Facts to Remember

? Facts to Remember – Joints of Upper Limb

General Concepts

- The **upper limb joints** are designed for **mobility** rather than stability — allowing a wide range of coordinated motion for prehension and manipulation.
- **All major joints are synovial**, with varying structural types (plane, hinge, pivot, saddle, ellipsoid, ball-and-socket).
- **Hilton's Law:** Nerves supplying muscles acting on a joint also supply the joint and the skin over it.

1. Sternoclavicular Joint

- **Only true bony connection** between upper limb and trunk.
- **Type:** Saddle synovial joint (functionally ball-and-socket).
- Contains a **complete articular disc** dividing the cavity into two compartments.
- **Ligaments:** Anterior, posterior, interclavicular, and costoclavicular.
- **Strongest ligament:** Costoclavicular.

- **Movement:** Elevation, depression, protraction, retraction, rotation.
- **Clinical:** Dislocation is rare due to strong ligaments.

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2. Acromioclavicular Joint

- **Type:** Plane synovial joint.
- Contains **incomplete fibrocartilaginous disc**.
- **Chief stabilizer:** Coracoclavicular ligament (conoid + trapezoid parts).
- **Movement:** Gliding and rotation between clavicle and scapula.
- **Clinical:** Complete rupture ? “step deformity” (shoulder separation).

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3. Shoulder (Glenohumeral) Joint

- **Type:** Ball-and-socket synovial joint — *most mobile* in the body.
- **Articular surfaces:** Head of humerus and glenoid cavity with labrum.
- **Capsule:** Loose, attached to glenoid margin and anatomical neck.
- **Stability:** Provided mainly by **rotator cuff muscles (SITS)**.
- **Bursae:** Subscapular and subacromial (subdeltoid).
- **Movements:** Flexion, extension, abduction, adduction, rotation, circumduction.

- **Axis:** Multi-axial (three axes).
- **Clinical:**
  - Most common dislocation ? *anteroinferior*.
  - Common lesion ? *rotator cuff tear (supraspinatus)*.
  - Axillary nerve injury ? deltoid paralysis, sensory loss over “regimental badge”.

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4. Elbow Joint

- **Type:** Complex hinge synovial joint (humeroulnar + humeroradial).
- **Ligaments:** Ulnar and radial collaterals, annular ligament of radius.
- **Movements:** Flexion (0–145°), extension (up to 0°).
- **Carrying angle:** 10–15° (males), 15–20° (females).
- **Stability:** Trochlear interlocking + strong collaterals.
- **Clinical:**
  - *Pulled elbow (nursemaid’s elbow)* ? subluxation of radial head.
  - *Supracondylar fracture* ? risk of brachial artery injury ? Volkmann’s ischemia.
  - *Olecranon bursitis* ? “student’s elbow”.

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5. Radioulnar Joints

- **Superior & inferior joints:** Pivot synovial type.
- **Middle joint:** Fibrous (interosseous membrane).
- **Movements:** Supination and pronation around axis through head of radius and ulna.
- **Supinators:** Supinator, biceps brachii.
- **Pronators:** Pronator teres, pronator quadratus.
- **Interosseous membrane:** Fibres run downward and medially ? transmit load from radius to ulna.
- **Clinical:** Monteggia (ulna fracture + radial head dislocation); Galeazzi (radius fracture + distal radioulnar dislocation).

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6. Wrist (Radiocarpal) Joint

- **Type:** Ellipsoid (condyloid) synovial joint.
- **Bones:** Distal radius + articular disc with scaphoid, lunate, triquetral.
- **Ligaments:** Palmar, dorsal, ulnar, and radial collaterals.
- **Movements:**
    - Flexion (80°), Extension (70°), Abduction (20°), Adduction (45°), Circumduction.
- **Clinical:**

- *Colles' fracture* ? dorsal displacement of radius ("dinner-fork deformity").
- *Smith's fracture* ? volar displacement ("garden-spade deformity").
- *Scaphoid fracture* ? tenderness in snuffbox, risk of avascular necrosis.

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7. Joints of Hand

a. Intercarpal & Midcarpal

- Plane synovial; small gliding movements; contribute to wrist flexibility.

b. Carpometacarpal (CMC)

- 2nd–5th: Plane synovial, limited movement.
- **1st (thumb):** Saddle synovial, highly mobile — allows opposition.
- **Clinical:**
  - *Osteoarthritis (1st CMC)* common in women.
  - *Gamekeeper's (Skier's) thumb* ? tear of ulnar collateral ligament.

c. Intermetacarpal

- Plane synovial; stabilize metacarpal bases.

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8. Metacarpophalangeal (MCP) Joints

- **Type:** Condyloid synovial.
- **Movements:** Flexion, extension, abduction, adduction, circumduction.
- **Collateral ligaments** tighten during flexion ? restrict abduction.
- **Clinical:**
  - Dislocation usually dorsal.
  - In rheumatoid arthritis ? ulnar deviation.

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9. Interphalangeal (IP) Joints

- **Type:** Hinge synovial.
- **Movements:** Flexion, extension only.
- **Ligaments:** Palmar plate + collaterals.
- **Clinical:**
  - *Mallet finger* ? extensor rupture.
  - *Boutonnière* and *Swan-neck deformities* in rheumatoid arthritis.
  - *Dupuytren's contracture* ? palmar fascia fibrosis ? flexion deformity.
  - *Trigger finger* ? flexor sheath thickening.

10. Functional Notes

- **Scapulohumeral rhythm:** 2:1 ratio between glenohumeral and scapulothoracic movement during abduction.
- **Shoulder mobility:** Greatest range of any joint due to shallow socket and loose capsule.
- **Elbow stability:** Hinged trochlear system; limited side motion prevents injury.
- **Interosseous membrane:** Distributes load and stabilizes forearm rotation.
- **Thumb opposition:** Unique to humans ? responsible for precision grip.

11. Clinical Correlations

CONDITION	ANATOMICAL BASIS
Winged scapula	Paralysis of serratus anterior (long thoracic nerve)
Frozen shoulder	Adhesive capsulitis of glenohumeral joint
Wrist drop	Radial nerve injury
Claw hand	Ulnar nerve injury
Hand of benediction	Median nerve injury at elbow
Ape hand	Median nerve injury at wrist

? **Summary Formula**

Saddle ? Plane ? Ball ? Hinge ? Pivot ? Ellipsoid ? Saddle ? Condyloid ? Hinge

? represents the **progression of joint types** from **sternum to fingertips**.