The Anatomy of the Arm

(or **The Brachium**)

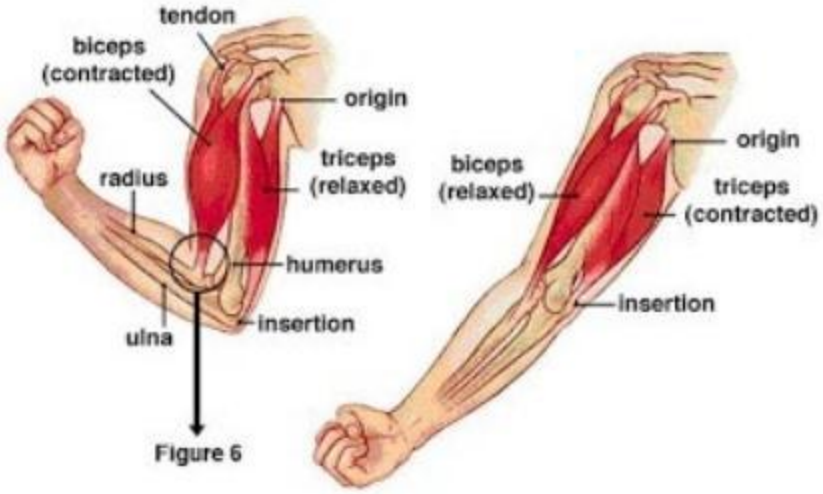


Figure 6

Cutaneous Innervation

- **The upper medial surface of the arm** is supplied by the lateral branch of the second intercostal nerve **(the intercostobrachial nerve).**
- **The lower medial surface of the arm** is supplied by the medial cutaneous nerve of the arm.
- **The lateral aspect of the arm** is supplied by the upper lateral cutaneous nerve (a branch of the axillary nerve) and the lower lateral cutaneous nerve (a branch of the radial nerve).
- **The posterior aspect** is supplied by the posterior cutaneous nerve of the arm, a branch of the radial nerve

Fascial Compartments of the Upper Arm

- The upper arm is enclosed in a sheath of deep fascia.
- Two fascial septa;
- **medial intermuscular septum** on the medial side extend from this sheath and are attached to the medial supracondylar ridge of the humerus
- **lateral intermuscular septum** on the lateral side, extend from this sheath and are attached to the lateral supracondylar ridge of the humerus.
- By this means, the upper arm is divided into an **anterior and a posterior fascial compartment**, each having its muscles, nerves, and arteries

Contents of the anterior compartment of the arm

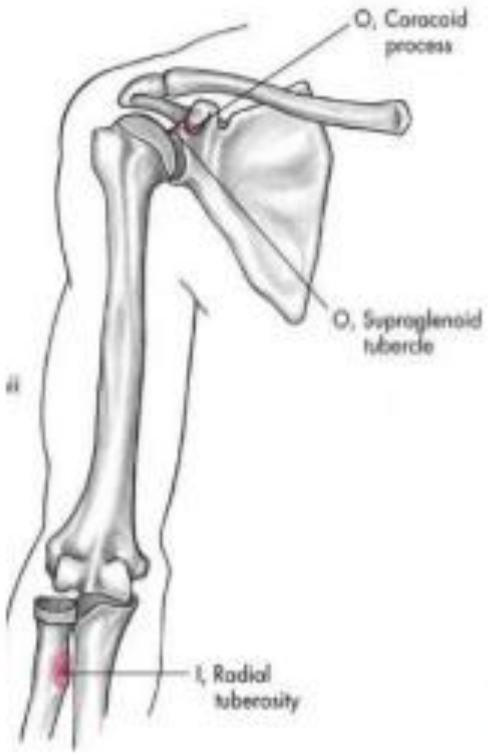
- **Muscles:** Biceps brachii, coracobrachialis, and brachialis
- **Blood supply:** Brachial artery
- **Nerve supply to the muscles**: Musculocutaneous nerve
- **Structures passing through the compartment:** Musculocutaneous, median, and ulnar nerves; brachial artery and basilic vein.
- The radial nerve is present in the lower part of the compartment.

Biceps brachii muscle

- **Origin:**
- **Long head:** from the supraglenoid tubercle of the scapula.
- **Short head:** from the tip of coracoid process of the scapula.
- **Insertion:** Into the posterior part of the tuberosity of the radius.

The bicipital aponeurosis inserted into the deep fascia of the upper part of the medial side of the forearm.

- **Nerve Supply:** From musculocutaneous nerve.
- **Action:**
- Supination of the forearm at the radio-ulnar joints.
- Flexion of the forearm at the elbow joint.
- Weak flexion of the shoulder joint.



Biceps brachii

Origin

Short head: tip of coracoid process of scapula; **Long head:** supraglenoid tubercle of scapula, passes through the shoulder joint and emerges from the joint through the intertubercular groove.

Insertion Tuberosity of radius and fascia of forearm via bicipital aponeurosis

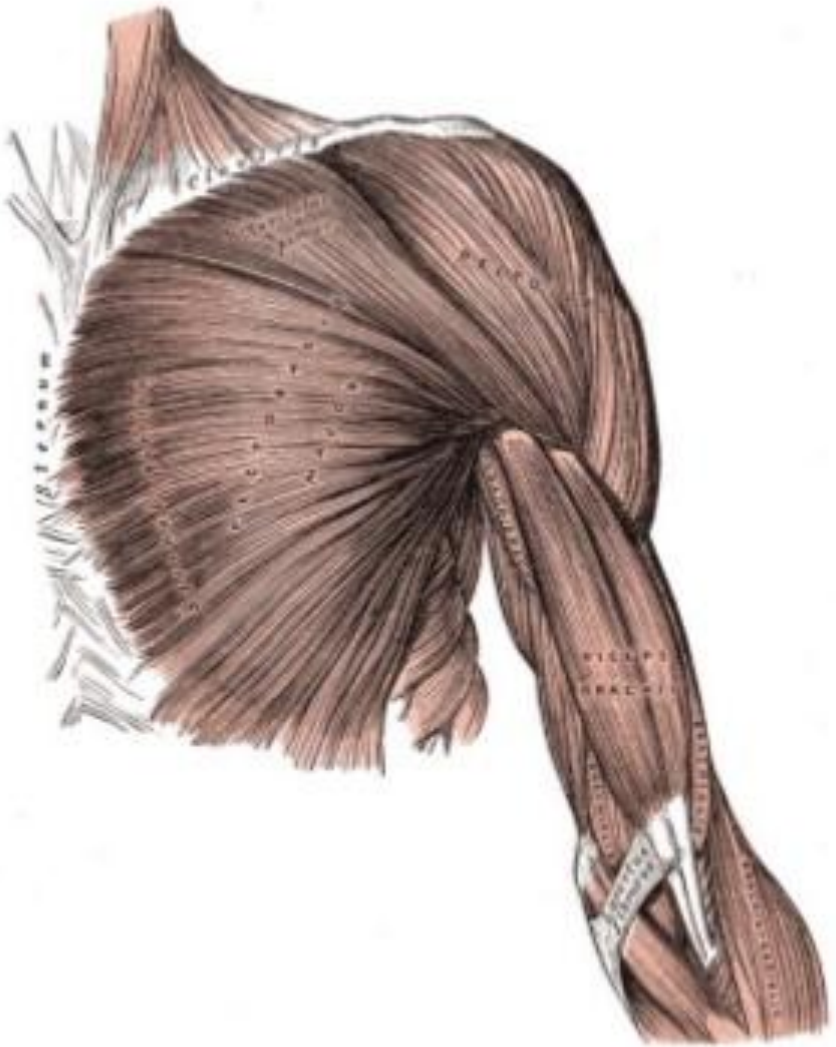
Action

Supinates forearm and, when it is supine, flexes forearm

Weak flexion of arm

Innervation Musculocutaneous nerve (C5, C6)

The **bicipital aponeurosis**



- It is a **broad aponeurosis** of the biceps brachii located in the cubital fossa .
- It separates superficial from deep structures in the fossa.
- It originates from the distal insertion of the biceps brachii and runs across the brachial artery.
- It **is inserted into the antebrachial fascia of the forearm.**
- It **helps to protect the brachial artery and the median nerve running underneath(during venipuncture**) from the median cubital vein.

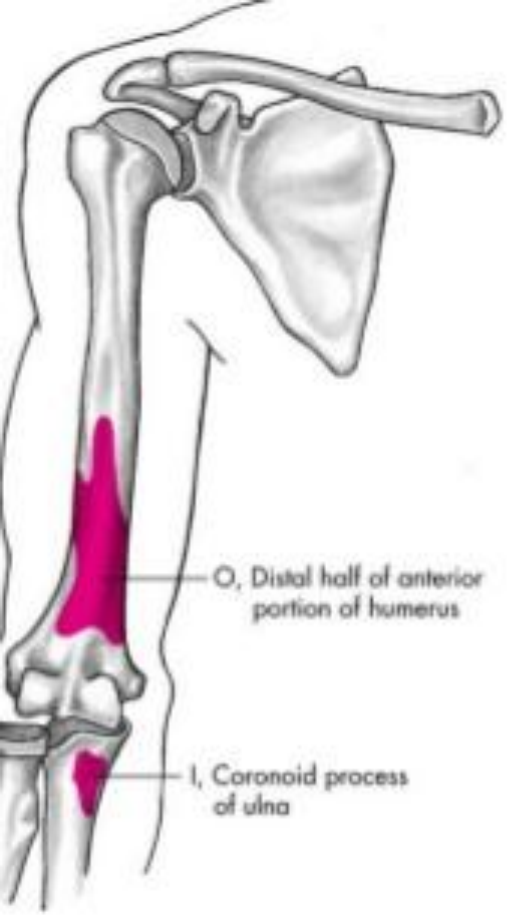
Coracobrachialis muscle

- **Origin:** From the tip of coracoid process of the scapula (with short head of biceps).
- **Insertion:** Into the middle third of the medial side of the shaft of the humerus.
- **Blood Supply:** Muscular branches of brachial artery
- **Nerve Supply:** From musculocutaneous nerve.
- **Action:**
- Flexion of the shoulder joint.
- Weak adduction of the shoulder joint.

Brachialis muscle

- **Origin:**
- From the lower half of the anterior surface of the shaft of the humerus.
- **Insertion:** Into the anterior surface of the coronoid process of the ulna.
- **Nerve Supply:**
- Majority of the muscle from musculocutaneous nerve.
- Small lateral part from the radial nerve.
- **Action:** Strong flexion of the elbow joint.

Brachialis



Origin Distal half of anterior surface of humerus

Insertion Coronoid process and tuberosity of ulna

Action Major flexor of forearm -

flexes forearm in all positions

Innervation

Musculocutaneous nerve (C5, C6)

Arterial Supply Muscular branches of brachial artery, recurrent radial artery

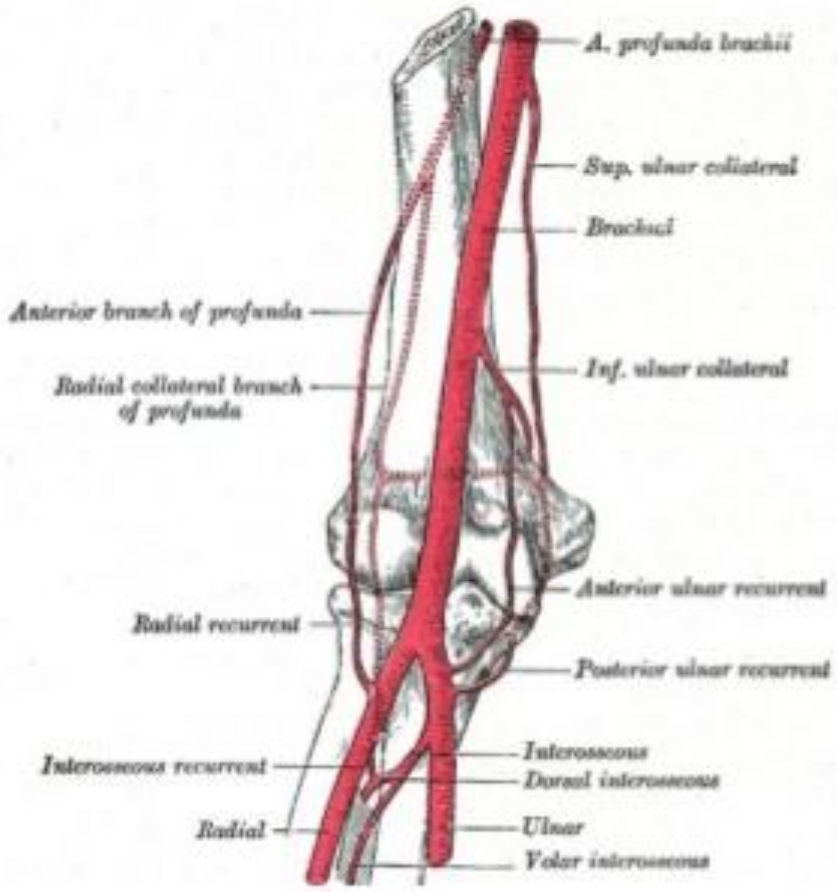
Structures Passing Through the Anterior Fascial Compartment

- Brachial artery
- Musculocutaneos nerve
- Median nerve
- Ulnar nerve

Brachial Artery

- **Beginning** The brachial artery begins at the lower border of the teres major muscle as a continuation of the axillary artery.
- It provides the main arterial supply to the arm.
- **Termination** It terminates opposite the neck of the radius by dividing into the radial and ulnar arteries.
- **Relations**
- **Anteriorly:** The vessel is superficial and is overlapped from the lateral side by the coracobrachialis and biceps. The medial cutaneous nerve of the forearm lies in front of the upper part; the median nerve crosses its middle part; and the bicipital aponeurosis crosses its lower part.
- **Posteriorly:** The artery lies on the triceps, the coracobrachialis insertion, and the brachialis
- **Medially:** The ulnar nerve and the basilic vein in the upper part of the arm; in the lower part of the arm, the median nerve lies on its medial side
- **Laterally:** The median nerve and the coracobrachialis and biceps muscles above; the tendon of the biceps lies lateral to the artery in the lower part of its course

Brachial artery



Begins at the lower margin of the tendon of the Teres major **as continuation of Axillary.**

It terminates just below the elbow by dividing into the **radial** and **ulnar arteries.**

Branches

Profunda Brachii.

Superior Ulnar Collateral.

Nutrient artery of Humerus

Inferior Ulnar Collateral.

Muscular.

Branches of brachial artery

- **Muscular branches** to the anterior compartment of the upper arm
- **The nutrient artery** to the humerus
- **The profunda artery** arises near the beginning of the brachial artery and follows the radial nerve into the spiral groove of the humerus.
- It supplies muscular branches, the nutrient artery of the humerus, and finally divides into terminal radial and middle collateral branches.
- **The superior ulnar collateral artery** arises near the middle of the upper arm and follows the ulnar nerve.
- **The inferior ulnar collateral artery** arises near the termination of the artery and takes part in the anastomosis around the elbow joint

Musculocutaneous Nerve

- The origin of the musculocutaneous nerve from the lateral cord of the brachial plexus (C5, 6, and 7).
- It runs downward and laterally, pierces the coracobrachialis muscle, and then passes downward between the biceps and brachialis muscles.
- It appears at the lateral margin of the biceps tendon and pierces the deep fascia just above the elbow.
- It runs down the lateral aspect of the forearm as the **lateral cutaneous nerve of the forearm**

Musculocutaneous nerve(C,5&6)

It arises from lateral cord of brachial plexus

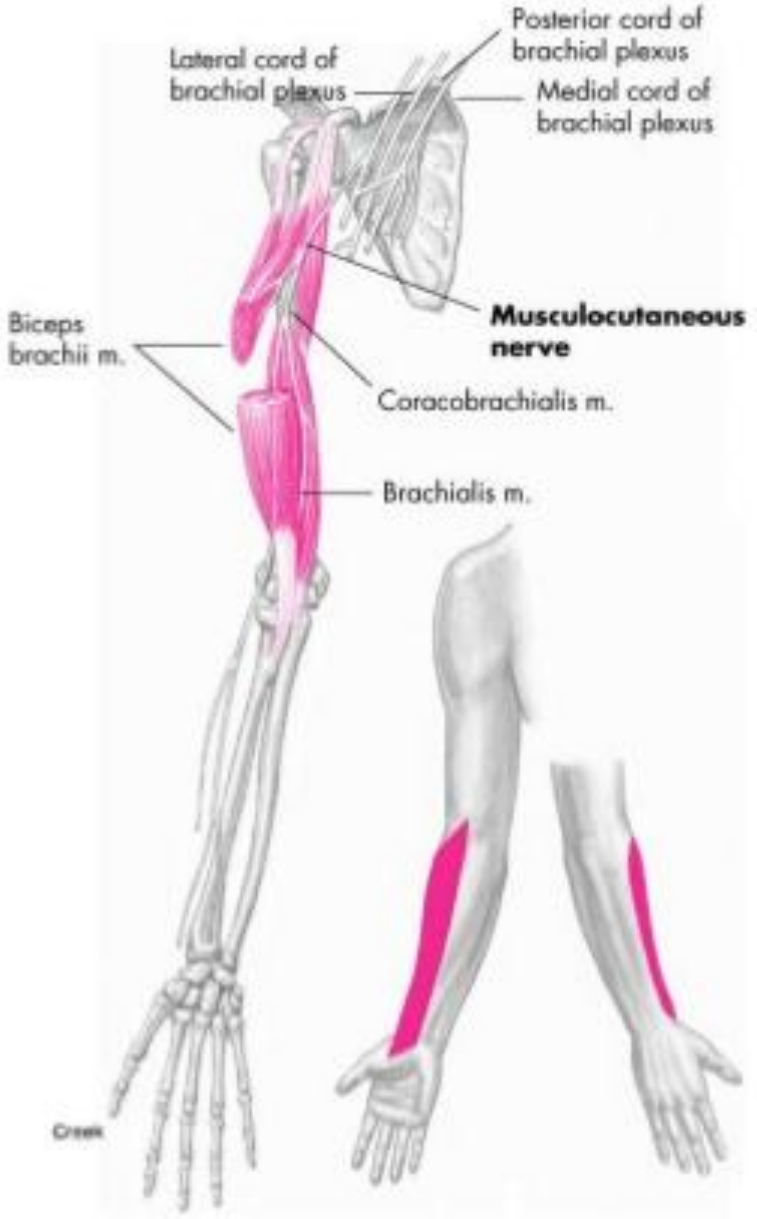
It pierces the coracobrachialis and supplies

Biceps brachii

Brachialis

Coracobrachialis

It continues as lateral cutaneous nerve of forearm.



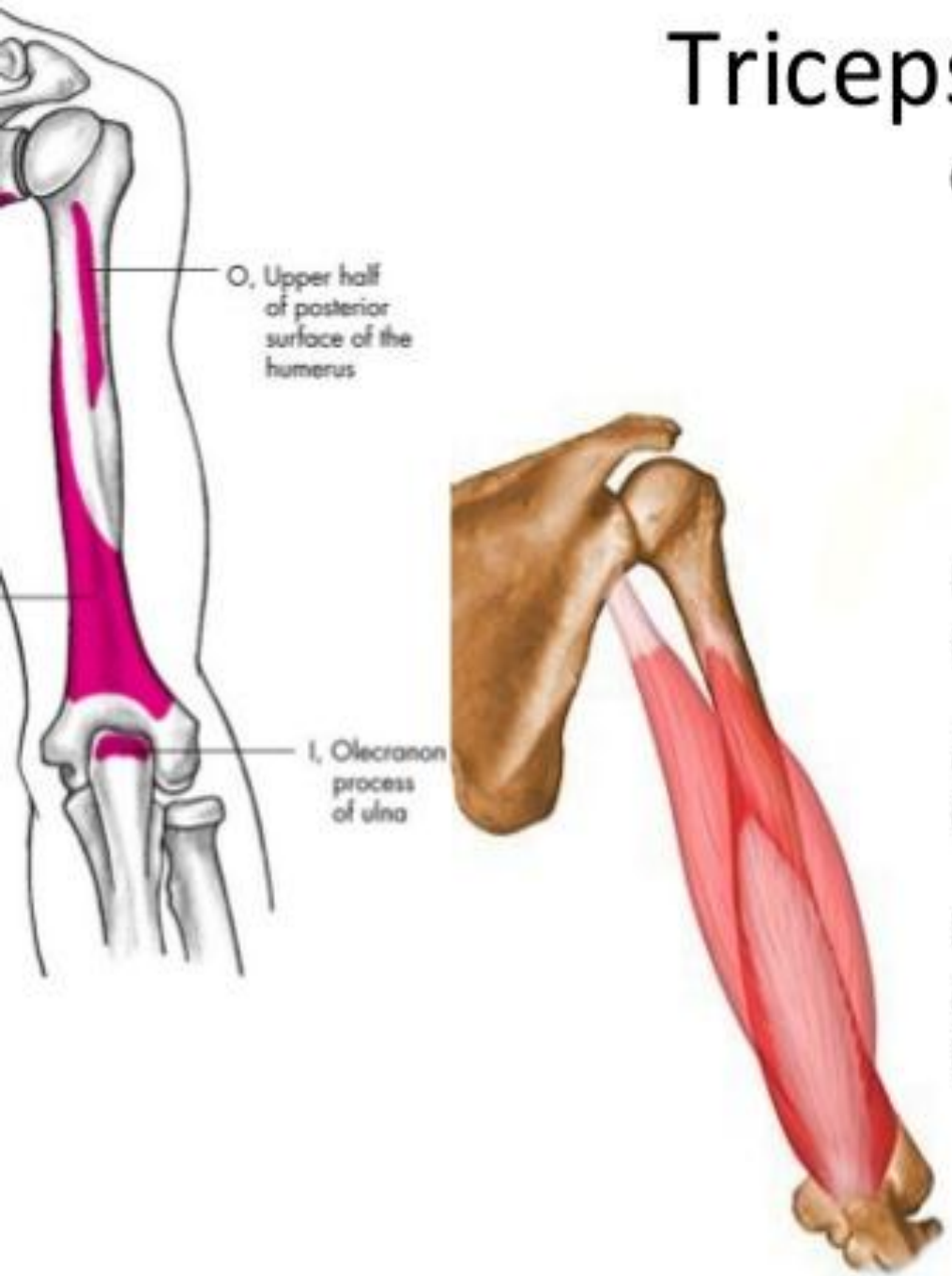
Branches of musculocutaneous nerve

- **Muscular branches** to the biceps, coracobrachialis, and brachialis
- **Cutaneous branches;** the lateral cutaneous nerve of the forearm supplies the skin of the front and lateral aspects of the forearm down as far as the root of the thumb.
- **Articular branches** to the elbow joint

Median Nerve

- The origin of the median nerve from the medial and lateral cords of the brachial plexus in the axilla.
- It runs downward on the lateral side of the brachial artery . Halfway down the upper arm, it crosses the brachial artery and continues downward on its medial side.
- The nerve, like the artery, is therefore superficial, but at the elbow, it is crossed by the bicipital aponeurosis.
- The median nerve has no branches in the upper arm , except for a small vasomotor nerve to the brachial artery.

Triceps brachii



Origin

Long head: infraglenoid tubercle of scapula;

Lateral head: posterior surface of humerus, superior to radial groove;

Medial head: posterior surface of humerus, inferior to radial groove

Insertion

Proximal end of olecranon process of ulna and fascia of forearm

Action

Chief extensor of forearm; long head steadies head of abducted humerus

Innervation Radial nerve (C6, C7, C8)

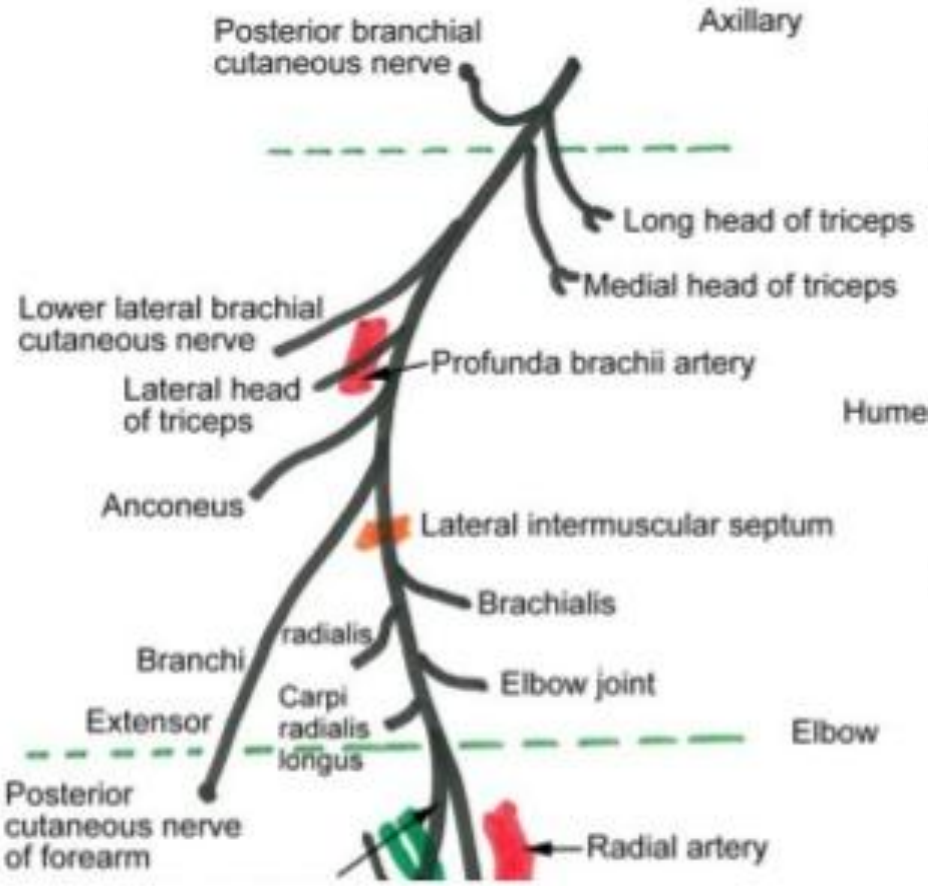
Arterial Supply

Branches of deep brachial artery

Radial nerve

- In the posterior compartment winds in the spiral groove of the humerus with the profunda brachii vessels.
- Just above the elbow, it pierces the lateral intermuscular septum and continues downward into the cubital fossa
- At the level of the elbow (lateral epicondyle), it divides into **superficial and deep branches**.
- Superficial branch , a sensory nerve of the hand is a content of cubital fossa.
- The **deep branch** of the radial nerve enters the posterior compartment of the forearm.

Branches of radial nerve



Branches in the axilla

- **Cutaneous branch - Posterior brachial cutaneous nerve**
- **Muscular branches - Long and medial heads of triceps**

Branches in the spiral groove

- **Cutaneous branches - Lower lateral brachial cutaneous nerve, posterior antebrachial cutaneous nerve**
- **Muscular branches - Lateral and medial heads of the triceps, anconeus**

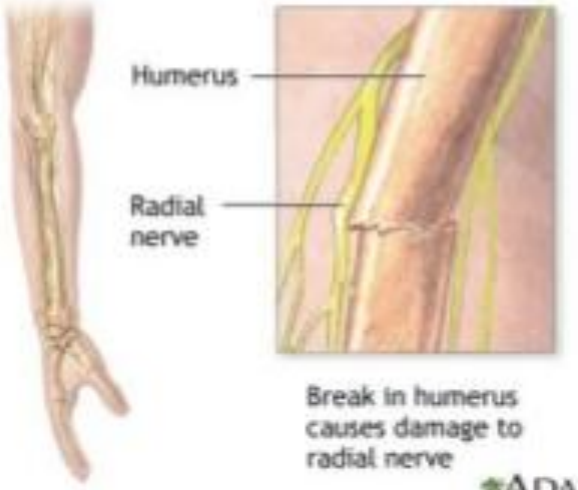
- **Branches in the arm**
  - **Articular branch - Elbow joint**
  - **Muscular branches - Brachialis, brachioradialis, extensor carpi radialis longus**

Radial nerve Palsy

- **Causes:**

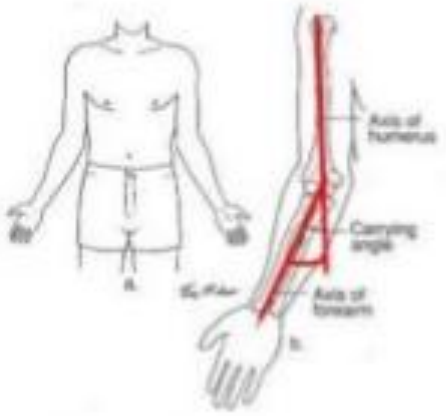
fracture of midshaft of humerus
Intramuscular injection
Saturday night palsy
Crutch paralysis
Fractures of shaft of humerus

- Results in a loss of function in the extensors of forearm, hand, metacarpals and phalanges.
- Results in loss of wrist extension leading to **Wrist Drop** and producing a weakness of adduction and abduction of hand.



The elbow joint

- Humerus, radius and ulna form a hinge joint.
- The capitulum of the humerus articulates with the upper aspect of the head of the radius (**humeroradial joint)**
- The trochlea of the humerus articulates with the trochlear notch of the ulna (**humero-ulnar joint).**
- These two parts of the elbow joint are continuous with each other and share a **common cavity with the proximal radio-ulnar joint.**



Movements

- Flexion is done by biceps, brachialis and coracobrachialis.
- Extension is performed by triceps, particularly medial head.
- The extended ulna makes with the humerus an angle of 170 degrees. This is **carrying angle. It is 10-15degrees** It fits the elbow into the waist when the arm is at the side.

Proximal radioulnar joint

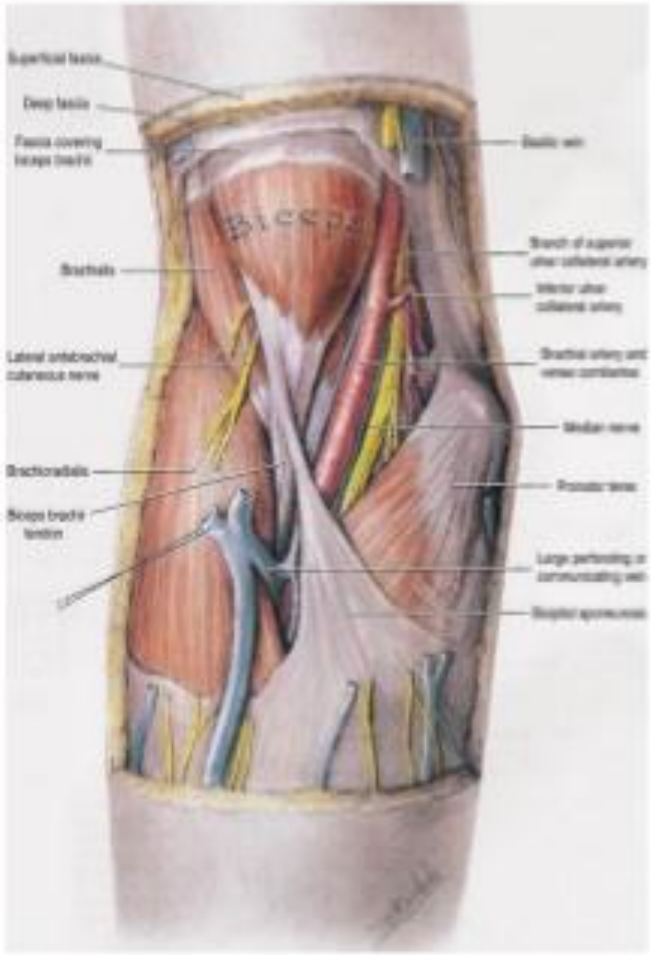
(c) Pivot joint between head of radius and radial notch of ulna

- The circumference of the head of the radius fits into the radial notch of ulna to form **a pivot joint.**
- **Strong annular ligament** :attached to the anterior and posterior margins of the notch.
- Some fibres extend from the lower margin of the notch to the neck of radius(quadrate ligament)
- The synovial membrane is continuous with that of the elbow joint.

Movements-Supination &Pronation

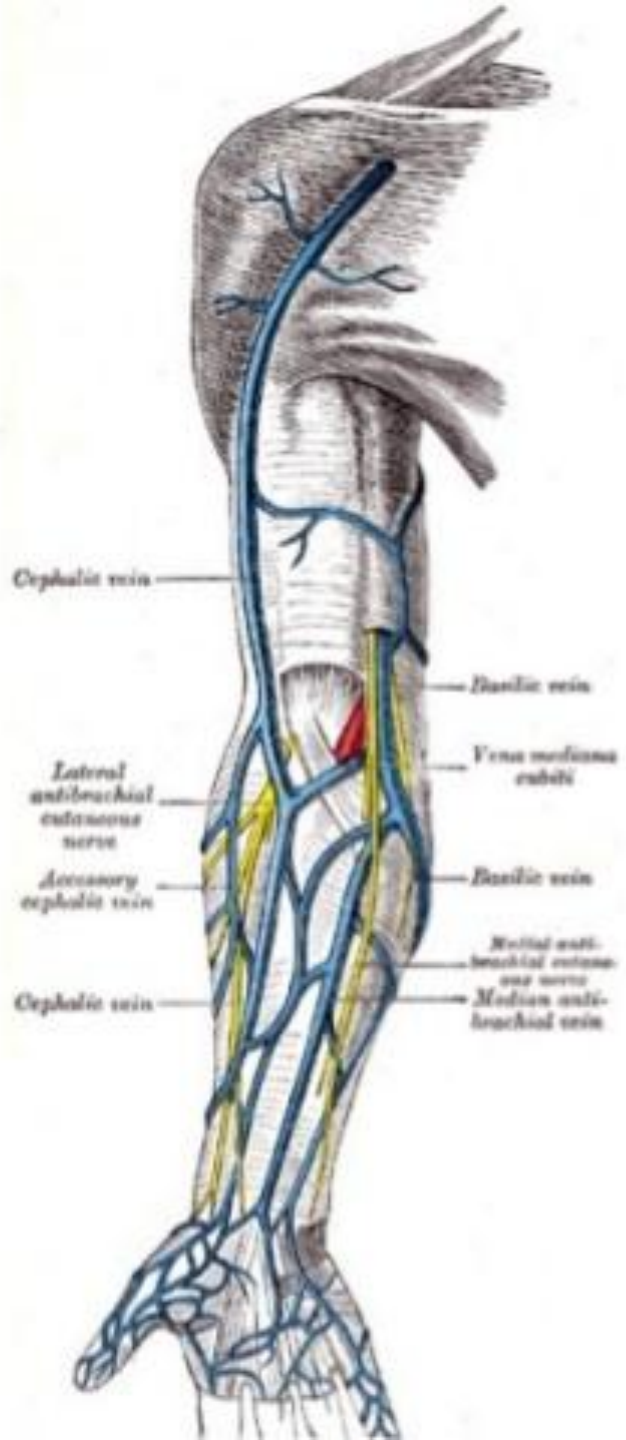
- The axis of movement extends from the middle of the head of the radius to the lower end of the ulna.
- Although the head of the radius merely rotates within the annular ligament, its inferior end describes an arc around the lower end of the ulna and carries the hand with it.
- The **supinators are supinator and biceps.**
- The **pronators are pronator quadratus and pronator teres.**

The Cubital Fossa



Boundaries

- Lateral: medial border of Brachioradialis
- Medial : Lateral border of pronator teres
- Base: Imaginary line connecting medial and lateral epicondyles of humerus
- Apex: Site of overlap of pronator teres by brachioradialis



Structures in roof of cubital fossa

- Skin
- Superficial fascia
- Deep fascia with bicipital aponeurosis
- Cephalic vein
- Basilic vein
- Median cubital vein connecting the cephalic and basilic veins
- Lateral and medial cutaneous nerves of forearm