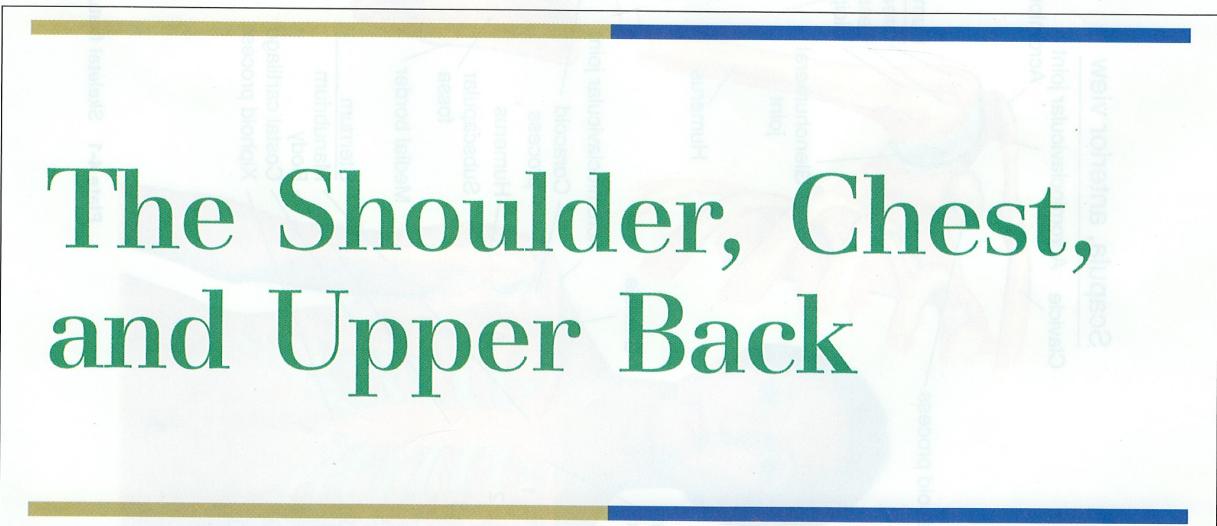

CHAPTER

4

The Shoulder, Chest, and Upper Back



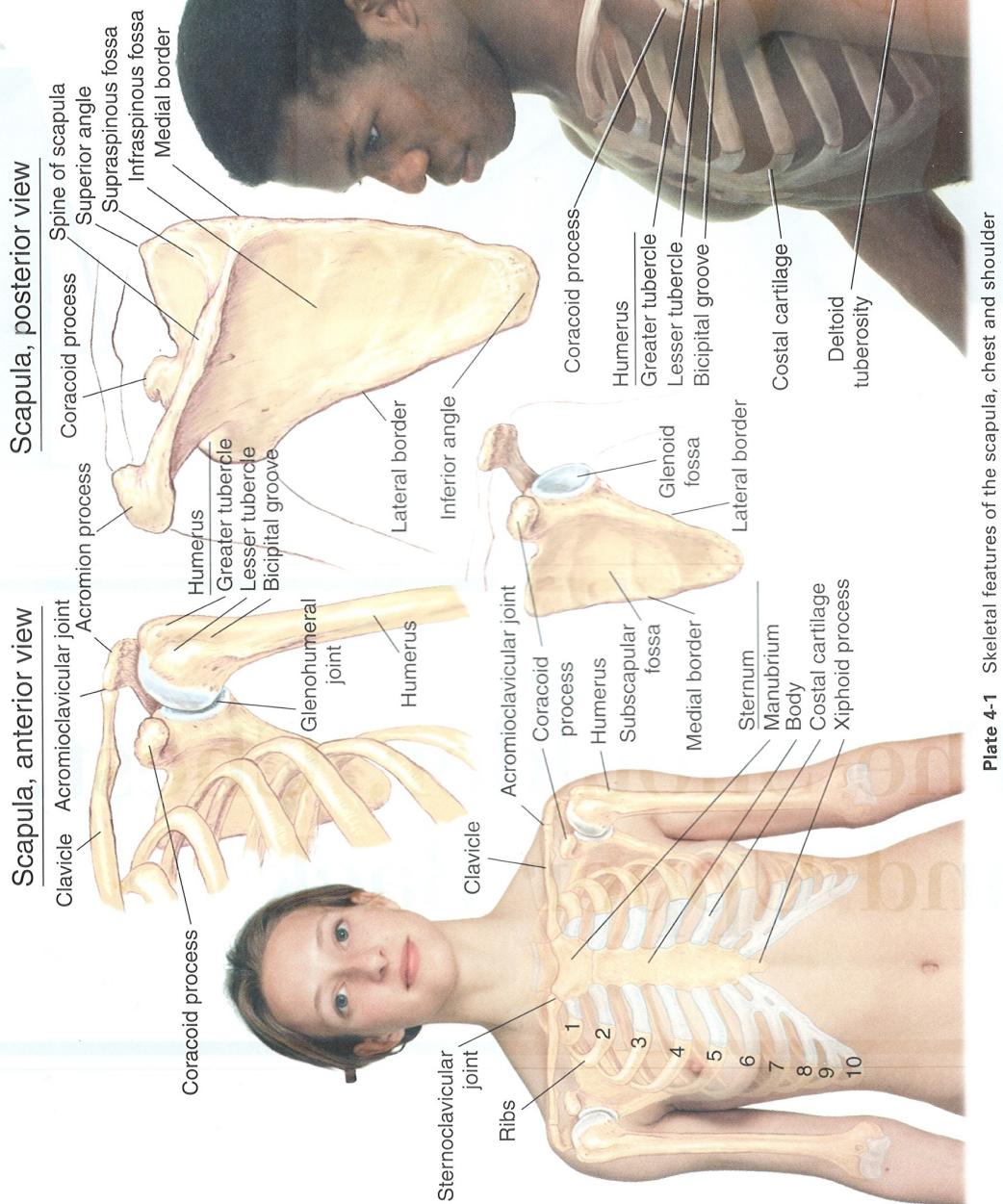


Plate 4-1 Skeletal features of the scapula, chest and shoulder

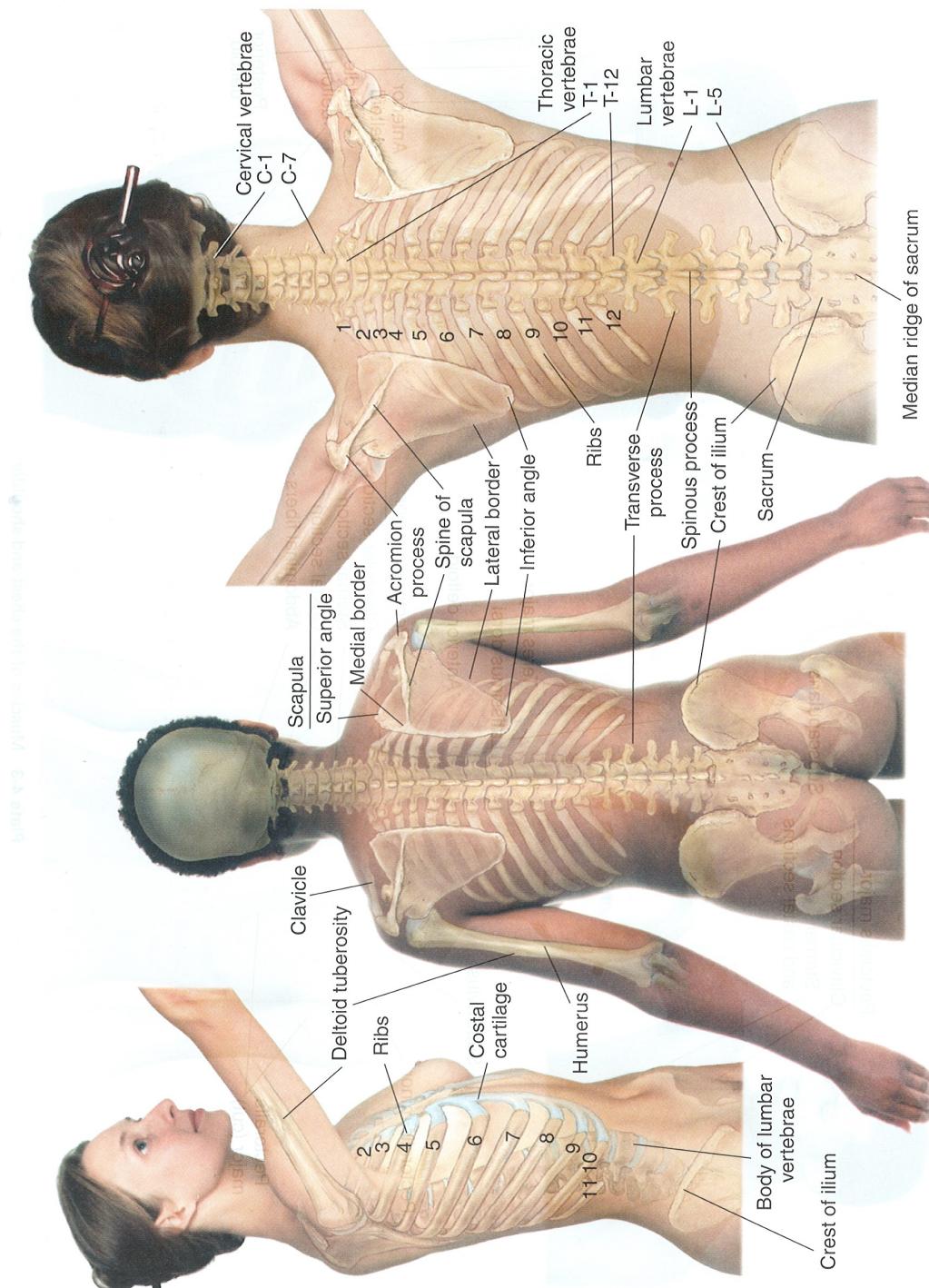


Plate 4-2 Skeletal features of the lateral chest, posterior shoulder, and upper back

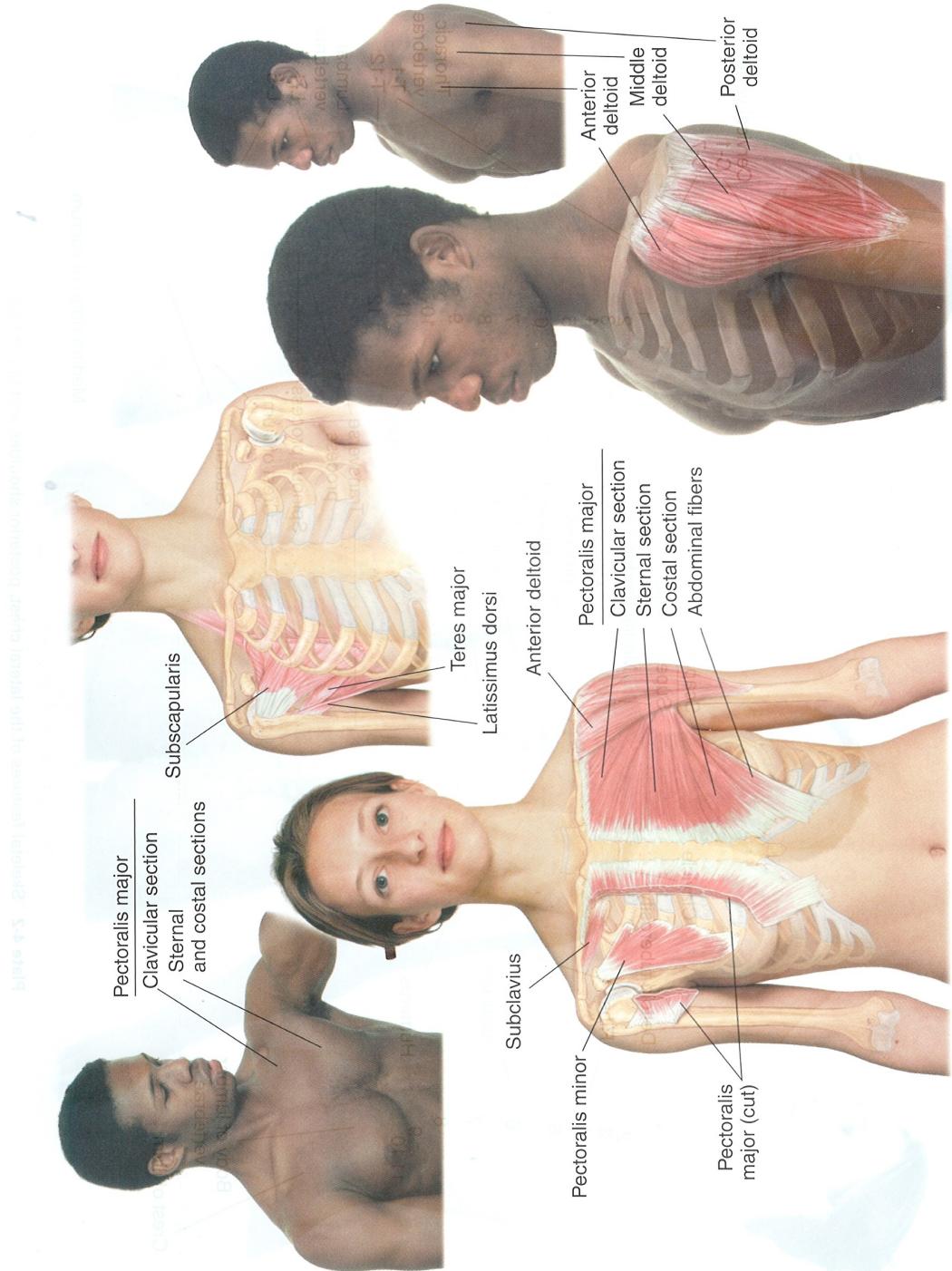


Plate 4-3 Muscles of the chest and shoulder

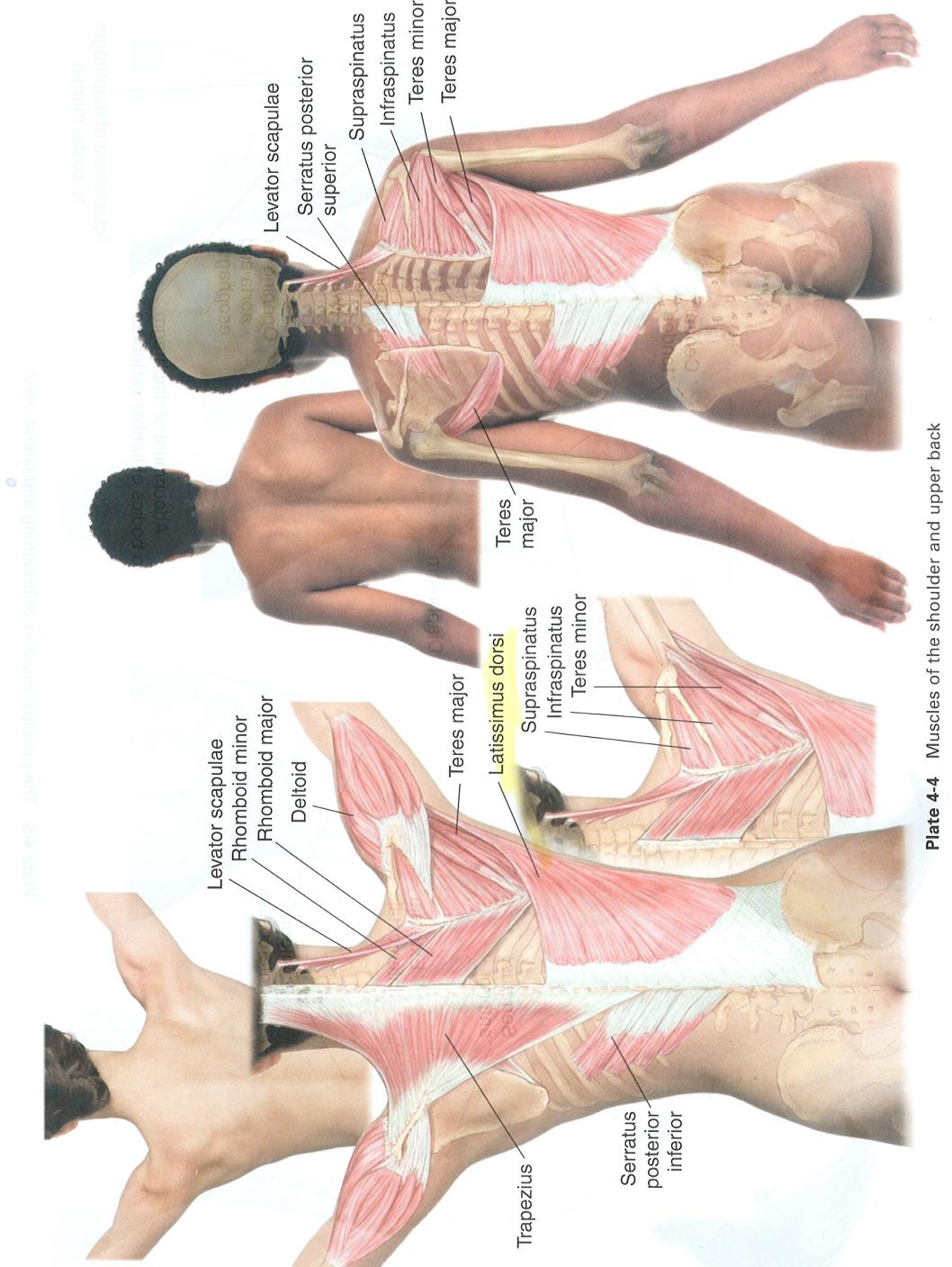


Plate 4-4 Muscles of the shoulder and upper back

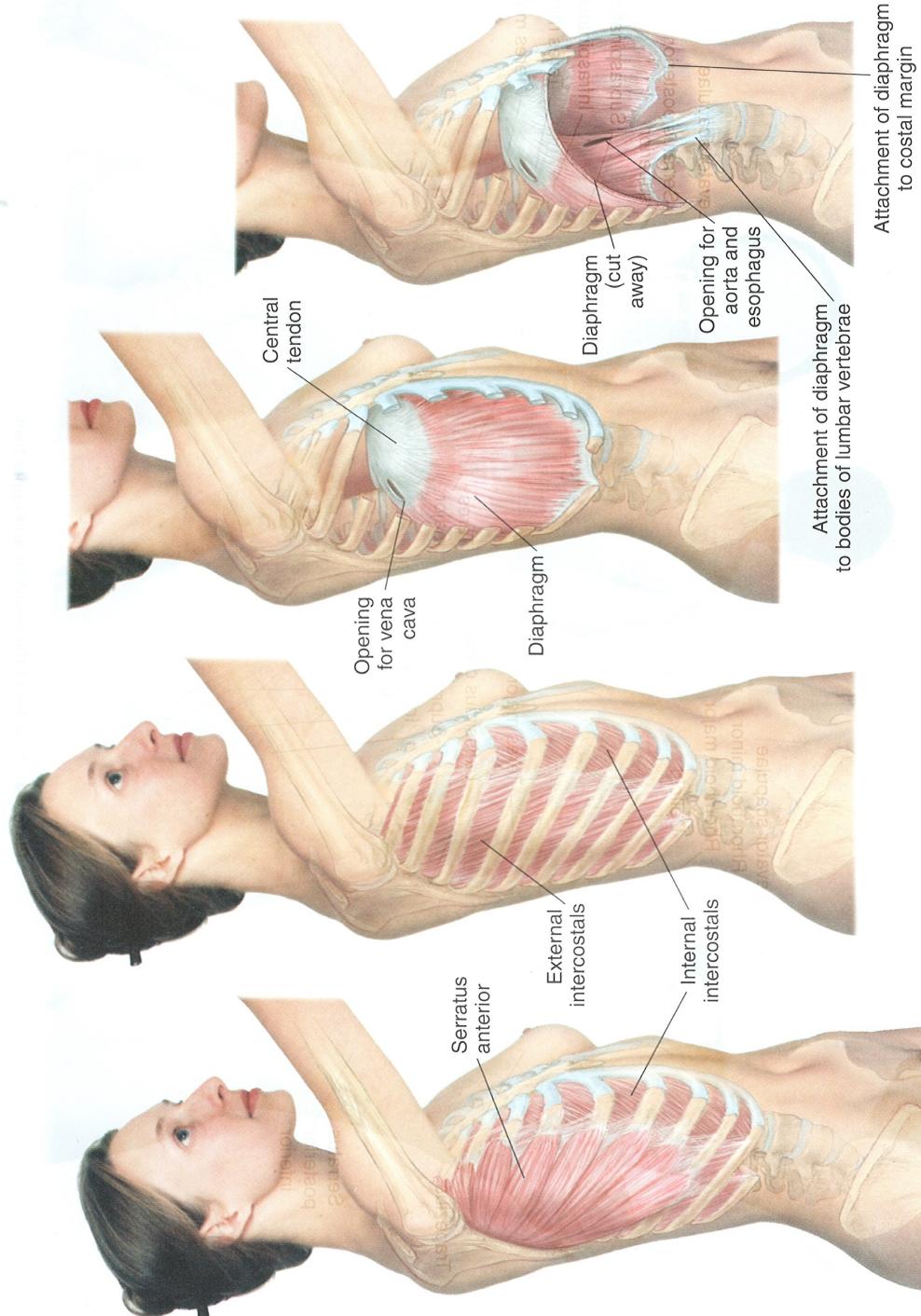


Plate 4-5 The principal muscles of breathing and lateral chest

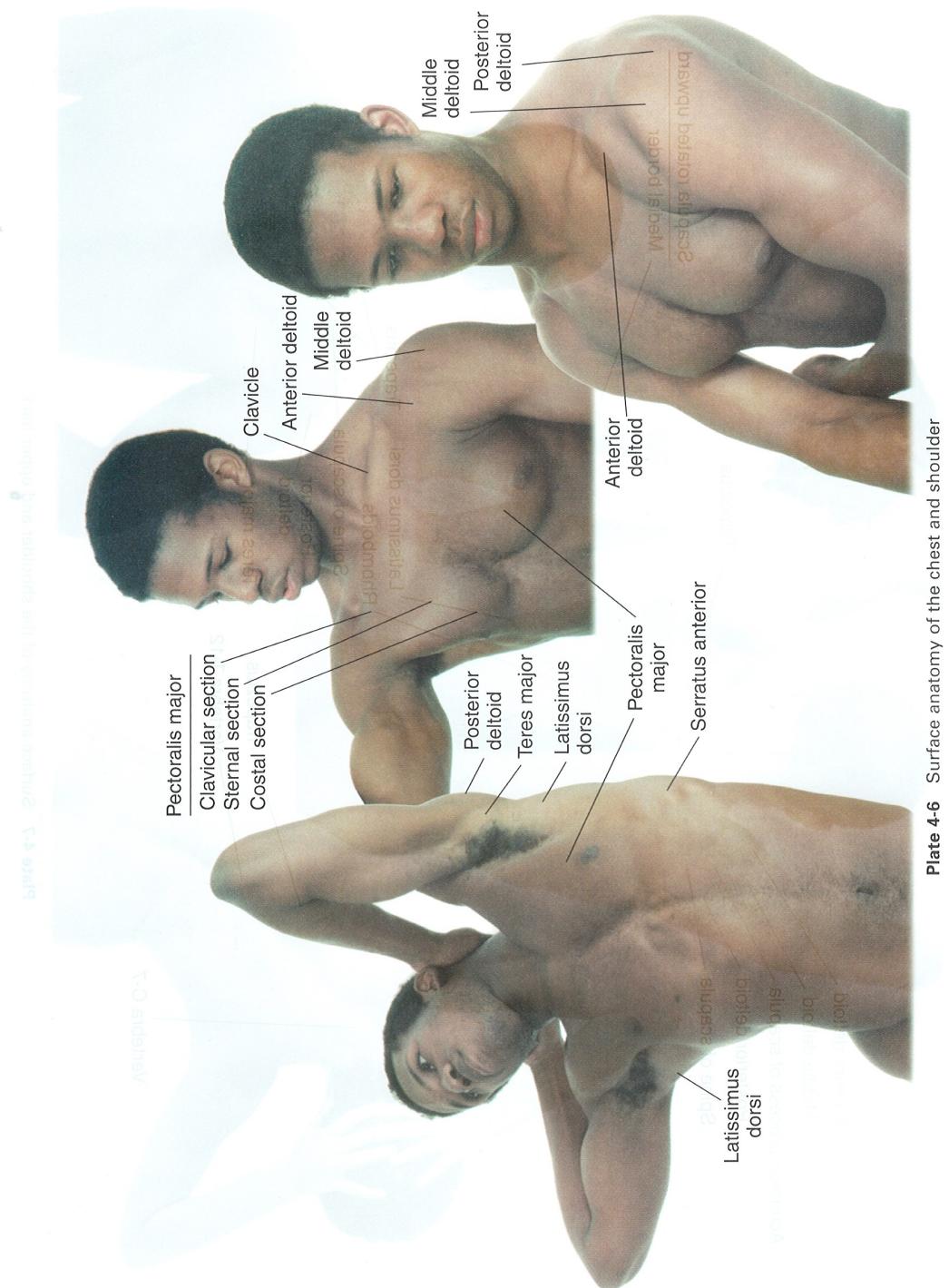


Plate 4-6 Surface anatomy of the chest and shoulder

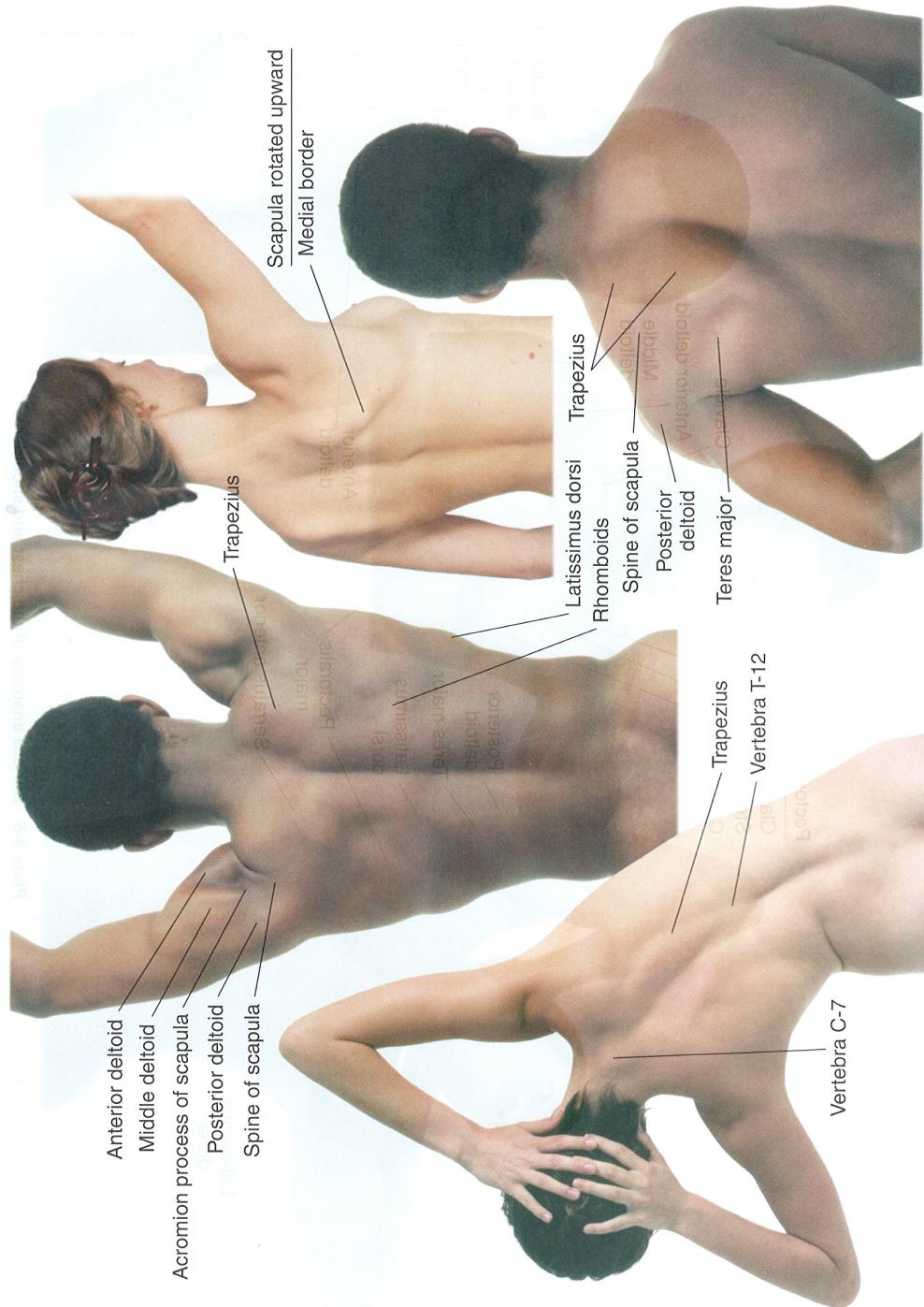


Plate 4-7 Surface anatomy of the shoulder and upper back

OVERVIEW OF THE REGION

The muscles of the shoulder, chest, and upper back are grouped not only because of their physical proximity but chiefly because the majority of the chest and upper back muscles are either directly involved in control of the shoulder or strongly influence it. The only muscles in this area that are not actually shoulder muscles are those of the ribs and of respiration.

Although we have already seen trapezius in Chapter 3, we need to remember that its territory is vast, covering the posterior shoulders and upper back. It plays a major role in moving and stabilizing the shoulders, and is usually involved in problems of the upper back and shoulders.

The Shoulder

Perhaps the most important thing to understand about the shoulder is that it is connected to the rest of the skeletal structure by only one joint, the **sternoclavicular joint**. Aside from this one rather tenuous connection, the entire shoulder structure, including the arm, is supported by soft tissues. While this arrangement allows considerable freedom of movement for the arm, it also renders the shoulder highly vulnerable to soft-tissue injury.

The shoulder girdle is a bony ring comprised of the *manubrium* of the sternum, the *clavicles*, and the two *scapulae*. It is an incomplete ring, since the scapulae are not joined in the back. Each side of the shoulder girdle might be compared to the boom on a sailboat (the clavicle) swinging freely from the mast (the sternum). Its considerable range of motion is limited only by the soft tissues.

Thus the shoulder combines great flexibility with great vulnerability:

- Great flexibility, because the soft tissues (muscles, tendons, and fascia) which connect the arm and shoulder to the back, chest and neck are soft and stretchable, allowing for movement in many directions.

- Great vulnerability, because movement too far in any direction can result in dislocation or separation of shoulder joints or injury to the soft tissues.

Shoulder Components

Two bones make up the shoulder [not counting the arm] (See Plate 4-1):

- Anteriorly, the *clavicle*, or collarbone, which joins the arm and shoulder to the rest of the skeleton at the *manubrium* of the sternum, by means of the **sternoclavicular joints**. Posteriorly, the *scapula* or shoulderblade.
- The clavicle has its own muscle, **subclavius**, which attaches it inferiorly to the top rib. It is a fairly simple bone, but the scapula is intricate and complex. It is rather like the famous Swiss Army knife, in that it includes several extensions that serve a variety of purposes.

The Scapula

Most of the bones in the body serve as rigid spacers, like tent poles. A few, however, instead act as anchors for soft tissues and other bones. The scapula, or shoulderblade, is one of the most important of these “anchors.”

We usually think of the shoulder blade as the essentially flat, triangular bone that we can see on the surface at the back of each shoulder. This part of the scapula serves mainly as an anchor for several muscles, four of which make up the **rotator cuff** of sports injury notoriety—four muscles that help rotate the arm (**supraspinatus**, **infraspinatus**, **teres minor**, and **subscapularis**). This large section of the scapula is divided into two areas by a bony ridge running across it at a slight upward angle from the horizontal. This ridge is called the **spine of the scapula**. A muscle superior and inferior to the spine of the scapula attaches to the surface of the scapula, and muscles also attach to the spine itself.

The spine of the scapula extends beyond the flat, triangular portion to form the **acromion process**. (A **process** is an extension of a bone.) The function of the acromion process is to join with the clavicle at the **acromioclavicular joint**. It also forms a hood or roof over the joint inferior to it, the head of the **humerus**, and the tendons that pass just under it, giving them some protection.

Just inferior to the acromion process and the acromioclavicular joint, the upper outer corner of the triangular bone forms a socket for the arm. The socket is called the **glenoid fossa** (a *fossa* is a cavity or hollow), and the ball-and-socket joint where the arm bone, or humerus, fits into the glenoid fossa is called the **glenohumeral joint**. Compared to the hip joint, the glenohumeral joint is a very shallow and open ball-and-socket joint. It functions well only because of the additional protection of the acromion process and attached tendons and ligaments. Even so, dislocations of the shoulder are much more common than those of the hip—another way in which flexibility is gained at the price of vulnerability.

Finally, another process extends from the front of the superolateral corner of the scapula. This process, the **coracoid process**, serves as an anchor for muscles, such as **pectoralis minor**, **coracobrachialis**, and the short head of the **biceps** (these last two muscles will be presented in Chapter 5).

Since the scapula provides the socket for the arm, it must be able to move freely in all directions. It can move up or down, it can move somewhat forward and closer to the ribs, and, most importantly, it can rotate both clockwise and counterclockwise.

Six muscles hold the scapula in position and move it in these various directions:

- Pectoralis minor
- Rhomboid major
- Rhomboid minor
- Levator scapulae
- Trapezius
- Serratus anterior

Three other powerful muscles move the humerus:

- The **deltoid** muscle, or *deltoideus*, which covers the superior, anterior, posterior, and lateral aspects of the shoulder joint structure, with attachments to the spine of the scapula, the acromion process, the clavicle, and the humerus. It is often referred to as three muscles: anterior deltoid, lateral deltoid, and posterior deltoid.
- **Pectoralis major** covers the anterior chest and attaches to the humerus.
- **Latissimus dorsi** is a shoulder muscle extending from the *iliac crest* over much of the back and attaching to the humerus.

Muscles of the Ribs and Respiration

The muscles of the ribs are the *internal* and *external intercostals*, *serratus anterior*, and *serratus posterior superior* and *inferior*.

The mechanical and physiological aspects of the breathing process are key factors in neuro-muscular integrity. Therefore, the muscles of breathing are an essential consideration in body-work. Although other muscles assist, the primary muscle of respiration is the **diaphragm**.

ANTERIOR SHOULDER

Subclavius

sub-CLAY-vee-us

Etymology Latin *sub*, under + *clavis*, key (*clavicularis*, little key)

Overview

For such a small muscle, *subclavius* (Fig. 4-1) can refer pain over a broad expanse. It should always be treated along with the other anterior chest muscles.

► See also Box 4-1, *Anterior Thoracic Muscles*.



Attachments

- Medially, to the first costal cartilage
- Laterally, to the inferior surface of the acromial end of the clavicle



Actions

- Fixes the clavicle or elevates the first rib
- Helps protract the scapula, drawing the shoulder down and forward



Referral Area

Laterally along the clavicle, over the front of the shoulder and upper arm, along the radial side of the forearm and into the thumb and first two fingers

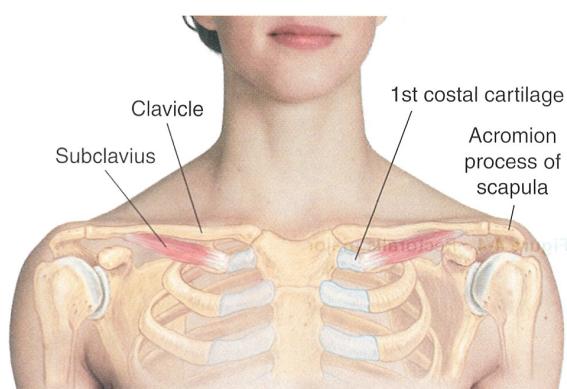


Figure 4-1 Subclavius



Figure 4-2 Stripping massage of subclavius (Draping option #2)



Other Muscles to Examine

- Pectoralis major and minor
- Scalenes



Manual Therapy

STRIPPING

- The client lies supine.
- Place the thumb or fingertips on the subclavius just medial to the head of the humerus and just inferior to the clavicle.
- Pressing firmly, glide your thumb or fingertips along the muscle as far as the medial end of the clavicle (Fig. 4-2).
- This technique may also be performed with the client seated (Fig. 4-3).



Figure 4-3 Stripping of subclavius in sitting position (Draping option #16)

Pectoralis Major

PECK-tor-AL-is MAY-jer

Etymology Latin *pectus*, *pectoris*, breast (chest) + *major*, larger; “the larger muscle of the breast”

Overview

Pectoralis major (Fig. 4-4) has three sections named for their attachments: *clavicular*, *sternal*, and *costal*, with additional fibers to the abdominal aponeurosis. The fibers of each of these sections run in different directions. The muscle crosses three joints: sternoclavicular, acromioclavicular, and glenohumeral.

Pectoralis major plays an important role in postural alignment, particularly with regard to the

“head-forward” posture discussed in Chapter 3 (see pages 64–65). David G. Simons, MD, says that “the [head-forward] posture is often caused by *pectoralis major* MTrPs [myofascial trigger points] that pull the shoulder blades forward creating a round-shouldered posture that includes a forward positioning of the head. Correction of that posture is rarely successful for any length of time unless you correct the *pectoralis* major problem” (Simons, David G., MD, private communication, September 23, 2001).

Attachments

- Inferiorly and medially, clavicular part, to the medial half of the clavicle; sternal and costal parts, to the anterior surface of the manubrium and the

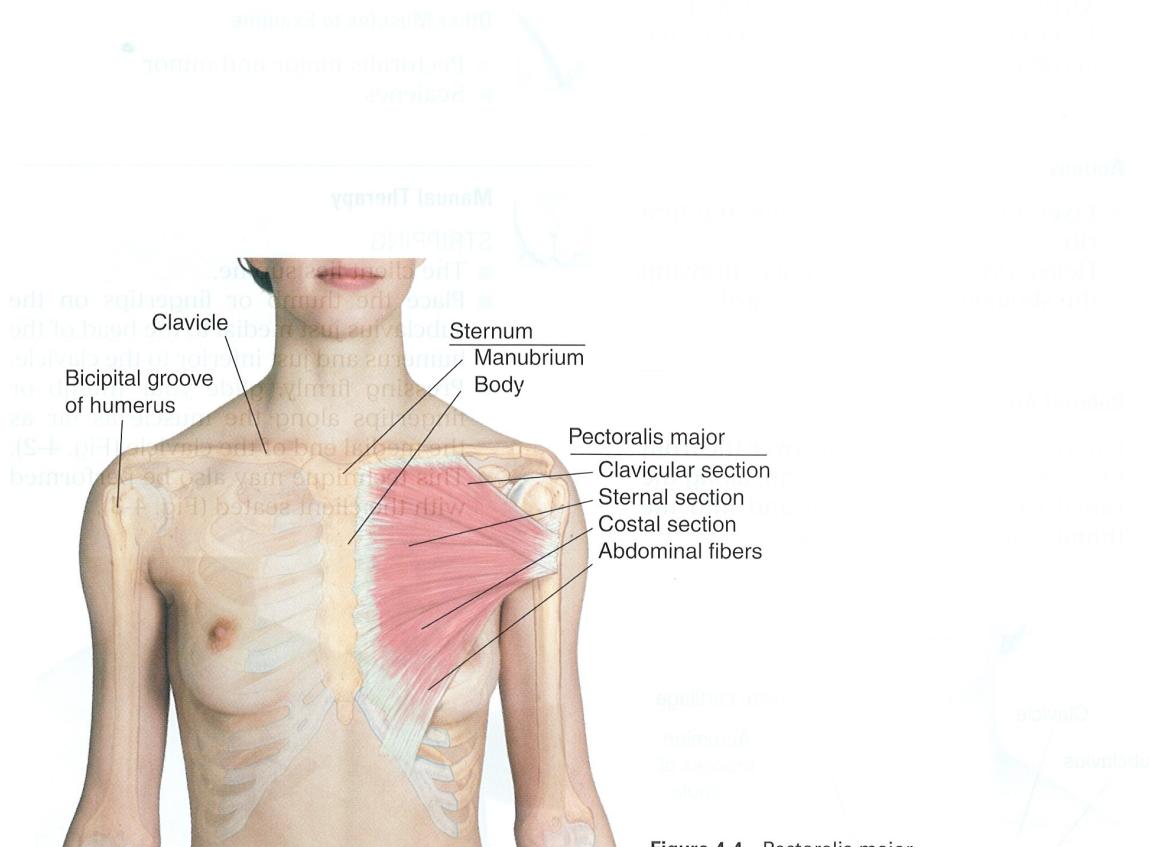


Figure 4-4 Pectoralis major

- body of the sternum and cartilages of the first to the sixth ribs; abdominal part, to the aponeurosis of the external oblique muscle.
- Superiorly and laterally, to the lateral lip of the bicipital groove.



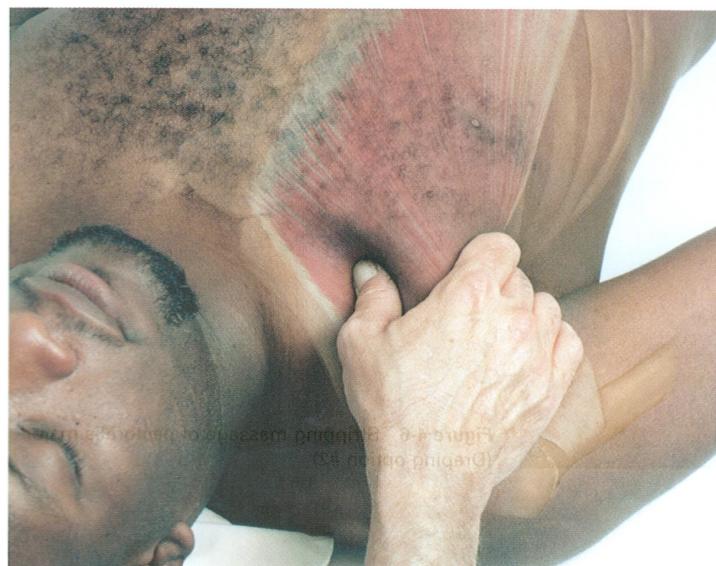
Actions

Adducts, flexes, and medially rotates arm



Referral Area

In the ipsilateral (on the same side) breast and anterior chest, over the anterior shoulder, down the volar palm surface of the upper arm, over the volar surface of the forearm just below the elbow, and into the middle and ring fingers



Other Muscles to Examine

- Pectoralis minor
- Scalenes
- Sternocleidomastoid (SCM)
- Sternalis
- Subclavius
- Deltoid
- Biceps brachii
- Coracobrachialis



Manual Therapy

PINCER COMPRESSION

- The client lies supine.
- The therapist stands at the client's shoulder beside the head.
- Grasp the pectoralis major just medial to the humerus between the thumb and first three fingers. Squeeze the muscle firmly and wait for release (Fig. 4-5).

Figure 4-5 Pincer compression of pectoralis major (Draping option #2)

- Move the thumb and fingers to a position farther away from the shoulder as the muscle widens; squeeze and wait for release.
- Continue this process, moving farther along the muscle as it widens, until you have worked as much of the muscle as you can reasonably grasp.

STRIPPING

- The client lies supine.
- The therapist stands beside the client's shoulder, facing the client.
- Place the fingertips on the muscle just medial to the humerus.
- Pressing firmly into the tissue, glide the fingertips medially across the muscle to its attachments on the sternum.
- Beginning at the same spot, repeat this procedure, sliding diagonally along the muscle just inferior to the path you traced in the last movement.
- Repeat the same procedure, beginning each time at the same point, with the paths of your movement forming a fan

shape, ending with a path along the lateral edge of the muscle (Fig. 4-6).

- With a female client with developed breasts, each path should end when you reach the bulk of the breast tissue ahead of your fingers (Fig. 4-7).

COMPRESSION

- The client lies supine.
- The therapist stands beside the client facing the client's head.
- Place the hand nearest the client flat on the client's ribcage with the fingertips resting on the inferior aspect of pectoralis major.
- Press firmly into the tissue, searching for tender spots. Hold for release.
- Move the hand upward so that the fingertips are just superior to the previous spot.
- Repeat this procedure until you reach the upper aspect of the muscle.
- Start again at the lower ribcage, with your hand just medial to the original starting point. Keep moving superiorly



Figure 4-6 Stripping massage of pectoralis major (Draping option #2)

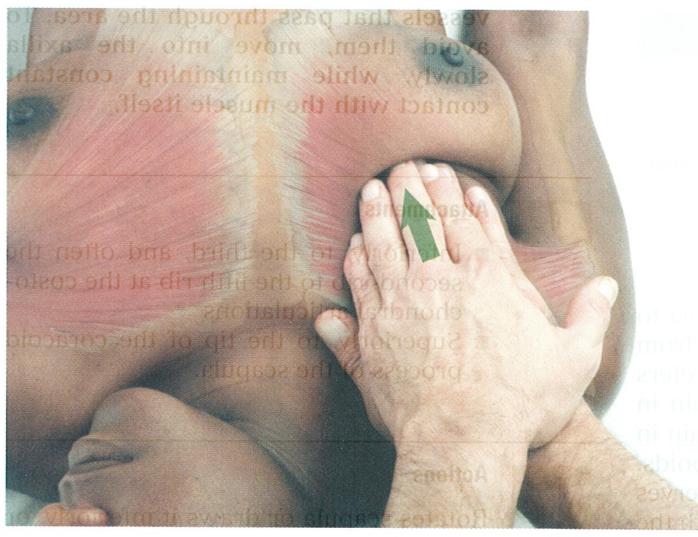


Figure 4-7 Treatment of pectoralis major in a female client (Draping option #2)

- to new positions on the muscle on a slight diagonal till you reach the superior aspect.
- Continue this procedure, moving up the medial aspect of the muscle along the sternum, until you have covered the entire muscle in a fan-shaped pattern.
- With a female client with developed breasts, continue each path as far as

the breast tissue allows you to remain in contact with the muscle (Fig. 4-8A). When you have worked as much of the muscle as you can from this position, move to the client's shoulder and repeat the process working inferiorly (Fig. 4-8B). You should be able to cover all the muscle tissue underlying the breast in this way.



Figure 4-8 Compression of pectoralis major in a female client: medial inferior portion (A), lateral portion (B) (Draping option #3)

Pectoralis Minor

PECK-ter-AL-is MY-ner

Etymology Latin *pectus, pectoris*, breast (chest) + *minor*, smaller; “the smaller muscle of the breast.”

Overview

Pectoralis minor (Fig. 4-9) anchors the scapula to the chest. It is therefore susceptible to injury from inferior motions of the arm and commonly refers pain to the arm as far as the fingertips. Pain in *pectoralis minor* is often accompanied by pain in the upper back muscles such as the rhomboids. Because the brachial plexus (the bundle of nerves leading to the arm) passes directly underneath the attachment to the coracoid process, tightness in *pectoralis minor* can entrap the nerve, causing numbness in the arm (Fig. 4-10), especially when the arm is raised.



Caution

The **axilla**, or armpit, is the area directly inferior to the *glenohumeral joint*, and lies within a cavity formed posteriorly by a bundle of muscles made up of *teres major* and *minor* and *latissimus dorsi*, and anteriorly by *pectoralis major*. Caution must be taken when working in the axilla, on account of the major brachial nerves and blood

vessels that pass through the area. To avoid them, move into the axilla slowly, while maintaining constant contact with the muscle itself.

Attachments

- Inferiorly, to the third, and often the second, rib to the fifth rib at the costochondral articulations
- Superiorly, to the tip of the coracoid process of the scapula.

Actions

Rotates scapula or draws it inferiorly, or raises ribs



Referral Area

Over the anterior shoulder, into the anterior chest and along the volar surface of the arm into the last three fingers.



Other Muscles to Examine

- *Pectoralis major*
- *Scalenes*
- *Sternocleidomastoid*
- *Rotator cuff*

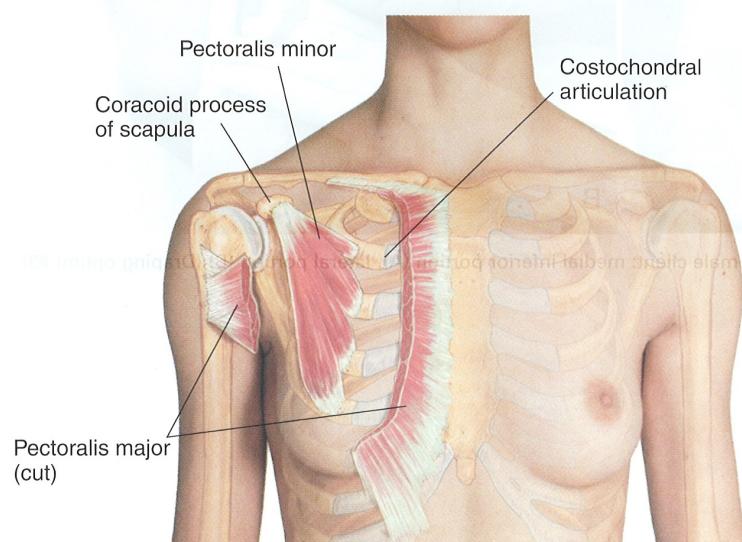
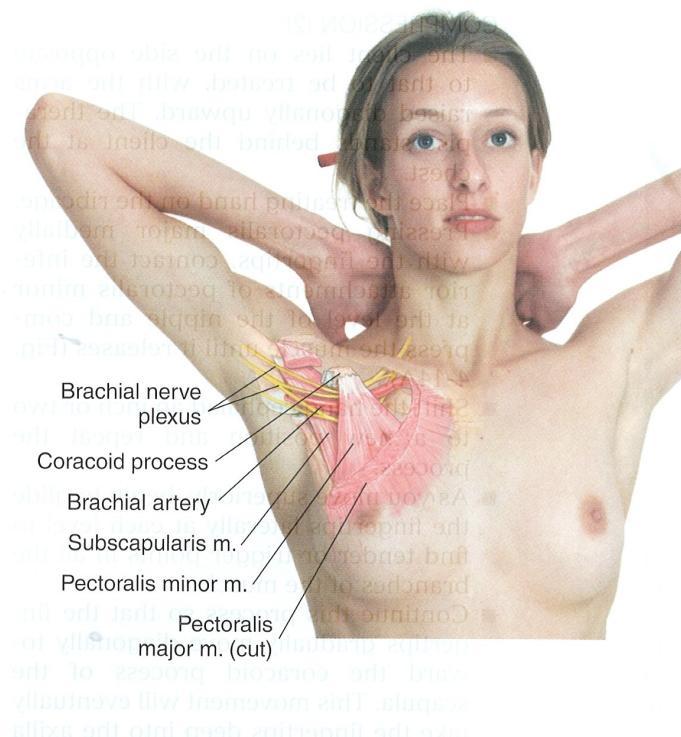


Figure 4-9 Pectoralis minor



Manual Therapy

STRIPPING

- The client lies supine, with the arm nearest the therapist slightly abducted and bent at the elbow.
- The therapist stands beside the client's shoulder.
- Place the fingertips on the ribcage just lateral to the pectoralis major slightly superior to the nipple, with your fingers pointing diagonally across the chest below the nipple.
- Push the fingers under the pectoralis major along the ribcage until they encounter the attachment of pectoralis minor to the fifth rib.
- Pressing your fingertips against the muscle, turn your arm and hand so that the fingertips glide along the muscle from an inferior to superior position (Fig. 4-11).
- Move your hand up to a point just below the axilla and repeat the procedure, with the fingertips finally pressing deeply into the axilla under the pectoralis major, contacting the attachment of pectoralis minor to the coracoid process (Fig. 4-12).



Figure 4-10 Position of brachial nerves and vessels relative to pectoralis minor

COMPRESSION (1)

- The client lies on the side opposite to that to be treated, with the arms raised diagonally upward. The therapist stands in front of the client at the chest.
- Place the treating hand on the ribcage with the thumb on the most inferior attachment of the muscle, in line with the nipple. The treating hand and thumb may be supported with the other hand and thumb.
- Compress the muscle with the thumb until it releases.



Figure 4-11 Treatment of pectoralis minor in supine position (Draping option #3)



Figure 4-12 Compression of pectoralis minor attachment to coracoid process (Draping option #3)

- Shift the hand cephalad an inch or two to a new position and repeat the process.
- As you move superiorly, begin to glide the thumb laterally at each level to find tender or trigger points in all the branches of the muscle (Fig. 4-13).
- Continue this process so that the thumb gradually moves diagonally toward the coracoid process of the scapula. This movement will eventually take the thumb deep into the axilla, where you should carefully seek out the attachment to the coracoid process deep in the axilla (see Caution on page 124).

COMPRESSION (2)

- The client lies on the side opposite to that to be treated, with the arms raised diagonally upward. The therapist stands behind the client at the chest.
- Place the treating hand on the ribcage.
- Pressing pectoralis major medially with the fingertips, contact the inferior attachments of pectoralis minor at the level of the nipple and compress the muscle until it releases (Fig. 4-14A).
- Shift the hand cephalad an inch or two to a new position and repeat the process.
- As you move superiorly, begin to glide the fingertips laterally at each level to find tender or trigger points in all the branches of the muscle.
- Continue this process so that the fingertips gradually move diagonally toward the coracoid process of the scapula. This movement will eventually take the fingertips deep into the axilla (Fig. 4-14B), where you should carefully seek out the attachment to the coracoid process deep in the axilla (see Caution on page 124).
- Compression may also be performed with the thumb on a client in supine position (Fig. 4-15).



Figure 4-13 Treating pectoralis minor in sidelying position (Draping option #15)



Figure 4-14 Sidelying treatment of pectoralis minor from behind client from starting position (A) to final position (B) (Draping option #15)



Figure 4-15 Compression of pectoralis minor with thumb (Draping option #3)

- As the fingertips move into the axilla, turn the hand gradually so that the fingertips are pointing superiorly into the axilla, finally encountering the attachment of the muscle to the coracoid process of the scapula.



Figure 4-16 Compression of pectoralis minor on seated client (Draping option #16)

- The client sits upright and the therapist stands behind the client. The client's forearm on the side to be treated rests at the side, with the arm slightly abducted and rotated medially to slacken pectoralis major.
- Place the non-treating hand on the client's shoulder contralateral (on the opposite side) to the side to be treated.
- Place the treating hand on the client's ribcage, sliding the fingertips under pectoralis major at the level of the nipple.
- Compress the muscle at that level, holding until release (Fig. 4-16).
- Move the treating hand to a position just superior to the last, repeating the above procedure.
- At each level, glide the fingertips outward to contact all the branches of the muscle.

Levator Scapulae

Ie-VAY-ter SKAP-you-lay

Etymology Latin *levator*, raiser + *scapulae*, of the shoulderblade

Overview

After trapezius, levator scapulae (Fig. 4-17) is probably the most common site of pain and tightness in the neck and shoulders. It is one of the muscles most abused by the carrying of heavy backpacks and shoulder bags. It assists trapezius in raising the scapula and the rhomboids in rotating the glenoid fossa downward.



Attachments

- Superiorly, to posterior tubercles of transverse processes of four upper cervical vertebrae
- Inferiorly, to superior angle of scapula

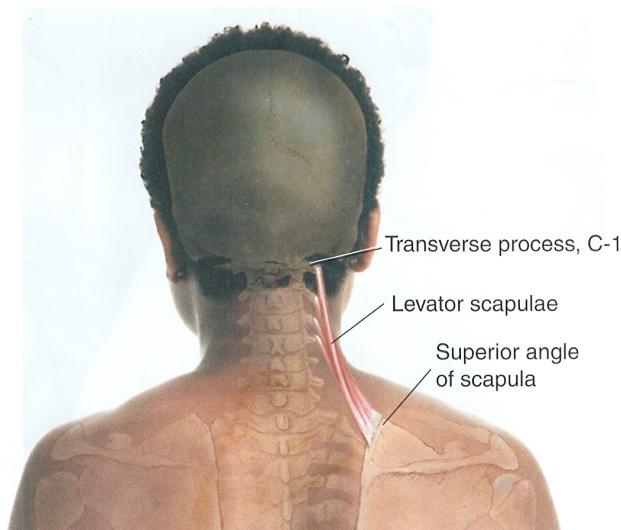


Figure 4-17 Levator scapulae



Actions

Raises the scapula



Referral Area

Locally over the muscle, along the medial border of the scapula, across the upper scapula to the back of the upper arm



Other Muscles to Examine

- Rhomboids
- Trapezius
- Supraspinatus
- Posterior neck muscles



Manual Therapy

STRIPPING (1)

- The client lies prone.
- The therapist stands at the side of the client's head to be treated, facing the shoulder.
- Place the thumb of the treating hand on the neck over the transverse processes of the cervical vertebrae.
- Pressing firmly medially and deeply, glide the thumb inferiorly along the muscle all the way to its attachment on the superior angle of the scapula (Fig. 4-18).



Figure 4-18 Stripping massage of levator scapulae (1) (Draping option #7)

STRIPPING (2)

- The client lies prone.
- The therapist stands at the client's side, facing diagonally toward the client's opposite shoulder.
- Place the treating hand on the near shoulder of the client with the thumb resting on the attachment of levator

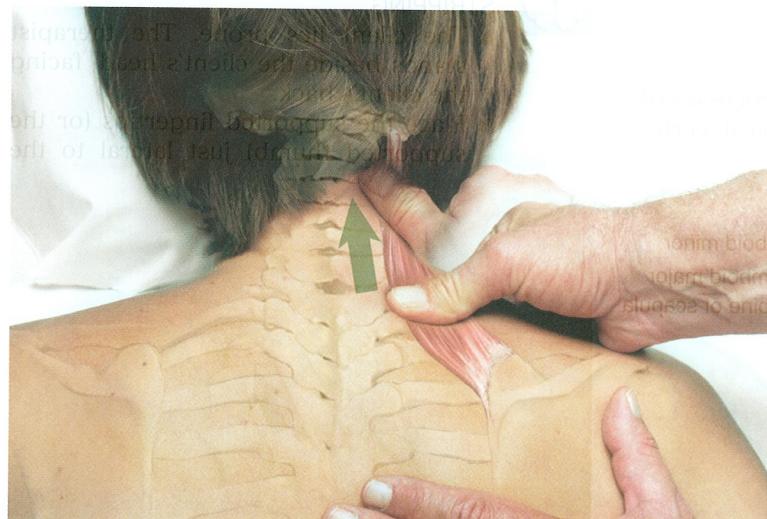


Figure 4-19 Stripping massage of levator scapulae (2) (Draping option #7)

scapulae at the superior angle of the scapula.

- Pressing firmly medially and deeply, glide the thumb superiorly toward the neck, following the muscle all the way to its attachment to the transverse processes of the cervical vertebrae (Fig. 4-19).

Rhomboids Major and Minor

ROM-boydz

Etymology Greek *rhombo*, an oblique parallelogram, but having unequal sides + *eidos*, resembling

Overview

The rhomboids (Fig. 4-20) are a major source of upper back pain. They rotate the scapula to lower the glenohumeral joint, and they retract the scapula. Keep in mind that they are in constant tension with the forces of the chest muscles, which pull the shoulder forward. Therefore, rhomboid tightness is almost always associated with tightness in the pectoral muscles.



Attachments

RHOMBOID MAJOR

- Above, to the spinous processes and corresponding supraspinous ligaments of the first four thoracic vertebrae
- Below, to the medial border of scapula below spine.

RHOMBOID MINOR

- Superiorly, to the spinous processes of the sixth and seventh cervical vertebrae

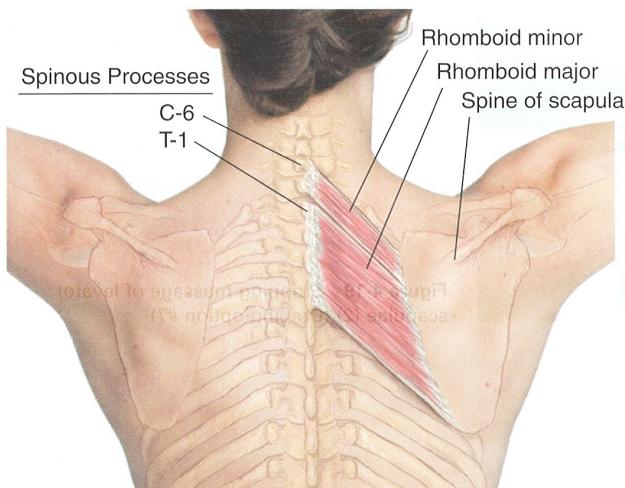


Figure 4-20 Rhomboids major and minor

- Inferiorly, to the medial margin of the scapula above the spine

Actions

Draws scapula toward vertebral column; minor also draws slightly upward.



Referral Area

Along the medial border of the scapula and over the superior angle of the scapula



Other Muscles to Examine

- Serratus posterior superior
- Levator scapulae
- Thoracic paraspinal muscles



Manual Therapy

STRIPPING

- The client lies prone. The therapist stands beside the client's head, facing the client's back.
- Place the supported fingertips (or the supported thumb) just lateral to the



Figure 4-21 Stripping massage of the rhomboids (Draping option #7)



Figure 4-22 Rhomboid stretch, prone (Draping option #7)

spinous process of the sixth cervical vertebra.

- Pressing deeply, glide the fingertips (or thumb) slowly diagonally until you encounter the medial border of the scapula (Fig. 4-21).
- Place the fingertips (or thumb) at a point just below the previous starting point and repeat the above process.
- Repeat the process until you have reached the inferior angle of the scapula.

COMPRESSION/STRETCH

- The client lies prone. The therapist stands beside the client's head, facing the client's back.
- Place the fingertips at the medial border of the scapula, pointing laterally.
- With the other hand, lift the client's shoulder at the glenohumeral joint while inserting the fingertips under the scapula (Fig. 4-22).

COMPRESSION/STRETCH

- The client is seated, and the therapist sits next to the client.
- Place the hand flat on the back, the index finger aligned with the medial border of the scapula.
- With the other hand, press back on the client's shoulder at the glenohumeral joint while pressing the index finger under the medial border of the scapula (Fig. 4-23).



Figure 4-23 Stretch of rhomboids, client seated (Draping option #16)

Latissimus Dorsi

La-TISS-imus DOR-see

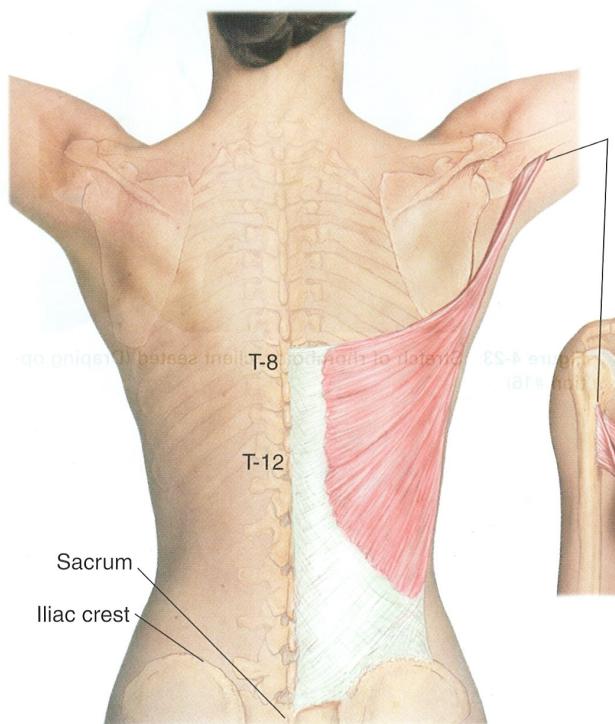
Etymology Latin *latissimus*, widest (from *latus*, wide) + *dorsi*, of the back (from *dorsum*, back)

Overview

A large and powerful muscle, **latissimus dorsi** (Fig. 4-24) allows us to pull ourselves up by the arms (or pull things down and back with the arms, e.g., paddling a canoe). It covers the lower posterior torso as trapezius covers the upper posterior torso: it extends up the back and side, and attaches to the anterior aspect of the upper arm, thus anchoring the arm to the low back and pelvis. With teres major, it forms the muscle bundle that defines the posterior border of the axilla.

Attachments

- Inferiorly, to the spinous processes of the lower five or six thoracic and the lumbar vertebrae, to the median ridge of sacrum, and to the outer lip of the iliac crest



- Superiorly, with teres major into the medial lip of the bicipital groove of the humerus.

Actions

Adducts arm, rotates it medially, and extends it

Referral Areas

- Around the inferior angle of the scapula, across the scapula to the axilla, and down the back of the arm to the last two fingers
- Over the anterior deltoid
- On the side at the waist

Other Muscles to Examine

- Serratus posterior inferior
- Teres major
- Teres minor
- Pectoralis minor
- Serratus anterior
- Interior and exterior obliques

Figure 4-24 Latissimus dorsi

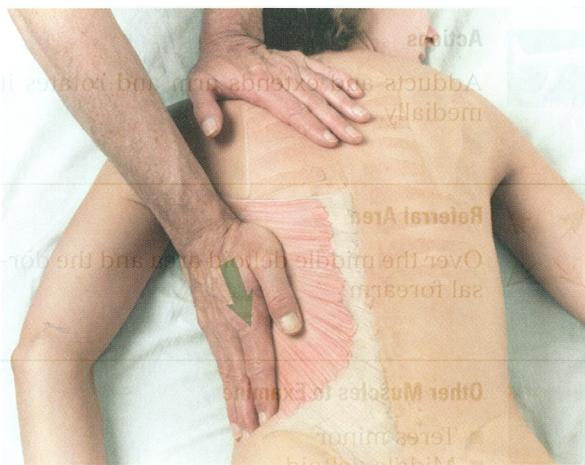


Figure 4-25 Stripping massage of latissimus dorsi (Draping option #7)



Manual Therapy

STRIPPING

- The client lies prone.
- The therapist stands at the client's head on the side to be treated.
- Place the heel of the hand (or the knuckles or supported fingertips) lateral to the lateral border of the scapula just below the axilla.



Figure 4-26 Pincer compression of latissimus dorsi (Draping option #7)

■ Pressing deeply, glide the hand inferomedially all the way to the iliac crest (Fig. 4-25).

■ Repeat the above process, gliding your hand to a more medial position on the iliac crest each time, then diagonally across to the spine, ending about a third of the way up the spine.

PINCER COMPRESSION

■ The client may be prone or seated. The therapist stands beside the client if prone, or behind the client if seated, facing the axilla on the side to be treated.

■ Grasp the bundle of muscles that form the rear border of the axilla (latissimus dorsi and teres major).

■ Squeeze firmly. Explore the posterior aspect of the bundle with your thumb, compressing as needed and holding for release (Fig. 4-26). Explore the anterior aspect of the bundle with your fingertips, compressing and holding for release as needed.

■ Note that there is a trigger point frequently found in the muscle near the bottom of the bundle; examine in particular for this trigger point and compress as needed. (Fig. 4-27)

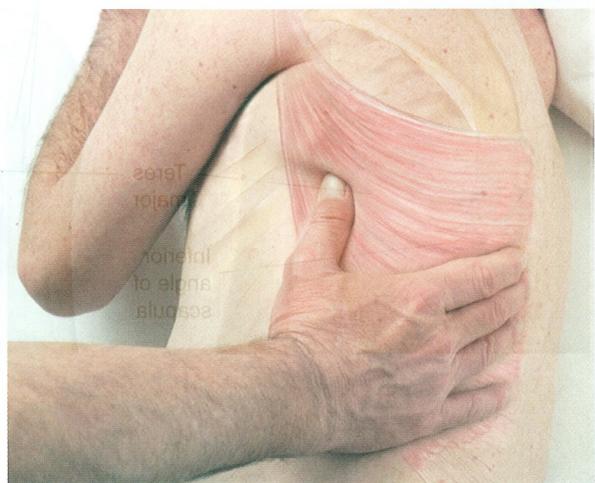


Figure 4-27 Trigger point compression in latissimus dorsi (Draping option #7)

Teres Major

TERR-ease

Etymology Latin *teres*, round and long + *major*, greater

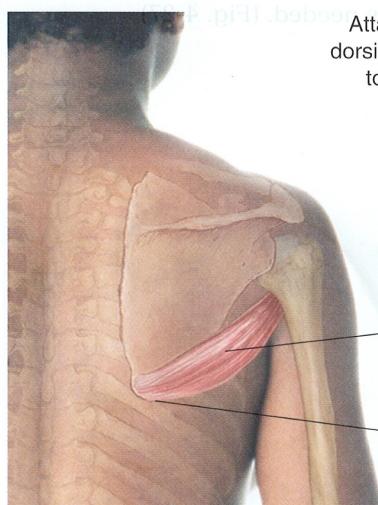
Overview

Teres major (Fig. 4-28) works with latissimus dorsi, exerting its force from the scapula. These two muscles form the bundle of muscle tissue that passes into the axilla from the scapula and attaches to the front of the upper humerus. This bundle forms the rear border of the armpit.

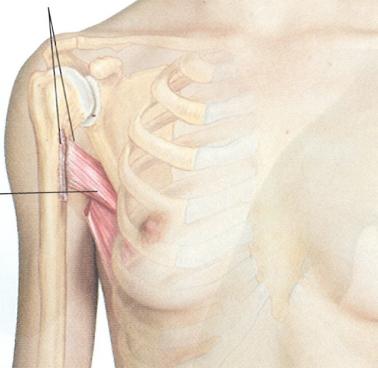


Attachments

- Medially, to the inferior angle and lower third of the lateral border of the scapula
- Laterally, to the medial border of the bicipital groove of the humerus.



Attachment of latissimus dorsi (cut) and teres major to medial lip of bicipital groove of humerus



Actions

Adducts and extends arm and rotates it medially.



Referral Area

Over the middle deltoid area and the dorsal forearm



Other Muscles to Examine

- Teres minor
- Middle deltoid
- Infraspinatus
- Latissimus dorsi



Manual Therapy

PINCER COMPRESSION

- The client may be prone or seated. The therapist stands beside the client if

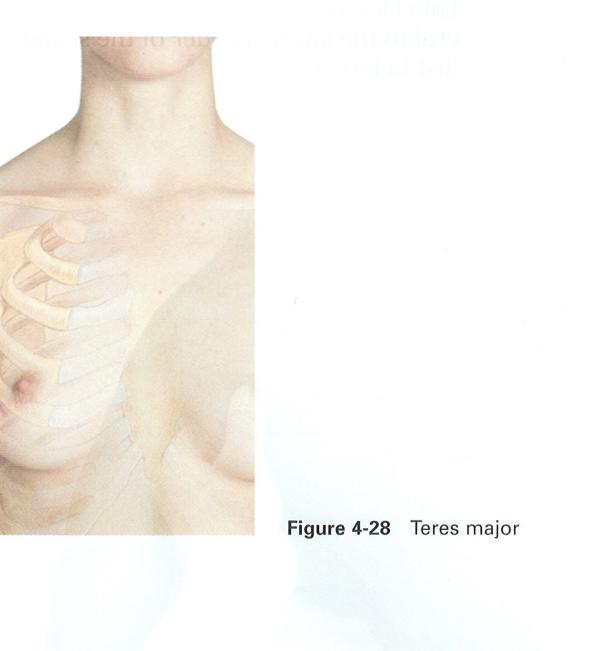


Figure 4-28 Teres major



Figure 4-29 Pincer compression of teres major (Draping option #7)

- To get prone, or behind the client if seated, facing the axilla on the side to be treated.
- Grasp the bundle of muscles that form the rear border of the axilla (latissimus dorsi and teres major).
- Find teres major just superior and medial to latissimus dorsi.
- Squeeze firmly. Explore the posterior aspect of the bundle with your thumb, compressing as needed and holding for release (Fig. 4-29). Explore the anterior aspect of the bundle with your fingertips, compressing and holding for release as needed.
- Work the bundle with a kneading motion between your thumb and fingertips.

STRIPPING

- The client lies prone. The therapist stands beside the client, facing the shoulder to be treated.
- Place the thumb of the treating hand against the lateral border of the scapula near the inferior angle (Fig. 4-30).
- Pressing deeply and medially, glide the thumb superiorly toward the axilla. Continue until your thumb reaches the humerus.

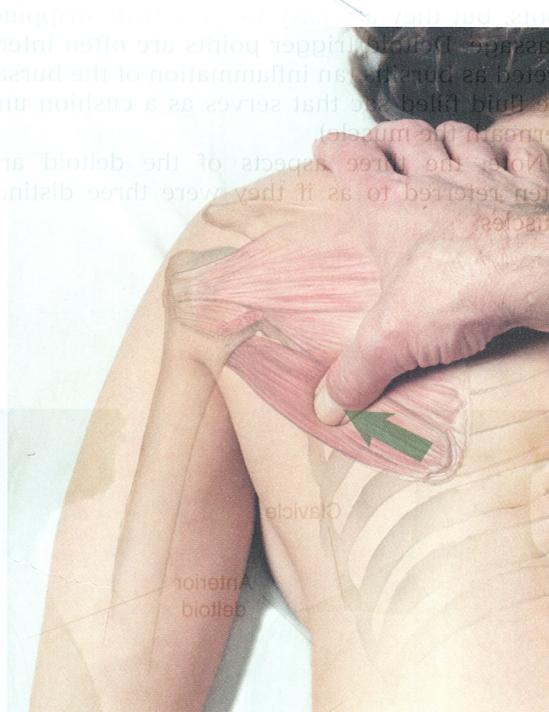


Figure 4-30 Stripping massage of teres major (Draping option #7)

Deltoid

DEL-toyd

Etymology Resembling the Greek letter *delta* (i.e., triangular)

Overview

The three aspects of the deltoid (Fig. 4-31) cap the shoulder over the head of the humerus and provide much of the force that initiates movement of the arm forward, backward, and away from the body. This three-sided arrangement makes the anterior and posterior aspects of the deltoid antagonists to each other. The middle deltoid works closely with supraspinatus in abduction. The deltoids are common problem spots, but they are easy to treat with stripping massage. Deltoid trigger points are often interpreted as bursitis (an inflammation of the bursa, the fluid filled sac that serves as a cushion underneath the muscle).

Note: the three aspects of the deltoid are often referred to as if they were three distinct muscles.

Attachments

- Medially, to the lateral third of the clavicle, the lateral border of the acromion process, the lower border of the spine of the scapula
- Laterally, to the lateral side of the shaft of the humerus a little above its middle (deltoid tuberosity).

Actions

Abduction, flexion, extension, and rotation of arm.

Referral Area

Radiating locally over the area of the muscle

Other Muscles to Examine

- Rotator cuff muscles, especially infraspinatus
- Teres major
- Pectoralis major

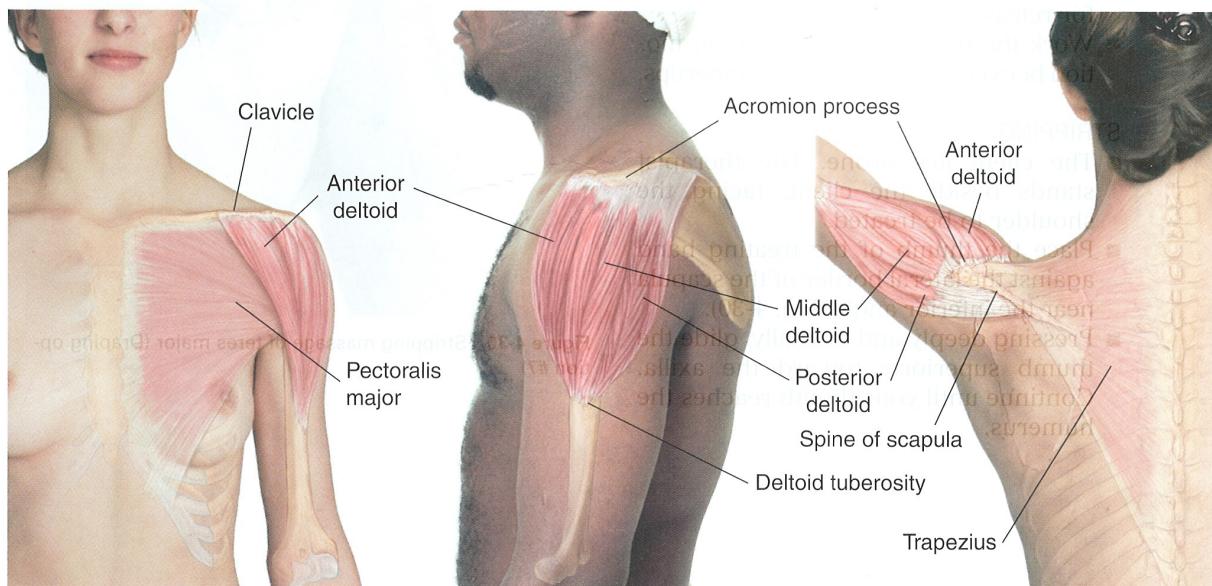


Figure 4-31 Deltoid anatomy



Manual Therapy

STRIPPING (FIG. 4-32)

- The client lies supine. The therapist stands beside the client's head, facing the shoulder to be treated.
- Place the knuckles, fingertips or thumb on the most superior aspect of the anterior deltoid at its medial border.
- Pressing deeply, glide inferiorly over the muscle to its attachment on the humerus.

Medially to the superior fibers of the latissimus dorsi and teres major muscles, which are inserted into the medial border of the humerus.

- Reposition the hand laterally and repeat this procedure, moving onto the lateral deltoid and turning the hand as necessary.
- Continue repeating this procedure with the hand moving underneath the shoulder onto the posterior deltoid and pressing upward, until the entire deltoid has been treated.
- You may treat the posterior deltoid when the client is lying prone.



Figure 4-32 Stripping massage of all aspects of the deltoid: (from left) anterior (A), middle (knuckles) (B), middle (fingertips) (C), and posterior (D) (Draping options #2, #7)

THE ROTATOR CUFF

The rotator cuff is probably best known for its frequent injury in athletes, particularly baseball pitchers and football quarterbacks, because of the demands made on it by forceful throwing. The rotator cuff takes its name from the “cuff” of tendons of these four muscles that attach side by side at the head of the humerus. The traditional acronym for remembering the rotator cuff muscle is SITS: supraspinatus, infraspinatus, teres minor, and subscapularis.

Supraspinatus

SOUP-ra-spin-**A**TE-us

Etymology Latin *supra*, above + *spina*, spine; “above the spine (of the scapula)”

Overview

Supraspinatus (Fig. 4-33) is a surprisingly small muscle given the demands that are made on it. It functions with the middle deltoid in abduction of the arm, but most of its problems arise from its job as stabilizer of the glenohumeral joint. It is active in this capacity during all rotator cuff activi-

ties, such as holding a heavy weight in the hand, or working with the arms raised. People who carry heavy objects such as suitcases or even heavy briefcases are likely to have problems with supraspinatus. Repetitive motions also cause rotator cuff problems, such as using a computer mouse for long periods of time.

Attachments

- Medially, to the supraspinous fossa of scapula
- Laterally, to the greater tubercle of the humerus.

Actions

Initiates abduction of arm

Referral Area

Over the shoulder, over the middle deltoid area, and down the radial aspect of the arm

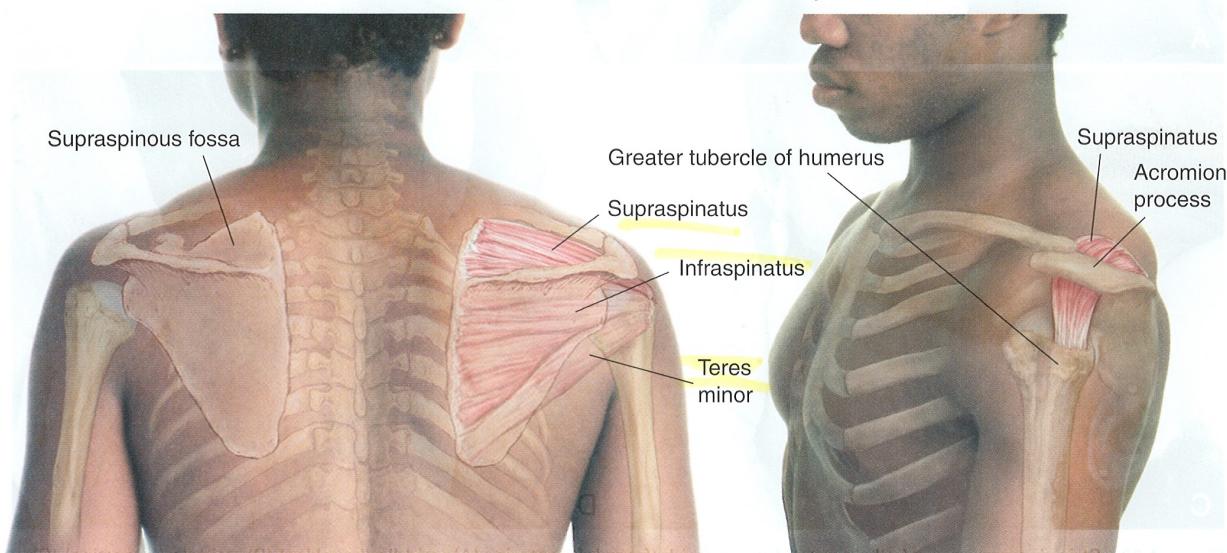


Figure 4-33 Supraspinatus



Figure 4-34 Stripping massage of supraspinatus (Draping option #7) (© 2009 Lippincott Williams & Wilkins)

Other Muscles to Examine

- Middle deltoid
- Other rotator cuff muscles, especially infraspinatus



Manual Therapy

STRIPPING

- The client lies prone. The therapist stands beside the client's head on the side to be treated.
- Place the thumb of the treating hand on the medial end of the muscle at the superior angle of the scapula (Fig. 4-34).



Figure 4-35 Stripping of supraspinatus with elbow (Draping option #7) (© 2009 Lippincott Williams & Wilkins)

- Pressing deeply and inferiorly, move the thumb laterally along the muscle, pressing it into the trough formed by the spine of the scapula, until your thumb is stopped by the acromion process.
- This procedure may also be done with the fingertips or elbow (Fig. 4-35).

COMPRESSION

- The client may be prone or seated. The therapist stands beside the client.
- The client's hand on the side to be treated is placed behind the client's back at the waist to internally rotate the shoulder (Fig. 4-36A).
- Press the thumb deeply through the middle deltoid just under the acromion process until you encounter the attachment of the supraspinatus tendon to the head of the humerus. Hold for release (Fig. 4-36B).



A



B

Figure 4-36 Compression of supraspinatus attachment (Draping option #7) (© 2009 Lippincott Williams & Wilkins)

Infraspinatus**IN-fra-spin-ATE-us**

Etymology Latin *infra*, below + *spina*, spine, hence "below the spine (of the scapula)"

(ICD-9-CM 950.00; ICD-10-CM M54.0)

Overview

Infraspinatus (Fig. 4-37) is a lateral rotator and a stabilizer of the glenohumeral joint during arm movements. It is a common trouble spot, most often referring pain to the outer aspect of the upper arm from trigger points along the scapular spine and the medial border of the scapula.

(ICD-9-CM 950.00; ICD-10-CM M54.0)

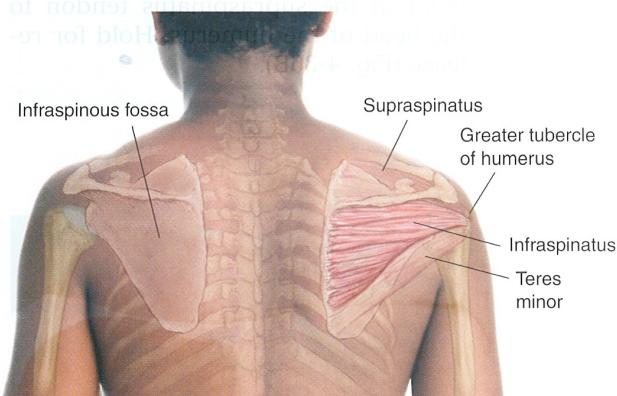
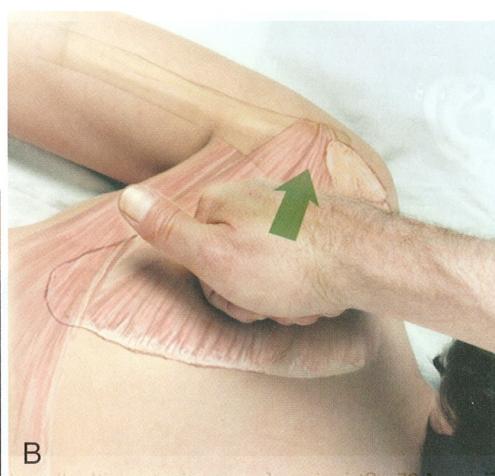


Figure 4-37 Infraspinatus



A



B

Figure 4-38 Stripping massage of infraspinatus with fingertips (A) and knuckles (B) (Draping option #7)

Attachments

- Medially, to the infraspinous fossa of the scapula
- Laterally, to the greater tubercle of humerus

Actions

Extends the arm and rotates it laterally

Referral Area

Along the medial border of the scapula, over the middle and/or anterior deltoid area, and down the radial aspect of the arm into the first two or three fingers

Other Muscles to Examine

- Deltoids
- Other rotator cuff muscles
- Biceps brachii
- Coracobrachialis

Manual Therapy**STRIPPING (1)**

- The client lies prone. The therapist stands at the client's shoulder opposite



Figure 4-39 Stripping massage of infraspinatus from inferior angle (Draping option #7)

the side to be treated, facing the shoulder to be treated.

- Place the fingertips (Fig. 4-38A), knuckles (Fig. 4-38B), or supported thumb on the muscle at the medial border of the scapula just below the root of the scapular spine.
- Pressing deeply, glide laterally along the muscle just inferior to the spine of the scapula all the way to the attachment on the posterior aspect of the head of the humerus.
- Place the hand just inferior to the prior starting point and repeat the above procedure. Continue along the scapula inferiorly, shifting the angle as necessary, until the entire muscle has been treated.

sary, until the entire muscle has been treated.

STRIPPING (2)

- The client lies prone. The therapist stands at the client's side, facing the scapula.
- Place the thumb on the scapula at the inferior angle.
- Pressing firmly into the muscle, glide the thumb up the lateral border of the scapula (Fig. 4-39) to the spine, then follow the muscle to the humerus.
- Either of the two procedures above may also be performed with the elbow (Fig. 4-40).

COMPRESSION

- The client lies prone. The therapist stands by the client's shoulder to be treated, facing the shoulder.
- Place the thumb on the muscle at its medial edge just inferior to the root of the spine of the scapula and press deeply.
- Repeat the procedure shifting the position of your thumb laterally, holding for release as necessary.
- When you have reached the lateral edge of the scapula, begin shifting the position of your thumb inferiorly along the lateral border of the scapula in the same way until you reach the inferior angle of the scapula (Fig. 4-41).

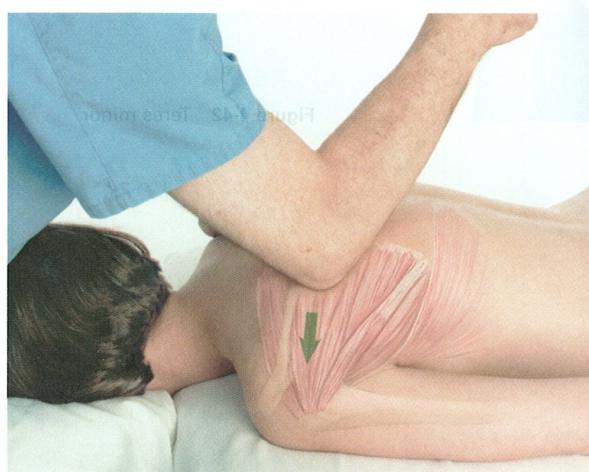


Figure 4-40 Stripping of infraspinatus with the elbow (Draping option #7)



Figure 4-41 Compression of infraspinatus (Draping option #7)

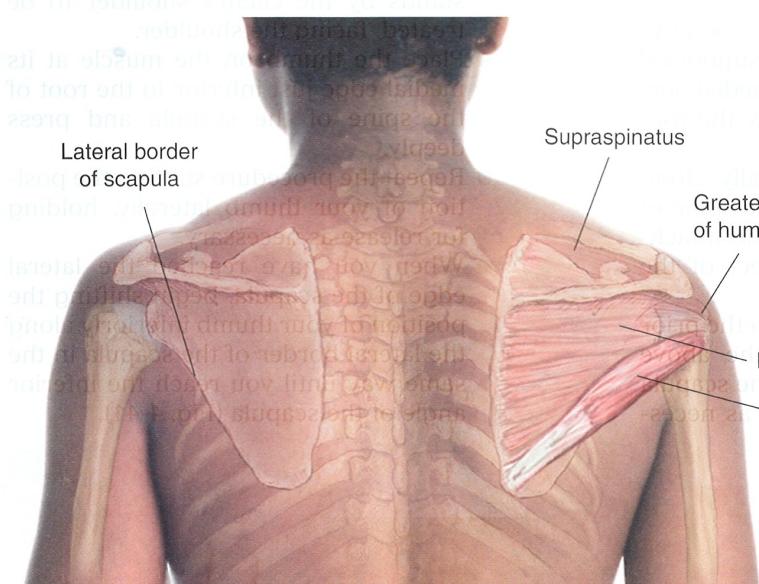
Teres Minor

TERR-ease

Etymology Latin *teres*, round and smooth

Overview

Teres minor (Fig. 4-42) is essentially an adjunct muscle to infraspinatus. It has the same function and, when it has trigger points, refers to the same area (outer aspect of the upper arm).



Attachments

- Medially, to the upper two-thirds of the lateral border of scapula
 - Laterally, to the greater tubercle of the humerus just below the infraspinatus

Actions

Adducts arm and rotates it laterally

Figure 4-42 Teres minor

**Referral Area**

Over the outer, upper arm
lateral rotator cuff and infraspinatus

**Other Muscles to Examine**

- Other rotator cuff muscles, especially infraspinatus
- Teres major
- Middle deltoid

**Manual Therapy****STRIPPING**

- The client lies prone. The therapist stands at the client's side to be treated, facing the client's shoulder.
- Use the thumb to find the muscle around the midpoint of the lateral edge of the scapula, between teres major and infraspinatus (Fig. 4-43).
- Pressing deeply with the supported thumb, glide along the muscle all the way to its attachment on the posterior aspect of the humerus.

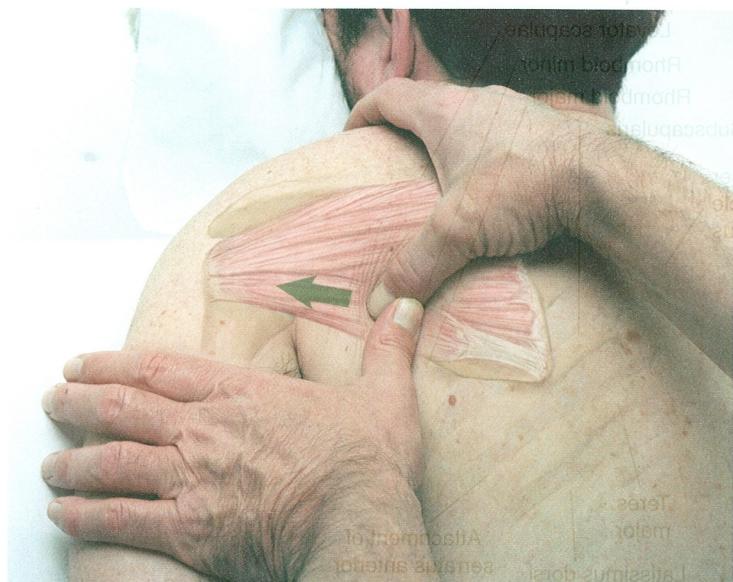


Figure 4-43 Stripping massage of teres minor (Draping option #7)

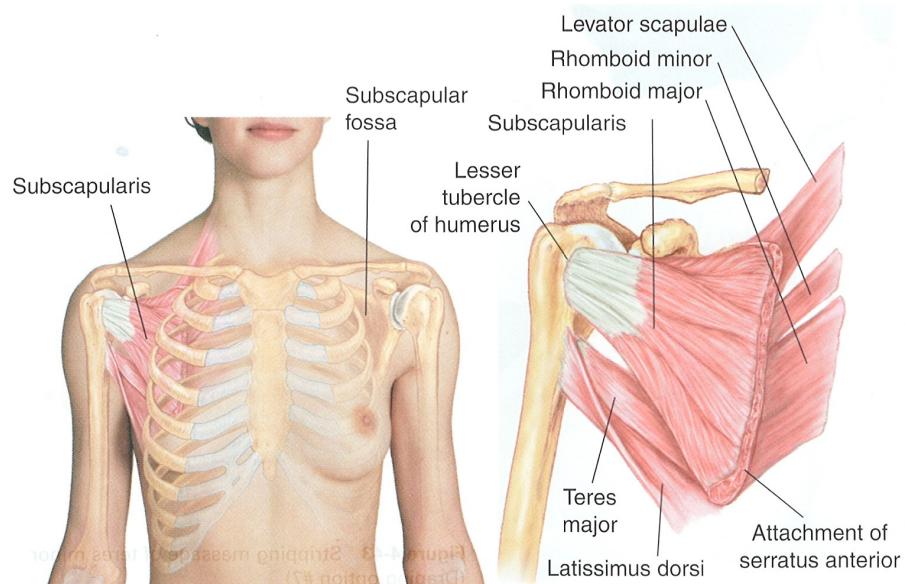
Subscapularis

SUB-SCAP-you-LAIR-iss

Etiology Latin *sub*, under + *scapula*, shoulderblade

Overview

Subscapularis (Fig. 4-44) is a medial rotator of the shoulder and a stabilizer of the glenohumeral joint. It is stressed in heavy or repetitive lifting. An inability to raise the arm fully overhead can be a sign of a tight subscapularis.



Attachments

- Medially, to the subscapular fossa
- Laterally, to the lesser tubercle of humerus.

Actions

- Rotates arm medially

Figure 4-44 Subscapularis

**Referral Area**

Over the scapula, behind the axilla, along the posterior arm, and into the wrist

**Other Muscles to Examine**

- Other rotator cuff muscles
- Teres major

**Manual Therapy****STRIPPING (1)**

- The client lies prone. The therapist stands at the client's side, facing the shoulder to be treated.

- Abduct the client's arm, bending it at the elbow, and internally rotating it (palm up), to about 45°.
- Place the non-treating hand on the medial border of the scapula, pressing the scapula laterally and superiorly.
- Place the fingertips of the treating hand under the muscle bundle forming the rear boundary of the axilla, pressing medial to the bundle into subscapularis. (Fig. 4-45)
- Pressing firmly into the muscle, glide the fingertips from the superior to the inferior aspect of the muscle (or vice versa, according to what works best for you), covering as much of the muscle as possible.



Figure 4-45 Stripping massage of subscapularis (1)
(Draping option #7)

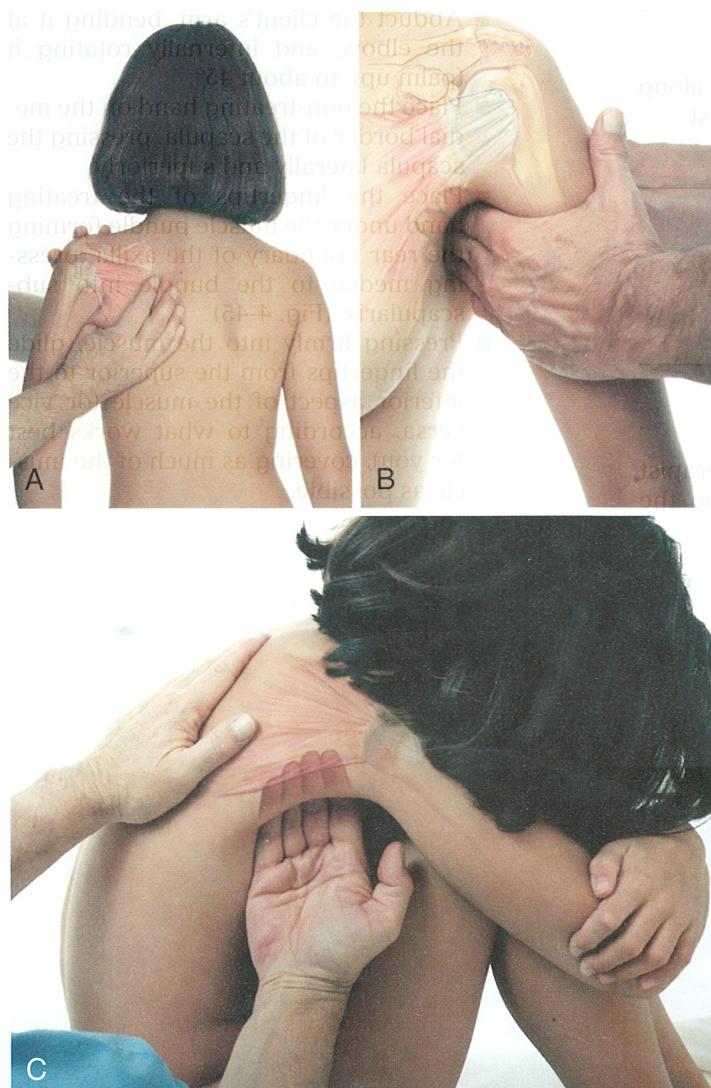


Figure 4-46 Accessing subscapularis with client seated: with thumb (A), with fingertips (B), with client's hips and knees flexed and arms wrapped around knees (C) (Draping option #16)



Figure 4-47 Compression of inferior aspect of subscapularis (Draping option #7)

- This technique may also be performed with the client sitting on the side of the table, using the thumb (Fig. 4-46A) or the fingertips (Fig. 4-46B), or with legs drawn up and arms wrapped around legs (Fig. 4-46C).

COMPRESSION

- To reach the inferior portion of the muscle, bend the client's arm at the elbow 45° behind the back.
- Lift the shoulder with your far hand.
- Insert the fingertips of your near hand underneath the inferior angle of the scapula and press upward. (Fig. 4-47)

STRIPPING (2)

- The client lies supine with the arm abducted. The therapist stands at the client's side, facing the shoulder.



Figure 4-48 Stripping massage of subscapularis (2) (Draping option #3)

- Place the far hand under the client's scapula with the fingertips hooked over the medial border, pulling the scapula laterally.
- With the fingertips of the near hand, press firmly just under the axilla into the underside of the scapula. (Fig. 4-48)
- Glide the fingertips slowly inferiorly or superiorly along the muscle.

MUSCLES OF THE RIBS

Serratus Anterior

serr-RATE-us an-TIER-ee-yore

Etymology Latin *serra*, saw + *anterior*, more toward the front

Overview

Serratus anterior (Fig. 4-49) works with the pectoral muscles and opposes the rhomboids. It can

produce pain in the side of the chest and down the arm in a pattern similar to that of pectoralis minor, and it is most easily treated along with that muscle.

Attachments

- Inferiorly, to the center of the lateral aspect of the first eight to nine ribs
- Superiorly, to the superior and inferior angles and intervening medial margin of scapula

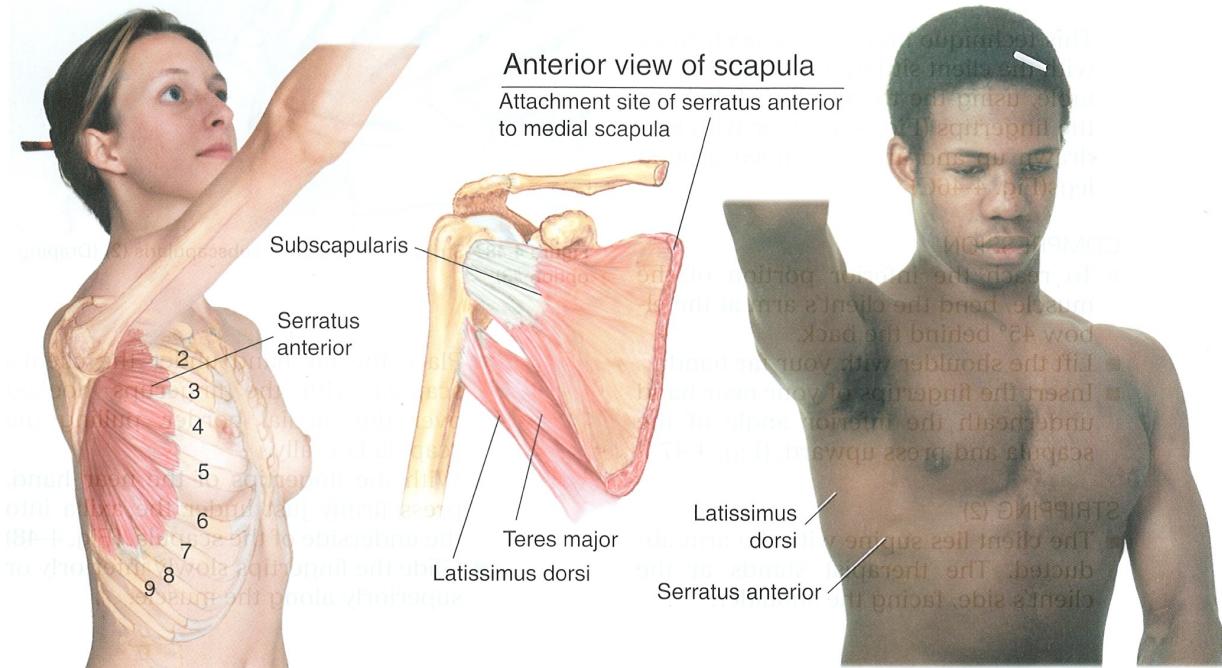


Figure 4-49 Serratus anterior

**Actions**

The deltoid is endurance

Rotates the scapula and pulls it forward; elevates the ribs

Contractile

**Referral Area**

To the side of the chest at the middle of the rib cage, down the ulnar aspect of the arm to the last two fingers, and just medial to the inferior angle of the scapula

**Other Muscles to Examine**

- Latissimus dorsi
- Teres major
- Pectoralis minor
- Rhomboids

**Manual Therapy****STRIPPING**

- The client lies on the side contralateral to that to be treated. The therapist stands in front of the client's chest.
- Place one hand on the side of the client's ribcage, with the fingers lying over the scapula and the thumb resting on the ninth rib.
- Pressing deeply, glide the thumb in an arc toward the scapula until it reaches the inferior angle.
- Shift the thumb one rib superiorly and repeat the process (Fig. 4-50), each time ending slightly more superiorly on the lateral border of the scapula. As you encounter the bundle of muscles that forms the posterior boundary of the axilla, let your thumbs slip under the bundle to the scapula.

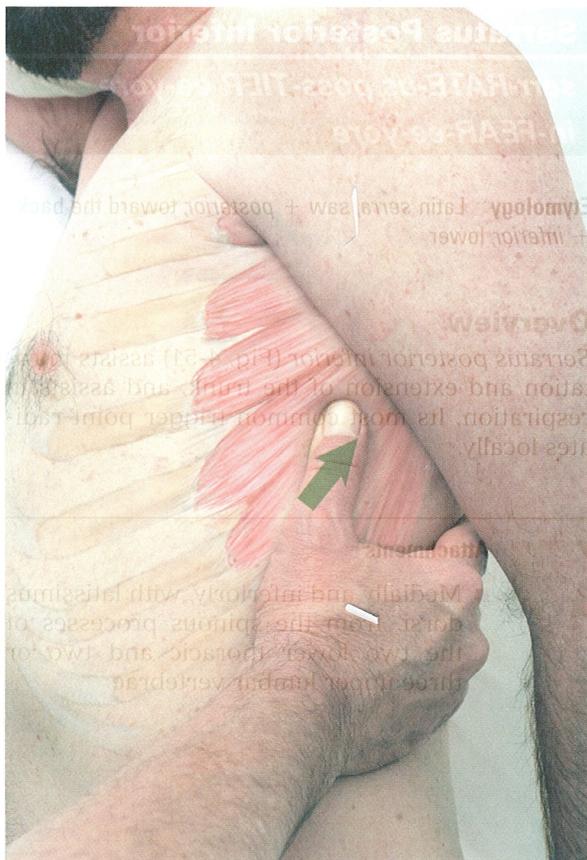


Figure 4-50 Stripping massage of serratus anterior in sidelying position (Draping option #15)

Serratus Posterior Inferior

**serr-RATE-us poss-TIER-ee-yore
in-FEAR-ee-yore**

Etymology Latin *serra*, saw + *posterior*, toward the back + *inferior*, lower

Overview

Serratus posterior inferior (Fig. 4-51) assists in rotation and extension of the trunk, and assists in respiration. Its most common trigger point radiates locally.



Attachments

- Medially and inferiorly, with latissimus dorsi, from the spinous processes of the two lower thoracic and two or three upper lumbar vertebrae

- Laterally and superiorly, to the lower borders of the last four ribs

Actions

- Draws lower ribs backward and downward



Referral Area

- Radiating locally over the muscle



Other Muscles to Examine

- Quadratus lumborum
- Iliocostalis thoracis
- Psoas major
- Rectus abdominis
- Pyramidalis
- Diaphragm

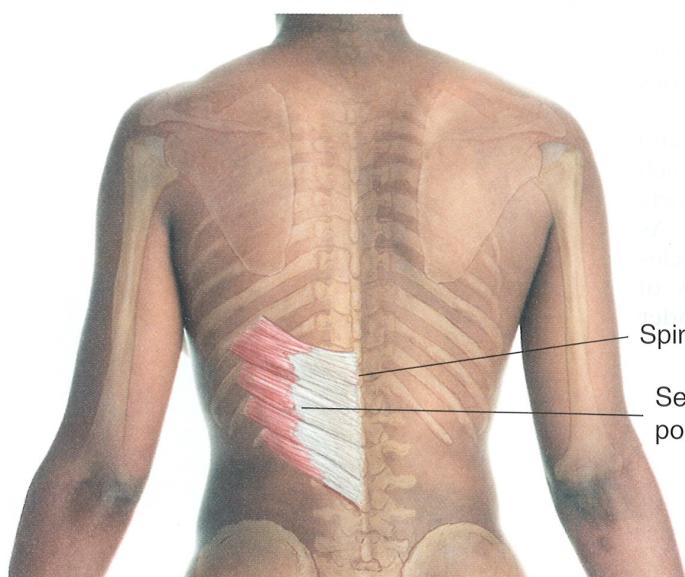


Figure 4-51 Serratus posterior inferior

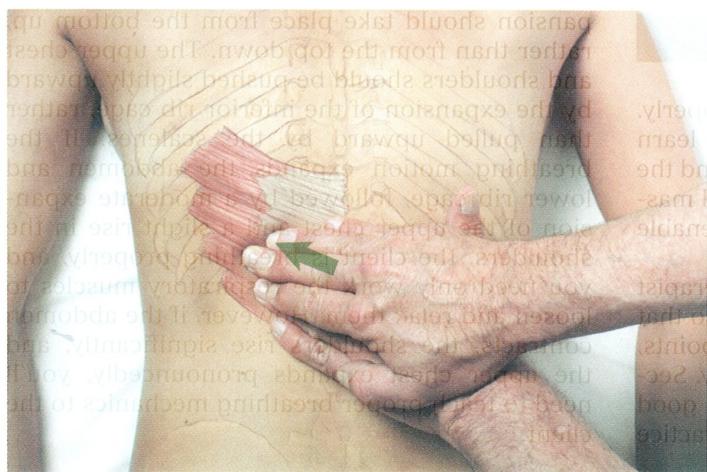


Figure 4-52 Stripping massage of serratus posterior inferior (Draping option #7)

Manual Therapy

STRIPPING

- Client lies supine; therapist stands at client's hips on side contralateral to that to be treated.
- Place your supported fingertips at the upper lumbar vertebrae.
- Press deeply into muscle, moving the fingertips diagonally (inferiorly and laterally) over the lower two ribs.



Figure 4-53 Compression of trigger point in serratus posterior inferior with thumb (Draping option #7)

- Move the fingertips up to the lowest two thoracic vertebrae and repeat (Fig. 4-52).
- In place of the fingertips, the thumb, elbow, or knuckles may be used.

COMPRESSION

- Palpate the area over the muscle with thumb or supported fingertip until the client reports a sharp, radiating pain.
- Compress that point with the thumb or elbow until the pain eases (Fig. 4-53).

Muscles of Breathing

Many, if not most, people do not breathe properly. There are many theories about why people learn improper breathing skills, but they are beyond the scope of this book. Nevertheless, the clinical massage therapist is in an excellent position to enable clients to relearn breathing skills.

Two things are necessary: first, the therapist should work on the muscles of respiration so that they are free of constrictions and trigger points, have good muscle tone, and can move freely. Second, the therapist should teach the client good breathing skills and urge the client to practice them outside of therapy.

Most people tend to breathe from the neck, shoulders, and upper chest, allowing the upper rib cage to expand while tightening the abdominal muscles. This habit is called "paradoxical breathing," because the abdomen is contracted rather than expanded. In proper breathing, the sternum, lower rib cage, and abdomen expand. This skill is called "diaphragmatic breathing."

Diaphragmatic breathing draws air more deeply into the lungs and increases breathing efficiency. It requires less effort and is far more efficient than "upper chest" breathing, is more relaxing, and increases respiratory endurance. Professional singers and musicians learn diaphragmatic breathing, and it will improve the quality of the voice. The latter advantage can be observed not only in opera singers, but in the lusty cry of a baby!

Begin by evaluating the client's breathing practices. Although the shoulders rise slightly and the upper chest expands somewhat, the ex-

pansion should take place from the bottom up, rather than from the top down. The upper chest and shoulders should be pushed slightly upward by the expansion of the inferior rib cage, rather than pulled upward by the scalenes. If the breathing motion expands the abdomen and lower rib cage, followed by a moderate expansion of the upper chest and a slight rise in the shoulders, the client is breathing properly, and you need only work the respiratory muscles to loosen and relax them. However, if the abdomen contracts, the shoulders rise significantly, and the upper chest expands pronouncedly, you'll need to teach proper breathing mechanics to the client.

Manual Therapy

INITIAL ASSESSMENT



- The client may stand (Fig. 4-54), sit, or lie supine (Fig. 4-55).
- Ask the client to take a deep breath while you observe the shoulders, chest, and abdomen.
- If the client is breathing paradoxically, you will see the shoulders rise pronouncedly, the upper chest expand markedly, and the abdomen contract (Fig. 4-54A) (Fig. 4-55A).
- If the client is breathing diaphragmatically, you will see the abdomen and lower rib cage expand, the shoulders rise slightly, and the upper chest expand moderately (Fig. 4-54B) (Fig. 4-55B).

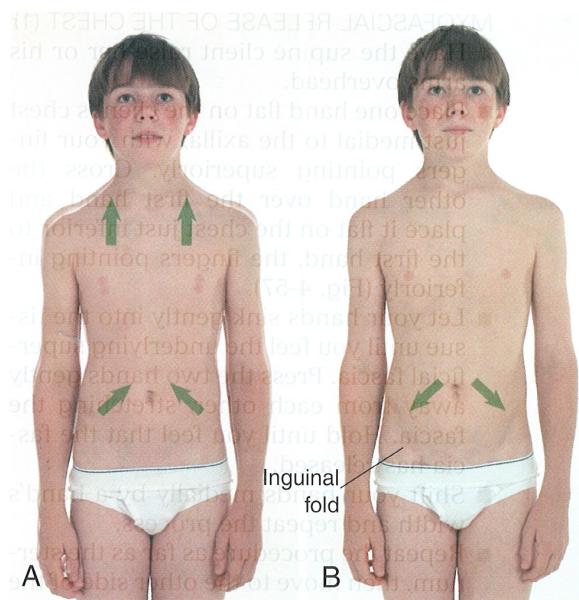


Figure 4-54 Client standing for breathing assessment: (A) paradoxical, and (B) diaphragmatic inhalation

- Note the clearer delineation of the inguinal folds (Fig. 4-54B) when the abdomen expands, and the flattening of the inguinal folds on contraction.
- Before proceeding to teach breathing, release the entire breathing apparatus with myofascial work on the chest and manual therapy of the muscles of breathing. First, examine the diaphragm. Place your hand on the abdomen with the fingers pointing superiorly just at the edge of the costal margin. As the client exhales, press your fingers under the costal arch in a superior direction (Fig. 4-56). Repeat on the opposite side. Tightness or pain indicates constriction and probable trigger point activity in the breathing mechanism that can cause pain and prevent comfortable respiration.

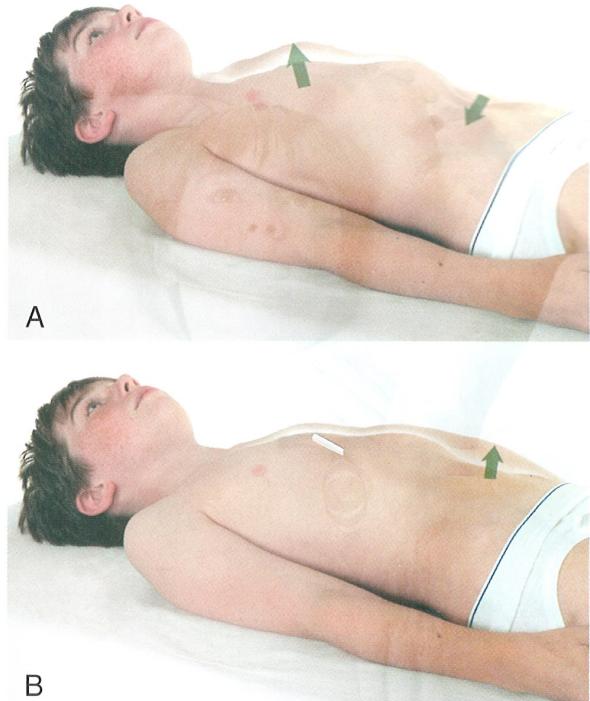


Figure 4-55 Client supine for breathing assessment: (A) paradoxical inhalation, (B) diaphragmatic inhalation (Draping option #2)



Figure 4-56 Examination of the diaphragm (Draping option #2)



Figure 4-58 Myofascial release of the chest (2) (Draping option #2)

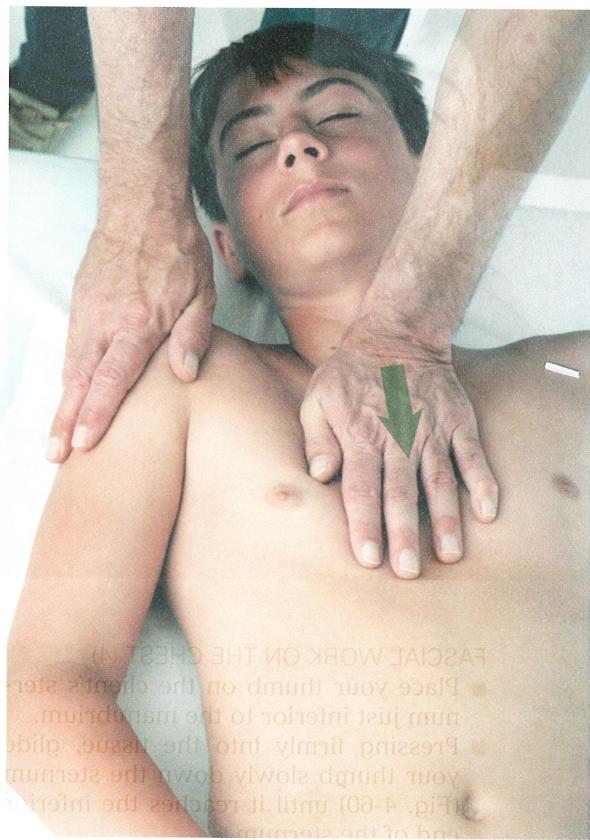


Figure 4-59 Fascial work on the chest (3) with the hand (Draping option #2)

MYOFASCIAL RELEASE OF THE CHEST (2)

- Stand at the client's head.
- Place one hand flat on the client's chest with the heel of the hand resting on the sternum just below the manubrium, the fingers pointing laterally.
- Cross the other hand over and place it next to the first, the fingers pointing laterally in the other direction (Fig. 4-58).
- Let your hands sink gently into the tissue until you feel the underlying superficial fascia. Press the two hands gently away from each other, stretching the fascia. Hold until you feel that the fascia has released.
- Shift your hands inferiorly by a hand's width and repeat the process.
- Continue this procedure as far as the inferior end of the sternum.

FASCIAL WORK ON THE CHEST (3)

- Place one hand flat on the client's sternum just inferior to the manubrium, with your fingers pointing inferiorly (Fig. 4-59).

- Pressing firmly into the tissue, glide your hand slowly down the sternum until the heel of your hand reaches the inferior end of the sternum.

Note: do not press on the xiphoid process. It can be broken with pressure.





Figure 4-57 Myofascial release of the chest (1) (Draping option #3)

MYOFASCIAL RELEASE OF THE CHEST (1)

- Have the supine client raise her or his arms overhead.
- Place one hand flat on the client's chest just medial to the axilla, with your fingers pointing superiorly. Cross the other hand over the first hand and place it flat on the chest just inferior to the first hand, the fingers pointing inferiorly (Fig. 4-57).
- Let your hands sink gently into the tissue until you feel the underlying superficial fascia. Press the two hands gently away from each other, stretching the fascia. Hold until you feel that the fascia has released.
- Shift your hands medially by a hand's width and repeat the process.
- Repeat the procedure as far as the sternum, then move to the other side of the client and repeat.
- On female clients with developed breasts, discontinue this procedure at the breasts and continue on the medial side.



Figure 4-60 Fascial work on the chest (4) with the thumb (Draping option #2)

FASCIAL WORK ON THE CHEST (4)

- Place your thumb on the client's sternum just inferior to the manubrium.
- Pressing firmly into the tissue, glide your thumb slowly down the sternum (Fig. 4-60) until it reaches the inferior end of the sternum.

hand off the sternum

Note: do not press on the xiphoid process. It can be broken with pressure.



Figure 4-61 Fascial work on the chest (5) with the hand (Draping option #2)

FASCIAL WORK ON THE CHEST (5)

- Standing beside the supine client at chest level, place your whole hand flat on the upper chest on the contralateral side of the client's body, the heel of your hand resting on the sternum just below the manubrium.
- Pressing into the tissue primarily with the heel of your hand, glide your hand away from yourself (Fig. 4-61), following the curve of the body as far as you can reach comfortably.

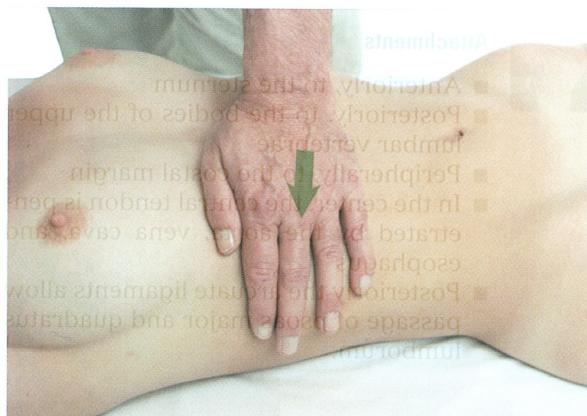


Figure 4-62 Fascial work on the chest (5) with a female client with developed breasts (Draping option #2)



Figure 4-63 Fascial work on the chest (6) with client in sidelying position: (A) starting position, (B) over shoulder (Draping option #15)

- Shift your hand by a hand's width inferiorly on the chest and repeat the process, continuing to the inferior rib cage.
- In the case of female clients with developed breasts, perform this procedure as far as the breast area, then continue on the chest below the breast (Fig. 4-62).

FASCIAL WORK ON THE CHEST (6)

- The client is in sidelying position.
- The therapist stands behind the client at waist level.
- Place one hand on the inferior rib cage, iliac crest, or back, to stabilize the client. Place the other hand on the lateral rib cage, the fingers pointing diagonally toward the client's contralateral shoulder (Fig. 4-63A).
- Pressing deeply into the tissue with the whole palm of the hand, glide the hand diagonally over the rib cage as far as the sternum (or until breast tissue is encountered in a female client with developed breasts).

- From the same starting point, repeat the procedure to the axilla.
- From the same starting point, change hands as necessary, and repeat the procedure directly up the client's side and over the posterior border of the axilla to the deltoid area (Fig. 4-63B).
- From the same starting point, repeat the procedure over the posterior chest to the scapula.

The Diaphragm

DIE-a-fram

Greek *dia*, through + *phragma*, enclosure

Overview

The *diaphragm* (Fig. 4-64) is a dome of muscle and connective tissue separating the thoracic from the abdominal cavity. It is the primary muscle of inspiration.

Attachments

- Anteriorly, to the sternum
- Posteriorly, to the bodies of the upper lumbar vertebrae
- Peripherally, to the costal margin
- In the center, the central tendon is penetrated by the aorta, vena cava, and esophagus
- Posteriorly the arcuate ligaments allow passage of psoas major and quadratus lumborum.

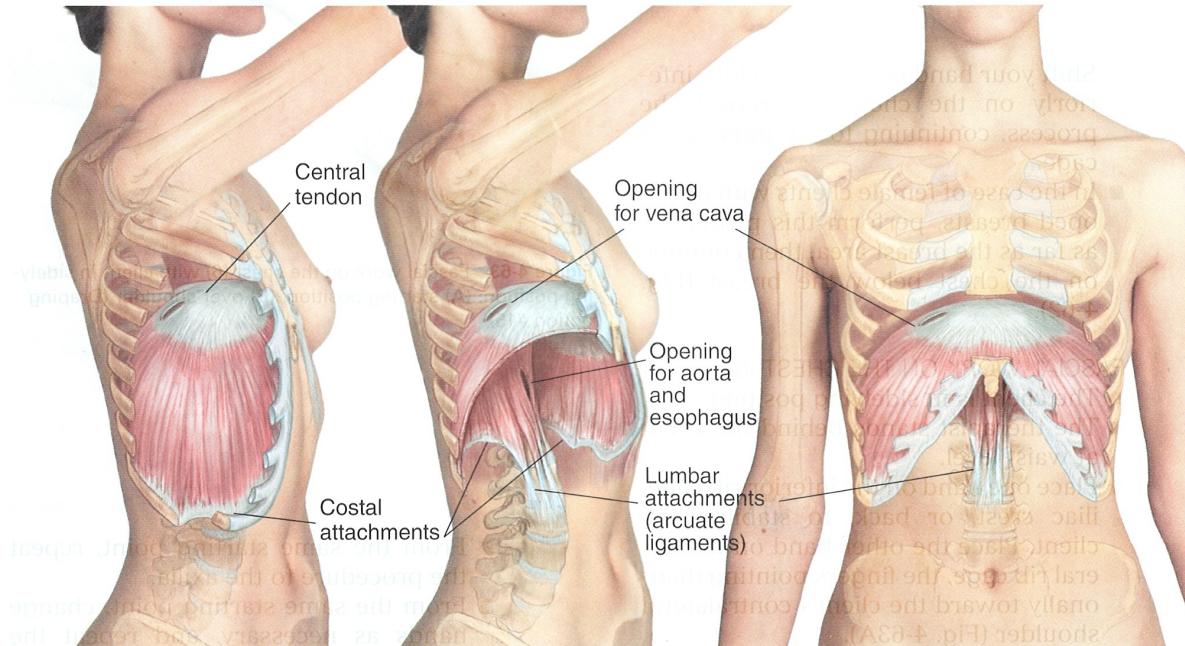


Figure 4-64 Anatomy of the diaphragm



Actions

Elevates and expands the lower costal margin and lower ribs, expanding the abdomen and lower ribcage in inspiration



Referral Area

"Stitch in the side", chest pain, substernal pain, or pain along the lower border of the ribs



Other Muscles to Examine

- Intercostals
- Scalenus
- Pectoralis major
- Pectoralis minor
- Rectus abdominis



Manual Therapy

RELEASE

- Standing at the client's side at waist level, place one or both hands at the base of the opposite rib cage, with the thumb, supported thumb, or fingertips against the lowest rib.
- Ask the client to inhale deeply, then slowly exhale.
- As the client exhales, press the thumb (Fig. 4-65A), supported thumb (Fig. 4-65B), or fingertips deeply under the lower rib cage, lifting it upward and away from yourself.
- Move to the other side of the client and repeat the procedure.

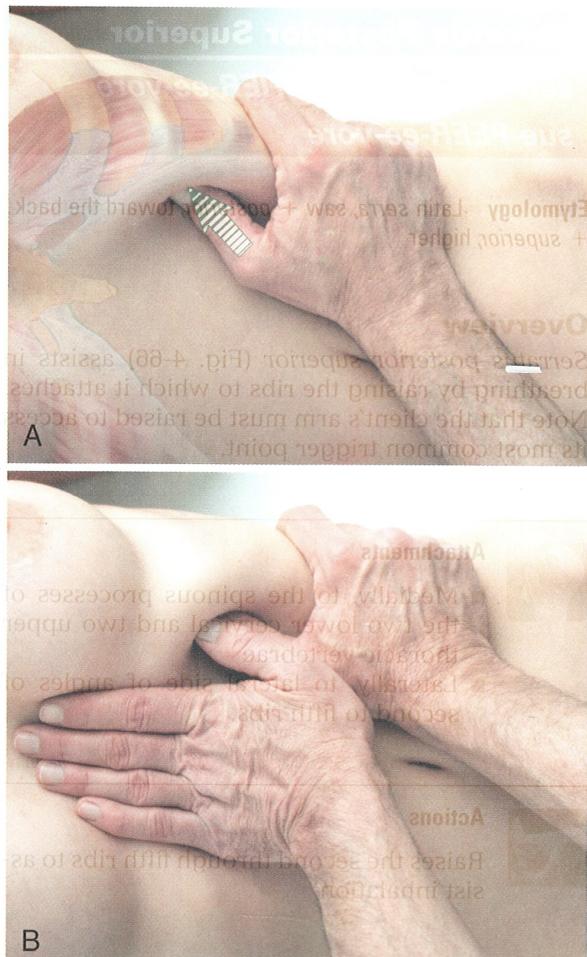


Figure 4-65 Release of diaphragm with thumb (A) or supported thumb (B) (Draping option #2)

Serratus Posterior Superior

**serr-RATE-us poss-TIER-ee-yore
sue-PEER-ee-yore**

Etymology Latin *serra*, saw + *posterior*, toward the back + *superior*, higher

Overview

Serratus posterior superior (Fig. 4-66) assists in breathing by raising the ribs to which it attaches. Note that the client's arm must be raised to access its most common trigger point.



Attachments

- Medially, to the spinous processes of the two lower cervical and two upper thoracic vertebrae
- Laterally, to lateral side of angles of second to fifth ribs.



Actions

Raises the second through fifth ribs to assist inhalation

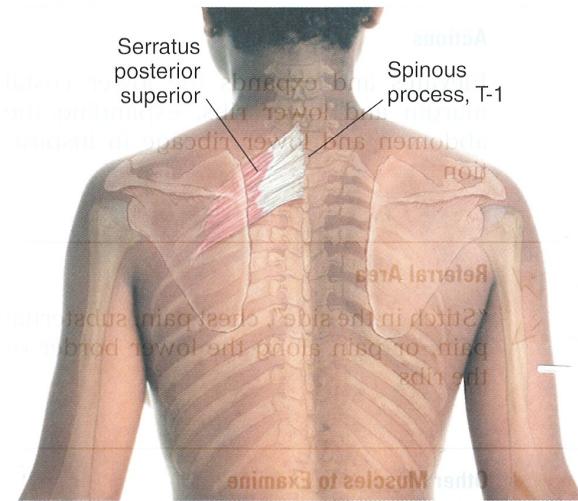


Figure 4-66 Anatomy of serratus posterior superior



Referral Area

Over the upper half of the scapula, into the anterior chest, along the dorsal and ulnar aspects of the arm to the little finger



Other Muscles to Examine

- Rhomboids
- Rotator cuff muscles
- Teres major
- Pectoralis minor
- Posterior and middle deltoids

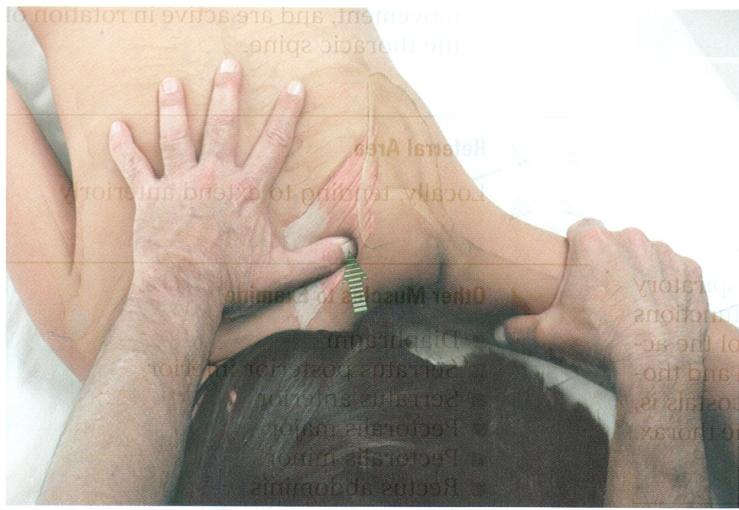


Figure 4-67 Compression of trigger point in serratus posterior superior (Draping option #7)

Manual Therapy

STRIPPING/COMPRESSION

- The client lies supine, with the arm on the side to be treated abducted and extended to rotate the superior angle of the scapula downward to expose more of the muscle. The therapist stands beside the client's head contralateral to the side to be treated.
 - Place the fingertips or supported thumb just next to the spinous process

of the sixth cervical vertebra. Pressing deeply, glide the hand diagonally downward as far as the scapula will permit.

- Repeat the process at the seventh cervical and first two thoracic vertebrae. The most common trigger point in this muscle lies in the area nearest the ribs that is uncovered by rotating the scapula. If this trigger point is present, compress and hold until it releases (Fig. 4-67).

Intercostals

In-ter-COST-als

Latin *inter*, between + *costa*, rib

Overview

The intercostals (Fig. 4-68) have both respiratory and postural functions, and their precise functions are quite complex. Essentially, they control the activity of the ribs, and thus both inspiration and thoracic rotation. Release of shortened intercostals is, therefore, an important part of work on the thorax.

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Attachments

- External: Each attaches to the inferior border of one rib and passes obliquely in an inferior and anterior direction to the superior border of the rib below.
- Internal: Each attaches to the inferior border of one rib and passes obliquely in an inferior and posterior direction to the upper border of the rib below.
- Note: The external intercostals do not extend all the way to the costal cartilages except between the lowest ribs. In their place is fascia.
- External intercostals contract during inspiration; internal intercostals contract during expiration. Both also maintain tension to resist mediolateral

movement, and are active in rotation of the thoracic spine.



Referral Area

Locally, tending to extend anteriorly



Other Muscles to Examine

- Diaphragm
- Serratus posterior inferior
- Serratus anterior
- Pectoralis major
- Pectoralis minor
- Rectus abdominis
- Transversus abdominis
- External and internal obliques



Manual Therapy

Anterior Treatment

Lower Intercostals

STRIPPING

- The client lies supine.
- Standing beside the client at chest level, place your thumb at the juncture of the eighth and ninth ribs at the costal cartilage on the opposite side of the body.
- Pressing between the ribs and following the curve of the ribs, glide your

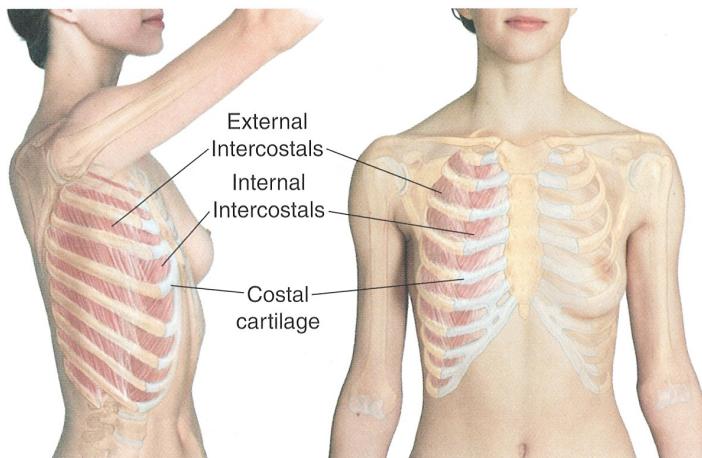


Figure 4-68 Anatomy of the intercostals

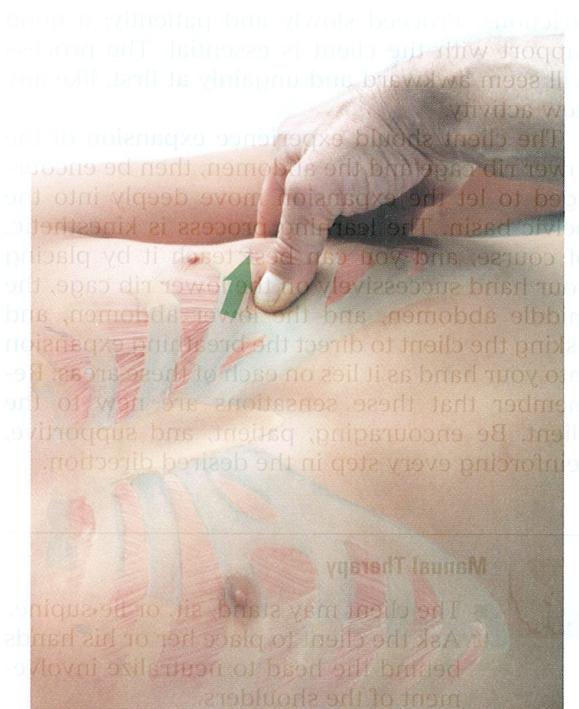


Figure 4-69 Stripping massage of intercostals (Draping option #2)

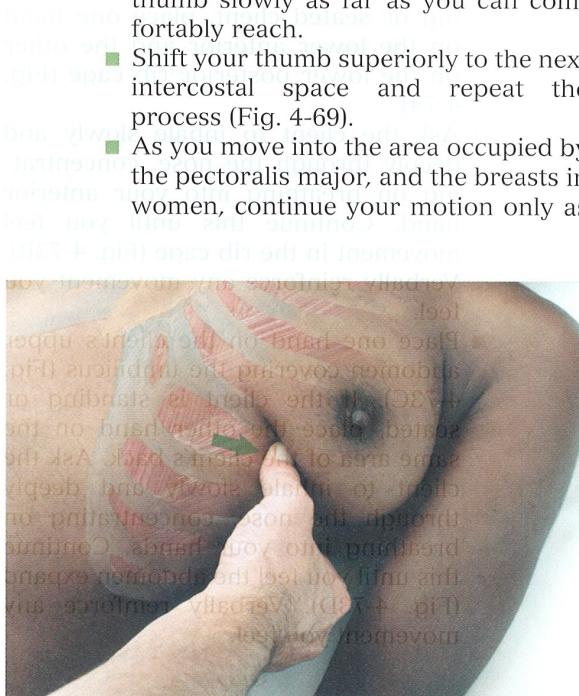


Figure 4-70 Stripping massage of intercostals in a female client (Draping option #2)

far as you are able to feel the intercostal space (Fig. 4-70).

- Move to the other side of the client and repeat the process.

STRETCH

- The client lies supine.
- Stand next to the client at chest level. Have the client raise the near arm overhead, reaching toward the opposite shoulder.
- Place your hand farthest from the client's head on the client's axillary region, maintaining an upward pressure.
- Place your other hand over the client's lower rib cage on the side, maintaining a downward pressure.
- Ask the client to breathe deeply. As the client inhales, use the rib cage hand to resist the elevation of the ribs.
- As the client exhales, press downward on the ribs, and have the client reach toward the opposite shoulder (Fig. 4-71).
- Repeat for two or three cycles, then move to the other side of the client and repeat the entire process.

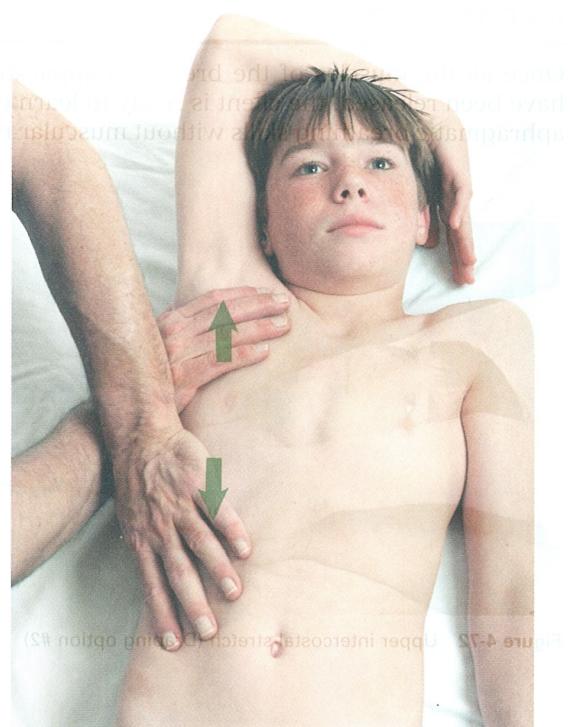


Figure 4-71 Lower intercostal stretch (Draping option #2)

Upper Intercostals

STRETCH

- Stand at the head of the client, who is supine with the hand on the side to be treated raised overhead.
- Place one hand under the client's back on the posterior superior ribs.
- Place the other hand on the client's upper rib cage.
- Ask the client to take slow, deep breaths. Pull the posterior ribs superiorly (toward you) with hand underneath the client; push the anterior ribs inferiorly (away from you) with the hand on the client's chest (Fig. 4-72).
- Maintain this pressure through five or six breathing cycles, or until you feel release in the rib cage.
- Repeat on the other side.

(adapted from Dr. John S. Barnes, M.D.)

Posterior Treatment

Posterior trigger points in the intercostals tend to refer anteriorly, and should be located and treated individually with compression.

TEACHING DIAPHRAGMATIC BREATHING

Once all the muscles of the breathing apparatus have been released, the client is ready to learn diaphragmatic breathing skills without muscular re-



Figure 4-72 Upper intercostal stretch (Draping option #2)

strictions. Proceed slowly and patiently; a good rapport with the client is essential. The process will seem awkward and ungainly at first, like any new activity.

The client should experience expansion of the lower rib cage and the abdomen, then be encouraged to let the expansion move deeply into the pelvic basin. The learning process is kinesthetic, of course, and you can best teach it by placing your hand successively on the lower rib cage, the middle abdomen, and the lower abdomen, and asking the client to direct the breathing expansion into your hand as it lies on each of these areas. Remember that these sensations are new to the client. Be encouraging, patient, and supportive, reinforcing every step in the desired direction.

Manual Therapy

- The client may stand, sit, or lie supine.
- Ask the client to place her or his hands behind the head to neutralize involvement of the shoulders.
- Standing beside the supine client, place one hand (Fig. 4-73A) on the lower anterior rib cage. Alternatively, standing or sitting beside the standing or seated client, place one hand on the lower anterior and the other on the lower posterior rib cage (Fig. 4-74).
- Ask the client to inhale slowly and deeply through the nose, concentrating on breathing into your anterior hand. Continue this until you feel movement in the rib cage (Fig. 4-73B). Verbally reinforce any movement you feel.
- Place one hand on the client's upper abdomen covering the umbilicus (Fig. 4-73C). If the client is standing or seated, place the other hand on the same area of the client's back. Ask the client to inhale slowly and deeply through the nose, concentrating on breathing into your hands. Continue this until you feel the abdomen expand (Fig. 4-73D). Verbally reinforce any movement you feel.



Figure 4-73 Teaching diaphragmatic breathing with client supine: (A) rib cage neutral, (B) rib cage expanded, (C) middle abdomen neutral, (D) middle abdomen expanded, (E) lower abdomen neutral, (F) lower abdomen expanded (Draping option #2)

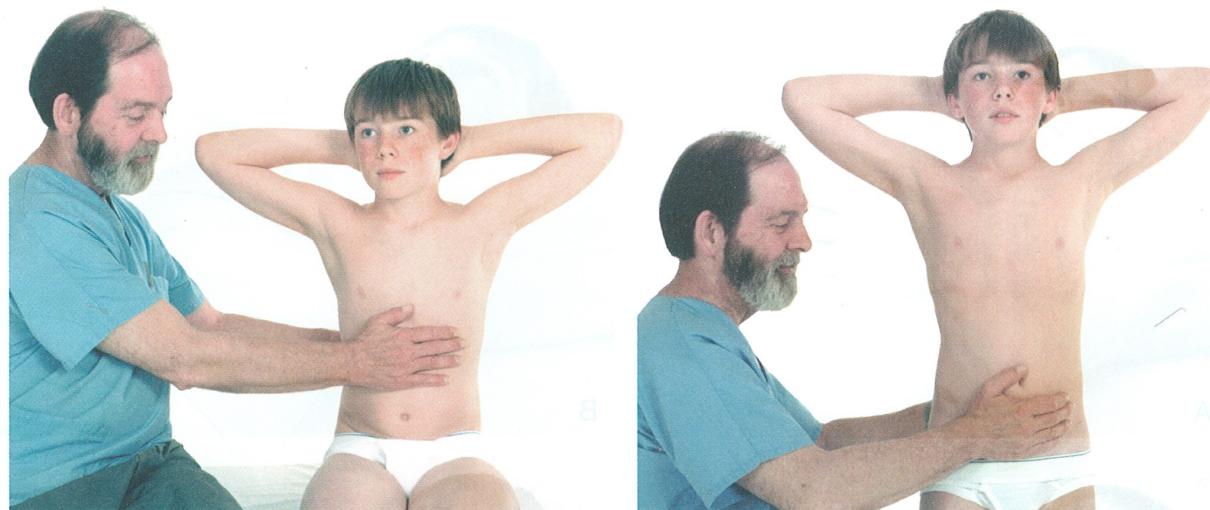


Figure 4-74 Teaching diaphragmatic breathing with client standing or seated, with the therapist's hands placed on anterior and posterior rib cage or abdomen

- Place your hand on the lower abdomen just above the pubis (Fig. 4-73E). If the client is standing or seated (Fig. 4-74), place the other hand at the top of the client's sacrum. Ask the client to inhale slowly and deeply through the nose, concentrating on breathing into your hands. Continue this until you feel the abdomen expand (Fig. 4-73F). Verbally reinforce any movement you feel.

Some people catch on very quickly, while others find it more challenging, so work patiently. Urge the client to practice these skills at home. Assure the client that this style of breathing, once mastered, will be far more comfortable and relaxing than his or her previous style.