Bones and Joints of the Upper Limb

In the study of human anatomy, the upper limb refers to the region between the shoulder and the hand. It primarily consists of the bones and joints that form the framework of the arm, forearm, and hand. Understanding the structure and function of the bones and joints in the upper limb is crucial for healthcare professionals, such as physiotherapists and orthopedic surgeons, as well as for individuals interested in learning about the human body. This topic provides an in-depth exploration of the bones and joints of the upper limb.

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FATIMA ASHAR

Bones of the Upper Limb

Shoulder Girdle

The upper limb's skeleton begins with the shoulder girdle, which is composed of two bones: the clavicle (collarbone) and the scapula (shoulder blade). The clavicle connects the upper limb to the trunk and provides stability to the shoulder joint. The scapula serves as an attachment point for muscles and forms the posterior aspect of the shoulder joint.

TABLE 9.1 Muscles Connecting the Upper Limb to the Thoracic Wall

Muscle	Origin	Insertion	Nerve Supply	Nerve Roots[a]	Action
Pectoralis major	Clavicle, sternum, and upper six costal cartilages	Lateral lip of bicipital groove of humerus	Medial and lateral pectoral nerves from brachial plexus	C5, **6, 7, 8**; T1	Adducts arm and rotates it medially; clavicular fibers also flex arm
Pectoralis minor	3rd, 4th, and 5th ribs	Coracoid process of scapula	Medial pectoral nerve from brachial plexus	C6, **7**, 8	Depresses point of shoulder; if the scapula is fixed, it elevates the ribs of origin
Subclavius	1st costal cartilage	Clavicle	Nerve to subclavius from upper trunk of brachial plexus	**C5**, 6	Depresses the clavicle and steadies this bone during movements of the shoulder girdle
Serratus anterior	Upper eight ribs	Medial border and inferior angle of scapula	Long thoracic nerve	C5, **6, 7**	Draws the forward anterior around the thoracic wall; rotates scapula

[a]The predominant nerve root supply is indicated by boldface type.

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TABLE 9.2 Muscles Connecting the Upper Limb to the Vertebral Column

Muscle	Origin	Insertion	Nerve Supply	Nerve Roots[a]	Action
Trapezius	Occipital bone, ligamentum nuchae, spine of 7th cervical vertebra, spines of all thoracic vertebrae	Upper fibers into lateral third of clavicle, middle and lower fibers into acromion and spine of scapula	Spinal part of accessory nerve (motor) and C3 and 4 (sensory)	XI **cranial nerve** (spinal part)	Upper fibers elevate the scapula; middle fibers pull scapula medially; lower fibers pull medial border of scapula downward
Latissimus dorsi	Iliac crest, lumbar fascia, spines of lower six thoracic vertebrae, lower three or four ribs, and inferior angle of scapula	Floor of bicipital groove of humerus	Thoracodorsal nerve	C6, **7**, 8,	Extends, adducts, and medially rotates the arm
Levator scapulae	Transverse processes of 1st four cervical vertebrae	Medial border of scapula	C3 and 4 and dorsal scapular nerve	C3, 4, 5	Raises medial border of scapula
Rhomboid minor	Ligamentum nuchae and spines of 7th cervical and 1st thoracic vertebrae	Medial border of scapula	Dorsal scapular nerve	**C4**, 5	Raises medial border of scapula upward and medially
Rhomboid major	Second to 5th thoracic spines	Medial border of scapula	Dorsal scapular nerve	**C4**, 5	Raises medial border of scapula upward and medially

[a]The predominant nerve root supply is indicated by boldface type.

Ref: Dr. Lawrence E. Wineski (Snell's Clinical Anatomy by regions)

TABLE 9.6 Muscles of the Anterior Fascial Compartment of the Forearm

Muscle	Origin	Insertion	Nerve Supply	Nerve Roots*	Action
Pronator Teres					
Humeral head	Medial epicondyle of humerus	Lateral aspect of shaft of radius	Median nerve	C6, **7**	Pronation and flexion of forearm
Ulnar head	Medial border of coronoid process of ulna				
Flexor carpi radialis	Medial epicondyle of humerus	Bases of second and third metacarpal bones	Median nerve	C6, **7**	Flexes and abducts hand at wrist joint
Palmaris longus	Medial epicondyle of humerus	Flexor retinaculum and palmar aponeurosis	Median nerve	C7, 8	Flexes hand
Flexor Carpi Ulnaris					
Humeral head	Medial epicondyle of humerus	Pisiform bone, hook of the hamate, base at fifth metacarpal bone	Ulnar nerve	C8; T1	Flexes and adducts hand at wrist joint
Ulnar head	Medial aspect of olecranon process and posterior border of ulna				
Flexor Digitorum Superficialis					
Humeroulnar head	Medial epicondyle of humerus; medial border of coronoid process of ulna	Middle phalanx of medial four fingers	Median nerve	C7, **8**; T1	Flexes middle phalanx of fingers and assists in flexing proximal phalanx and hand
Radial head	Oblique line and anterior surface of shaft of radius				
Flexor pollicis longus	Anterior surface of shaft of radius	Distal phalanx of thumb	Anterior interosseous branch of median nerve	**C8**; T1	Flexes distal phalanx of thumb
Flexor digitorum profundus	Anteromedial surface of shaft of ulna	Distal phalanges of medial four fingers	Ulnar (medial half) and median (lateral half) nerves	**C8**; T1	Flexes distal phalanx of fingers; then assists in flexion of middle and proximal phalanges and wrist
Pronator quadratus	Anterior surface of shaft of ulna	Anterior surface of shaft of radius	Anterior interosseous branch of median nerve	**C8**; T1	Pronates forearm

*The predominant nerve root supply is indicated by boldface type.

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Ref: Dr. Lawrence E. Wineski (Snell's Clinical Anatomy by regions)