The Elbow and the cubital fossa

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Elbow and Forearm Anatomy

• The elbow joint is formed by the humerus, radius, and the ulna
Bony anatomy of the elbow
Distal Humerus

- **Medial side**
  - Distal anteromedial border: trochlea
  - Conoid fossa: Immediately above trochlear anteriorly to accept ulna coronoid process during flexion
  - Olecranal fossae: corresponding place posteriorly to accept the olecranium during extension
  - Medial Epicondyle
    - Epicondyle serves as axis of rotation of ulna

- **Lateral side**
  - Capitulum (means little head), articulates with the radial head
  - Lateral Epicondyle
  - Radial Fossa
    - Immediately above capitulum to accept radial head during elbow flexion
The Distal Humerus
Ulna

- Forms medial border of forearm
- Trochlear notch
  - Lined with articular cartilage and fits snugly around trochlea of the humerus
- Olecranon Process
  - Forms the proximal border of ulna
  - Fits into humeral olecranon fossa at full extension
- Coronoid process
  - Distal border of the trochlear fossa. Fits into coronoid fossa of the humerus during elbow flexion
- Radial notch
  - Indentation that accepts radial head to form proximal radioulnar joint
Radius

- Lateral aspect of elbow when in anatomical position
- Bicipital tuberosity (radial tuberosity)
  - Insertion site for bicep brachii
Joints of the Elbow

Hinge joint

• Composed of 3 articulations:
  1. Humeroulnar joint
  2. Humeroradial joint
  3. Radioulnar joint
Humeroulnar

• Modified Hinge joint
• Allows for axis of motion:
  – Flexion
  – Extension
Proximal Radioulnar

- Formed by convex head of the radius and concave radial notch of the ulna
- Allows for axis of movement also:
  - Pronation
  - Supination
The Joint Capsule

• Thin anteriorly and posteriorly

Proximal attachment

• Above coronoid and radial fossa anteriorly
• Above olecranial fossa posteriorly

Distal attachment

• Superior margin of olecranium process posteriorly
• Blends with annular ligament laterally
• Edge of the conoid process anteriorly
Ulnar Collateral Ligament (UCL)

• Medial
• Supports against valgus force
• Composed of three components or bands:
  i. Anterior band
  ii. Posterior band
  iii. Oblique band
Radial Collateral Ligament (RCL)

- Thickened area in lateral joint capsule between the lateral epicondyle and annular ligament
- Resists varus stress
- Helps to maintain the relationship between humeral and radial head
Annular Ligament

- Permits rotation of radial head within the radioulnar articulation
- Attaches to anterior & posterior rims of the radial notch of the ulna
- Serves as attachment to radial collateral ligament
- Proximally blends with the elbow capsules
Muscles acting across the elbow

- Anterior group
  - i. Biceps brachii
  - ii. Brachialis
  - iii. Brachioradialis
  - iv. Pronator teres
  - v. Pronator quadratus
  - vi. Flexor carpi radialis
  - vii. Palmaris longus
  - viii. Flexor carpi ulnaris

- Posterior group
  - i. Triceps
  - ii. Anconeus
  - iii. Supinator
  - iv. Extensor carpi radialis
  - v. Extensor carpi ulnaris
Anterior Group: Biceps Brachii

- **O**: Long head: superior glenoid
  - Short head: coracoid
- **I**: Radial tuberosity of the ulna
- **A**: Elbow flexion & supination, shoulder flexion
- **N**: Musculocutaneous
Anterior Group: Brachialis

- **O**: Anterior surface: Distal humerus
- **I**: Tuberosity of the ulna
- **A**: Elbow flexion
- **N**: Musculocutaneous
Anterior Group: Brachioradialis

- **O**: Lateral supracondylar ridge of the distal humerus
- **I**: Styloid process of the radius
- **A**: Elbow flexion
- **N**: Radial Nerve

**Note:**
- i. In the forearm, the brachioradialis overlies the radial nerve and artery
- ii. Developmentally, brachioradialis belongs to the extensor (Posterior) group of muscles
Anterior Group: Pronator Teres

- **O**: Medial distal humerus (condyle) & medial aspect of coronoid process of ulna
- **I**: Lateral aspect of radius; middle 1/3
- **A**: Elbow pronation & flexion
- **N**: Median Nerve

**Note:**
- a) It is the most superficial of the muscles arising from the medial side of the humerus
- b) It forms the medial border of the cubital fossa
Anterior Group: Flexor Carpi Radialis

- **O**: Medial epicondyle (Common flexor origin)
- **I**: Palmar aspect of base of second metacarpal
- **A**:
  i. Flexion of the wrist: in conjunction with the Flexor Carpi Ulnaris
  ii. Abduction of the Wrist: in conjunction with Extensor Carpi Radialis
  iii. Simultaneously flexes and abducts the wrist when acting alone
- **N**: Median Nerve
Anterior Group: Palmaris Longus

- **O**: Medial epicondyle (Common flexor origin)
- **I**: Palmar aponeurosis and part of the flexor retinaculum
- **A**: Flexion of the wrist
- **N**: Median
- **Note**:
  - i. It is absent in about 14-15% of the population
  - ii. At the wrist, it is medial to the Median nerve
Anterior Group: Flexor Carpi Ulnaris

- **O:** Humeral head: Medial epicondyle (Common flexor origin)  
  Ulna head: Olecranium
- **I:** Pisiform, hook of hamate and base of 5th metacarpal
- **A:**
  i. Flexion of the wrist: in conjunction with the Flexor Carpi Radialis
  ii. Adduction of the Wrist: in conjunction with Extensor Carpi Ulnaris
  iii. Simultaneously flexes and adducts the wrist when acting alone
- **N:** Ulnar
- **Note:**
  i. The most medial of the superficial flexor muscles
  ii. The ulnar nerve enters the forearm by passing between the  
     humeral and the ulnar heads of its proximal attachment
  iii. It is the only muscle of the anterior compartment that is FULLY  
     innervated by the ulna nerve
Anterior Group: Flexor Carpi Ulnaris

Posterior view

Anterior view
Posterior Group: Triceps Brachii

**O:**

i. Long head: infraglenoid tubercle of scapula

ii. Lateral head: posterior humerus, proximal to the radial groove

iii. Medial head: posterior humerus, distal to the radial groove

**I:** Olecranial process

**A:**

i. Elbow extension,

ii. weak shoulder extension

iii. Supports the humeral head in shoulder abduction

**N:** Radial Nerve
Posterior Group: Anconeus

- **O:** Lateral epicondyle of the humerus
- **I:** Lateral surface of the olecranon
- **A:** Assists the Triceps in elbow extension
- **N:** Radial Nerve
Posterior Group: Supinator

- **O**: Superficial Head from lateral epicondyle of humerus
- **Deep head** from supinator crest of ulna
- **I**: Wraps round the proximal radius to be inserted on its anterior surface
- **A**: Supination of the forearm
- **N**: Radial Nerve

**NOTE:**
- i. Deep branch of radial nerve enters the posterior compartment by passing through the space between the two heads
- ii. Forms part of the floor of the cubital fossa
Posterior Group: Extensor Carpi Radialis

- **O**: Lateral supra epicondylar ridge
- **I**: Dorsum of the base of 2\(^{nd}\) metacapal
- **A**:  
  - Extension and abduction of the hand at the wrist (When acting alone)  
  - Pure extension of the Wrist: in conjunction with Extensor Carpi Ulnaris  
  - Pure abduction of the Wrist: in conjunction with Flexor Carpi Radialis
- **N**: radial
Posterior group: Extensor Carpi Ulnaris

- **O:**
  - **Humeral Head:** Lateral epicondyle (Common extensor origin)
  - **Ulna head:** Posterior border of the ulna through aponeurotic attachment

- **I:** Dorsal aspect of base of 5th metacarpal

- **A:**
  - Extension and adduction of the wrist (When acting alone)
  - Pure extension of the Wrist: in conjunction with Extensor Carpi Radialis
  - Pure adduction of the Wrist: in conjunction with Flexor Carpi Ulnaris

- **N:** Radial nerve
Cubital Fossa

- Triangular area anterior to the elbow and between:
  - Brachioradialis muscle originating from the lateral supracondylar ridge of the humerus
  - Pronator teres muscle originating from the medial epicondyle of the humerus
  - Base of the triangle is an imaginary horizontal line between the medial and lateral epicondyles
- Floor is the brachialis muscle.
- Roof is formed by superficial fascia and skin
**Cubital Fossa: Contents**

**From lateral to medial:**

1. Tendon of the biceps brachii muscle
2. Brachial artery
3. Median nerve

- Crossed on the lower part by the bicipital aponeurosis
- Within the roof are:
  1. Median cubital vein
  2. Medial cutaneous nerve of the forearm
  3. Lateral cutaneous nerves of the forearm
Cubital Fossa: Superficial contents
Elbow: Blood supply

- The elbow anastomosis is made up of 8 arteries:
  
  i. 2 Branches of Brachial artery: Superior and Inferior ulna collateral arteries
  
  ii. 2 branches of Profunda brachii: Radial and Middle Collateral arteries
  
  iii. 2 Branches of Ulna Artery: Anterior and Posterior Ulna Recurrent Arteries
  
  iv. 1 from Radial Artery: Radial Recurrent artery
  
  v. 1 from Common Interosseous Artery: Interosseous Recurrent Artery
Clinical Anatomy 1

• Dislocation of the Elbow
  – This occurs when the trochlear shifts from the trochlear fossa
  – Usually as the result of severe trauma
  – Diagnosis usually confirms by x-ray
Lateral Epicondylitis

- “Tennis Elbow”
- Caused by excessive wrist extension, especially with a clenched fist
- Pain over outer part of the elbow
Olecranon Bursitis

• A collection of fluid in the olecranon bursa that covers the posterior tip of the elbow.
• It is the result of direct trauma to the elbow.
Radial Head Dislocation (Pulled Elbow)
Radial Head Dislocation (Pulled Elbow)

- The radial head may be displaced forward, backward or outward
- Children under 5 are prone to subluxation of the radial head due to a “pulling” on the forearm
- Commonly called “pulled elbow” or “Nursemaid’s arm”
Mercí

ANY QUESTIONS?