

Lecture 4

MYOLOGY

the Upper Limb

Lecture 4: Myology of the Upper Limb

Introduction

The **myology** of the upper limb studies the muscles responsible for the wide range of movements of the shoulder, arm, forearm, and hand.

These muscles ensure **mobility**, **strength**, and **precision** required for daily and athletic activities. They are organized into **regions** according to anatomical position and **functional roles**.

I. Muscles of the Shoulder Region

The muscles of the shoulder connect the **axial skeleton** (trunk) to the **upper limb**. They are classified into **four groups** according to their topographical position.

A. Anterior Group

Muscle	Origin	Insertion	Action	Innervation
Pectoralis major	Clavicle, sternum, costal cartilages	Crest of greater tubercle of humerus	Adduction, medial rotation, flexion of arm	Medial and lateral pectoral nerves
Pectoralis minor	Ribs 3–5	Coracoid process of scapula	Stabilizes scapula by drawing it anteriorly and inferiorly	Medial pectoral nerve
Subclavius	First rib and its cartilage	Inferior surface of clavicle	Depresses and steadies clavicle	Nerve to subclavius

B. Posterior Group

Muscle	Origin	Insertion	Action	Innervation
Supraspinatus	Supraspinous fossa of scapula	Greater tubercle of humerus	Initiates abduction of arm	Suprascapular nerve
Infraspinatus	Infraspinous fossa	Greater tubercle of humerus	Lateral rotation of arm	Suprascapular nerve
Teres minor	Lateral border of scapula	Greater tubercle of humerus	Lateral rotation of arm	Axillary nerve
Teres major	Inferior angle of scapula	Crest of lesser tubercle	Adduction, medial rotation	Lower subscapular nerve
Subscapularis	Subscapular fossa	Lesser tubercle of humerus	Medial rotation of arm	Upper and lower subscapular nerves
Latissimus dorsi	Spinous processes of T7–L5, thoracolumbar fascia, iliac crest	Intertubercular sulcus of humerus	Extension, adduction, medial rotation	Thoracodorsal nerve

C. Internal Group

Muscle	Origin	Insertion	Action	Innervation
Serratus anterior	Ribs 1–8	Medial border of scapula	Protracts scapula, holds it against thoracic wall, assists upward rotation	Long thoracic nerve

D. External Group

Muscle	Origin	Insertion	Action	Innervation
Deltoid	Clavicle, acromion, and spine of scapula	Deltoid tuberosity of humerus	Abduction of arm (after initiation by supraspinatus), flexion, extension, rotation	Axillary nerve

Detailed Description

- 1. Anterior Group:**
 - **Pectoralis major:** Powerful adductor and medial rotator of arm.
 - **Pectoralis minor:** Pulls scapula forward and downward.
 - **Subclavius:** Stabilizes and depresses clavicle.
- 2. Posterior Group :** Includes muscles forming the **rotator cuff** (Supraspinatus, Infraspinatus, Teres minor, Subscapularis) that stabilize the shoulder joint and assist rotation.
- 3. Internal Group : Serratus anterior:** Keeps scapula attached to thorax; its paralysis causes "winged scapula".
- 4. External Group : Deltoid:** Chief abductor of arm beyond 15°.

II. Muscles of the Arm (Brachium)

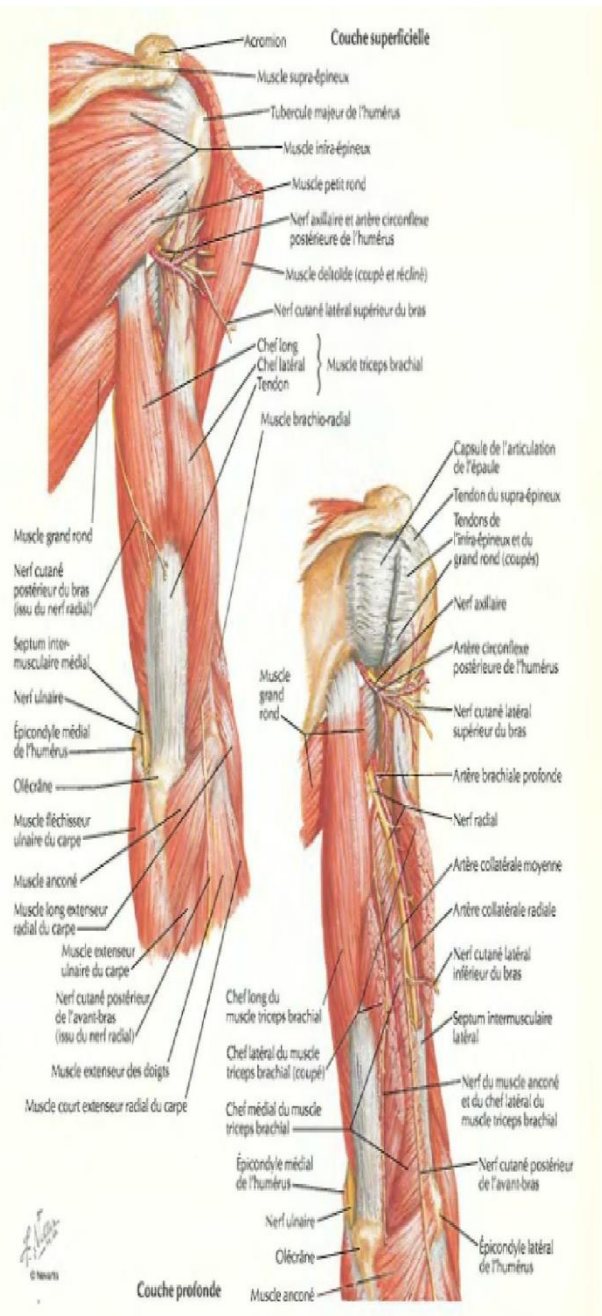
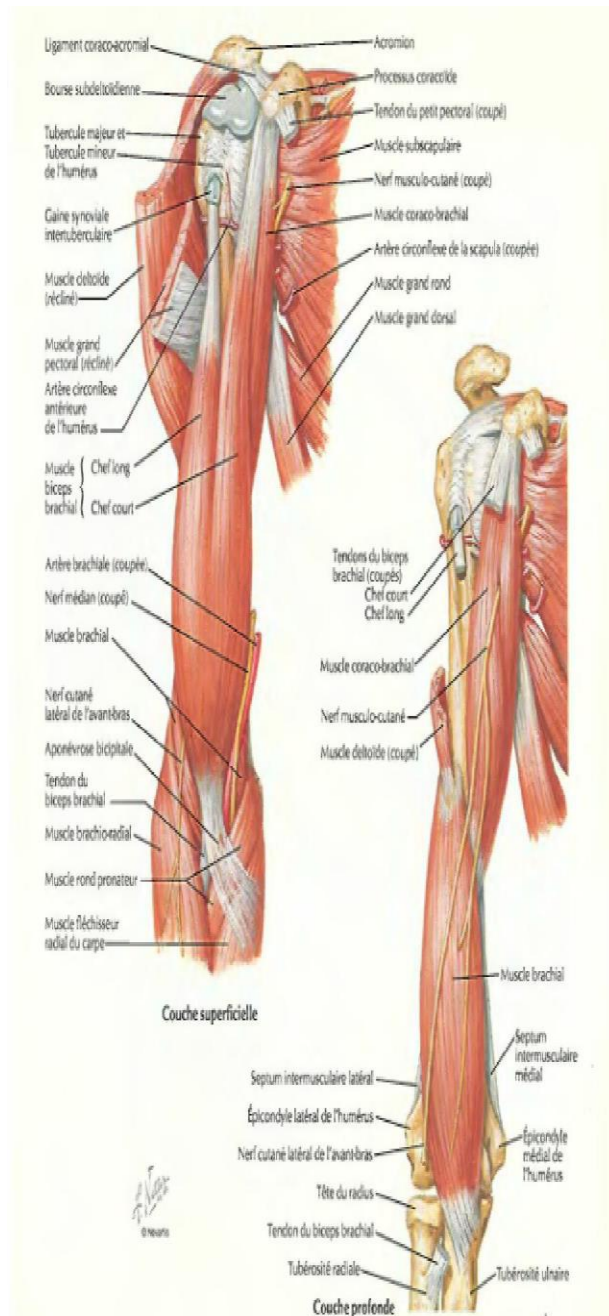
Divided into two compartments by the intermuscular septa: **anterior (flexor)** and **posterior (extensor)**.

A. Anterior Compartment

Muscle	Origin	Insertion	Action	Innervation
Biceps brachii	Long head: supraglenoid tubercle Short head: coracoid process	Radial tuberosity and bicipital aponeurosis	Flexion of elbow, supination	Musculocutaneous nerve
Brachialis	Anterior surface of humerus	Coronoid process of ulna	Primary flexor of elbow	Musculocutaneous nerve
Coracobrachialis	Coracoid process	Middle of humerus	Flexion and adduction of arm	Musculocutaneous nerve

B. Posterior Compartment

Muscle	Origin	Insertion	Action	Innervation
Triceps brachii	Long head: infraglenoid tubercle Lateral & medial heads: posterior humerus	Olecranon of ulna	Extension of elbow	Radial nerve



III. Muscles of the Forearm (Antebrachium)

The forearm is divided into **three compartments** based on function and innervation.

A. Anterior Compartment (Flexor–Pronator Group)

Subdivided into **superficial**, **intermediate**, and **deep layers**.

Layer	Muscles	Main Actions	Nerve Supply
Superficial	Pronator teres, Flexor carpi radialis, Palmaris longus, Flexor carpi ulnaris	Wrist and finger flexion, pronation	Median & ulnar nerves
Intermediate	Flexor digitorum superficialis	Flexes middle phalanges	Median nerve
Deep	Flexor digitorum profundus, Flexor pollicis longus, Pronator quadratus	Flexion of distal phalanges, thumb flexion, pronation	Median (anterior interosseous) & ulnar nerves

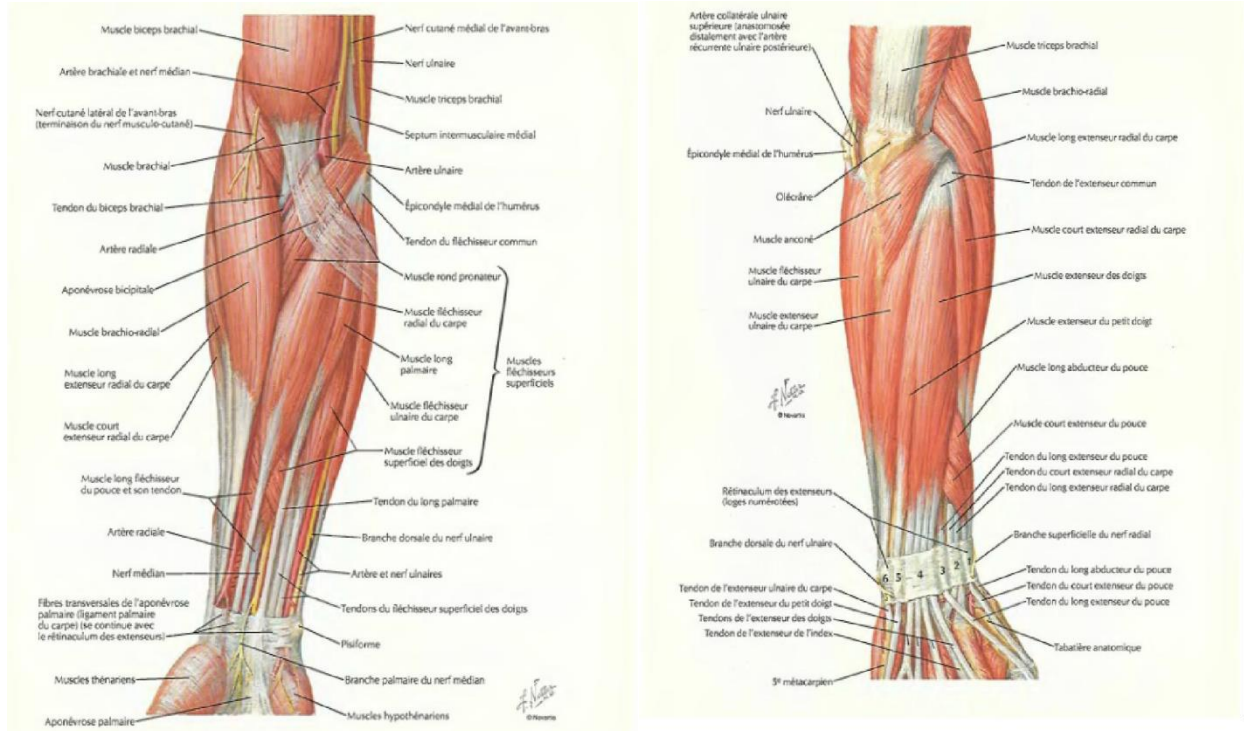
B. Lateral Compartment

Muscles	Actions	Innervation
Brachioradialis, Extensor carpi radialis longus, Extensor carpi radialis brevis	Flexion of elbow (brachioradialis), extension and abduction of wrist	Radial nerve

C. Posterior Compartment (Extensor–Supinator Group)

Subdivided into **superficial** and **deep layers**.

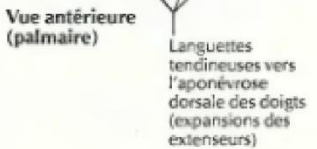
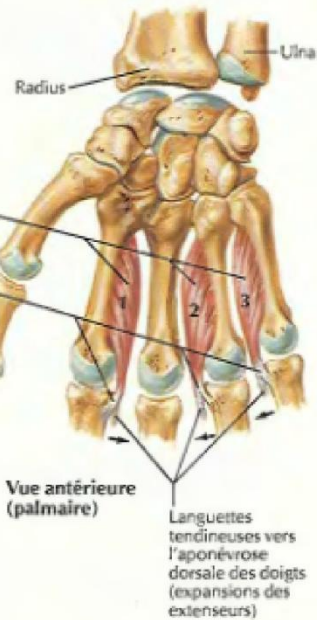
Layer	Muscles	Main Actions	Nerve Supply
Superficial	Extensor digitorum, Extensor digiti minimi, Extensor carpi ulnaris	Extension of wrist and fingers	Radial nerve
Deep	Supinator, Abductor pollicis longus, Extensor pollicis brevis, Extensor pollicis longus, Extensor indicis	Supination, extension of thumb and index finger	Posterior interosseous nerve



IV. Muscles of the Hand (Manus)

Briefly grouped as follows:

- **Thenar muscles** (move the thumb): abductor pollicis brevis, flexor pollicis brevis, opponens pollicis.
- **Hypothenar muscles** (move the little finger): abductor digiti minimi, flexor digiti minimi brevis, opponens digiti minimi.
- **Lumbricals and Interossei**: fine movements of fingers, flexion at metacarpophalangeal and extension at interphalangeal joints.
- **Adductor pollicis**: adducts the thumb.



V. Functional Table of Movements

Movement	Principal Muscles	Joints Involved
Shoulder Flexion	Pectoralis major, Deltoid (anterior), Coracobrachialis	Glenohumeral
Shoulder Extension	Latissimus dorsi, Teres major, Deltoid (posterior)	Glenohumeral
Abduction	Supraspinatus, Deltoid (middle fibers)	Glenohumeral
Adduction	Pectoralis major, Latissimus dorsi, Teres major	Glenohumeral
Medial Rotation	Subscapularis, Pectoralis major, Latissimus dorsi	Glenohumeral
Lateral Rotation	Infraspinatus, Teres minor	Glenohumeral
Elbow Flexion	Biceps brachii, Brachialis, Brachioradialis	Humeroulnar
Elbow Extension	Triceps brachii, Anconeus	Humeroulnar
Supination	Biceps brachii, Supinator	Radioulnar
Pronation	Pronator teres, Pronator quadratus	Radioulnar
Wrist Flexion	Flexor carpi radialis, Flexor carpi ulnaris	Radiocarpal
Wrist Extension	Extensor carpi radialis longus/brevis, Extensor carpi ulnaris	Radiocarpal

Conclusion

The myology of the upper limb reveals the **complex organization** that allows the limb to perform both **powerful** and **precise movements**.

Each region contributes in coordination to activities ranging from lifting and pushing to writing or grasping — demonstrating the **functional harmony** of muscular anatomy.