MEDICAL EDUCATION RESOURCE

Wrist (Radiocarpal) Joint,Dissection,Clinical Anatomy

? Wrist (Radiocarpal) Joint

Type

- **Ellipsoid (condyloid) synovial joint.**
- Allows movements in **two axes** — flexion/extension and abduction/adduction (circumduction as a combination).

Articular Surfaces

STRUCTURE	SURFACE DESCRIPTION
Proximal (upper)	*Distal end of radius* and *articular disc of inferior radioulnar joint* (triangular fibrocartilage)
Distal (lower)	*Proximal surfaces* of **scaphoid, lunate, and triquetral bones** (carpal bones)

? The **ulna does not participate** directly — its articular disc intervenes.

Joint Capsule

- Thin and loose ? allows free movement.
- **Attached:**
  - **Above:** Margins of articular surface of radius and disc.
  - **Below:** Around proximal carpal row (scaphoid, lunate, triquetral).
- **Lined by synovial membrane.**

Ligaments

LIGAMENT	ATTACHMENTS	FUNCTION
Palmar radiocarpal	From anterior distal radius ? anterior carpal bones	Limits wrist extension
Dorsal radiocarpal	From posterior radius ? dorsal carpus	Limits wrist flexion
Ulnar collateral	From ulnar styloid ? triquetral & pisiform	Prevents excessive abduction
Radial collateral	From radial styloid ? scaphoid	Prevents excessive adduction

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Synovial Membrane

- Lines inner surface of capsule.
- Does **not** communicate with midcarpal joint cavity.

Relations

ANTERIORLY	POSTERIORLY
Tendons of FCR, FDS, FDP, FPL; median & ulnar nerves; radial & ulnar arteries	Extensor tendons of forearm enclosed by synovial sheaths

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Nerve Supply

- **Anterior interosseous branch of median nerve**
- **Posterior interosseous branch of radial nerve**
- **Deep branch of ulnar nerve**

(Hilton's law — nerves supplying muscles acting on the joint also supply the joint.)

Blood Supply

- Dorsal and palmar carpal branches of **radial and ulnar arteries**, with **anterior interosseous artery**.

? Movements at Wrist Joint

MOVEMENT	RANGE (°)	MUSCLES PRODUCING MOVEMENT
Flexion	0–80°	FCR, FCU, FDS, FDP, FPL
Extension	0–70°	ECRL, ECRB, ECU
Abduction (radial deviation)	0–20°	FCR, ECRL, ECRB
Adduction (ulnar deviation)	0–45°	FCU, ECU
Circumduction	Composite	Sequential combination of above movements

Axes of Movement

- **Flexion–extension:** Transverse axis.
- **Abduction–adduction:** Anteroposterior axis.

Stability Factors

- Strong **collateral and capsular ligaments**.
- **Interlocking carpal bones**.

- **Balanced muscle tone** of flexors and extensors.

? Dissection of Wrist Joint

Steps

1. Place forearm prone; make a **transverse incision** about 3 cm above the wrist crease and another across the dorsum of hand.
2. Reflect skin and superficial fascia to expose **extensor and flexor tendons**.
3. Identify:
    - **Radial artery** (lateral) and **ulnar artery** (medial).
    - **Median nerve** anterior to wrist joint (beneath flexor retinaculum).
4. Reflect **extensor retinaculum** and tendons to reveal dorsal aspect of capsule.
5. Identify **dorsal radiocarpal and radial collateral ligaments.**
6. Anteriorly, expose **palmar radiocarpal and ulnar collateral ligaments.**
7. Carefully incise capsule ? observe:
    - **Convex radius/disc** above, **concave scaphoid–lunate–triquetral** below.
    - Synovial membrane and meniscoid folds.
8. Move wrist to demonstrate **flexion, extension, and circumduction.**

? Clinical Anatomy of Wrist Joint

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1. Colles’ Fracture

- Fracture of **distal radius** about 2.5 cm above wrist.
- **Fragment displaced dorsally** ? “Dinner-fork deformity.”
- Common after a fall on outstretched hand (especially in elderly women).
- May cause **median nerve compression** or **radiocarpal stiffness.**

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2. Smith’s Fracture (Reverse Colles’)

- Fracture of distal radius with **palmar displacement** of fragment ? “Garden-spade deformity.”
- Occurs in fall on dorsum of hand.

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3. Barton's Fracture

- Intra-articular fracture of distal radius extending into wrist joint ? may cause **radiocarpal dislocation.**

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4. Scaphoid Fracture

- Commonest carpal fracture; tenderness in **anatomical snuffbox**.
- **Blood supply (radial artery)** runs distal-to-proximal ? risk of **avascular necrosis** of proximal fragment.

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5. Wrist Sprain

- Stretch injury of ligaments during forceful dorsiflexion.
- Pain and restricted movement, but no fracture on X-ray.

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6. Carpal Instability

- Results from ligamentous injury between scaphoid, lunate, and triquetral ? abnormal alignment, pain, “clunk” on movement.

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7. Ganglion Cyst

- Cystic swelling from **synovial sheath or joint capsule**, commonly on **dorsum of wrist**.
- Contains clear jelly-like fluid; often asymptomatic or painful during extension.

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8. Radiocarpal Arthritis

- Inflammation or degeneration (as in rheumatoid arthritis) ? swelling, stiffness, pain on flexion/extension.

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9. Carpal Tunnel Syndrome (indirect effect)

- Swelling at wrist (tenosynovitis or arthritis) compresses **median nerve** ? numbness in lateral 3½ digits and thenar weakness.