King Saud University
College of medicine
Musculoskeletal block

Anatomy Team
433

Arm, Cubital Fossa & Elbow Joint

9

Objectives

- ***At the end of this session, students should be able to:***
- DESCRIBE the attachments, actions & innervations of: biceps brachii, coracobrachialis, brachialis, triceps brachii
- DEMONSTRATE the articulating bones, capsule, lateral & medial collateral ligaments and synovial membrane of the elbow joint
- 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.

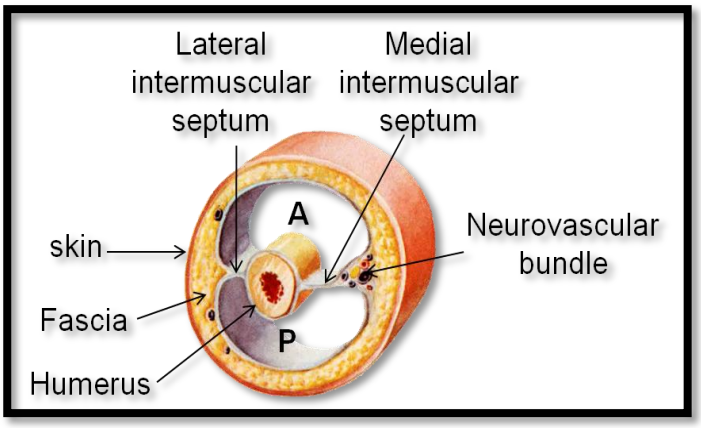
Color Index:

- Red : Important.
- Violet: Explanation.
- Gray: Additional Notes.

Other colors are for Coordination

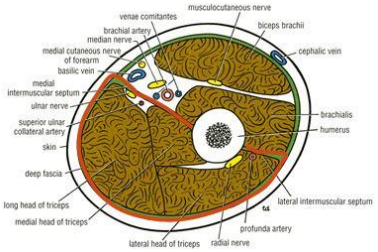
Say "بسم الله" then start

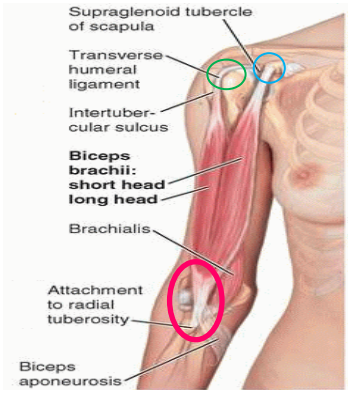
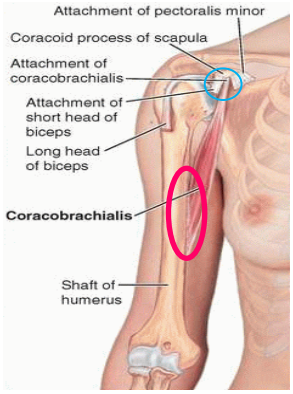
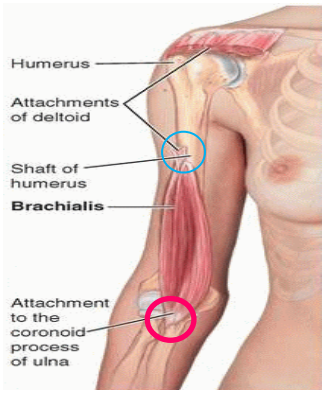
MIND MAP

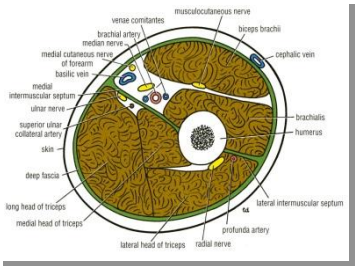


- Lateral and medial intermuscular septa divides the arm into:
  - Anterior compartment
    - Muscles
      - Biceps Brachii
      - coracobrachalis
      - brachialis
    - Blood vessels
      - Brachial Artery
      - Basilic vein
    - Nerves
      - Musculocutaneous
      - median
      - ulnar
      - Radial
  - Posterior compartment
    - Muscles
      - Triceps
    - Vessels
      - Profundus Brachii
      - Ulnar Collateral Arteries
    - Nerves
      - Radial
      - Ulnar

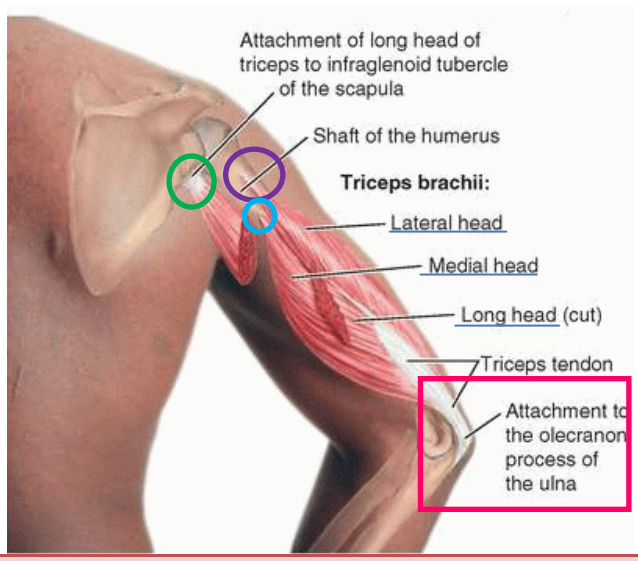
❖ Anterior Compartment:

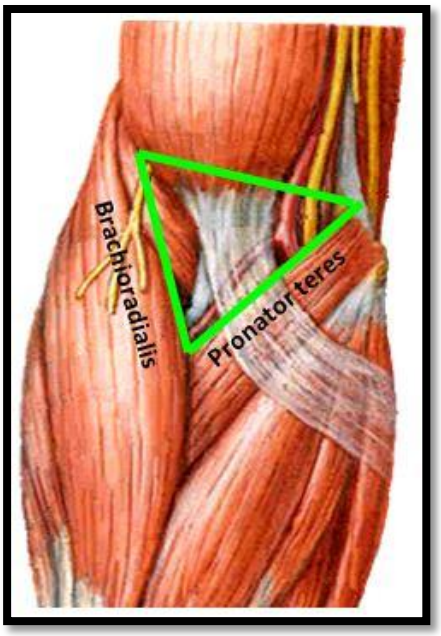


Muscles	Biceps Brachii	Coracobrachialis	Brachialis
Origin	Two heads join in the middle of the arm • ***Long head:***from supraglenoid tubercle of scapula (Intracapsular). • ***Short head:***from the tip of corocoid process of scapula.	Tip of the Coracoid process like the short head of biceps femoris	Front of the lower half of Humerus
Insertion	• In the posterior part of the radial tuberosity. • Into the deep fascia of the medial aspect of the forearm through bicipital aponeurosis.  [check slides for a clear photo of insertion]	Middle of the medial side of the shaft of the humerus 	Anterior surface of Coronoid process of Ulna 
Nerve Supply	Musculocutaneous	Musculocutaneous	Musculocutaneous & Radial
Action Mainly flexion because it's anterior	• Strong supinator of the forearm(used in screwing)[midpronation → supination] • Powerful flexor of elbow. • Weak flexor of shoulder.	Flexor & weak adductor of the arm	Strong flexor of the forearm



❖ Posterior Compartment:

Muscle	Triceps
Origin	**3 heads** • Long head: from infraglenoid tubercle of 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 Extension because it's in the back	Strong extensor of the elbow joint



• Cubital Fossa:

The cubital fossa is a triangular depression on the anterior aspect of the elbow.

3 Boundaries:

Base: Line drawn through the two epicondyles of Humerus.

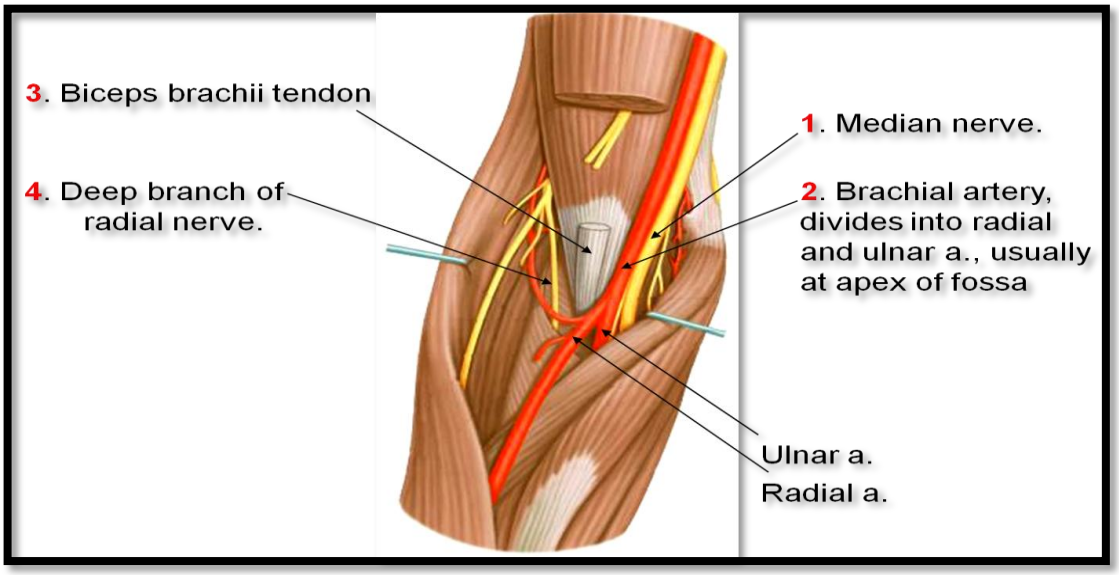
Laterally: Brachioradialis

Medially: Pronator Teres

Roof: skin, superficial and deep facia and bicipital aponerosis.

Floor: Brachialis medially and supinator

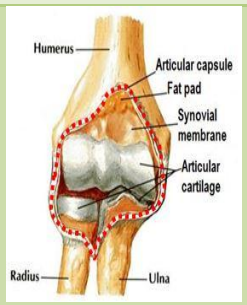
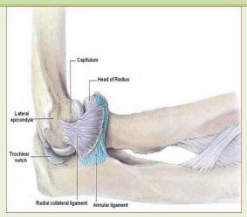
- Content of cubital fossa:



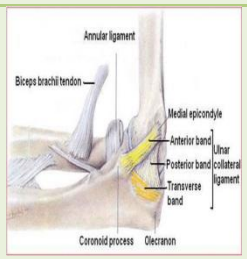
❖ Elbow joint:

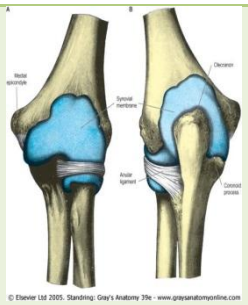
<table>
<tr><td>Articulation</td><td> 
</td><td colspan="3">Trochlea and capitulum of the humerus <u>above</u>

Trochlear notch of ulna and the head of radius <u>below</u>

The articular surfaces are covered with articular (hyaline) cartilage.</td></tr>
<tr><td rowspan="4">Capsule</td><td rowspan="2"> 
</td><td rowspan="2">Anteriorly</td><td>Above</td><td>to the Humerus along the upper margins of the coronoid and radial fossae and to the front of the medial and lateral epicondyles</td></tr>
<tr><td>Below</td><td>to the margin of the coronoid process of the Ulna and to the anular ligament (surround head of the Radius)</td></tr>
<tr><td rowspan="2"> 
</td><td rowspan="2">Posteriorly</td><td>Above</td><td>to the margins of the olecranon fossa of the Humerus</td></tr>
<tr><td>Below</td><td>to the upper margin and sides of the olecranon process of the ulna and the Anular ligament</td></tr>
<tr><td>Ligaments</td><td>  </td><td>Lateral (Radial collateral)</td><td colspan="2">Triangular in shape

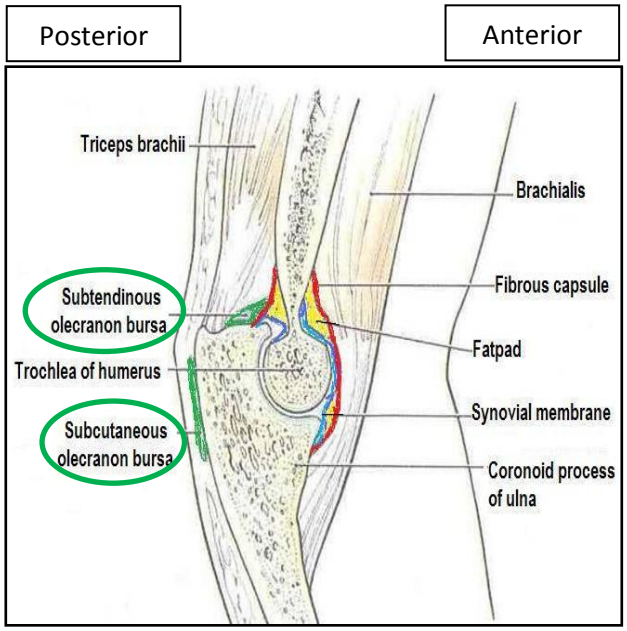
Apex attached to lateral epicondyle of Humerus

Base attached to the upper margin of annular ligament.</td></tr>
<tr><td> 
</td><td>Medial (Ulnar collateral)</td><td colspan="2">Composed of three parts (bands)—
• Anterior (strong cord-like) band: between medial epicondyle & 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</td></tr>
</table>

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 Radioulnar joint. (inflammation of one joint, other joint will be affected)

❖ Relations:

- ***Anterior:*** Brachialis, tendon of biceps, median nerve, brachial artery
- ***Posterior:*** Triceps muscle, small bursa intervening
- ***Lateral:*** Common extensor tendon & the supinator
- ***Medial:*** Ulnar nerve



Bursae around the elbow joint:

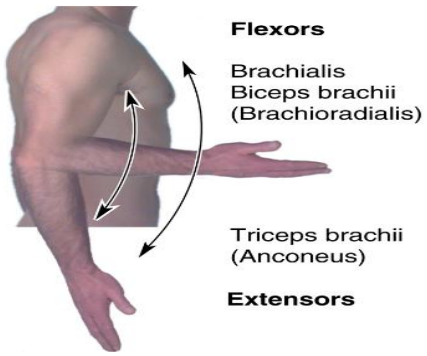
- Subcutaneous olecranon bursa
- Subtendinous olecranon bursa

❖ Movement:

Movements possible are ***Flexion & Extension***

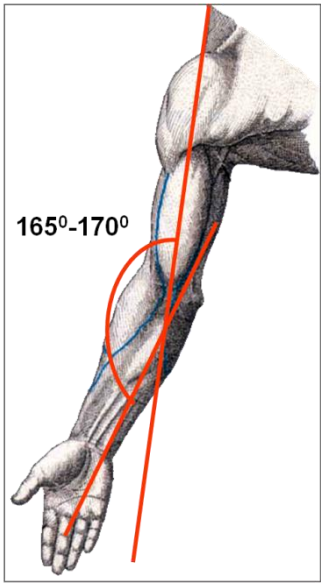
Flexion	Extension
Is limited by: the anterior surfaces of the forearm and arm coming into contact.	Is limited by: the tension of the anterior ligament and the brachialis muscle.

The joint is supplied by branches from the median, ulnar, musculocutaneous, and radial nerves.



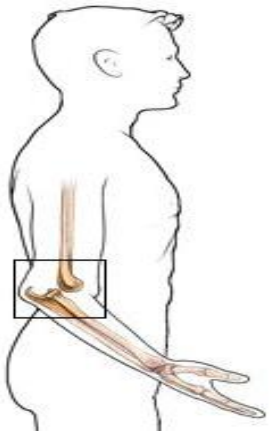
❖ Carrying Angle:

- Angle between the long axis of the extended forearm and the long axis of the arm
- Opens laterally
- Is about **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, and is important when carrying objects



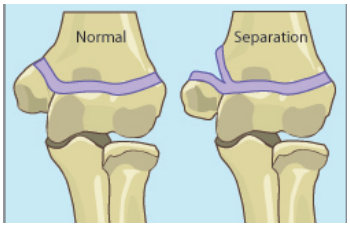
❖ Stability:

The elbow joint is a **stable** joint 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, and **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.*

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



SUMMARY

- There are 2 compartments in the forearm that are separated by the lateral and medial intramuscular septa.
- The anterior compartment has 3 muscles, 2 blood vessels, and 4 nerves. The main action is flexion.
- The posterior compartment has 1 muscle, 2 blood vessels, and 2 nerves. The main action is extension.
- The cubital fossa contains: Median Nerve, Brachial artery and its branches (Ulnar and radial arteries), Biceps brachii tendon, deep branch of radial nerve.

Remember That

- ✓ Biceps brachii have 2 heads (2 origins) and a common insertion.
- ✓ Short head of the biceps brachii and coracobrachialis have the same origin (tip of coracoid process)
- ✓ Brachialis is the only one from the anterior part that has an origin on the shaft.
- ✓ Biceps brachii is the strong flexor of the elbow joint.
- ✓ Brachialis is the strong flexor of the forearm
- ✓ Triceps have 3 heads (3 origins) and a common insertion
- ✓ The lateral and medial heads of the triceps originate above and below the spiral groove respectively.
- ✓ Triceps muscle is the strong extensor of the elbow joint.
- ✓ Lateral boundary of the cubital fossa is Brachioradialis
- ✓ Medial boundary of the cubital fossa is pronator teres
- ✓ The elbow joint is a uniaxial, synovial, hinge joint.
- ✓ The elbow joint is stable because of its shape and the strong medial and lateral ligaments.
- ✓ The carrying angle disappears when the elbow joint is flexed

Multiple Choice Questions

1- The muscle inserted into supraglenoid tubercle of scapula:

a) Triceps b) Coracobrachialis c) Long head of biceps brachii d) Short head of biceps brachii

2- The muscle used in screwing (strong supinator of the forearm):

a) Corachobrachialis b) biceps brachii c) triceps d) brachialis

3- The base of the cubital fossa is:

a) Pronator teres b) brachialis c) supinator d) line drawn through the lateral and medial epicondyles

4- The apex of the lateral (radial collateral) ligaments is attached to:

a) Lateral epicondyle of the humerus b) the anular ligament c) Medial epicondyle

5- The structure on the medial boarder of the elbow joint is:

a) Common extensor tendon b) supinator c) ulnar nerve d) Brachialis

6- The carrying angle is males is:

a) 150 degrees b) 180 degrees c) 160 degrees d) 170 degrees

Q Answers:

1-c 2- b 3- d 4- a 5- c
6- d

Anatomy Team
433

Good luck

Done by: Basmah AlDeghaither & AlAnoud AlBegami

For any comments

Please don't hesitate to contact with us by

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