MED437
KING SAUD UNIVERSITY

ANATOMY
Team 437

Arm & Elbow

Lecture 10

تمت المراجعة
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Please check our Editing File.

هذا العمل لا يغني عن المصدر الأساسي للمذاكرة

{وَمَنْ يَتَوَكَّلْ عَلَى اللَّهِ فَهُوَ حَسْبُهُ}

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.

- **Text in BLUE was found only in the boys' slides**
- **Text in PINK was found only in the girls' slides**
- **Text in RED is considered important**
- Text in GREY is considered extra notes

The ARM

*Arm: is the region between the axilla and the elbow.

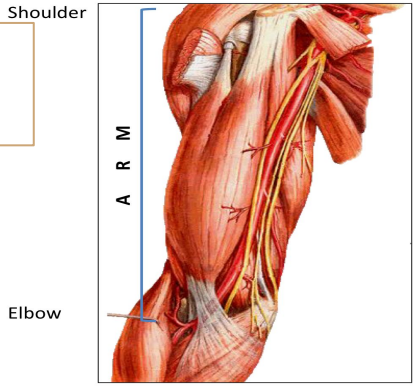
Deep fascia form the lateral and medial intermuscular septa which divide the distal part of the arm into two compartments:

★Anterior (Flexor) compartment.

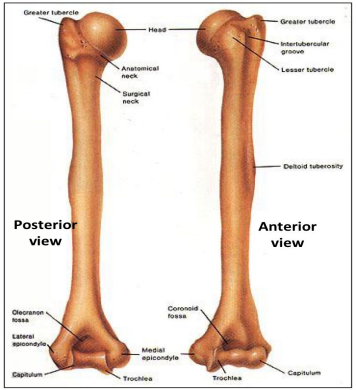
★Posterior (Extensor) compartment.

Clinical importance:
this process of compartmentalizing is important because an infection in one part cannot spread to the next.

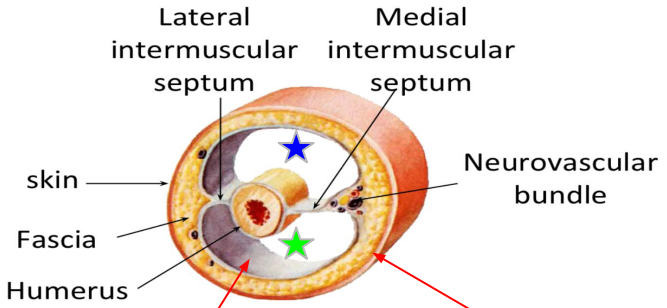
- Skin is only supplied by sensory nerves (no motor nerves).
- The skin does not attach to the muscle directly except in the face.
- The general arrangement of the body is:
  skin ➡fascia ➡muscle ➡bone.



Arm

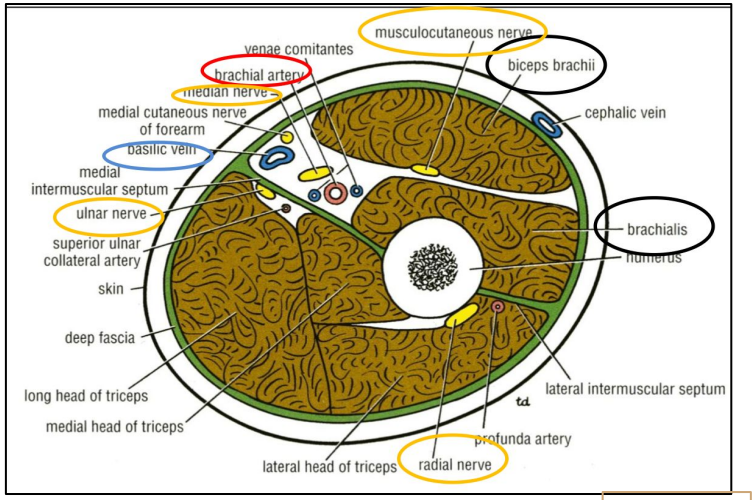


Humerus



*The function of the deep fascia is: protection, compartmenting, and allowing neurovascular bundles to pass.

Anterior Fascial Compartment Content



Muscles: Biceps brachii, Coracobrachialis and Brachialis.

Blood vessels: Brachial artery and Basilic vein.(the brachial artery is a continuation of the axillary artery)

Nerves: Musculocutaneous, Median, Radial and Ulnar*.

- Bi = Two, Ceps = Head (Biceps = Two Headed)
- Brachii = Arm
- Coraco = under the Coracoid process

*the radial and ulnar nerves begin in the anterior compartment then pierce the intermuscular septum and enter the posterior compartment.

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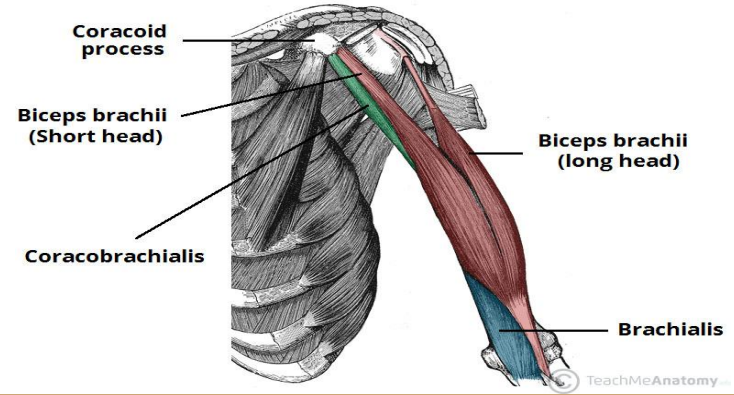


Biceps Brachii

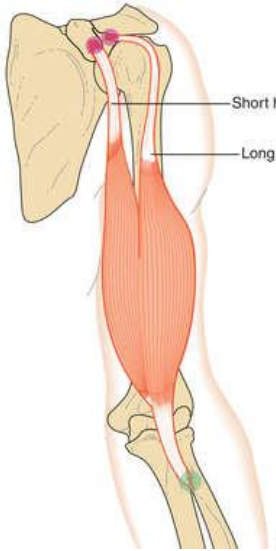
Question: what are the primary and secondary actions of the biceps brachii?
- Strong supinator (primary action)
- Powerful flexor (secondary action)

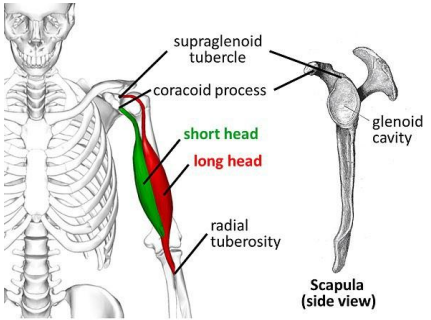
Origin: Two heads:

- **Long Head (Lateral head):** from supraglenoid tubercle of scapula (intracapsular*).
- **Short head (medial head)**: from the tip of coracoid process of scapula.

The two heads join in the middle of the arm.

*Intracapsular = inside shoulder joint.





Insertion:

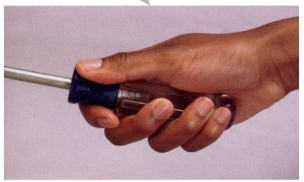
- Into the posterior part of radial tuberosity.
- Into the deep fascia of the medial aspect of forearm through bicipital aponeurosis.

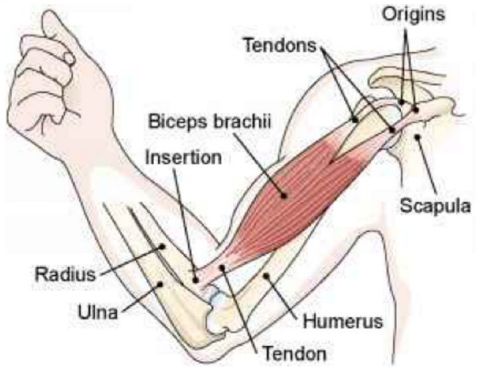
Clinical importance: the median cubital vein passes above the bicipital aponeurosis, which makes it a safe and easy access point to draw blood.

Nerve supply: Musculocutaneous.

Action:

- Strong supinator of the forearm (used in screwing).
- Powerful flexor of elbow.
- Weak flexor of shoulder.





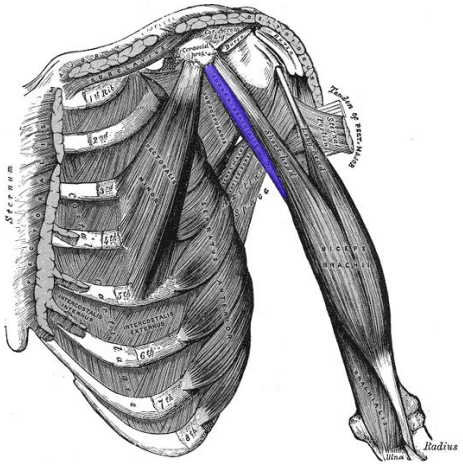
Coracobrachialis

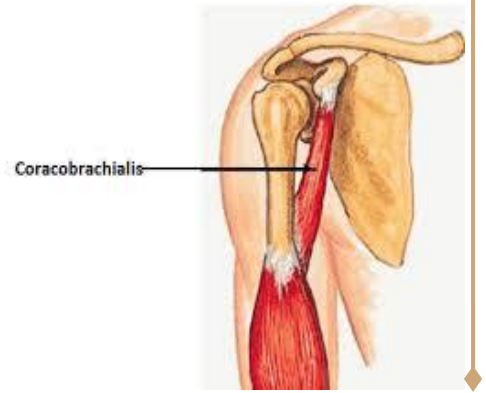
Origin: Tip of the coracoid process of scapula. (with short head of biceps brachii).

Insertion: Middle of the medial side of the shaft of the humerus.

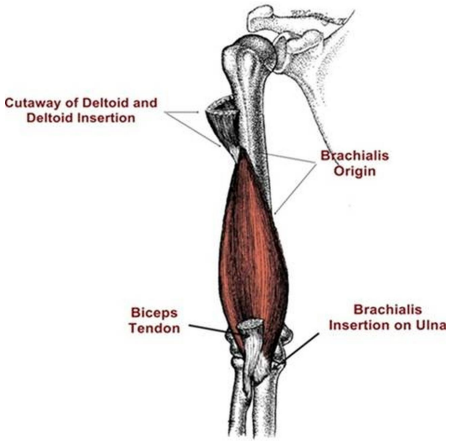
Nerve supply: Musculocutaneous

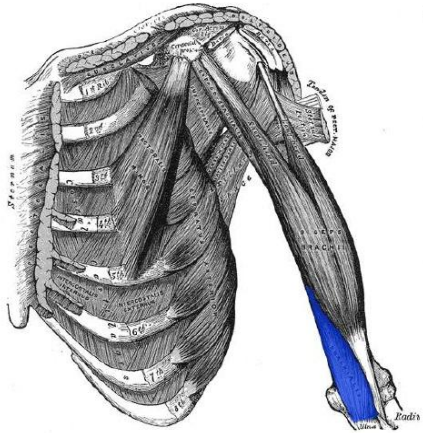
Action: Flexor and a weak adductor of the arm.





Brachialis





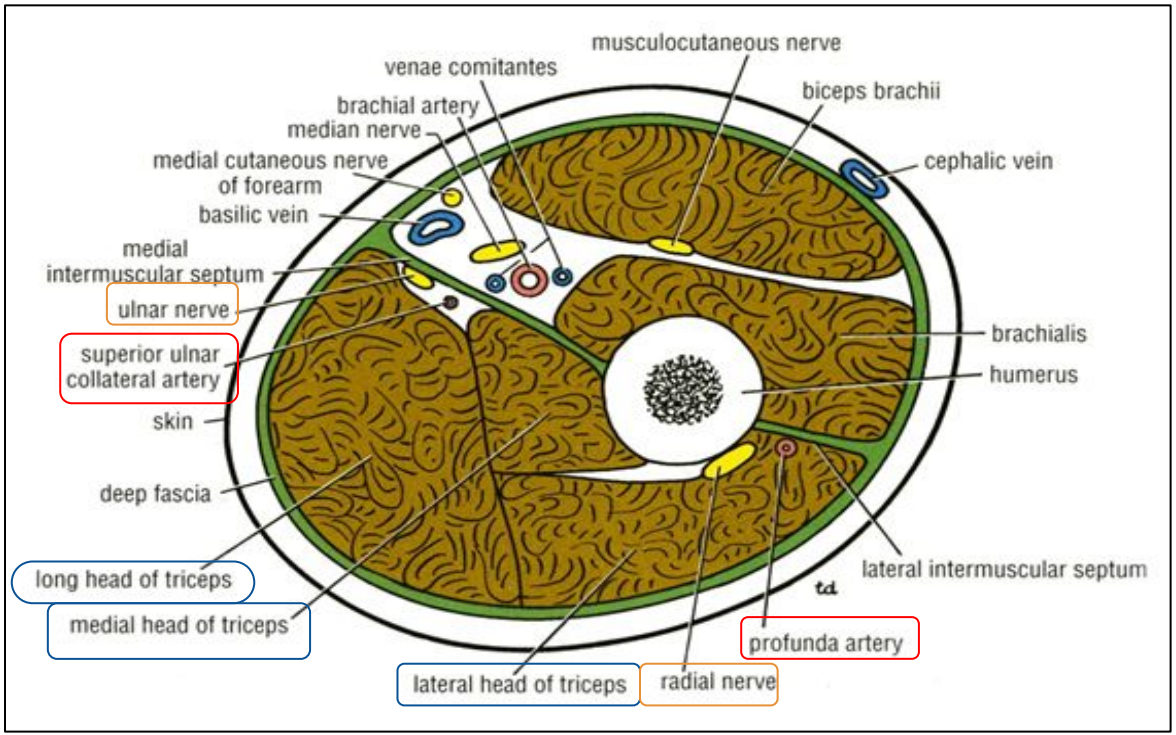
Origin: Front of the lower half of humerus.

Insertion: Anterior surface of coronoid process of ulna.

Nerve supply: Double nerve supply by: the Musculocutaneous (medial part) and. Radial (lateral part).

Action: Strong flexor of the forearm.

Posterior fascial compartment contents



Muscles: Triceps brachii

(tri- = three / -ceps = heads)

Vessels: Profunda (deep) brachii artery and superior ulnar collateral arteries (which enters the forearm behind the medial epicondyle)

Nerves: Radial & Ulnar (from the medial cord). The posterior compartment is only supplied by the radial nerve, the ulnar nerve only passes through it.

Triceps brachii

Origin: Three heads (tri):

1- Long Head from infraglenoid tubercle of the scapula.

2- Lateral Head from the upper half of the posterior surface of the shaft of humerus above the spiral groove.

3- Medial Head from the lower half of the posterior surface of the shaft of humerus below the spiral groove.

Insertion:

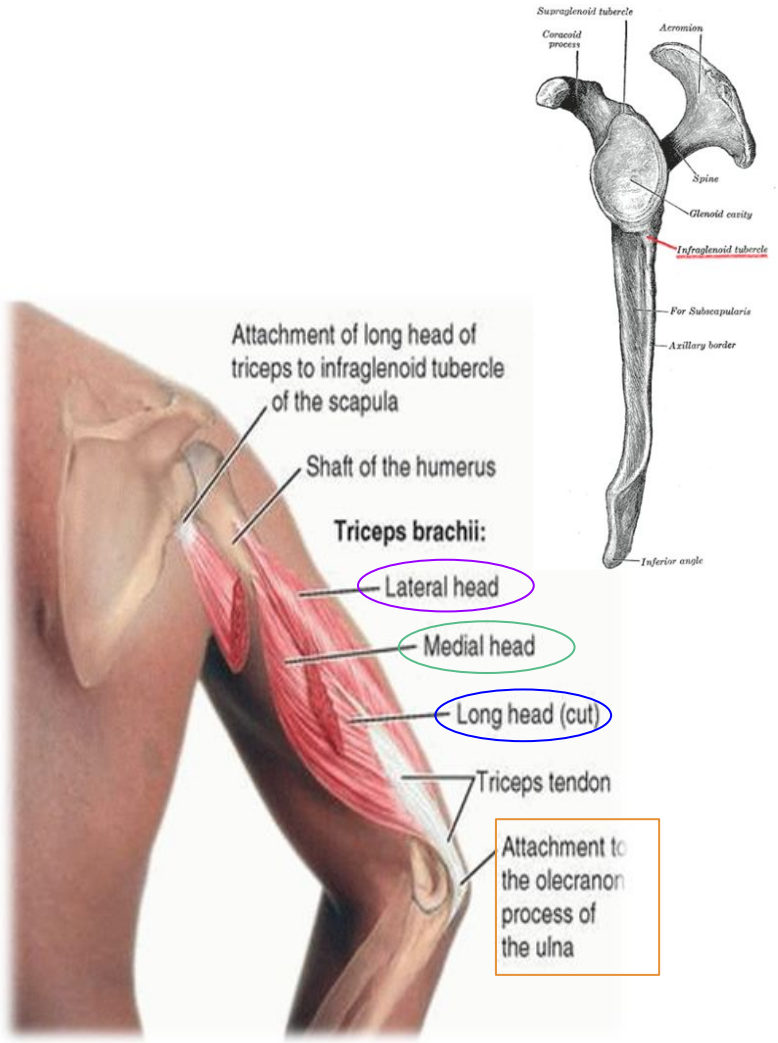
Common tendon inserted into the upper surface of the olecranon process of ulna.

Nerve supply:

Radial nerve (the main nerve of the posterior compartment of the arm).

Action:

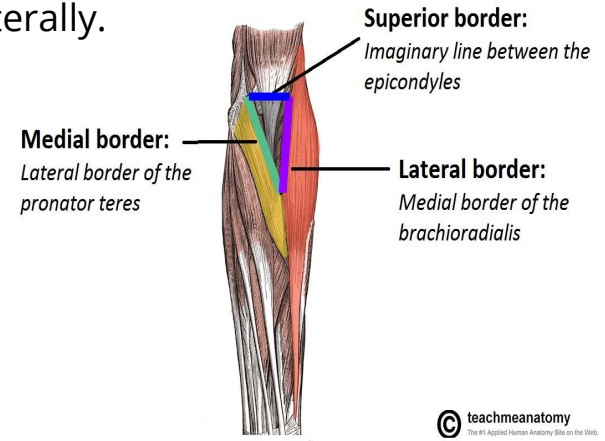
Strong extensor of the elbow joint



Cubital Fossa

Is a triangular depression that lies in front of the elbow:

- 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.



Contents of Cubital Fossa (Very important)

From medial to lateral:

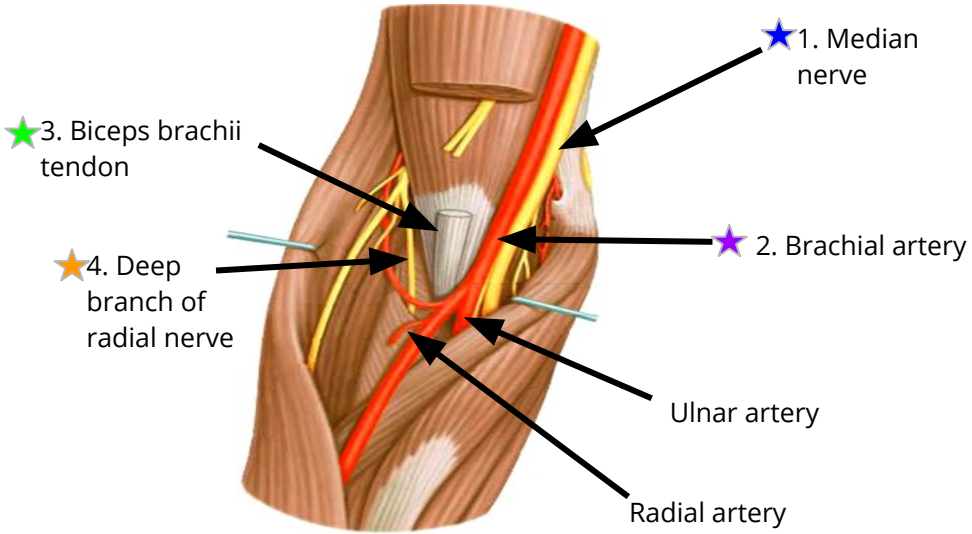
1- Median nerve. (Most medial)

2- Brachial artery. → Radial Artery, Ulnar Artery

3- Biceps brachii tendon.

4- Deep branch of radial nerve. (Most lateral)

Possible Question: Which of the following is from the contents of the cubital fossa?



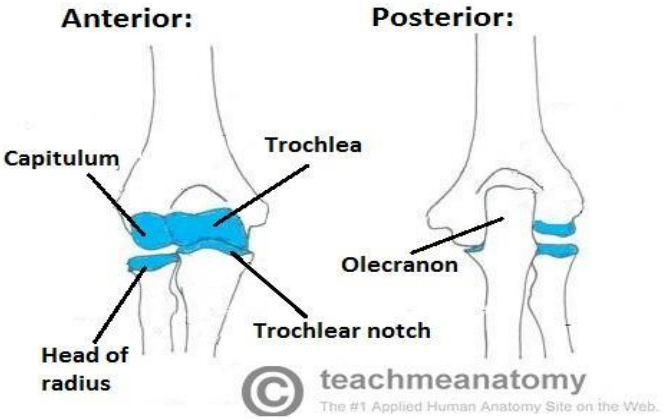
Elbow Joint

- Joint Type: Uniaxial, Synovial Hinge joint
- The articular surfaces are covered with articular (hyaline) cartilage.

Articulation:

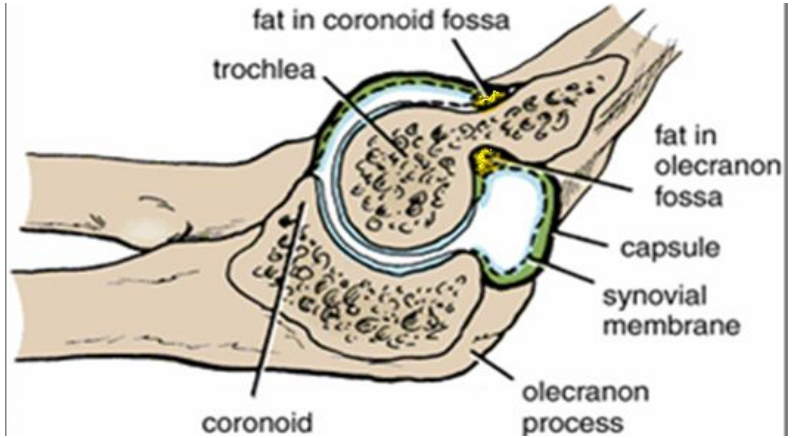
Above: Trochlea and capitulum of the humerus

Below: Trochlear notch of ulna and the head of radius



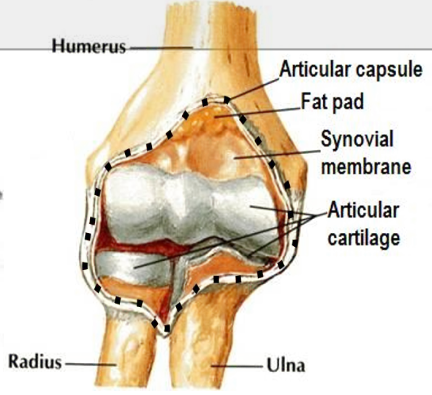
Synovial Membrane (inner side of capsule)

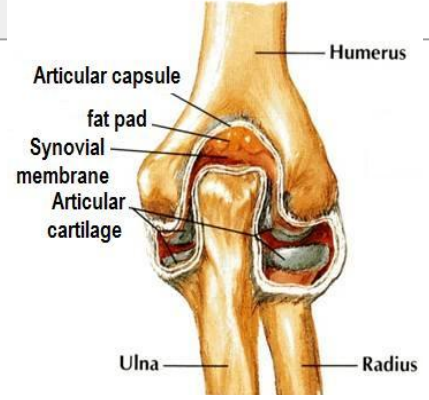
- This lines the inner surface of the capsule and covers fatty pads in the floors of the coronoid, radial, and olecranon fossa.
- Is continuous below with synovial membrane of the superior radioulnar joint.



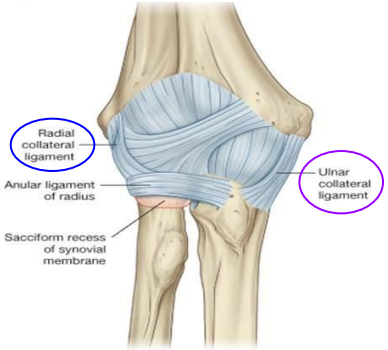
Synovial membrane produces fluid called Synovial fluid

Capsule (covers articular surface)	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.	To the margins of the olecranon fossa of the humerus.
Below	To the margin of the coronoid process of the ulna and to the annular ligament, which surrounds the head of the radius.	To the upper margin and sides of the olecranon process of the ulna and to the annular ligament

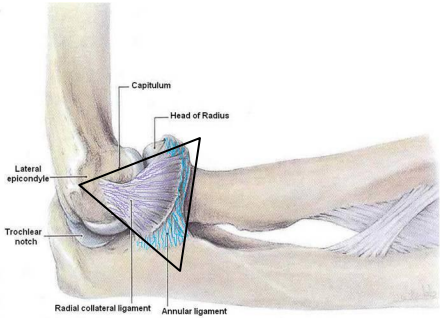




Ligaments



*Annular ligament: Circular ligament around the radius



Lateral (radial collateral) ligament:

Shape:

Triangular ▲

Apex:

Attached to the lateral epicondyle of humerus

Base:

Attached to the upper margin of annular ligament*.

Medial (ulnar collateral) ligament:

- Anterior strong cord-like band:

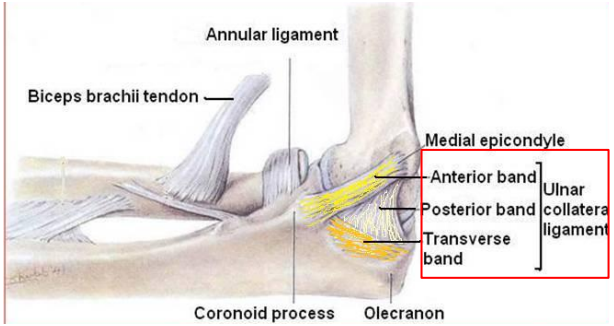
Between medial epicondyle and the coronoid process of ulna

- Posterior weaker fan-like band:

Between medial epicondyle and the olecranon process of ulna.

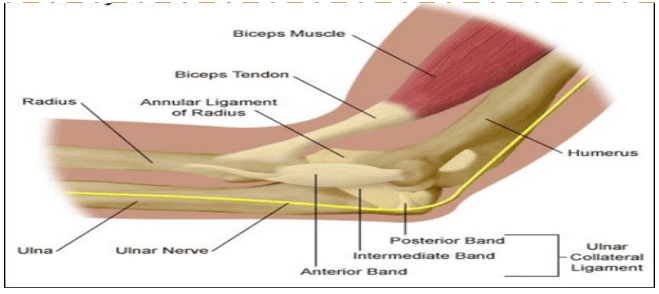
- Transverse band:

Passes between the anterior and posterior bands.



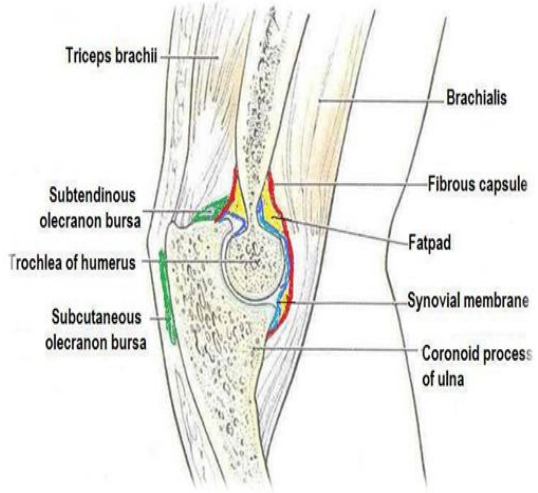
Relations of Elbow Joint

Anterior	1-Brachialis. 2-tendons of biceps. 3-Median nerve. 4-Brachial artery.
Posterior	1-Triceps muscle. 2-small bursa intervening.
Lateral	1- Common extensor tendon (attached to lateral epicondyles of the humerus). 2- Supinator.
Medial	Ulnar nerve : (between the medial epicondyle and the skin) -Considered the largest unprotected nerve by muscle or bone. هذا هو سبب شعورنا بألم (كهرباء) عند ضرب الكوع



Bursae around the elbow joint:
(a sac containing synovial fluid which protects the joint)

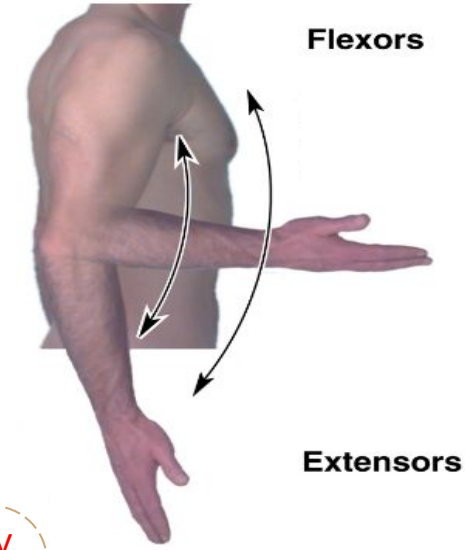
1- **Subcutaneous** (under the skin) olecranon bursa.
2- **Subtendinous** (under the tendon) olecranon bursa.



Movements of Elbow Joint (Very Important)

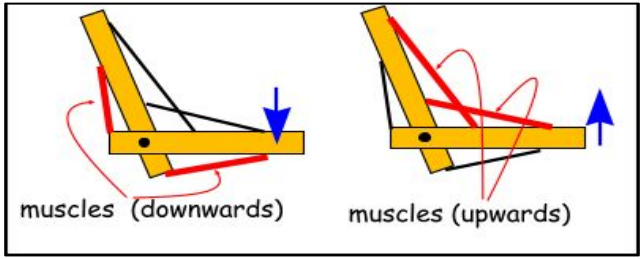
Flexion:

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



Extension:

Is limited by the **tension of anterior ligament** and the brachialis muscle.



The joint is supplied by branches from the nerves:

1. Median Nerve.
2. Ulnar Nerve.
3. Musculocutaneous Nerve.
4. Radial Nerve.

All the nerves in the arm supply the elbow joint.

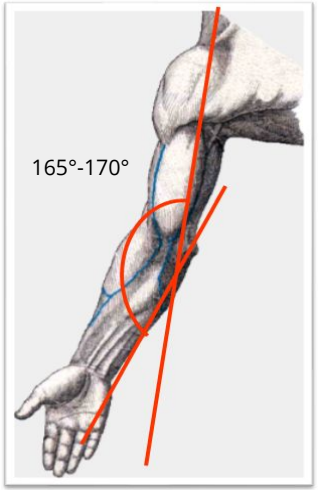
Carrying Angle

Angle

Between the long axis of the extended forearm and the long axis of the arm.

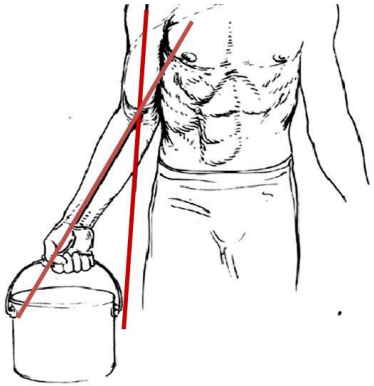
Opens

Laterally.



The Degree (About)

170° in male
167° in females.



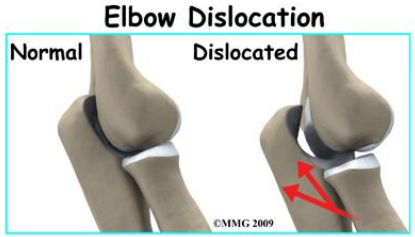
Disappears

When the elbow joint is **flexed**.

Permits

The forearms to clear the hips in swinging movements during walking, and is important when carrying objects.

Articulations and Applied Anatomy

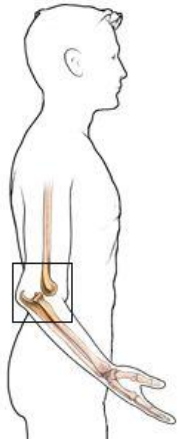


The elbow joint is stable because of

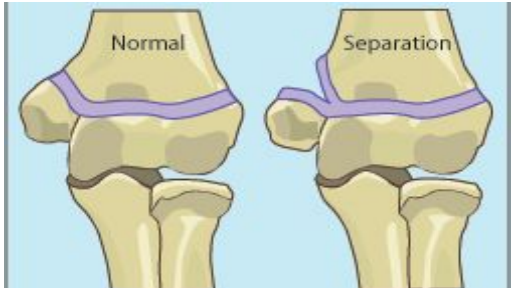
- Wrench-shaped articular surface of the olecranon and the pulley-shaped trochlea of humerus
- Strong medial and lateral ligaments.

Elbow dislocations are common and most are posterior dislocations:

- 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.



Elbow Joint

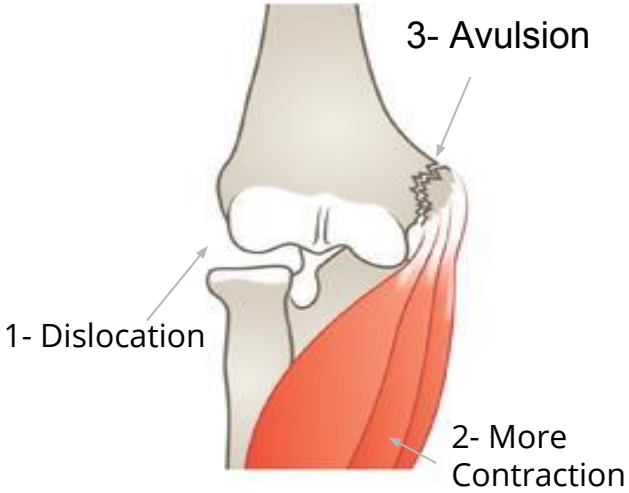


—**Avulsion** (نزع/تمزيق) **of the epiphysis** of the medial epicondyle, is also common in **childhood** because the medial ligament is much stronger than the bond of union between the epiphysis and the diaphysis.

(بمعني انه منطقة الepiphysis of the medial epicondyle عند الأطفال أكثر عرضة للخلع
لان الاربطة الي في ال medial اقوى من التي بينepiphysis and the diaphysis)

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:

- Fall on an outstretched hand with the elbow in full extension.
- Posterior elbow dislocation (common in children).
- Direct blow.



MCQ:

Q1 : The brachialis muscle lies in which fascial compartment?

A) Posterior B) Anterior

Q2: What is the origin of the long head of the biceps brachii?

A) Coracoid process B) Supraglenoid tubercle.
C) Infraglenoid tubercle D) Medial border of scapula

Q3: In males what is the degree of the carrying angle?

A) 170 B) 180 C) 167 D) 200

Q4: Which of the following is in the medial boundary of the cubital fossa?

A) Pronator teres B) Brachioradialis C) Brachialis
D) Supinator

Q5: What type of nerve supplies the biceps brachii?

A) Radial B) Median

C) Ulnar D) Musculocutaneous

Q6: What nerve supplies the lateral part of brachialis?

A) Median B) Ulnar C) Axillary D) Radial

Q7: What is the shape of the lateral ligaments of the elbow?

A) Squared B) Triangular

Q8: The lateral epicondyle of the humerus is attached to which part of the elbow ligaments?

A) Apex B) Base

Answers:

1)B
2)B
3)A
4)A
5)D
6)D
7)B
8)A

Team Members

Lamia Abdullah Alkuwaiz (Team Leader)
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Afnan Abdulaziz Almustafa
Ahad Algrain
Alanoud Almansour
Albandari Alshaye
AlFhadah abdullah alsaleem
Arwa Alzahrani
Dana Abdulaziz Alrasheed
Dimah Khalid Alaraifi
Ghada Alhaidari
Ghada Almuhanna
Ghaida Alsanad
Hadeel Khalid Awartani
Haifa Alessa
Khulood Alwehabi
Layan Hassan Alwatban
Lojain Azizalrahman
Lujain Tariq AlZaid
Maha Barakah
Majd Khalid AlBarrak
Norah Alharbi
Nouf Alotaibi
Noura Mohammed Alothaim
Rahaf Turki Alshammari
Reham Alhalabi
Rinad Musaed Alghoraiby
Sara Alsultan
Shahad Alzahrani
Wafa Alotaibi
Wejdan Fahad Albadrani
Wjdan AlShamry

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Fahad Alfaiz
Akram Alfandi
Saad Aloqile
Saleh Almoaiqel
Abdulaziz Alabdulkareem
Abdullah Almeaither
Yazeed Aldossari
Muath Alhumood
Abdulrahman Almotairi
Abdulelah Aldossari
Abdulrahman Alduhayyim
Hamdan Aldossari
Abdullah Alqarni
Mohammed Alomar
Abdulrahman Aldawood
Saud Alghufaily
Hassan Aloraini
Khalid Almutairi
Abdulmajeed Alwardi
Abdulrahman Alageel
Rayyan Almousa
Sultan Alfuhaid
Ali Alammari
Fahad Alshughaithry
Fayez Ghiyath Aldarsouni
Mohammed Alquwayfili
Abduljabbar Al-yamani
Sultan Al-nasser
Majed Aljohani
Zeyad Al-khenaizan
Mohammed Nouri
Abdulaziz Al-drgam
Fahad Aldhowaihy
Omar alyabis