📚 Radioulnar Joints

🦴 Superior (Proximal) Radioulnar Joint

🧩 Type of Joint

- Synovial joint
- Pivot type (rotation around a central axis)

⭐ Exam Pearl:

Pivot joint = rotation only → think *"screwdriver motion"*

🔗 Articulating Surfaces

Structure	Description

Head of radius	Circumference (cylindrical surface)
Ulna	Radial notch

👉 The head of radius rotates within a ring formed by ligaments.

🧱 Capsule & Synovial Membrane

- Encloses the joint
- Continuous with elbow joint capsule

⭐ Exam Trick:

Effusion in elbow joint may also affect superior radioulnar joint

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🔒 Ligaments

1. Annular Ligament

- Encircles head of radius
- Holds it against radial notch
- Inner surface lined with cartilage

👉 Allows smooth rotation of radial head

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2. Quadrate Ligament

- Connects neck of radius → ulna
- Stabilizes joint
- Limits excessive rotation

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3. Oblique Cord (Accessory)

- Runs from ulna → radius
- Provides additional support

🔌 Nerve Supply

- Median nerve
- Ulnar nerve
- Radial nerve
- Musculocutaneous nerve

⭐ Clinical Insight:

Joint pain can be referred via multiple nerves

⚙️ Movements

🔄 Pronation & Supination

- Occur along a vertical axis

👉 Axis:

- From head of radius → styloid process of ulna

🧠 Flowchart: Pronation

Pronation → Head of radius rotates within annular ligament → Radius crosses over ulna → Distal radius moves forward (anteriorly) → Ulnar notch of radius moves around head of ulna → Distal ulna shifts slightly laterally → Palm faces posteriorly (or downward)

🧠 Flowchart: Supination (Reverse Process)

Supination → Radius uncrosses from ulna → Distal radius moves back → Bones become parallel → Palm faces anteriorly (or upward)

💪 Muscles Involved

Movement	Muscles
Pronation	Pronator teres, Pronator quadratus
Supination	Supinator, Biceps brachii

⭐ Exam Pearl:

- Biceps = powerful supinator when elbow flexed
- Supinator works more when elbow extended

🧠 Concept Simplified

👉 Think of:

- Ulna = fixed axis
- Radius = rotating bone

⚠️ Clinical Correlation

🧒 Pulled Elbow (Nursemaid's Elbow)

Cause: Sudden pull on child's forearm

Mechanism: Radial head slips out of annular ligament → Ligament gets trapped

Presentation: Child refuses to use limb → Forearm kept in pronation

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⭐ Summary

- Joint type = Pivot synovial
- Key ligament = Annular ligament
- Movement = Pronation & Supination
- Axis = Head of radius → styloid of ulna

- Radius rotates, ulna stays relatively fixed
- Classic injury = Pulled elbow

🔎 Relations of Superior Radioulnar Joint

📍 Anterior Relations

- Supinator muscle
- Radial nerve

👉 The deep branch of radial nerve (posterior interosseous nerve) passes through supinator ⚠️

📍 Posterior Relations

- Supinator muscle
- Common extensor tendons

⭐ Exam Pearl:

Supinator is present both anteriorly and posteriorly → wraps around proximal radius

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🦴 Inferior (Distal) Radioulnar Joint

🧩 Type of Joint

- Synovial
- Pivot joint

👉 Works together with superior joint for pronation–supination

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🔗 Articulating Surfaces

Structure	Description
Radius	Ulnar notch
Ulna	Rounded head

🧱 Capsule & Synovial Membrane

- Capsule encloses the joint
- Deficient superiorly ⚠️
- Synovial membrane: Lines capsule → Extends between articular surfaces

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🔒 Ligaments

- Anterior radioulnar ligament (weak)
- Posterior radioulnar ligament (weak)

👉 These provide limited stability compared to proximal joint

🧠 Functional Integration

Both radioulnar joints act together:

🔄 Flowchart: Combined Movement

Superior radioulnar joint → Rotation of radial head

Inferior radioulnar joint → Movement of distal radius around ulna

→ Coordinated pronation & supination

🧠 Mechanics Recap

Pronation → Radius crosses ulna → Distal radius moves anteriorly → Hand turns downward

Supination → Radius becomes parallel to ulna → Hand turns upward

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⚠️ Clinical Correlation

🦴 Distal Radioulnar Joint Instability

- Seen in wrist injuries / fractures (e.g., Colles fracture)
- Leads to: Pain during pronation-supination → Weak grip

🧠 Radial Nerve Relation (Applied)

- Injury near supinator → affects posterior interosseous nerve
- Results in: Loss of finger extension → No sensory loss (pure motor branch)

⭐ Summary

- Both joints = pivot synovial joints
- Superior joint: stabilised by annular ligament
- Inferior joint: weaker ligaments, capsule deficient superiorly
- Movements are always coordinated
- Supinator is key relation (important clinically)

-> The End <-