

SHOULDER REGION

Muscles

The two most superficial muscles of the shoulder are the trapezius and deltoid muscles. Together, they provide the characteristic contour of the shoulder:

- The trapezius attaches the scapula and clavicle to the trunk.
- The deltoid attaches the scapula and clavicle to the humerus.

Both the trapezius and deltoid are attached to opposing surfaces and margins of the spine of the scapula, acromion, and clavicle. The scapula, acromion, and clavicle can be palpated between the attachments of the trapezius and deltoid. Deep to the trapezius the scapula is attached to the vertebral column by three muscles—the levator scapulae, rhomboid minor, and rhomboid major. These three muscles work with the trapezius (and with muscles found anteriorly) to position the scapula on the trunk.

Trapezius

The trapezius muscle has an extensive origin from the axial skeleton, which includes sites on the skull and the vertebrae, from C1 to T12. From C1 to C7, the muscle attaches to the vertebrae through the ligamentum nuchae. The muscle inserts onto the skeletal framework of the shoulder along the inner margins of a continuous U-shaped line of attachment oriented in the horizontal plane, with the bottom of the U directed laterally. Together, the left and right trapezius muscles form a diamond or trapezoid shape, from which the name is derived. The trapezius muscle is a powerful elevator of the shoulder and also rotates the scapula to extend the reach superiorly. Innervation of the trapezius muscle is by the accessory nerve [XI] and the anterior rami of cervical nerves C3 and C4. These nerves pass vertically along the deep surface of the muscle. The accessory nerve can be evaluated by testing the function of the trapezius muscle. This is most easily done by asking patients to shrug their shoulders against resistance.

Deltoid

The deltoid muscle is large and triangular in shape, with its base attached to the scapula and clavicle and its apex attached to the humerus. It originates along a continuous U-shaped line of attachment to the clavicle and the scapula, mirroring the adjacent insertion sites of the trapezius muscle. It inserts into the deltoid tuberosity on the lateral surface of the shaft of the humerus. The major function of the deltoid muscle is abduction of the arm. The deltoid muscle is innervated by the axillary nerve, which is a branch of the posterior cord of the brachial plexus. The axillary nerve and associated blood vessels (the posterior circumflex humeral artery and vein) enter the deltoid by passing posteriorly around the surgical neck of the humerus.

Levator scapulae

The levator scapulae originates from the transverse processes of C1 to C4 vertebrae. It descends laterally to attach to the posterior surface of the medial border of the scapula from the superior angle to the smooth triangular area of bone at the root of the spine. The levator scapulae muscle is innervated by the dorsal scapular nerve and directly from C3 and C4 spinal nerves. The levator scapulae elevates the scapula.

Rhomboid minor and major

The rhomboid minor and major muscles attach medially to the vertebral column and descend laterally to attach to the medial border of the scapula inferior to the levator scapulae muscle. The rhomboid minor originates from the lower end of the ligamentum nuchae and the spines of C7 and T1 vertebrae. It inserts

laterally into the smooth triangular area of bone at the root of the spine of the scapula on the posterior surface. The rhomboid major originates from the spines of vertebrae TII to TV and from the intervening supraspinous ligaments. It descends laterally to insert along the posterior surface of the medial border of the scapula from the insertion of the rhomboid minor to the inferior angle. The rhomboid muscles are innervated by the dorsal scapular nerve, which is a branch of the brachial plexus. The rhomboid minor and major retract and elevate the scapula.

Latissimus dorsi

Latissimus dorsi is a large, flat triangular muscle that begins in the lower portion of the back and tapers as it ascends to a narrow tendon that attaches to the humerus anteriorly. As a result, movements associated with this muscle include extension, adduction, and medial rotation of the upper limb. The latissimus dorsi can also depress the shoulder, preventing its upward movement. The thoracodorsal nerve of the brachial plexus innervates the latissimus dorsi muscle. Associated with this nerve is the thoracodorsal artery, which is the primary blood supply of the muscle. Additional small arteries come from dorsal branches of posterior intercostal and lumbar arteries.

Movements of the scapula

Elevation:

- Levator scapulae
- Upper fibers of trapezius
- Rhomboids

Depression:

- Lower fibers of trapezius
- Latissimus dorsi
- Pectoralis minor
- Sternocostal pectoralis major
- Serratus anterior

Protraction:

- Pectoralis minor
- Serratus anterior
- Sternocostal pectoralis major

Retraction:

- Middle fibers of trapezius
- Rhomboids
- Latissimus dorsi

Lateral rotation:

- Upper and lower trapezius
- Lower serratus anterior

Medial rotation:

- Rhomboid minor and major

- Levator scapulae
- Pectoralis minor
- Lower sternocostal part of pectoralis major
- Latissimus dorsi

POSTERIOR SCAPULAR REGION

The posterior scapular region occupies the posterior aspect of the scapula and is located deep to the trapezius and deltoid muscles. It contains four muscles, which pass between the scapula and proximal end of the humerus: the supraspinatus, infraspinatus, teres minor, and teres major muscles.

The posterior scapular region also contains part of one additional muscle, the long head of the triceps brachii, which passes between the scapula and the proximal end of the forearm. This muscle, along with other muscles of the region and the humerus, participates in forming a number of spaces through which nerves and vessels enter and leave the region. The supraspinatus, infraspinatus, and teres minor muscles are components of the rotator cuff, which stabilizes the glenohumeral joint.

Muscles

The supraspinatus and infraspinatus

The supraspinatus and infraspinatus muscles originate from two large fossae, one above and one below the spine, on the posterior surface of the scapula. They form tendons that insert on the greater tubercle of the humerus.

■ The tendon of the supraspinatus passes under the acromion, where it is separated from the bone by a subacromial bursa, passes over the glenohumeral joint, and inserts on the superior facet of the greater tubercle.

■ The tendon of the infraspinatus passes posteriorly to the glenohumeral joint and inserts on the middle facet of the greater tubercle. The supraspinatus participates in abduction of the arm. The infraspinatus laterally rotates the humerus.

Teres minor and teres major

The teres minor muscle is a cord-like muscle that originates from a flattened area of the scapula immediately adjacent to its lateral border below the infraglenoid tubercle. Its tendon inserts on the inferior facet of the greater tubercle of the humerus. The teres minor laterally rotates the humerus and is a component of the rotator cuff.

The teres major muscle originates from a large oval region on the posterior surface of the inferior angle of the scapula. This broad cord-like muscle passes superiorly and laterally and ends as a flat tendon that attaches to the medial lip of the intertubercular sulcus on the anterior surface of the humerus. The teres major medially rotates and extends the humerus.

Reference:

- Gray's Anatomy for Students 4th Ed