MEDICAL EDUCATION RESOURCE

Facts to Remember. Clinicoanatomical Problems & Frequently Asked Questions – Chapter: Arm

Facts to Remember – Chapter: Arm

General Overview

- The **arm (brachium)** is the region between the **shoulder** and **elbow joints**.
- Divided by **medial and lateral intermuscular septa** into:
  - **Anterior compartment (flexor)** ? musculocutaneous nerve.
  - **Posterior compartment (extensor)** ? radial nerve.

Muscles

- **Anterior compartment muscles:** *Biceps brachii, Brachialis, Coracobrachialis (BBC)*.
- **Posterior compartment muscles:** *Triceps brachii, Anconeus.*
- Chief **flexor of elbow:** *Brachialis.*
- Chief **extensor of elbow:** *Triceps brachii.*
- **Coracobrachialis** is pierced by musculocutaneous nerve.
- **Long head of biceps** arises from *supraglenoid tubercle*, while **long head of triceps** arises from *infraglenoid tubercle* — both cross the shoulder joint.

Arteries

- **Brachial artery** ? continuation of *axillary artery* beyond teres major.
- Ends in cubital fossa ? divides into *radial and ulnar arteries.*
- Main branches:
    - Profunda brachii
    - Superior & inferior ulnar collateral arteries
    - Muscular branches
    - Nutrient artery to humerus
- **Profunda brachii artery** ? accompanies radial nerve in spiral groove.

Veins

- **Cephalic vein** ? lateral side ? drains into axillary vein.
- **Basilic vein** ? medial side ? joins brachial veins to form axillary vein.
- **Median cubital vein** ? connects cephalic and basilic veins ? site for venipuncture.
- **Bicipital aponeurosis** separates brachial artery from median cubital vein.

Nerves

- **Musculocutaneous nerve** ? pierces coracobrachialis ? supplies all flexor muscles.

- **Median nerve** ? no branches in arm; crosses in front of brachial artery.
- **Ulnar nerve** ? passes behind medial epicondyle (funny bone).
- **Radial nerve** ? passes in spiral groove with profunda brachii artery ? supplies extensors.
- **Axillary nerve** ? supplies deltoid and teres minor (near shoulder).

Cubital Fossa

- Triangular depression in front of elbow.
- **Boundaries:**
  - Medial – Pronator teres
  - Lateral – Brachioradialis
  - Base – Line joining epicondyles
- **Contents (medial to lateral):** *Median nerve, Brachial artery, Biceps tendon, Radial nerve.*
- Median cubital vein lies superficial to it ? used for IV access.

Reflexes

- **Biceps jerk** ? C5–C6 ? musculocutaneous nerve.
- **Triceps jerk** ? C7–C8 ? radial nerve.

Clinical Highlights

- **Brachial pulse:** felt medial to biceps tendon in cubital fossa.
- **Fracture of mid-shaft humerus:** injures radial nerve ? *wrist drop*.
- **Fracture of surgical neck:** injures axillary nerve ? *deltoid paralysis*.
- **Ulnar nerve at medial epicondyle:** exposed and painful when struck (“funny bone”).
- **Volkmann’s ischemic contracture:** results from brachial artery injury in supracondylar fractures.
- **Bicipital tendinitis:** inflammation of long head tendon ? anterior shoulder pain.
- **Biceps rupture:** produces “Popeye deformity.”
- **Cubital fossa:** site for venipuncture and blood pressure measurement.

Collateral Circulation Around Elbow

- Maintained by:
  - **Above elbow:** Profunda brachii (radial & middle collateral), superior & inferior ulnar collaterals.
  - **Below elbow:** Radial, ulnar, and interosseous recurrent arteries.

Clinicoanatomical Problems – Chapter: Arm

---

1. Case: Wrist Drop After Mid-shaft Humerus Fracture

Problem:
A 35-year-old male sustains a spiral fracture of the humerus. After injury, he cannot extend his wrist and fingers.

Anatomical Basis:

- **Radial nerve injury** in the **spiral groove** of humerus ? paralysis of wrist and finger extensors.
- Triceps partly spared (long and lateral heads intact).
- **Result:** *Wrist drop*.
  Key Sign: Sensory loss over dorsum of hand and posterior forearm.

---

2. Case: Numbness Over Lateral Forearm After Arm Injury

Problem:
A patient complains of loss of sensation over the lateral side of the forearm following trauma to the arm.

Anatomical Basis:

- **Musculocutaneous nerve injury** (or its continuation, *lateral cutaneous nerve of forearm*).
- May be compressed by fibrosis of **coracobrachialis**, which the nerve pierces.
  Result: Weak flexion at elbow and loss of sensation on lateral forearm.

---

3. Case: Claw Hand After Elbow Injury

Problem:
Following fracture of medial epicondyle of humerus, patient presents with clawing of 4th and 5th fingers.

Anatomical Basis:

- **Ulnar nerve injury** behind **medial epicondyle**.
- Paralysis of lumbricals to 4th and 5th fingers ? hyperextension at MCP joints, flexion at IP joints.
- Sensory loss: medial 1½ fingers (both palmar and dorsal).

---

4. Case: Loss of Forearm Flexion and Supination

Problem:
A knife wound in upper arm causes loss of elbow flexion and weak supination.

Anatomical Basis:

- Damage to **musculocutaneous nerve** ? paralysis of *biceps brachii* and *brachialis*.
- **Elbow flexion** mainly lost; supination weakened (biceps is chief supinator when flexed).

---

5. Case: Pain and Numbness Over Lateral Palm and Fingers

Problem:
A 40-year-old presents with pain, tingling in thumb, index, and middle fingers after arm trauma.

Anatomical Basis:

- **Median nerve compression** by fibrous bands near insertion of **coracobrachialis** or between pronator teres heads.
- Produces early *median nerve entrapment* symptoms.

---

6. Case: Volkmann’s Ischemic Contracture

Problem:
A child develops severe flexion deformity of fingers after a supracondylar fracture of humerus.

Anatomical Basis:

- **Brachial artery injury** or spasm ? ischemia of forearm flexor muscles.
- Results in fibrosis and contracture ? *claw-like hand*.
- Early sign: pain on passive finger extension.

---

7. Case: Biceps Reflex Absent

Problem:
Loss of biceps reflex following cervical root injury.

Anatomical Basis:

- Reflex arc involves **musculocutaneous nerve (C5–C6)**.
- Damage to these segments or nerve ? absent reflex and weak flexion.

---

8. Case: Severe Pain at Posterior Elbow After Fall

Problem:
A patient reports tenderness over posterior elbow and difficulty extending forearm.

Anatomical Basis:

- Injury or strain of **triceps tendon** insertion on olecranon process.
- May also involve **anconeus** or *olecranon bursitis*.

---

9. Case: Inability to Palpate Brachial Pulse

Problem:
After supracondylar humeral fracture, brachial pulse absent in cubital fossa.

Anatomical Basis:

- **Brachial artery** trapped or torn by bone fragments.
- May cause distal ischemia and Volkmann's contracture if not treated.

---

10. Case: Numbness Over Posterior Arm and Forearm After Crutch Use

Problem:
After prolonged use of crutches, patient develops sensory loss over posterior arm and wrist drop.

Anatomical Basis:

- **Radial nerve compression in axilla (Crutch Palsy)** ? paralysis of triceps, wrist and finger extensors.
- **Result:** Complete wrist drop + sensory deficit posteriorly.

Frequently Asked Questions – Chapter: Arm

General Anatomy of Arm

Q1. What are the compartments of the arm and their nerve supply?
? The arm has **two compartments**:

- **Anterior (flexor)** ? *Musculocutaneous nerve*
- **Posterior (extensor)** ? *Radial nerve*

Q2. Name the muscles of the anterior compartment of the arm.

? *Biceps brachii, Brachialis, Coracobrachialis.*

Q3. Which muscles are supplied by the musculocutaneous nerve?

? *Biceps brachii, Brachialis, Coracobrachialis.*

Q4. What are the boundaries and contents of the cubital fossa?

?

- **Boundaries:**
  - Medial ? Pronator teres
  - Lateral ? Brachioradialis
  - Base ? Line joining epicondyles
- **Contents (medial to lateral):** Median nerve, Brachial artery, Biceps tendon, Radial nerve.

Q5. Which structures lie superficial to the cubital fossa?

? Skin, superficial fascia, *median cubital vein*, *medial and lateral cutaneous nerves of forearm*, *bicipital aponeurosis*.

Muscles of Arm

Q6. What is the chief flexor of the elbow joint?

? *Brachialis.*

Q7. What is the chief extensor of the elbow joint?

? *Triceps brachii.*

Q8. From where does the long head of biceps arise?

? *Supraglenoid tubercle of scapula.*

Q9. What is the nerve supply and root value of triceps?

? *Radial nerve (C6, C7, C8).*

Q10. What is the action of coracobrachialis?

? *Flexion and adduction of arm at shoulder joint.*

Q11. Which muscle is pierced by musculocutaneous nerve?

? *Coracobrachialis.*

Q12. Which muscle is called "the workhorse of elbow flexion"?

? *Brachialis* – acts in all positions of forearm.

Nerves of Arm

Q13. Which nerve lies in the spiral (radial) groove of humerus?

? *Radial nerve.*

Q14. Which artery accompanies the radial nerve in the spiral groove?

? *Profunda brachii artery.*

Q15. What are the branches of the radial nerve in the arm?

? Muscular (to triceps, anconeus), cutaneous (posterior arm & forearm), articular (elbow joint).

Q16. Which nerve passes behind the medial epicondyle of humerus?

? *Ulnar nerve.*

Q17. What is "funny bone" sensation?

? Tingling/pain due to compression of *ulnar nerve* behind the medial epicondyle.

Q18. Which nerve lies medial to the brachial artery in the lower arm?

? *Median nerve.*

Q19. Which nerve supplies all the flexors of the arm?

? *Musculocutaneous nerve.*

Q20. What are the branches of the musculocutaneous nerve?

? Muscular branches to *biceps, brachialis, coracobrachialis*, and continuation as *lateral cutaneous nerve of forearm.*

Arteries and Veins

Q21. What is the main artery of the arm?

? *Brachial artery.*

Q22. Where does the brachial artery begin and end?

? Begins at *lower border of teres major* ? ends in *cubital fossa* by dividing into *radial and ulnar arteries.*

Q23. What is the largest branch of brachial artery?

? *Profunda brachii artery (deep artery of arm).*

Q24. Which artery supplies the posterior compartment of arm?

? *Profunda brachii artery.*

Q25. Which vein connects cephalic and basilic veins?

? *Median cubital vein.*

Q26. Why is median cubital vein preferred for venipuncture?

? Superficial, large, fixed by perforators, and separated from artery by bicipital aponeurosis.

Clinical and Applied

Q27. What is the cause of wrist drop?

? *Radial nerve injury* in the spiral groove of humerus.

Q28. What is the cause of Volkmann's ischemic contracture?

? *Brachial artery obstruction* following supracondylar fracture of humerus.

Q29. What is the result of musculocutaneous nerve injury?

? Weak flexion of elbow and loss of sensation over lateral forearm.

Q30. What is the result of ulnar nerve injury at the elbow?

? *Claw hand deformity* (4th and 5th fingers flexed).

Q31. Which nerve injury causes loss of pronation?

? *Median nerve injury.*

Q32. What is the significance of the spiral groove?

? Lodges *radial nerve* and *profunda brachii artery*; fracture here causes wrist drop.

Q33. How can the brachial pulse be felt?

? In cubital fossa, **medial to tendon of biceps brachii**.

Q34. Which spinal segments are tested by the biceps and triceps jerks?

?

- *Biceps jerk* ? C5–C6 (musculocutaneous).
- *Triceps jerk* ? C7–C8 (radial).

Q35. What is the main function of the long head of triceps besides extension?

? *Stabilizes and adducts shoulder joint.*