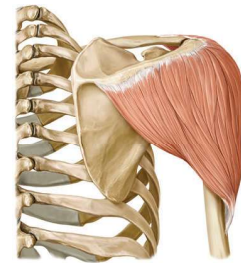


Scapular Region and Shoulder



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Learning Objectives

After reading this chapter, students should be able to identify the following:

- **Muscles:** Deltoid, subscapularis, supraspinatus, infraspinatus, teres minor, teres major, long head and short head of biceps, and long head of triceps.
- **Nerves:** Axillary, radial, musculocutaneous, median, and ulnar.
- **Arteries:** Subscapular, anterior and posterior circumflex humerals, and profunda brachii.

Introduction

The scapular region comprises structures that are closely related to the area around the shoulder joint. It has six muscles: *deltoid*, *supraspinatus*, *infraspinatus*, *teres minor*, *teres major*, and *subscapularis*.

Surface Landmarks

1. **Acromion:** The crest of the spine of the scapula, the *medial (vertebral)*, *lateral (axillary)* borders of the scapula and its *inferior angle* can be felt through the skin.
2. **Deltoid:** The muscle covers nearly the upper half of the humerus and forms the rounded contour of the shoulder.
3. **Greater tubercle** of the humerus forms the most lateral bony landmark at the shoulder. It is advisable to identify the bony features associated with the scapula and humerus using the skeleton before dissection of the region (**Fig. 4.1**).

Dissection and Identification (Video 4.1)

1. Place the cadaver in the prone position; abduct the upper limb to 45 degrees. Place the block under the chest; this will facilitate the dissection of the region offering better access (**Fig. 4.2**).
2. Reflect the trapezius upward with its cervical fascial attachment left intact.
3. Remove the fascia over the *deltoid* and clear its borders. Trace the muscle to its proximal attachment and to the spine and acromion of the scapula and also the lateral third of the clavicle.



Video 4.1 Deltoid muscle and axillary nerve.

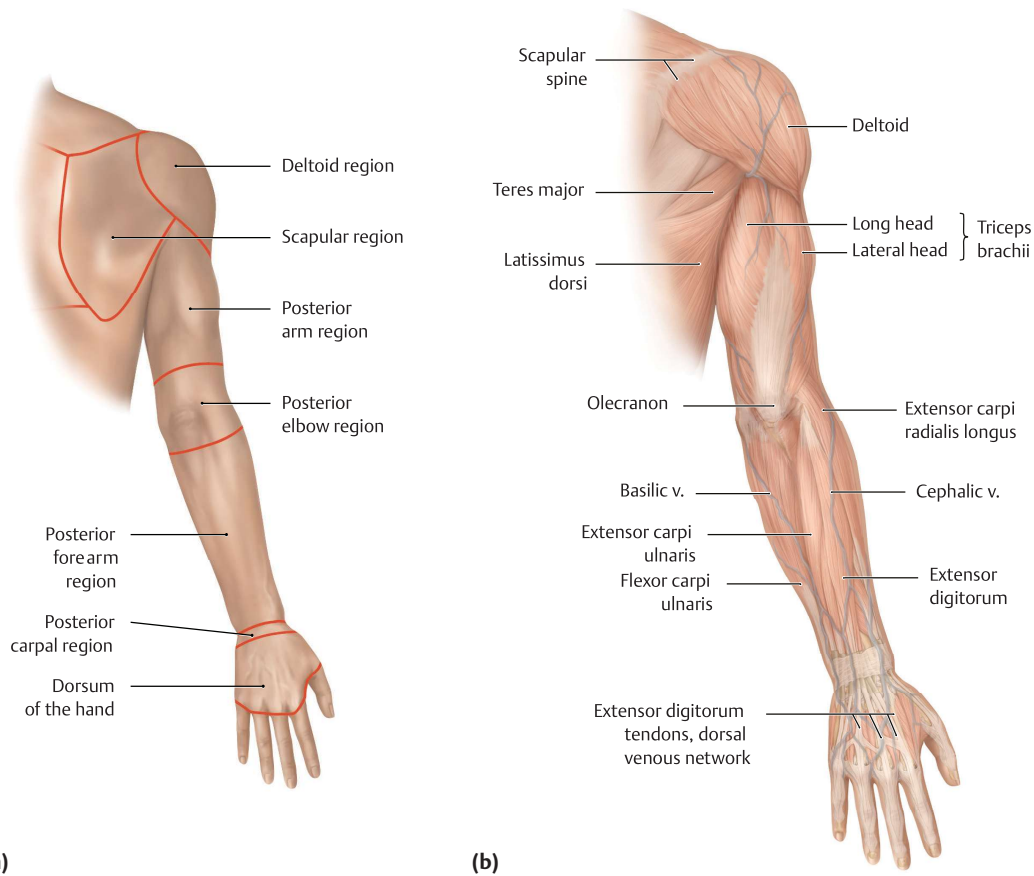


Fig. 4.1 (a) Region of the upper limb. (From: Schuenke M, Schulte E, Schumacher U. THIEME Atlas of Anatomy. General Anatomy and Musculoskeletal System. Illustrations by Voll M and Wesker K. © Thieme 2020.) (b) Palpable musculature. (From: Gilroy AM et al. Atlas of Anatomy. 2nd ed. 2012. Based on: Schuenke M, Schulte E, Schumacher U. THIEME Atlas of Anatomy. Illustrations by Voll M and Wesker K. © Thieme 2011.)

4. Note the distal attachment of the deltoid to the deltoid tuberosity of the humerus.
5. Using a scalpel, detach the deltoid from its proximal attachment. Let your cut be close to the bone. Leave the muscle distally attached to the deltoid tuberosity.
6. Reflect the deltoid laterally to expose the underlying vessels and nerve, avoiding damage to them.
7. Note the *axillary nerve* and *posterior circumflex humeral artery* on the deep surface of the deltoid muscle. Using a probe, clean the nerve and vessels. Trace them around the surgical neck of the humerus.
8. Note the branches of the axillary nerve to the deltoid and teres minor muscles.
9. Push your finger parallel to the axillary nerve to trace the *axillary nerve* and the accompanying *posterior circumflex humeral vessels* through the *quadrangular space* bounded (**Fig. 4.3**):
 - a. *Superiorly* by the inferior border of the teres minor.
 - b. *Medially* by the long head of the triceps brachii.

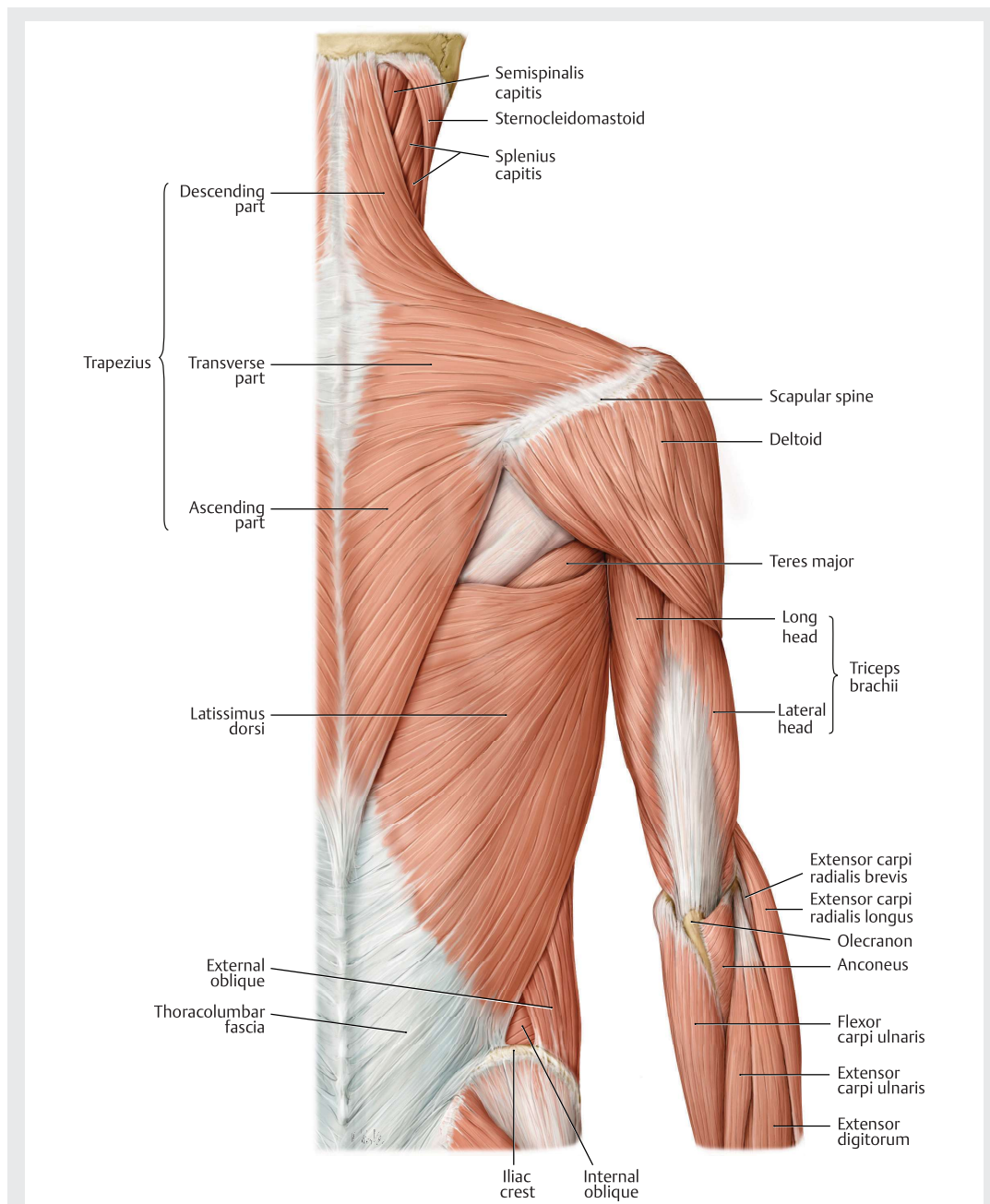


Fig. 4.2 Posterior muscles of the shoulder and arm (right side, posterior view). (From: Schuenke M, Schulte E, Schumacher U. THIEME Atlas of Anatomy. General Anatomy and Musculoskeletal System. Illustrations by Voll M and Wesker K. © Thieme 2020.)

- c. *Inferiorly* by the upper border of the teres major.
 - d. *Laterally* by the surgical neck of the humerus.
10. Identify the *long head of the triceps brachii* and note that it passes anterior to the teres minor but posterior to the teres major.
 11. Define the borders of the *teres minor muscle*. Trace its medial attachment along the lateral border of the scapula and lateral attachment to the greater tubercle of the humerus.

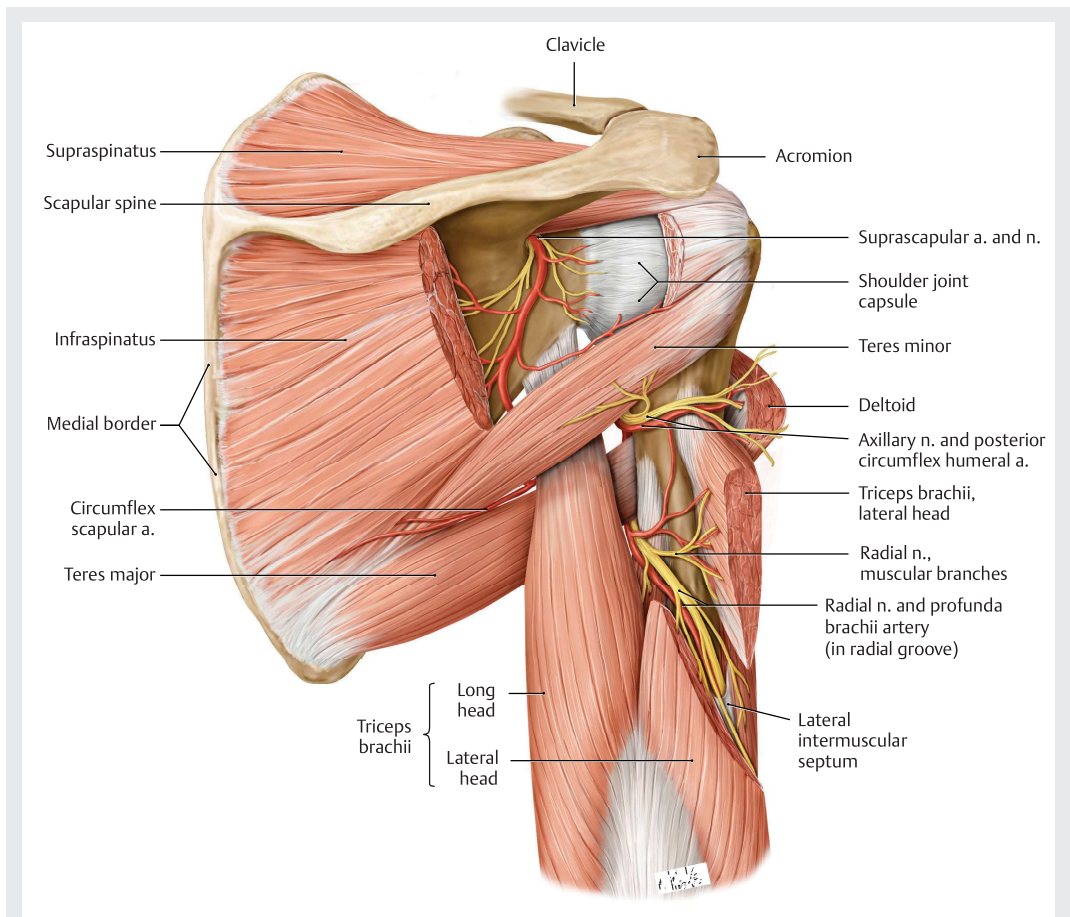


Fig. 4.3 Deep dissection of right shoulder (posterior view) showing quadrangular and triangular spaces. (From: Schuenke M, Schulte E, Schumacher U. THIEME Atlas of Anatomy. General Anatomy and Musculoskeletal System. Illustrations by Voll M and Wesker K. © Thieme 2020.)

- 12.** Clean and define the borders of the *teres major muscle*. Medially, it is attached to the facet along the inferior angle of the scapula. Laterally, it is attached to the medial lip of the intertubercular sulcus in front of the humerus.

Note the two triangular spaces in the region.

The *upper triangular space* is bounded (**Fig. 4.3**):

- a. Medially by the teres minor.
- b. Laterally by the long head of triceps.
- c. Inferiorly by the teres major.

Circumflex scapular artery passes through this space and anastomoses with the suprascapular artery.

The *lower triangular space* is bounded (**Fig. 4.3**):

- a. Medially by the long head of the triceps brachii.
- b. Laterally by the shaft of the humerus.
- c. Superiorly by the teres major.

Through this space, the *radial nerve* and *profunda brachii* vessels enter the radial/spiral groove.

13. Now clean the surface of the *supraspinatus muscle* and observe its medial attachment to the supraspinous fossa and lateral to the highest facet on the greater tubercle of the humerus.
14. Using a probe, define the attachment of the *infraspinatus muscle*. Trace its medial attachment to the infraspinous fossa of the scapula and lateral to the greater tubercle of the humerus.
15. Reflect the supraspinatus after transecting it ~5 cm lateral to the superior angle of the scapula and medial to the suprascapular notch.
16. By blunt dissection, loosen the supraspinatus from the supraspinous fossa and reflect it laterally toward its humeral attachment.
17. Now identify the *suprascapular artery and nerve*. Note that the artery passes above and the nerve passes below the *suprascapular ligament* (Fig. 4.3).
18. Transect the infraspinatus ~5 cm lateral to the vertebral border of the scapula; using blunt dissection, loosen the muscle from the infraspinous fossa and reflect it laterally.
19. Follow the suprascapular artery and nerve as they enter the infraspinatus fossa passing through the spinoglenoid notch.
20. Note that the suprascapular artery contributes to the *scapular anastomosis* along with the circumflex scapular artery and deep branch of the transverse cervical artery.

Rotator Cuff/Musculotendinous Cuff

It consists of four muscles: (1) *supraspinatus*, (2) *infraspinatus*, (3) *teres minor*, and (4) *subscapularis* (Fig. 4.4). At this stage, we have seen three of them. The subscapularis has already been studied during the dissection of the axilla (Chapter 2).

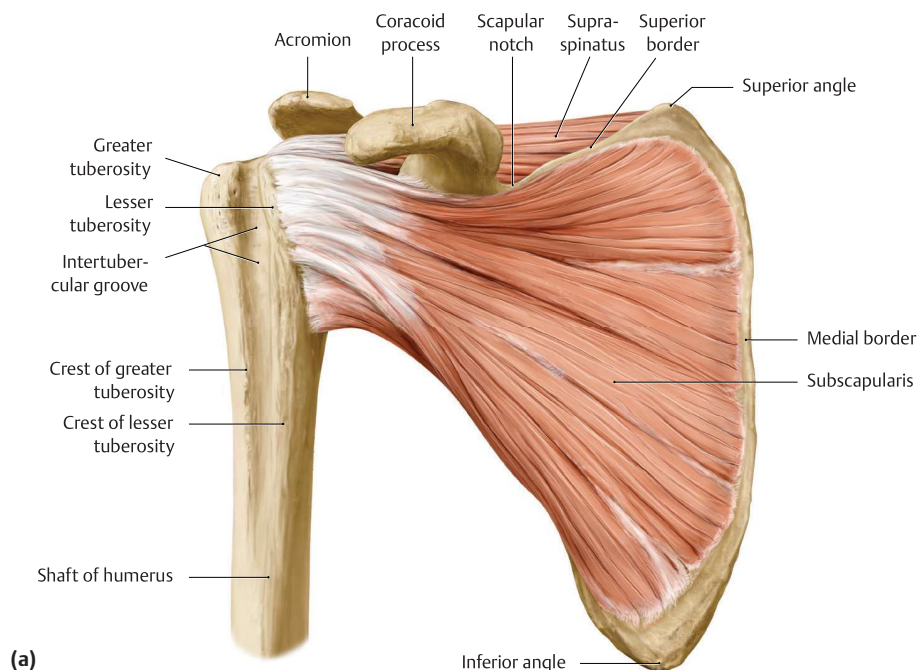


Fig. 4.4 Rotator cuff/musculotendinous cuff. **(a)** Anterior view. (Continued)

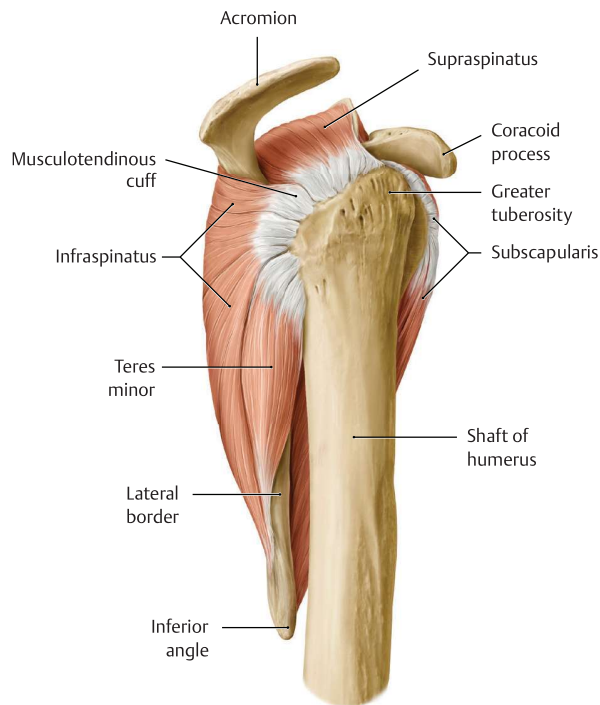
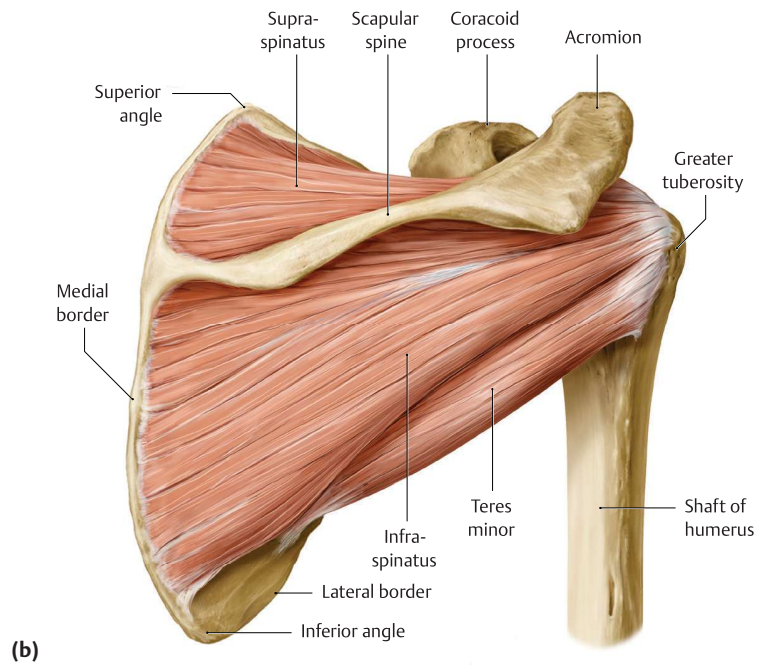


Fig. 4.4 (Continued) (b) posterior view, and (c) lateral view. (From: Schuenke M, Schulte E, Schumacher U. THIEME Atlas of Anatomy. General Anatomy and Musculoskeletal System. Illustrations by Voll M and Wesker K. © Thieme 2020.)

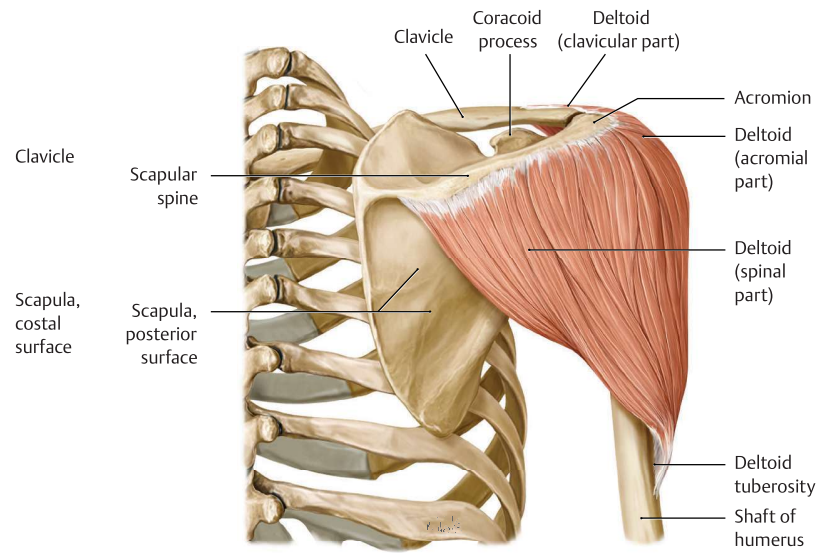


Fig. 4.5 Deltoid muscle (posterior view). (From: Schuenke M, Schulte E, Schumacher U. THIEME Atlas of Anatomy. General Anatomy and Musculoskeletal System. Illustrations by Voll M and Wesker K. © Thieme 2020.)

An overview of the muscles of the scapular region is given in **Table 4.1** (**Fig. 4.4**).

Table 4.1 Muscles of the scapular region

Name of muscle	Origin	Insertion	Nerve supply	Action/function
Deltoid (Fig. 4.5)	Lateral third of the clavicle, lateral border of the acromion, and spine of the scapula	Deltoid tuberosity of the humerus	Axillary nerve	Flexion and medial rotation, extension, lateral rotation, and abduction
Supraspinatus (Fig. 4.4b)	Medial three-fourths of the supraspinous fossa of the scapula	Superior part of the greater tubercle of the humerus	Suprascapular nerve	Initiation of abduction at the shoulder joint with the deltoid and action along with the rotator cuff muscles
Infraspinatus (Fig. 4.4b)	Medial three-fourths of the infraspinous fossa of the scapula	Middle part of the greater tubercle of the humerus	Suprascapular nerve	Lateral rotation at the shoulder joint and action along with the rotator cuff muscles
Teres minor (Fig. 4.3)	Middle third of the posterior surface of the lateral border of the scapula	Inferior part of the greater tubercle of the humerus	Axillary nerve	Lateral rotation at the shoulder joint and action along with the rotator cuff muscles
Teres major (Fig. 4.3)	Inferolateral along the lateral border on posterior surface of the scapula	Medial lip of the bicipital groove of the humerus	Inferior subscapular nerve	Adduction and medial rotation at the shoulder joint

Clinical Notes

1. *Subacromial bursitis*: Pressure over the deltoid below the acromion causes pain; however, pressure over the same point does not cause pain when the arm is abducted because the bursa moves under the acromion. It is referred to as *Dawbarn's sign*.
2. *Supraspinatus tendinitis*: It is the inflammation of the supraspinatus tendon. The inflammatory changes are usually associated with calcification.
3. *Damage to the axillary nerve* may occur in the inferior dislocation (subglenoid) of the shoulder or in fracture involving the surgical neck of the humerus. The deltoid is paralyzed and may undergo disuse atrophy leading to loss of rounded contour of the shoulder.
4. *Scapular anastomosis* provides collateral circulation if the distal part of the subclavian or proximal part of the axillary artery is blocked.