the chest. It arises by fleshy digitations from the outer surfaces and superior borders of the upper eight or nine ribs, and from the aponeuroses covering the intervening Intercostales. Each digitation (except the first) arises from the corresponding rib; the first springs from the first and second ribs; and from the fascia covering the first intercostal space. From this extensive attachment the fibers pass backward, closely applied to the chest-wall, and reach the vertebral border of the scapula, and are inserted into its ventral surface in the following manner. The first digitation is inserted into a triangular area on the ventral surface of the medial angle. The next two digitations spread out to form a thin, triangular sheet, the base of which is directed backward and is inserted into nearly the whole length of the ventral surface of the vertebral border. The lower five or six digitations converge to form a fan-shaped mass, the apex of which is inserted, by muscular and tendinous fibers, into a triangular impression on the ventral surface of the inferior angle. The lower four slips interdigitate at their origins with the upper five slips of the Obliquus externus abdominis.

Variations.—Attachment to tenth rib. Absence of attachments to first rib, to one or more of the lower ribs. Division into three parts; absence or defect of middle part. Union with Levator scapulae, External intercostals or External oblique.

Nerves.—The Pectoralis major is supplied by the medial and lateral anterior thoracic nerves; through these nerves the muscle receives filaments from all the spinal nerves entering into the formation of the brachial plexus; the Pectoralis minor receives its fibers from the eighth cervical and first thoracic nerves through the medial anterior thoracic nerve. The Subclavius is supplied by a filament from the fifth and sixth cervical nerves; the Serratus anterior is supplied by the long thoracic, which is derived from the fifth, sixth, and seventh cervical nerves.

Actions.—If the arm has been raised by the Deltoideus, the Pectoralis major will, conjointly with the Latissimus dorsi and Teres major, depress it to the side of the chest. If acting alone, it adducts and draws forward the arm, bringing it across the front of the chest, and at the same time rotates it inward. The Pectoralis minor depresses the point of the shoulder, drawing the scapula downward and medially toward the thorax, and throwing the inferior angle backward. The Subclavius depresses the shoulder, carrying it downward and forward. When the arms are fixed, all three of these muscles act upon the ribs; drawing them upward and expanding the chest, and thus becoming very important agents in forced inspiration. The Serratus anterior, as a whole, carries the scapula forward, and at the same time raises the vertebral border of the bone. It is therefore concerned in the action of pushing. Its lower and stronger fibers move forward the lower angle and assist the Trapezius in rotating the bone at the sternoclavicular joint, and thus assist this muscle in raising the acromion and supporting weights upon the shoulder. It is also an assistant to the Deltoideus in raising the arm, inasmuch as during the action of this latter muscle it fixes the scapula and so steadies the gelenoid cavity on which the head of the humerus rotates. After the Deltoideus has raised the arm to a right angle with the trunk, the Serratus anterior and the Trapezius, by rotating the scapula, raise the arm into an almost vertical position. It is possible that when the shoulders are fixed the lower fibers of the Serratus anterior may assist in raising and evertting the ribs; but it is not the important inspiratory muscle it was formerly believed to be.

III. THE MUSCLES AND FASCIAE OF THE SHOULDER.

In this group are included:

- Deltoideus.
- Subscapularis.
- Supraspinatus.
- Infraspinatus.
- Teres minor.
- Teres major.

Deep Fascia.—The deep fascia covering the Deltoideus invests the muscle, and sends numerous septa between its fasciculi. In front it is continuous with the fascia covering the Pectoralis major; behind, where it is thick and strong, with that covering the Infraspinatus; above, it is attached to the clavicle, the acromion, and the spine of the scapula; below, it is continuous with the deep fascia of the arm.

The Deltoideus (Deltoideus muscle) (Fig. 410) is a large, thick, triangular muscle, which covers the shoulder-joint in front, behind, and laterally. It arises from the anterior
border and upper surface of the lateral third of the clavicle; from the lateral margin and upper surface of the acromion, and from the lower lip of the posterior border of the spine of the scapula, as far back as the triangular surface at its medial end. From this extensive origin the fibers converge toward their insertion, the middle passing vertically, the anterior obliquely backward and laterally, the posterior obliquely forward and laterally; they unite in a thick tendon, which is inserted into the deltoid prominence on the middle of the lateral side of the body of the humerus. At its insertion the muscle gives off an expansion to the deep fascia of the arm. This muscle is remarkably coarse in texture, and the arrangement of its fibers is somewhat peculiar; the central portion of the muscle—that is to say, the part arising from the acromion—consists of oblique fibers; these arise in a bipenniform manner from the sides of the tendinous intersections, generally four in number, which are attached above to the acromion and pass downward parallel to one another in the substance of the muscle. The oblique fibers thus formed are inserted into similar tendinous intersections, generally three in number, which pass upward from the insertion of the muscle and alternate with the descending septa. The portions of the muscle arising from the clavicle and spine of the scapula are not arranged in this manner, but are inserted into the margins of the inferior tendon.

Variations.—Large variations uncommon. More or less splitting common. Continuation into the Trapezius; fusion with the Pectoralis major; additional slips from the vertebral border of the scapula, infraspinous fascia and axillary border of scapula not uncommon. Insertion varies in extent or rarely prolonged to origin of Brachialialis.

Nerves.—The Deltoideus is supplied by the fifth and sixth cervical through the axillary nerve.

Actions.—The Deltoideus raises the arm from the side, so as to bring it at right angles with the trunk. Its anterior fibers, assisted by the Pectoralis major, draw the arm forward; and its posterior fibers, aided by the Teres major and Latissimus dorsi, draw it backward.

Subscapular Fascia (fascia subscapularis).—The subscapular fascia is a thin membrane attached to the entire circumference of the subscapular fossa, and affording attachment by its deep surface to some of the fibers of the Subscapularis.

The Subscapularis (Fig. 411) is a large triangular muscle which fills the subscapular fossa, and arises from its medial two-thirds and from the lower two-thirds of the groove on the axillary border of the bone. Some fibers arise from tendinous lamina which intersect the muscle and are attached to ridges on the bone; others from an aponeurosis, which separates the muscle from the Teres major and the long head of the Triceps brachii. The fibers pass laterally, and, gradually converging, end in a tendon which is inserted into the lesser tubercle of the humerus and the front of the capsule of the shoulder-joint. The tendon of the muscle is separated from the neck of the scapula by a large bursa, which communicates with the cavity of the shoulder-joint through an aperture in the capsule.

Nerves.—The Subscapularis is supplied by the fifth and sixth cervical nerves through the upper and lower subscapular nerves.

Actions.—The Subscapularis rotates the head of the humerus inward; when the arm is raised, it draws the humerus forward and downward. It is a powerful defence to the front of the shoulder-joint, preventing displacement of the head of the humerus.

Supraspinatus Fascia (fascia supraspinata).—The supraspinatus fascia completes the osseofibrous case in which the Supraspinatus muscle is contained; it affords attachment, by its deep surface, to some of the fibers of the muscle. It is thick medially, but thinner laterally under the coracocadoimal ligament.

The Supraspinatus (Fig. 412) occupies the whole of the supraspinatus fossa, arising from its medial two-thirds, and from the strong supraspinatus fascia. The muscular fibers converge to a tendon, which crosses the upper part of the
shoulder-joint, and is inserted into the highest of the three impressions on the greater tubercle of the humerus; the tendon is intimately adherent to the capsule of the shoulder-joint.

**Infraspinatus Fascia** *(fascia infraspinata)*.—The infraspinatus fascia is a dense fibrous membrane, covering the Infraspinatus muscle and fixed to the circumference of the infraspinatus fossa; it affords attachment, by its deep surface, to some fibers of that muscle. It is intimately attached to the deltoid fascia along the overlapping border of the Deltoides.

![Diagram of muscles on the dorsum of the scapula, and the Triceps brachii.](image)

**Fig. 412.—Muscles on the dorsum of the scapula, and the Triceps brachii.**

The **Infraspinatus** (Fig. 412) is a thick triangular muscle, which occupies the chief part of the infraspinatus fossa; it arises by fleshy fibers from its medial two-thirds, and by tendinous fibers from the ridges on its surface; it also arises from the infraspinatus fascia which covers it, and separates it from the Teretes major and minor. The fibers converge to a tendon, which glides over the lateral border of the spine of the scapula, and, passing across the posterior part of the capsule of the shoulder-joint, is inserted into the middle impression on the greater tubercle of the humerus. The tendon of this muscle is sometimes separated from the capsule of the shoulder-joint by a bursa, which may communicate with the joint cavity.

The **Teres minor** (Fig. 412) is a narrow, elongated muscle, which arises from the dorsal surface of the axillary border of the scapula for the upper two-thirds of its extent, and from two aponeurotic laminae, one of which separates it from the Infraspinatus, the other from the Teres major. Its fibers run obliquely upward and lateralward; the upper ones end in a tendon which is inserted into the lowest of the three impressions on the greater tubercle of the humerus; the lowest fibers are inserted directly into the humerus immediately below this impression. The
tendon of this muscle passes across, and is united with, the posterior part of the capsule of the shoulder-joint.

**Variations.**—It is sometimes inseparable from the Infraspinatus.

The **Teres major** (Fig. 412) is a thick but somewhat flattened muscle, which arises from the oval area on the dorsal surface of the inferior angle of the scapula, and from the fibrous septa interposed between the muscle and the Teres minor and Infraspinatus; the fibers are directed upward and latelward, and end in a flat tendon, about 5 cm. long, which is inserted into the crest of the lesser tubercle of the humerus. The tendon, at its insertion, lies behind that of the Latissimus dorsi, from which it is separated by a bursa, the two tendons being, however, united along their lower borders for a short distance.

**Nerves.**—The Supraspinatus and Infraspinatus are supplied by the fifth and sixth cervical nerves through the suprascapular nerve; the Teres minor, by the fifth cervical, through the axillary; and the Teres major, by the fifth and sixth cervical, through the lowest subscapular.

**Actions.**—The Supraspinatus assists the Deltoides in raising the arm from the side of the trunk and fixes the head of the humerus in the glenoid cavity. The Infraspinatus and Teres minor rotate the head of the humerus outward; they also assist in carrying the arm backward. One of the most important uses of these three muscles is to protect the shoulder-joint, the Supraspinatus supporting it above, and the Infraspinatus and Teres minor behind. The Teres major assists the Latissimus dorsi in drawing the previously raised humerus downward and backward, and in rotating it inward; when the arm is fixed it may assist the Pectorales and the Latissimus dorsi in drawing the trunk forward.

### IV. THE MUSCLES AND FASCIA OF THE ARM.

The muscles of the arm are:
- **Coracobrachialis.**
- **Biceps brachii.**
- **Brachialis.**
- **Triceps brachii.**

**Brachial Fascia** (*fascia brachii; deep fascia of the arm*).—The brachial fascia is continuous with that covering the Deltoides and the Pectoralis major, by means of which it is attached, above, to the clavicle, acromion, and spine of the scapula; it forms a thin, loose, membranous sheath for the muscles of the arm, and sends septa between them; it is composed of fibers disposed in a circular or spiral direction, and connected together by vertical and oblique fibers. It differs in thickness at different parts, being thin over the Biceps brachii, but thicker where it covers the Triceps brachii, and over the epicondyles of the humerus: it is strengthened by fibrous aponeuroses, derived from the Pectoralis major and Latissimus dorsi medially, and from the Deltoides laterally. On either side it gives off a strong intermuscular septum, which is attached to the corresponding suprascapular ridge and epicondyle of the humerus. The **lateral intermuscular septum** extends from the lower part of the crest of the greater tubercle, along the lateral suprascapular ridge, to the lateral epicondy; it is blended with the tendon of the Deltoides, gives attachment to the Triceps brachii behind, to the Brachialis, Brachioradialis, and Extensor carpi radialis longus in front, and is perforated by the radial nerve and profunda branch of the brachial artery. The **medial intermuscular septum**, thicker than the preceding, extends from the lower part of the crest of the lesser tubercle of the humerus below the Teres major, along the medial suprascapular ridge to the medial epicondy; it is blended with the tendon of the Coracobrachialis, and affords attachment to the Triceps brachii behind and the Brachialis in front. It is perforated by the ulnar nerve, the superior ulnar collateral artery; and the posterior branch of the inferior ulnar collateral artery. At the elbow, the deep fascia is attached to the epicondyles of the humerus and the olecranon of the ulna, and is continuous with the deep fascia of the forearm.