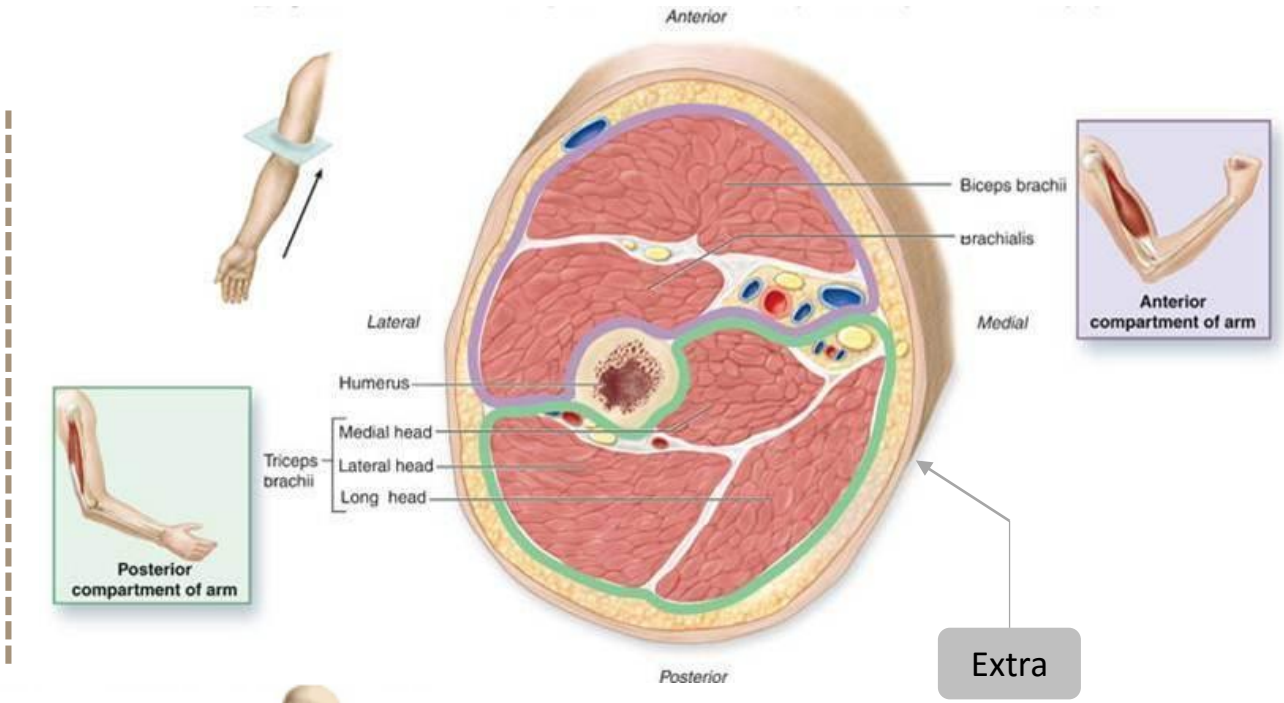
Anterior Fascial compartment Contents

Radial and ulnar pass through the anterior compartment before they enter the posterior compartment

- **Muscles:** Biceps brachii, Coracobrachialis &Brachialis.
- **Blood Vessels:** Brachial artery & Basilic vein.
- **Nerves :** Musculocutaneous, Median, *Radial &* Ulnar.

Near the biceps muscle



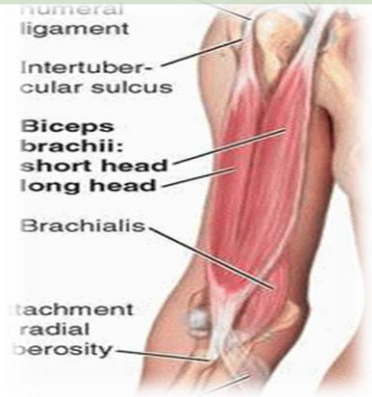


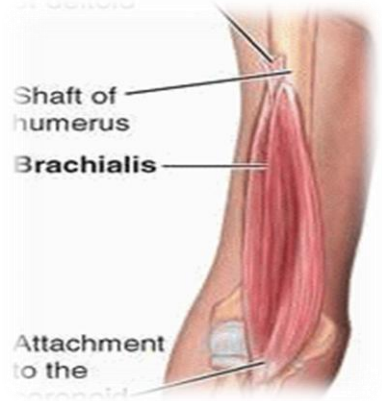
Extra

Muscles of the Anterior Compartment

Name of Muscle	Biceps brachii	*Coracobrachialis	**Bracialis
Origin	Has Two Heads: Long Head (lateral head): From the Supraglenoid Tubercle of the scapula (Intracapsular)→ inside the capsule of shoulder joint Short Head: The Tip of the Coracoid Process of the scapula. -The 2 heads join in the middle of the arm	- Tip of the coracoid process of the scapula (with short head of the biceps brachii)	- Front of the lower half of the Humerus.

*Coracobrachialis is a small muscle
**Brachialis lies on humerus
(نايمة عليها)



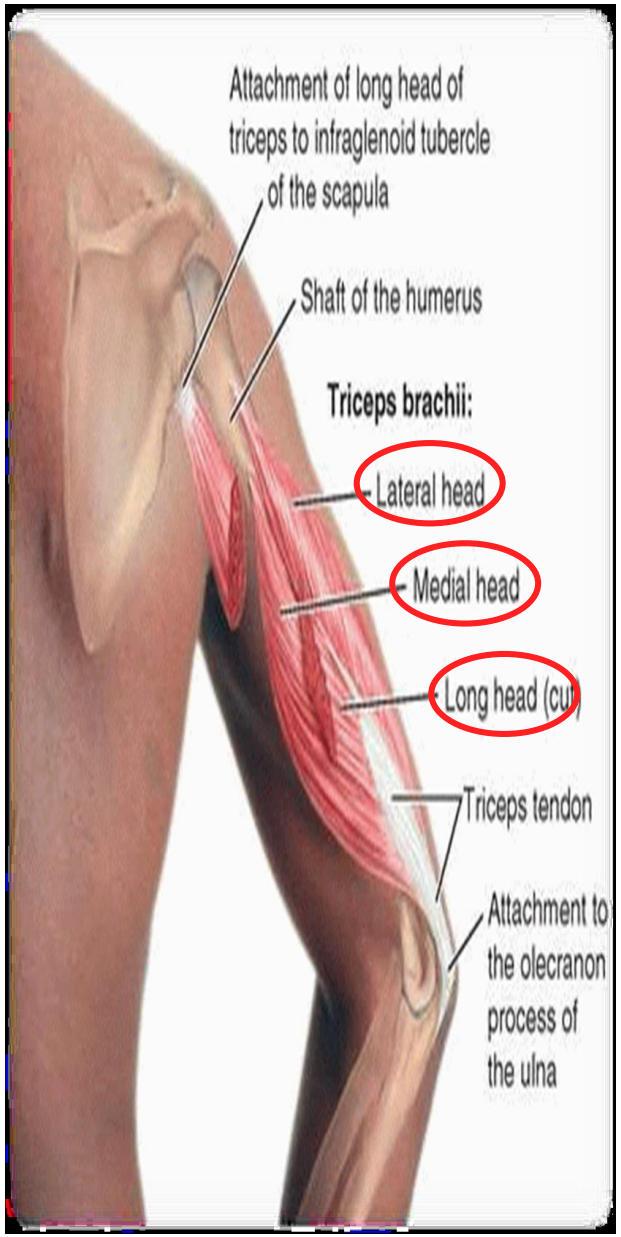


Name of Muscle	Biceps brachii	Coracobrachialis	Bracialis
Insertion	- Into the posterior part of the Radial Tuberosity (by a common tendon). - Into the deep fascia of the medial aspect of the foreman throuhg Bicipital Aponeurosis.	- Middle of the Medial side of the shaft of the humerus	- Anterior surface of Coronoid Process of the Ulna
Nerve Supply	- Musculocuteneous	- Musculocuteneous	- Musculocuteneous - **Radial**
Action	- Strong supinator of the forearm. (used in screwing) - Powerful flexor of Elbow. - Weak flexor of Shoulder.	- Flexor and weak adductor of the arm (or shoulder joint). - Doesn't act on the forearm because it doesn't pass to the elbow "insertion in humerus"	- Strong flexor of the forearm (elbow).

Note:

- It is called Biceps because it has 2 heads.
- It is called brachii because it is in the arm.
- Brachialis is under the Biceps

Posterior Fascial Compartment Contents



Nerves:
Radial & Ulnar

Muscles :
Triceps brachii

Branch from brachial artery

Vessels :
Profunda brachii & Ulnar collateral arteries

Origin: *Three heads*:

- **Long Head** from **infrglenoid 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

Cubital fossa: is a triangular depression that lies in the front of the elbow.

Boundaries of cubital fossa

1/Base: (1) line drawn through the two epicondyles of humerus

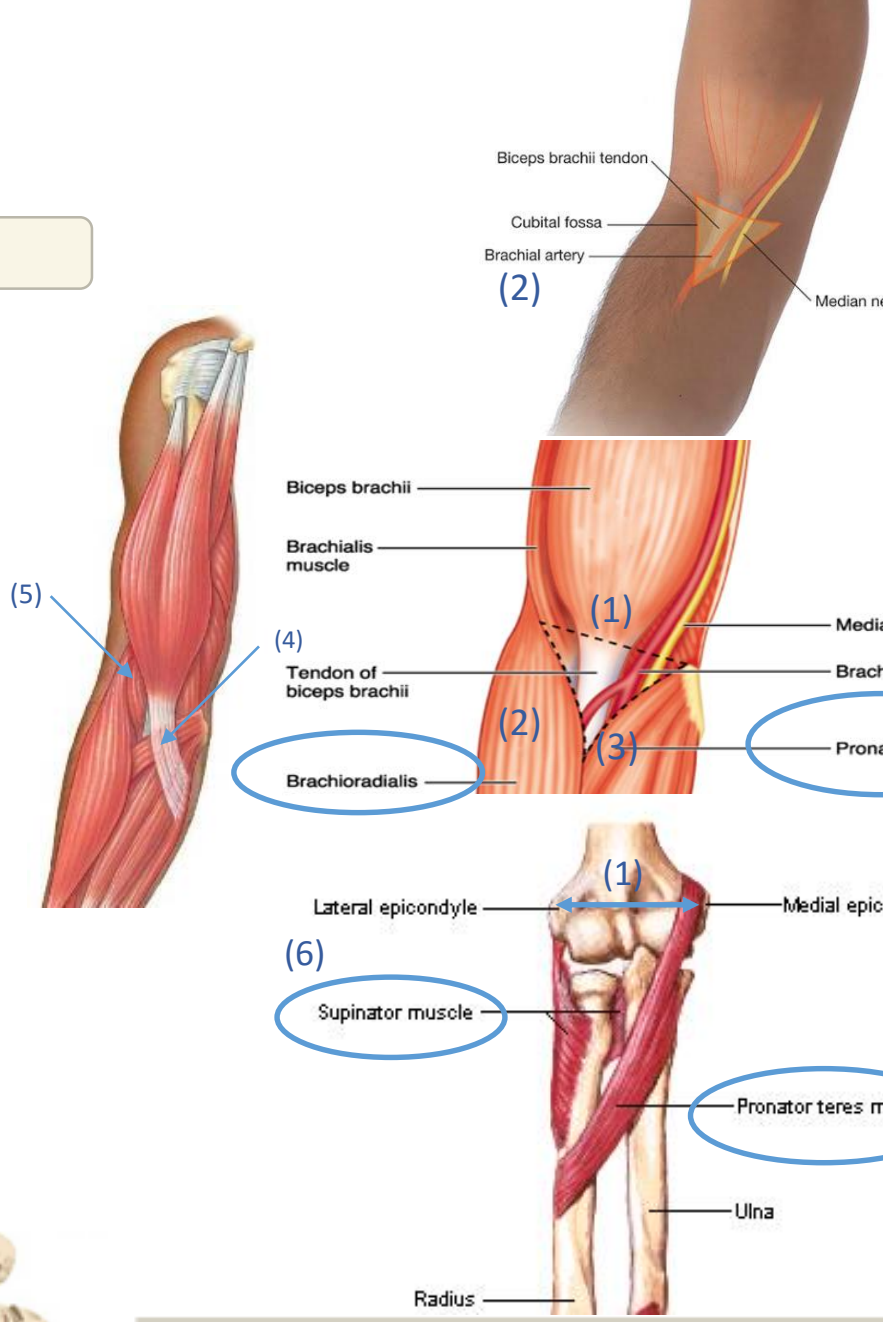
4/Roof: skin,superficial & deep fascia and (4) bicipital aponeurosis.

By cross section, the arrangement of the layers will be “anterior to posterior”:
skin —>superficial fascia —> deep fascia —> bicipital aponeurosis .

2/Laterally: (2) Brachioradialis muscle

5/Floor: (5)Brachialis medially and (6) supinator laterally

3/Medially: (3) pronator teres muscle

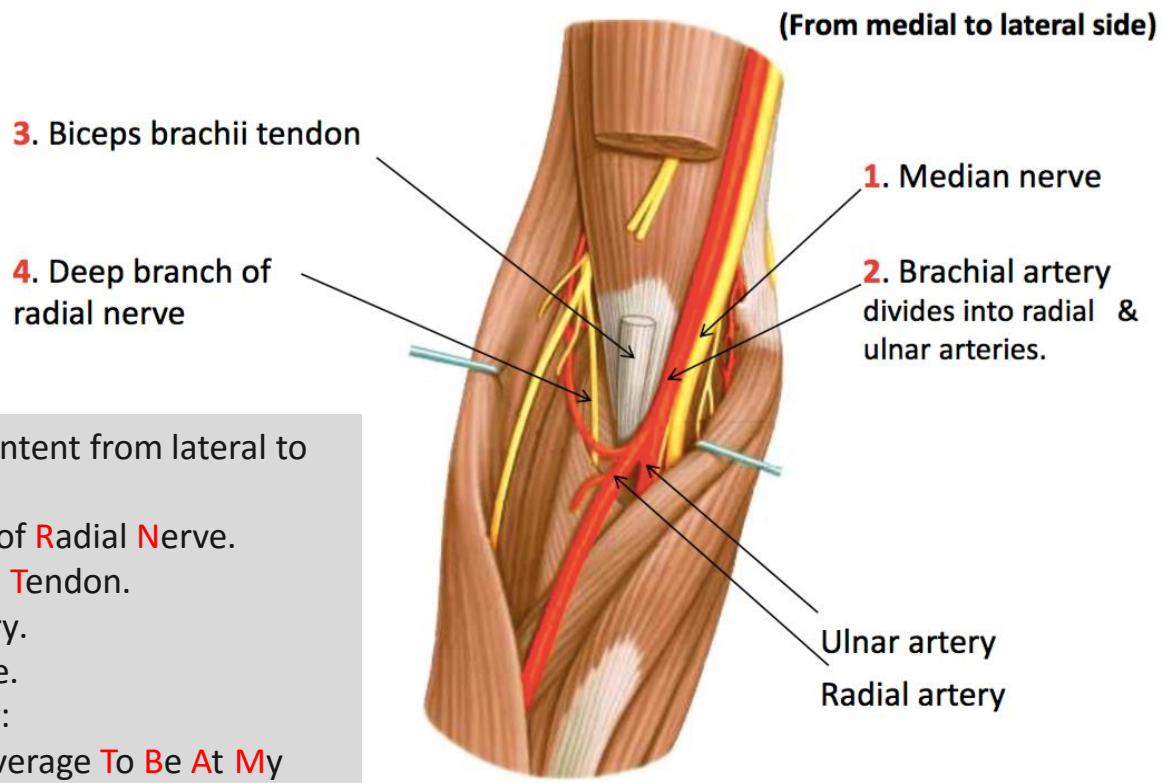


Content of Cubital fossa

Cubital fossa contents from medial to lateral:

- 1- Median Nerve
- 2- Brachial Artery
- 3-Biceps brachii tendon.
- 4-Deep branch of radial nerve.

Piercing the supinator muscle

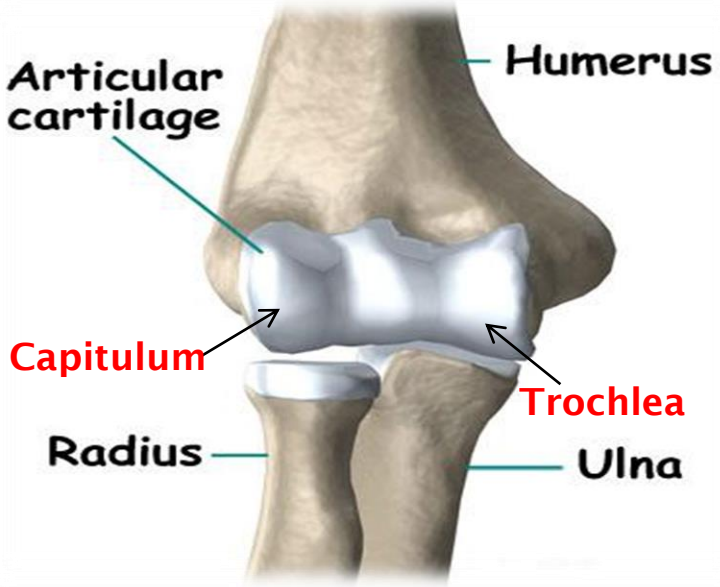


Cubital fossa content from lateral to medial:
-1Deep branch of Radial Nerve.
-2Biceps brachii Tendon.
-3Brachial Artery.
-4Median Nerve.
For memorizing:
Really Need Beverage To Be At My Nicest.

Brachial artery passes through cubital fossa (that's why we can measure blood pressure at cubital fossa).

ELBOW Joint

Elbow joint is **Uniaxial**, **Synovial Hinge** joint



Articulation

Trochlea and capitulum

of the **humerus** **above** with Trochlear notch of **ulna** and the head of **radius** **below**

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

Capsule

Anteriorly: attached

Posteriorly: attached

Above

To the **humerus** along the upper margins of the coronoid and radial fossa and to the front of the medial and lateral epicondyles.

Below

To the margin of the coronoid process of the ulna and to the ***anular ligament**, which surrounds the head of the radius.

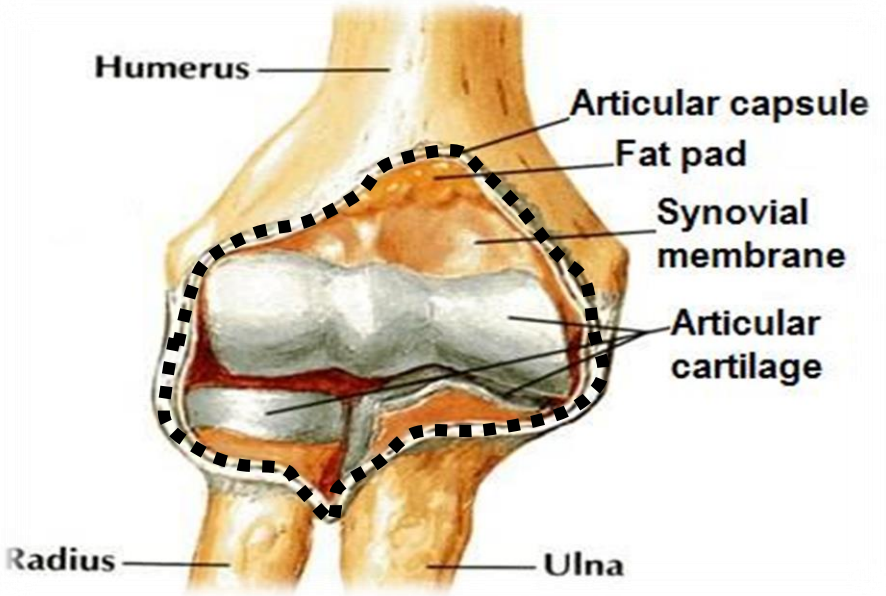
*Surrounds the head of radius then attaches to ulna

Above

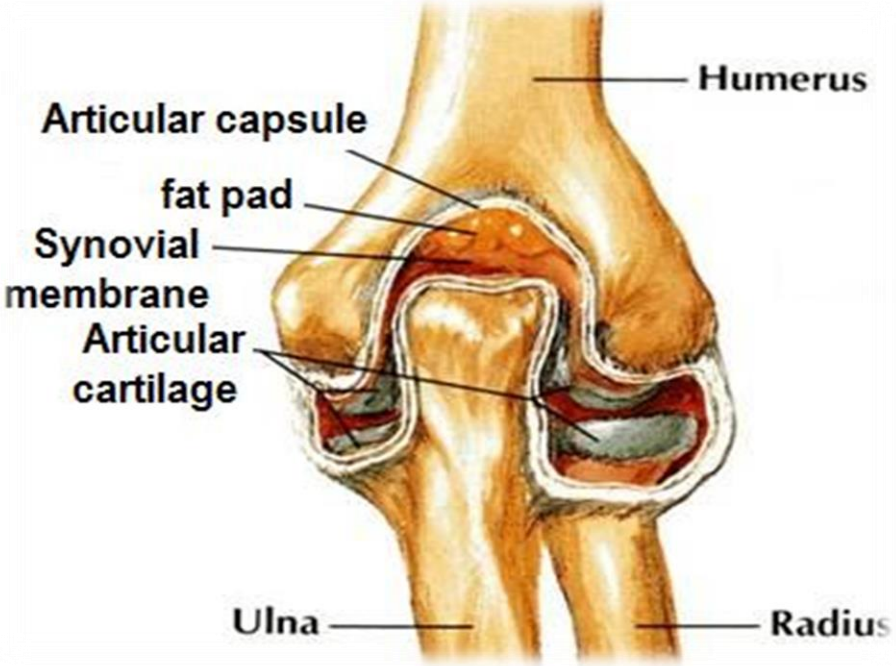
To the margins of the olecranon fossa of the humerus.

Below

To the upper margin and sides of the olecranon process of the ulna and to the anular ligament.

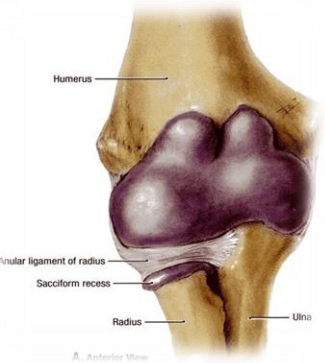


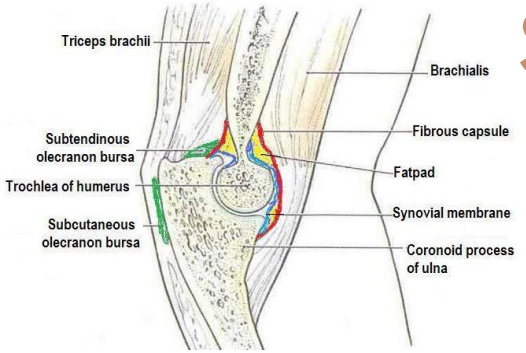
Anterior



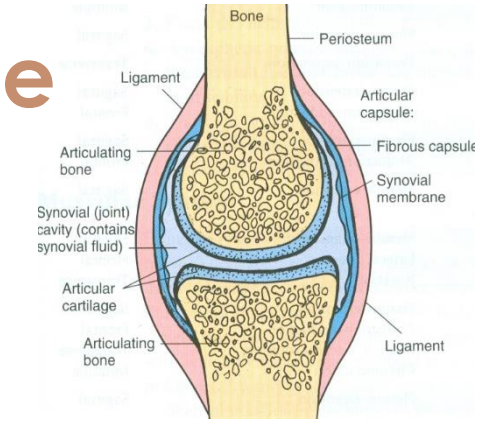
Posterior

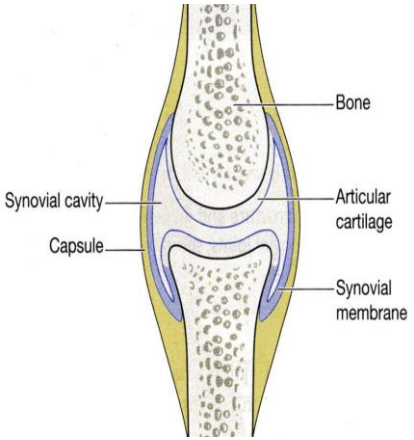
Synovial membrane





*Remember from joint lecture:
Synovial membrane produce synovial fluid to minimize the friction of the joint





1. Lines the **inner surface** of the **capsule**

2. covers **fatty pads** in the floors of the **coronoid fossa, radial fossa, and olecranon fossa**.

3. Is **continuous <u>below</u>** with synovial membrane of the ***superior radioulnar joint**

*للتذكير:
Fossa
هي جزء منخفض من العظم يستقبل جزء بارز من عظم آخر.

In humerus:
Anterior:
Coronoid fossa , radial fossa
Posterior:
Olecranon fossa.

Very important!

*superior and inferior radioulnar joints cause supination and pronation of forearm

Ligaments

Lateral ligament

Radial collateral

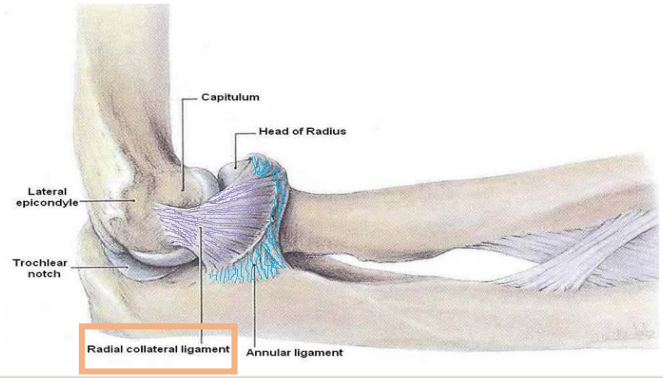
Triangular in shape

Base

Attached to the upper margin of the annular ligament of the radius

Apex

Attached to the **lateral Epicondyle** of the humerus



Medial ligament

Ulnar collateral

stronger Cord-like

Anterior band

between **medial Epicondyle** of the humerus and **coronoid process** of ulna

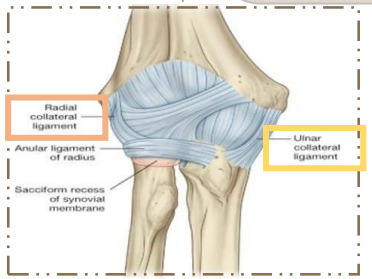
Transverse band

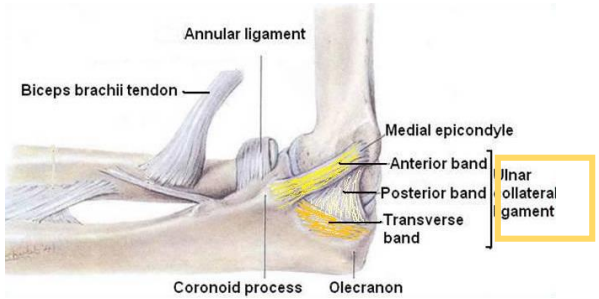
Passes between the Anterior and the posterior band

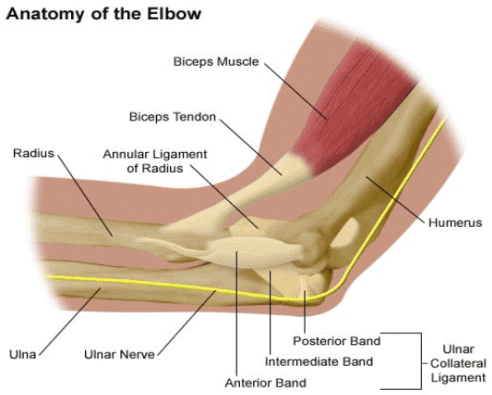
weaker Fan-like

Posterior band

between **medial Epicondyle** of the humerus and **olecranon process** of ulna







Relation

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

Anterior	Posterior	medial	lateral
- Brachialis - Tendon of biceps - Brachialis artery - Median nerve	- Triceps muscle - Small bursa intervening	- Ulna nerve (Under the medial epicondyle, directly related to the skin "subcutaneous")	- Common extensor tendon. (Originating from lateral epicondyle) - Supinator

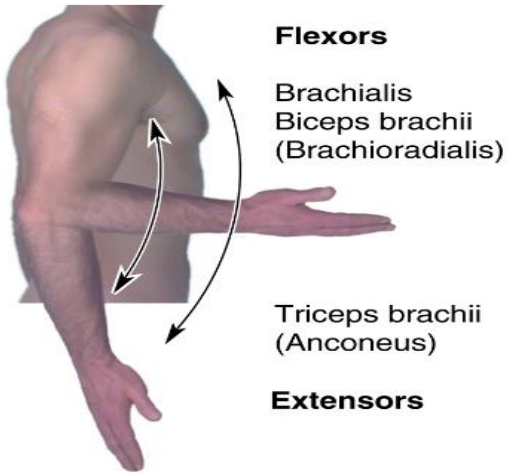
Bursea around elbow joint:
- **Subtendinous** olecranon bursa.
- **Subcotanous** olecranon bursa.

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

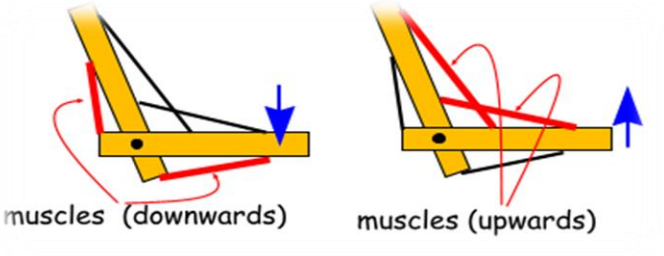
Bursa: Sac filled with synovial fluid countering friction at a joint

لهذا السبب عند حدوث ضربة عند الكوع نشعر بألمها وكأنها كهرباء

Movement



Flexion	Extension
is limited by the **anterior surfaces** of the **forearm** and **arm coming into contact**.	is limited by the **tension** of the **anterior ligament** and **brachialis muscle**.

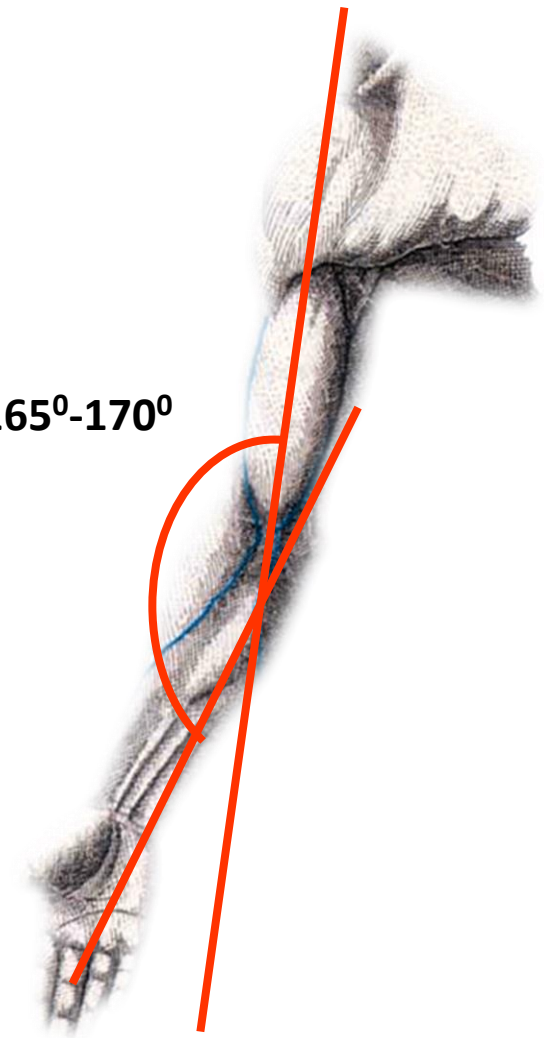


The joint is **supplied by** branches from :

- Median
- Ulnar
- Musculocutaneous
- Radial nerves

Carrying Angle

- **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.



Articulation and applied anatomy of elbow joint

The elbow joint is **stable** because of

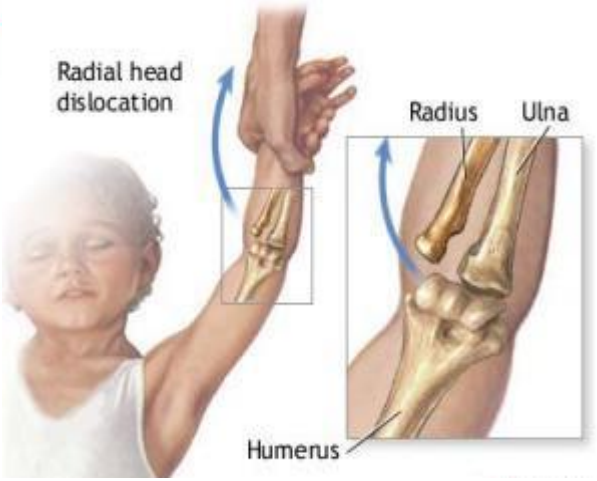
Wrench-shaped articular surface of the **olecranon** and **pulley-shaped trochlea of humerus**

Strong medial and lateral ligament

Elbow dislocation 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**.



Articulation and applied anatomy of elbow joint

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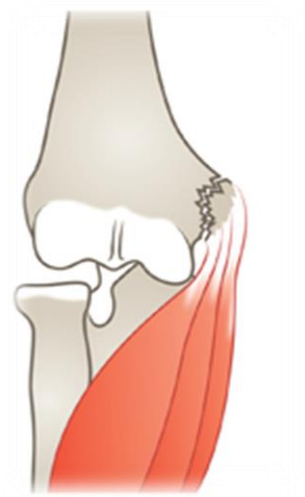
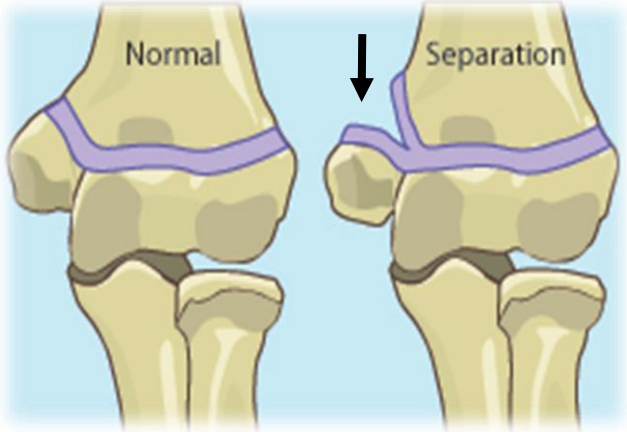
Wrench-shaped articular surface of the **olecranon** and **pulley-shaped trochlea of humerus**





Strong medial and lateral ligament

Avulsion of the epiphysis of the **medial epicondyle** 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 a **result from** an avulsion (**pull off**) injury caused by

1/contraction of the flexor muscles as in

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

2/ valgus stress at the elbow

Muscle:	Compartment:	Origin:	Insertion:	Nerve supply:	Action:
Biceps brachii	Anterior compartment (flexor compartment)	**Two heads:** - **Long head:** From supraglenoid tubercle of the scapula - **Short head:** from the tip of the coracoid process of the scapula **The two heads are joined in the middle of the arm**	- In the Posterior part of the radial tuberosity. - Into the deep fascia of the medial aspect of the forarm through bicipital aponeurosis	Musculocutaneous	- Strong flexor of **the elbow**. - Weak flexor of **the shoulde**r. - Supinator of **the forearm .**
Coracobrachialis	Anterior compartment (flexor compartment	from the tip of the coracoid process of the scapula	Middle of the medial side of the shaft of the humerus	Musculocutaneous	- flexor. - Weak adductor of **the arm**
brachialis	Anterior compartment (flexor compartment	Front of the lower half of humerus	Anterior surface of coronoid process of ulna	Musculocutaneous & radial	Strong flexor **of the forearm**
Triceps	posterior compartment (extensor compartment	**Three heads:** **- Long head:** infraglenoid tubercle of the scapula. - **Lateral head:** upper half of the posterior surface of the shaft of humerous above the spiral groove. - **medial head:** lower half of the posterior surface of the shaft of humerous below the spiral groove.	Common tendon inserted into the upper surface of the olecranon process of ulna	Radial nerve	Strong extensor **of the elbow joint**

CUBITAL FOSSA

What is it? The cubital fossa is a triangular depression that lies in front of the elbow

Boundaries:

- **Base:** Line drawn through the two epicondyles of humerus
- **Laterally:** Brachioradialis
- **Medially:** Pronator teres
- **Roof:** Skin, superficial & deep fascia and bicipital aponeurosis
- **Floor:** Brachialis medially and supinator laterally.

CONTENT OF CUBITAL FOSSA (From medial to lateral side)

1. **Median nerve**
2. **Brachial artery divides into radial & ulnar arteries.**
3. **Biceps brachii tendon**
4. **Deep branch of radial nerve**

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

Anterior compartments
known as the flexor compartment

- **Muscles:**
1- Biceps brachii
2- Coracobrachialis
3- Brachialis.
- **Blood Vessels:**
Brachial artery & Basilic vein.
- **Nerves:**
Musculocutaneous and Median.

Posterior compartments
known as the extensor compartment

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

Elbow Joint

- **Type:** Synovial Joint, Hinge

- **Articulation :**

Above→ Trochlea and capitulum of the humerus
Below → Trochlear notch of ulna and the head of radius below

- **Synovial Membrane:**

- It lines the capsule and covers fatty pads in the floors of the coronoid, radial, and olecranon fossae.

- **Elbow joint is stable** because of the shapes of the the olecranon and trochlea, in addition tom Strength of medial and lateral ligaments .

- **Capsule :**

	Above	Below
Posterior	To the humerus along the upper margins of the coronoid and radial fossae and to the front of the medial and lateral epicondyles.	To the margin of the coronoid process of the ulna and to the anular ligament, which surrounds the head of the radius.
anterior	To the margins of the olecranon fossa of the humerus.	To the upper margin and sides of the olecranon process of the ulna and to the anular ligament.

- **Relations:**

Medial	Lateral	Anterior	Posterior
Ulnar nerve	- Common extensor tendon - The supinator	- Brachialis - Tendon of Biceps - Median nerve - Brachial artery	- Triceps muscle - Small bursa intervening

- **Movement:**

Flexion	extension
Is limited by the anterior surfaces of the forearm and arm coming into contact.	Is limited by the tension of the anterior ligament and the brachialis muscle

- **The joint is supplied by branches from the:**
  - Median
  - Ulnar
  - Radial nerves
  - Musculocutaneous

- **Carrying angle:**

- It is an angle that is located Between the long axis of the extended forearm and the long axis of the arm, and opens laterally, Disappears when the elbow is flexed .
- **170 degrees** in male and **167 degrees** in females.
- Permits The forearms to clear the hips in swinging movements during walking, and is important when carrying objects.

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

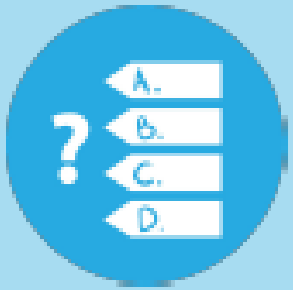
- Posterior dislocation usually follows falling on the outstretched hand and it's common in children

- Avulsion of the epiphysis of the medial epicondyle is also common in childhood

ANATOMY TEAM 435

https://www.youtube.com/watch?v=3l3-5Ij3JZ8

https://www.youtube.com/watch?v=iQGZYswWPDI



https://www.onlineexambuilder.com/anatomy-arm-elbow-1/exam-51922

https://www.onlineexambuilder.com/anatomy-arm-elbow-2/exam-51928

هذا العمل إجتهاد من طلاب و طالبات

إن أصبنا فمن الله و إن أخطأنا فمن أنفسنا و من الشيطان

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