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Tendinosis

Also known as:

Tendonitis, Tendinopathy, Tennis Elbow, Golfer's Elbow, Pitcher's Shoulder, Swimmer's Shoulder, Jumper's Knee

Definition: Injury and damage to a tendon.

GENERAL INFORMATION

- Primary cause: joint overuse due to athletic, recreational, or occupational activities
- Secondary causes: sudden joint injury, aging
- Commonly affected joints: elbow, wrist/forearm, shoulder, knee, heel/ankle
- Risk factors: frequent overhead motions, using vibratory tools or forceful exertion, working in awkward positions, repetitive movements, obesity
- Prevalent in middle age
- Often associated with systemic diseases, such as rheumatoid arthritis and diabetes

PATHOPHYSIOLOGY

Tendons are thick, fibrous bands located at the muscle's distal and proximal ends. All muscle/joint movement is possible because of this fulcrum-and-lever, highly effective biomechanical arrangement. Collagen and elastin within the tendinous tissue provide strength and elasticity, respectively. Inflammation of, or damage to, the tendon can occur anywhere along its path, but it usually happens at the juncture between tendon and bone. Rarely, in severe cases, the muscle can rupture off the bone. Temporarily or permanently weakened surrounding muscles often accompany tendinosis because of disuse atrophy at the painful site and overuse hypertonicity at the contralateral joint.

Diagnosis is medically confirmed by a variety of muscle resistance examinations. The patient generally reports a history of a specific, repeated activity leading to joint pain, tenderness, and self-imposed restrictions. X-rays, CT scans, or MRIs are rarely ordered and then only to rule out more complicated, possibly contributing, conditions. Self-diagnosis is the norm, however, as sufferers use the same previously mentioned criteria (usually combined with Internet research and colleagues' or friends' war stories) to confirm their condition.

OVERALL SIGNS AND SYMPTOMS

- Warmth to the touch
- Mild redness
- Mild swelling
- Decreased range of motion (ROM) secondary to pain
- Pain and tenderness upon palpation along the tendon path, often near the joint; at night and at rest; worse with activity

Massage Therapist Tip

An "Itis" without Inflammation

Although the term *tendonitis* is commonly used both inside and outside the medical profession, *tendinosis* and *tendinopathy* are more appropriate names because they encompasses the overall cellular (not necessarily inflammatory) and functional damage that results from a tendon injury. All four classic signs of inflammation—redness, swelling, heat, and pain—do not accompany many tendon injuries. It has now become questionable whether inflammation is a serious component of these injuries at all. You might think of a tendinopathy as a cellular and fibrous disorganization of the normally functioning muscle and tendon fibers. You will have the most success with clients if you work to repair damaged collagen and flush out joint waste instead of attempting to decrease a possibly nonexistent inflammation.

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

- The massage therapist approaches this condition primarily as a disorganization of cellular tendon components (and sometimes as a mild inflammatory process) and secondarily with respect for the client's pain, discomfort, and diminished ROM.
- Therapeutic techniques can address localized cellular nourishment and cleansing, as well as healing painful joints and atrophied, underused, or overused muscles.

TREATMENT OPTIONS

Initial treatment focuses on relieving pain and reducing any inflammation. Subsequent treatment includes strengthening and stretching the joint-tendon-muscle unit to ensure the return to full function. Rest, or ceasing offending activities, is essential. Rest, however, is not synonymous with complete immobilization. Severely restricting all normal limb use leads to joint weakness, thereby impeding healing and causing secondary difficulties. Ice application is helpful for acute, throbbing pain when the tendon appears inflamed. Warm packs are appropriate when the inflammation or acute pain has subsided, and for dull, achy pain. Self-care without medical attention, combined with rest, simple home remedies, and over-the-counter (OTC) pain and anti-inflammatory medications, can resolve most cases of tendinosis.

If simple personal restraint is not possible or convenient, a physician may suggest a splint or removable brace, a cane, or crutches for short-term use. If pain persists and normal activities are compromised for more than a few days, a sports medicine physician or rheumatologist should be consulted. In severe cases, when the tendon ruptures off the bone, surgical repair is necessary.

Preventive techniques include avoiding or altering the performance of a repeated activity, stretching before and especially after activity, and striving for ergonomically correct body mechanics. If mild symptoms recur, vigilant ice application and self-imposed rest can completely prevent exacerbation.

Common Medications

Corticosteroid injections around the affected joint can reduce inflammation and pain. Repeated injections, which can lead to a weakened and possibly ruptured tendon, are not recommended.

- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as naproxen (Aleve, Anaprox, Naprelan, Naprosyn)
- Nonopioid pain reliever and fever reducers, such as acetaminophen (Tylenol, Feverall, Anacin, Panadol)

MASSAGE THERAPIST ASSESSMENT

Because tendinosis is often self-diagnosed, the massage therapist has an opportunity to use keen assessment skills. If the client complains of a painful joint associated with specific overuse (e.g., hammering, playing tennis, continual wrist twisting on the job); has relative, but not complete, relief upon rest; and reports a chronic pattern of occurrence, the therapist is probably dealing with a tendinopathy. Gentle palpation and passive and active ROM movements will further confirm the assessment. It is advisable to look at other structures related to the shoulder to determine if there is accompanying pain in the triceps, flexors, or extensors. Trigger points harbored in surrounding muscles can contribute to elbow joint pain.

If, however, the client presents with a painful joint that has resulted from no obvious overuse, or if the joint is reddened, warm to the touch, swollen, and/or the client suffers from an autoimmune disorder or diabetes, the therapist should refer him to a physician before treating.

Thinking It Through

The importance of rest in healing overuse injuries is well documented. Also well established is the damage to the body caused by prolonged immobility. The massage therapist who addresses overuse injuries must often delicately balance these two physiologic realities while treating and when assigning homework. Here are some questions that might arise:

- Is the injury work-related or recreation-related? How will this affect the client's ability to truly rest?
- Does the client understand that rest is important until the joint begins to heal, but then movement, albeit not full-throttle use, is essential?
- If the client is using a brace or splint, how long is he wearing it, and is it making the joint weaker or dependent? What is the effect on surrounding and contralateral joints?
- Is he inclined to "muscle his way through" the pain and keep using the joint while ignoring the therapeutic necessity of rest?
- Is he inclined to overrest until there is absolutely no pain? Does he understand the importance of mild use and stretching?

THERAPEUTIC GOALS

It is reasonable for the massage therapist to help relieve pain and inflammation (if inflammation is present), help the reorganization and rebuilding of healthy collagen, flush the joint of cellular irritants, improve ROM, and decrease anxiety, which often accompanies overuse injuries.

MASSAGE SESSION FREQUENCY

Unless the therapist is trained in lymphatic drainage techniques, the injured limb should not be addressed during the acute, very painful stage. Once the acute pain has quieted, the client can be seen regularly.

- 60-minute sessions once a week, until most symptoms subside
- 60-minute sessions every other week, for 2 weeks, after all symptoms subside
- 60-minute monthly maintenance sessions

MASSAGE PROTOCOL

The following protocol addresses forearm flexor tendinosis manifesting at the wrist. You can use these same techniques on any similarly affected joint. You do not treat this condition as if it is an inflammation. The cross-fiber and frictioning techniques are not intended to create a temporary region of localized inflammation as much as they are used to help reorganize collagen fibers. This reorganization is facilitated by increasing the presence of fresh arterial blood, which is full of essential reparatory nutrients, to the region and by flushing waste from the joint. As with any injury, working on the painful site for a full 60 minutes would be inappropriate and painful. Half of the protocol addresses the injury, while the other half addresses contralateral, compensatory hypertonicity.

Getting Started

Positioning for the client's comfort level is essential. Have plenty of pillows ready. Treatment will include whole-body relaxation techniques, so more than partial disrobing is necessary. Ice packs and warm packs can be helpful. (Even though you are not treating this as an inflammation, ice packs can quiet the pain.)

The protocol will require you to cause temporary, localized discomfort. Diplomacy and tact are necessary to persuade the client to bear the sometimes uncomfortable—but never painful—techniques. It is important to be patient and keenly aware of the effects of your pressure and methods. As always, "no pain, no gain" is *not* the massage therapist's mantra.

HOMEWORK

Self-care is the norm when treating tendinopathies. The vigilance and consistency with which the client performs the following exercises can significantly speed healing.

- Immobilization is essential only in the early stages of your injury. Once the acute pain subsides, gentle use and movement are important.
- Apply ice packs any time you are in pain—10 minutes on, and then take the ice off once every hour.
- Apply hot or warm packs when the pain is dull and achy.
- Experiment with OTC "hot/cold" creams and gels; some can be beneficial.
- When you are not in acute pain, grip the belly of your affected muscle and squeeze it like a sponge. Move it around as much as possible. Stroke the muscle deeply from one joint to another, working in the direction of your heart.

Massage Therapist Tip

Telling Him He Can't Play Tennis

You will face many challenges when attempting to treat a tendinopathy, because the offending activity is either essential for the client's livelihood or necessary for his enjoyment. He'll be most anxious to return to full activity; however, the client's adamant desire to be fully functional can seriously thwart your therapeutic efforts. A single hour of even stellar massage therapy will have little effect if the client immediately returns to the same unmodified behavior. You will need to use all of your diplomatic skills to convince him that he must be patient and temporarily halt the offending activity, while assuring him that if he follows your advice, and possibly the advice of his physician, he will play tennis again, pain free.

Step-by-Step Protocol for Tendinosis of the Wrist

Technique	Duration
Greet the client's body with overall warming compression. Offer relaxation techniques to one specific area to begin the session.	5 minutes
Compression, light-then-medium pressure, evenly rhythmic • Shoulder, arm, forearm, palm	3 minutes
Effleurage, light-then-medium pressure, evenly rhythmic, work cephalically • Shoulder, arm, forearm, palm	2 minutes
Compression and effleurage, deep pressure, evenly rhythmic • Forearm and palm	2 minutes
Digital stripping (using your thumb is most helpful), start with light pressure and then move in as deeply as the client can tolerate. Work slowly, in between, in, and around all tendons and muscles; perform thorough and detailed work. This area is dense with long, stringy muscles. • Palm • Distal forearm • Mid-forearm • Proximal forearm	8 minutes
Effleurage, medium pressure, briskly • Palm, forearm, arm	1 minute
Cross-fiber friction, as if strumming guitar strings; start with light pressure, then move in as deeply as the client can tolerate. • Palm • Distal forearm • Mid-forearm • Proximal forearm	5 minutes
Find the point at which the client reports the most pain. It could be no larger than a quarter or as large as a few inches. Gently stroke the region for a few seconds, and then compress it slightly more deeply. Then effleurage it even more deeply. Now do cross-fiber friction as deeply as the client can tolerate. At the point where he is uncomfortable, stop and compress the area with your thumb, hold it still, and then slowly release the compression. Ask the client to continue to breathe; ask him about his favorite hobby or sports team to distract him. This may not be comfortable, but it is very beneficial. Stroke the region when you are done. Then perform slow, careful, passive ROM at the wrist, holding the stretch a little at the end-feel.	3 minutes
Effleurage, petrissage, effleurage, stroking, medium pressure, slow, evenly rhythmic • Arm • Forearm • Palm	1 minute

(continued)

Contraindications and Cautions

- **Warm packs are not appropriate when the joint shows any signs of inflammation.**
- **Causing pain (moving beyond the necessary feeling of discomfort) is not therapeutic or respectful of the injury.**
- **If the injury does not respond well and relatively quickly to rest and immobility (within days to a couple of weeks), urge the client to see a physician.**
- **Deep friction techniques are contraindicated if the client is taking anti-inflammatory medications.**

Technique	Duration
Treat compensating, hypertonic muscles at the shoulder joint or contralateral forearm.	25 minutes
Finish the session by performing more overall relaxing techniques.	5 minutes

Try to grasp the tendon between your thumb and index finger where it attaches to the bone. Wiggle it back and forth slowly.

- Soak the joint and limb in a warm Epsom salts bath.
- As soon as the acute pain subsides, stretch the muscle by performing slow ROM exercises. Hold the stretch in every direction for a few seconds.
- Be sure not to overrest the joint or overuse splints or protective devices.
- Rearrange your workspace for better ergonomics and body mechanics.
- Once you are pain-free and have returned to full function, be keenly aware of *any* hint of recurrence. Immediately ease up on activities, apply ice, do self-massage, and use any variety of OTC anti-inflammatory topical products.

Review

1. What is tendinosis?
2. List some of the other names for the condition.
3. Is it classically an inflammatory process?
4. Describe the normal treatment for tendinosis.
5. What are some beneficial self-care techniques?

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Thoracic Outlet Syndrome

Also known as:
TOS

Definition: Upper extremity pain and/or compromised function resulting from compression, irritation, or injury to the neurovascular structures of the anterior neck.

GENERAL INFORMATION

- Controversial cause, diagnosis, and treatment
- Classified as neurogenic, venous, or arterial based on the structures affected
- Neurogenic TOS causes: neck injury, whiplash, fall, repetitive movement
- Venous TOS causes: subclavian vein obstruction secondary to congenital anatomic anomalies or arm overuse, as in pitching, swimming, weight lifting, or working with the arms above the head; also poor posture, pregnancy, or obesity
- Arterial TOS causes: subclavian artery (axillary artery) stenosis or aneurysm secondary to a cervical rib congenital anomaly
- Mimicked by trigger points in the primary neck muscles
- Onset usually between ages 20 and 50
- Prevalence: three times more common in women

Morbidity and Mortality

Reported statistical occurrence varies widely. Some medical professionals question whether the syndrome exists at all. TOS symptoms are often shared with or mistaken for, or are comorbid with, spinal cord injuries or neoplasms, diabetes, hypothyroidism, superficial thrombophlebitis, carpal tunnel syndrome, multiple sclerosis, rotator cuff injuries, ulnar nerve compression at the elbow, fibromyalgia, brachial plexitis, and vasculitis.

The prognosis for all forms of TOS is good. Neurogenic TOS rarely progresses but does take longer to resolve. Venous and arterial TOS usually resolve relatively quick with appropriate treatment. If left untreated, however, permanent nerve damage and, in rare cases, loss of limb use can occur.

PATHOPHYSIOLOGY

The thoracic outlet spaces are located anterolateral, bilaterally between the clavicle and T-1, the first rib. The structures involved in TOS are shown in Figure 42-1. The brachial plexus, which is a bundle of the C-5, C-6, C-7, C-8, and T-1 spinal nerve roots, exits the spinal cord at the base of the skull. The plexus then traverses down the neck in a usually predictable pattern from underneath the clavicle and first rib then out toward the axilla, where it branches to continue down the anterior, medial, lateral, and posterior arm. It is a sensory *and* motor nerve network consisting of five major nerves: the median, radial, ulnar, musculocutaneous, and axillary. The brachial plexus controls shoulder, arm, and hand muscle sensations and movements. Sensations travel *to* the brain, and motor signals are issued *from* the brain through this nerve bundle. Thus, a person can both feel the heat of a coffee mug and grasp the mug to bring it to the mouth.

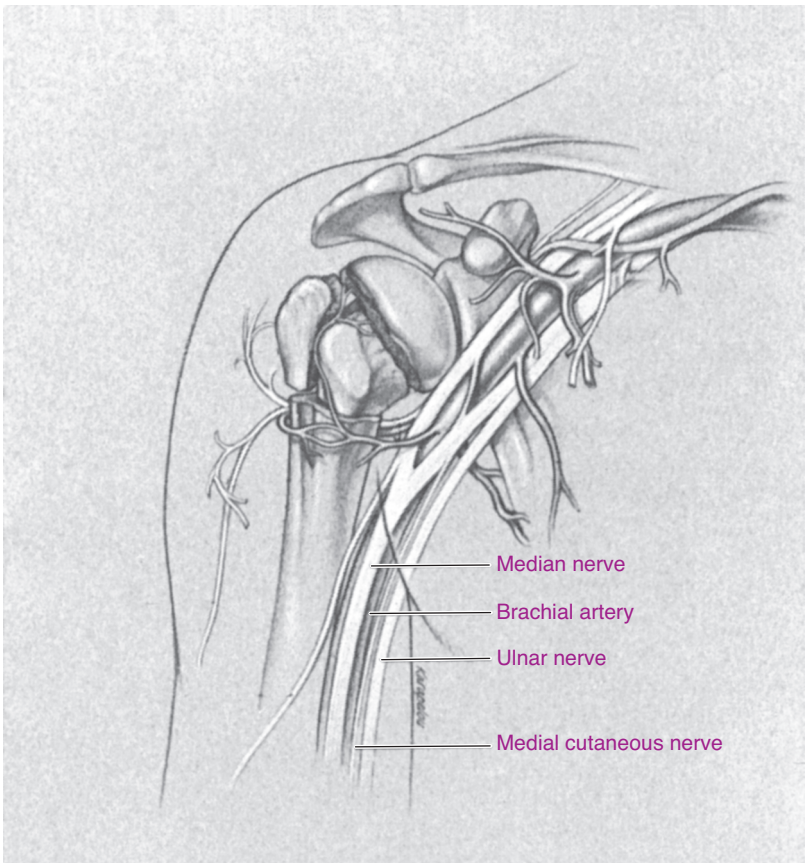

FIGURE 42-1 Anatomic structures involved in, and affected by, TOS. The plexus traverses down the neck from underneath the clavicle and first rib, then out toward the axilla. From Koval KJ, Zuckerman, JD. *Atlas of Orthopaedic Surgery: A Multimedia Reference*. Philadelphia: Lippincott Williams & Wilkins, 2004.

All forms of TOS are entrapment syndromes of either the brachial plexus or the veins and arteries that feed the shoulder, arm, and hand. The nerves and vessels may be trapped between the anterior and middle scalenes, between the clavicle and T-1, and/or between the pectoralis minor and rib cage. As in any other part of the body, nerve compression or compromise results in pain along the nerve pathway and/or loss of function of the limb. The severity of the pain and the degree of functional loss correlate to the extent of injury to the nerve.

Neurogenic symptoms, from compression of the brachial plexus, occur in 95% of TOS cases. Nerve roots at C-8 and T-1 are usually involved, causing pain and paresthesias (numbness and tingling) along the ulnar nerve pathway. Nerve root involvement at C-5, C-6, and C-7 occurs almost as often, with neurogenic symptoms radiating to the neck, ear, upper chest, upper back, and outer arm along the radial nerve pathway.

Venous or arterial TOS occurs when veins or arteries that travel under the clavicle are compressed. The subclavian artery (axillary artery) sends oxygenated blood to, and the subclavian vein drains deoxygenated blood from, the upper extremity. Compression of these delicate structures leads to compromised blood flow, which manifests as color changes, such as blanching (paleness) and cyanosis (bluish color), as well as an uncomfortable cooling of the upper extremity. Neurogenic TOS is far more prevalent than the two vascular forms.

Diagnosis is difficult and sometimes controvesial. Symptoms can be subjective and chronic and related to other medical conditions. Sensory symptoms are difficult to measure. Physical examination findings are often completely normal. As a result, a typical diagnosis may be nerve compression syndrome rather than TOS. However,

attempts are sometimes made to pin down an exact diagnosis by performing specific tests. Provocative tests (techniques that duplicate or exacerbate the patient's complaints), although commonly used, are considered unreliable. Although the elevated arm stress test (EAST) is also considered inconclusive, it is the one that is used most often for screening for TOS. Neck X-rays may indicate skeletal abnormalities. Chest X-rays can indicate clavicular deformities, pulmonary disease, or tumors. Arteriographies and venographies can show evidence of blood flow abnormalities. Nerve conduction evaluations are the best indicators of neurogenic TOS.

OVERALL SIGNS AND SYMPTOMS

The phrase, *constellation of symptoms,* is often used when describing TOS symptomology due to the varying and widespread nature of the complaints. Symptoms can be unilateral or bilateral.

Neurogenic TOS symptoms:

- Pain, usually along the middle upper arm, forearm, fourth and fifth fingers
- Paresthesias, usually involving all fingers, especially the fourth and fifth fingers and the forearm
- Arm and/or hand weakness
- Arm and/or hand cold intolerance
- Neck pain, usually at the trapezius or the chest below the clavicle
- Headache in the occipital region

Venous and arterial TOS symptoms are very similar. Affected arm cyanosis is specific to venous TOS. The absence of a pulse in the affected arm is specific to arterial TOS.

Venous and arterial TOS symptoms:

- Arm swelling
- Hand and/or finger paresthesias
- Arm and/or hand pain, pallor, or paresthesias

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

- The massage therapist can address the pain, paresthesias, and compensating hypertonicity and trigger points that accompany this condition.
- *Note:* The origin of TOS is located in what most massage schools describe as an endangerment zone, so discovering signs and symptoms should be approached with caution.

TREATMENT OPTIONS

Treatment usually involves conservative measures of physical therapy (PT) combined with pain relief medications. Rarely is surgery necessary. Patients are counseled to avoid prolonged periods of overhead arm positioning, such as sleeping supine with arms extended up and behind the head, or sleeping prone with arms above the head.

Common Medications

Patients whose symptoms prompt an emergency room visit may be suffering from painful venous or arterial TOS and will be given intravenous (IV) anticoagulants (heparin) immediately. This situation, however, is rare. Muscle relaxants may be

Massage Therapist Tip

Being Aware of Possible Thrombus

When blood vessels are compressed, blood does not flow freely, and pooled blood is an ideal environment for the formation of a blood clot or thrombus. Thrombi are life threatening, especially in the neck because of the proximity to the brain and lungs. As you palpate your client's cervical and upper arm regions before the treatment, be aware of the classic signs of localized thrombi: swelling, heat, pain, and warmth. You'll notice that these are identical symptoms to venous or arterial TOS; however, don't take a chance and proceed with any techniques that might move the thrombus. If you notice any of these symptoms, discontinue your treatment and refer the client to a physician.

prescribed temporarily. More commonly, the following medications are used to address TOS.

- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Advil)
- Nonopioid pain reliever and fever reducers, such as acetaminophen (Tylenol, FeverAll, Anacin, Panadol)
- Tricyclic antidepressants, such as doxepin hydrochloride (Sinequan)
- Anticoagulants, such as warfarin sodium (Coumadin)

MASSAGE THERAPIST ASSESSMENT

Assessing for the presence of TOS is well outside the scope of practice for most massage therapists. Given the complexity of the condition, the fact that it often mimics other systemic diseases, and that even the simple test of pulse taking is not taught in most massage therapy schools, it is wiser for the massage therapist to wait until after the client has been diagnosed by a medical professional. After this assurance, a detailed verbal assessment of symptoms, combined with range-of-motion (ROM) exercises and palpation for temperature changes and localized pain, can give the therapist sufficient information to initiate treatment. If there is any doubt about the origin of the client's pain, however, or if swelling and heat are present, it is best to refer the client immediately to a physician.

THERAPEUTIC GOALS

Even with the complexity of this condition, it is reasonable to expect that the massage therapist can aid in decreasing pain, relaxing hypertonic muscles, reducing sympathetic nervous system activity, increasing circulation to compromised structures, and teaching the client more efficient postural, breathing, and compensating habits.

MASSAGE SESSION FREQUENCY

- Ideally: 60- to 90-minute sessions, twice a week, when the client is first diagnosed and pain and discomfort are at their worst.
- 60- to 90-minute sessions once a week, when the pain decreases. Continue this frequency until all symptoms are relieved.
- 60-minute sessions every other week for 3 months.
- 60-minute monthly maintenance as part of the client's self-care regimen.
- Infrequent work will not produce the desired results.

MASSAGE PROTOCOL

The best approach to treating TOS is directly related to its etiology. The specific structures—anterior scalenes, pectoralis minor, and costoclavicular region—correlate to the manifesting symptoms. Compensating and postural muscles must also be addressed. In an ideal world and with the client getting medical and/or PT treatment, you will know the exact origin of the TOS. The diagnosis might be "TOS of neurogenic origin" or "TOS of vascular origin," for example. Remembering that all forms of TOS are entrapment syndromes of either the brachial plexus or the arteries and veins that feed and drain the shoulder, arm, and hand, you would check your anatomy books to review that the nerves and vessels may be trapped between the anterior and middle scalenes, between the clavicle and T-1, and between the pectoralis minor and rib cage. You would then have a clear map for proceeding.

Thinking It Through

Muscular bracing is a common side effect of TOS. The condition begins insidiously and progresses to the point of sometimes severe compromise of the neck, upper back, and upper extremity. As a result, the person braces for pain and compensates by using alternative muscles for a period of months or years. By the time the massage therapist gets involved, the entire upper body may well be compromised. The therapist can consider why the following muscles may respond as a result of bracing and self-limiting movements from TOS pain.

- Sternocleidomastoid (SCM)
- Trapezius
- Latissimus dorsi
- Scalenes
- Cervical and thoracic erector complex
- Pectoralis major and minor
- Deltoids
- Occipitofrontalis
- Temporalis
- Masseter

In the real world, however, it is more likely that your client will present with a vague set of upper extremity symptoms after having visited several physicians and experiencing little relief. While being appropriate in your comments about the medical profession, you can make it clear that—unless the TOS has a pathologic origin (tumor or thrombus)—it is a *structural problem* ideally treated by intelligent massage therapy and that you will most probably be able to provide relief. The generalized approach of treating the entire shoulder girdle, neck region, and upper back in the following protocol is based on the real-world scenario. It assumes entrapment of either the brachial plexus or the subclavian vein or artery from postural or overused etiology.

Getting Started

Positioning will be a challenge. Side-lying, which could be the perfect position to approach cervical, clavicular, and upper shoulder problems, may be out of the question because of client discomfort. The prone position may be ruled out for the same reason. Working with the client comfortably pillowed in the supine position may be your only option and that is the position assumed in the following protocol. Of course, the client leads the way.

Do not apply hot or cold packs to any swollen structures in the neck, shoulder, or upper extremity when treating this condition. If you are not sure that there is no thrombus, hot packs can exacerbate TOS.

Use caution during stretching techniques so you do not reproduce or exacerbate this condition. For example, if she tells you that laying her arm over her head causes numbness and tingling, do not perform either passive or active ROM exercises approaching that position.

It is worth repeating that this work is performed in what is most commonly called an endangerment zone, for good reason. The neck is congested with vascular and nervous structures that, if compressed for too long, can compromise brain function. Be sure to focus, keep a clear head, remember your anatomy, and proceed gently.

There is a lot to be done in this protocol, so it departs from the normal 60-minute session and moves to a more appropriate 90-minute session.

HOMEWORK

Whether or not you are working with a PT or a physician, you can safely recommend gentle homework assignments to ensure your client's ongoing shoulder mobilization and improved posture.

- The doorway stretch: Do this once a day. (See Figures 5-4, 5-5, 5-6, and 6-1.)
- Stand up straight. Make slow, big circles with your arms, one arm at a time. Circle several times backward then circle several times forward. If you experience pain or tingling, stop.
- Maintain good posture. Don't slouch. If you find yourself slouching when you are sitting or standing, take a big breath and purposefully roll your shoulders backward several times. Pretend that you are hanging your shoulders on a very straight hanger that is positioned behind you, and allow them to gently stay there.
- Teach yourself exercises for whole-body relaxation.
- Lay on the floor in a position reminiscent of making "snow angels" when you were a kid. Make "carpet angels" by reproducing that slow, even, full ROM movement of both arms and legs. Do not cause pain. When you're done, rest with your arms fully outstretched from your shoulders and breathe deeply.
- Take frequent breaks from any activities that make your symptoms worse.

Step-by-Step Protocol for Neurogenic Thoracic Outlet Syndrome of the Right Upper Extremity

Technique	Duration
With the client supine and you sitting at her head, gently lay your hands on the anterior neck. Rest a moment.	1 minute
Soften the fascia by slowly and gently, but firmly, stretching the tissue in all directions. Thoroughly work the following regions: • Anterior, lateral, posterior neck • Above and below the clavicle • As far down the anterior chest as modesty allows • Over the superior trapezius • Over the deltoid	5 minutes
Plucking, briskly, firmly, with keen awareness of staying on the superficial tissue, not involving the muscles yet. (*Avoid any throbbing vessel; it is probably the carotid artery.*) • Anterior, lateral, posterior neck • Above and below the clavicle • As far down the anterior chest as modesty allows • Over the superior trapezius region • Over the deltoid region	5 minutes
Passive ROM, slowly, gently, moving to end-feel. Ask the client to take a full breath, and move slightly beyond comfortable end-feel. Be sure not to cause any pain. • The head and neck: side to side, then ear to shoulder. (*Avoid hyperflexion and hyperextension at the neck.*) • The affected shoulder. After performing normal ROM, carefully pull the shoulder down toward the client's feet. Grasp the arm at the biceps and forearm, not at the joints, to perform this passive stretch. • The elbow, wrist, and all fingers.	7 minutes
Compression, effleurage, petrissage, effleurage, trying to reach all origins and insertions; medium pressure, slowly rhythmic • Superior trapezius where it attaches to the occipital ridge • Superior trapezius at the shoulders • Scalene complex • SCM • Pectoralis major and minor • Deltoid complex • Biceps and triceps (spend the least amount of time here)	10 minutes
By now, you have identified areas of hypertonicity and/or trigger points. (See Chapter 43 for trigger points.) Return to the areas of extreme hypertonicity. Digitally knead, effleurage, petrissage, and muscle strip these regions with care. Use medium pressure in the neck region, medium-to-deep pressure elsewhere. Use caution not to compromise underlying vessels. Work slowly and evenly rhythmic.	15 minutes

(continued)

Contraindications and Cautions:

- **Be aware of possible comorbidities. Proceed only after considering contraindications for all existing medical conditions.**
- **Heat or cold should not be applied to the neck, chest, arm, or hand regions without physician's permission.**
- **Even in the presence of trigger points and extreme hypertonicity, aggressive techniques such as stripping or too aggressive ROM, are contraindicated.**

Technique	Duration
Stand at the client's affected side. Ask her to slide to the edge of the table. Lay her arm over the edge of the table, down toward the floor. (If this exacerbates symptoms, skip this step.) Place the heel of your hand at the position of the pectoralis minor, near the coracoid process. Slowly but firmly press directly down into the client's pectoralis minor until you feel the coracoid process. Press for a few seconds and release. Repeat once again. Then return the client to the normal position on the table.	5 minutes
Digital kneading, effleurage, petrissage, deep to the client's tolerance, evenly rhythmic • Along the occipital ridge • Into the superior trapezius and out onto the deltoids	5 minutes
Effleurage and stroke the entire area you have been working to soothe any irritated structures (and the client).	5 minutes
Repeat the initial, introductory techniques of softening the fascia and plucking. Perform them much more deeply and with more vigor this time. Aim to produce superficial redness from your plucking. Work to muscle depth when moving the fascia. Finish by stroking the area you worked again to soothe.	7 minutes
Repeat the *passive* ROM exercises, same as the previous step, especially the shoulder pull. Ask the client to perform *active* ROM to determine any increased ROM and pain relief.	5 minutes
Return to the most hypertonic and compromised structures. Compression, muscle stripping, petrissage, effleurage, deep to the client's tolerance, a little more swiftly.	15 minutes
Effleurage the entire area to soothe. Work more firmly than your normal effleurage but work very slowly.	5 minutes

Review

1. Why is TOS so difficult to diagnose?
2. Describe other conditions that mimic the symptoms of TOS.
3. Explain why heat would be inappropriate to apply to a swollen cervical region where a thrombus is suspected.
4. Name 10 muscles that might be affected by TOS.
5. Explain the difference in symptoms based on TOS of neurogenic origin as opposed to TOS of vascular origin.

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43

Trigger Points

Also known as:

Nodules, "Knots," "Muscle Knots," TrPs

Definition: A localized area of muscle hypertonicity that radiates in a predictable pain pattern.

GENERAL INFORMATION

- Cyclical causes: insufficient cellular energy (adenosine triphosphate [ATP]) to a specific muscle area secondary to localized ischemia (restricted blood flow), from prolonged muscle contraction, leading to further insufficient ATP
- Contributing factors: poor posture; repetitive motion; muscle compensation from injury, accident, or prolonged inactivity; nutritional deficiency; chronic infection; sleep deprivation; depression
- Usually occurs in skeletal muscles, especially the trapezius, rhomboids, sternocleidomastoid (SCM), masseter; can occur in organs and bones
- Common in most adults, either latent or active, at some point in life; rare in children
- Often associated with chronic headaches, tendonitis, bursitis, arthritis, and stress
- Often incorrectly referred to as "knots"; the more correct term is "nodule"

PATHOPHYSIOLOGY

In order to function, every cell needs oxygen delivered via the bloodstream. In addition to pain, the body's response to insufficient blood supply can be dramatic. The person might faint or convulse; the affected body part might turn blue, decay, and fall off.

The causes of insufficient blood supply are numerous, but in the case of trigger points, the cause is subtle and cellular. Nodules are created as follows: (1) a small fragment of the muscle contracts; (2) this fragment pulls on another, progressively tightening, band of muscle; (3) blood flow to the constricted region is reduced because of the tightness; (4) oxygen debt occurs; (5) local ischemia follows; (6) this cycle of poorly vascularized cellular muscle structures causes an involuntary painful contraction; (7) the lack of oxygen, combined with the sustained contraction, causes pain signals to flood the region; (8) pain is experienced in the focal and more frequently in the referred pain zone that characterizes the muscle harboring a TrP.

Localized pain that radiates away from a central muscle nodule is known as *referred pain*, and it is a characteristic component of trigger points. The patterns of radiating pain are reproducible, predictable, and unique to the muscle affected. For example, an active trigger point in the SCM can be expected to refer pain to the face, ear, jaw, head, and around the eye (Figure 43-1). As is often the case with pain, the body compensates in a holding pattern in an effort to gain relief. This compensation creates *satellite trigger points*, secondary nodules resulting from radiating pain.

Persistently restricted or weakened muscles may develop *latent trigger points* that do not refer pain and are not painful unless palpated. Latent TrPs can be seen as *active*

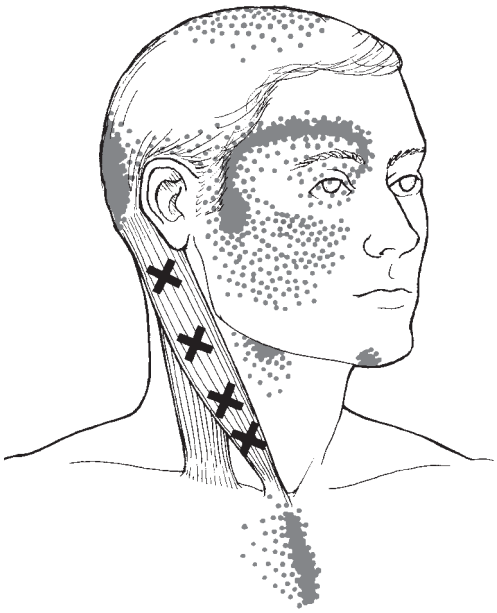

FIGURE 43-1 The referred pain pattern of SCM trigger points. MediClip image. Philadelphia: Lippincott Williams & Wilkins, 2003.

trigger points waiting to happen. If ischemia persists and if the cellular flood of pain signals accumulate sufficiently in a latent trigger point, it can turn into an actively painful, radiating trigger point very quickly. Active TrPs cause exquisite local and radiating pain, even when the muscle is at rest.

OVERALL SIGNS AND SYMPTOMS

- Hypertonicity palpable as a taut band
- A palpable nodule usually in the muscle belly
- Often a palpable twitch when the nodule is stimulated by a "snapping palpation"
- Dramatic response from the client (wincing, pulling away), called a jump sign, upon direct TrP palpation
- Visible holding pattern of compensating structures
- Shooting pain radiating from the focal point, which may or may not seem directly related
- Dull, aching, throbbing, and burning pain at the focal point
- Pain at rest or with activity, often worse with activity

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

- Relieving hypertonicity is a centerpiece for most massage therapy and is regularly addressed with many traditional techniques.
- Compensatory hypertonicity and pain, as well as the accumulation of cellular debris and metabolic waste, are also treated with basic massage skills.

TREATMENT OPTIONS

Most people do not seek medical attention for muscle tightness alone. Temporary muscular discomfort is usually self-treated with over-the-counter (OTC) creams or patches that claim to provide relief. Those in pain may also take OTC anti-inflammatory

Thinking It Through

Why not use force or attempt to "dig out" trigger points? That has been the mistaken but accepted approach for years and, sometimes, it works. So what if the client experiences temporary pain if he ultimately gets relief? Plus, isn't it common knowledge that massage therapy to tight muscles *should* hurt in order to be effective? Thinking through the pathophysiology of a trigger point will further illuminate why brute force is not only unnecessary, potentially harmful, and disrespectful to the body, but also scientifically unsound. The therapist can follow the subsequent logic to come to a different understanding of TrP treatment.

- If trigger points, physiologically speaking, originate from cellular regions of ischemia . . .
- And ischemia means restricted blood flow . . .
- Why would an elbow, a tool, or a knuckle applied deeply and for a prolonged period *that has the purposeful effect of restricting blood flow* be considered appropriate treatment for this condition?
- Why, instead, not use slow, medium-depth, almost pumping techniques to try to *flood the region with blood,* thereby decreasing ischemia and delivering much-needed nutrients?

medications, apply hot or cold packs, and (erroneously) rest the affected area. If pain becomes intolerable, a sports medicine physician or physical therapist may treat with noninvasive, conservative techniques.

Common Medications

Medications are not usually prescribed. In extreme cases of multiple, intolerable trigger points, as in people with cerebral palsy, partial paralysis, Lou Gehrig's disease, and conditions that involve unrelenting hypertonicity, muscle relaxants may be prescribed.

MASSAGE THERAPIST ASSESSMENT

Asking questions about the client's general state of health and activity will give the therapist a sound baseline to start her assessment. A client's report of a recent accident that has produced compensating patterns, or prolonged inactivity, a desk job, or complaints about pain that "won't go away, burns and shoots from here to here," will help clarify the appropriate treatment.

A word of caution about the assessment: The quality of the pain should be described as dull, aching, nagging, steady, throbbing, and sometimes burning. The specific terms used for describing neurologic pain (shooting, tingling, numbness, and burning) are similar and may muddy the therapist's assessment. Knowing, or having a picture reference that indicates, typical trigger point referral patterns will help differentiate between TrP and neurological pain.

Asking about the duration of the pain and how the client has been self-treating will further help determine a treatment plan.

THERAPEUTIC GOALS

Decreasing pain and hypertonicity in the immediate and referred regions, increasing circulation to the affected muscles, increasing range of motion (ROM), restoring normal muscle resting length, and reducing secondary stress and tension—all of these are reasonable therapeutic goals for treating trigger points.

Palpation restores ROM to the tissues, and compression acts to move the myofascia. A properly trained therapist would move the muscle through ROM. Because improper technique will often stimulate TrPs and not deactivate them, the therapist's goal is to use techniques that precisely avoid a flare-up.

MASSAGE SESSION FREQUENCY

Trigger points can both develop and resolve quickly. However, they often reside in the muscle belly for weeks or months and thus need frequent, consistent treatment and self-care. Most people begin to notice relief in about 4–6 visits. If no resolution occurs, then therapy may not be effective and a perpetuating factor or another pathology may be present. At this point, a client should be referred to another health care practitioner for evaluation.

The following frequency suggestions assume that the client's symptoms are decreasing with massage therapy treatment and that he is doing his homework assignments.

- 60-minute sessions twice a week until resolution, for severe cases
- 60-minute sessions once a week, for normally painful cases
- 60-minute sessions once a month, for maintenance and prevention, after resolution

Massage Therapist Tip

When the Client Says, "Go Ahead, Beat Me Up"

A nagging myth surrounding the relief of muscle nodules is held by many, usually male, clients. The thinking is as follows: "I'm in pain, so I'm going to the strongest massage therapist I can find. She will really hurt me with her therapy. This is good and I know I'll be sore the next day, but that means I got my money's worth and it's supposed to hurt in order for it to work." It takes tact and persistence to reverse this attitude. Try this: Honor the client's request by saying you understand this is how he has been treated in the past, and perhaps it worked for him. Let him know there's another way to think about trigger point treatment that's much more effective. Tell him his body is like an onion, and you're going to "peel" (work on) one layer at a time until you get down to the most affected region. So, rather than "take a knife" to this onion, you'll carefully peel each layer away until you get to the core. Once you identify the source of his pain, you'll work on it, deeply and thoroughly, but not to the point of pain he is used to (or may want). Aggressive, deep work further injures the tissue and is counterproductive. Let him know this is a different—but more effective and less painful—way of working out his TrPs. This explanation will quiet most clients who insist on pain for perceived gain. Unfortunately, you may lose those who demand brute force massage therapy. Ultimately, your hands—and your professional reputation—will be better off if they seek treatment elsewhere.

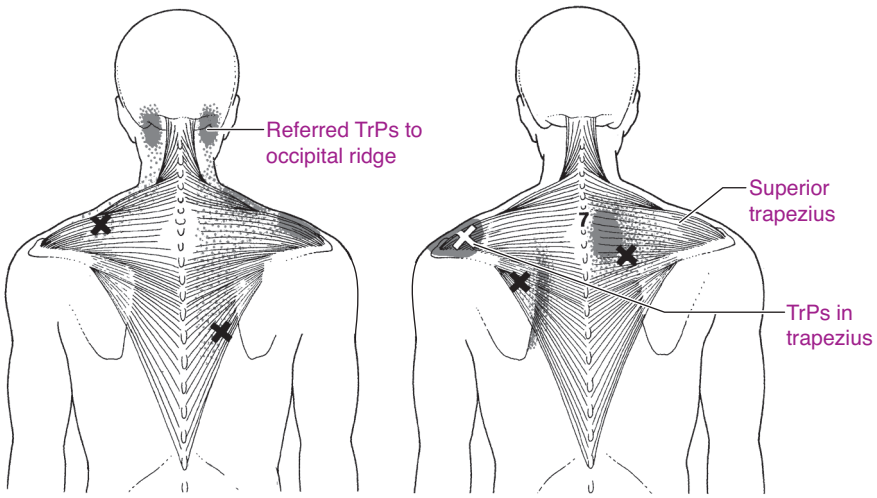

FIGURE 43-2 Superior trapezius trigger points refer pain along the entire body of this large muscle as well as at the occipital ridge on either side of the muscle attachment. MediClip image. Philadelphia: Lippincott Williams & Wilkins, 2003.

MASSAGE PROTOCOL

Trigger point pressure release is the application of slowly increasing, nonpainful pressure over a trigger point until a barrier of tissue resistance is encountered. Contact is then maintained until the tissue barrier releases, and pressure is increased to reach a new barrier to eliminate the trigger point tension and tenderness. Rather than "digging" into the tight muscle, thereby causing a painful response to which the body will react, constrict, and shut down, you will be respectfully, slowly, and carefully approaching the taut band of muscle and the surrounding area in order to flood the region with fresh blood. This will help release the constriction, remove the ischemia, flush waste products, alleviate pain, and increase function and ROM. The methods are simple.

Before and after ROM is used to demonstrate initial restrictions and then subsequent, post-treatment improvement. Heat, effleurage, petrissage, and intermittent deep stroking and kneading are used to bring blood into the restricted area, and remove metabolites from it. The medium-pressure fingertip pumping used at the center of the nodule replaces the sustained-pressure, elbow-to-the-bone techniques. No instruments are necessary.

Stubborn or long-standing trigger points will require several sessions for resolution. Homework is essential to keep the region flushed with blood and to prevent reconstriction of the muscle fibers. The following protocol focuses on trigger point treatment of the superior trapezius (Figure 43-2), as this is one of the most common complaints you will encounter.

Getting Started

Have hot packs ready. Be patient.

You'll notice that there are no durations indicated for the techniques in this protocol. With any soft tissue work, you must be keenly aware of the tissue's condition before moving mechanically onto the next step. In the case of trigger point work, you will want to train yourself to remain very aware of the depth to which you are working, the tissue's response, the presence of any spasms or tissue flinching, the width of the taut muscle band, the presence of "Rice Krispies," and whether or not the TrP is softening. It would be impossible to impose time restrictions on this process. Do not overwork the tissue in which the trigger points are embedded. Try, instead, to approximately spread your time evenly between all the steps, spending the most time directly on the trigger points themselves.

Massage Therapist Tip

"No Pain, No Gain"—No Place in Massage Therapy

There are almost as many schools of thought about how to treat trigger points as there are massage therapists. One persistent myth I hope to dispel is that the only way to treat a trigger point is with direct, deep, prolonged pressure using an elbow, a knuckle, or an instrument, and that the client must endure pain in order for the therapy to be effective. As a clinical instructor and a manager of hundreds of massage therapists, I have received many complaints from clients who came in with painful trigger points and the next day found themselves sore and badly bruised from "treatment." If you have been schooled in this erroneous train of thought, approach the following protocol with an open mind—and a gentler hand.

Step-by-Step Protocol for Trigger Point in the Right Superior Trapezius

Technique	Duration*
Position the client in a right side-lying position. Start by treating the left side. Tuck a moist hot pack into the space between the table and the client's affected right shoulder. Leave it in place as you treat the left shoulder. Keep the hot pack away from the lateral neck region.	
Stroking, effleurage, skin-rolling, petrissage, kneading, forearm effleurage, forearm compressions, light-then-medium pressure, slowly, evenly rhythmic • Along the occipital ridge • Into the entire trapezius muscle. Include the attachments at the shoulder, along the scapula, into the cervical and thoracic spine regions. Attempt to "grip" the muscle frequently, and move it as much as you can. • Reach over, respectfully, and work the superior pectoralis major. • Finish by using your forearm and stretching/pulling the shoulder away from the neck, down toward the feet. Note: There may be a satellite TrP or radiating point of pain in the left trapezius, but that is not your focus right now. You are softening related structures in order to work into the primary trigger point on the right.	
Remove the hot pack. Roll the client to his other side. Warm this entire area by repeating the same steps you performed on the unaffected side before you begin the actual trigger point work. Stroking, effleurage, skin-rolling, petrissage, kneading, forearm effleurage, forearm compression, light-then-medium pressure, slowly, evenly rhythmic. • Along the occipital ridge • Into the entire trapezius muscle. Include the attachments at the shoulder, along the scapula, into the cervical and thoracic spine regions. Attempt to "grip" the muscle frequently and move it as much as you can. • Reach over, respectfully, and work the superior pectoralis major. • Finish by using your forearm and stretching/pulling the shoulder away from the neck, down toward the feet.	
Using gentle palpation and digital kneading, ask the client to help identify the *exact* location of the offending trigger point. You will feel a palpable nodule under your fingers, and/or a feeling of "Rice Krispies" in the tissue immediately surrounding the nodule. Sometimes, I draw a circle around the nodule with a nonpermanent marker in order to save time and to be able to return to the exact spot again as the protocol demands.	
With your full open hand, grasp as much tissue *around the trigger point and including the trigger point region. The TrP should be situated almost near the palm of your hand.* Hold this position, just grasping the superior trapezius in a medium-pressure grasp for a few seconds. Wiggle the tissue around a bit. Feel as if you are actually lifting the trapezius off the bone but not yanking it. Return the tissue to its normal position, stroke it for a few seconds, and repeat.	

(continued)

Contraindications and Cautions

- **Clients taking daily aspirin or anticoagulants are at risk for serious bruising resulting from any form of prolonged deep work.**
- **Be keenly aware of the medical history of those clients whose trigger points do not resolve after several sessions. Seemingly persistent localized muscle pain can be an indicator of cancer recurrence or other systemic diseases.**
- **Although you may be well-intentioned, overzealous work at a focused point of pain can cause extremely uncomfortable soreness or even pain for the client the next day. Monitor the depth and vigor with which you perform this work.**

Technique	Duration*
With open, flat hands, deeply effleurage and knead the area surrounding the trigger point, *moving your hands in the direction of the trigger point*. Imagine you are forcing blood directly into the most painful and affected area. This action is similar to that of kneading bread, rhythmically, with both hands working toward the center of the trigger point.	
Stand back and ask the client to move his arm in a full ROM arc. Ask him to move his arm and shoulder in every plane, a full 360 degrees, bending his elbow, pulling his shoulder back, bringing it forward. (This is as much for distraction as for assessment). Ask him to report pain and restriction.	
Return to the trigger point. With gentle fingers, palpate the trigger point. Ask the client to identify the exact path of referred pain. Now, the real work begins. With the client's shoulder in a relaxed position, with firm fingers or soft knuckles, apply a pumping-like pressure to the center of the trigger point and all along the path of the referred pain. Your compressions are at the rate of about one per second. These compressions should not cause pain, although they might cause mild discomfort. This is detailed, focused work. Stay centered.	
Sweep the entire area with broad effleurage strokes. Ask the client how he's doing. Allow him to stretch if he needs to.	
Now, ask the client to stretch his shoulder into the position that duplicates his worst pain. This may be a position in which he stretches his head to the side and forces the shoulder down. Ask him to move the shoulder *just an inch or two to relieve the worst pain*. This is the position he will hold for your next step.	
Repeat the previous poking-compression steps along the path of the trigger point and radiating pain while the client holds this stretched position. You will perform this step in a little less time than the previous step because it is difficult for the client to hold this position for long.	
Allow the client to rest, and broadly effleurage the area.	
Palpate for the trigger point and taut band of surrounding muscles. Effleurage, petrissage, kneading, plucking, hacking, medium-to-deep (nonpainful) pressure at a brisk pace. • Along the occipital ridge • Into the entire trapezius muscle. Include the attachments at the shoulder, along the scapula, into the cervical and thoracic spine regions. • Reach over, respectfully, and work the superior pectoralis major.	
Position the client prone. Using any techniques, working briskly, and with medium-to-deep pressure, massage the entire back from the sacrum to the occipital ridge.	
Position the client supine. Ask him to stretch—full extension—both arms over his head and bring them down to his sides. Repeat this several times. The movement is reminiscent of "making snow angels" except the legs are not engaged.	

(continued)

Contraindications and Cautions: *(cont.)*

- **Although a trigger point does not manifest all the symptoms of a thrombus (blood clot), to the layperson or the inexperienced massage therapist, the two can be confused. If *any* swelling, redness, or heat is present along with the exquisite radiating pain of the typical trigger point, you should halt all work (that means anywhere on the body) and refer the client to a physician. It's possible to inadvertently move a thrombus into an embolus by attempting to work on a presumed nodule.**
- **If the trigger point is injury-related and accompanied by local inflammation, the application of heat to the region is contraindicated.**
- **If the trigger point is secondary to an overstretch injury, passive and active stretching exercises are contraindicated.**
- **The application of ice to a "burning" trigger point may worsen symptoms.**

Technique	Duration*
Position the client seated on the side of the table with you standing behind him. Maintain appropriate draping and provide a footstool for back support. Effleurage and petrissage, medium pressure, working briskly. • Bilateral superior trapezius • Bilateral superior deltoids • Occipital ridge	
Finish by performing strong, open-handed, full effleurage to the entire neck, back, and arms. Ask the client to repeat full ROM of both shoulders and report pain and restriction.	
Assign ample homework including stretches, stress management, and the application of hot packs.	

*Durations are not given for trigger point work because the pace and duration depends on how the tissues respond to the work. For further explanation, see Getting Started section.

HOMEWORK

The stress of daily life can be as responsible for muscle nodules as the more medically precise cause of localized ischemia. This painful and radiating problem will consistently recur unless the client realizes that he must manage both his stress level and his muscles. Diplomatically, let your client know that homework is not optional; it's mandatory.

- As soon as you become aware of your muscles tightening, stop what you're doing. Move. Stretch. Slowly roll your head. Place your right hand on your head, almost over to the top of your left ear, and gently press your head down to the right shoulder. Repeat on the other side. Raise your shoulders to your ears and hold them for a few seconds. Force your shoulders down as far as they'll go, hold for a few seconds. Slowly roll your shoulders forward, one at a time, in large circles. Roll them backward, one at a time.
- The doorway stretch—do this once a day. See Figures 5-4, 5-5, 5-6, and 6-1.
- Take a huge inhale as you raise your arms up over your head. Exhale as you bring your arms back to your sides. Let your body fall forward, and try to touch the floor.
- Find effective relaxation techniques. Perform these every day.
- Daily, until your next massage therapy session, apply moist hot packs to the trigger point region. Replace them before they become cool.

Review

1. What is the physiologic cause of trigger points?
2. Name the most common locations for TrP formation.
3. Describe the difference between referred pain and satellite trigger points.
4. Why is sustained pressure no longer considered an effective TrP treatment?
5. Explain why cold application would not be an effective therapy for a "burning" TrP.

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Also known as:

Whiplash-associated Disorder (WAD), Acceleration Flexion-extension Neck Injury, Cervical Sprain, Cervical Strain

44 Whiplash

Definition: A hyperextension soft tissue injury of the neck.

GENERAL INFORMATION

- Caused by a sudden acceleration and/or deceleration of the head and neck
- Most common cause: front-to-back, back-to-front, or side-to-side motor vehicle collision
- Other causes: sports injury, a blow to the head, a fall, a violent shaking of the body
- Onset: 24–48 hours following the triggering incident
- Duration: About 6 weeks
- Describes multiple injuries to numerous neck tissues

Morbidity and Mortality

Although "whiplash" is not a clinically correct term, its use persists when describing the multiple problems following a neck injury. While 95% of whiplash injuries involve superficial damage to muscle and tendons only, treatment confusion exists because so many neck, shoulder, and back structures can be affected long after the initial injury. For example, compensatory trigger points can lead to muscular dysfunction and pain that can linger for months or years.

Whiplash is rarely life threatening. The short-term prognosis is usually good, and most people recover within several weeks. About 40% of patients may experience symptoms after 3 months; 18% may still suffer after 2 years. Prolonged periods of partial disability are not unusual. There are no reliable statistics about long-term prognosis. However, a previous whiplash injury can double the risk of developing severe symptoms from a second whiplash incident.

PATHOPHYSIOLOGY

The neck is one of the most vulnerable regions of the body. It is densely packed with arteries, veins, lymphatic vessels, muscles, tendons, and ligaments, most of which intricately work to keep the brain alive, the body moving, and the immune system responsive. When the neck is injured, the following structures can be affected:

- Diaphragm
- Intercostal muscles
- Entire erector system
- Chewing and jaw muscles
- Scalenes
- All rectus and capitis structures
- Trapezius
- Levator scapulae

- Cervical and thoracic vertebrae, as well as surrounding muscles, tendons, ligaments, fascia, and blood vessels
- Cervical and thoracic nerve roots, as well as the vagus and phrenic nerves

Conditions resulting from injury to these delicate and essential structures range in severity from temporary vertigo to permanent paralysis. Although most whiplash injuries affecting soft tissue (muscles, tendons, ligaments) are transient, the lingering chronic pain and emotional stress reflect the profound fear surrounding injury to this area.

Diagnosis is made by a physician who inspects the patient's head and neck for visible signs of trauma. X-rays determine cervical spine fracture. CT scans may be ordered if extensive soft tissue injury is suspected.

OVERALL SIGNS AND SYMPTOMS

Pain usually begins within 24–48 hours after the incident. It is not unusual, however, for the following symptoms to occur days, weeks, or months later. The sooner after the incident symptoms manifest, the more serious the injury.

- Neck ache and/or tenderness
- Neck and shoulder spasms
- Shoulder pain
- Low-back pain
- Headache
- Tinnitus (ringing in the ears)
- Limited neck range of motion (ROM)
- Neck swelling
- Arm or hand paresthesias (if neurologic structures are affected)

SIGNS AND SYMPTOMS MASSAGE THERAPY CAN ADDRESS

- Scar tissue from sprained or strained muscles can be addressed with massage techniques.
- Massage can relieve the generalized stiffness of the neck and compensating structures.
- The stress that accompanies any accident or injury can be reduced with soothing massage therapy techniques.
- Fascial stretches can soften constricted fascia.

TREATMENT OPTIONS

The first medical step in whiplash treatment is to determine if any life-threatening or possibly permanent paralytic neck damage has occurred. Once the patient is evaluated and stabilized, conservative treatment can begin. Neck immobilization, usually by the fitting of a neck brace, has been the traditional whiplash treatment. New thinking includes the understanding that artificial and lengthy immobilization of already injured (immobilized) tissue can promote further damage and prolong rehabilitation. Health care practitioners now suggest early and gentle neck movement, limited physical activity, and rest following an accident or neck injury. If a neck brace is prescribed, it should be worn intermittently and for short periods. Prolonged rest, although initially beneficial, is not the key to recovery.

Patients are often sent home from the ER with instructions to apply ice (to reduce inflammation) and take over-the-counter (OTC) pain relievers. Massage, neck rest, bed rest, ROM exercises starting 72 hours after injury, and avoiding excessive neck strain for 1–2 weeks are the normal home treatments. Patients are encouraged

Massage Therapist Tip

No Massage Immediately After Whiplash

As massage therapists, we sometimes can do real harm, and prematurely treating whiplash is a prime example. We are not first-line responders. As desperate as a client might be ("It was just a fender bender; I don't want to go to the ER or to my doctor, and my neck is killing me") and as determined as you are to relieve pain, *you must not touch or treat a whiplash victim for at least 3 days after the accident.* You can do real, permanent, damage to the neck or brain if you prematurely relax muscles that are guarding the injured neck. This muscle splinting is the body's way of compensating and protecting the injured area. A client must seek professional medical treatment for a neck injury. Once the voluntary splinting has relaxed and she has been cleared for massage therapy, you can proceed but not before.

to revisit their physician or the ER if they experience dizziness, fatigue, irritability, or continued shoulder or arm pain.

Prevention includes wearing a seat belt, using proper headgear when doing high-impact sports, and not shaking a child in a way that could injure the neck.

Common Medications

- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Motrin, Advil) and naproxen (Aleve, Anaprox, Naprelan, Naprosyn)

MASSAGE THERAPIST ASSESSMENT

It is important for the massage therapist to take a detailed history before treating a client with whiplash. The answers to the following questions will help determine safe treatment.

- When did the accident occur?
- What pain have you experienced since?
- When did the pain begin?
- Where is the pain?
- Are you experiencing any dizziness or vertigo?
- Are you experiencing spasms? Where?
- Are you experiencing any numbness and tingling down your arm?
- Did you hit your head?
- Have you seen a physician or gone to the ER?
- Are you taking painkillers or muscle relaxants now?

If the acute pain and spasms have quieted, if the incident occurred at least 3 days ago, and if the client is taking neither narcotics nor muscle relaxants, the therapist can proceed with assessment and then treatment.

The neck and shoulder structures should be palpated for hypertonicity and trigger points. Gentle neck ROM should be performed. If the therapist is qualified, palpation of every spinous process, from the cervical to the lumbar spine, will determine tenderness or rotation, as well as hypertonicity in the surrounding muscles.

THERAPEUTIC GOALS

Relieving hypertonicity and trigger points in the neck and surrounding tissue, improving neck ROM, relieving secondary back pain, providing a listening ear for possible secondary gain issues, and relieving stress are reasonable treatment goals for the massage therapist.

MASSAGE SESSION FREQUENCY

- 60-minute sessions twice a week (beginning no sooner than 3 days after the incident), until all pain and hypertonicity are resolved
- 60-minute sessions once a week for 1 month
- 60-minute maintenance sessions once a month

MASSAGE PROTOCOL

Although it may appear as though I have tried to scare you away from treating whiplash, that's not the case. You can provide highly effective treatment with the simplest of techniques and relieve much of the pain experienced by most whiplash sufferers.

Massage Therapist Tip

Wearing a Neck Brace

If a client is wearing a neck brace, ask whether it was prescribed by a physician. Sometimes a whiplash victim will borrow a neck brace from a friend who had an accident in the past, for instance. Inform your client that prolonged immobility from wearing a neck brace can cause more problems and further injury. She should wear a neck brace only if it was prescribed by a physician and only for the suggested duration. Remember, *you cannot remove or affix a neck brace before or after treatment.* This is outside your scope of practice.

Thinking It Through

Secondary gain is a term used in chronic pain management. It refers to the perceived advantages a patient may get by "holding on to her pain" well after the physiologic symptoms should have passed. Think through why your understanding of secondary gain might be a component in your treatment of certain clients.

- An unhappily married client was the passenger in a car her husband was driving when a collision occurred. What might be her secondary gain if she continues to complain about this perceived husband-induced accident?

Step-by-Step Protocol for Cervical Strain 5 Days After a Motor Vehicle Collision

Technique	Duration
Position for client's comfort and access. Well-supported side-lying may be the best option	
Apply warm packs to the posterior cervical neck. Leave in place while you perform general relaxation techniques *anywhere else in the body other than the neck and shoulders*. Remove the packs.	5 minutes
Using no lubricant, gently cup the client's neck with your hands and rest for a moment. Using your full, open, soft hands, gradually increase pressure to perform fascial stretching, making slow, large circles. • Work the entire posterior and lateral neck region. • Work up into the occipital ridge and down to C-7/T-1. • Move down to the superior trapezius and out over the deltoids	
Apply lubricant. Palpate the entire area listed previously for taut muscle bands and trigger points. In this case, the deeper muscles supporting the neck as well as the trapezius will be directly affected and will be hypertonic.	2 minutes
Effleurage, light to medium, slow, evenly rhythmic • Posterior, lateral neck • Trapezius down to T-12 • Out over bilateral deltoids • Pectoralis major	3 minutes
Effleurage, petrissage, effleurage, medium pressure, slow, evenly rhythmic • Posterior, lateral neck • Trapezius down to T-12 • Bilateral deltoids • Pectoralis major	3 minutes
Digital, palmar, and fist kneading, light-to-medium pressure, slow, evenly rhythmic. (You can perform gentle trigger point work at this point.) • Posterior, lateral neck • Trapezius down to T-12 • Bilateral deltoids • Pectoralis major	5 minutes
Stroking, effleurage, slightly more briskly, medium pressure, all of the previously listed tissue	2 minutes
Digital probing, kneading, mobilization, and stripping, light-to-medium pressure, evenly rhythmic, working one side at a time. (Again, trigger point work is appropriate at this time.) • Bilateral sternocleidomastoid (SCM) from the mastoid process to the insertion on the clavicle	5 minutes

(continued)

Thinking It Through *(cont.)*

- A disgruntled employee was driving a forklift on the job when he was hit by another vehicle from behind. What might be his economic gain if he suffers from perceived continued pain?
- A lonely widow experiences a minor whiplash from a fall. What might her emotional gain be if she continues to need medical attention?

Contraindications and Cautions:

- **Do not remove a neck brace (cervical collar) prescribed by a physician in order to perform your therapy. *If the client has been instructed that she can take it off at will, she should remove and replace it herself.***
- ***No pain or discomfort should ever be caused by any of your techniques.***
- **If there is any chance of a fracture, concussion, displaced disc, or serious injury, do not attempt massage therapy; refer the client to a physician.**

Contraindications and Cautions: *(cont.)*

- **Avoid working both sides of the neck simultaneously (e.g., the SMC). This can cause discomfort and vertigo.**
- **Be sure that the normal, protective, and essential cervical muscle splinting has quieted before you perform any massage therapy techniques intended to relax these muscles. *Serious damage can be done to the neck structures if you relax muscles that are trying to hold the head and spine in place.***
- **Be keenly aware of the location of the carotid arteries. Do not apply direct pressure to them or to the nearby tissues.**
- **If palpation of a spinous process indicates rotation or elicits a painful response, do not proceed with the treatment and instead, refer the client to a physician or chiropractor.**
- **Do not assign or perform neck stretches unless you are working as part of a health care team and have a written or verbal order from a physical therapist (PT) or a physician.**

Technique	Duration
Digital probing, kneading, mobilization, and stripping; light-to-medium pressure, evenly rhythmic, working one side of the spine at a time (Trigger point work may be done at this time.) • Deep cervical muscles, tendons, and ligaments • Work up as high under the occipital ridge as you can reach, then down to C-7	5 minutes
Digital probing, kneading, mobilization, and stripping; light-to-medium pressure, evenly rhythmic, working one side at a time • Bilateral scalenes	5 minutes
Effleurage, using broad, slow strokes with your open hand • All previously worked tissue	5 minutes
Dry the skin of all lubricant. Fascial stretching, performed deep to client's tolerance. • All previously worked tissue • Offer a scalp massage	10 minutes
Stroking, performed with an open, soft hand, slow, evenly rhythmic • Anterior, posterior, and lateral neck • Pectoralis major • Trapezius • Deltoids	3 minutes
Finish as you started. Cup the neck in your soft hands and rest for a moment.	2 minutes

Myofascial techniques, probing effleurage, petrissage, and some kneading—performed without aggression—will serve your client well and give you satisfactory tissue response. The following protocol treats a very common form of whiplash: cervical strain secondary to a front-to-back motor vehicle collision 5 days after the accident.

Getting Started

Hot packs can provide comfort and soften the tissue. Stay away from the carotid arteries when placing a hot pack on the neck. Positioning may be a challenge. A recommended position is the client seated on the side of the table, feet firmly planted on a footstool, with pillows supporting each elbow. All work should be firm, not aggressive. Don't use so much pressure that the client must "push against you" to keep her neck aligned. Support her head with your free hand if you find she is not strong enough to hold her head in place during your treatment.

HOMEWORK

Unless you have been trained and are certified as a personal trainer, strengthening exercises—especially work on the neck muscles—is outside your scope of practice. Offering supportive encouragement for continuous but gentle activity will be your goal in assigning homework to this client.

- Wear your neck brace only for the amount of time prescribed by your physician.

- You may need to adjust how you sleep for a few days. Sitting comfortably in a big armchair, with pillows, might provide the needed back and neck support.
- Rest your head, neck, and back, but don't overdo the periods of rest. Gently perform your daily activities without overstretching or causing pain.

Review

1. List the structures that might be involved in a whiplash injury.
2. What are other names for whiplash?
3. Describe voluntary muscle splinting.
4. Why is treating a client whose neck is still spasming and in voluntary splinting a contraindication for massage therapy?
5. As a massage therapist, why are you not allowed to apply or remove a client's neck brace?
6. Explain what is meant by secondary gain.

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