

Hyperkyphosis and Massage Home Study Course

1 CE Hour

Text, Examination, and Course Guide

Presented by the:

Center for Massage Therapy Continuing Education

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Instructions for the Hyperkyphosis and Massage home study course

Thank you for investing in the Hyperkyphosis and Massage home study course, a 1 CE hour course designed to further your knowledge in the principles and practice of treating clients who may be presenting with signs and symptoms of hyperkyphosis in your massage practice. This guide will contain all of the instructions you will need to complete this course. This is a 1 CE hour course, so that means it should take you approximately 1 hour to read the text and complete the multiple choice exam and course evaluation.

The following are steps to follow in completing this course:

- 1. Read and review the exam and text in this file. The exam is provided for review before testing online and is the same as the online exam.**
- 2. When you are ready to test online, access the online examination by logging in to your account at <https://www.massagetherapyceu.com/login.php>.**
- 3. Complete your examination and print your certificate. The exam is open book and there is no time limit for completion.**

You must pass the exam with a 70% or better to pass this home study course. You are allowed to access and take the exam up to 3 times if needed. There is no time limit when taking the exam. Feel free to review the text while taking the test. This course uses the text *Hyperkyphosis, an excerpt from Condition-Specific Massage*, by Celia Bucci. All of the answers can be found in the text. It is advised to answer the exam questions in the study guide before testing online. That way, when you are testing you do not have to go back and forth through the online exam.

If you have any questions please feel free to contact us at 866-784-5940, 712-490-8245, or info@massagetherapyceu.com. Most state boards require that you keep your “proof of completion” certificates for at least four years in case of audit. Thank you for taking our Hyperkyphosis and Massage home study course.

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It is the responsibility of the practitioner to determine the appropriateness of the techniques presented in terms within the scope of practice. This information is in no way meant to diagnose or treat medical conditions. Written medical opinions are always the best way to resolve any questions regarding contra-indications to or advanced treatment of hyperkyphosis.

Hyperkyphosis and Massage Exam

1. What is hyperkyphosis?
 - A. An increased kyphotic curve
 - B. A decreased kyphotic curve
 - C. A decreased lordotic curve
 - D. An increased lordotic curve
2. Which of the following muscles are short and tight (with agonist action) in the upper crossed syndrome?
 - A. Infraspinatus
 - B. Middle trapezius
 - C. Upper trapezius
 - D. Infrahyoids
3. Which of the following is the primary contributing factor to functional thoracic hyperkyphosis?
 - A. Poor diet
 - B. Poor posture
 - C. Congenital factors
 - D. Injury
4. Which of the following should be avoided if the client has a systemic inflammatory condition, such as rheumatoid arthritis or osteoarthritis, and the health of the underlying tissues is compromised or if the client is taking an anti-inflammatory medication?
 - A. Effleurage
 - B. Feather strokes
 - C. Light frictions
 - D. Deep frictions
5. What is the average active ROM extension of the muscles of the cervical spine involved in hyperkyphosis?
 - A. 25 degrees
 - B. 35 degrees
 - C. 45 degrees
 - D. 55 degrees
6. Which of the following is a special test that may reveal a herniated disc, tumor, or other factor that increases pressure on the spinal nerves?
 - A. Vertebral artery test
 - B. Spurling's test
 - C. Valsalva maneuver
 - D. Active ROM

7. Common trigger points in the _____ are found along the mid sternum, at the clavicular attachments, and along the inferior fibers, particularly near the axilla.
 - A. Pectoralis major
 - B. Deltoid
 - C. Scalenes
 - D. Middle trapezius

8. Which of the following is a stretch that clients can do as self-care to help with symptoms of hyperkyphosis?
 - A. Rhomboid stretch
 - B. Pectoral stretch
 - C. Thoracic erector spinae stretch
 - D. Middle trapezius stretch

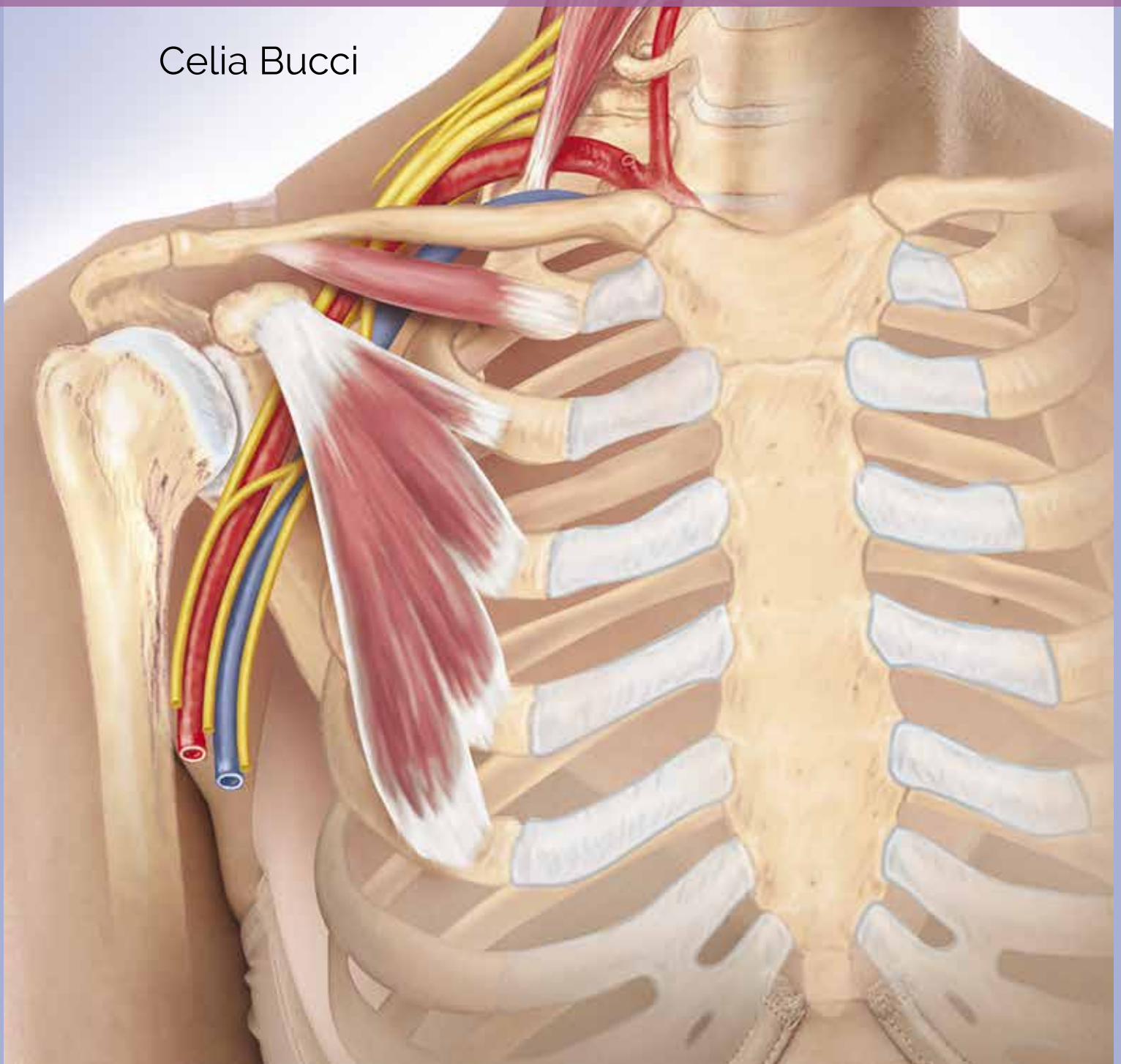
9. Ideally, a client developing hyperkyphosis will have treatments:
 - A. Once a week until symptoms are absent for at least 7 days
 - B. Daily until symptoms are absent for 4 days
 - C. Once a week until symptoms are absent for 14 days
 - D. Once a month until symptoms are absent for 7 days

This completes the Hyperkyphosis and Massage exam. Proceed to the next page to view the text.

Condition Specific Massage Therapy

SECOND EDITION

Celia Bucci



Chapter 4:

Hyperkyphosis

(Neck & Upper Back Pain)

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Hyperkyphosis

Understanding Hyperkyphosis

A healthy spine has four natural curves (Fig.1). The two lordotic curves—cervical and lumbar—are anteriorly. The two kyphotic curves—thoracic and pelvic—are posteriorly. These curves are ideal in our species to maintain balance, absorb the impact of movement, and allow maximum flexibility for our particular types of activity.

Hyperkyphosis is an increased kyphotic curve. This chapter focuses on the more common thoracic hyperkyphosis: an increased thoracic curve most often accompanied by protracted scapulae, internally rotated shoulders, and a head-forward posture (Fig. 2). In a very short period relative to our evolution, human lifestyle has changed from one that was once considerably physical—hunting and gathering, walking, manual labor, and so on—to one that is becoming increasingly sedentary. Today, we spend a lot of time driving, sitting at a desk, working at a computer, watching television, and so on. These static postures put many of the body’s joints in flexion. The hips, knees, thorax, and shoulders are often nearly immobile for hours at a time. Because of this, hyperkyphosis and hyperlordosis are two very common postural deviations that lead to chronic pain and reduced ROM in our modern lifestyle. Both of these postures may lead to other conditions, but you may find that normalizing the curves of the spine and leveling the ilia and scapulae will reduce pain and restriction and may facilitate your treatment of accompanying conditions.

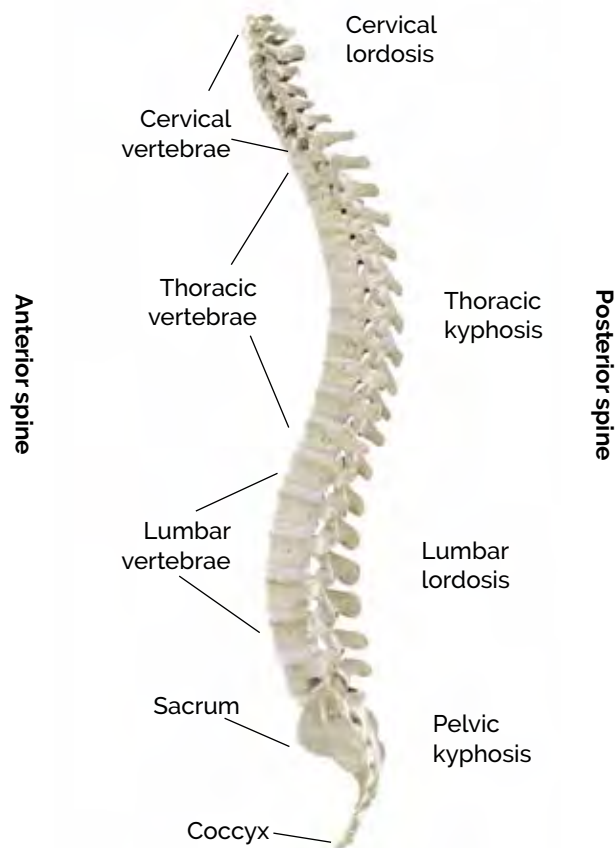


Figure 4-1 Curves of the spine.
Image Credit: SciePro/Shutterstock



Figure 4-2 Hyperkyphosis.

FUNCTIONAL VERSUS STRUCTURAL POSTURAL IMBALANCE

The hyperkyphosis described above is functional; its cause is primarily soft tissue dysfunction and postural deviations that result from an injury or activities of daily living. These deviations can be treated with manual therapy, self-care, and postural awareness. The therapeutic goal for functional hyperkyphosis is to lengthen the muscles that have shortened, have become hypertonic, and are pulling the bones out of alignment; to strengthen the muscles that have stretched and become weak; and to reset the neuromuscular system to recognize proper posture and diaphragmatic breathing as normal.

A structural curve, in contrast, is primarily caused by changes in bones. Bone fusions, the development of spurs or new bony prominences, fractured bones that were not well set, osteoporosis, and degenerative disc disease are a few of the possible contributing factors. Manual therapy may offer pain relief, increase ROM, and slow the progression of postural imbalance but is unlikely to reverse the dysfunction. A client's health history may help you assess whether postural deviations are structural in nature, although a diagnosis of structural hyperkyphosis requires medical testing. When a client's hyperkyphosis is structural, it is best to discuss the condition with a health care provider to fully understand the causes. You may need to modify positioning, bolstering, length of treatment, and techniques to accommodate the client's particular needs.

MUSCLES OF THE UPPER CROSS

Thoracic hyperkyphosis is also referred to as upper cross syndrome. Coined by Vladimir Janda, MD, DSc, upper cross syndrome refers to an imbalance and dysfunction of the agonists and antagonists that move and support the thorax. The muscles that become short and tight and the muscles that become weak and over-stretched form a cross through the upper thoracic spine (Fig. 3). You typically find the pectorals, anterior deltoid, and posterior neck muscles short and tight, while the muscles between the scapulae and those deep

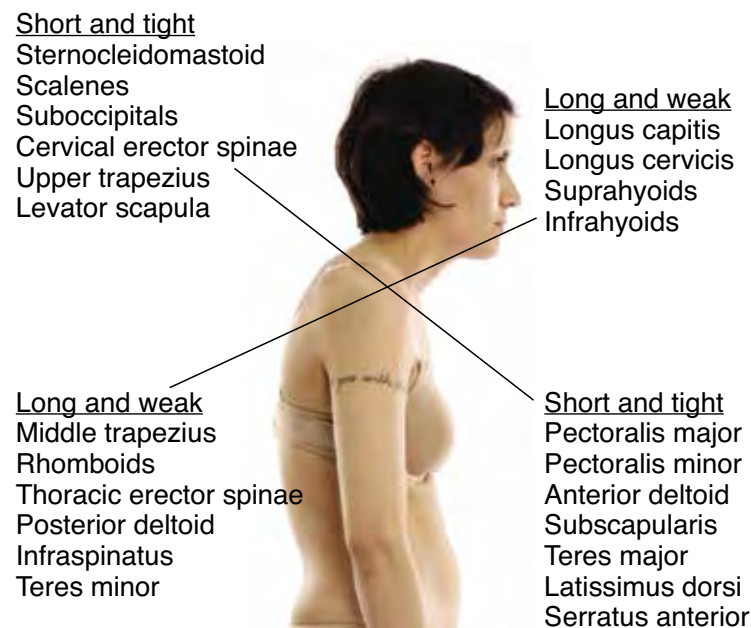


Figure 4-3 Muscles of the upper cross.

Table 4-1: Muscles of the Upper Cross with Actions That Contribute to Hyperkyphosis

MUSCLES THAT ARE SHORT AND TIGHT (WITH AGONIST ACTION)	MUSCLES THAT ARE STRETCHED AND WEAK (WITH ANTAGONIST OPPOSITION)
Pectoralis major (internal rotation of shoulder)	Infraspinatus (internal rotation of shoulder)
Anterior deltoid (internal rotation of shoulder)	Posterior deltoid (internal rotation of shoulder)
Subscapularis (internal rotation of shoulder)	Teres minor (internal rotation of shoulder)
Teres major (internal rotation of shoulder)	
Latissimus dorsi (internal rotation of shoulder)	
Serratus anterior (protraction of scapula)	Middle trapezius (protraction of scapula)
Pectoralis minor (protraction of scapula)	Rhomboid major and minor (protraction of scapula)
SCM (head forward)	Longus capitis (head forward)
Scalenes (head forward)	Longus cervicis (head forward)
Upper trapezius (upper cervical extension)	Suprahyoids (upper cervical extension)
Levator scapulae (upper cervical extension)	Infrahyoids (upper cervical extension)
Suboccipitals (upper cervical extension)	Thoracic erector spinae (increased thoracic curve)
Cervical erector spinae (upper cervical extension)	

in the anterior neck are stretched and weak. The weakened muscles become less able to oppose the actions of the agonists that internally rotate the shoulders, protract the scapula, flex the thoracic spine, and pull the head forward. As this happens, the imbalance can become more profound and the body less able to reverse the process without intervention (Table 1).

COMMON SIGNS AND SYMPTOMS

The most common signs of hyperkyphosis are postural changes such as an increased thoracic curve, protracted scapulae, internally rotated shoulders, and a head-forward posture. The most common symptom of developing thoracic hyperkyphosis is pain between the scapulae and along the posterior neck. Overstretched muscles including the rhomboids, middle trapezius, and thoracic erector spinae form taut bands that may harbor trigger points. The primary function of the rhomboids and middle trapezius in a static posture is to keep the spine erect and the scapulae retracted. When the client's common posture stretches them, these muscles (and the nerves that innervate them) are working against the tight pectorals to try to bring the scapulae closer to the spine. If the pectorals are not lengthened, the rhomboids and middle trapezius are fighting a difficult battle, a form of overuse, and can become weak and easily fatigued. In addition, trigger points in the scalenes, levator scapula, trapezius, and latissimus dorsi all refer pain between the scapulae. With adhesions, trigger points, and spasm, the cervical and thoracic spine may become hypomobile if left untreated.

Internally rotated shoulders, protracted scapulae, and the head-forward position each involve muscles that, when hypertonic, may compress nerves and vessels, resulting in thoracic outlet syndrome, which is frequently mistaken for carpal tunnel syndrome when the site of nerve compression is not correctly identified. When thoracic outlet syndrome develops, lymphatic structures may be compressed, causing insufficient drainage and edema; vasculature may be compressed, leading to insufficient circulation and ischemia; and nerves may be compressed, leading to pain, numbness, and tingling along their distribution and weakening or atrophy of muscles supplied by the compromised nerves.

With the thorax flexed, movement of the ribcage and the muscles of respiration are restricted, which may

cause shallow breathing and can lead to chronic respiratory dysfunction. A client with prior respiratory disorders who develops hyperkyphosis may experience increased signs and symptoms of respiratory dysfunction. Protraction of the scapulae turns the glenohumeral joint inferiorly, causing the rotator cuff muscles to compensate and become hypertonic. If left untreated, particularly if the client uses repetitive motions of the glenohumeral joint with resistance, frozen shoulder may develop. The head-forward posture and extension of the upper cervical vertebrae may stress the facet joints and lead to wearing of the intervertebral discs. When the head is in a forward position, the mandible is drawn posteriorly, which may contribute to dysfunction in the temporomandibular joint, often resulting in grinding of the teeth, called bruxism. Trigger points in the muscles of mastication refer pain into the teeth that can be mistaken for toothache. Trigger points in muscles including the SCM and upper trapezius may refer into the head, causing tension headaches. You may also find one or both shoulders elevated, or hyperlordosis. It is difficult to say which of these postural deviations begins the process, but as one develops, the others may follow as the body attempts to stay balanced on its center of gravity with the eyes level and looking forward.

POSSIBLE CAUSES AND CONTRIBUTING FACTORS

Pathologies that affect the integrity of bones are often the cause of structural hyperkyphosis. Porous bones (osteoporosis) become unable to bear weight and may cause the thoracic vertebrae to collapse upon each other, resulting in increased curvature. Nutritional deficiencies of calcium and vitamin D as well as increased consumption of calcium oxalate and carbonated beverages may play a role in the body's ability to rebuild bone. Ankylosing spondylitis—an autoimmune disease that causes arthritis or swelling in the spine—ultimately causes the vertebrae to fuse with the thorax in flexion. Tuberculosis that settles in the spine—an infection called Pott's disease—also results in deterioration of the vertebrae that can cause structural hyperkyphosis. Scheuermann's disease—an idiopathic condition that affects adolescents—occurs when the posterior aspects of the vertebrae grow faster than the anterior portion, causing the vertebrae to wedge and increase the thoracic curve. Congenital defects, such as spina bifida or muscular dystrophy, may also contribute.

The primary contributing factor to functional thoracic hyperkyphosis is poor posture. In some cases, as with muscular dystrophy or radiculopathy, poor posture results from muscle degeneration and interrupted innervation. More commonly, upper cross postural deviations result from voluntary poor posture. For example, if a client regularly performs activities that require the shoulders to be in flexion and internal rotation, the head is likely to jut forward, adding much weight to the anterior frontal plane (Fig. 4).

Try this yourself: Sit straight with your arms hanging comfortably at your sides. Slowly raise your shoulders into flexion and internal rotation as if to type on a keyboard, paying close attention to how your neck and head follow. Certainly, you can force your head to stay straight, but these movements often naturally cause the head to move slightly forward and the neck to flex slightly. Because we need to look straight ahead, the upper vertebrae of the neck extend to level the eyes. When this is a common, daily posture, the thoracic spine begins



Figure 4-4 Poor seated posture.

to curve posteriorly. Moreover, when a client regularly assumes this posture, the pectoral muscles are shortened and develop increased tone, while the middle trapezius and rhomboids become overstretched, making it difficult for them to resist the pull of the pectorals. Left untreated, the kyphotic curve will continue to increase, the scapulae will continue to protract, and the cervical and lumbar lordotic curves may continue to increase to compensate.

Exercise and sports involving resisted contraction in the pectoral muscles may contribute to hyperkyphosis. Professions that involve heavy lifting, repeated flexion and internal rotation of the shoulders, or a slouched posture may place the worker at risk. Age also plays a role as the bones become weaker over time, and the person performs less frequently those activities that keep the joints mobile. Poor eyesight or hearing, which may cause the client to thrust the head forward in order to see or hear better, may become a contributing factor if left unaddressed. Respiratory conditions affecting the tone of the muscles of respiration may also play a role.

CONTRAINDICATIONS AND SPECIAL CONSIDERATIONS

- Underlying pathologies.** Ankylosing spondylitis, osteoarthritis, osteoporosis, degenerative disc disease, bone spurs, or fusions may be present. If you suspect one of these (consult Table 2 and your pathology book for signs and symptoms), refer the client to a health care provider for assessment before initiating treatment. If the client is diagnosed with an underlying pathology that is not contraindicated for massage, work with the health care provider to develop a treatment plan.
- Endangerment sites.** Be cautious near the endangerment sites in the neck and axilla. Gently palpate for the pulse of the carotid artery before you begin working on the neck. Avoid this area; if you feel a pulse while working, back off slowly and avoid the area.

Table 4-2: Differentiating Conditions Commonly Confused with or Contributing to Hyperkyphosis

CONDITION	TYPICAL SIGNS & SYMPTOMS	TESTING	MASSAGE THERAPY
Osteoporosis	Bone or joint pain, tenderness, bone fractures, loss of height, slouching	Bone mineral density test CT, X-ray Urinary calcium test	Indicated in early stages and with health care provider approval in later stages. May reduce pain. Take care not to use force that may fracture a bone.
Spondylolisthesis (begins in lumbar, proceeds to thoracic spine)	Lumbar hyperlordosis Pain in low back, buttocks, and thighs Stiff back	X-ray	Massage is indicated. Use caution if bones are fragile. Stretching and strengthening encouraged.
Ankylosing spondylitis	Pain often begins in low back unilaterally and progresses bilaterally to upper back and throughout thorax. Blood tests Fatigue and anemia may develop	MRI	Indicated to reduce pain, maintain mobility, and slow progress of spinal distortion. Use caution if bones are fragile. Use caution if bones are fragile.

Table 4-2: Differentiating Conditions Commonly Confused with or Contributing to Hyperkyphosis (continued)

CONDITION	TYPICAL SIGNS & SYMPTOMS	TESTING	MASSAGE THERAPY
Scheuermann's disease (juvenile kyphosis)	Begins at puberty Pain, curved spine that worsens when bending, difficulty breathing, chest pain Signs and symptoms cease when child stops growing	X-ray Adam's forward bending test	Indicated to reduce pain
Pott's disease (tuberculous arthritis)	Slow onset Low-grade fever Excessive perspiration Loss of appetite Swollen, tender joints Spinal masses Numbness and tingling in extremities Reduced ROM	X-ray Tuberculin skin test (PPD) Aspiration of joint fluid Biopsy to test bacteria	Contraindicated until infection is resolved completely Work with health care provider in cases of abscesses or other contraindications. Massage may be helpful to reduce pain.
Muscular dystrophy	Many forms appear in childhood or adolescence, although a few may develop in adulthood Muscle weakness Loss of coordination Progressive, resulting in fixed contracture of muscles	Blood test for creatine level Electromyography Ultrasonography Muscle biopsy Genetic testing	Work with health care provider. Massage may reduce pain and delay contracture.
Paget's disease	Persistent bone pain Joint pain and stiffness Headache, neck pain Bowed legs Locally hot to touch Fractures Hearing loss Loss of height	X-ray Bone scan Blood test for serum alkaline phosphatase and serum calcium	Work with health care provider. Massage may help maintain flexibility.
Nerve root compression (radiculopathy)	Muscle spasm, weakness, or atrophy Pain around scapula on affected side Neck pain Pain radiates to extremities Pain worsens with lateral flexion or rotation or when sneezing, coughing, laughing, or straining	Spurling's test Valsalva's test Neurological exam to test reflexes, sensation, and strength X-ray or MRI to assess for space occupying lesions	Indicated if cause and location are understood. Take care not to increase compression of nerve or reproduce symptoms.

- **Treatment duration and pressure.** If the client is elderly, has degenerative bone disease, or has been diagnosed with a condition that diminishes activities of daily living, you may need to adjust your pressure as well as the treatment duration. Frequent half-hour sessions may suit the client better.
- **Positioning.** Use bolsters to position a client for comfort as well as to reduce postures that may contribute to hyperkyphosis. In the prone position, bolsters under the shoulders will reduce protraction of the scapulae. Adjust the face cradle to reduce extension in the neck. In the supine position, a bolster along the length of the spine and under the occiput will reduce protraction of the scapulae and extension of the neck. If hyperlordosis is present, a bolster across the anterior superior iliac spine in the prone position will reduce anterior pelvic tilt, and a bolster under the ankles may reduce tension in the low back. A bolster under the knees in the supine position may reduce tension on the low back.
- **Hydrotherapy.** Do not use moist heat on the neck or chest if the client has a cardiovascular condition that may be affected by the dilation of blood vessels. Severe hypertension and atherosclerosis are two examples of conditions where hydrotherapy is contraindicated. Consult your pathology book for recommendations.
- **Friction.** Do not use deep frictions if the client has a systemic inflammatory condition, such as rheumatoid arthritis or osteoarthritis, if the health of the underlying tissues is compromised or if the client is taking an anti-inflammatory medication. Friction may initiate an inflammatory process, which may interfere with the intended action of anti-inflammatory medication. Recommend that your client refrain from taking such medication for several hours before treatment if their health care provider agrees.
- **Tissue length.** It is important when treating myofascial tissues to not stretch tissues that are already overstretched. Assess for myofascial restrictions first and treat only those that are clearly present. Likewise, overstretched muscles should not be stretched from origin to insertion because their length should not be increased. If you treat trigger points, use heat or a localized pin and stretch technique instead of full ROM stretching. For example, because the rhomboids and middle trapezius tend to be overstretched, it is not advised to perform myofascial release or a full stretch from origin to insertion across the length of these muscles.
- **Hypermobile joints and unstable ligaments.** Be cautious with mobilizations if the client has hypermobile joints or if ligaments are unstable due to injury, pregnancy or a systemic condition.

MASSAGE THERAPY RESEARCH

Studies in journals covering subjects ranging from physical therapy to neuroscience report that hyperkyphosis results in structural changes or is caused by functional changes, such as the shortening or lengthening of muscles in the upper cross, and is often associated with neurological dysfunction. Although several articles describe exercise, yoga, chiropractic care, surgery, self-care, proprioceptive neuromuscular facilitation, and other methods of reducing the symptoms of hyperkyphosis, a thorough literature review reveals no research, case studies, or articles specifically showing the benefits of massage therapy for hyperkyphosis, kyphosis, or upper cross syndrome. Many of the studies addressing hyperkyphosis focus on increased thoracic curvature in the elderly as a result of osteoporosis. While much literature describes the phenomenon of increased thoracic flexion in a society prone to hunched, seated postures, research has not yet investigated massage as a specific treatment option for hyperkyphosis.

In 2008, Greig et al. conducted a study titled “Postural taping decreases thoracic kyphosis but does not influence trunk muscle electromyographic activity or balance in women with osteoporosis.” As the title suggests, taping decreased the thoracic curve but had no effect on muscle tone associated with hyperkyphosis. Additional research is necessary to determine whether manual manipulation of the trunk muscles may have an effect on electromyographic activity and whether such an effect may suggest massage as a treatment option with longer-lasting effects.

Research into the benefits of massage for scoliosis, thoracic outlet syndrome, temporomandibular joint dysfunction, respiratory distress, and other syndromes commonly associated with hyperkyphosis is available. Although anecdotal evidence has suggested that manual therapy reduces pain and increases ROM when hyperkyphosis is present, additional research is needed to determine the benefits of massage therapy intended to lengthen shortened muscles, strengthen weakened muscles, and reset neuromuscular function for clients presenting with signs and symptoms of functional hyperkyphosis.

Working With the Client

Client Assessment

Hyperkyphosis is one of the most common postural deviations causing chronic pain and restricted ROM in the upper body. It involves many joints and nearly all of the muscles of the upper body. A wide variety of possible factors can contribute to the development of both structural and functional hyperkyphosis. All of these elements add up to many variations in how a client may present to you. For example, a client may hold the phone more frequently at their left ear with the left shoulder and present with left lateral flexion and right rotation of the neck, which suggests that the scalenes and SCM on the left side may be short and tight. Another client may frequently carry a heavy bag on the right shoulder and may present with an elevated right shoulder, which suggests that the upper trapezius and levator scapulae may be short and tight.

Table 4-3: Health History

QUESTIONS FOR THE CLIENT	IMPORTANCE FOR THE TREATMENT PLAN
Where do you feel symptoms?	The location of symptoms gives clues to the location of trigger points, injury, or other contributing factors.
Describe what your symptoms feel like.	Differentiate possible origins of symptoms and determine the involvement of nerves or blood vessels.
Do any movements make it worse or better?	Locate tension, weakness, or compression in structures producing such movements.
Have you seen a health care provider for this condition? What was the diagnosis? What tests were performed?	Bone density, blood, and respiratory function tests may indicate contributing factors. Medical tests may indicate that hyperkyphosis is structural in nature.
Have you been diagnosed with a condition such as osteoporosis, rheumatoid arthritis or osteoarthritis, asthma, temporomandibular joint disorder, weakened vision or hearing?	Systemic and other conditions may contribute to signs and symptoms, may require adjustments to treatment, and may impact treatment outcomes.
Have you had an injury or surgery?	Injury or surgery and resulting scar tissue may cause adhesions, hyper- or hypotonicity, and atypical ROM.
What type of work, hobbies, or other regular activities do you do?	Repetitive motions and static postures that increase thoracic flexion, protracted scapulae, neck extension, or head-forward posture may contribute to the client's condition.
Are you taking any prescribed medications or herbal or other supplements?	Medications of all types may contribute to symptoms or have contraindications or cautions.
Have you had a cortisone shot in the past 2 weeks? Where?	Local massage is contraindicated.
Have you taken a pain reliever or muscle relaxant within the past 4 hours?	The client may not be able to judge your pressure.
Have you taken anti-inflammatory medication within the past 4 hours?	Deep friction may initiate an inflammatory process and should not be performed if the client has recently taken anti-inflammatory medication.

Common presentations of hyperkyphosis are described below. However, it is essential to assess every joint to put together an accurate picture for each individual client. In addition, because treatment goals differ, it is important to know if the primary cause of hyperkyphosis is functional or structural.

Assessment begins at your very first contact with a client. In some cases, this may be on the telephone when an appointment is requested. Ask in advance if the client is seeking treatment for a specific area of pain so that you can prepare yourself.

Postural Assessment

Allow the client to walk and enter the room ahead of you while you assess posture and movements before the client is aware that the assessment has begun. Look for imbalances or patterns of compensation for deviations common with hyperkyphosis. Have the client sit at a desk or table to fill out the assessment form, and look for a slouching posture. If they are slouched, ask a question to draw their attention to you and away from the form. Notice whether they extend the thoracic spine or only the upper cervical spine when looking up at you. Extending only the upper cervical spine may indicate weakness in thoracic extension. Look for slight rotation of the neck when the client is looking straight ahead. This may indicate shortening of the contralateral upper trapezius, scalenes, or SCM or shortening of the ipsilateral levator scapulae, splenius, or cervical erector spinae. If the internal rotators of the shoulder are shortened, the client's elbow and forearm may not rest on the table while writing. Watch also as the client stands up to see whether they extend the thoracic spine or whether the momentum comes mostly from hip and knee extension. If hyperlordosis is also present, knee extension may be the primary force, and the client may use the table for assistance in standing. Supplement these findings with a standard assessment of the client's stationary, standing posture. Figure 5 compares the anatomic position to posture affected by hyperkyphosis.

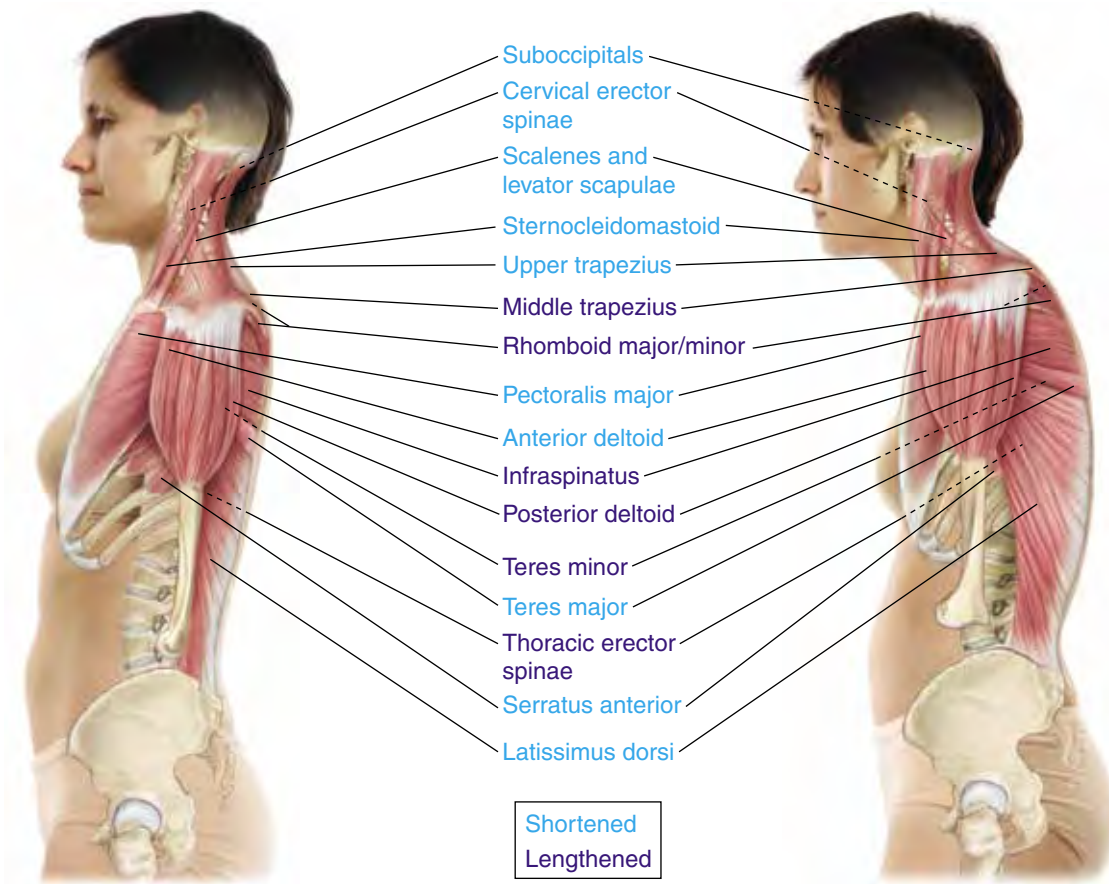


Figure 4-5 Compare the anatomical postures on the left to the hyperkyphotic postures on the right.

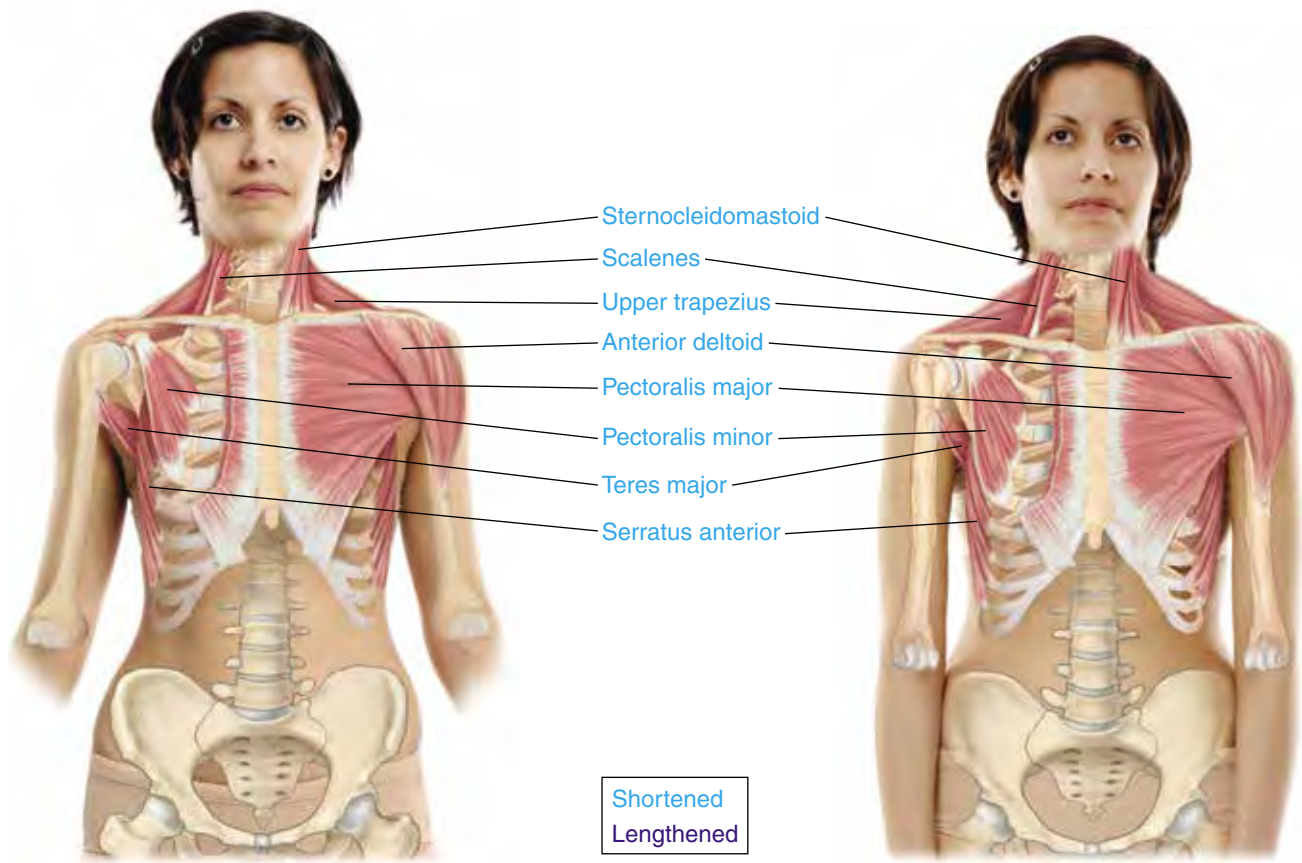


Figure 4-5 (continued) Compare the anatomical postures on the left to the hyperkyphotic postures on the right.

ROM Assessment

Test the ROM of the neck, shoulders, and thoracic spine, assessing length and strength of both agonists and antagonists that cross the joints tested. If hyperkyphosis is structural in nature, do not perform ROM tests that move the affected joints into ranges that are inhibited by altered joint structure. For example, if thoracic vertebrae are fused into flexion, do not test extension of the thoracic spine. Since it allows the client to control the amount of movement and stay within a pain-free range, only active ROM should be used in the acute stage of injury to prevent undue pain or re-injury. Box 1 presents the average active ROM results for the joints involved in hyperkyphosis.

Active ROM

Compare your assessment of the client's active ROM to the values in Box 1. Pain and other symptoms may not be reproduced with active ROM assessment because the client may limit movement to a symptom-free range.

- **Active extension of the thoracic spine** may be reduced when muscle tension, adhesions, and trigger points in the extensors of the thoracic spine contribute to hyperkyphosis. The client may resist full active extension of the thoracic spine if this produces symptoms during activities of daily living.
- **Active flexion of the cervical spine** may be restricted due to weakened deep cervical flexors attempting movement against shortened upper cervical extensors.
- **Active rotation and lateral flexion** of the cervical spine may be reduced or cause pain due to hypertonicity or spasm in the rotators and lateral flexors of the cervical spine or the weakening of their antagonists.
- **Active external rotation of the shoulder** may be restricted due to adhesions, hypertonic internal rotators of the shoulder, and protraction of the scapula.

Box 4-1: Average Active ROM for Joints Involved in Hyperkyphosis

Cervical Spine

Flexion 60°

SCM (bilateral)
Anterior scalenes (bilateral)
Longus capitis (bilateral)
Longus colli (bilateral)

Extension 55°

Upper trapezius (bilateral)
Levator scapulae (bilateral)
Splenius capitis (bilateral)
Splenius cervicis (bilateral)
Rectus capitis (bilateral)
Oblique capitis superior (bilateral)
Semispinalis capitis (bilateral)
Longissimus capitis (bilateral)
Longissimus cervicis (bilateral)
Iliocostalis cervicis (bilateral)

Lateral Flexion 20–45°

Upper trapezius (unilateral)
Levator scapulae (unilateral)
Splenius capitis (unilateral)
Splenius cervicis (unilateral)
SCM (unilateral)
Longus capitis (unilateral)
Longus colli (unilateral)
Anterior scalene (unilateral)
Middle scalene (unilateral)
Posterior scalene (unilateral)
Longissimus capitis (unilateral)
Longissimus cervicis (unilateral)
Iliocostalis cervicis (unilateral)

Ipsilateral Rotation 70–90°

Levator scapulae (unilateral)
Splenius capitis (unilateral)
Splenius cervicis (unilateral)
Rectus capitis (unilateral)
Oblique capitis (unilateral)
Longus colli (unilateral)
Longus capitis (unilateral)
Longissimus capitis (unilateral)
Longissimus cervicis (unilateral)
Iliocostalis cervicis (unilateral)

Contralateral Rotation 70–90°

Upper trapezius (unilateral)
SCM (unilateral)
Anterior scalene (unilateral)
Middle scalene (unilateral)
Posterior scalene (unilateral)

Shoulder

Flexion 180°

Anterior deltoid
Pectoralis major (upper fibers)
Biceps brachii
Coracobrachialis

Extension 50–60°

Posterior deltoid
Latissimus dorsi
Teres major & minor
Infraspinatus
Pectoralis major (lower fibers)
Triceps brachii

Shoulder (continued)

Internal Rotation 60–100°

Anterior deltoid
Latissimus dorsi
Teres major
Subscapularis
Pectoralis major

External Rotation 80–90°

Posterior deltoid
Infraspinatus
Teres minor

Abduction 180°

Deltoids
Supraspinatus

Adduction 50–75°

Latissimus dorsi
Teres major
Infraspinatus
Teres minor
Pectoralis major
Triceps brachii (long head)
Coracobrachialis

Horizontal Abduction 45°

Posterior deltoid
Infraspinatus
Teres minor

Horizontal Adduction 130°

Anterior deltoid
Pectoralis major (upper fibers)

Thoracic Spine

Flexion 30–40°

Rectus abdominis
External obliques
Internal obliques

Extension 20–30°

Spinalis
Longissimus
Iliocostalis
Multifidi
Rotatores
Semispinalis capitis
Latissimus dorsi
Quadratus lumborum

Lateral Flexion 20–25°

Spinalis (unilateral)
Longissimus (unilateral)
Iliocostalis (unilateral)
Quadratus lumborum (unilateral)
External oblique (unilateral)
Internal oblique (unilateral)
Latissimus dorsi (unilateral)

Ipsilateral Rotation 35°

Internal oblique (unilateral)

Contralateral Rotation 35°

Rotatores (unilateral)
Multifidi (unilateral)
External oblique (unilateral)

Cervical Spine

Mandible

Elevation (contact of teeth)
Masseter
Temporalis
Medial pterygoid

Depression 35–50 mm

Hyoids
Digastric
Platysma

Protraction 3–7 mm

Lateral pterygoid
Medial pterygoid

Retraction

Temporalis
Digastric

Contralateral Lateral Deviation 5–12 mm

Lateral pterygoid
Medial pterygoid

Respiration

Inhalation

Diaphragm
Scalenes
SCM
External intercostals
Serratus anterior
Serratus posterior superior

Exhalation

Internal intercostals
Serratus posterior inferior
Internal obliques
External obliques
Transversus abdominis

Passive ROM

Compare the client's passive ROM on one side to the other when applicable. Note and compare the end feel for each range.

- **Passive flexion of the cervical spine** may be restricted or cause discomfort due to shortened cervical extensors or dysfunction of the vertebrae.
- **Passive lateral flexion or rotation of the cervical spine** may be restricted unilaterally if the client's posture favors lateral flexion or rotation in the opposite direction.
- **Passive extension of the cervical spine** may be restricted by the head-forward posture due to tension in muscles such as the scalenes or SCM that also flex the cervical spine. If the head-forward posture is not present, passive extension of the cervical spine will likely occur with ease, although it may produce pain at the end point.
- **Passive external rotation of the shoulder** may be restricted if the scapula is protracted, causing the glenohumeral joint to be rotated inferiorly.

Resisted ROM

Use resisted tests to assess the strength of the muscles that cross the involved joints. Compare the strength of the affected side to that of the unaffected side.

- **Resisted extension of the thoracic spine** may reveal pain and weakness in the thoracic erector spinae.
- **Resisted retraction of the scapula** may reveal pain and weakness in the rhomboids and middle trapezius.
- **Resisted rotation or lateral flexion of the neck** may produce pain or a referral if the muscles responsible for that action are tight or contain trigger points, and may reveal weakness in their antagonists.
- **Resisted external rotation of the shoulder** may reveal weakness in the external rotators of the shoulder.

SPECIAL TESTS

The following special tests will help you determine when a client should be evaluated by their health care provider using X-ray or other tools, which may reveal conditions that are contraindicated or require special consideration when planning massage treatment.

The **vertebral artery test** may reveal insufficiency in the vertebral artery and is performed if the client experiences vertigo, blurred vision, or light-headedness during activities of daily living (Fig. 6).

1. Position the client seated in a chair facing you with the eyes open.
2. Instruct the client to fully rotate and extend the neck to one side for 30 seconds.
3. If the test is negative on one side, test the other. Do not test the other side if the first side tests positive.

Spurling's test may reveal compression of a nerve or irritation to the facet joint in the cervical spine and is performed when the client has had an injury, complains of pain that radiates, or experiences numbness and tingling in the arm (Fig. 7). Although massage may not be contraindicated for a client with these conditions, refer the client to their health care provider for more detailed information or to a massage therapist with advanced training if you have not studied the client's condition in detail. If the client tests positive for vertebral artery insufficiency, do not perform Spurling's test.



Figure 4-6 Vertebral artery test.



Figure 4-7 Spurling's test.

1. Stand behind the seated client and instruct them to extend, laterally flex, and rotate the head to the affected side.
2. Gently and slowly press down on the client's head. If the client cannot extend, laterally flex, or rotate the neck, perform a simple compression test without these actions.
3. If the client experiences radiating pain, numbness, or tingling in the arm, the test is positive for nerve root compression.
4. Ask the client to describe the location of symptoms, because this may suggest which nerve is compressed.
5. If the client feels pain that does not move past the neck, the test is positive for irritation of the facet joint.
6. Applying gentle traction to the neck after the test may relieve symptoms. If traction does relieve symptoms, this is considered reinforcement that Spurling's test is positive for compression of a nerve or facet joint irritation.

The **Valsalva maneuver** may reveal a herniated disc, tumor, or other factor that increases pressure on the spinal nerves; it is used when the client complains of pain in a localized area along the spine, particularly when coughing or sneezing. A herniated disc does not contraindicate massage, but this test is not specific for the cause of increased pressure. For this reason, it is best to refer the client to their health care provider for further testing before performing a massage.

1. To avoid even a temporary reduction in circulation, do not perform this test if the client has tested positive for vertebral artery insufficiency or has cardiovascular disorders.
2. With the client seated and facing you, ask them to take a deep breath and then attempt to exhale against the closed throat (such as when moving the bowels).
3. The test is positive if the client feels pain in a localized spot along the spine.

Palpation Assessment

Palpate the muscles of the upper cross to assess for hyper- and hypotonicity and myofascial restrictions. You are likely to find hypertonicity and myofascial restrictions in the pectorals, especially near the glenohumeral joint. The serratus anterior, subclavius, and anterior intercostals may also be adhered and hypertonic, particularly if the client slouches or has developed a pattern of shallow breathing. The SCM, upper trapezius, suboccipitals, cervical erector spinae, levator scapulae, and scalenes may be hypertonic, particularly if the client has developed the head-forward posture, elevated shoulders, or extension of the upper cervical spine. When internal rotation of the shoulder is present, you may also find adhesions and hypertonicity in the anterior deltoid, latissimus dorsi, subscapularis, and teres major.

Overstretched muscles may include the deep anterior neck muscles, rhomboids, middle trapezius, and thoracic erector spinae with the head-forward posture, protracted scapulae, and increased thoracic curve. With internally rotated shoulders, the posterior deltoid, infraspinatus, and teres minor may be lengthened.

CONDITION SPECIFIC MASSAGE

Because hyperkyphosis may be structural, it is essential to understand the client's health history. If a systemic condition or a degenerative bone or disc disease is present, discuss treatment with the client's health care provider and adjust the treatment accordingly. Treatment goals for structural hyperkyphosis may be limited to pain reduction. If thoracic outlet syndrome, chronic tension headaches, or hyperlordosis is present, refer to those CE courses for special testing and consideration of the neuromuscular characteristics. Temporomandibular joint dysfunction may also develop with hyperkyphosis. This disorder is not covered in this text, but you may treat the muscle of mastication generally to offer some relief; if you have not studied this condition in detail, refer the client to a massage therapist with training in this area.

It is essential for the treatment to be relaxing. You are not likely to eliminate the pain associated with hyperkyphosis or any of the associated conditions in one treatment. Do not try to do so by treating aggressively. Be sure to ask your client to let you know if the amount of pressure keeps them from relaxing. If the client

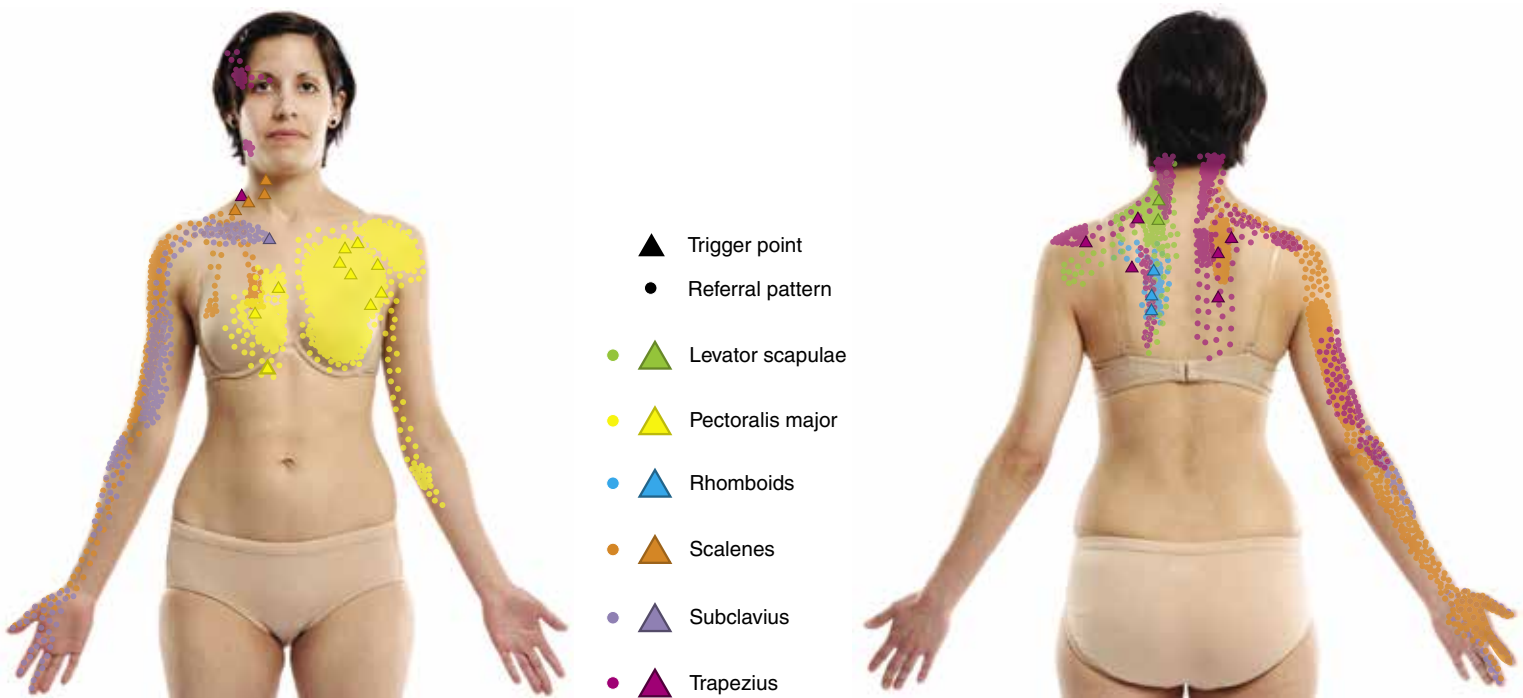


Figure 4-8 Common trigger points and referral patterns associated with hyperkyphosis.

responds by tensing muscles or has a facial expression that looks distressed, reduce your pressure. Remember that you are working on tissue that is compromised.

Ask the client to let you know if any part of your treatment reproduces symptoms. If deep palpation of a trigger point reproduces symptoms, explain this phenomenon to your client and ask them to breathe deeply during the application of the technique. As the trigger point is deactivated, the referral pain will also diminish. Common trigger points and their referral points are shown in Figure 8.

If any other symptoms are reproduced, adjust the client to a more neutral position, reduce your pressure, or move slightly off the area, and take note of this because it may help you understand more clearly exactly what is contributing to the client's symptoms. Instruct your client to use deep but relaxing breathing to assist in relaxation.

The following suggestions are for treatment that considers several factors involved in hyperkyphosis. Because several joints and many muscles are involved in this condition, your treatment will likely fill the entire session.

Treatment Goals:



Increase circulation



Reduce adhesions



Reduce tone/tension



Lengthen tissue



Treat trigger points



Passive stretch



Clear area

- Begin with the client in the supine position with a rolled towel along the length of the spine (Fig. 9). This bolster will retract the scapulae and lengthen the pectoral muscles. If the client's neck is in extension, fold a pillow case or hand towel into a bolster that is small enough to be placed under the occiput without obstructing your access to the posterior neck muscles.
- If the client has symptoms that suggest thoracic outlet syndrome, begin on the affected side. If both arms are affected, begin with the dominant side.



- Place moist heat on one pectoral if the client does not have a cardiovascular condition. After heating one pectoral, move the heat to the other side and begin treating the heated side. After heating the second pectoral, you can move the heat to the posterior neck if this is comfortable for the client.



- Before applying emollient, assess the tissues of the anterior upper cross for myofascial restrictions and release them if found. Adhesions are often found around the glenohumeral joint, along the anterior deltoid, along the lateral and posterior neck, and at the occiput.



- Reduce tension, then apply lengthening strokes to the full length of the pectoralis major to soften tissues to allow you to treat deeper structures. Apply these strokes from sternum or clavicle toward the humerus to reduce internal rotation of the shoulder.



- Assess the pectoralis major for trigger points, and treat them if found. Common trigger points in the pectoralis major are found



Figure 4-9 Bolster in supine position.

along the mid sternum, at the clavicular attachments, and along the inferior fibers, particularly near the axilla.



- Assess and treat the subclavius for hypertonicity and trigger points. The subclavius is a slight, thin muscle deep to the pectoralis major and may not be easily palpated. Trust your knowledge of anatomy as you palpate along the inferior edge of the middle third of the clavicle toward the costal cartilage of the first rib. If you find and treat trigger points in the subclavius, use a pin and stretch technique to lengthen the muscle fibers.



- You can treat the pectoralis minor through the pectoralis major, but it is difficult to distinguish the two muscles when palpating both. You can access pectoralis minor more directly by pushing the lateral fibers of the pectoralis major medially as you palpate ribs 3, 4, and 5. This may be easiest by kneeling next to the client and placing their hand on your shoulder, which will gently lift the pectoralis major out of the way. This is also preferable to externally rotating the shoulder, which would put tension on a shortened pectoralis major. Once you have found the pectoralis minor, ask the client to depress their shoulder and feel for a contraction. If you are palpating through the pectoralis major, you may also feel it contract.



- If you treat myofascial restrictions, hypertonicity, and trigger points in the pectoral area, perform a full stretch to the pectorals, and close with clearing strokes. If you found the area to be only minimally affected, close with clearing strokes.



- Assess the anterior deltoid for hypertonicity. Warm the tissues and lengthen them from the clavicle toward the deltoid tuberosity to reduce the internal rotation of the shoulder.



- Treat any trigger points found, and stretch the anterior deltoid using external rotation or by extending the shoulder off the edge of the table.



- With the head turned slightly away from the side you are treating, warm and lengthen the superficial neck muscles, particularly the upper trapezius, from the occiput to the acromion process. Be very careful not to work in the endangerment areas. Avoid direct compression to nerves and blood vessels, and back away gently if you feel a pulse.



- Soften then lengthen the levator scapulae, splenius capitis, splenius cervicis, the suboccipitals, and the cervical erector spinae. Treat any trigger points as necessary. Hooking your fingers under the occiput and gently rocking the head into minimal flexion and extension is an effective way of releasing the suboccipitals.



- If you treat hypertonicity and trigger points in the posterior neck muscles, perform a full stretch, and close with clearing strokes.



- Release the SCM; using pincer grip petrissage along its length is often effective. Treat trigger points if found. Trigger points in the SCM may cause vertigo, nausea, or ringing in the ears. Ask your client to let you know if any unusual sensations are felt, and reduce your pressure if necessary.

- Once you have softened the SCM and trapezius, you will have greater access to the scalenes. To access the anterior scalene, gently push the SCM medially with one or two fingertips as you feel for the deeper scalenes. As you move the SCM medially, your fingers should be gently resting on the soft tissue covering the transverse processes of the cervical vertebrae. Use this as your guide for treating the anterior scalene. Once you have found it, ask the client to take a quick, forced breath into their chest, and feel for a contraction.



- Lengthen the anterior scalene from the transverse processes to the first rib. Treat any trigger points found with muscle stripping and compression. It is often helpful once you have found a trigger point in the scalenes to compress it gently while slowly rotating the head ipsilaterally. Trigger points in the anterior scalene are often quite sensitive, and the client may feel cautious when you work deeply in the neck. Begin gently so as not to frighten the client or cause them to jerk the head. Remember that you are working in an area that is filled with nerves and vasculature. Trigger points in the scalenes may radiate across the top of the shoulder and into the arm, hand, and fingers. If the client also has thoracic outlet syndrome, symptoms may appear. Reduce your pressure, and realign the neck if necessary.



- Find the middle and posterior scalenes by gently palpating the transverse processes and then moving slightly posterior. The middle scalene crosses the transverse processes as it heads toward the first rib. The posterior scalene is posterior to the middle scalene, and runs inferiorly toward the second rib. Once you have found them, ask the client to take a quick, forced breath into their chest, and feel for a contraction. Take the same cautions with the middle and posterior scalenes as you did with the anterior scalene. Lengthen the muscles, and treat trigger points if found.



- If you treat trigger points, stretch the scalenes by increasing the distance between their origins and insertions. Options for stretching include contralateral lateral flexion and ipsilateral rotation. If you found no trigger points, use clearing strokes, and turn the client into the prone position.

- Turn the client to the prone position, and use rolled towels to bolster the shoulders. This will keep the pectorals lengthened, retract the scapulae, and reduce any stretch on the rhomboids and middle trapezius. The bolster should be placed under the shoulder and a few inches of the humerus to avoid adding tension to the joints.

- Adjust the face cradle to reduce flexion in the cervical spine. If you see a crease in the skin on the back of the neck, lower the head rest slightly as long as this is comfortable for the client.



- Reduce adhesions between the scapulae. These are commonly found around the superior angle of the scapula, at the vertebrae, and at the intersection of the lower trapezius and latissimus dorsi.



- When treating the middle trapezius and rhomboids, apply strokes from the scapula toward the spine. Remember that these muscles are often overstretched in hyperkyphosis. Stripping in the opposite direction may lengthen the already overstretched muscles.



- When treating the deeper thoracic erector spinae, cross fiber strokes may help separate adhered tissues. Apply strokes from superior to inferior to encourage thoracic extension.



- Assess the rhomboids, middle trapezius, and thoracic erector spinae for trigger points. It may be difficult to use compression on the erectors because of their rope-like texture. Try to isolate the trigger point and stabilize the tissue with one hand while you compress with the other to keep it from continually rolling away from your pressure. If you treat trigger points in these

muscles, use a pin and stretch technique to lengthen only the affected area to avoid stretching the full muscle.



- Assess the teres major, serratus anterior and latissimus dorsi for hypertonicity and trigger points and treat if necessary.

- Assess the infraspinatus and teres minor for adhesions and trigger points and treat if necessary.



- If you have time, consider the other possible conditions that may develop with hyperkyphosis, and treat these areas. Tension headaches suggest additional treatment to the head, temporomandibular joint dysfunction to the jaw, thoracic outlet syndrome to the affected limb, and hyperlordosis to the hip flexors and lumbar erectors. You may not have time to treat all of these fully, but you can give some attention to them in each session as time permits. As the signs and symptoms of hyperkyphosis decrease, you can increase the amount of time you spend on other pain patterns or restrictions in ROM.



- End with clearing strokes to the full back.

		TREATMENT GOAL				
		General		Specific	General	
		Superficial		Deep	Superficial	
STRUCTURES	Proximal	Chest	Pectoralis major	Pectoralis minor Serratus anterior	Chest	Primary goals for treatment (Hyperkyphosis)
	Distal	Arm	Anterior deltoid Latissimus dorsi Teres Major	Subscapularis	Arm	
	Distal	Neck	Upper trapezius Levator scapula Sternocleidomastoid	Splenii Cervical erector spinae Suboccipitals Scalenes	Neck	
	Proximal	Back	Middle trapezius Infraspinatus Posterior deltoid	Rhomboid minor Rhomboid major Teres minor Thoracic erector spinae	Back	

CLIENT SELF-CARE

Avoiding further injury is a primary concern when recommending self-care. Self-care for a client with structural hyperkyphosis should be planned with the client’s health care provider. Reducing or eliminating habitual offending activities and other perpetuating factors is crucial for long-term relief of pain related to functional hyperkyphosis. The client with functional hyperkyphosis must learn to recognize when they are holding the affected muscle in a shortened position and which of their activities of daily living is putting undue stress on the joints and the muscles that cross them. You can help clients learn how to modify such activities to avoid oversteering the affected structures. The following are intended as general recommendations for stretching and strengthening the muscles involved in hyperkyphosis. The objective is to create distance between the attachment sites of muscles that have shortened and to perform repetitions of movements that decrease the distance between the attachments of muscles that have weakened. If you have had no training in remedial exercises and do not feel that you have a functional understanding of stretching and strengthening, refer the client to a professional with training in this area.

Clients often neglect self-care because their daily lives are busy. Encourage them to follow these guidelines:

- Instruct the client to perform self-care activities throughout the day, such as while taking a phone call, reading e-mail, watching television, or during other activities of daily living instead of setting aside extra time.
- Encourage the client to take regular breaks from repetitive actions. Demonstrate gentle self-massage to keep adhesions and hypertonicity at bay between treatments.
- Instruct the client on proper posture in the seated position to keep pressure off the weakened joints.
- Instruct an athlete who is strengthening the pectorals more regularly than they are strengthening the rhomboid and middle trapezius to reduce pectoral resistance exercises and increase scapular retraction and thoracic extension to balance strength in the thoracic area.
- Instruct a client who regularly performs heavy lifting to lift with the legs instead of the back.
- Demonstrate all strengthening exercises and stretches to your client and have them perform these in your presence before leaving to ensure that they are performing them properly and will not harm themselves when practicing alone. Stretches should be held for 15–30 seconds and performed frequently throughout the day within the client’s limits. The client should not force the stretch. It should be slow and gentle, trying to keep other muscles as relaxed as possible.

Stretching

Instruct the client to stretch the pectoralis major and minor by standing in a doorway with the hands on the frame while stepping forward to bring the arms slightly posterior (Fig. 10). It is essential that they step rather than lean forward, because leaning will affect the muscles of the neck, back, and hips. The stretch is best performed with the spine straight. The client can raise the hands above the head on the doorway to stretch the lower fibers, at the level of the shoulder to stretch the middle fibers, and below the hips to stretch the upper fibers.



Figure 4-10 Pectoral stretch.



Figure 4-11 Seated pectoral stretch.



Figure 4-12 Cervical extensor stretch.

As an alternative stretch that the client can perform during work hours, while reading an e-mail or during a conference call, instruct the client to clasp the fingers behind the head (moderate stretch) or rest the fingers behind the ears (deeper stretch) while drawing the elbows posteriorly within their range of comfort (Fig. 11). This will also retract the scapulae and reduce the stretch on the rhomboids and middle trapezius.

To stretch the posterior neck muscles, instruct your client to let the head hang so that the chin approaches the chest, without flexing the thoracic spine (Fig. 12). The client should not actively force the chin to touch the chest. If they want to increase the stretch, they can rest the hands on the back of the head and allow the weight of the arms to gently pull the chin toward the chest. It may help to gently rotate the flexed neck from side to side so that the chin is parallel to the shoulder on either side. Although, for some, it may feel good to include cervical extension into the stretch, this is not advised if the client is at risk for nerve compression or disc herniation. Even in the absence of disc disease or nerve compression, one rotation in extension may be performed after several side-to-side rotations in flexion, but do not instruct the client to do a full, repeated circumduction of the head.

Strengthening

The client should also strengthen the middle trapezius, rhomboids, and thoracic erector spinae in order to efficiently antagonize protraction of the scapula and flexion of the thorax.

Instruct the client to sit or stand while squeezing the scapulae together (Fig. 13). When this is done properly, only the scapulae should retract, and the shoulders should be relaxed. Hold each contraction for 5–10 seconds with 3–5 seconds of rest between contractions. Perform 10 repetitions or as many as are comfortable before feeling fatigue or weakness.

Instruct the client to strengthen the thoracic erector spinae by resting their hands behind the head in either a seated or prone position while extending the thoracic spine within their limits.

The client can work toward reducing the head-forward posture by tucking the chin inward (Fig. 14). The act of retracting the neck and head may also reduce thoracic flexion. Hold the posture for about 5–10 seconds



Figure 4-13 Middle trapezius and rhomboid strengthening.



Figure 4-14 Strengthening the deep neck flexors.

with 3–5 seconds of rest between contractions. Perform 10 repetitions or as many as are comfortable before feeling fatigue or weakness in the neck.

SUGGESTIONS FOR FURTHER TREATMENT

Ideally, a client developing hyperkyphosis will have treatments once a week until symptoms are absent for at least 7 days. A client with more severe signs and symptoms is best treated twice per week until signs of improvement occur, such as improvement in ROM and reduction in hypertonicity and pain. Reduce frequency to once per week until symptoms are absent for at least 7 days. When the client reports that they have been pain-free for up to 7 days, treatment can be reduced to twice per month. If the client is pain-free for 2 or more weeks at a time, they can then schedule an appointment once per month or as necessary. With functional hyperkyphosis, there should be some improvement with each session. If this is not happening, consider the following possibilities:

- There is too much time between treatments. It is always best to give the newly treated tissues 24–48 hours to adapt, but if too much time passes between treatments in the beginning, the client’s activities of daily living may reverse any progress.
- The client is not adjusting their activities of daily living or is not keeping up with self-care. As much as we want to fix the problem, we cannot force a client to make the adjustments we suggest. Explain the importance of the client’s participation in the healing process, and encourage the client to follow your recommendations, but be careful not to judge or reprimand a client who does not.
- The condition is advanced or involves other musculoskeletal complications that are beyond your basic training. Refer this client to a massage therapist with advanced training. Continuing to treat a client whose case is beyond your scope could hinder healing and turn the client away from massage therapy altogether.
- The hyperkyphosis is structural or there is an undiagnosed, underlying condition. Discontinue treatment until the client sees a health care provider for a medical assessment. Discuss the medical as-

assessment with the client's health care provider to determine cautions or contraindications for future treatments.

If you are not treating the client in a clinical setting or private practice, you may not be able to take this client through the full program of healing. Still, if you can bring some relief, it may encourage the client to discuss this change with their health care provider and seek manual therapy rather than more aggressive treatment options. If the client agrees to return for regular treatments, the symptoms are likely to change each time, so it is important to perform an assessment before each session. Once you have released superficial tissues in general areas, you may be able to focus more of your treatment on a specific area. Likewise, once you have treated the structures specific to hyperkyphosis, you may be able to pay closer attention to compensating structures and coexisting conditions.

Professional Growth

Case Study

Seth is a 26-year-old recording engineer. He works an average of 50 hours per week, usually beginning in the late afternoon and finishing well after midnight. Seth rides his bicycle 6 miles to work and 6 miles home for daily exercise. He eats a reasonably healthy diet and drinks water throughout the day, but beer is often the drink of choice during a recording session. He has been feeling pain between his scapulae, especially on the left side.

SUBJECTIVE

The client complained of pain between his shoulder blades, particularly on the left side, with an area of sharp, intermittent pain along his spine about midway between his upper and lower back. He rides a classic 10-speed bicycle on which he must lean forward to hold the handle bars, causing him to bend his neck back in order to look forward. While at work, he spends the first hour or so arranging microphones and equipment but spends the rest of the session in a chair at the recording console. He rarely gets up, except to go to the bathroom. He reports that the symptoms are most aggravating when he gets tired or feels weaker toward the end of a recording session, and he has noticed that he feels less stiff the day after working with a band that does not drink alcohol. When it hurts most, it hurts to turn his head to the right, and he feels like he cannot turn all the way when he tries to turn it to the left. He has no insurance and has not seen a health care provider but has had no history of illness and feels no pain or weakness in any other part of his body. When asked if he has experienced nausea, vertigo, or blurred vision, Seth responded "No." When asked if he had radiating pain or numbness or tingling in the arm, Seth responded "No." He could not recall if he felt pain near the spine when he coughs or sneezes. The symptoms do not keep him from his normal activities. Seth asked for a session focused on his neck and back pain.

OBJECTIVE

As Seth was explaining his symptoms, he stood with most of his weight on the left leg, the right hip externally rotated, and the thorax slightly laterally flexed to the left. Postural assessment revealed a slight increase in thoracic kyphosis, slight internal rotation of the shoulders bilaterally, and significant head-forward posture with extension of the upper cervical spine, particularly near the occiput. The left shoulder is slightly elevated. The head is slightly rotated to the right and laterally flexed to the left. The left hip is slightly elevated; the right hip is slightly externally rotated.

Valsalva test was negative for herniation or other factors increasing pressure on the spinal cord. Active rotation of the cervical spine was reduced to the left and caused pain at the end point to the right. Flexion of the cervical spine was reduced but caused no pain. Extension of the thoracic spine was normal and produced no pain.

Palpation revealed hypertonicity in upper trapezius, SCM, scalenes, and pectoralis major bilaterally, and levator scapula, latissimus dorsi, and lower trapezius on the left. The rhomboids minor, serratus posterior superior, middle trapezius, and thoracic erector spinae are taut and tender bilaterally.

ACTION

I began in the supine position with a rolled towel along the length of the spine and a pillow under the occiput. I performed myofascial release on the tissue around the humeral attachments of the pectoralis major and latissimus dorsi and along the sternum. I used effleurage to warm the pectorals and anterior deltoid and used muscle stripping to lengthen both bilaterally. No trigger points were found.

I performed myofascial release on the posterior neck, particularly near the occiput. I used effleurage to warm the superficial tissues followed by muscle stripping to the upper trapezius and levator scapulae. No trigger points were found. I used pincer grip kneading on the SCM bilaterally. No trigger points were found. I used muscle stripping on the scalenes, splenius muscles, and occipitals bilaterally. Hypertonicity was greater in the left scalenes. A trigger point was found in the left anterior scalene, halfway between the origin and the insertion, that referred toward the left scapula. Referred pain decreased from level 7 to 3 after two rounds of compression followed by muscle stripping. No trigger points were found on the right side. I performed a full cervical rotation to the left and lateral flexion to the right followed by postisometric relaxation to lengthen the left scalenes.

I removed the bolster from the occiput to apply deep petrissage to the occipital muscles. No trigger points were found. I applied a passive stretch to the cervical extensors by bringing the chin toward the chest.

In a prone position, I began with firm effleurage and superficial cross-fiber friction on the latissimus dorsi, particularly on the left side. A tender spot was found slightly medial to the scapula in upper fibers of the left latissimus dorsi. No referral was produced.

I performed superficial, bilateral cross-fiber friction to reduce adhesions around the superior angle of the scapula and at the junction of the lower trapezius and latissimus dorsi. Muscle stripping on the lower trapezius revealed a trigger point slightly medial to the lateral border of the left scapula, which referred around the left scapula and toward the acromion process. Compression of the trigger point produced a local twitch response. Pain reduced from level 6 to 2. I used pin and stretch along the fibers containing the trigger point.

I used deep effleurage from the medial border of the scapula toward the spine along the rhomboids and middle trapezius. Compression slightly inferior to the superior angle of the scapula produced a local twitch response in the rhomboid major but no referred pain. Local pain reduced from level 5 to 2.

I followed deep cross-fiber friction with muscle stripping from superior to inferior along the thoracic erector spinae. No trigger points were found. The client reported feeling no pain, but rather, comfortable relief here.

Following treatment, active left rotation of the cervical spine increased by approximately 10° compared to pre-treatment, and right rotation caused no pain. Flexion of the cervical spine improved by approximately 25° compared to pre-treatment.

PLAN

I demonstrated stretches for the pectoral muscles and posterior neck, and strengthening exercises for the rhomboids and middle trapezius that can be performed during work hours. Seth rescheduled for 1 week from today. If improvement is significant enough to allow time for treatment to other areas, I will assess and treat the muscles of the lower back and hips that may be contributing to the elevation and external rotation of the hip and lateral flexion of the trunk. Based on my assessment of the tissues and posture, which are only minimally affected, general maintenance may be sufficient following a second treatment if the client is pain-free and maintains normal ROM for at least 1 week. I encouraged the client to drink plenty of water following treatments to flush out metabolites and keep the muscles hydrated. I recommended avoiding alcohol during flare-ups if it intensifies symptoms. I recommended that Seth consider switching to a bicycle, like an upright cruiser, which allows him to sit erect without extending his neck.

CRITICAL THINKING EXERCISES

1. Develop a 10-minute stretching and strengthening routine for a client, which covers all of the muscles involved in hyperkyphosis. Use Table 4-1, Box 4-1, and Figure 4-8 as a guide. Remember that a stretch increases the distance between the origin and insertion of a muscle and is important for those muscles that are shortened, while strengthening is performed by actively bringing the origin and insertion closer together and is important for the antagonists of shortened muscles. Describe each step of the routine in enough detail that the client can perform it without your assistance.
2. A client calls to schedule a massage for pain between the shoulder blades and in the neck. She explains that she had open heart surgery 5 years ago that left a scar along the length of her sternum. Although her physician considers her healthy and she has normal activities of daily living, she is regularly monitored for signs of cardiovascular disease. Discuss the impact her surgery may have had in the development of her chronic pain, the essential questions to ask the client and her health care provider before initiating treatment, and the cautions and considerations necessary when planning treatment.
3. Discuss the necessary adjustments to treatment for a client who has a natural or surgical fusion of cervical or thoracic vertebrae.
4. Conduct a short literature review to explain how the following conditions may put a client at greater risk for developing hyperkyphosis:
 - Nerve root compression
 - Obesity
 - Respiratory disorders
 - Rheumatoid arthritis
 - Vitamin D deficiency
 - Hormone imbalance
 - Spondylolisthesis
 - Pott's disease
 - Paget's disease

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