

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)	<i>Distal end of radius and articular disc of inferior radioulnar joint (triangular fibrocartilage)</i>
Distal (lower)	<i>Proximal surfaces of scaphoid, lunate, and triquetral bones (carpal bones)</i>

? 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

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

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

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**.

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.

3. Barton's Fracture

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

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.

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.