SHOULDER REGION

The shoulder is the region of upper limb attachment to the trunk.

Bones of the shoulder region

The bone framework of the shoulder consists of clavicle, scapula and proximal humerus. (pp.690-693)

Muscles of the shoulder region

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.

. 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.

Muscles of the shoulder (spinal segments in bold are the major segments innervating the muscle)

Muscle	Origin	Insertion	Innervation	Function
Trapezius	Superior nuchal line, external occipital protuberance, medial margin of the ligamentum nuchae, spinous processes of CVII to TXII and the related supraspinous ligaments	Superior edge of the crest of the spine of the scapula, acromion, posterior border of lateral one-third of clavicle	Motor spinal part of accessory nerve (XI). Sensory (proprioception) anterior rami of C3 and C4	Powerful elevator of the scapula; rotates the scapula during abduction of humerus above horizontal; middle fibers retract scapula; lower fibers depress scapula
Deltoid	Inferior edge of the crest of the spine of the scapula, lateral margin of the acromion, anterior border of lateral one-third of clavicle	Deltoid tuberosity of humerus	Axillary nerve (**C5**, C6)	Major abductor of arm; clavicular fibers assist in flexing the arm; posterior fibers assist in extending the arm
Levator scapulae	Transverse processes of CI and CII vertebrae and posterior tubercles of transverse processes of CIII and CIV vertebrae	Posterior surface of medial border of scapula from superior angle to root of spine of the scapula	Branches directly from anterior rami of **C3** and **C4** spinal nerves and by branches (**C5**) from the dorsal scapular nerve	Elevates the scapula
Rhomboid minor	Lower end of ligamentum nuchae and spinous processes of CVII and TI vertebrae	Posterior surface of medial border of scapula at the root of the spine of the scapula	Dorsal scapular nerve (**C4, C5**)	Elevates and retracts the scapula
Rhomboid major	Spinous processes of TII–TV vertebrae and intervening supraspinous ligaments	Posterior surface of medial border of scapula from the root of the spine of the scapula to the inferior angle	Dorsal scapular nerve (**C4, C5**)	Elevates and retracts the scapula

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POSTERIOR SCAPULAR REGION

The posterior scapular region occupies the posterior aspect of the scapula and is located deep to the trapezius and deltoid muscles.

Muscles of the posterior scapular region

The posterior scapular region contains four muscles, which pass between the scapula and proximal end of the humerus: the supraspinatus, infraspinatus, teres minor, and teres major.

It also contains the long head of the triceps brachii, which passes between the scapula and the proximal end of the forearm.

The supraspinatus, infraspinatus, and teres minor muscles are components of the rotator cuff, which stabilizes the glenohumeral joint.

Muscles of the posterior scapular region (spinal segments in bold are the major segments innervating the muscle)

Muscle	Origin	Insertion	Innervation	Function
Supraspinatus	Medial two-thirds of the supraspinous fossa of the scapula and the deep fascia that covers the muscle	Most superior facet on the greater tubercle of the humerus	Suprascapular nerve (**C5**, C6)	**Rotator cuff muscle**; participates in abduction of the glenohumeral joint; stabilization of glenohumeral joint
Infraspinatus	Medial two-thirds of the infraspinous fossa of the scapula and the deep fascia that covers the muscle	Middle facet on posterior surface of the greater tubercle of the humerus	Suprascapular nerve (**C5**, C6)	**Rotator cuff muscle**; lateral rotation of arm at the glenohumeral joint; stabilization of glenohumeral joint
Teres minor	Upper two-thirds of a flattened strip of bone on the posterior surface of the scapula immediately adjacent to the lateral border of the scapula	Inferior facet on the posterior surface of the greater tubercle of the humerus	Axillary nerve (**C5**, C6)	**Rotator cuff muscle**; lateral rotation of arm at the glenohumeral joint; stabilization of glenohumeral joint
Teres major	Elongate oval area on the posterior surface of the inferior angle of the scapula	Medial lip of the intertubercular sulcus on the anterior surface of the humerus	Inferior subscapular nerve (**C5**, **C6**, **C7**)	Medial rotation and extension of the arm at the glenohumeral joint; stabilization of glenohumeral joint
Long head of triceps brachii	Infraglenoid tubercle on scapula	Common tendon of insertion with medial and lateral heads on the olecranon process of ulna	Radial nerve (C6, **C7**, C8)	Extension of the forearm at the elbow joint; accessory adductor and extensor of the arm at the glenohumeral joint

Gateways to the posterior scapular region

- **Suprascapular foramen**

  It is the route through which structures pass between the base of the neck and the posterior scapular region. It is formed by the suprascapular notch of the scapula and the superior transverse scapular (suprascapular) ligament, which converts the notch into a foramen.

  The suprascapular nerve passes through the foramen, the suprascapular artery and the suprascapular vein pass immediately superior to the ligament and not through the foramen.

- **Quadrangular space**

  It provides a passageway between the axilla and the posterior scapular region. Its boundaries are formed by:

  1. The inferior margin of the teres minor,
  2. The surgical neck of the humerus,
  3. The superior margin of the teres major, and
  4. The lateral margin of the long head of the triceps brachii.

  The axillary nerve and the posterior circumflex humeral artery and vein pass through th space.

- **Triangular space**

  It is an area of communication between the axilla and the posterior scapular region. When viewed from the posterior scapular region, the triangular space is formed by:

  1. The medial margin of the long head of the triceps brachii,
  2. The superior margin of the teres major, and
  3. The inferior margin of the teres minor.

  The circumflex scapular artery and vein pass through this space.

- **Triangular interval (triceps hiatus)**

  It serves as a passageway between the anterior and posterior compartments of the arm and between the posterior compartment of the arm and the axilla. It is formed by:

  1. The lateral margin of the long head of the triceps brachii,
  2. The shaft of the humerus, and
  3. The inferior margin of the teres major.

  The radial nerve, the profunda brachii artery (deep artery of arm), and associated veins pass through this interval.

Nerves of the posterior scapular region

The two major nerves of the posterior scapular region are the suprascapular and axillary nerves, both of which originate from the brachial plexus in the axilla.

❖ Suprascapular nerve

It originates in the base of the neck from the superior trunk of the brachial plexus.

It passes posterolaterally from its origin, through the suprascapular foramen to reach the posterior scapular region, where it lies in the plane between bone and muscle.

It innervates the supraspinatus muscle and then passes through the greater scapular (spinoglenoid) notch, between the root of the spine of the scapula and the glenoid cavity, to terminate in and innervate the infraspinatus muscle.

Generally, the suprascapular nerve has no cutaneous branches.

❖ Axillary nerve

It originates from the posterior cord of the brachial plexus.

It exits the axilla by passing through the quadrangular space in the posterior wall of the axilla and enters the posterior scapular region. Together with the posterior circumflex humeral artery and vein, it is directly related to the posterior surface of the surgical neck of the humerus.

The axillary nerve innervates the deltoid and teres minor muscles. In addition, it has a cutaneous branch, the superior lateral cutaneous nerve of the arm, which carries general sensation from the skin over the inferior part of the deltoid muscle.

Arteries of the posterior scapular region

Three major arteries are found in the posterior scapular region: the suprascapular, posterior circumflex humeral, and circumflex scapular arteries.

These arteries contribute to an interconnected vascular network around the scapula

❖ Suprascapular artery

The artery originates in the base of the neck as a branch of the thyrocervical trunk, which, in turn, is a major branch of the subclavian artery. It may also originate directly from the third part of the subclavian artery.

It normally enters the posterior scapular region superior to the suprascapular foramen.

In addition to supplying the supraspinatus and infraspinatus muscles, the suprascapular artery contributes branches to numerous structures along its course.

❖ Posterior circumflex humeral artery

It originates from the third part of the axillary artery in the axilla. With the axillary nerve, the artery leaves the axilla through the quadrangular space in the posterior wall and enters the posterior scapular region. It supplies the related muscles and the glenohumeral joint.

❖ Circumflex scapular artery

The circumflex scapular artery is a branch of the subscapular artery that also originates from the third part of the axillary artery in the axilla. It leaves the axilla through the triangular space and enters the posterior scapular region, passes through the origin of the teres minor muscle, and forms anastomotic connections with other arteries in the region.

Veins of the posterior scapular region

Veins in the posterior scapular region generally follow the arteries and connect with vessels in the neck, back, arm, and axilla.

References:
Gray's Anatomy for Students - 4th Edition
Snell Clinical Anatomy by Regions - 9th Edition