MEDICAL EDUCATION RESOURCE

Elbow Joint,Dancing Shoulder, Carrying Angle ,Dissection

? Elbow Joint

Type

- **Complex hinge-type synovial joint**.
- Allows **flexion and extension** of forearm.
- Functionally part of the **elbow complex** which also includes the **superior radioulnar joint** (for pronation–supination).

Articulating Bones

1. **Humerus**
    - *Capitulum* ? articulates with **head of radius**.
    - *Trochlea* ? articulates with **trochlear notch of ulna**.
2. **Ulna** – Trochlear notch with trochlea.
3. **Radius** – Head with capitulum.

Articular Surfaces

- **Humeroulnar articulation:** hinge movement.
- **Humeroradial articulation:** ball-and-socket type but functions with hinge.
- Both share a **common synovial cavity**.

Joint Capsule

- **Anterior & posterior:** thin and loose ? allows flexion/extension.
- **Medially & laterally:** reinforced by strong collateral ligaments.

Ligaments

LIGAMENT	ATTACHMENTS	FUNCTION
Ulnar (medial) collateral ligament	Medial epicondyle ? coronoid & olecranon	Prevents abduction of forearm
Radial (lateral) collateral ligament	Lateral epicondyle ? annular ligament	Prevents adduction
Annular ligament (of radius)	Encircles head of radius, attached to ulna	Holds radial head in radial notch

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Synovial Membrane

- Lines capsule and fossae (radial, coronoid, olecranon).
- Continuous with **proximal radioulnar joint** cavity.

Relations

ANTERIOR	POSTERIOR
Brachialis, Brachial artery, Median nerve	Triceps tendon, Anconeus muscle, Olecranon bursa

Laterally: Common extensor origin, radial nerve.
Medially: Common flexor origin, ulnar nerve (behind medial epicondyle).

Blood Supply

- Anastomosis around elbow:
  - *Collateral branches* from profunda brachii & brachial artery.
  - *Recurrent branches* from radial and ulnar arteries.

Nerve Supply

- **Musculocutaneous, Median, Radial, and Ulnar nerves** (Hilton's law).

Movements

- **Flexion:** 0–145° ? Brachialis, Biceps brachii, Brachioradialis.
- **Extension:** ? Triceps brachii, Anconeus.

Axis: Through lateral and medial epicondyles.

Stability Factors

- Strong collateral ligaments.
- Interlocking of trochlea and trochlear notch.
- Muscular tone (brachialis, triceps, anconeus).

? Dancing Shoulder

Definition

- Term used to describe the **apparent movement of shoulder during elbow flexion and extension**.
- Occurs because **humerus and scapula move together**, and **the upper limb acts as a kinetic chain**.

Anatomical Basis

- During elbow flexion, contraction of **biceps brachii** also produces **slight shoulder flexion** (since it crosses both joints).
- During extension, **triceps** pulls the shoulder into **slight extension**.
- Hence, the shoulder appears to “dance” or move in harmony with elbow actions.

Clinical Note

- Used to emphasize the **functional linkage** between **shoulder, elbow, and forearm movements**, especially in **rehabilitation or neurological assessment**.

? Carrying Angle

Definition

- The **acute angle** between the **long axis of humerus** and the **long axis of forearm** when elbow is extended and forearm supinated.

Normal Values

- **Males:** 10–15°
- **Females:** 15–20° (greater to clear hips during carrying)

Cause

- The **trochlea** projects **lower than the capitulum**, producing an oblique alignment between humerus and ulna.

Functional Significance

- Keeps the forearm away from body during carrying.
- Disappears during flexion ? forearm aligns with arm.

Clinical Variations

CONDITION	DESCRIPTION	CAUSE
Cubitus valgus	Increased carrying angle	Lateral epicondyle fracture or growth plate injury
Cubitus varus	Decreased or reversed angle (“gunstock deformity”)	Malunion of supracondylar fracture of humerus

? Dissection – Elbow Joint

Steps

1. Place limb supine; make a **midline incision** across the anterior aspect of elbow, extending up the arm and forearm.
2. Reflect skin and superficial fascia to expose:
    - **Median cubital vein**, **bicipital aponeurosis**, **brachial artery**, and **median nerve** anteriorly.
3. Posteriorly, identify **olecranon**, **triceps tendon**, and **anconeus muscle**.
4. Clean lateral and medial epicondyles, **common flexor and extensor origins**.
5. Reflect **brachialis** anteriorly and **triceps** posteriorly ? expose capsule.
6. Observe **radial collateral, ulnar collateral, and annular ligaments.**
7. Open joint capsule to demonstrate:
    - **Trochlea** and **trochlear notch** (ulna).
    - **Capitulum** and **radial head**.
    - **Synovial folds** into coronoid and olecranon fossae.
8. Demonstrate movements — flexion and extension around the epicondylar axis.

? Applied Clinical Points

- **Dislocation of elbow:** Usually posterior; may injure **ulnar nerve** and **brachial artery**.
- **Pulled elbow (nursemaid's elbow):** Subluxation of radial head from annular ligament — common in children.

- **Olecranon bursitis (“student’s elbow”):** Inflammation of bursa over olecranon due to repetitive pressure.

- **Supracondylar fracture:** Common in children; may injure **brachial artery** ? *Volkmann’s ischemic contracture*.

- **Recurrent dislocation:** Rare due to strong ligaments.