Radial Nerve (Musculospiral Nerve)

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Root Value

- **C5, C6, C7, C8, T1**
- It is the **largest branch of the posterior cord** of the brachial plexus.

Course

In the Axilla

- Lies **posterior to the third part of the axillary artery**.
- Accompanied by the **subscapular and thoracodorsal nerves**.
- Gives branches to:
  - **Long head of triceps**
  - **Medial head of triceps**
  - **Posterior cutaneous nerve of arm**

In the Arm

1. Enters the **spiral (radial) groove** with the **profunda brachii artery**.
2. Passes **obliquely downward and laterally** between the **lateral and medial heads of triceps**.
3. Gives off:
    - **Muscular branches:** to *lateral* and *medial heads of triceps*, and *anconeus*.
    - **Cutaneous branches:**
        - *Lower lateral cutaneous nerve of arm*
        - *Posterior cutaneous nerve of forearm*
4. Leaves the groove and **pierces the lateral intermuscular septum** ? enters anterior compartment.
5. Descends between **brachialis (medial)** and **brachioradialis (lateral)**.
6. Just above lateral epicondyle ? divides into:
    - **Superficial branch** (sensory).
    - **Deep branch (posterior interosseous nerve)** ? motor to extensors.

Branches in the Arm

TYPE	BRANCHES
Muscular	To long, lateral, and medial heads of triceps; anconeus

TYPE	BRANCHES
Cutaneous	Posterior cutaneous nerve of arm, lower lateral cutaneous nerve of arm, posterior cutaneous nerve of forearm
Articular	To elbow joint

Areas Supplied

- **Motor:** All extensor muscles of arm and forearm.
- **Sensory:** Skin of posterior arm, posterior forearm, and dorsum of hand (lateral 3½ proximal phalanges).

Clinical Anatomy

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1. Sites of Injury

- **(a) In the Axilla – “Crutch Palsy”**
    - Cause: Improper use of crutches, sleeping with arm over chair back, or axillary compression.
    - Effects:
        - Paralysis of **triceps, anconeus, and all extensors** of wrist and fingers.
        - **Complete wrist drop.**
        - Sensory loss over posterior arm, forearm, and dorsum of hand.

- **(b) In the Spiral Groove – “Saturday Night Palsy”**
  - Cause: Mid-shaft fracture of humerus or prolonged compression (arm hanging over chair).
  - Effects:
    - **Triceps partially spared** (long and lateral heads intact).
    - Paralysis of **wrist and finger extensors** ? wrist drop.
    - Sensory loss on dorsum of hand and posterior forearm.

- **(c) Near Elbow**
  - Injury to **deep branch (posterior interosseous nerve)** ? loss of finger extension but **wrist extension preserved**.
  - Injury to **superficial branch** ? isolated sensory loss over dorsum of hand.

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2. Wrist Drop

- Characteristic feature of **radial nerve palsy.**
- Wrist cannot be extended; fingers remain flexed.
- Hand hangs flaccidly due to unopposed flexors.

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3. Triceps Reflex

- Tests **C7–C8** spinal segments.
- Absent in high radial nerve lesion (axillary level).

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4. Surgical Relevance

- Radial nerve and **profunda brachii artery** must be protected during fixation of **mid-shaft humeral fractures** or **posterior surgical approaches**.

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5. Diagnostic Test

- Ask patient to **extend wrist and fingers** against resistance.
    - Inability ? radial nerve lesion.
    - If wrist extension preserved but finger extension lost ? deep branch (posterior interosseous) lesion.