CHAPTER 7

Modalities working with massage

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In this chapter a number of modalities that integrate well with massage therapy will be discussed. To support proficiency, practical examples and skill enhancement exercises are included. The methods presented include:

- connective tissue focus
- neuromuscular technique
- trigger point methods
- muscle energy technique
- positional release technique
- integrated neuromuscular inhibition (for trigger point deactivation)
- spray-and-stretch chilling methods.

CONNECTIVE TISSUE FOCUS

The quality of the connective tissue can generally be assessed by the plasticity of the skin and subcutaneous layers. Thickened, adhered fascia is less mobile, and the skin will glide only a short distance before feeling tight (bind). With healthy tissue it is amazing how far it can comfortably be stretched in all directions. In the treatment of musculoskeletal problems, such as head and neck pain, the connective tissue of primary concern is the fascia that wraps the muscle fibers into bundles and compartments, and then wraps all these together to form the whole muscle. The outer layer of fascia makes up the muscle's sheath, which maintains the overall shape and is smooth on the outside so the muscle can move freely and independently of other structures; it should have the same elasticity as the muscle. The structure of the head and neck is highly influenced by numerous connective tissue structures such as the dura and the ligamentor muci and connective tissue of the scalp.

The fascia is subject to trauma through overstretching or impact, and scar tissue and adhesions can form.

The main problem, however, comes from chronic changes as a result of long-term stress. The fascia thickens and becomes more fibrous, which makes it less mobile and reduces its permeability. This affects the function of the underlying muscle and may restrict its free movement. In addition, if the interstitial fluid cannot pass freely through the fascia, the muscle may not get an adequate supply of oxygen and nutrients, and will be less able to eliminate metabolic waste material.

As well as releasing excessive tension or thickening in the fascia, connective tissue forces affect the autonomic nervous system through a neurofascial reflex. This stimulates local blood flow, and the skin appears red and is warm.

It is the adhesions and fibrous tissue created by scar tissue that cause the most dysfunction. In the early stages, scar tissue is quite sticky and can adhere fibers together. For a muscle to function, the fibers need to be able to glide smoothly alongside one another, but when stuck together they cannot do this and the affected area will not function optimally. Over time, a local area of muscle fibers can mat together into a fibrous mass.

The nonmuscular soft tissues can also be affected by fibrous adhesion, which will make them thick and less pliable. Adhesions can also form between differing structures, such as between ligaments and tendons, muscles and bone. This can lead to a significant restriction in movement and function.

Transverse strokes using shear and bend forces can break down the adhesions by literally tearing the adhesive bonds apart. Once the fibers are separated they are able to functionally slide again. Applied effectively, the massage methods should create a sensation of burning and localized pain, but must not cause any actual damage because the adhesions themselves contain no blood vessels. If done too heavily or on tissue that is in an early stage of repair, further damage can be caused.

When a large fibrous knot of compacted tissue has formed there may be little or no circulation running through it and therefore a natural healing process cannot take place. Massage increases tissue pliability and allows blood to flow more easily through it, stimulating healing.

Massage is able to stretch specific localized areas of tissue in a way that may not be possible with other approaches. Longitudinal (tension force) stroking and kneading (bend and torsion force) can stretch the tissues by drawing them apart and in all possible directions (Figure 7.1).

In most instances, a lubricant is not used with connective tissue approaches because the drag quality on the tissue is necessary to produce results, and lubricant reduces drag.

Methods that primarily affect the ground substance require a quality of slow, sustained pressure and agitation. Most massage methods can soften the ground substance as long as the application is not abrupt. Tapotement and abrupt compression are less effective than slow gliding methods that have a drag quality. Kneading and skin rolling that incorporate a slow pulling action are effective as well. The appropriate application introduces one or a combination of the mechanical forces of tension, compression, bind, shear, and torsion to achieve results.

The fiber component is affected by stretching methods that elongate the fibers past the normal give of the fiber and enter the plastic range past the bind. This creates either a freeing and unraveling of fibers or a small therapeutic (beneficial and controlled) inflammatory response that signals for change in the fibers.

Tissue movement methods

The more subtle connective tissue approaches rely on the skilled development of following tissue movements. The process is as follows (Figure 7.2):

1. Make firm but gentle contact with the skin. This is best accomplished with the tissue in the ease position.
2. Increase the downward, or vertical, pressure slowly until resistance is felt; this barrier is soft and subtle.
3. Maintain the downward pressure at this point; now add horizontal drag until the resistance barrier is felt again.
4. Sustain the horizontal pressure and wait.
5. The tissue will seem to creep, unravel, melt, slide, quiver, twist, or dip, or some other movement sensation will be apparent.
6. Follow the movement, gently maintaining the tension on the tissues, encouraging the pattern as it undulates though various levels of release.
7. Slowly and gently release first the horizontal force and then the vertical force.

Twist-and-release kneading and compression applied in the direction of the restriction can also release these fascial barriers (Figure 7.3).

The important consideration for all connective tissue massage methods is that the pressure vertically and horizontally actually moves the tissue to create tension, torsion, shear, or bend, which forces alteration of the ground substance long enough for energy to build up in it and soften it. The development of connective tissue patterns is highly individualized, and because of this, systems that follow a precise protocol and sequence are often less effective in dealing with these complex patterns.

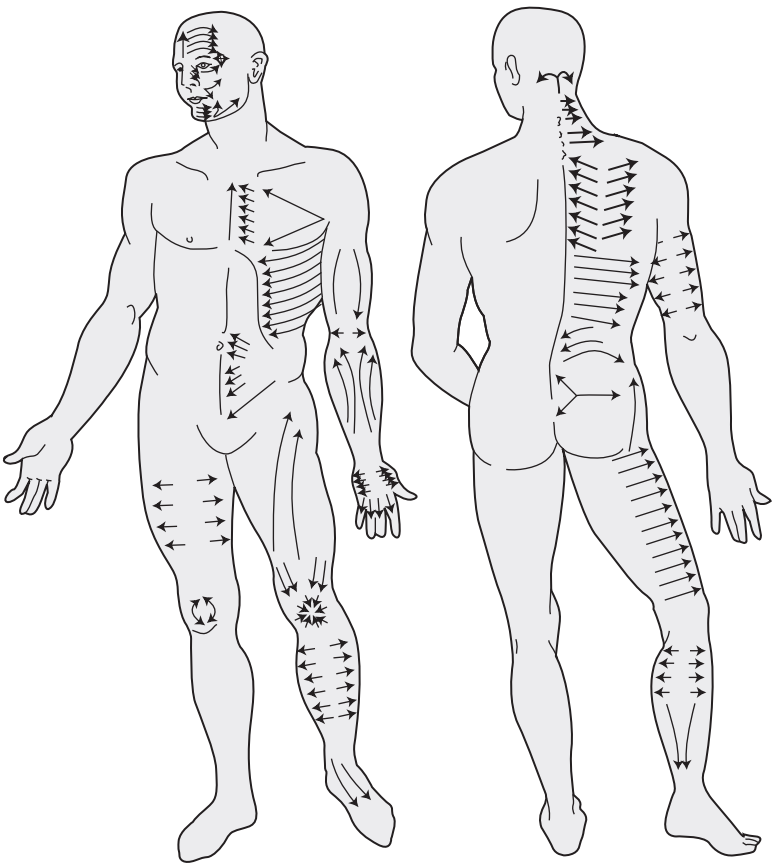

Figure 7.1 Application of connective tissue massage, modified from Bindegewebmassage. This system primarily introduced the mechanical forces of tension, bend, shear, and torsion.

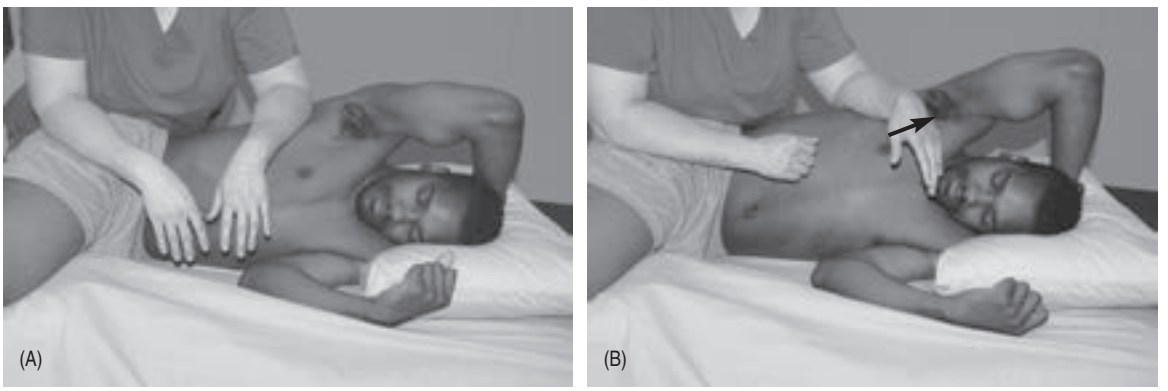

Figure 7.2 Tissue movement. A: Begin ease. B: End bind.

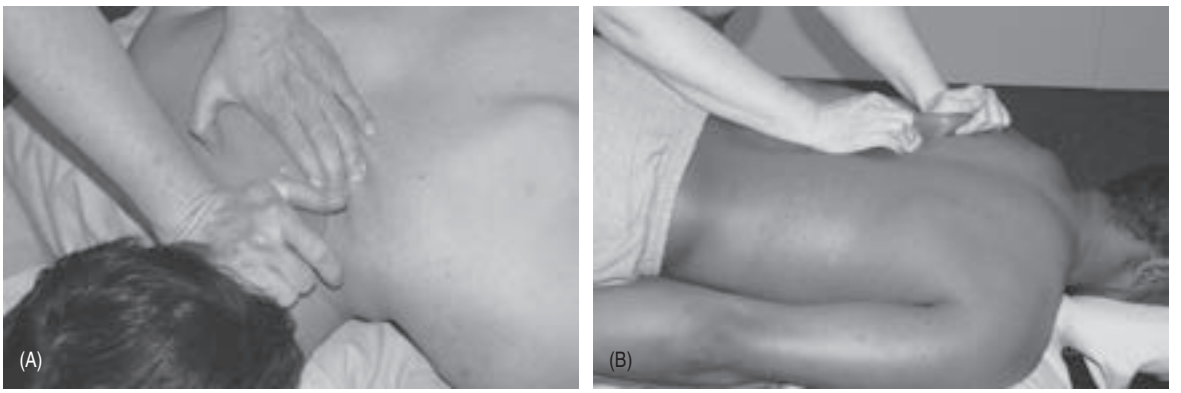

Figure 7.3 Tissue movement. A: Twist and release, neck. B: Twist and release, back.

A good grip with the skin is essential, so there must be no lotion or oil present. This grip can be with the hands or forearms. The technique is even sometimes performed with a towel to provide stronger contact with the skin.

Tissue can be moved toward ease (the way it wants to move) and is held for a few seconds to allow the tissue to soften. The client can add a neurologic component by contracting or relaxing the muscle as the massage therapist holds the tissue at ease. The entire procedure can be repeated while holding the tissue at bind (the way it does *not* want to move).

Some varieties of this process have been formalized into modality systems such as active release and deep tissue methods.

Active release

In active release, the massage therapist applies passive pressure, and the movement is provided by the client. Assessment identifies a local area of fibrotic tissue and/or adhered fibers. Compression is applied to hold the area in a static position; the tissues are then stretched away from that point. The points where the pressure is applied are often the same as those used for typical trigger points.

The basic method is to start with the muscle relaxed and held in a passive shortened position by moving the associated joint. Focused compression is applied directly into the adhered fibers to fix them in position. The muscle is then stretched by the massage therapist away from this fixed point by moving the joint. The pressure needs to be applied with sufficient force to prevent the target tissues from moving as the stretch takes place.

Active and resisted movements, instead of passive ones, can be used to stretch the muscle. In fact, this may be more effective since the neuromuscular function is involved as well as the focus on connective tissue. The client contracts the antagonist that reciprocally inhibits the muscle being treated and moves the area while the massage therapist maintains focused pressure. An easy way to do this is to have the client move the associated joint areas in a slow circle, or back and forth if the joint is a hinge joint. The tissues can also be stretched away from the pressure point using deep massage strokes made with the other hand or forearm. This is useful when it is not convenient to move the joint – for example, when treating the gluteal muscles while the client is in the prone position, where hip flexion to stretch the muscle would be impossible.

NEUROMUSCULAR TECHNIQUE

Neuromuscular technique (NMT) evolved in Europe in the 1930s as a blend of traditional Ayurvedic (Indian) massage techniques and soft tissue methods derived from other sources. Stanley Lief DC and his cousin Boris Chaitow ND DO developed the techniques now known as NMT into an excellent and economical diagnostic (and therapeutic) tool (Chaitow 2003a, Youngs 1962).

There is also an American version of NMT that emerged from the work of chiropractor Raymond Nimmo (Cohen & Gibbons 1998). NMT is an effective method to address trigger point activity.

Basics of NMT

A light lubricant is always used in NMT to avoid skin drag. The main contact is made with the tip of the thumb(s), more precisely the medial aspect of the tip. In some regions the tip of the index or middle finger is used instead as this allows easier insertion between the ribs for assessment (or treatment) of, for example, intercostal musculature.

Neuromuscular thumb technique
The therapist uses the medial tip (ideally) of the thumb to sequentially 'meet and match' tissue density/tension and to insinuate the digit through the tissues, seeking local dysfunction (Figure 7.4).

Neuromuscular finger technique
The therapist utilizes the index or middle finger, supported by a neighboring digit (or two), to palpate and assess the tissues between the ribs for local dysfunction. This contact is used instead of the thumb if it is unable to maintain the required pressure.

Posture and positioning
The therapist's posture and positioning are particularly important when applying NMT, as the correct application of forces dramatically reduces the energy expended and the time taken to perform the assessment/treatment.

The examination table should be at a height which allows the therapist to stand erect, legs separated for ease of weight transference, with the assessing arm straight at the elbow. This allows the therapist's bodyweight to be transferred down the extended arm through the thumb, imparting any degree of force required, from extremely light to quite substantial, simply by leaning on the arm.

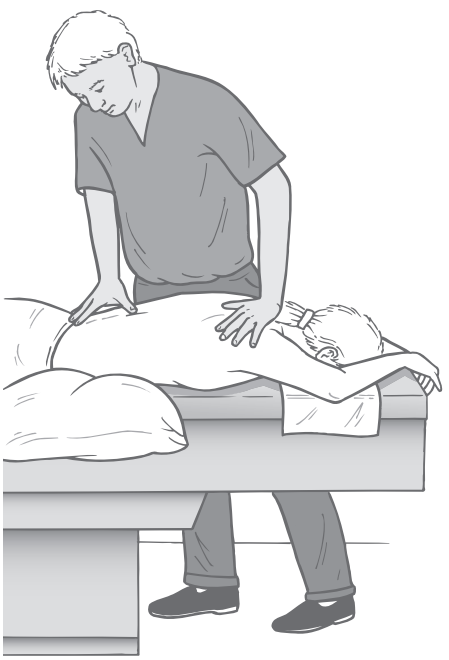

Figure 7.4 NMT thumb technique. (Reproduced with permission from Chaitow & Fritz 2006.)

The NMT thumb stroke
It is important that the fingers of the assessing/treating hand act as a fulcrum and that they lie at the front of the contact, allowing the stroke made by the thumb to run across the palm of the hand, towards the ring or small finger as the stroke progresses.

The finger/fulcrum remains stationary as the thumb draws intelligently towards it, across the palm. This is quite different from a usual massage stroke, in which the whole hand moves. Here the hand is stationary and only the thumb moves.

Each stroke, whether it be diagnostic or therapeutic, extends for approximately 4–5 cm before the thumb ceases its motion, at which time the fulcrum/fingers can be moved further ahead in the direction the thumb needs to travel. The thumb stroke then continues, feeling and searching through the tissues.

Another vital ingredient, indeed the very essence of the thumb contact, is its application of variable pressure (diagnostic pressure is in ounces or grams initially), which allows it to 'insinuate' and tease its way through whatever fibrous, indurated or contracted structures it meets.

A degree of vibrational contact, as well as the variable pressure, allows the stroke and the contact to have an 'intelligent' feel and seldom risks traumatizing or bruising tissues even when heavy pressure is used.

Application of NMT

Diagnostic assessment involves one superficial and one moderately deep contact only.

If treatment is decided on at that time then several more strokes, applied from varying angles, would be used to relax the structures, to stretch them, to inhibit contraction, or to deal with trigger points discovered during the examination phase.

When assessing (or treating) joint dysfunction, it is suggested that all the muscles associated with a joint receive NMT attention to proximal and distal attachments, and that the bellies of the muscles be searched for evidence of trigger points and other dysfunction (fibrosis, contractions, etc.).

A full spinal NMT assessment can be accomplished in approximately 15 minutes with ease, once the method is mastered. However, a diagnostic evaluation of a localized region – say covering the area of the neck and upper back, accompanied by other diagnostic and assessment modalities and methods – may be all that is necessary. With effective use of NMT, not only would localized, discrete 'points' be discovered, but also patterns of stress bands, altered soft tissue mechanics, contractions, and shortenings.

NMT exercise: finger and thumb strokes
Apply a light lubricant and position yourself and place your treating hand according to the illustration (see Figure 7.4), with your fingers acting as a fulcrum and the thumb (medial tip) feeling through the tissues, slowly and with variable pressure.

Practice this, in no particular sequence of strokes, until the mechanics of the body/arm/hand/thumb positions are comfortable and require no thought. Pay attention to varying the pressure, to meeting and matching tension in the tissues, and to using bodyweight, transferred through a straight arm, to increase pressure when needed.

Also practice the use of the finger stroke, especially on curved areas, by drawing the slightly hooked and supported (by one of its neighboring digits) finger toward yourself, in a slow, deliberate, searching manner. The objective is to obtain information, without causing excessive discomfort to the patient, and without stressing your palpating hands.

NMT in its treatment mode involves greater pressure in order to modify dysfunctional tissues, but in these sequences you can, if you wish, focus on 'information gathering' only, not treating. In time, with practice, treatment and assessment meld seamlessly together, with one feeding the other.

Chart any findings you make – tender areas, stress bands, contracted fibers, edematous areas, nodular structures, hypertonic regions, trigger points and so on. If trigger points are located, note their target area as well.

TRIGGER POINT METHODS

Theories of trigger point development are outlined in Box 7.1.

Box 7.1 Theories of trigger point development

There are three main theories (and a number of minor ones) that attempt to explain just what is happening that allows a trigger point to evolve.

1. ENERGY CRISIS THEORY
This is the earliest explanation of trigger point formation (Bengtsson et al 1986, Hong 1996, Simons et al 1999).

The theory suggests that increased demand on a muscle, possibly involving repetitive, very small-grade trauma (microtrauma) or actual injury (macrotrauma), causes calcium release from muscle cells, leading to shortening of the sarcomeres. This has the effect of obstructing normal circulation, so that tissues receive less oxygen. This causes the cells to be unable to produce enough energy (ATP) to allow the shortened sarcomeres to relax.

Waste products of metabolism accumulate (Simons et al 1999), and this causes some of the pain because of irritation and sensitization of sensory nerves (nociceptors).

This concept was partly supported by Bengtsson et al (1986).

2. THE MOTOR ENDPLATE THEORY
The motor nerve connects with a muscle cell at the motor endplate.

Research has shown that each trigger point contains very small areas (loci) that produce unusual electrical activity (Hubbard & Berkhoff 1993). These loci are usually found at the motor endplate zone (Simons 2001, Simons et al 2002).

The activity seen on EMG (electromyogram) is thought to be the result of an increased rate of release of acetylcholine (ACh) from the nerve cell. This may be enough to cause activation of a few contractile elements and be responsible for some degree of muscle shortening (Simons 1996).

By combining these two theories (energy crisis and motor endplate), a basic model exists that helps explain the origin of the trigger point.
There is a third theory.

3. RADICULOPATHIC MODEL
Some researchers have a different model altogether. They think that there is a neurologic cause, and that trigger points are a secondary phenomenon (Gunn 1997, Quintner & Cohen 1994).

Gunn (1997) suggests that myofascial pain often derives from intervertebral disk degeneration, which causes nerve root compression and paraspinal muscle spasm. This is described as a form of neuropathy (carpal tunnel syndrome is a neuropathy) that sensitizes and irritates structures in the distribution of the nerve root, and causes distal muscle spasm.

4. POLYMODAL THEORY (FIG. 7.5)
The polymodal receptor (PMR) hypothesis suggests that trigger points are nothing more than sensitized neural structures (pain receptors/nociceptors called polynodal receptors).

The PMR is a kind of nociceptor, and is responsive to mechanical acupuncture, and thermal and chemical stimuli. Its sensory terminals are free nerve endings and exist in various tissues of the entire body (Kawakita et al 2002).

Irrespective of which theory, or combination of theories, is actually proved to be correct, the fact remains that these noxious, painful troublemakers cause a great deal of pain and dysfunction.

Box 7.1 Theories of trigger point development—cont'd

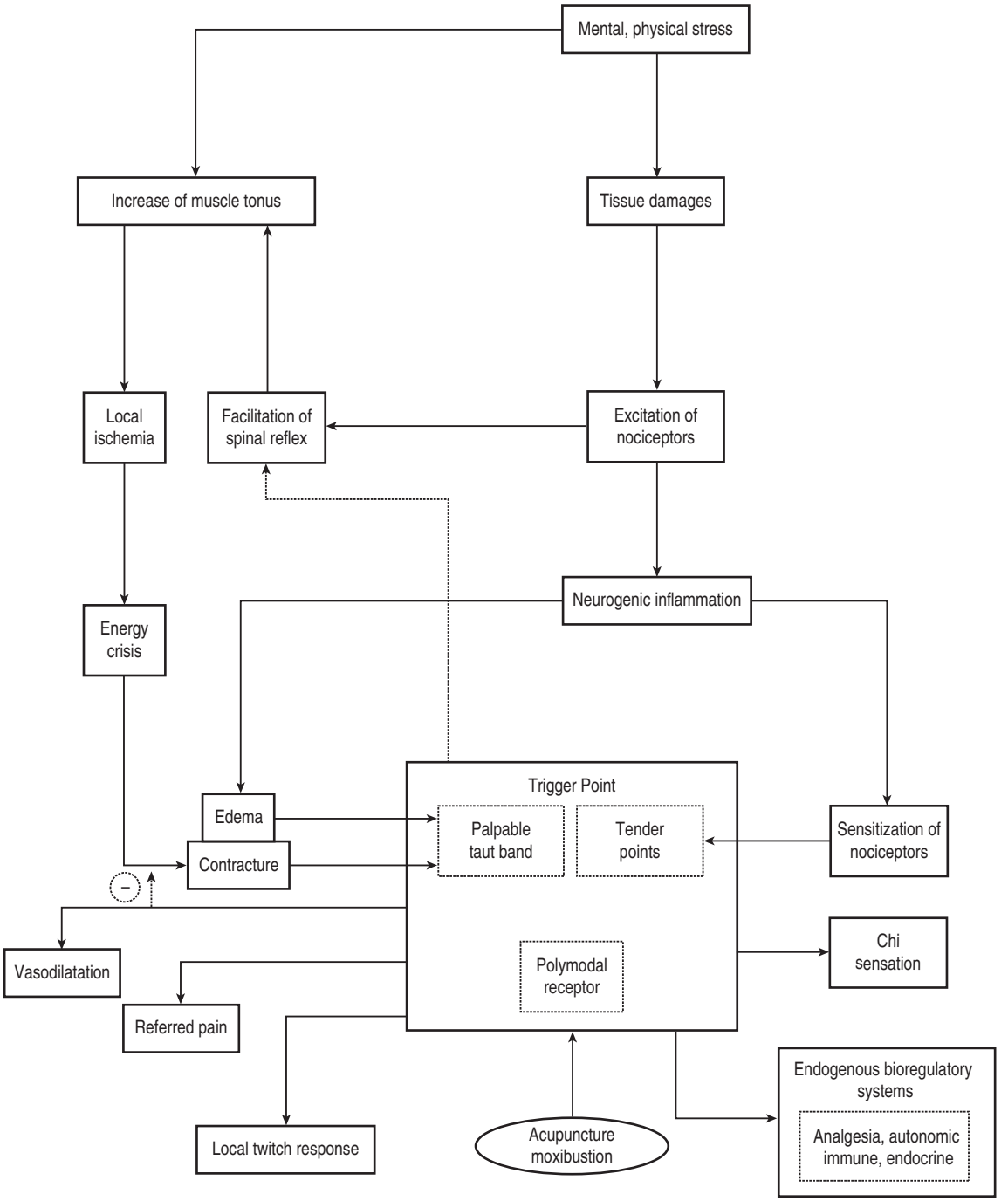

Figure 7.5 Polymodal receptor hypothesis of acupuncture and moxibustion. (Adapted from Kawakita et al 2002.)

Active and latent trigger points

The pain characteristics of an active myofascial trigger point (Figure 7.6) are as follows:

- When pressure is applied, active trigger points are painful and either refer (i.e., symptoms are felt at a distance from the point of pressure) or radiate (i.e., symptoms spread from the point of pressure).
- Symptoms that are referred or radiated include pain, tingling, numbness, burning, itching or other sensations and, most importantly, in an active trigger these symptoms are recognizable (familiar) to the person.
- Other signs of an active trigger point include the 'jump sign', palpable indications such as a taut band, fasciculation, etc.

The pain characteristics of a latent myofascial trigger point are as follows:

- Commonly the individual is not aware of the existence of a latent point until it is pressed (i.e., unlike an active point, a latent one seldom produces spontaneous pain).
- When pressure is applied to a latent point it is usually painful, and it may refer (i.e., symptoms are felt at a distance from the point of pressure) or radiate (i.e., symptoms spread from the point of pressure).
- If the symptoms – whether pain, tingling, numbness, burning, itching or other sensations – are not familiar, or perhaps are sensations that the person used to have in the past but has not experienced recently, then this is a latent myofascial trigger point (Figure 7.7).

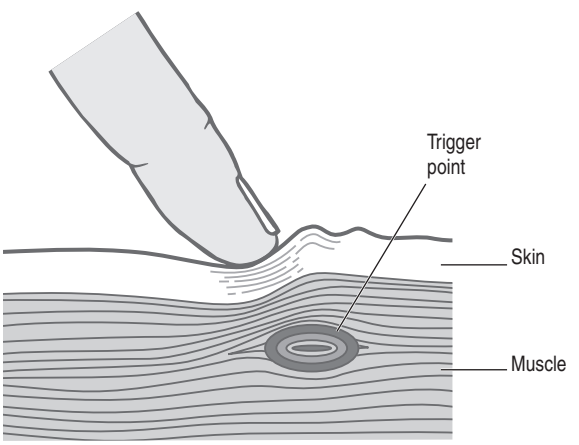

Figure 7.6 Trigger points are areas of local facilitation that can be housed in any soft tissue structure, most usually muscle and/or fascia. Palpation from the skin or at depth may be required to localize them. (From Chaitow 2003a.)

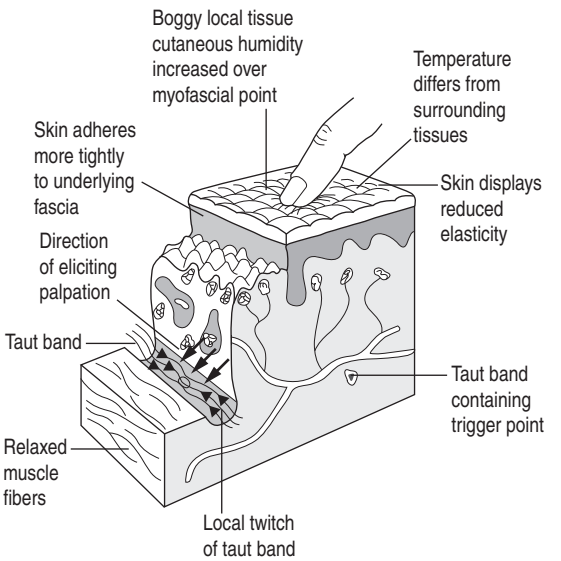

Figure 7.7 Altered physiology of tissues in region of myofascial trigger point.

Neck, head and face referral patterns and major trigger point locations are illustrated in Box 7.2; key and satellite trigger points are outlined in Box 7.3.

Progression

- Latent trigger points may become active trigger points at any time, perhaps becoming a 'common, everyday headache' or adding to, or expanding, the pattern of pain already being experienced for other reasons.
- The change from latent to active may occur when the tissues are overused, strained by overload, chilled, stretched (particularly if this is rapid), shortened, traumatized (as in a motor vehicle accident or a fall or blow) or when other perpetuating factors (such as poor nutrition or shallow breathing) provide less than optimal conditions of tissue health.
- Active trigger points may become latent trigger points with their referral patterns subsiding for brief or prolonged periods of time. They may then be reactivated with their referral patterns returning for no apparent reason.

Embryonic points

Any sensitive point in the soft tissues that hurts unusually on pressure but which does not radiate or refer is termed an embryonic trigger point. This is a disturbed or dysfunctional region of soft tissue that,

Box 7.2 Neck, head and face referral patterns and major trigger point locations

The maps illustrated below cover most of the body apart from the upper neck, head and face. These illustrations are all taken from *Clinical Application of Neuromuscular Techniques, Volume 1, Upper Body*, where detailed instructions are given for assessment and treatment of these (Chaitow & DeLany 2000).

- *Splenius capitis*: There are two major trigger point sites in this muscle, capable of referring pain to the top and side of the head (upper point) as well as into the lateral aspects of the neck (lower point) (Fig. 7.8).
- *Suboccipital and semispinalis capitis*: The trigger points in the suboccipital and semispinalis capitis muscles refer in a very similar pattern to the upper splenius – across the side of the head just above ear level to the forehead.
- *Platysma*: Referral from platysma trigger points is similar to part of the sternocleidomastoid referral zone (see below) into the face.
- *Sternocleidomastoid*: There are numerous trigger point sites in the sternocleiodomastoid, requiring careful assessment, usually using a flat pincer grip.
- *Temporalis*: A variety of trigger point sites in the enormously powerful temporalis muscle refer into different areas of the face, head, and jaw (including teeth).
- *Masseter*: Masseter trigger points refer into the teeth, jaw, face and sinuses.

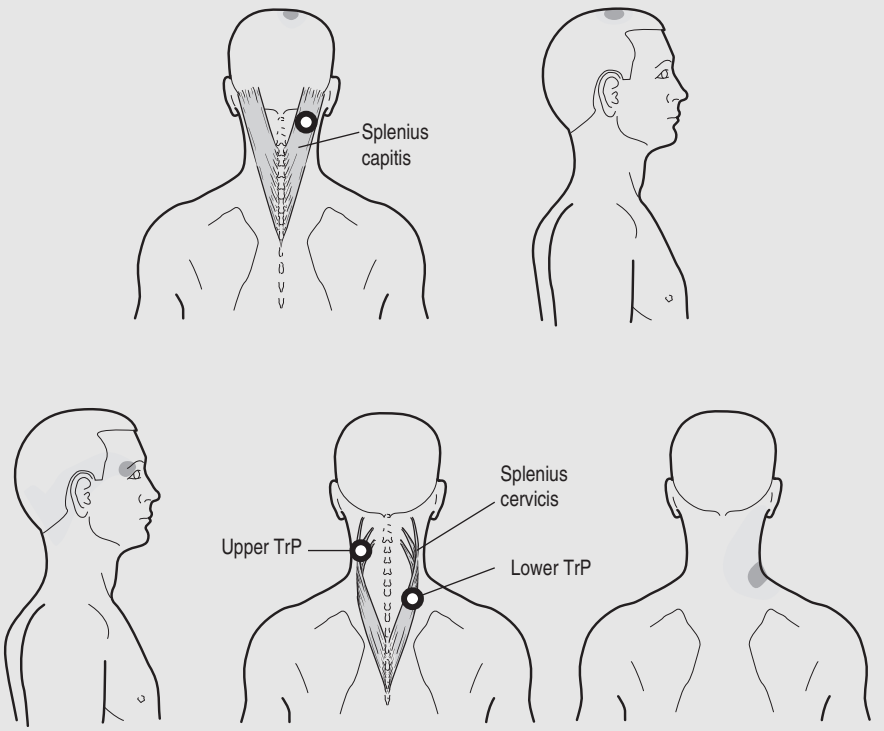

Figure 7.8 The combined patterns of splenii trigger point target zones of referral.

over time, with sufficient additional stress input (overuse, etc.), may become first a latent, and eventually an active, trigger point.

Attachment and central points

When a trigger point is situated near the center (belly) of a muscle, near the motor end-point, it is known as a central point. When it is situated close to the attachment of a muscle, it is known as an attachment point.

The major sites of trigger points are often close to the proximal (origins) and distal (insertions) attachments of muscles, and this is where NMT probes for information more effectively than most other systems.

Lief (described in Chaitow 1992) advocated that the same sequence of contacts be followed at each

Box 7.3 Key and satellite trigger points

Key trigger	Satellite trigger
Sternocleidomastoid	Temporalis, masseter, digastric
Upper trapezius	Temporalis, masseter, splenius, semispinalis, levator scapulae, rhomboid major
Scaleni	Deltoid, extensor carpi radialis, extensor digitorum communis, extensor carpi ulnaris
Splenius capitis	Temporalis, semispinalis
Supraspinatus	Deltoid, extensor carpi radialis
Infraspinatus	Biceps brachii
Pectoralis minor	Flexor carpi radialis, flexor carpi ulnaris, first dorsal interosseous
Latissimus dorsi	Triceps, flexor carpi ulnaris
Serratus posterior superior	Triceps, latissimus dorsi, extensor digitorum communis, extensor carpi ulnaris, flexor carpi ulnaris
Deep paraspinals	Gluteus maximus, medius and minimus, piriformis, hamstrings, tibialis, peroneus longus, gastrocnemius, soleus
Quadratus lumborum	Gluteus maximus, medius and minimus, piriformis
Piriformis	Hamstrings
Hamstrings	Peroneus longus, gastrocnemius, soleus

treatment session, whether assessing or treating, the difference between these modes (assessment and treatment) being merely one of repetition of the strokes, with a degree of added pressure when treating.

Lief's recommendation did not, however, mean that the same treatment was given each time, for the essence of NMT is that the pressure applied, both in diagnosis and in therapy, is variable, and that this variability is determined by the changes located in the tissues themselves.

MUSCLE ENERGY TECHNIQUE

Most problems of the musculoskeletal system involve, as part of their etiology, dysfunction related to muscle shortening (Janda 1978, Liebenson 1996):

- Are the tissues you are assessing tense or relaxed?
- Can your palpating hands identify 'ease' and 'bind'?

The tissues provide the palpating hands or fingers with a sense of these states, and there can never be enough focus on these two characteristics, which allow the tissues to speak as to their current degree of activity, comfort or distress. Ward (1997) states: 'Tightness suggests tethering, while looseness suggests joint and/or soft tissue laxity, with or without neural inhibition.'

Where weakness (lack of tone) is apparently a major element, it will often be found that antagonists are shortened, reciprocally inhibiting their tone, and that prior to any effort to strengthen weak muscles, hypertonic antagonists should be dealt with by appropriate means (such as MET), after which spontaneous toning occurs in the previously hypotonic or relatively weak muscles.

If tone remains reduced then, and only then, should there be specific focus on toning weak muscles (Lewit 1999).

Muscle energy technique summary

By lightly contracting a short, tight muscle isometrically (the agonist) for approximately 7 seconds an effect known as post-isometric relaxation (PIR) is produced. This offers an opportunity to stretch the previously shortened muscle(s) more effectively.

By lightly contracting the antagonists to tight/short muscles an effect known as reciprocal inhibition (RI) is produced in the affected muscle(s), and this also offers an opportunity to stretch the previously shortened muscle(s) more effectively.

A process known as 'increased tolerance to stretch' (ITS) is produced by isometric contractions (i.e., MET) of the agonist(s) – the muscle(s) needing lengthening – or their antagonists. This ITS effect means that you can more easily (because the muscle will be more relaxed) introduce greater force into a stretch than you could have done without the isometric contraction, because a neurologic change will have taken place, reducing the sensitivity of the patient (Ballantyne et al 2003, Rowlands et al 2003).

The aim is to contract the shortened muscles, or their antagonists, in order to achieve the release of tone and to then be able with greater ease to stretch the muscle(s) (Figures 7.9 and 7.10).

Which method should you choose – PIR or RI?

The presence of pain is frequently the deciding factor in choosing one or other of the methods described (PIR or RI) – contracting the agonist or the antagonist.

When using PIR, the very muscles which have shortened are being contracted. If the condition of the area is one in which there is a good deal of pain,

Figure 7.9A Muscle energy technique. In this example the patient, who cannot easily side-bend and rotate the neck towards the left, is held just short of the present barrier in order to introduce an isometric contraction by turning the head to the right against resistance.

Figure 7.9B Following the contraction described in Figure 7.9A, it is possible for the practitioner to ease the neck into a greater degree of side-bending and rotation towards the left.

Figure 7.10 MET treatment of right-side upper trapezius muscle. A: Posterior fibers; B: middle fibers; C: anterior fibers. Note that stretching in this (or any of the alternative positions which access the middle and posterior fibers) is achieved following the isometric contraction by means of an easing of the shoulder away from the stabilized head, with no force being applied to the neck and head itself.

where any contraction could trigger more pain, it might be best to avoid using these muscles, and choose the antagonists instead. Use of the antagonists (inducing RI) might therefore be the first choice for MET when the shortened muscles are very sensitive.

Later, when pain has been reduced by means of MET (or other) methods, PIR techniques (which use isometric contraction of the already shortened muscles rather than the antagonists used in RI methods) could be tried.

To a large extent, just how acute or chronic a condition is helps to decide the method best suited to treating it. Both methods (PIR and RI) will produce a degree of increased tolerance to stretch.

The essential variables of MET
Major variables that are controllable are:

- how long the contraction is allowed to continue, and how often it is repeated
- the amount of effort used in the contraction effort (the degree of effort in isometric contractions should always be much less than the full force available from the muscles involved)
- achieving a controlled degree of effort at all times.

Controlling the degree of effort calls for the use of only part of the available strength in a muscle or muscle group and the initial contraction should involve the use of a quarter or less of the strength available. This is never an exact measurement but indicates that we do not ever want a wrestling match to develop between the contracting area controlled by the patient and the counterforce offered by the massage therapist.

- After the initial slowly commenced contraction, subsequent contractions may involve an increase in effort, but should never reach more than half of the full strength of that muscle.
- The timing of isometric contractions is usually such as to allow around 7 seconds for the contraction, from beginning to end.
- The start and the end of the contraction should always be slow. There should never be a rapid beginning or end to the contraction.
- Always attempt a smooth build-up of power in the muscle(s) and a slow switch-off of the contraction at the end. This will prevent injury or strain, and allows for the best possible results.
- Contractions should always commence with the shortened muscle held close to its end of range, but, for comfort, never while it is already at stretch.
- After the isometric contraction you, assisted by the patient, should move the muscle past its previous barrier, into slight stretch, and this should be held for not less than 30 seconds to achieve slow lengthening.
- No pain should be caused. If there is pain you may have taken the muscle into an excessive degree of stretch.
- Each stretch should be repeated twice.

MET exercises (Goodridge & Kuchera 1997, Greenman 1996)

Exercise 1: Post-isometric relaxation (PIR) – upper trapezius

- Position the patient so that the target area can be isolated. In this example the person is side-lying.
- Holding the patient's head, slowly ease the area into bind, and stop when a barrier of resistance has been reached (this 'first barrier' is sensed by an increase in the amount of effort as you move the head).
- Your other (palpating) hand rests passively on the shoulder, palpating the muscles which are being tested (upper trapezius).
- The palpating hand must be in touch with the skin, molded to the contours of the tissues being assessed, but should exert no pressure, and should be completely relaxed.
- The palpating hand should also sense the barrier, by virtue of a feeling of increased tension/bind.
- By testing both sides it is possible to evaluate whether the lateral flexors of the head and neck muscles are tight and short on both sides, or whether one is and the other is not.
- Even if both are tight and short, one may be more restricted than the other. This is the one to treat first using MET.
- The point at which the very first sign of bind was noted is the resistance barrier.
- Identification and appropriate use of the first sign of resistance (i.e., where bind is first noted) is a fundamental part of the successful use of MET.

Exercise 2: Treatment of shortness using MET

- The patient is asked to use no more than 20% of available strength to attempt to take the head gently back towards the shoulder against firm, unyielding resistance offered by you. In this example the patient is trying to take the head away from the barrier, while you hold firmly, providing a solid platform for the client to push against.
- The patient will be contracting the agonists, the muscles which require release (and which, once released, should allow greater and less restricted movement).
- The isometric contraction should be introduced slowly, and resisted without any jerking, wobbling, or bouncing. Maintaining resistance to the contraction should produce no strain in the therapist.
- The contraction should be held for between 7 and 10 seconds. This is thought to place 'load' on the Golgi tendon organs, neurologically influencing intrafusal muscle spindle fibers, inhibiting muscle tone, and providing the opportunity for the muscle to be taken to a new resting length/resistance barrier without effort (Scariati 1991).

- An instruction is given to the patient, 'Release your effort, slowly and completely', while the therapist maintains the head at the same resistance barrier.
- The patient is asked to breathe in and out, and to relax completely while exhaling. Stretch is then introduced, which takes the tissues to a point just beyond the previous barrier of resistance.
- It is useful to have the patient gently assist in taking the (now) relaxed area towards and through the barrier. The stretch is held for 30 seconds.
- The procedure of contraction, relaxation, followed by patient-assisted stretch is repeated (ideally with a rest period between contractions) at least once more.

Exercise 3: Reciprocal inhibition (RI) – pectoralis major area

- This example involves abduction of the limb (i.e., shortened adductors) against resistance.
- The barrier, first sense of restriction/bind, is evaluated as the limb is positioned into bind, at which point the limb is returned a fraction towards a mid-range position (by a few degrees only).
- From this position the patient is asked to attempt to move through the barrier, using no more than 20% of strength (taking it towards the restriction barrier), while the therapist resists this effort.
- After 7 seconds, following the end of the contraction, the patient is asked to 'release and relax', followed by inhalation and exhalation and further relaxation, at which time the limb is guided through the new barrier, with the patient's assistance.
- This stretch is held for at least 30 seconds.

MET – some common errors and contraindications

Greenman (1996) summarizes several of the important elements of MET as follows. There is a patient-active muscle contraction:

- from a controlled position
- in a specific direction
- met by therapist-applied distinct counterforce
- involving a controlled intensity of contraction.

Patient errors during MET usage (commonly based on inadequate instruction from the therapist!)

- Contraction is too strong (*remedy*: give specific guidelines, e.g. 'use only 20% of strength', or whatever is more appropriate).
- Contraction is in the wrong direction (*remedy*: give simple but accurate instructions).
- Contraction is not sustained for long enough (*remedy*: instruct the patient to hold the contraction until told to ease off, and give an idea ahead of time as to how long this will be).
- The patient does not relax completely after the contraction (*remedy*: have them release and relax, and then inhale and exhale once or twice, with the suggestion 'now relax completely').

Therapist errors in application of MET

- Inaccurate control of position of joint or muscle in relation to the resistance barrier (*remedy*: have a clear image of what is required and apply it).
- Inadequate counterforce to the contraction (*remedy*: meet and match the force).
- Counterforce is applied in an inappropriate direction (*remedy*: ensure precise direction needed for best results).
- Moving to a new position too hastily after the contraction (*remedy*: take your time to have the patient relax completely before moving to a new position).
- Inadequate patient instruction is given (*remedy*: get the instructions right so that the patient can cooperate).
- The therapist fails to maintain the stretch position for a period of time that allows soft tissues to begin to lengthen (*remedy*: ideally 30 seconds, but certainly not just a few seconds).

Contraindications and side effects of MET

If pathology is suspected, no MET should be used until an accurate diagnosis has been established. Pathology (osteoporosis, arthritis, etc.) does not rule out the use of MET, but its presence needs to be established so that dosage of application can be modified accordingly (amount of effort used, number of repetitions, stretching introduced or not, etc.).

There are no other contraindications except for the injunction to cause no pain.

Pulsed MET (Ruddy 1962)

There is another MET variation, which is powerful and useful – pulsed MET.

This simple method has been found to be very useful since it effectively accomplishes a number of changes at the same time, involving the local nerve supply, improved circulation and oxygenation of tissues, reduction of contraction, etc.

This method depends for its effectiveness on the 'pulsed' efforts of the person producing them being very

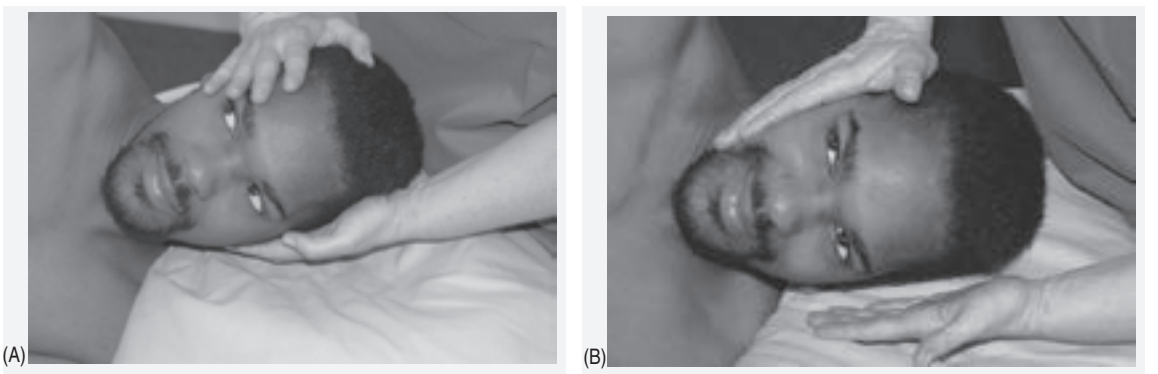

Figure 7.11 Example of a pulsed muscle energy sequence. A: Isolate target muscle and position for counterpressure. B: Pulse muscle back and forth and then lengthen the muscle. Pulsed muscle energy methods can be difficult for the client to perform. The pulsing contractions are small and precise. The eyes can move back and forth to facilitate the pulsing movement.

light indeed, with no 'wobble' or 'bounce', just the barest activation of the muscles involved (Figure 7.11).

An example of self-applied pulsed MET

- Sit at a table, rest your elbows on it, and tilt your head forward as far as it will go comfortably and then rest your hands against your forehead.
- Use a pulsing rhythm of pressure of your head pushing against your firm hand contact, involving about two pulsations per second (against your hands) for 10 seconds.
- After 20 pulsations retest the range of forward bending of your neck. It should go much further, more easily than before.

This method will have relaxed the muscles of the region, especially those involved in flexion, and will have produced 20 small reciprocal inhibition 'messages' to the muscles on the back of your neck which were preventing easy flexion.

Pulsed MET may be used for restricted muscles or joints in any part of the body. The simple rule is to have the patient engage the restriction barrier while you provide a point of resistance (with your hands) as the patient pulses toward the barrier rhythmically. No pain should be felt. After 20 contractions in 10 seconds the barrier should have retreated and the process can be repeated from the new barrier.

The pulsing method should always be against a fixed resistance, just as in other MET methods.

POSITIONAL RELEASE TECHNIQUE

Positional release technique (PRT) is itself made up of a number of quite different methods, but the one that is probably most suitable for use in a massage therapy context is called strain/counterstrain (SCS). In order to understand this method a brief explanation is needed (Chaitow 2003b, D'Ambrogio & Roth 1997, Deig 2001).

Jones (1981) described the evolution of strain/counterstrain as depending upon identification of 'tender' points found in the soft tissues associated with joints that have been stretched, strained or traumatized.

These tender points are usually located in soft tissues shortened at the time of the strain or trauma (i.e., in the antagonists to those that were stretched during the process of injury). For example, in spinal problems following on from a forward-bending strain, in which back pain is complained of, the appropriate 'tender' point will be found on the anterior surface of the body. The same process of tender point development in shortened structures takes place in response to chronic adaptation.

Tender points are exquisitely sensitive on palpation but are usually painless otherwise. Once identified, such points are used as monitors (explained below) as the area, or the whole body, is repositioned ('fine-tuned') until the palpated pain disappears or reduces substantially.

Tissue tension almost always eases at the same time as the easing of pain in the palpated point, making it possible to palpate the person, or part, into an ease position. If the 'position of ease' is held for some 90 seconds, there is often a resolution of the dysfunction which resulted from the trauma (Figure 7.12).

Positional release exercise (Figure 7.13)

Using one of the skin assessment methods discussed earlier in this chapter, or NMT, or whatever palpation method you are used to using, palpate the musculotendinous tissues that are antagonists to those that were being stretched during a joint or spinal trauma or strain, or which are chronically shortened as part of a longstanding problem.

Figure 7.12 (A) Identify painful point. (B) Use pressure against the rib cage to locate the ease position.

Figure 7.13 Alternate the methods to obtain the ease position.

The area being assessed should be one that is not being complained of as being painful. Any localized, unusually tender area in such tissue can be used as a 'tender point'.

You should apply sufficient pressure to that point to cause mild discomfort and then slowly position the joint or area in such a way as to remove the tenderness from the point. Creating 'ease' in the tissues housing the point usually involves producing some degree of increased slack in the palpated tissues.

Hold this position for 90 seconds and then slowly return to a neutral position and repalpate. The tenderness should have reduced or vanished, and functionality should be improved.

Main features of PRT

- All movements should be passive (therapist controls the movement, patient does nothing), and should be painless, slow and deliberate.
- Existing pain reduces, and no additional or new pain is created.
- Movement is away from restriction barriers.
- Muscle origins and insertions are brought together, rather than being stretched.
- Movement is away from any direction, or position, that causes pain or discomfort.
- Tissues being palpated relax.
- Painful tissues being palpated (possibly a trigger point) reduce in pain.
- It is often the case that the position of ease is a replica of a position of strain that started whatever problem the patient now has.

Guidelines for PRT use

- For treatment of tender points on the anterior surface of the body, flexion, side-bending, and rotation should be toward the palpated point, followed by fine-tuning to reduce sensitivity by at least 70%.
- For treatment of tender points on the posterior surface of the body, extension, side-bending, and rotation should be away from the palpated point, followed by fine-tuning to reduce sensitivity by 70%.
- The closer the tender point is to the midline, the less side-bending and rotation should be required, and the further from the midline, the more side-bending and rotation should be required, in order to effect ease and comfort in the tender point (without any additional pain or discomfort being produced anywhere else).
- The direction toward which side-bending is introduced when trying to find a position of ease often needs to be away from the side of the palpated pain point, especially in relation to tender points found on the posterior aspect of the body.

The SCS process described step-by-step

To use the strain/counterstrain (SCS) approach a painful point is located. This can be a 'tender' point, or an actual trigger point.

- Sufficient pressure is applied to the point to cause some pain. If it is a trigger point ensure that just enough pressure is being applied to cause the referred symptoms.
- The patient is told to give the pain being felt a value of '10'. (*Note*: This is not a situation in which the patient is asked to describe a pain level out of 10, instead it is one in which the question asked is: 'Does the pressure hurt?' If the answer is yes, then the patient is told: 'Give the level of pain you are now feeling a value of 10, and as I move the area around and ask for feedback, give me the new pain level ... whatever it is.')
- It is important to ask the patient to avoid comments such as 'The pain is increasing', or 'It's getting less', or any other verbal comment other than a number out of 10. This helps to avoid undue delay in the process.
- The patient would be side-lying, and the therapist would be applying sufficient pressure to the point in the tissue to register pain which he/she would be told has a value of 10.
- The head would be moved in one direction (rotated away from the pain) as the patient is asked to give a value out of 10 for the pain.
- If the pain reduces, another direction might be introduced (say adduction), and the question is repeated. If the pain increases, a different movement direction would be chosen.
- By gradually working through all the movement possibilities, in various directions, and possibly adding compression and distraction, a position would be found where pain drops by at least 70% (i.e., the score reaches 3 or less).
- Once this 'position of ease' has been found, after all the careful slow-motion fine-tuning, it is maintained for not less than 90 seconds – and sometimes more – after which a slow return is made to the starting position.
- Range of motion and degree of previous pain should have changed for the better.
- In different tissues the possible directions of movement might include flexion, extension, rotation one way or the other, side flexion one way or the other, translation (shunting, or evaluating joint play), as well as compression or distraction, to find the position of maximum ease.

What happens when tissues are at ease (whether 90 seconds or much longer)?

Pain receptors (nociceptors) reduce in sensitivity – something that is of importance where pain is a feature, whether this involves trigger points or not (Bailey & Dick 1992, Van Buskirk 1990).

In the comfort/ease position there is a marked improvement in blood flow and oxygenation through the tissues. Facilitated areas (spinal or trigger points) will be less active, less sensitized, calmer – less painful.

Positional release is used as part of the integrated neuromuscular inhibition (INIT) sequence, described below, for trigger point deactivation.

INTEGRATED NEUROMUSCULAR INHIBITION (FOR TRIGGER POINT DEACTIVATION)

An integrated treatment sequence has been developed for the deactivation of myofascial trigger points. The method is as follows:

- The trigger point is identified by palpation.
- Ischemic compression is applied in either a sustained or intermittent manner (Figure 7.14A). When referred or local pain starts to reduce in intensity, the compression treatment stops.
- The patient should be told something such as: 'I am going to press that same point again, and I want you to give the pain that you feel a "value" of 10. I will then gently reposition the area and you will feel differences in the levels of pain. In some positions the pain may increase, in others it will decrease. When I ask you for feedback as to what's happening to the pain, please give me a number out of 10. If the pain has increased it may go up – to say 11 or 12. Just give me the number you are feeling. We are aiming to find a position in which the pain drops to 3 or less, and the more accurately you give me the "pain score" the faster I will be able to fine-tune the process, so that we can get to the "comfort" position.'
- Using these methods (as described in the section above on positional release) the tissues housing the trigger point are then carefully placed in a position of ease.
- This ease position is held for approximately 20–30 seconds, to allow neurological resetting, reduction in pain receptor activity, and enhanced local circulation/oxygenation.

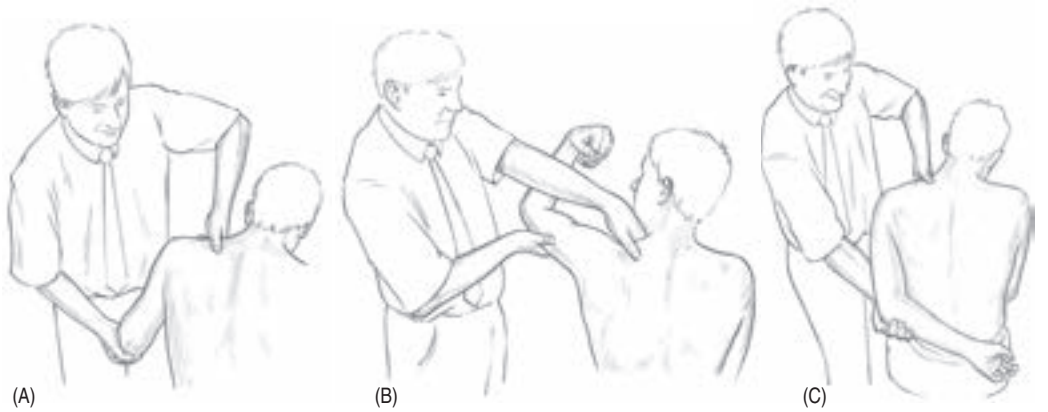

Figure 7.14 A: First stage of the integrated neuromuscular inhibition technique (INIT) in which a tender/pain/trigger point in the supraspinatus is located and is compressed, either intermittently or persistently. B: The pain is removed from the tender/pain/trigger point by finding a position of ease, which is held for at least 20 seconds, following which an isometric contraction is achieved involving the tissues that house the tender/pain/trigger point. C: Following the holding of the isometric contraction for an appropriate period, the muscle housing the point of local soft tissue dysfunction is stretched. This completes the INIT sequence. (From Chaitow 2001.)

- An isometric contraction is then focused into the musculature around the trigger point (Figure 7.14B) to create post-isometric relaxation (PIR), as discussed in the MET section earlier in this chapter. The way this is done varies with the particular part of the body being treated. Sometimes all that is necessary is to say to the patient: 'Tighten the muscles around the place where my thumb is pressing.'
- At other times if the patient is being supported in a position of ease, it may be helpful to say something such as: 'I am going to let go of your leg or neck (or arm, or whatever else you are supporting) and I want you to hold the position on your own for a few seconds.' In one way or another you need to induce a contraction of the muscle tissues surrounding the trigger point, so that they can be more easily stretched afterwards.
- After the contraction (5–7 seconds, with the patient using only a small amount of effort) the soft tissues housing the trigger point are stretched locally (Figure 7.14C).
- The local stretch is important because it is often the case in a large muscle that stretching the whole muscle will effectively lengthen it, but the tight bundle where the trigger point is situated will be relatively unstretched – like a knot in a piece of elastic, which remains knotted even though the elastic is held at stretch.
- After holding the local stretch for approximately 30 seconds the entire muscle should then be contracted and stretched – again holding that stretch for at least 30 seconds.
- The patient should assist in stretching movements (whenever possible) by activating the antagonists and so facilitating the stretch.
- A towel that has been wrung out in warm/hot water placed over the treated tissues for 5 minutes helps to ease the soreness that may follow this treatment.
- Within 24 hours the trigger should have reduced in activity considerably, or no longer be active. Retesting immediately after the INIT sequence may not offer evidence of this, as tissues will be tender.

SPRAY-AND-STRETCH CHILLING METHODS

An effective method for deactivation of trigger points, and also for easing pain and releasing chronic muscle spasm, is use of spray-and-stretch chilling methods (Mennell 1974).

A container of vapocoolant spray with a calibrated nozzle that delivers a fine jet stream, or a source of ice, is needed. The jet stream should have sufficient force to carry in the air for at least 3 feet; a mist-like spray is less desirable.

Ice can consist of a cylinder of ice formed by freezing water in a paper cup and then peeling this off the ice. A wooden handle will have been frozen into the ice to allow for its ease of application, as it is rolled from the trigger towards the referred area in a series of sweeps. A piece of ice may also be used, directly

against the skin, for the same purpose, although this tends to be messy as the ice melts. Whichever method is chosen, the patient should be comfortably supported to promote muscular relaxation.

If a spray is used, the container is held about 2 feet away, in such a manner that the jet stream meets the body surface at an acute angle or at a tangent, not perpendicularly. This lessens the shock of the impact.

- The stream/ice massage is applied in one direction, not back and forth.
- Each sweep is started at the trigger point and is moved slowly and evenly outward over the reference zone. The direction of chilling should be in line with the muscle fibers towards their insertion (Figure 7.15).
- The optimum speed of movement of the sweep/roll over the skin seems to be about 4 inches (10 cm) per second.
- Each sweep is started slightly proximal to the trigger point and is moved slowly and evenly through the reference zone to cover it and extend slightly beyond it.
- These sweeps are repeated in a rhythm of a few seconds on and a few seconds off, until all the skin over the trigger and reference areas has been covered once or twice.

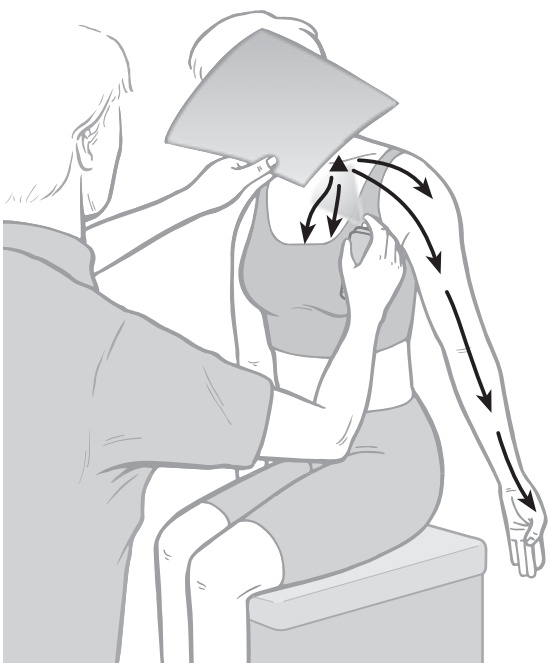

Figure 7.15 Use of spray ice to chill an area between scalene muscle trigger point and the target area in the arm. Note that the head is side-bent right and extended to stretch the left scalenes at the same time as the chilling takes place. (From Chaitow 2004.)

- If aching or 'cold pain' develops, or if the application of the spray/ice sets off a reference of pain, the interval between applications is lengthened.
- Care must be taken not to frost or blanch the skin.
- During the application of cold or directly after it, the taut fibers should be stretched passively. The fibers should not be stretched in advance of the cold.
- Steady, gentle stretching is usually essential if a satisfactory result is to be achieved.
- As relaxation of the muscle occurs, continued stretch should be maintained for 20–30 seconds, and after each series of cold applications active motion is tested.
- An attempt should be made to restore the full range of motion, but always within the limits of pain, as sudden overstretching can increase existing muscle spasm.
- The entire procedure may occupy 15–20 minutes and should not be rushed. The importance of re-establishing normal motion in conjunction with the use of the chilling is well founded.

INTEGRATING TREATMENT STRATEGIES

Incorporating numerous interventions without overwhelming adaptive capacity is a valuable treatment strategy. Any of the following would be a beneficial massage aspect:

- normalization of soft tissue dysfunction
- deactivation of myofascial trigger points
- strengthening weakened structures
- proprioceptive re-education using physical therapy methods
- postural and breathing re-education
- ergonomic, nutritional, and stress management strategies
- psychotherapy, counseling or pain management techniques
- occupational therapy which specializes in activating healthy coping mechanisms
- appropriate exercise strategies to overcome deconditioning.

A team approach to rehabilitation is called for, where referral and cooperation between health care professionals allow the best outcome to be achieved. You are encouraged to develop an understanding of the multiple disciplines with which you can interface so that the best outcome for the patient can be achieved.

Core stability and breathing rehabilitation exercises are described in Chapter 9.

KEY POINTS

- Good palpation skills allow a therapist to rapidly and accurately localize and identify dysfunctional tissues.
- Neuromuscular technique offers a unique way of searching tissues for local changes (such as trigger points) in a sequential way, and then treating whatever is located.
- Muscle energy techniques offer useful ways of encouraging length into previously tight, short, soft tissues.
- Positional release technique offers painless ways for encouraging release of hypertonicity and spasm.
- Integrated neuromuscular inhibition is a sequence involving pressure methods, together with MET and PRT for trigger point deactivation.
- Spray-and-stretch chilling methods are of proven value in trigger point deactivation and easing spasm.
- Connective tissue approaches.
- Rehabilitation exercise methods are vital for ultimate recovery and prevention.
- Massage combines with any of these approaches and has unique attributes of its own in headache and neck pain treatment.

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CHAPTER 8

Therapeutic massage treatment for headache and neck pain

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INTRODUCTION

The information up to this point has involved both theory and methodology specifically focused on understanding, assessing, determining the appropriateness of treatment of and finally developing massage treatment approaches for headache and neck pain.

This chapter specifically concerns the integration of theory, assessment and treatment of headache and neck pain into the general massage application and will not repeat assessment and treatment recommendations.

The focus of this chapter is to describe ways of incorporating the information and skills outlined in previous chapters into a massage session, so that the essence of the full body massage experience remains and is enhanced by the ability to specifically address dysfunction related to headache and neck pain in the context of massage. Massage can provide an integrated approach for treatment, addressing many of the major factors already discussed.

MASSAGE TREATMENT

A variety of massage applications can be employed to accompany the methods outlined in this chapter.

A combination of physical effects occurs, apart from the undoubted anxiety-reducing (Sandler 1983) influences that involve biochemical changes. Massage techniques vary greatly. The following are a few examples:

- Plasma cortisol and catecholamine concentrations alter markedly as anxiety levels drop and depression is also reduced (Field 1992).
- Serotonin levels rise as sleep is enhanced, even in severely ill patients – preterm infants, cancer patients, and people with irritable bowel problems

as well as HIV-positive individuals (Acolet 1993, Ferel-Torey 1993, Xujian 1990).

- Pressure strokes tend to move fluid content, encouraging venous, lymphatic, and tissue drainage.
- Increase of blood flow results in fresh oxygenated blood, which aids in normalization via increased capillary filtration and venous capillary pressure.
- Edema is reduced and so are the effects of pain-inducing substances which may be present.
- Decreases occur in the sensitivity of the gamma efferent control of the muscle spindles, thereby reducing any shortening tendency of the muscles (Puustjarvi 1990).
- A transition occurs in the ground substance of fascia (the colloidal matrix) from gel to sol, which increases internal hydration and assists in the removal of toxins from the tissue (Oschman 1997).
- Pressure techniques can have a direct effect on the Golgi tendon organs, which detect the load applied to the tendon or muscle.

Outcome-based massage

When massage is used to address a specific problem or set of symptoms it is considered outcome-based massage. Outcome-based massage targets results instead of methods and modalities. Various methods can be combined to achieve outcomes. For example, if a massage therapist is working with a multidisciplinary health care team to treat headache and neck problems, outcome-based instructions to the massage therapist might include suggestions such as:

- increase scalp pliability
- lengthen shortened neck extensors
- address trigger point referred pain from the sternocleidomastoid muscle
- reduce sympathetic arousal.

The instructions are unlikely to be: 'Apply Swedish massage with reflexology and energy-based modalities.'

While the difference between massage modalities and massage based on outcome goals may seem simple, this is actually a major paradigm shift with which the massage community continues to grapple. Approaching therapeutic massage to address head and neck pain needs to be outcome based, since different massage modalities can be used alone or in combination, and with other methods to achieve a positive change for those experiencing headaches and neck problems.

To be proficient in outcome-based massage it is necessary to be skilled in evaluation and clinical reasoning in order to develop appropriate treatment plans. The information in previous chapters provides the foundation upon which the massage therapist can make appropriate treatment plan decisions in the context of treating head and neck problems.

It is possible to include much of the assessment process into a general full body massage session. This is especially true of all the palpation methods and neuromuscular technique (NMT) assessment. In fact it is desirable to consider the first few massage sessions as assessment. Then, based on assessment information gathered during massage sessions, coupled with other information from a comprehensive history, and tests performed outside the context of massage, together with information from other professionals involved with the patient, a specific treatment plan can be developed to achieve the outcome goals.

Because most people have preconceived ideas about what a massage should be (relaxing, passive, general) it becomes important to incorporate both assessment and treatment into the massage in such a way that the generalized full body experience of the massage is not compromised.

People enjoy massage because it feels good, and is a nurturing, integrated experience. This major strength of massage needs to be preserved, not replaced. General nonspecific full body massage – based on the outcomes of decreased sympathetic arousal and maladaptive stress response, tactile pleasure sensation and nurturing – is effective in the treatment of headache and neck pain symptoms even if nothing else is done (Yates 2004). It is prudent to preserve these qualities and benefits of massage when addressing specific conditions such as headache and neck dysfunction.

The massage therapist can increase the effectiveness of massage treatment by becoming more skilled in how to target a specific outcome, such as reducing pain and stiffness in the cervical area. This is accomplished by incorporating assessment skills and targeted treatment methods based on that assessment information into the full body massage session. Targeted treatment such as for deactivation of trigger points can feel intense and/or uncomfortable. These methods are often better accepted and integrated by the patient when 'wrapped' in the pleasure and nurturing experience of a general massage session. Since headache and neck pain are so common and massage has been shown to be beneficial (see Chapter 5), the massage therapist needs to be skilled in this area.

The headache and neck pain massage treatment suggestions in this text are most effective for muscle tension-type headaches and mechanical neck pain, although strategies for vascular-type headaches are offered.

Based on many years of professional experience, client populations that typically often seek massage experience headache and neck pain. Causal factors are typically a cumulative response to many different adaptive responses, such as postural distortion, a combination of short soft tissue and long weak muscles or lax ligaments, various types of joint dysfunction (especially instability), generalized stress and breathing dysfunction, repetitive strain, lack of movement – and the list goes on – as discussed in detail elsewhere in this book.

It is logical that individuals undergoing medical procedures such as surgery may develop pain secondary to the positioning required to perform the procedure, extended bed rest, reduced physical activity, anxiety and other predisposing factors. Headache and neck pain is a major treatment concern in health care in many populations, including children and adolescents, in postural distortion during pregnancy, postural strain from obesity, and muscle pain as part of osteoporosis and other conditions related to aging (Yates 2004).

Management of headache and neck pain and improvement in function require lifestyle changes on the part of the client/patient and compliance with various treatment protocols. Chapter 9 also discusses lifestyle choices which could possibly be creating the symptom and be the cause of the dysfunction. Unfortunately, many people are not diligent when it comes to implementing these changes. For these individuals, headache and neck pain can frequently be symptomatically managed with massage. This means that the massage outcome goal is pain management more so than targeting a change in the factors causing the condition. And just as pain medication will wear off, so will the effects of massage, so it may need to be more frequent in order to maintain symptom management. At the end of Chapter 6, massage treatment protocols are provided for various breathing dysfunctions, which can be a cause of head and neck pain.

Massage may actually be the treatment of choice for those people who will not be compliant with a multidisciplinary care plan for headache and neck dysfunction. Based on the assumption that they are not going to make behavioral changes, or do the necessary exercises, massage can replace – to some extent – the activities necessary to maintain pliability and flexibility in shortened soft tissue structures as well as reducing generalized stress. People can become discouraged, which increases the tendency to be noncompliant with self-treatment protocols. A massage twice a week can often manage the pain and dysfunction in these people by moving fluids, lengthening short structures, stimulating internal pain-modulating mechanisms, and by reducing generalized motor tone by decreasing sympathetic anatomic nervous system activity, as well as by providing pleasurable relaxation experiences.

The goal is not to 'fix' the pain but to both mask it and superimpose short-term beneficial changes in the tissue. If these patients are treated with medication they would take muscle relaxants, some sort of analgesic and anti-inflammatory, and possibly mood-modulating drugs. All of these medications have potentially serious side effects, with long-term use making them undesirable in management of chronic head and neck pain. Massage may accomplish similar results to that achieved by medication, if applied frequently and consistently – and without the side effect problem. Massage can replace or help reduce the dose of various medications, and it can be used indefinitely to treat the symptoms of chronic headaches and neck dysfunction. Massage has few (if any) side effects, is cost effective, produces at least short-term benefits and since people typically enjoy massage they tend to be compliant about attending sessions (Fritz 2004). This situation is not ideal but it is not the worst-case situation either, and it is possible that eventually the patient/client will reach a point in their life when they are able and willing to be more responsible for the lifestyle and attitude changes necessary to manage head and neck pain.

Describing massage

There is an evolution taking place in massage. The shift from a modality focus (e.g., Swedish massage, reflexology, deep tissue massage, Amma, Lomi Lomi) to an outcome focus requires a change in terminology and how massage application is described. One definition of massage is that it represents the manual manipulation of the soft tissues. Soft tissue manipulations create various mechanical forces which cause shifts in the form and function of the body. The physiologic responses of the body to massage are not specific to the modality used but to what is described as qualities of touch.

Qualities of touch

Massage application involves touching the body to manipulate the soft tissue, influence body fluid movement, and stimulate neuroendocrine responses. How the physical contact is applied is considered the qualities of touch. Based on information from massage pioneer Gertrude Beard and current trends in therapeutic massage, the massage application can be described as follows (De Domenico 2007).

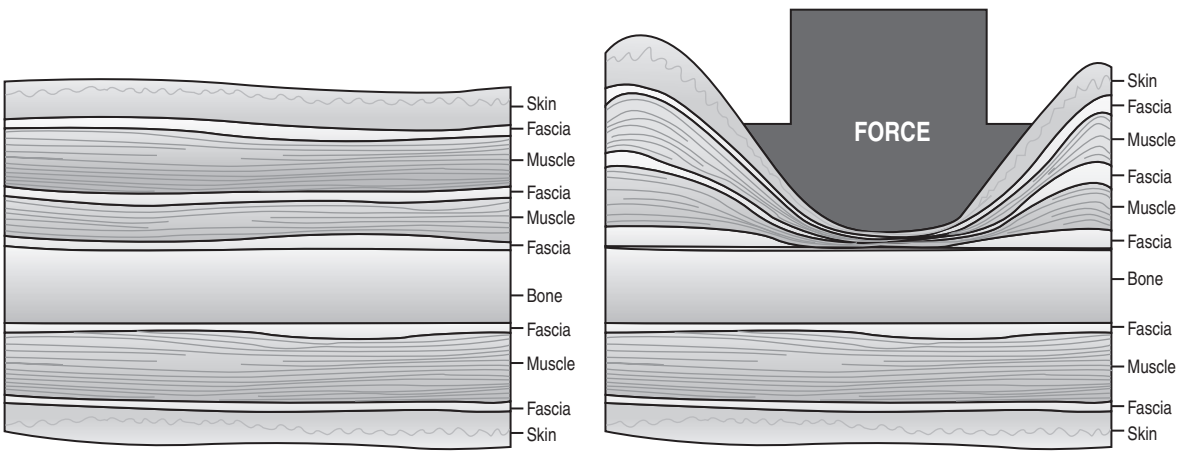


Figure 8.1 Massage applications systematically generate force through each tissue layer. This figure provides a graphic representation of force applied, which would begin with light superficial application, progressing with increased pressure to the deepest layer.

Depth of pressure (Figure 8.1)
Depth of pressure (compressive force) – which is extremely important – can be light, moderate, deep, or variable.

Most soft tissue areas of the body consist of three to five layers of tissue, including the skin; the superficial fascia; the superficial, middle, and deep layers of muscle; and the various fascial sheaths and connective tissue structures. Pressure should be delivered through each successive layer to reach the deeper layers without damage and discomfort to the more superficial tissues. The deeper the pressure, the broader the base of contact required on the surface of the body. It takes more pressure to address thick, dense tissue than thin, delicate tissue.

Depth of pressure is important for both assessment and treatment of soft tissue dysfunctions. Soft tissue dysfunction can form in all layers of tissue.

In order to treat various changes in soft tissue (such as a trigger point) it is necessary to be able to apply the correct level of pressure to reach the location of the point as well as to compress the tissue to alter flow of circulation. Soft tissue dysfunctions located in surface tissue require less depth of pressure than those located in deeper muscle layers.

Drag (Figure 8.2)
Drag describes the amount of pull (stretch) on the tissue (tensile force).

Drag is applicable for various types of palpation assessment for soft tissue dysfunctions, including skin drag assessment and functional technique used to identify areas of ease and bind. Ease is identified when tissue moves freely and easily, whereas bind is where tissue palpates as stuck, leathery or thick.

Drag is also a component of connective tissue methods used to treat soft tissue dysfunctions and lymphatic drainage methods.

Direction
Direction can move from the center of the body out (centrifugal) or in from the extremities toward the center of the body (centripetal).

Direction can proceed from proximal to distal (or vice versa) of the muscle, following the muscle fibers, transverse to the tissue fibers, or in circular motions.

Direction is a factor in stretching tissues containing soft tissue dysfunctions or in the methods that influence blood and lymphatic fluid movement.

Speed
Speed is the rate that massage methods are applied. The speed can be fast, slow, or variable, depending on the demands of the tissues being addressed and of the state of the client/patient (faster and more energizing in situations where stimulation is called for, slower and more rhythmic where calming influences are needed).

Rhythm
Rhythm refers to the regularity of application of the technique. If the method is applied at regular intervals, it is considered even, or rhythmic; if the method is disjointed or irregular, it is considered uneven, or arrhythmic.

Figure 8.2 Gliding prone, proximal to distal, with drag.

The on/off aspect of compression applied to a trigger point to encourage circulation to the area should be rhythmic, as should lymphatic drainage application.

Jostling and shaking can be rhythmic or arrhythmic.

Frequency

Frequency is the rate at which the method is repeated in a given timeframe. This aspect of massage relates to how often the treatment, such as ischemic compression or gliding, is performed. In general, the massage practitioner repeats each method about three times before moving or switching to a different approach.

The first application can be considered assessment, the second treatment and the third post-assessment. If the post-assessment indicates remaining dysfunction, then the frequency is increased to repeat the treatment/post-assessment application.

Duration

Duration is the length of time that the method lasts, or that the manipulation stays focused on the same location. Typically, duration of a specific method is approximately 60 seconds, although functional methods that position the tissue or joint in ease (the way it wants to move) or bind (the way it does *not* want to move) can be an exception and may need to be applied for longer periods.

Duration relates to how long compression is applied to soft tissue areas of dysfunction, or how long a stretch is held.

The following example describes how some of these qualities can be used to describe a massage modality. Myofascial/connective tissue methods may be indicated in the management and treatment of neck pain.

> Massage used to influence superficial fascia can be explained as light pressure, with sustained drag, to create tension forces (Figure 8.3), stretching the tissues just past their end of range barriers (bind) in multiple directions, for a duration of 60 seconds and repeated three times.

Delivery of massage

Through these varied qualities of touch, delivery of massage methods can be adapted to achieve the outcomes best suited to meet the needs of the client.

The mode of application (e.g., gliding/effleurage, kneading/petrissage, compression) provides the most efficient way to apply the methods. Each method can be varied, depending on the desired outcome, by adjusting depth, drag, direction, speed, rhythm, frequency, and duration.

In perfecting massage application, the quality of touch is as important as the method. Quality of touch is altered when there is a contraindication or caution for massage. For example, when a person is fatigued, the duration of the application should be reduced; if a client has a fragile bone structure, the depth of pressure should be altered.

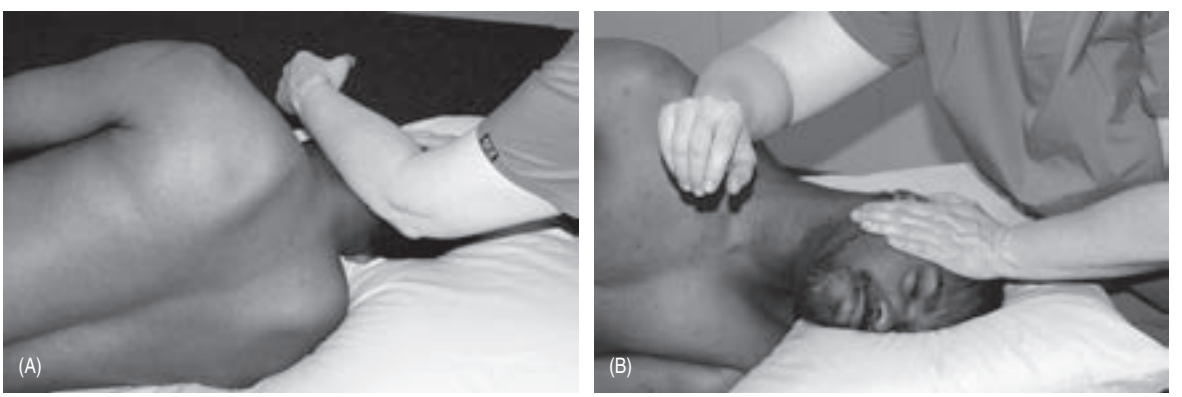


Figure 8.3 (A) Light pressure with drag. (B) Stretch (drag).

Components of massage methods

All massage methods introduce forces into the soft tissues. These forces stimulate various physiologic responses.

Some massage applications are more mechanical than others – connective tissue and fluid dynamics are most affected by mechanical force. Connective tissue is influenced by mechanical forces by changing its pliability, orientation, and length (Yahia et al 1993).

The movement of fluids in the body is a mechanical process (e.g., the mechanical pumping of the heart). Forces applied to the body mimic various pumping mechanisms of the heart, arteries, veins, lymphatics, muscles, respiratory system, and digestive tract (Lederman 1997).

Neuroendocrine stimulation occurs when forces are applied during massage that generate various shifts in physiology (NCCAM 2004):

- Massage causes the release of vasodilator substances that then increase circulation in an area.
- Massage stimulates the relaxation response, reducing sympathetic autonomic nervous system dominance (Freeman & Lawlis 2001).
- Forces applied during massage stimulate proprioceptors which alter motor tone in muscles (Lederman 1997).

Typically these two responses to massage (fluid dynamics and neuroendocrine) occur together, although the intent of the massage application can target one response more than the other.

Different forces

It is helpful to identify the different types of mechanical force and to understand the ways in which mechanical forces applied during massage act therapeutically on the body. The forces created by massage are tension loading, compression loading, bending loading, shear loading, rotation or torsion loading, and combined loading. How these forces are applied during massage becomes the mode of application.

The historical terms used to describe the application of these forces are effleurage, petrissage, tapotement, and so forth. These terms are gradually being replaced with the terms gliding, kneading, percussion, and oscillation. When force is applied to the tissue through the mode of application, this is called loading. The various forces listed above are outlined in more detail next.

Tension loading (Figure 8.4)

Tension forces (also called tensile force) occur when two ends of a structure are pulled apart from one another. Tension force is created by methods such as traction, longitudinal stretching, and stroking with tissue drag.

Figure 8.4 Tension loading.

Tissues elongate under tension loading, with the intent of lengthening shortened tissues. Tension loading is also effective in moving body fluids.

Tension force is used during massage with applications that drag, glide, lengthen, and stretch tissue to elongate connective tissues and lengthen short muscles. Gliding and stretching make the most use of tension loading.

The distinguishing characteristic of a gliding stroke is that it is applied horizontally in relation to the tissues, generating a tensile force.

When applying gliding strokes, light pressure remains on the skin. Moderate pressure extends through the subcutaneous layer of the skin to reach muscle tissue but not so deep as to compress the tissue against the underlying bony structure. Moderate to heavy pressure that puts sufficient drag on the tissue mechanically affects the connective tissue and the proprioceptors (spindle cells and Golgi tendon organs) found in the muscle. Heavy pressure produces a distinctive compressive force of the soft tissue against the underlying or adjacent bone.

Strokes that use moderate pressure from the fingers and toes toward the heart, following the muscle fiber direction, are excellent for mechanical and reflexive stimulation of blood flow, particularly venous return and lymphatics. Light to moderate pressure with short, repetitive gliding following the patterns for the lymph vessels is the basis for manual lymph drainage.

Note: The traditional term effleurage describes a gliding stroke.

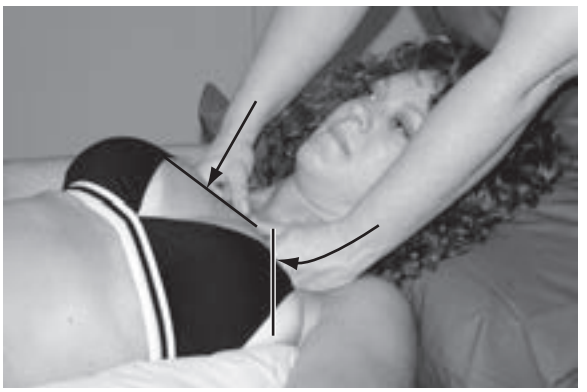


Figure 8.5 Compression loading.

Compression loading (Figure 8.5)
Compressive forces occur when two structures are pressed together. Compression moves down into the tissues, with varying depths of pressure adding bending and compressive forces. Compressive force is a component of massage application that is described as depth of pressure.

The manipulations of compression usually penetrate the subcutaneous layer, whereas in the resting position they stay on the skin surface. Excess compressive force will rupture or tear muscle tissue, causing bruising and connective tissue damage. This is a concern when pressure is applied to deeper layers of tissue.

To avoid tissue damage, the massage therapist must distribute the compressive force of massage over a broad contact area on the body. Therefore, the more compressive the force being used to either assess or treat the tissue, the broader the base of contact with the tissue should be, to prevent injury.

Compressive force is used therapeutically to affect circulation, nerve stimulation, and connective tissue pliability. Compression is effective as a rhythmic, pump-like method to facilitate fluid dynamics. Tissue will shorten and widen, increasing the pressure within the tissue and affecting fluid flow.

Compression is an excellent method for enhancing circulation. The pressure against the capillary beds changes the pressure inside the vessels and encourages fluid exchange. Compression appropriately applied to arteries allows back pressure to build, and when the compression is released, it encourages increased arterial flow.

Much of the effect of compression results from pressing tissue against the underlying bone, causing it to spread. Sustained compression will result in more pliable connective tissue structures and is effective in reducing tissue density and binding.

Compression loading is a main method of trigger point treatment.

Bending loading (Figure 8.6)
Bending forces are a combination of compression and tension. One side of a structure is exposed to compressive forces while the other side is exposed to tensile forces.

Bending occurs during many massage applications. Pressure is applied to the tissue, or force is applied across the fiber or across the direction of the muscles, tendons or ligaments, and fascial sheaths. Bending forces are excellent for direct stretching of tissue.

Bending force is very effective in increasing connective tissue pliability and affecting proprioceptors in the tendons and bellies of the muscles.

A variation of the application of bending force is skin rolling. Applying deep bending forces attempts to lift the muscular component away from the bone but skin rolling lifts only the skin from the underlying muscle layer. It has a warming and softening effect on the superficial fascia, causes reflexive stimulation of the spinal nerves, and is an excellent assessment method for trigger points.

Areas of 'stuck' skin often suggest underlying problems (see Chapter 6).

Shear loading (Figure 8.7)
Shear forces move tissue back and forth, creating a combined pattern of compression and elongation of tissue. Shearing is a sliding force.

The massage method called friction uses shear force to generate physiologic change by increasing connective tissue pliability and to insure that tissue layers slide over one another instead of adhering to

Figure 8.6 Using bend forces to stretch trigger point area.

Figure 8.7 Shear.

underlying layers, creating bind. Application of friction also provides pain reduction through the mechanisms of counterirritation and hyperstimulation analgesia (Yates 2004). Friction prevents and breaks up local adhesions in connective tissue, especially over tendons, ligaments, and scars (Gehlsen et al 1999).

All of these outcomes of applying shear force during massage can address various factors influencing headache and neck pain. For example, deep neck muscles can adhere to each other or develop local areas of fibrosis from microtrauma injury. The result is short, inflexible muscles, which can be a contributing factor in neck dysfunction. The fascia in the area can develop fibrotic changes that cause a decrease in pliability, and shortening of the structure can also contribute to neck pain. Trigger point referred pain patterns are aspects of pain symptoms, and the tissues surrounding trigger points that have been in place a long time may be fibrotic.

Friction is beneficial in these situations as properly applied shear force loading of the tissues can create a controlled inflammatory response that stimulates a change in tissue structure.

Friction consists of small, deep movements performed on a local area. The movement in friction is usually transverse to the fiber direction. It is generally performed for 30 seconds to 10 minutes.

The result of this type of friction is initiation of a small, controlled inflammatory response. The chemicals released during inflammation result in activation of tissue repair mechanisms together with reorganization of connective tissue. As the tissue responds to the friction, the therapist should gradually begin to stretch the area and increase the pressure and intensity of the method.

The feeling for the client may be intense and typically described as burning, and if it is painful enough to produce flinching and guarding by the client, the application should be modified to a tolerable level so that the client reports the sensation as a 'good hurt'. The recommended way to work within the client's comfort zone is to use pressure sufficient for the client to feel the specific area, but not to feel the need to complain of pain.

The area being frictioned may be tender to the touch for 48 hours after use of the technique. The sensation should be similar to a mild, after-exercise soreness.

Because the focus of friction is the controlled application of a small inflammatory response, heat and redness are caused by the release of histamine. Also, increased circulation results in a small amount of puffiness as more water binds with the connective tissue. The area should not bruise.

While using friction can be very beneficial, there are cautions to applying excessive shear forces to tissues:

- This method should not be used during an acute illness, or soon after an injury, or close to a fresh scar, and should only be used if adaptive capacity of the client can respond to superimposed tissue trauma.
- Excess friction (shearing force) may result in an inflammatory irritation that causes many soft tissue problems.
- Friction will increase blood flow to an area but also cause edema from the resulting inflammation and tissue damage from the frictioning procedure.

The method is best used in small, localized areas of connective tissue changes and to separate layers of tissue that might have become adhered. The most common areas where more surface tissue becomes stuck to underlying structures are: scars, pectoralis major muscle adhering to pectoralis minor, rectus femoris adhering to vastus intermedialis, gastrocnemius adhering to soleus, and hamstring muscles adhering to each other, overlapping areas of tendons and ligaments.

Rotation or torsion loading (Figure 8.8)

This force type is a combined application of compression and wringing, resulting in elongation of tissue along the axis of rotation. It is used where a combined effect to both fluid dynamics and connective tissue pliability is desired. Torsion forces are best thought of as twisting forces.

Massage methods that use kneading introduce torsion forces that lift, roll, and squeeze soft tissues. Kneading soft tissue assesses changes in tissue texture and can be an aspect of treatment, especially as an aspect of stretching tissue or encouraging circulation or fluid movement in soft tissue. Torsion force can be used therapeutically to affect connective tissue in the body.

Figure 8.8 Torsion loading.

Changes in depth of pressure and drag determine whether the kneading manipulation is perceived by the client as superficial or deep. By the nature of the manipulation, the pressure and pull peak when the tissue is lifted to its maximum, and decrease at the beginning and end of the manipulation.

Note: Petrissage is another term for kneading.

Combined loading (Figure 8.9)

> Tension = areas stretched, bend = tissue lifted, torsion = tissue twisted.

Combining two or more forces effectively loads tissue. The more forces applied to tissue the more intense the response. As tension and compression underlie all the different modes of loading, any form of manipulation is either tension or compression, or a combination.

Tension is important in conditions where tissue needs to be elongated and compression where fluid flow needs to be affected.

Figure 8.9 Combined loading.

Joint movement methods

Joint movement is incorporated into massage for both assessment and treatment. Joint movement is used to position muscles in preparation for muscle energy methods and before stretching tissues.

Joint movement also encourages fluid movement in the lymphatic, arterial, and venous circulation systems. Much of the pumping action that moves these fluids in the vessels results from rhythmic compression during joint movement and muscle contraction.

The tendons, ligaments, and joint capsule are warmed from joint movement. This mechanical effect helps keep these tissues pliable.

Types of joint movement methods

Joint movement involves moving the jointed areas within the physiologic limits of range of motion of the client. The two basic types of joint movement used during massage are active and passive.

Active joint movement means that the client moves the joint by active contraction of muscle groups. The two variations of active joint movement are:

- active assisted movement, which occurs when both the client and the massage practitioner move the area
- active resistive movement, which occurs when the client actively moves the joint against a resistance provided by the massage practitioner.

Passive joint movement occurs when the client's muscles stay relaxed and the massage practitioner moves the joint with no assistance from the client. Various forms of oscillation (rocking and shaking) involve passive joint movement.

Since muscle energy techniques are focused on specific muscles or muscle groups, it is important to be able to position muscles so that the muscle attachments are either close together or in a lengthening phase with the attachments separated. Joint movement is how this positioning is accomplished.

Joint movement is effective for positioning tissues to be stretched. The more surface muscles are relatively easy to position during the massage using joint movement. The method can also be used for the smaller, deeper joints of the spine and surrounding muscles but the positioning needs to be precise and focused.

Shortened tissue located in deep layers of muscle, or in a muscle that is difficult to lengthen by moving the body, can be addressed with local bending, shearing, and torsion in order to lengthen and stretch the local area, and this is easy to accomplish during the course of the massage (Box 8.1).

Box 8.1 Sequence of massage based on clinical reasoning to achieve specific outcomes

1. Massage application intent (outcome) determines mode of application and variation in quality of touch:
   - Mode of application – influenced by type/mode of application (glide, knead, oscillation compression, percussion, movement, etc.).
   - Quality of touch – location of application, depth of pressure (light to deep), tissue drag, rate (speed) of application, rhythm, direction, frequency (number of repetitions), and duration of application of the method.
2. Mode of application with variations in quality of touch generates mechanical forces.
3. Mechanical forces (tension, compression, bend, shear, torsion to effect tissue changes from physical loading) leading to influence on physiology.
4. Influence on physiology:
   - Mechanical changes (tissue repair, connective tissue viscosity and pliability, fluid dynamic).
   - Neurologic changes (stimulus response – motor system and neuromuscular, pain reflexes, mechanoreceptors).
   - Psycho-physiologic changes (changes in mood, pain perception, sympathetic and parasympathetic balance).
   - Interplay with unknown pathways and physiology (energetic, meridians, chakras, etc.).
5. These factors contribute to development of treatment approach.
6. Treatment resulting in desired outcome.

Regardless of the massage methods practiced, or the massage style, the previous explanations – qualities of touch, mode of application to apply mechanical forces to affect the body in various mechanical and reflexive ways, in order to achieve specific outcomes – should create a generic base for communicating and understanding massage application.

SPECIFIC PROTOCOLS FOR THERAPEUTIC MASSAGE TREATMENT OF HEADACHE AND NECK PAIN

This section of the chapter provides suggestions and protocols (based on the author's experience) for using massage to address headache and neck pain.

Targeting breathing dysfunction

As described in Chapter 6, dysfunctional breathing is a common aspect of head and neck pain and dysfunction.

The massage therapist influences breathing in two distinct ways:

1. Supporting balance between sympathetic and parasympathetic autonomic nervous system functions. This is generally accomplished with a relaxation focus to the general full body massage.
2. Normalizing and then maintaining effective thoracic and respiratory muscle function.

The following protocol specifically targets these areas. The applications would be integrated into the general massage protocol to work more specifically with breathing function if assessment indicates any tendency to breathing pattern dysfunction. It is strongly recommended that the reader study using the textbook *Multidisciplinary Approaches to Breathing Pattern Disorders* (Chaitow et al 2002).

Treatment

The following muscles are specifically targeted by massage because they relate directly to symptom development and tend to shorten during breathing dysfunction:

- occipital/frontalis
- temporalis
- masseter
- occipitals
- scalenes
- sternocleidomastoid
- serratus anterior
- serratus posterior superior and inferior
- levator scapulae
- rhomboids
- upper trapezius
- pectoralis major and minor
- latissimus dorsi
- psoas
- quadratus lumborum
- all abdominals
- calf muscles.

The intercostals and diaphragm, which are the main breathing muscles, should also be addressed.

All of these muscles should be assessed for increase in motor tone, tender points, shortening, weakness, and agonist/antagonist interaction.

- Muscles that orient mostly transversely, such as the serratus anterior, serratus posterior superior and inferior, rhomboids and pelvic floor muscles, are difficult to assess with movement and strength testing. Palpation (see Chapter 6) will be more accurate. The typical patterns of the upper and lower crossed syndromes are often involved.
- Muscles assessed as short with increased motor tone need to be inhibited and lengthened. If the primary cause of the shortening is neuromuscular, then use inhibitory pressure at the muscle belly and lengthen either by moving the adjacent joints or, more likely, by introducing tension, bend or torsion force directly on the muscle tissues. This is the most logical approach for the muscles of the face and head and occipital base.
- For the scalenes, sternocleidomastoid, serratus anterior, pectoralis minor, latissimus dorsi, psoas, quadratus lumborum, diaphragm, rectus abdominis, and pelvic floor muscles, follow recommendations in the specific release section later in this chapter.
- Work with each area as needed, as it becomes convenient during the general massage session. Use the least invasive measure possible to restore a more normal muscle resting length.
- If the breathing has been dysfunctional for an extended period of time (over 3 months) connective tissue changes are common. Focused connective tissue massage application is effective.
- Once the soft tissue is more normal, then gentle mobilization of the thorax is appropriate. If the thoracic vertebrae and ribs are restricted, chiropractic or other joint manipulation methods may be appropriate and referral is indicated. The massage therapist can use indirect functional techniques to increase the mobility of the area as well. These methods are described in general in Chapter 6.
- Methods and sequences used to address breathing dysfunction need to be integrated into a full body approach since breathing is a whole body function. A possible protocol to add to the general massage session would be as follows:
  - Increased attention to general massage of the thorax: posterior, anterior and lateral access to the thorax is used primarily to address the general tension or dysfunctional patterns in the respiratory muscles of this area.
  - Address the scalenes, psoas, and quadratus lumborum and legs, especially hamstrings and calves.
  - Use appropriate muscle energy techniques to lengthen and stretch the shortened muscles of the cervical, thoracic, and lumbar regions, and legs.
  - Identify the amount of rigidity in the ribs with the client supine by applying bilateral compression to the thorax, beginning near the clavicles and moving down toward the lower ribs, maintaining compressive force near the costal cartilage.
  - With the client prone, identify rigidity in the ribs by applying compression bilaterally (on both sides of the spine) at the facet joints, beginning near the seventh cervical vertebra and moving down toward the lower ribs, maintaining compressive force near the facet joints.
  - Gently mobilize the rib cage with broad-based compression.
  - Assess for areas that move easily and those that are restricted.
  - Assess the anterior, lateral and posterior areas. Compression against the lateral aspect of the thorax with the client in a side-lying position will assess rib mobility in both facet and costal joints.
  - Begin applying the compression near the axilla and then move down toward the lower ribs. Sufficient force needs to be used while applying the compression to feel the ribs spring but not so much as to cause discomfort.
- A normal response would be a feeling of equal mobility bilaterally; a feeling of stiffness or rigidity would indicate immobility.
  - Identify the area of most mobility and the area of most restriction.
  - Position the client so that a broad-based compressive force can be applied to the areas of ease – the most mobile.
  - Gently and slowly apply compression until the area begins to bind.
  - Hold this position and have the client cough (coughing will act as a muscle energy method and also support mobility of the joint through activation of the muscles).
  - Repeat three or four times.

If areas of rigidity remain the following intervention may be useful:

- Apply broad-based compression to the area of immobility using the whole hand or forearm.
- Have the client exhale then increase the intensity of the compressive force while following the exhalation.
- Hold the ribs in this position.

- Have the client push out against the compressive pressure.
- Instruct the client to inhale while continuing to hold the compressive focus against the ribs.
- Then have the client exhale while following the action of the ribs. There should be an increase in mobility.

Gently mobilize the entire thorax with rhythmic compression. Reassess the area of most bind/restriction. If the areas treated have improved then a different area is located and the sequence is repeated. It is appropriate to do three or four areas in a session.

Palpate for tender points in the intercostals, pectoralis minor, and anterior serratus (clients are not very tolerant of this, so be direct and precise).

Use positional release to release these points by moving the client or having them move into various positions until the pain in the tender point decreases. The procedure for positional release is as follows:

- Locate the tender point.
- Gently initiate the pain response with direct pressure (remember the sensation of pain is a guide only; the pain point is not the point of intervention).
- Slowly position the body, actively or passively, until the pain subsides. This position can be focal and accomplished by moving the client's ribs, arm or head, or a whole body process involving many different areas to achieve the position where there is a decrease in the pain.
- Maintain the position for up to 30 seconds or until the client feels the release, while encouraging them to breathe from the diaphragm, lightly monitoring the tender point.
- Slowly reposition the client to neutral and then into a stretch position for the tender point.
- Direct tissue stretching is usually most effective.

If the client is sniffling, coughing, sneezing, or has been laughing a lot, then the posterior serratus inferior can be the cause of back pain. This muscle tends to shorten due to its stabilizing function of the lower ribs. Because of its fiber direction it is very difficult to stretch.

The symptoms include an aching sensation just below the scapula at the location of the muscle. Compression into the muscle belly with local tissue stretching usually relieves the symptoms.

Once the thorax and breathing function begins to normalize – usually after four to six focused sessions – then it is appropriate to teach a simple breathing exercise.

Specific assessment and release methods for these muscles that are easily incorporated into massage are described below. The intervention used to normalize muscle motor tone and length is inhibitory pressure in the belly of the muscle if possible and occasionally at the attachments if access to the muscle belly is difficult. The client is positioned so the compression applied to the muscle is effective.

Specific releases

There are key muscles that typically become dysfunctional in head and neck problems. The main method for addressing these areas is inhibiting pressure either in the muscle belly or at the attachments. These specific procedures address muscles that are often short and in the deeper tissue layers, which makes access more difficult.

Perform general massage before and after doing muscle releases.

Most inhibiting pressure is applied to the muscle belly unless it is easier to access the attachments. Use a 45-degree angle to exert pressure on a hill instead of 90 degrees in a valley unless specified as 90 degrees. If you release muscle on left side, then be sure to release the same muscle on right side, even it if tested tight on only one side.

Scalenes (Figure 8.10)

Symptoms. Most symptoms relate to brachial or cervical plexus impingement with symptoms of midthoracic pain near midscapula, and chest pain. Arm pain is often mistaken for carpal tunnel syndrome, and occasionally pain radiates into the head behind the eye.

Assessment. Best positions for assessment are sidelying and supine. Palpate to reproduce symptoms. Systematically apply a flat pressure to the area between the upper trapezius and the sternocleidomastoid. Start at the base of the skull and work down toward the clavicle using sufficient pressure to reproduce

Figure 8.10 Release of scalenes.

referred pain patterns. If the pain pattern can be reproduced, the assessment is positive.

The pain is usually caused by a contracted scalene muscle in conjunction with a chain pattern, often involving lumbar flexors or lateral flexion. The quadratus or psoas is often involved.

Procedure. Use positional release if possible, relying on the position of the lower body to achieve the position of ease.

- Client side-lying, therapist stands above client's head.
- Apply compression to recreate the symptoms. Have the client activate apposing antagonist patterns, such as the opposite scalene groups, to initiate reciprocal inhibition.
- As the muscle softens, pinpoint the area of tension. This area will appear more tense than the surrounding tissue. Then have the client use pulsed muscle energy using both the muscle and the antagonist against the compression being held.
- Let the client rest and lighten pressure every 15 seconds or so. Resume until the tension reduces but no longer than a minute. If the area does not release in 60 seconds, it is held by the chain compensation pattern (upper and lower crossed syndromes). Work will need to focus on normalizing this pattern.
- Once the muscle releases it needs to be lengthened gently if acute and then stretched if the condition has been chronic. The stretching will span several sessions.
- Keep the palpating hand in place and slowly move the head and rib cage until the palpating hand identifies the longest position of the muscle tissue. The tissue will feel taut in this position. Stabilize the head and lengthen and stretch from the thorax.

Occipital base (Figure 8.11)

- Client side-lying, therapist stands at client's side.
- Use the forearm for broad-based compression at a 45-degree angle. Client rolls eyes; you should feel muscles activate first, then hold the position for up to a total of 30 seconds.

Sternocleidomastoid (Figure 8.12)

If doing this release before psoas, find out whether the client also needs psoas release by using the test described on page 106.

- Client supine, therapist stands above client's head.
- Hold target muscle between thumb and fingertips and squeeze; start superior, proceed to inferior. Client rolls eyes; lifts chin and legs or bends knees to engage psoas during release of sternocleidomastoid, longus colli.

Figure 8.11 Release of occipitals.

Figure 8.12 Release of sternocleidomastoid.

Mulifidi, rotators, intertransversari, and interspinalis (Figure 8.13)

As a combined group these muscles produce small refined movements of the vertebral column. They work in coordination, with each small group of muscle fibers contributing to the entire action.

Symptoms. Clients often feel like they want to have their neck and back 'cracked' yet manipulation does not provide relief. There is stiffness upon initiation of movement but once the movement begins, the stiffness is reduced. The client is unable to stretch effectively to affect the muscle groups. The client experiences an aching as opposed to a sharp pain.

Assessment. Palpation is the only effective assessment. These are small, deep muscles basically located

Figure 8.13 Release of multifidi.

between the vertebrae. A history of seated or fixed standing for extended periods of time is common. Palpation deep into the spaces between the vertebrae, which will replicate the symptoms, will reveal tough tissue bands. Effective palpation must go deep enough to contact the muscle group and get under the erector spinae muscles.

Procedure. Meticulous frictioning of the tight muscle bands combined with tissue stretching using compression is required. Softening and lengthening the erector spinae and associated fascia are necessary before beginning the methods.

- Position the client in side-lying with the affected side up and with a small amount of passive extension. It may be necessary to get on the table or use a stool to achieve an effective mechanical advantage.
- Angle in at 45 degrees against the groove next to the spinal column using braced fingers. Sink in until you can feel the spinous processes.
- Hold the compression firmly against the affected tissue and have the client slowly move the area back and forth from extension to flexion. Then have the client remain in a slight extension while you move down in a deep scooping action and then out as if you were digging or scooping.
- After the tissue has softened further, firmly hold the compression and have the client move into spinal flexion very slowly until you feel the tissue become taught, in order to stretch the area. Hold this position until the tissue softens.

Rhomboid, pectoralis major, anterior serratus (Figure 8.14)

Symptoms. The client generally complains of pain between the scapulae and the back feels tight and

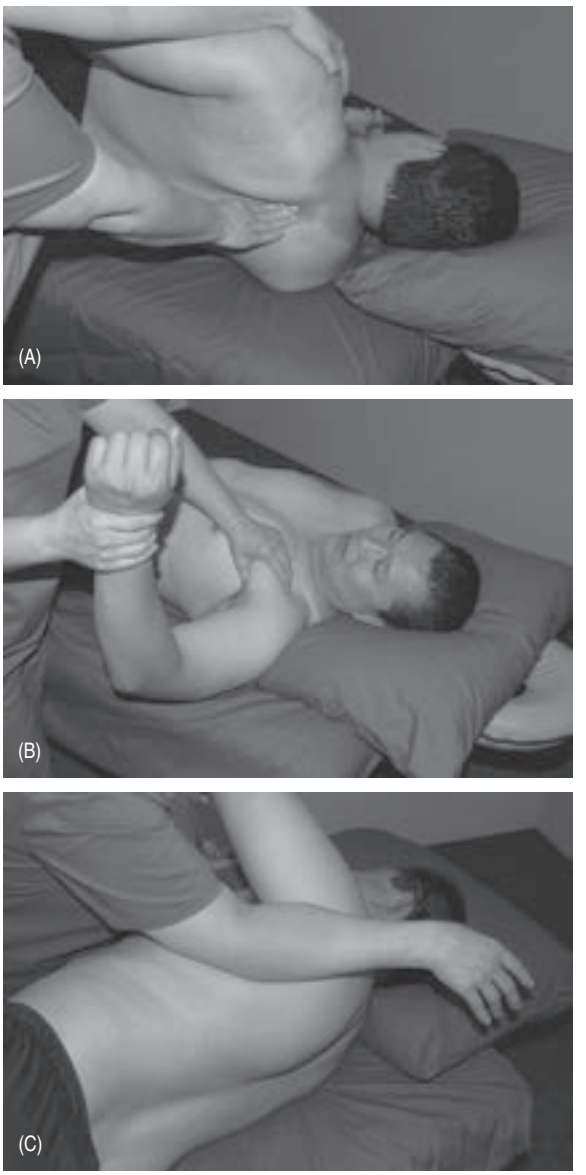


Figure 8.14 (A) Release of rhomboid, (B) pectoralis major, and (C) anterior serratus.

fatigued. There can sometimes be a specific tender point or aching in the upper rhomboid area. Clients often say they are stretching their back but when observed they are stretching the chest area. Breathing is often of the upper chest pattern and/or restricted.

Assessment. The most common problem is increased tension in the pectoralis major and anterior serratus. Palpate these muscle areas for tender points. Usually the client is unaware that these points exist. The scapulae will be difficult to wing. There will be a

forward roll to the shoulders. The client often presents a history of static position of the arms forward and using small muscle action, such as computer work. Any activity that requires pushing forward or pulling down will set up or aggravate the symptoms.

Procedure. Reducing tension and restoring length in the pectoralis and anterior serratus will relieve tension on the rhomboids. Pressure held on the tender points in the chest is often effective. If the pattern has become habitual or chronic, the fascia of the chest will need to be stretched.

- If possible, palpate for the tender points with the client either side-lying or prone. One hand should be in the rhomboid region to feel for the interplay of the pressure applied into the chest involving the pectoralis major and anterior serratus. Both of these muscles pull the scapula forward. Compress into the area to identify the tender points.
- Once located, apply pressure using various angles against the rhomboid area to see if a position of release can be found. If not, have the client move around slowly to see if a position of release can be found. Once located, follow the positional release or integrate the procedure in Chapter 6.
- If this is unsuccessful, then rock the pressure back and forth between both hands until the tenderness decreases. It is important to stretch the area. This is accomplished by having the client side-lying and manually moving the scapula toward the spine. This is facilitated by either having the client pull the scapulae together or using a firm tapotement to the rhomboid reflexively, creating a contraction reflex while pushing the scapula toward the spine.

Diaphragm (Figure 8.15)

Symptoms. The client will complain of neck and shoulder tension and an aching or pulling at the area of the thoracolumbar junction. The symptoms get worse if anything restricts the abdomen, such as tight clothing or pulling in of the stomach. The client may complain of symptoms that indicate breathing pattern disorder.

Assessment. Complete all assessment for breathing pattern disorder. In addition, palpate the area of the diaphragm along the edge of the rib cage for tenderness or rigidity.

Procedure. A release of the diaphragm should be done in conjunction with the breathing pattern disorder, psoas, and quadratus lumborum procedures.

- Client is supine with knees bent. Locate the edge of the rib cage and access with either an overlapping double hand with braced finger contact or the ulnar side of the hand braced by the opposite hand.
- When the client exhales, slowly let the hand sink under the ribs. When resistance is felt, have the client raise arm up and over the head, inhale, and then exhale deeply and slowly.
- Follow the exhale, taking up any slack. The direction of the compressive force should be at an angle

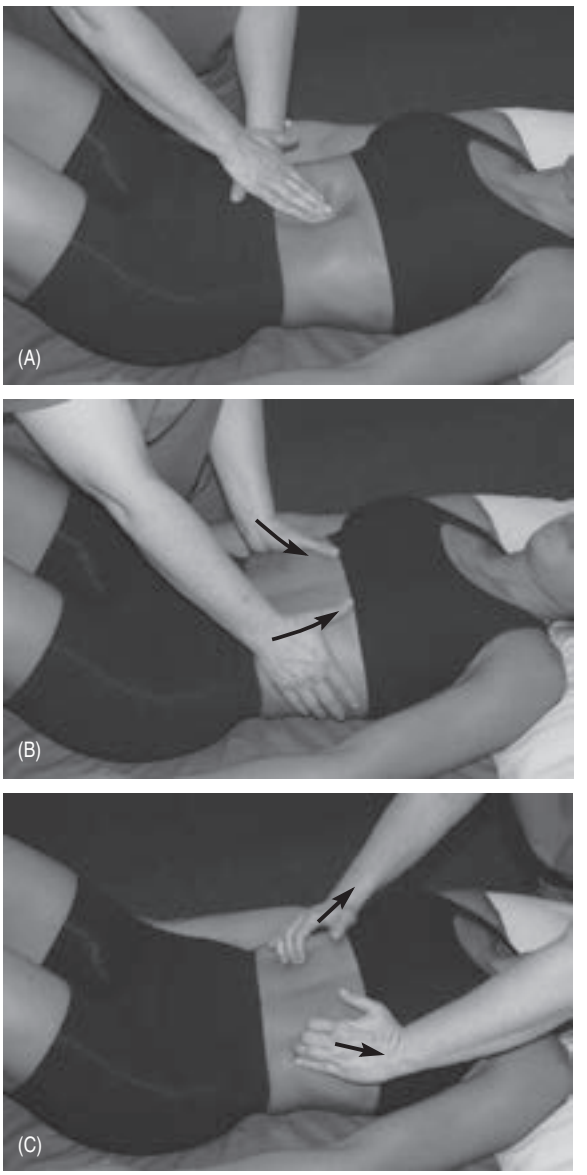


Figure 8.15 Release of diaphragm.

of about 25 degrees along and under the rib cage. Do not press directly down toward the spine. It may be helpful if the client holds their breath to the end of the exhale, and while holding the breath, attempts to push your hand out using their muscles. Be aware of extended breath-holding for anyone with high blood pressure.

- Apply a broad-based alternating rhythmic compression to the lower rib attachments by gently but firmly pushing the rib cage in and out. Do not apply pressure on the xiphoid process. The compression along and under the rib cage may start proximal to midline and be repeated if necessary to encompass the entire inferior border of rib cage on right and left sides.

Psoas (Figures 8.16 and 8.17)

Symptoms. Client complains of:

- generalized lumbar aching
- aching into tops of thighs
- low back pain when coughing, sneezing
- pain when lying on stomach
- pain when laying flat on back
- neck stiffness and aching.

Assessment

- Gait stride shortened more so on the short side.
- Externally rotated leg on short side.
- Bracing with hands when sitting down or standing up.
- Leg unable to fall into full extension, as in supine edge of table test below.
- Anteriorly tipped pelvis.

Note: A tight and/or shortened quadratus group and tensor fasciae latae are often found with psoas dysfunction and should be addressed before addressing the psoas muscles.

1. *Edge of table test*: This test is done by having the client place their ischial tuberosity on the edge of the table, bringing one leg to the chest and rolling back to lay on the table. When the leg is held tightly to the chest the other leg should lay horizontally with the table. If it is above the table, that psoas is short.
2. *Sit-up test*: Client lies supine on the table with knees bent. Arms are extended at a slight angle toward the ceiling. The client then lifts torso off the table by reaching for the ceiling. The practitioner holds or observes both feet. The foot on the side of the short psoas will lift first off the table.

Procedure. Muscle energy lengthening and stretch all positions – edge of table, supine, side-lying, and prone.

Figure 8.16 Release of psoas.

Figure 8.17 Location of hands to access psoas.

1. Positioning:
   a. Positioning supine edge of table: Make sure the pelvis is fixed firmly to the table and the knee on the opposite side is rolled as close to the chest as possible. Hand placement for resistance force and lengthening is above the knee.
   b. Positioning supine: Client lies close to edge of table and bends knee not near the edge. The psoas should be addressed and accessed by having the client drop the leg over the edge of the table to achieve lengthening and stretching. The pelvis must be fixed and stabilized.
   c. Positioning side-lying: Bottom leg is drawn up toward chest and the practitioner is positioned behind the client. The torso remains fixed and the lumbar area is stabilized. The client bends the top knee and the practitioner cradles the thigh in their arm. The top leg is then slightly internally rotated, abducted, and extended.
   d. Positioning prone: Pelvis is fixed to the table. The practitioner is positioned opposite the side to be addressed. The leg remains straight on the side

closest to the practitioner. The knee of the target leg is flexed past 90 degrees and the hip slightly internally rotated (accomplished by allowing the foot to fall a bit to the outside) to prepare that side to be lengthened and stretched. The practitioner reaches across and cradles the anterior thigh in their arm, lifts up and leans back.

Note: Decisions on which of these four positions is the most effective depend on the reports of the client and the size of the client in relation to the practitioner.

2. Direct access of psoas using hand and/or fist:
   - Client is supine with the knees flexed to at least 110 degrees. Both feet are flat on the table. The practitioner stands on the side to be addressed. Either a flat, stabilized hand or a loose fist can be used. Decision is based on size and comfort of the client. For the practitioner, the fist position will withstand a longer duration of treatment.
   - With client side-lying and knees flexed the practitioner kneels in front of the client and leans in using stabilized hand or loose fist. The leg can be used to pull the client toward the pressure.
   - The muscle location is best accessed midline between the iliac crest and the navel and can usually be found by placing the metacarpophalangeal joint on the iliac crest. The fingers remain straight and the tips of the fingers identify the location of the muscle. This muscle is located deep against the anterior aspect of the lumbar and lower thoracic spine. Slow deliberate compression into the lower abdomen is required. The ovary is tucked under the ilea and must not be compressed. The abdominal aorta can be palpated as pulsation and must not be compressed. The small and large intestine will slide out of the way with an undulating action as the downward force is exerted. Identification of the proper location can be confirmed by having the client flex the leg.
   - A flat, sustained compression is used in conjunction with having the client forward and laterally flex the cervical spine as well as rotate the neck. These actions facilitate the psoas and act as a contract/then relax of the muscle. The psoas can be inhibited by having the client activate the neck extensor by slightly tipping the chin toward the ceiling and pushing the back of the head against the table. Alternating flexion and extension on the neck is valuable while maintaining a contraction against the psoas. All these neck actions can be supplemented with eye movement: eyes look downward during forward flexion, sideways during lateral flexion, and upward during extension.
   - Additionally, the client can slowly slide the heel of the foot out so that the leg becomes straight. When the leg is straight, if the client contracts the buttock the psoas is further inhibited. Then the client relaxes the gluteal muscles and slides the heel as close to the buttocks as possible to contract the psoas. This action is repeated while the compression is maintained.
   - Release at the distal attachment: If it is difficult to access the psoas through the abdomen then inhibiting pressure near the distal attachment when the muscle crosses over the pubic bone is possible. Usually the leg is moved into an ease or bind position while the inhibiting pressure is held.
   - Compression of the psoas acts to lengthen and stretch this muscle. Make sure the client does not get right off the table, but instead rolls first to the side and then rolls up. Assist them if necessary. Do not let them sit straight up.
   - Having the client lay prone is a gentle lengthening position for this muscle. Then have the client assume a four-point position by getting on their hands and knees. Have the client do the sway back position and hunch back position. Then have them slide their arms in front of them and bring the buttocks back against the hamstrings. Apply broad-based compression against the lumbar area in this position. If the psoas is not acute, then have the client drop gently into the cobra position by lifting the head and chest, straightening the arms, and placing the pelvis flat against the table. Each position is held for up to 3 minutes based on what feels good. The client then assumes the hands and knees position to get off the table.

     Note: Both methods can be used in coordination for a more intense interaction. The goal is to reduce tension in the psoas muscles. This is usually palpated as a sinking in or feeling of giving in of the tissues. The client will usually shift their breathing by taking a deep breath and relax when the muscle lets go. This is a painful and intense procedure. Give the client breaks during the procedure by decreasing the pressure a bit but do not lose contact with the muscle since it is uncomfortable to relocate the muscle again.

3. Rehabilitation exercises:
   a. Teach client the same sequence as described previously:
      – lay on stomach
      – sway back/hunch back
      – knee/arm stretch
      – yoga cobra.
   b. Also beneficial are large gym balls and the various exercises described for the low back.

Quadratus lumborum

Symptoms

- Deep local low back pain which may be more on one side.
- Pain radiating into buttocks and down side of leg to knee (nerve entrapment).
- Tends to wiggle or attempts to stretch with lateral trunk flexion.
- May have restricted breathing.
- Short leg on affected side (may be functional or physical).

Assessment

1. Position client on their side. Palpate with either the forearms or the hands in the space between the ribs and the iliac crest. Have the client straighten and then lift the top leg. The area being palpated should not activate until the leg is raised approximately 20 degrees. If it does, the quadratus is tense and short.
2. Have the client lay prone with legs straight and assess leg length. The short leg may indicate a tight quadratus lumborum. If lateral flexion of the torso is restricted or asymmetrical, the most restriction will be on the short/tense side.

Procedure

- Position client on side with bottom leg bent and top leg straight and in slight hip extension. While standing behind the client, apply compression into the space between the last rib and the top of the iliac crest. The angle of force is about 70 degrees (heading toward the navel).
- When resistance is felt in the muscle, have the client lift the top leg up and down. Make sure the hip stays in extension. Alternatively, have the client move their neck and head back and forth in lateral flexion and extension. Both of these moves facilitate or inhibit the quadratus lumborum muscles. These neck movements can be supplemented with side-to-side eye movements.

After the muscle releases it will need to be lengthened and stretched:

- Stabilize the thorax and lengthen by dropping the top leg even more into a lengthen-and-stretch position. Alternatively, use a manual stretch by exerting a force into the low back toward the navel and side-bending the client in extension with both the torso and the leg. Self-help could include fingers interlaced, palms turned up, and arms extended over the head.
- The pelvis is held stable and rolled forward either standing or on knees. Side-bend and twist into slight flexion.

Specific massage strategies for headaches

Massage and other forms of soft tissue therapy are effective in treating muscle-contraction headache but much less effective for migraine or cluster headaches. Soft tissue therapy can relieve secondary muscle-contraction headache caused by the pain of the primary headache. Headache is often stress induced. Stress management in all forms is usually indicated in chronic headache conditions. Massage and other forms of soft tissue therapy are effective in treating muscle-contraction headaches.

The following two headache massage strategies are effective.

Vascular/fluid pressure headache (inside the head pressure headache)

Sometimes headache is from constipation. Abdominal massage is an option (Figure 8.18). A toxic headache from chemicals such as monosodium glutamate (MSG), excessive alcohol consumption, etc. will often respond to hydration and the vascular headache strategy. However, until the liver detoxifies the substance and it is cleared from the body, the headache will linger.

Approach the massage as if there is excessive fluid in the skull and the goal of the massage is to help get the fluid out of the skull. Rhythmic compression on the head and face can act like a pump to move the

Figure 8.18 Massage of colon.

fluid. The compressive force exerted on the head is substantial and should be broad based. The sensation felt by the client should be a pleasant relief from the pressure inside the head. Place the flat hands or forearm on the occipital bone/frontal bone, press firmly together, then release. Rhythmically and slowly repeat up to 50 repetitions. Next, repeat but with pressure applied at the temporal bones.

If the pain is more in the face such as a sinus headache, the location of the rhythmic compression is also applied at the temples (sphenoid), cheeks (zygomatic), side of the nose, and over the eyes. Either the palm of the hand or pads of the fingers are used. When applying pressure over the eyes, the eyeball is not actually pressed but cupped in the palm and pressure applied around it. Often a tension headache accompanies a vascular headache.

Tension headache (pain on the outside of the head and base of the neck)

This may be muscle/connective tissue bind headache. Inhibitory pressure used on the muscles of the scalp – occipital/frontalis, temporalis, and auricular (ear) muscles. Muscle energy and positional release methods can be used by instructing the client to move the eyebrows, clench the teeth, and move the ears. The entire muscle area is massaged with attention to both the belly and attachments. The pressure levels are intense enough to recreate the headache symptoms. Suboccipital muscles, scalenes, sternocleidomastoid, and trapezius tension can cause referred pain by creating nerve impingement. Inhibiting pressure with muscle energy and lengthening procedures are used on the muscles that create the headache symptoms.

Headaches more in the face can be from the muscles of mastication or those that control eyebrow movement. They are addressed as previously described.

The pressure levels are intense enough to recreate the headache symptoms. This is significantly more pressure than is typically used during general relaxation massage. The intensity should not cause guarding and, while painful, it should be a 'good hurt'.

The scalp has a significant amount of connective tissue structures. The tendons and fascial anchoring bands of the scalp can shorten. Usually the forces applied during massage on these structures are shear and bend with localized tension force. As in any connective tissue application, the forces are applied slowly and rhythmically, into and out of bind. Again, this level of intensity is more typically used during general massage, and both pressure and location should feel 'right' to the client.

If possible, muscles and connective tissue can be stretched by pulling the hair. A large bundle of hair is grabbed near the scalp and an even, firm pull is exerted. At the point of resistance, the direction can be shifted into and out of bind. The process is sequentially repeated all over the head. This should feel intense but good to the client. If there is no hair or very short hair, the scalp can be rolled and twisted about the skull, into and out of bind. Next, firmly massage along all cranial sutures with circular-type friction.

Eye muscles can be a factor in headache pain. Have the client place finger pads over the eyes and exert a gentle compression to the eyeball. Then, while maintaining the compression, the client moves the eyes in alternating circles and a figure-of-eight pattern. The neck and shoulder muscles are thoroughly massaged, addressing any areas that recreate the headache symptoms (Figure 8.19).

The connective tissue structures from the skull to the sacrum, if short, can create headache. These structures need to be addressed to increase tissue pliability and reduce bind. Connective tissue methods generat-

A Client side-lying. Assess, compress, and glide.

B Assess and bend, global muscles.

Figure 8.19 Massage application to the neck and shoulder.

(Continued)

C Assess to make sure tissue layers are not adhered and shear.

D Myofascial release.

Figure 8.19 Cont'd Massage application to the neck and shoulder.

ing mechanical forces and skin rolling approaches with sufficient drag from the scalp down the midline of the back to the sacrum are effective (Figure 8.20).

Additional approaches for headache of both general types include reflexology, especially at the big toe, and acupressure.

Essential oil

A menthol- or peppermint-based cooling counterirritant ointment applied to the base of the neck, temples and forehead is effective for all headache types. Essential oils can be placed on cotton balls and put in plastic bags for the client to smell. Sinus headaches

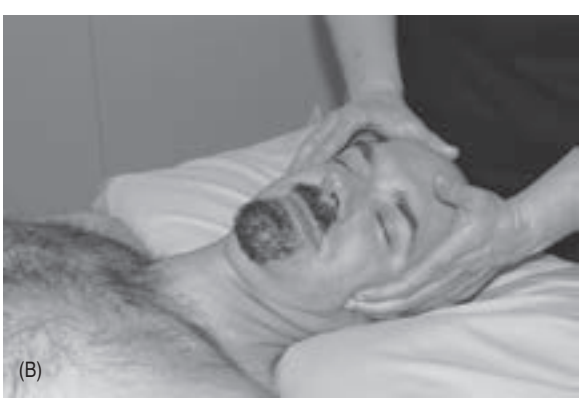


Figure 8.20 Examples of massage for headache.

tend to respond to eucalyptus. Tension headaches respond to peppermint and lavender, and toxic headaches to citrus (e.g., lemons, oranges, limes, etc.). If the headache is of a migraine type, using the various aromas may make the headache better or worse. The client would need to guide the use. Various medications can relieve headache, so the massage therapist needs to know if the client has taken medications and adjust massage accordingly.

Self-help for headache

Vascular (inside the head)-type headache responds to external compression, such as wrapping a towel or elastic bandage tightly around the head, wearing a tight hat, or placing a weight like a rice bag on the top of the head.

Muscle-contraction headache responds to compression of the muscles. As silly as this may sound and look, pull a plastic clothes hanger over the head on the muscles that are creating the symptoms. This should relieve the pain somewhat. Areas of the hanger that poke should be padded. A sand or rice bag also works.

Massage treatment for acute neck pain (Figure 8.21)

Side-lying and supine positions are recommended. If prone, support with pillows under the abdomen and ankles. *Do not* keep the client in the prone position for an extended time unless using a face cradle maintaining a neutral position of the neck – 15 minutes maximum.

Target pain control mechanisms. *Do not* do deep work or any method that causes guarding, flinching, or breath-holding. Use rocking, gentle shaking combined with gliding and kneading to the area of most pain and symptomatic muscle tension. This will most likely be on the posterior torso, even though the causal muscle tension and soft tissue problem is usually in the anterior torso.

A Glide (tension force).

B Knead (torsion force).

C Glide toward neck.

D Compression.

Figure 8.21 Examples of massage to head and neck.

(Continued)

E Pulsed muscle energy.

F Pulsed muscle energy continued.

Figure 8.21 Cont'd Examples of massage to head and neck.

Subacute treatment using massage

24–48 hours after onset

- In the context of general massage repeat the acute massage application but begin to address second- and third-layer muscle shortening, connective tissue pliability, and firing patterns.
- Use direct inhibition pressure on the psoas, quadratus lumborum, and paravertebrals, especially multifidi, always monitoring for guarding response. Have the client move the eyes and head in a circle while addressing these muscles. *Do not* cause guarding.
- Include massage application for breathing dysfunction since it is commonly associated with headache and neck problems.
- Do not overwork or fatigue the client.

3–7 days after onset

- Continue with subacute massage application in the context of general massage, increasing intensity of the massage as tolerated. In addition, muscle firing patterns and the short muscles of upper and lower crossed syndromes need to be normalized. No pain should be felt during any active or passive movements.
- Positional release methods and specific inhibiting pressure can be applied to tender points (the pressure recreates the symptoms but does not increase them).
- Address trigger points that are most medial, proximal, and painful. Do not address latent trigger points at this time or work with more than 3–5 areas.
- Continue to address breathing function.
- The client should be doing gentle stretches and appropriate therapeutic exercises.

Post-subacute treatment using massage

- Continue with general massage and address muscles that remain symptomatic.
- Begin to assess for bodywide instability, compensation patterns, etc., that are related to the acute neck pain event.
- Continue to normalize breathing pattern disorder.
- For chronic pain continue with post-subacute treatment and support rehabilitative exercises including breathing retraining (see Chapter 6).

The full body massage

The following massage protocol is appropriate for headache and neck pain conditions. The protocol offered is only one example of how assessment and treatment of headache and neck dysfunction is integrated into a general massage application. Based on assessment the appropriate methods to treat specific headache and neck pain previously described would be introduced into the massage as is convenient. First the sequence is described in a step-by-step process based on body location. After the word description there is an example of massage in three positions in an illustrated sequence. These two examples should be combined to provide a platform for massage that specifically targets headache and neck pain.

Face and head

Working with the face is relaxing. Therefore, if the face is done first, it can set the stage for a calming massage, or if the face is done at the end of the session, it will gently finish the massage.

- Lightly and systematically stroke the face, massaging in multiple directions to assess for temperature, tissue texture changes, and tissue ease and bind directions.

- To increase circulation to the area of tissue bind and to shift neuroresponses, move the skin into multiple directions of ease, holding the ease position for up to 30–60 seconds.
- Address the muscle structures. Light to moderate compressive force is adequate to address the area.
- The muscles that clench the jaw (muscles of mastication) can shorten when a person is stressed. It is prudent to make sure these muscles are functioning normally. The muscles of mastication often house trigger points. Hold the tissues housing the trigger point in the ease position using bending forces and move the tissues into bind to stretch the area. Use gliding and gentle kneading to stretch the areas.
- To finish the face, return to the initial light stroking of the lymphatic drain style to support fluid exchange in the area.

General massage of the head begins with the assessment process. The connective tissue of the head connects into the lumbodorsal fascia. As bind in the connective tissue of the head can be related to bind in the low back, it is important to massage both areas. The connective tissue in the lumbar area can be addressed when it is convenient.

- Typically hair prevents using skin drag palpation methods; however, the scalp can be moved into ease and bind positions and the muscles can be palpated for trigger point symptoms.
- Any soft tissue dysfunctions identified that are appropriate to treat during the massage are most easily addressed with compression methods and then manually stretched using ease and bind movement of the scalp in a connective tissue approach.
- Some clients enjoy having their hair gently stroked and pulled during massage, and pulling large bunches of the hair in a slow, steady manner can also stretch the tissue.
- Compression to the sides of the head and to the front and back coupled with a scratching motion to the scalp can be very pleasant.

Neck

Address this area with the client prone, side-lying or seated.

- Systematically, lightly stroke the area including assessment methods of scanning and skin drag. Then increase the pressure slightly and slowly move the tissue into ease and bind.
- Identify any potential areas that can influence the symptom pattern, especially connective tissue structures and tendency to upper and lower crossed syndrome patterns.
- Use gliding with a compressive element, beginning at the middle of the back of the head at the trapezius attachments and slowly drag the tissue to the distal attachment of the trapezius at the acromion process and lateral third of the clavicle.
- With the client prone, begin again at the head and glide toward the acromion. Then, reverse the direction and work from distal to proximal, applying tension force to stretch the area.
- Next, knead and glide across the muscle fibers, making sure that bending, shear, and torsion forces are only sufficient to create a pleasurable sensation while assessing for changes in the tissues.
- Use muscle energy methods and/or direct pressure to inhibit and then lengthen short muscles and connective tissue.
- Increase intensity of the kneading to further stretch the local tissue if needed and then again apply tension force, this time by passively or actively using joint movement and stretching the area.
- Integrate specific methods to normalize breathing.
- Gentle rocking rhythmic range of motion of the area (oscillation) may be used to continue to relax the area.

Torso anterior (Figure 8.22)

When massaging this area, generally target breathing mechanisms. Breathing dysfunction and headaches and neck pain dysfunction are interrelated. The massage therapist influences breathing by maintaining soft tissue mobility in the area and supporting balance between sympathetic and parasympathetic autonomic nervous system functions. This is generally accomplished with a relaxation focus to the general massage.

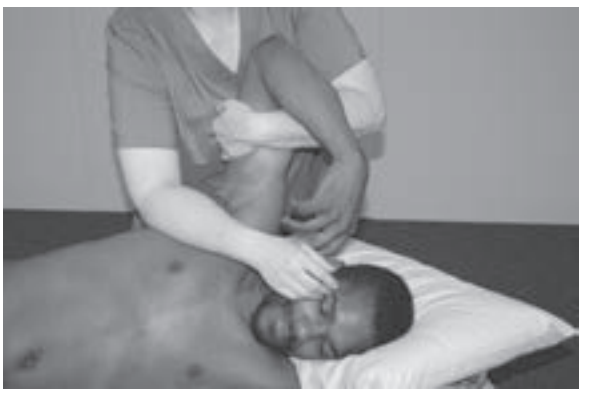
Massage begins superficially and progresses to deeper tissue layers and then finishes off with superficial work again. During the massage various forms of palpation, joint movement, and muscle assessment for tissue changes occur.

- Use gliding with a compressive element, beginning at the shoulder and work from the distal attachment of the pectoralis major at the arm toward the sternum, following fiber direction. This can be done in supine or side-lying position with the client rolled.
- Repeat three or four times, each time increasing the drag and moving slower. If short muscles are located, muscle energy methods can be used to facilitate lengthening.

A Massage of anterior torso – assess using bend and torsion forces.

B Fascial stretching (tension force).

C Address pectoralis major and thorax fascia.



D Gliding.

E Rectus abdominis.

F Multiple direction of ease over trigger point.

Figure 8.22 Massage application to the anterior torso.

- Positional release methods are especially effective for treating various tender points in this area.
- Then, reverse the direction and work from distal to proximal, applying tension force to stretch the area.
- Knead and glide across the muscle fibers, making sure that bending, shear, and torsion forces are only sufficient to create a pleasurable sensation while assessing for changes in the tissue.
- If the breathing has been dysfunctional for an extended period of time (over 3 months) connective tissue changes are common. Focused connective tissue massage application is effective.
- Once the soft tissue is more normal, then gentle mobilization of the thorax is appropriate. If the thoracic vertebrae and ribs are restricted, osteopathic, chiropractic or other joint manipulation methods may be appropriate and referral is indicated.
- Incorporate all anterior thorax methods for breathing dysfunction.
- Move to the abdomen and knead slowly across the fiber direction, always assessing for dysfunction related to headache or neck pain issues and then determining appropriateness of treatment based on the history and outcome goals.
- Skin drag palpation is often ticklish in this area so is not used but scanning for heat is possible.
- The psoas would be assessed and treated at this time using inhibitory pressure on the muscle belly or by using muscle energy methods and stretching. Since the target area is neck pain it would be appropriate to have the client roll the head and neck in a circle while working with the psoas.
- Rhythmic compression to the entire anterior torso area simulates the lymphatic flow, blood circulation, and relaxed breathing.
- Any areas or functions that received specific treatment should be reassessed for changes.

Torso posterior (Figure 8.23)

The posterior torso can be addressed in prone or side-lying. This area becomes involved in breathing function difficulties that relate to headache or neck pain.

The muscles commonly problematic are:

- serratus posterior superior and inferior
- levator scapulae
- rhomboids
- latissimus dorsi
- erector spinae and paravertebrals, especially the multifidi
- quadratus lumborum.

As described previously, massage begins superficially and progresses to deeper layers and then finishes off with superficial work.

- Begin with skin drag palpation and scanning to assess for possible tissue changes.
- Use gliding with a compressive element, beginning at the iliac crest and work diagonally along the fibers of the latissimus dorsi, ending at the axilla.
- Repeat three or four times, each time increasing the drag and moving slower to address deeper tissue layers.
- Identify areas of tissue bind, heat, increased histamine response, and muscle 'knots'.
- Move up to the thoracolumbar junction and repeat the same sequence on the lower trapezius.
- Then begin near the tip of the shoulder and glide toward the middle thoracic area to address the middle trapezius.
- Repeat three or four times, increasing drag and decreasing speed.
- Begin again near the acromion and address the upper trapezius with one or two gliding stokes to complete the surface area.

Muscle energy methods and stretching can also be used while addressing short muscles.

- Reverse the direction and work from distal to proximal, applying tension force to stretch the area.
- Knead and glide across the muscle fibers, making sure that bending, shear, and torsion forces are only sufficient to create a pleasurable sensation while assessing for changes in the tissue.
- Increase intensity of the kneading to further stretch the local tissue in the trigger point area and then again apply tension force, this time by passively or actively using joint movement and stretching the area.
- Knead the area again to increase circulation to the area and shift nervous system responses.
- Skin roll from the occipital base to the sacrum. Move the skin into multiple directions of ease, holding the ease position for up to 30–60 seconds. If appropriate, use lymphatic drainage methods in the area.
- Gentle rocking rhythmic ranges of motion of the area (oscillation) may be used to continue to relax the area.
- With the client prone, identify rigidity in the ribs by applying compression bilaterally (on both sides

A Assess with surface stroking.

B Lymphatic drain.

C Myofascial release, to address areas of bind.

D Glide, prone.

E Glide, seated.

F Glide, side-lying.

Figure 8.23 Massage application to the posterior torso.

of the spine) at the facet joints, beginning near the seventh cervical vertebra and moving down toward the lower ribs, maintaining compressive force near the facet joints.

- Rhythmic compression to the area stimulates various aspects of fluid movement, supports relaxed breathing, and finishes the massage of the area. Any areas or function that received specific intervention should be reassessed for changes.

Shoulder, arm, and hand

The area is massaged in supine, prone, side-lying, and seated positions. Massage of the torso and neck naturally progresses to the shoulder, arm, and hand. If the brachial plexus is involved there may be impingement symptoms in the arms.

- Commencing with the client prone, massage begins superficially, progresses to deeper layers and then finishes off with superficial work (i.e., kneading, compression, and gliding).
- To increase circulation to the area and shift nervous system responses, move the skin into multiple directions of ease, holding the ease position for up to 30–60 seconds.
- Next, move the tissues into bind to stretch the area.
- Stretch the area with either active or passive joint movement or direct tissue application incorporating gliding and kneading, whichever is more effective. It is also appropriate to use a combination of stretching methods.

The intrinsic muscles of the hand are addressed next.

- Systematically work the area, using compression and gliding of the soft tissue between the fingers, the web of the thumb, and on the palm.
- There is also a network of lymphatic vessels in the palm that when rhythmically compressed assist lymphatic movement.

Low back and hip

The low back and hip area is massaged in prone and side-lying positions.

Massage of the torso naturally progresses to the low back and hip area. Massage begins superficially and progresses to deeper layers, and then finishes off with superficial work.

- To increase circulation to the area and shift nervous system responses, move the skin into multiple directions of ease, holding the ease position for up to 30–60 seconds.
- Begin on the posterior torso to address the lumbar region that connects with the hip. This area was addressed while massaging the torso but now is massaged in relation to the low back and hip. Carry the strokes into the gluteus maximus.
- Repeat with the latissimus dorsi, again in relation to low back function. Begin at the shoulder and carry the stroke all the way into the opposite gluteus maximus.
- Systematically repeat the gliding, interspersing with kneading, to address the deeper tissue layers.
- Stretch the area with direct tissue methods by kneading and slow gliding and connective tissue methods. MET and stretching is also an option.
- Finish by gliding and kneading the entire area.

Thighs, legs and feet

The area can be massaged in all basic positions. Massage of the area naturally progresses from the hip. Like other body regions, massage begins superficially, progresses to deeper layers and then finishes off with superficial work.

- To increase circulation to the area and shift nervous system responses, move the skin into multiple directions of ease, holding the ease position for up to 30–60 seconds.
- Increase the pressure slightly and again gliding and kneading the entire area. Systematically repeat the gliding, interspersing with kneading, to assess the deeper tissue for tissue changes and treat appropriately.
- Move the hip and knee passively through flexion, extension, and internal and external rotation to assess for restrictions in joint function. If the hamstring muscles are short the resulting postural distortion can affect the neck position and contribute to pain and headache. Various muscle energy methods can be used to lengthen the hamstrings.
- Trigger point activity can be addressed with compression and muscle energy methods. Binding at the joint can be addressed with indirect functional methods (move into ease and hold for up to 60 seconds and then move into bind and the stretch just beyond bind) and connective tissue methods.
- Use active and passive joint movement to reassess the area.
- Finish by gliding and kneading the entire area.
- Add gentle shaking and oscillation in various positions.

The intrinsic muscles of the foot are addressed next. Side-lying is the best position.

- Work systematically, using compression and gliding of the soft tissue of the sole of the foot.
- There is also a network of lymphatic vessels in the soles of the feet that, when rhythmically compressed, will assist lymphatic movement.
- To finish off, use gentle shaking and oscillation, and compression and passive movement.

Re-evaluation

The specific areas addressed during massage should be re-evaluated for results and this information incorporated into the plan for the next massage session. Use the same methods for re-evaluation as were used for initial assessment.

Massage and prevention of headache and neck pain

Massage may be one of the most effective measures for preventing dysfunction. Massage can address causal factors before they become serious enough to cause headache and neck pain.

General full body massage that incorporates application to the various tissue types and layers of soft tissue may shift the circulation and metabolic dysfunction to a more normal state. Muscles with the tendency to form soft tissue dysfunctions can be maintained in a more pliable and lengthened state.

The soft tissues are regularly searched for changes during general massage and the soft tissue can be normalized before the trigger point develops or becomes fibrotic or sets up satellite points.

Tendency to postural distortion from nonoptimal use patterns during work or daily and recreational activities can be managed. Massage can also help maintain a more normal breathing pattern and autonomic nervous system balance.

For massage to be effective the person would need to have massage on a regular basis, with weekly sessions ideal and at the minimum receive a massage monthly.

KEY POINTS

- It is necessary to systematically work through the muscle layers and maintain a broad-based contact on the surface tissues as increasing pressure is applied to reach the more problematic deeper structures.
- The postural muscles and the surface phasic muscles of the cervical region often increase in motor tone to stabilize instability in the joints. This is resourceful compensation. Do not overwork the area by expecting complete relief after the massage. More realistic goals are a 50% reduction in pain and increased mobility, with the remaining sensations interpreted as stiffness more than pain.
- Trigger point activity in the belly of muscles is usually located in short, concentrically contracted muscles. These are the trigger points to be targeted during the massage if they relate to headache pain and pressure, and to neck dysfunction.
- Trigger points located near the attachments are usually found in eccentric patterns in long-inhibited muscles acting as antagonists to concentrically contracted muscles and it is usually best to leave these trigger points alone.
- Do not overtreat in any one session. Only address the soft tissue dysfunctions that recreate the symptoms the client is experiencing. This is especially true of the specific muscle releases and trigger points.
- Remember anything can feel like a trigger point or a painful muscle if pressed on hard enough, especially in the cervical region.
- Only address the trigger points that are most painful, most medial, and most proximal and that recreate the client's symptoms. Leave the rest alone and monitor them over the course of three or four massage sessions to identify improvement.
- When performing the specific muscle releases, choose one or two muscles to address during the massage session and then monitor the results.
- It is best to address the neck, shoulder, and chest issues in the short tissues first. It is typical for the anterior tissues to be short while the posterior tissues are long. Wait to see if the soft tissue dysfunctions in 'lengthened muscles', and at the attachments, resolve as the posture or muscle interaction normalizes.
- Both the massage methods and the joint movements (active and passive) used during massage should be applied in a slow, deliberate manner. Sudden, quick movements can lead to spasm and are likely to increase muscle tension by overstimulating the nerve receptors. Do not use the head as a lever since the attachment area at the occipital base is small. Instead, hold the head fairly stable and use the shoulder and arm to produce the movement if at all possible.
- Oscillation movements, such as shaking and rocking, are very effective in reducing motor tone in hyperreactive muscles, especially those that are guarding. Unfortunately, most of the muscles responsible for headache and neck pain are not easily shaken and so sustained rhythmic rocking of the whole body may be effective. During the massage, intermittently gently rock the person for 1–2 minutes then return to the massage strokes. Those

experiencing headache can be sensitive to vestibular activation, causing dizziness and nausea. Ask the client if these symptoms are an aspect of their pain pattern.
- Changes in the connective tissue structures in the head and cervical area are often identified as short or thick during assessment. The lumbodorsal fascia, iliotibial band and associated fascia of the thigh, and fascial structures of the anterior thorax are typically involved. Increasing pliability in these structures seems to reduce the symptoms of neck stiffness. Be cautious in how intensely the connective tissue is massaged since the shortening may be an aspect of increased stability in the area.
- Expect that it will take a series of 12 massage sessions before sustainable improvement is noticed.
- If the client feels very loose after the massage, and especially if they have difficulty balancing their head on the neck and symptoms are much worse the next day, the massage may have destabilized adaptive compensating mechanisms in the area. The work was probably too aggressive, resulting in a reflexive increase in the guarding response. The client should improve over the next 3–4 days. Reduce the intensity of the massage and target general relaxation responses.
- The important consideration for connective tissue massage methods is that the pressure vertically and horizontally actually moves the tissue to create tension, torsion, shear, or bend forces, which triggers alteration of the ground substance long enough for energy to build up in it and soften it.
- The development of connective tissue patterns is highly individualized and, because of this, systems that follow a precise protocol and sequence are often less effective in dealing with these complex patterns.
- A good grip with the skin is essential, so there must be no lotion or oil present. This can be with the hands or forearms. The technique is even sometimes performed with a towel to provide stronger contact with the skin.
- Tissues can be moved toward ease (the way it wants to move) and are held for a few seconds to allow the tissues to soften. The client can move the tissues by contracting or relaxing the muscle as the massage therapist holds the tissue at ease. The entire procedure can be repeated holding the tissues at bind (the way it does not want to move).
- Massage can be an effective approach to incorporating and blending various assessment and treatment options for headaches and neck dysfunction.
- Massage is generally enjoyed by clients/patients so compliance with treatment may be increased.
- Massage can be a satisfactory treatment option for symptom management if the client/patient will not make behavior changes necessary to address causal factors.
- Massage for headache and neck pain is an outcome-based process that incorporates many different modalities and methods to achieve the goals identified, including pain management, increased mobility, and normalization of soft tissue structure and function.
- To implement an outcome-based massage application it is necessary to perform appropriate assessments to target massage.
- Massage can be generically explained by describing qualities of touch and application of mechanical forces to influence the body's structure and function.
- Generalized full body massage application can ease symptoms. These include pain management, connective tissue normalization, and breathing function normalization.
- Specific massage strategies can address local dysfunctional areas such as short muscles and areas of fibrosis and adhesion, and joint dysfunction.
- Massage methods for acute pain are more general and less specific than methods for chronic pain.
- Massage focused for chronic headache and neck pain is both symptom management and reversal of causal factors.
- Massage is an effective aspect of a prevention program to inhibit or reduce the frequency of headache and neck pain.

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CHAPTER 9

Adjunctive treatment for headache and neck pain: what else should you know, and what else might help?

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Earlier chapters have offered a comprehensive overview, along with much detail, as to how to understand and manage head and neck pain from a massage/manual therapy perspective.

In this chapter a variety of additional approaches are described that – depending on causes and the type of headache – should be considered when managing/treating patients/clients with head and neck pain, and associated problems.

Before highlighting a number of these important clinically associated topics, the fundamental process of adaptation needs to be revisited so that the role of therapeutic intervention is clearly established.

REMEMBERING ADAPTATION

1. *All* health problems can benefit from reducing the adaptive load(s) being coped with, i.e., all the stresses of living, whether these be:
   - biomechanical (poor posture, physically stressful activities, restricted or weakened soft tissues and joints, disturbed breathing function, etc.)
   - biochemical (allergy, toxicity, deficiency, infection, hormonal imbalance, etc.), or
   - psychosocial (anxiety, fear, depression, etc.) (Figure 9.1).
2. Additionally, *all* health problems benefit from improved functionality – better circulation, mobility, strength, neural function, breathing, balance, posture, etc.
3. If the overall adaptive load is reduced, and/or if functions are improved, the self-regulating/self-repair systems and mechanisms of the body will be able to operate more effectively.

Figure 9.1 Sally has various health problems, including chronic blinding headaches. She is carrying a number of adaptive burdens – some physical, some psychological/emotional, some biochemical (malnourished, etc.) – and she needs help to shed as many of these adaptive demands as possible, while also needing help to carry those that cannot be eliminated. This requires manual help (better tone, better posture, better breathing, fewer trigger points, etc.), as well as specific interventions to eliminate or reduce her chemical and psychological loads as well. (Reproduced with permission from *Journal of Bodywork and Movement Therapies* 1(2):107-116.)

GENERAL ADAPTATION SEQUENCE (FIGURE 9.2)

Selye's (1943) general adaptation syndrome describes a process in which the individual, with his or her unique inherited and acquired characteristics, is responding to multiple variable or constant adaptive demands, resulting in:

- an initial *alarm stage*. An example of this is the 'fight or flight' (sympathetic arousal) response, which might be triggered by a single stress event or by a number of minor stressors acting simultaneously (Figure 9.3). If the stressor(s) continues to operate, the body's defense mechanisms move to what is known as:

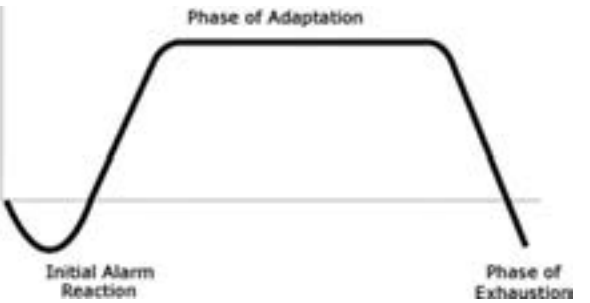
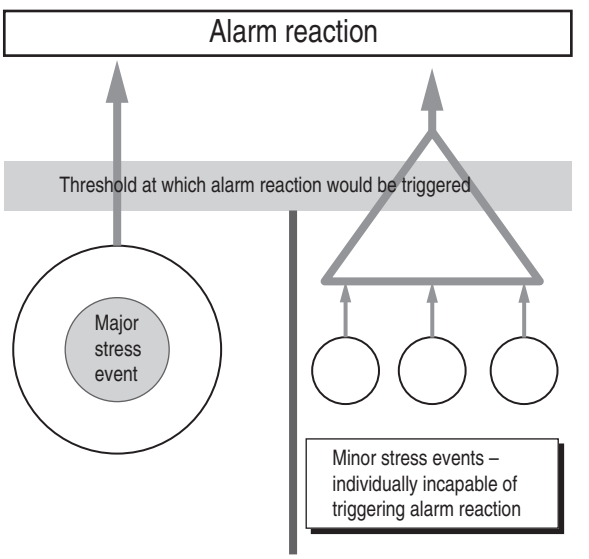


Figure 9.2 After the initial alarm phase (see Figure 9.3), if stresses continue, as they inevitably do, to one degree or another, the adaptation phase of the general adaptation syndrome (GAS) commences. This may last many years. As time passes functional changes appear (stiffness, restriction, weakness, balance problems, degrees of pain, etc.). When adaptation potential is eventually exhausted, and the phase of exhaustion starts, more obvious symptoms are experienced. At this stage *homeostasis*/self-regulation is no longer able to operate efficiently, and a state of *heterostasis* exists (see Figure 9.4B), where something (treatment, altered behavior patterns, etc.) is required in order to restore homeostasis, and improved adaptive potential, i.e. self-regulation. This is, however, not always possible, as damage (e.g., arthritis) may have progressed too far for more than modest improvement to be possible. (Adapted from Selye 1943.)



A combination of minor stresses, each incapable of triggering an alarm reaction in the general adaptation syndrome, can, when combined or sustained, produce sufficient adaptive demand to initiate that alarm. In fibromyalgia a combination of major and minor biochemical, biomechanical and psychosocial stressors commonly seem to be simultaneously active.

Figure 9.3 Alarm reaction.

- the *adaptation phase*, which continues until the ability of the body to compensate further is exhausted. This can be expressed as *homeostatic exhaustion*, or a stage of *heterostasis*, where adaptation potential fails (think of a piece of elastic that has been stretched until it starts to fray, and eventually snaps). When this occurs we have reached:
- the *stage of exhaustion*. The individual's self-regulating/self-repair potentials will be exhausted (or severely strained) and chronic symptoms and frank disease will follow. At this stage homeostatic mechanisms may fail, decompensation features emerge, and treatment to slow, modify or reverse the process is called for (Figure 9.4).

Therapeutic choices available are limited to those that reduce the adaptive load, improve the ability of the body's systems to handle adaptive demands, or methods that treat symptoms.

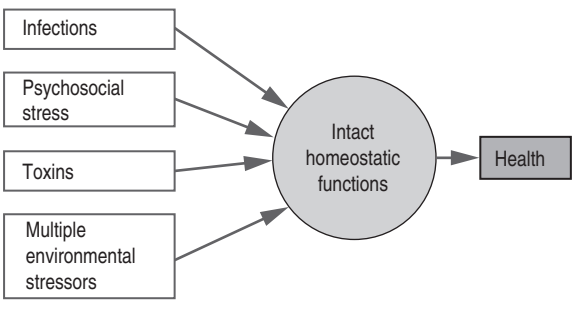


Figure 9.4A Homeostasis.

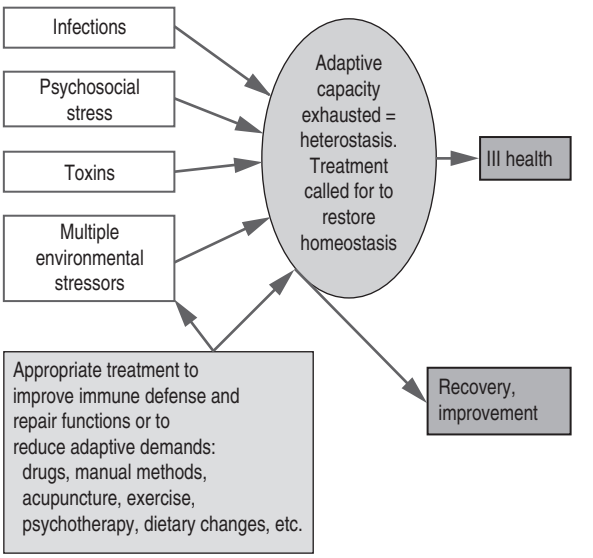


Figure 9.4B Heterostasis.

WHAT HELPS?

A wide range of methods, modalities, and techniques can be usefully employed by therapists to reduce the effects of adaptation influences, or to encourage better coping with these.

Those that will be considered, later in this chapter, in relation to headache and neck pain include:

- acupuncture (what you should know about this)
- aromatherapy
- emotion/stress management and relaxation methods
- ergonomics
- high-velocity manipulation (what you should know about this)
- hydrotherapy
- lifestyle changes, including nutrition and exercise
- posture
- respiration issues
- self-care (including balance training)
- soft tissue manipulation modalities.

Scope of practice may not allow all therapists to utilize some of these methods, or to advise patients/clients specifically (e.g., about nutritional influences on their symptoms); however, knowledge of these topics is important, so that at the very least, if they seem to apply in any given case, appropriate referral can be made.

GENERAL OBJECTIVES BASED ON AN UNDERSTANDING OF THE ADAPTATION PROCESS

There is a need:

- to identify and help the individual to reduce the adaptive demands – the habits of life that are helping to create (or aggravate, or maintain) the dysfunctional state that allows minor trigger factors to activate the symptoms
- to enhance functionality by improving posture, breathing, mobility, etc.
- to ease symptoms without adding to the person's adaptive burden, emphasizing the importance of remaining aware of just how sensitive and vulnerable this person is
- to support self-repair, self-regeneration, self-healing processes

- to take account of the whole person, the lifestyle, habits, attitudes and behavior – and not just the symptoms
- to keep in mind that the more complex the condition, and/or the more sensitive and unwell the individual is, the less that should be done therapeutically at any given time
- to try to focus on causes – and, above all,
- to do no harm.

INTERACTING CAUSES

Very few conditions – headache or neck pain as examples – arise from a single cause. That's not to say a single 'triggering' event may not be identifiable – such as the draft from an air-conditioning unit, or a particular food, or sleeping with the head/neck area not appropriately supported – or whatever else might provoke a headache. However, it's worth remembering that the same triggering event might not always produce a headache in the same individual, or ever produce a headache in another individual.

This simple example points to the fact that symptoms (such as headache and neck pain) commonly emerge out of a background of interacting circumstances and influences, where the scene has been set for that triggering event to start the pain.

Examples of contributing factors relative to the development of headaches and neck pain might include the following:

- Being female: Women are over-represented not only in migraine but also in tension headaches (Buchgreitz et al 2006).
- Poor posture, or poor patterns of use (overuse, misuse, microtrauma, etc.) that frequently, or repetitively, stress the tissues of the head–neck–shoulder region, involving a build-up of musculoligamentous tension in the muscles, with the inevitable emergence of myofascial trigger points capable of referring pain into the head and neck (Giacomini et al 2004). Among the commonest features are tighter ('harder') muscles than usual (Ashina et al 1999) and a forward head posture (Moore 2004, Zito et al 2006) (see Figure 9.5, and also Figures 9.9 and 9.10).
- Residual chronic structural and functional changes affecting joint or soft tissue status, following major trauma such as whiplash, or degenerative changes such as osteoarthritis, including excessive muscle tightness/'hardness' (Kashima et al 2006, Zito et al 2006).
- Emotional distress, whether intermittent or constant, including anger and depression (Materazzo et al 2000), or depression (Lipchik & Penzien 2004), are all associated with increased headache incidence. Some studies have found that psychological symptoms are more related to associated symptoms (digestive, sleep, fatigue, etc.) than with the headaches themselves (Mongini et al 2006).
- Allergy: People with allergies such as eczema, who also suffered intense chronic headache, were shown to improve both in terms of their allergies as well as their headaches, when an 'antihistamine' diet was followed: avoiding alcohol, matured or fermented food rich in histamine (such as old cheese, fish, cured sausages), bread products containing yeast, vegetables such as spinach and tomatoes, or histamine-liberating fruits such as citrus (Maintz et al 2006).
- Nutritional imbalances (toxicity, deficiency):
  a. A similar diet to that found to be helpful in allergies was found to improve pediatric migraine. Foods avoided included: cheese, chocolate, citrus fruits, hot dogs, monosodium glutamate, aspartame, fatty foods, ice cream, caffeine and alcoholic drinks, especially red wine and beer. A well-balanced diet is encouraged, with avoidance of skipped meals (Millichap & Yee 2003).

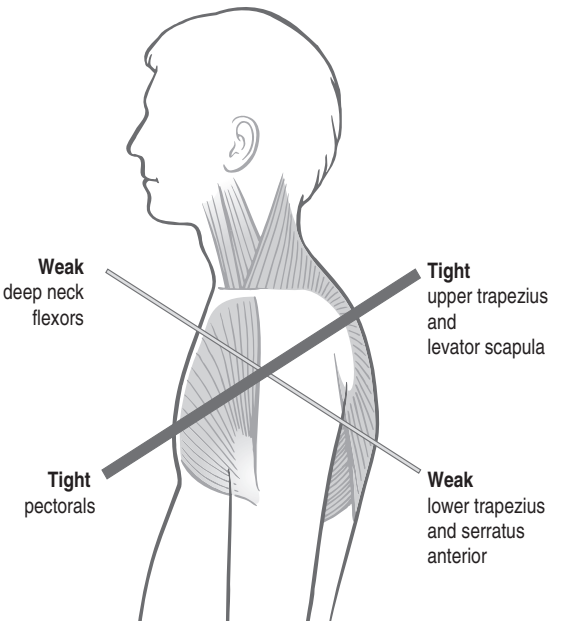


Figure 9.5 The upper crossed syndrome, as described by Janda (1996).

b. Research has shown that a higher number of healthy eating habits corresponded to a lower frequency of headaches (as well as back and neck pain). This means that the more symptoms, such as headache, that people report, the fewer healthy eating habits they practiced. Healthy eating in a study of over 1600 people was defined as: 'daily consumption of wholemeal bread, fresh fruit, vegetables, and salad, while avoiding daily consumption of sweets, soft drinks, meat, eggs and sausages' (Reime et al 2000).

- Hormonal factors: Hormones such as estrogen and progesterone have long been considered as well-known migraine triggers, probably as a result of genetic predisposition (Colson et al 2006).
- Underlying pathology: Conditions such as diabetes and high cholesterol levels (hypercholesterolemia) have been shown to be closely associated with headache (Davila & Hlaing 2007).
- Pregnancy – especially if high blood pressure is also a factor (Facchinetti et al 2005).
- Sensitization: As tissues respond to a variety of ongoing or periodic adaptive demands, a degree of sensitization may occur, allowing minor stress factors (of any sort) to provoke pain. This feature of what is known as *central sensitization* is common to all forms of chronic pain, including headaches and neck pain, and is discussed later in this chapter (Bendtsen et al 1996).
- Breathing pattern disorders: The common habit of upper chest breathing imposes physical stress (overuse) on the accessory breathing muscles (such as scalenes, sternocleidomastoid, upper trapezius), as well as producing a wide range of biochemical and emotional changes (Figure 9.6). Breathing imbalances associated with sleep are directly linked to headaches (Chervin et al 2000). Jennum & Jensen (2002) state: 'Primary sleep disorders such as insomnia, including sleep disordered breathing, are all associated with and may cause headache.' They note that obstructive sleep apnea syndrome (OSAS) leads to morning headaches.

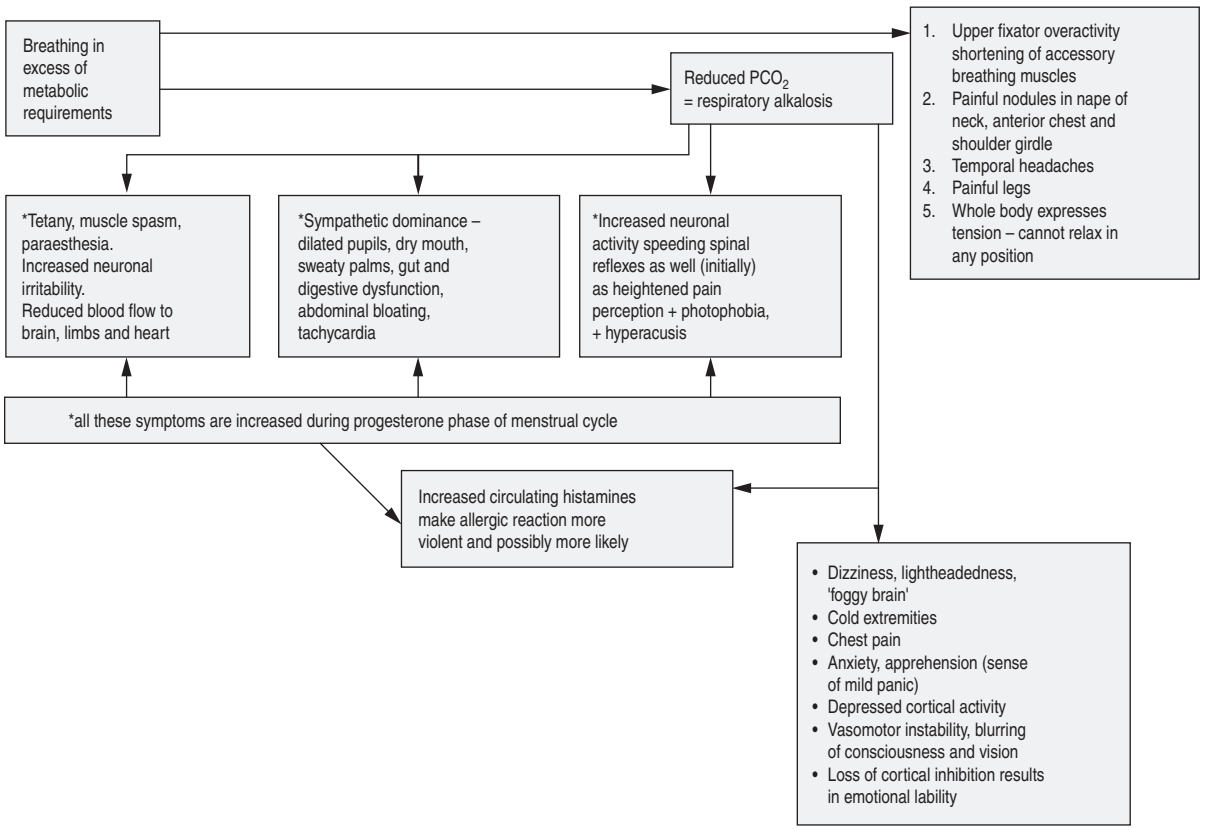


Figure 9.6 Negative health influences of a dysfunctional breathing pattern such as hyperventilation.

BACKGROUND

We can see that headaches, and their associated symptoms, may emerge from a background involving very different stressors, interacting with the unique genetic, biomechanical, biochemical, and psychosocial characteristics of the individual.

Clearly any person whose system is coping with multiple types, levels, and degrees of compensation and adaptation is likely to be susceptible to provocation by a variety of further stress factors – 'triggering' events or influences – including, as examples, additional physical and/or psychological strain, or a change in atmospheric pressure (such as occurs before a thunderstorm), or a draft from air-conditioning, or an infection, or an allergic response, or ... a host of other possibilities.

In such cases, when a headache develops, what's the real cause? What's the real 'trigger'? Is the trigger really a 'cause', or is it just a final straw? Or are the many interacting stresses the 'causes' – the biochemical, psychosocial, biomechanical factors to which the local area (cervical muscles for example) and the person as a whole are adapting – that have led to the stage where a single additional stress (the trigger) can start the headache, or initiate neck pain? Much depends on just how long adaptive stressor demands have been operating – weeks, months, years, or a lifetime.

THE SENSITIZATION MODEL

Bendtsen (2000) has described a model that explains the process leading to tension-type headache. He points to a process of *central sensitization* (facilitation) that occurs in both spinal and pericranial tissues, after prolonged bombardment of pain messages from pain receptors (nociceptors) in distant myofascial tissues.

This increased pain input to supraspinal structures 'sensitizes' (or 'facilitates') them, leading to increased pericranial muscle activity, which can continue even after the triggering factors have been normalized, resulting in episodic or chronic tension-type headaches. At its simplest this means that nerves have become hyperirritable, so that even minor stimuli, which would previously not have caused any discomfort, can lead to a great deal of pain. This does not mean that the person is imagining the pain, but that the sensations reaching the brain are interpreted as being far stronger than would be the case under 'normal' conditions, before sensitization.

The research supporting this model demonstrates the need to understand how, over time, a reversible problem may become entrenched and chronic.

Once they exist, areas of facilitation/sensitization appear to be capable of being irritated by stressors of all types – physical, chemical or psychological – even if there is no direct or obvious impact on the sensitized area (Bendtsen & Ashina 2000).

An adaptation example – leg length and headaches?

Janda (1988) describes the adaptive changes resulting from the presence of a significant degree of leg shortness (say ¾ inch/2 cm):

- A short leg inevitably leads to an altered pelvic position.
- This unlevels the sacral base and leads to scoliosis.
- As the spine adapts, a sequence of compensations is likely to lead to joint dysfunction at the cervicocranial junction.
- This inevitably results in compensatory activity of the small cervico-occipital muscles (such as rectus capitis posterior minor) and a modified head position.
- Further compensation occurs involving most of the neck musculature, some of which will lead to increased muscle tone and possibly muscle spasm.
- A sequence follows of compensation and adaptation responses in many muscles, ligaments and joints of the region, followed by the development of a variety of possible syndromes and symptoms involving the head, neck, temporomandibular joint, shoulder and/or the arm.

Janda's point is that after all the adaptation that has taken place, treatment of the most obvious cervical restrictions, or local soft tissue changes, where the person might be aware of pain and reduced range of motion, would offer only limited benefit.

Whether the short leg is anatomic or functional (i.e., where there is a primary sacroiliac dysfunction that alters the position on the ilia, and therefore creates an apparent change in leg length), the changes described by Janda will occur. The difference is that with a functional change, correction of the sacroiliac joint problem should reduce the chain reaction of adaptational modifications, whereas with a true anatomic short leg, choices would be far more limited (e.g., requiring a heel and sole lift) (see Figure 9.7 for an example of a short-leg-induced scoliosis corrected by a heel lift).

Another example

Liem (2004) has explained a sequence that results from a degree of malocclusion, involving, as an example, the first molar on the left, where premature contact occurs on bringing the teeth together.

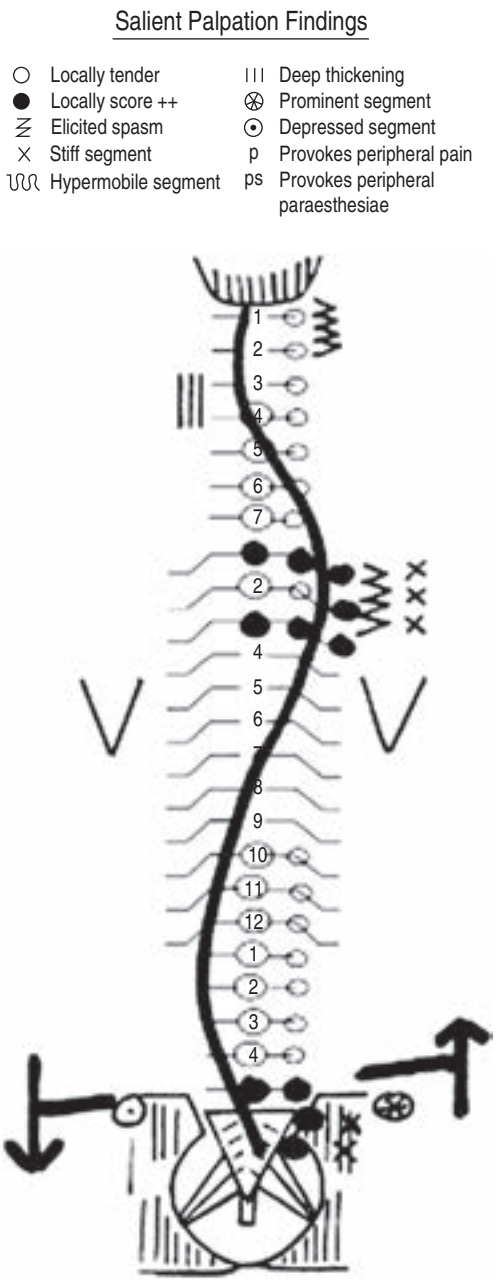


Figure 9.7 A scheme of the palpation findings (posterior aspect) in a young woman with a lateral pelvic tilt, upwards on the right side, and right unilateral dorsal pain from pelvis to occiput. Virtually all her chronic symptoms were relieved within 12 days by a simple unilateral heel raise. *Note*: The degree of scoliosis has been exaggerated. (Reproduced with permission from *Journal of Bodywork and Movement Therapies* 6:187.)

Figure 9.8 shows something of the chain reaction of adaptations resulting from this apparently minor structural imbalance, in which cranial modifications absorb the stresses of this dental misalignment, followed by bodywide muscular and fascial adaptations that also include osseous changes involving the left clavicle, humerus, radius, ilium, patella, tibia, and foot.

This individual might therefore display a range of symptoms involving the foot, knee, pelvis, spine, neck, and/or head. Although there is no certainty that headache would be one of the symptoms, it would be surprising if it were not. Treatment of the areas of adaptation might offer short-term relief to such symptoms; however, until the primary area of imbalance is addressed – the malocclusion – results would almost certainly be short term.

Janda's example of adaptation and facial pain

Janda (1982) describes a typical postural pattern in an individual with temporomandibular joint (TMJ) problems, involving changes in upper trapezius, levator scapulae, scalenii, sternocleidomastoid, suprahyoid, lateral and medial pterygoid, masseter and temporalis muscles. In this pattern (described below) all these muscles will show a tendency to tighten and/or to develop tendencies to spasm, tenderness, and the evolution of trigger points.

The postural pattern associated with TMJ dysfunction might therefore involve:

1. hyperextension of the knees
2. increased anterior tilt of the pelvis
3. flexion of the hips
4. lumbar hyperlordosis
5. rounded shoulders and winged (rotated and abducted) scapulae
6. cervical hyperlordosis
7. compensatory overactivity of upper trapezius and levator scapulae
8. forward head position resulting in opening of the mouth and retraction of the mandible
9. intervertebral joint stress in the cervical spine
10. . . . and almost certainly, neck and head pain.

The message that can be drawn from these examples is that dysfunction patterns first need to be identified before they can be assessed for the role they might be playing in the person's pain and restriction conditions, and certainly before these can be successfully and appropriately treated.

What's short? What's tight? What's weak? What's loose? What's affecting neighboring structures negatively? What's causing these changes, and what can be done about it without aggravating the situation?

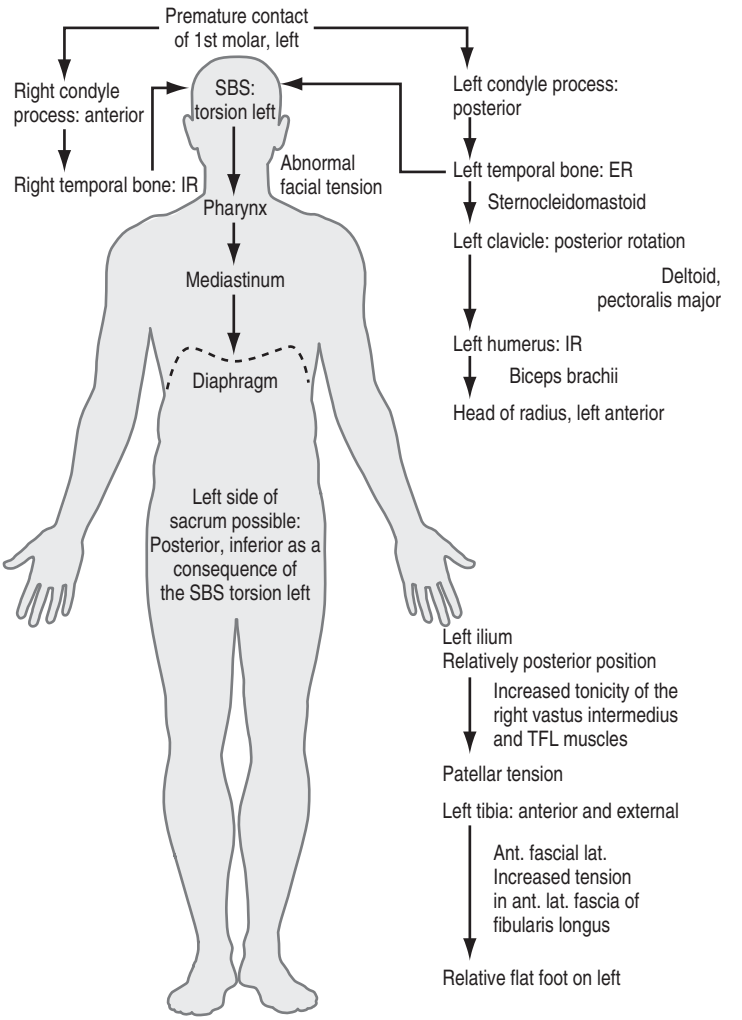


Figure 9.8 Bodywide adaptations in response to a left first molar malocclusion. Ant. fascial lat., anterior fascial lateral; ER, external rotation; IR, internal rotation; SBS, sphenobasilar symphysis; TFL, tensor fascia lata. (Reproduced with permission from Liem 2004.)

WHAT'S TO BE DONE?

In any given case your role is to try to identify what can be done to help ease the current headache (see previous chapters, and also Box 9.1), as well as what might be done, or what the person might do, to reduce the likelihood of further symptomatic episodes.

In these examples, using a biomechanical model of care, incorporating massage and appropriate soft tissue modalities (see Box 9.1) and rehabilitation strategies (posture, breathing, etc.) should certainly help to alter/improve the soft tissue status, enhance circulation and lymphatic drainage, and – if appropriate – assist in the deactivating of trigger points that may be contributing to the headache.

A broader model of care

The biomechanical model outlined in Box 9.1 is one way of managing such problems. Other proposed models for effective care of musculoskeletal dysfunction incorporate somatic, as well as behavioral, features. For example, Langevin & Sherman (2006) have described a model in which a broader therapeutic approach to musculoskeletal dysfunction in general can be understood. This is an 'integrative mechanistic'

Box 9.1 Soft tissue modalities in a clinical management sequence

1. Identify local and general imbalances that may be contributing to the symptoms being presented (posture, patterns of use, local dysfunction).
2. Identify, relax, and stretch overactive, tight muscles, using massage and possibly muscle energy techniques (MET), positional release techniques (PRT), myofascial release techniques (MRT) and others.
3. Mobilize restricted joints (possibly using MET, PRT).
4. Facilitate and strengthen weak muscles.
5. Re-educate (exercises, training, etc.) movement patterns, posture and/or breathing function.

This sequence is based on sound biomechanical principles (Jull & Janda 1987, Lewit 1999) and serves as a useful basis for care and rehabilitation of the patient with musculoskeletal problems that may be contributing to neck pain or headache. A variety of soft tissue normalization methods can be incorporated into this model (DiGiovanna 1991, Greenman 1989).

Box 9.2 Treatment as another form of stress

It is important that we remember that all forms of therapy, manual or otherwise – involving anything from the insertion of an acupuncture needle, to modification of lifestyle or diet, to the taking of supplements or botanical substances, or application of manual techniques – demand a response from the systems or the tissues of the body. Treatments of all sorts – when appropriately applied – are therefore forms of what can accurately be termed 'therapeutic stress' (Selye 1943).

The objective should always be to use the least invasive, most appropriate form of therapeutic stress to achieve positive homeostatic responses, ideally involving the least possible demand for additional adaptation – i.e., side effects.

model that addresses both behavioral and structural aspects, as well as pain psychology, postural control, and neuroplasticity.

This model emphasizes the need, in many instances, for multidisciplinary treatment protocols – possibly incorporating direct biomechanical/manual approaches including massage, movement re-education, psychosocial interventions, and, where necessary, pharmacologic and/or nutritional treatment methods and modalities – that meet the particular needs of the individual.

In this way long-term preventive approaches might also include:

- enhanced standing, sitting, and sleep postures
- greater care over work and leisure activity postures and positions (ergonomics) – for example, consider the often prolonged periods of distorted or strained positioning involved in people working in dentistry, hairdressing, construction, massage, house-painting, automobile repair, plumbing, gardening, nursing, home-making, running, jumping, throwing, climbing, etc. Consider also that in such situations repetitive and/or prolonged stresses may be being loaded onto already compromised tissues, which may have become shortened and/or weakened, fibrotic, indurated or in some other way dysfunctional, long before current stress patterns were imposed
- breathing rehabilitation strategies
- improved sleep patterns
- stress management (see Box 9.2), including learning relaxation techniques
- counseling or psychotherapy, if appropriate
- mobilization of restricted cervical and thoracic structures – including self-help measures (see below)
- stretching shortened associated musculature – including self-help measures (see below)
- improved nutrition and/or detoxification.

ADJUNCTIVE APPROACHES

The remainder of the chapter will focus on adjunctive approaches that may prove useful in management of the symptoms of clients with head and neck pain.

Remember that the objective is to 'lighten the adaptive load' and to enhance functionality – better mobility, flexibility, stability, balance – and of course to relieve or remove unpleasant symptoms. Focusing on the topics that fill the remainder of this chapter will help to achieve those ends, working alongside direct manual interventions.

Also remember that because a form of treatment, or an exercise, is useful, it does not mean that there may not be 'reactions' to the inevitable changes that result from it. The more fragile and sensitive the person, the less that should be done at any time, allowing for the adaptive changes resulting from treatment to be processed by the tissues and the mind.

Another useful reminder is that not everything is fixable. Although we are always working with the aim of enhancing self-regulation, some changes – for example, osteoarthritis or the circulatory or soft tissue

effects of old age – may involve such chronic change that the best we can hope for is a modest improvement, or a slowing of what may be inevitable decline. In such instances maintenance of the present state may be a realistic therapeutic objective.

Acupuncture (what you should know about this)

Acupuncture for pain relief is now widely used by physiotherapists, doctors of manual medicine, and of course acupuncturists. The methods used include the insertion (usually quite painlessly) of very fine, disposable, stainless steel needles into specific 'points' on the body. The depth of insertion may be very shallow or quite deep, depending on which part of the body is involved. Some (traditional) acupuncturists manipulate the needles (rotating them) to produce a sense of heaviness in the tissues. A similar effect is achieved by other (modern) acupuncturists, who attach clamps to the needles and pass mild electrical currents through them.

Other methods of influencing the painful tissues include heating the needles (known as moxibustion). Needles may stay inserted for a matter of seconds, or for 20 minutes or more, depending on what the acupuncturist is trying to achieve.

Western medicine believes that acupuncture has its main effect on pain by blocking pain messages to the brain. Eastern concepts are that energy rebalancing is being achieved. Despite the variations in belief and in application, all acupuncturists report (and research confirms) that this is one of the most effective methods for achieving pain relief, albeit temporarily if the causes are not also dealt with.

Acupressure methods, as used in shiatsu and Thai massage (Palanjian 2004), have very similar effects to those achieved by acupuncture.

Aromatherapy

In a clinical, placebo-controlled trial, individuals with depression as a major feature, but with secondary symptoms of sleep disturbance and chronic headaches, were treated with massage and essential oils (selected from bergamot, clary sage, lemon, lavender, Roman chamomile, geranium, rose, sandalwood, jasmine) in a hospital setting (Lemon 2004).

The control group received massage using grape seed oil. The essential oils selected for the treatment group had been previously shown to offer benefit in the conditions presented (Lawless 1994).

In the hospital study it was found that:

> The use of essential oils, prescribed for the relief of depression and anxiety, but also blended specifically for the client, addressed other issues such as sleep disturbance and headaches. It was concluded that this study has statistically proven that the holistic use of aromatherapy had a beneficial therapeutic effect on clients who were more than mildly depressed or anxious.

Emotion/stress management and relaxation methods

Stress management may play a part in easing the adaptation load in conditions such as recurrent or chronic head/neck pain, and this may call for specialized professional advice and/or treatment. However, in order to defuse, reduce, or minimize the effects of chronic emotional stress, a wide range of simple strategies exist, which can do no harm and which might be extremely helpful, even though they are not addressing the primary features of the problem.

According to Eisenberg et al (1998), 57% of people with neck pain used complementary and alternative medicine (CAM) in the previous 12 months, two-thirds visiting a practitioner. Chiropractic, massage, and relaxation techniques were used most commonly and perceived as 'very helpful' by patients (Wolsko et al 2003).

The methods described below – neutral bath, progressive muscular relaxation, and autogenic training exercises – can all be used at home without any risk, and with potentially beneficial effects.

Note: Clearly these methods do not address the underlying causes of emotional distress, but appear to offer relief from its effects in a safe manner. Ideally, individuals whose chronic anxiety, for example, is a feature of life should seek appropriate professional advice and help.

The neutral bath: for inducing deep relaxation/sleep enhancement

A neutral bath is one in which the body temperature is the same as that of the water. This produces a relaxing influence on the nervous system (this was the main method of calming violent and disturbed patients in mental asylums in the nineteenth century).

Indications. In all cases of anxiety, feelings of 'being stressed', and for relieving chronic pain and/or insomnia.

Materials required. Bathtub, water, bath thermometer.

Method. Run a bath as full as possible, and with the water as close to 97°F (36.1°C) as possible, and certainly not higher. (The bath has its effect because the water is close to body temperature. Immersion in water at this neutral temperature has a profoundly relaxing, sedating effect.)

Instructions

- Lie down in the bath so that, if possible, water covers your shoulders.
- Rest your head on a towel or sponge.
- A bath thermometer should be in the water and the temperature should not be allowed to drop below 92°F/33.3°C.
- It can be topped up periodically, but must not exceed the 97°F/36.1°C limit.
- The duration of the bath should be anything from 30 minutes to 2 hours – the longer the better as far as relaxation effects are concerned.
- After the bath, pat dry quickly and get into bed.

Caution: Neutral baths are suitable for most people but contraindicated where there are skin conditions which react badly to water, or if there is serious cardiac disease.

Progressive muscular relaxation exercise (time required approximately 20 minutes) (Carroll & Seers 1998)
Autogenic training and (Erickson's) progressive muscular relaxation were evaluated for their benefits in patients with fibromyalgia (Rucco et al 1995). The researchers reported that:

> This auto-hypnotic technique (autogenics) was compared to Erickson's relaxation training in a randomized controlled trial, with 53 fibromyalgia patients. The authors found that the latter approach was more suited to FM patients and led to a faster relief of symptoms.

Instructions

- Lie comfortably on a draft-free carpeted floor, arms and legs outstretched.
- Tense the fist of your dominant hand and hold tight for 10 seconds.
- Let go the tense fist and enjoy the sense of release for 10 seconds.
- Repeat this again, and then do the same with the other hand
- Go to your dominant side foot and draw the toes upwards towards the knee, tightening the muscles. Hold this for 10 seconds.
- Release and relax for 10–15 seconds, then repeat once more before going to the other foot.
- Perform a similar sequence in at least 5 other sites (each on both sides of the body, making 10 more sites) such as:
  - back of lower legs, but this time point the toes
  - upper leg, by 'pulling' the kneecap towards the hip
  - squeeze the buttocks together
  - hold an inhaled breath and at the same time draw the shoulder blades together
  - pull the abdominal area in strongly
  - draw the upper arm into the shoulder, strongly
  - tighten the face muscles around the eyes and mouth, or frown strongly.

Other muscles can also be contracted by working out just what tightens them.

Holding extreme tightness, followed by release, gives you awareness of the contrast between tension and relaxing, and this lets you recognize muscular tension as it builds up, allowing you to stop it early.

After a week or so of doing this once or twice daily, start to combine muscle groups, so that the entire hand/arm on both sides can be tensed and then relaxed together, followed by the face and neck, then the chest, shoulders and back, and finally the legs and feet.

After another week abandon the tension element of the exercise and you should be able to simply lie down and focus on the different regions, and note whether they are tense or not, and instruct them to relax. By doing this in the head/neck region you should be able to modify tension headache symptoms.

Results should come quickly but only if the exercise is performed regularly!

Autogenic training (Rucco et al 1995)
Every day, for 10 minutes, do the following:

- Lie comfortably, cushion under the head, knees bent, eyes closed.
- Focus attention on your dominant (say right) hand/arm and silently say: 'My right hand (or arm) feels heavy.'
- Sense the arm relaxed and heavy. Feel its weight. For about a minute repeat the affirmation 'My hand/arm feels heavy' several times, and try to stay focused on its heaviness.
- You may lose focus as your mind wanders periodically. This is normal, so don't be upset, just return to your arm and its heaviness.
- Try to enjoy the sense of release – of letting go – that comes with this heavy feeling.
- Next, focus on your left hand/arm and do exactly the same thing for about a minute.
- Move to the left leg, and then the right leg, for about a minute each, with similar messages, focusing attention for about 1 minute each.
- Return to your right hand/arm and this time affirm a message which says: 'My hand is feeling warm (or hot)'.
- After a minute go to the left hand/arm, then the left leg, and then finally the right leg, each time with the 'warming' message and focused attention. If warmth is sensed, feel it spread, and enjoy it.

- Finally focus on your forehead and affirm that it feels cool and refreshed. Hold this thought for about a minute.
- Finish by clenching your fists, bending your elbows and stretching out your arms. The exercise is complete.

Repeat the whole exercise at least once a day and you will gradually be able to stay focused on each region and sensation.

Using autogenics to ease pain
Once you have learned to stay focused, if there is pain relating to muscle tension (e.g., headache) these methods can be used to reduce tension by focusing thoughts of 'heaviness', or 'lightness', or 'warmth' into the region. If pain relates to poor circulation, a 'warmth' instruction can be used to improve it; if there is inflammation this can be eased by 'thinking' the area 'cool'.

You can focus on any area – for example, visualizing a stiff joint easing and moving, or a congested, swollen area returning to normality.

For headaches, depending on whether there is a circulatory influence (such as migraine) or a muscle-tension feature, appropriate 'messages' of warmth and/or heaviness and/or coolness can be initiated.

Breathing for pain relief
By practicing the *pursed lip breathing* described later in this chapter, a sense of calm and ease should emerge after some minutes of repeating the pattern of slow exhalation through pursed lips–pause–inhalation through the nose.

Ergonomics

Poor sitting posture – for example, sitting at a desk for lengthy periods – imposes a great deal of stress on the whole body, with very real implications for the neck and head (Cranz 2000) (Figure 9.9).

The concept of specific adaptation to imposed demands is essential in understanding how the human biomechanical design evolved, and what interventions can be made to enhance biomechanics – whether through treatment, stretching programs, or corrective or performance-based exercise. It may be possible, for example, to minimize the pain and discomfort of sitting in one position for several hours a day by offering advice regarding supports (lumbar supports, foot rests, wrist supports, head rests, etc.).

Questions should be asked about work and recreation positions and activities. In addition, sleeping, driving, and standing postures should be evaluated, and advice offered, or referral made to suitably

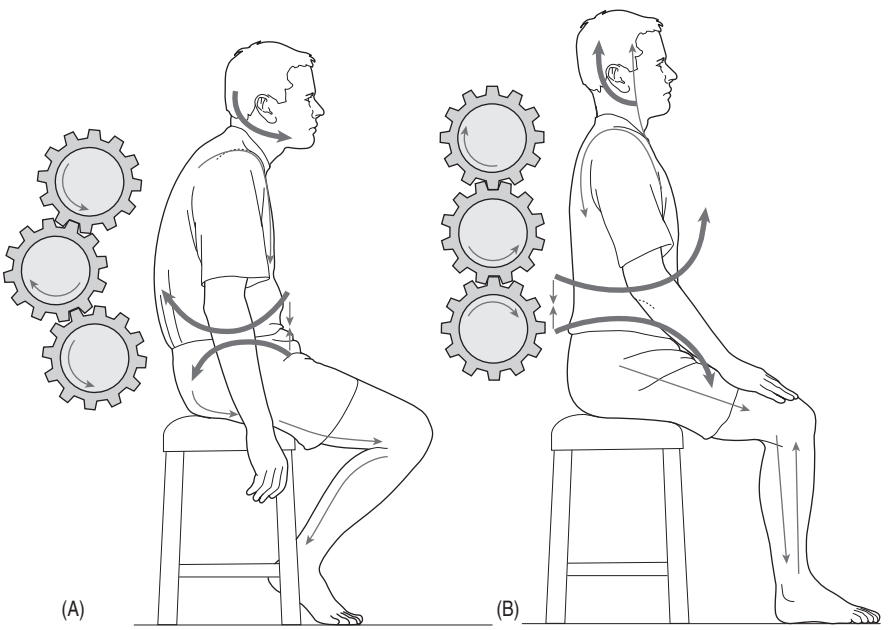


Figure 9.9 Seated postural stresses are demonstrated graphically by means of cogwheels which suggest the lines of force operating during (A) poor and (B) balanced sitting. (Reproduced with permission from *Journal of Bodywork and Movement Therapies* 3:148.)

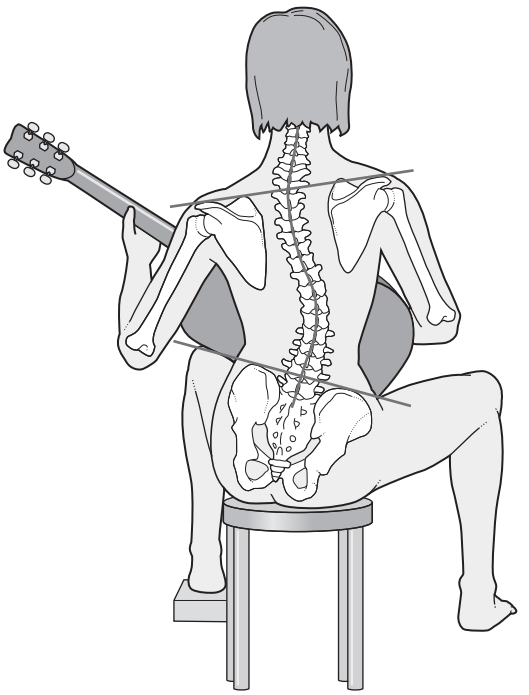


Figure 9.10 Postural stress in relation to guitar playing. (After Kapandji 2000.)

trained and licensed professionals for such advice. Figure 9.10 shows a possibly unavoidable posture for someone playing the guitar. Treatment of the stressed and distressed tissues, along with home stretching advice, should effectively reduce the soft tissue changes resulting from being in such a position for lengthy periods.

High-velocity manipulation (what you should know about this)

Chiropractors, osteopaths, and some physical therapists utilize manipulation described as high velocity, low amplitude (HVLA). Licensing is required, demonstrating that appropriate training has been received in use of these usually safe, but potentially dangerous methods, if used inappropriately.

The therapeutic effects of HVLA are summarized in Figure 9.11.

Safety

Most issues of safety in relation to use of HVLA involve the cervical spine. While practitioners using HVLA report that minor side effects (local discomfort, headache, tiredness, radiating discomfort) occur after approximately 33% of visits, these are usually no longer present after 24 hours (Malone et al 2002).

Major complications from cervical manipulation are rare (between 1 in 400 000 and 1 in 10 million; Shekelle et al 1992) but can be serious (Coulter et al 1996).

It is worth acknowledging that complications resulting from most other forms of treatment of neck pain, for which data are available, are estimated to be higher than those for manipulation. Haldeman et al (2002) note that in reviewing nearly 400 cases of vertebrobasilar artery dissection, it was not possible to identify a specific neck movement, type of manipulation or trauma that would be considered the offending activity in the majority of cases.

An editorial (Hill 2003) in the *Canadian Journal of Neurological Sciences* stated:

> Despite strong circumstantial reports and opinions, the quality of evidence that minor neck trauma including chiropractic neck manipulation causes vertebral or carotid artery dissection remains weak. A majority of papers are case reports or series only representing the weakest tier of clinical evidence.

Conclusion: If an appropriately trained and licensed practitioner performs HVLA manipulation after full assessment and observation of standard precautions, the evidence suggests that the procedure is safe.

Hydrotherapy

See also: 'Hot mustard foot bath' under the subheading 'Self-care' below, and 'neutral bath' methods under the subheading 'Emotion/stress management and relaxation methods' earlier in this chapter.

Constitutional hydrotherapy (Blake 2006, Watrous 1996)

Constitutional hydrotherapy (CH) has a nonspecific 'balancing' effect, inducing relaxation, reducing chronic pain, enhancing immune function, and promoting healing when it is used daily for some weeks.

Because effects are general, CH is ideal for treatment (and self-treatment) where a clear diagnosis is absent, since its effects are universally helpful, with no obvious contraindications.

The method described below is adapted for home use. (*Note*: Help is required to apply HC.)

Required are:

- a full-sized sheet folded in two, or two single sheets
- two blankets (wool if possible)
- three bath towels (when folded in two each should be able to reach from side to side and from shoulders to hips)
- one hand towel (this should, as a single layer, be the same size as the large towel folded in two)
- hot and cold water.

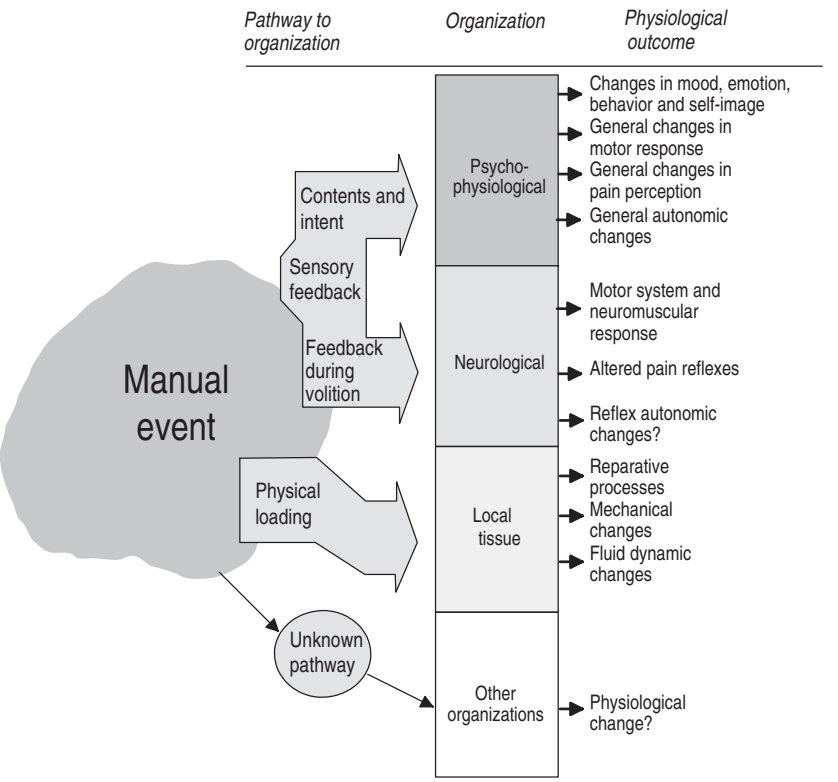


Figure 9.11 The physiologic model of manipulation. (Reproduced with permission from Lederman 1997.)

Method

1. Undress and lie face up between the sheets and under the blanket.
2. Whoever is assisting you should place two hot, folded bath towels (i.e., four layers of damp/hot toweling) to cover the trunk, shoulders to hips.
3. Cover the towels with a sheet and blanket and leave for 5 minutes.
4. Your helper then returns with a single-layer (small) hot towel and a single-layer cold towel.
5. The 'new' hot towel is placed onto the top of the four 'old' hot towels, and these are 'flipped over' so that the new hot towel is on the skin. The used/old towels are discarded.
6. Immediately place the cold towel onto the new hot towel, and flip again, so that the cold towel is on the skin. Remove and discard the single hot towel.
7. Cover the whole body with a sheet and leave for 10 minutes or until the cold towel warms up.
8. Remove the previously cold, now warm, towel and turn onto stomach.
9. Repeat steps 2 to 8 to the back.

Suggestions and notes

- If using a bed, take precautions not to get this wet.
- 'Hot' water in this context is a temperature high enough to prevent you leaving your hand in it for more than 5 seconds.
- The coldest water from a running tap is adequate for the 'cold' towel. On hot days, adding ice to the water in which this towel is wrung out is acceptable if the temperature contrast is acceptable to the patient.
- If the person being treated feels cold after the cold towel is placed, use back massage, foot or hand massage (through the blanket and towel) to warm up.
- *Apply daily or twice daily if headaches (or other pain) are chronic.*
- There are no contraindications to constitutional hydrotherapy.

Lifestyle changes, including nutrition and exercise

Lifestyle includes the activities of work and leisure; how much exercise and sleep we get; what, how much, and how often we eat and drink; and pretty

much everything else we do. Lifestyle is – economic considerations excluded – to a very large degree, a matter of choice.

Unless the following choices are dictated by circumstances out of our control (working environment, economic status), we choose what we wear (high heels, tight, constricting undergarments, etc.). We choose what and how often we eat and drink, and whether we do so slowly or quickly, and whether we follow a diet high in saturated fat and sugar, or one more in tune with healthy outcomes. We choose whether we drink alcohol, caffeine-rich liquids, and fizzy, chemical-laden fluids, or pure water. We choose whether we exercise or not. Even our posture and breathing patterns are largely a result of habitual choices.

Some 30 years ago Boris Chaitow ND DC wrote the following, which summarizes much of the problem highlighted in the previous paragraph:

> When humans were evolving, nutrition consisted of fruits, nuts, whole cereals, vegetation, roots, herbs, possibly small living creatures, all nutritionally whole, all rich in the essential factors that the body requires for high efficiency, energy and freedom from disease – especially in amino acids, trace elements, vitamins, enzymes, etc.
>
> Western man's diet today is excessive in high animal proteins, cooked, rich and fatty – high level of carbohydrates, largely derived from refined ingredients such as white bread, buns, cakes, biscuits, pastries, puddings, pies, as well as white sugar, sweets, chocolates, preserves and jams; cooked refined porridge, processed cereals, white rice, ice-cream, etc., fluids from tea, coffee, cocoa, alcohol and synthetic and artificially sweetened, bottled drinks; fried, pickled, preserved, cured, smoked, salted and tinned meats and fish; dairy products that are pasteurized and distorted – all of which contribute to the noxious encumbrances and the deficiencies contributing to today's tragic state of ill-health. And on top of that, many other items of civilised foods are 'doctored' by colouring, flavouring, preserving, sweetening, salting, chemicalising and generally overcooking, to create 'foodless' material, that in laboratory experiments causes rats to lose their hair and teeth, to abort their young, to become irritable, pugnacious and cannibalistic – and in ludicrous seriousness causes pain-ridden humans to become pouchy, grouchy, with falling hair, rotting teeth, poached-egg eyes, pickled livers, bleeding piles, and no idea what eating is all about.'(Chaitow 1980)

... and doubtless with headaches.

If a patient/client has any chronic health problem, such as musculoskeletal pain (neck or elsewhere) and/or headaches, these issues may be contributing to the adaptive load to which the individual is reacting. Appropriate nutritional and lifestyle advice should be offered (exercise, sleep, ergonomics, diet, etc.), or the person should be referred to health care providers who can offer such advice.

Hypoglycemia (low blood sugar) and headache (Brostoff 1992)

One common headache trigger is the occurrence of an episode of low blood sugar.

To establish if this is a trigger, the practitioner should ask simple questions such as: 'Do you feel shaky and unwell if you miss a meal'? or 'Does your energy dip an hour or so before mealtimes'?, and most specifically, if the answer to either of the previous questions is positive: 'Do headaches start at such times'? If so, solutions include eating regular meals, ensuring a good protein source at each meal (but most specifically at breakfast), and – for a month or two – taking a 200 microgram supplement each morning of chromium (glucose tolerance factor) (St Amand 1996).

Once again, anyone with such symptoms should be referred for advice to a health care provider (nutritionist, naturopath, chiropractor certified in clinical nutrition, etc.).

Posture

Experts in postural dysfunction, such as Janda (1982) and Lewit (1999), identified patterns of posture that were described as 'crossed pattern syndromes', as well as a 'layered syndrome'. These crossed patterns demonstrate the imbalances that occur as antagonists become inhibited due to the overactivity of specific postural muscles. The effect would be to create an environment in which pain and dysfunction (cervical and suboccipital areas) would become stressed and painful. The most obvious observable postural change suggesting biomechanical head/neck influences on symptoms in those areas, involves protracted ('round') shoulders, an anterior head posture, commonly combined with the jaw poking forward.

One of the main tasks in rehabilitation of such pain and dysfunction (see below) is to normalize (as far as is possible) these imbalances, to release and stretch whatever is overshort and tight, and to encourage tone in those muscles that have become inhibited and weakened.

Upper crossed syndrome (see Figure 9.5)
The muscular changes here include:

- *Shortened*: cervical extensors, suboccipitals, rotator cuff muscles, upper trapezius, levator scapulae, pectorals.
- *Lengthened/weakened/inhibited*: deep neck flexors, serratus anterior, lower and middle trapezius.

Lower crossed syndrome (see Figure 6.7)
The muscular changes here include:

- *Shortened*: psoas, erector spinae, tensor fascia lata, piriformis, quadratus lumborum, hamstrings, latissimus dorsi.
- *Lengthened/weakened/inhibited*: abdominal muscles, gluteals.

Layer syndrome (Figure 9.12)
The muscular changes here include:

- *Shortened*: hamstrings, thoracolumbar erectors, upper fibers of trapezius, levator scapulae, suboccipitals, hip flexors (rectus femoris and iliopsoas).
- *Lengthened/weakened/inhibited*: gluteus maximus, upper thoracic erectors, lower/middle fibers of trapezius.

Postural rehabilitation
Postural rehabilitation implies returning the individual toward a state of normality that has been lost through trauma, poor habits of use, or ill health. Among the many interlocking rehabilitation features involved in any particular case are the following:

- Normalization of soft tissue dysfunction, including abnormal tension and fibrosis. Treatment methods might include massage, neuromuscular techniques, muscle energy techniques, myofascial release, positional release techniques and/or articulation/mobilization, and/or other stretching procedures, such as yoga.
- Deactivation of active myofascial trigger points, possibly involving massage, neuromuscular techniques, muscle energy techniques, myofascial release, positional release techniques, spray and stretch. Appropriately trained and licensed practitioners might also use injection, dry needling or acupuncture in order to deactivate trigger points.
- Strengthening weakened structures, involving exercise and rehabilitation methods, such as Pilates.
- Proprioceptive re-education, utilizing manual therapy methods (e.g., balance retraining – see below – and/or use of balance sandals, or a wobble board) as well as spinal stabilization exercises and methods such as those devised by Feldenkrais, Hanna, Pilates, Trager and others.

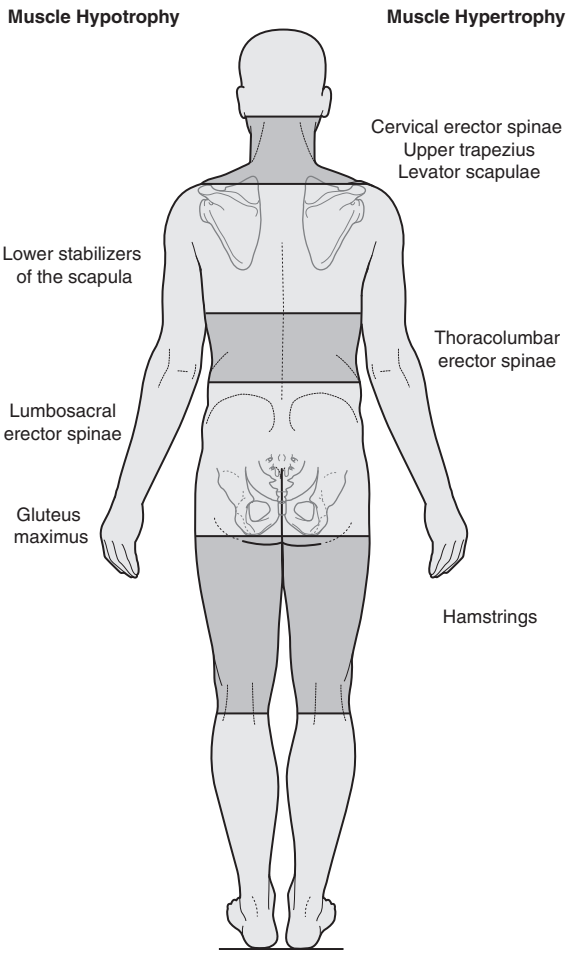


Figure 9.12 The layer syndrome. (Reproduced with permission from Jull & Janda 1987.)

- Postural retraining using Alexander technique (referral to specialized teachers of this method is recommended) as well as breathing re-education (see notes below), yoga, tai chi, and similar systems.
- Ergonomic, nutritional, and stress management strategies (see below).
- Psychotherapy, counseling or pain management techniques, such as cognitive behavior therapy, which may require specific referral to trained and licensed experts.
- Occupational therapy that specializes in activating healthy coping mechanisms, determining functional capacity, increasing activity that will help return the individual to a greater level of self-reliance and quality of life (Lewthwaite 1990).
- Appropriate exercise strategies to overcome deconditioning (Liebenson 1996) – see chin-tuck exercises below (Figures 9.13–9.15).

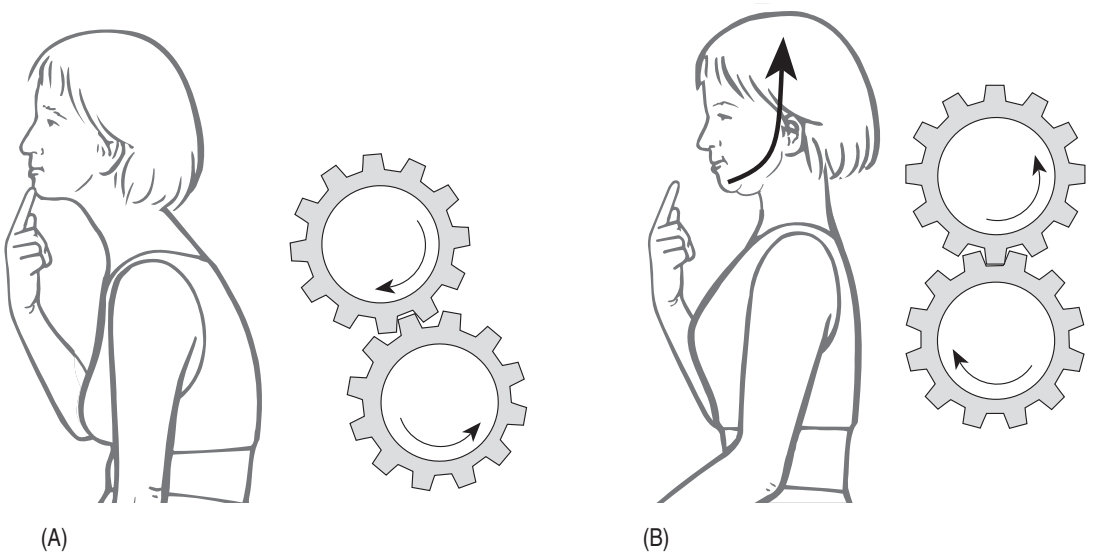


Figure 9.13 The chin tuck – beginner position. (Reproduced with permission from *Journal of Bodywork and Movement Therapies* 6:68.)

A team approach to postural rehabilitation is called for where referral and cooperation allow the best outcome to be achieved.

Specific neck exercises for individuals with head held forward of body – instructions for clients/patients

Chin-tuck exercise 1

- Place your finger on the front of your chin, then draw your chin away from your finger as you tuck it in.
- You should feel a gentle pull in the back of your neck as this stretches the tight muscles (Figure 9.13).
- Hold the chin tuck for 3–4 seconds and slowly release.
- Repeat three or four times, many times daily.

Chin-tuck exercise 2

- Adopt the sphinx position as shown in Figure 9.14.
- Place your finger on the front of your chin.
- Then draw your chin away from your finger as you pull it in and up towards the ceiling.
- As you draw your chin in, arch your upper back away from the floor.
- Repeat 8–10 times, holding the tucked chin position for 3–4 seconds each time.
- Perform the exercise twice a day.

Chin-tuck exercise 3

- Stand with your back against a wall and place a small inflated ball behind your head as in Figure 9.15.
- The exercise is performed by nodding 'yes', by tucking your chin in and pressing your head against the ball.

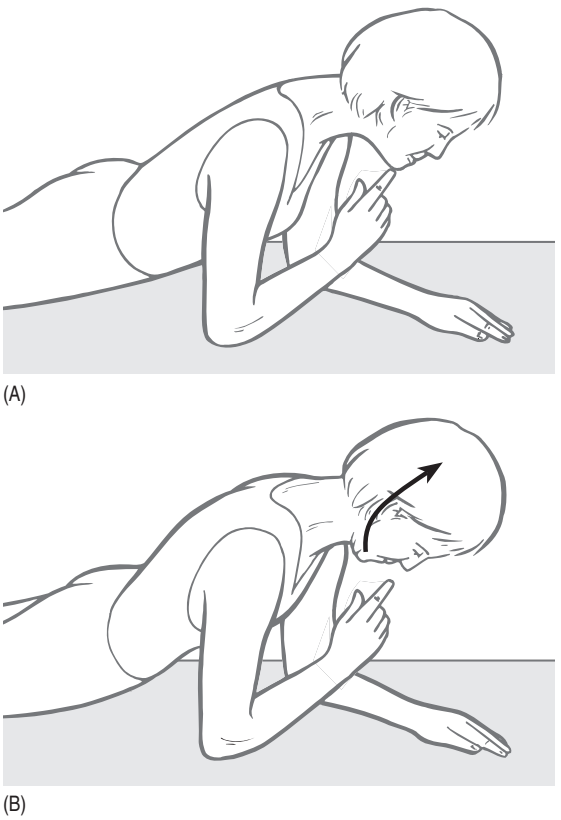


Figure 9.14 The chin tuck – intermediate position. A: Start position. B: End position. (Reproduced with permission from *Journal of Bodywork and Movement Therapies* 6:68.)

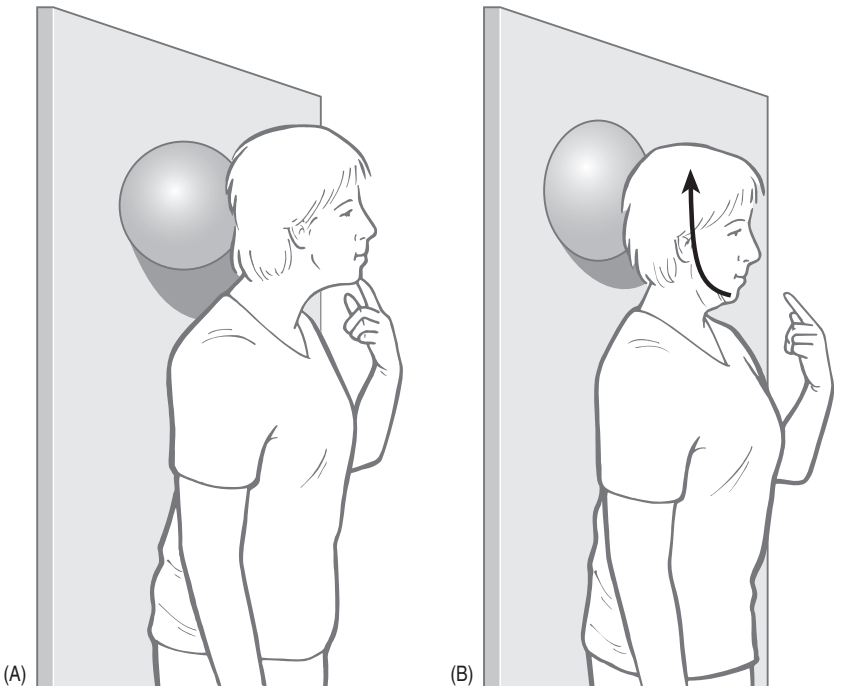


Figure 9.15 The chin tuck – advanced position (wall ball for the neck). A: Start position. B: End position. (Reproduced with permission from *Journal of Bodywork and Movement Therapies* 6:68.)

- The ball should roll slightly up the wall.
- *Note*: Avoid looking down while performing the exercise.
- Repeat the exercise 10–12 times, slowly, holding the tucked position for 3–4 seconds when the chin is in.
- Perform the exercise twice a day.

Respiration issues

There is evidence that the effects of breathing pattern disorders, such as hyperventilation, result in a variety of negative influences and interferences, capable of modifying each of these three subsystems (Chaitow 2004a).

- Overbreathing, upper chest breathing, places excessive demands on muscles that are in reality accessory to respiratory function, and which should only be involved in the process when heightened demand occurs, such as when running. These accessory muscles – such as upper trapezius and sternocleidomastoid – therefore become overused when habitual breathing pattern disorders exist, with all the consequences of overuse, including the evolution of myofascial trigger points that, when active, may refer pain directly to the head (Simons et al 1999).
- Breathing pattern disorders (the extreme form of which is hyperventilation) also automatically increase levels of anxiety and apprehension, which may be sufficient to alter motor control and to markedly influence balance (Balaban & Thayer 2001).
- Hyperventilation results in respiratory alkalosis, leading to reduced oxygenation of tissues (including the brain), smooth muscle constriction, heightened pain perception, speeding up of spinal reflexes, increased excitability of the corticospinal system (Seyal et al 1998), hyperirritability of motor and sensory axons, changes in serum calcium and magnesium levels, and encouragement of the development of myofascial trigger points (Simons et al 1999) – all or any of which, in one way or another, are capable of modifying normal motor control of skeletal musculature.

Core stability in general, and spinal support in particular, are compromised in such a setting, with implications for cervical stability and function (Hodges et al 2001). It is therefore extremely important to pay

attention to the breathing pattern of anyone with spinal, including cervical, pain. It is suggested that you observe several breathing cycles.

Seated assessment

1. The patient places a hand on the upper abdomen and another on the upper chest. You observe the hands as the patient inhales and exhales normally several times (Figure 9.16). If the upper hand (chest) moves superiorly rather than anteriorly, and moves significantly more than the hand on the abdomen, this suggests a dysfunctional 'upper chest' pattern of breathing.
2. Stand behind the seated patient and place both hands gently over the upper trapezius area, fingertips resting on the superior aspect of the clavicles. During inhalation note whether your hands move significantly superiorly. If they do, the scalenes are overworking, indicating stress and therefore possible shortening.
3. Stand or crouch facing the patient, who is seated on the edge of the treatment table, and place the hands on the patient's lower ribs, one on each side with fingers wrapping to the posterior surface, and note whether there is lateral excursion of the hands on inhalation to evaluate symmetry of movement.

Figure 9.16 Hi-lo upper chest breathing pattern test. (Reproduced with permission from Chaitow 2004b.)

Supine assessment

1. As the breathing pattern is observed you should ask yourself: 'Does the abdomen move forward on inhalation, or does the upper chest inappropriately move first while the abdomen retracts?' If the latter, breathing retraining is called for, as this is a paradoxical breathing pattern.
2. Also observe to see whether there is a normal lateral excursion of the lower ribs.
3. Assess for shortness of all the respiratory muscles available in the supine position, including the following, which are either involved in respiration or which – if shortened – could interfere with normal respiratory function: pectoralis major, latissimus dorsi, scalenes, upper trapezius, sternocleidomastoid, psoas (since this merges with the diaphragm).

If an upper chest pattern is indicated, you should proceed, over a period of weeks, to release and relax shortened muscles, and to guide the patient towards better breathing methods (see below).

Retraining exercise

Pursed lip breathing, combined with diaphragmatic breathing, enhances pulmonary efficiency.

- The patient should be seated or supine with the dominant hand on the abdomen and the other hand on the chest, as in Figure 9.16.
- The patient is asked to breathe in through the nose, and out through the mouth, with pursed lips, ensuring diaphragmatic involvement by means of a very slight movement of the abdomen against the hand on inhalation.
- Exhalation through the pursed lips is performed slowly, as this has been shown to relieve dyspnea (shortness of breath), slow the respiratory rate, increase tidal volume, and help restore diaphragmatic function (Tisp et al 1986).

Instructions

- Sit or recline comfortably, and exhale slowly and fully through pursed lips (imagine blowing a thin stream of air at a candle flame about 6 inches from your mouth).
- When you have exhaled fully, without strain, pause for a count of 'one', then inhale through the nose (full exhalation creates a virtual 'coiled spring', making inhalation easier and more automatic).
- After inhalation, without pausing to hold the breath, exhale slowly and fully, through pursed lips, blowing the air in a thin stream, and when you have exhaled to your comfortable end of breath, pause for a count of one.
- Repeat the inhalation and exhalation for not less than 30 cycles.

After some weeks of daily practice you should achieve an inhalation phase which lasts 2–3 seconds, and an exhalation phase of 6–7 seconds, without strain. Exhalation should be slow and continuous. Feelings of anxiety should reduce with this exercise.

Practice the whole process twice daily (morning and evening are ideal), and repeat the exercise for a few minutes (six cycles takes about a minute) every hour if you feel anxious, or when stress increases. Practice on waking, and before bedtime, and if at all possible before meals.

Reducing shoulder movement during breathing exercise
During breathing retraining it is important for the individual to use a strategy that breaks the link between inhaling and activation of the accessory breathing muscles, which, when stressed, can add to neck discomfort and activity of trigger points referring head pain.

These are the instructions that should be given at the same time as the breathing exercises are taught:

- Sit in a chair which has arms and place your elbows and forearms fully supported by the chair arms.
- Slowly exhale through pursed lips and then as you inhale through your nose, *push very gently down onto the chair arms to 'lock' the shoulder muscles, preventing them from rising as you inhale*.
- As you exhale, release the downward pressure.
- Repeat each time you inhale during performance of the exercise.

Or:

- If there is no chair with arms available, sit tall with your hands interlocked, palms upward, on your lap.
- As you inhale, *lightly but firmly push the pads of your fingers against the backs of the hands*.
- Release this pressure when you slowly exhale.
- This reduces the tendency for the muscles above the shoulders to contract, and will reduce the rise of the shoulders.
- Repeat each time you inhale during performance of the exercise.

Self-care (including balance training)

Single-leg-stance balance test (Bohannon et al 1984)
Posture and general stability are enhanced by ensuring that balance is optimal. When balance is not optimal postural adaptations are likely, placing stress on the entire musculoskeletal system, with automatic influence on head/neck positions.

A reliable procedure for information regarding balance/stability, as well as being useful for retraining (if necessary), which requires no equipment other than a timer, is described below (Figure 9.17).

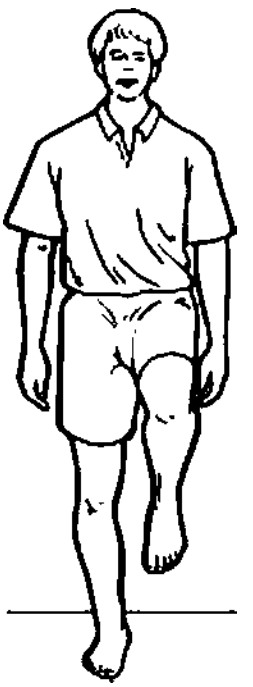


Figure 9.17 Single-leg-stance balance test. (Reproduced with permission from Liebenson 2001.)

Procedure
- The person is asked to stand, barefoot, and to raise one foot up without touching it to the support leg.
- The knee can be raised to any comfortable height.
- The person is then asked to balance on one leg for up to 30 seconds with eyes open.
- After standing on one leg in this way, standing on the other should be tested.
- When single-leg-standing with eyes open is successful for 30 seconds, the person is asked to identify a feature/spot on a wall opposite, and to then close the eyes while visualizing that spot.
- An attempt should be made to balance for 30 seconds, before switching legs and repeating the exercise.

Scoring. The time is recorded when any of the following occurs:

- The raised foot touches the ground or more than lightly touches the other leg.
- The stance foot changes (shifts) position or toes rise.
- There is hopping on the stance leg.
- The hands touch anything other than the person's own body.

By regularly (daily) practicing this balance exercise the time achieved in balance with eyes closed will increase.

Over time more challenging balance exercises can be introduced, including use of wobble boards and balance sandals.

It is important to give people home exercises to improve the self-management of their musculoskeletal conditions. Balance training is very simple to use and requires very little, if any, equipment so it is ideal for self-care.

Regular attendance at tai chi classes/practice will help achieve similar enhanced balance and stability.

Hot mustard foot bath

The hydrostatic effect in hydrotherapy involves the shifting of fluid from one part of the body to another. The hydrostatic effect can be used clinically in the treatment of conditions in which it is suspected that there is a locally congested area which is giving rise to symptoms, such as congestive headache or sinusitis. Dilation of the blood vessels of the skin at some area distal and inferior (e.g., feet) to the area affected (e.g., head) can be effective in relieving congested tissues (Blake 2008).

Self-help instructions for tension headache home-hydrotherapy method

This is a traditional naturopathic hydrotherapy method for tension headaches. (*Note*: This method is likely to help tension-type headaches if started early on, not when the pain is well established.)

- Place 9 litres (2 gallons) of hot water (not scalding!) into a bowl large enough for both feet to rest in.
- Stir one to two teaspoons of mustard powder into this and put your feet, up to the ankles, in the water.
- Wrap a large bag of frozen peas in a towel and place this behind your neck (if you use an upright chair and place this against a wall, you can lean back onto the towel containing the peas), or
- Wrap a damp (not dripping) cold towel around your head.
- Spend at least 10 minutes in this position and then lie down and rest.

Soft tissue manipulation modalities

Throughout the book there have been references to soft tissue modalities and methods that integrate well with massage. These include:

- muscle energy techniques – including pulsed (Ruddy's) method (Greenman 1996, Ruddy 1962)
- myofascial release (Mock 1997)
- neuromuscular technique (NMT) – including European (Lief's) approach and American NMT (based on Nimmo's (1957) and Travell & Simons' (1992) concepts) (Chaitow 2001)
- positional release techniques – including strain/counterstrain, functional technique (Chaitow 2007).

It is suggested that you undertake training in these modalities, if they are not already part of the methods you employ.

SUMMARY

This chapter has summarized adjunctive methods, for use alongside massage methods, in the care of patients with headache or chronic neck pain. Some of the modalities discussed are included for information only, and some are suggested as being appropriate, with suitable training, to be used by licensed massage therapists.

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Glossary

active trigger points painful areas that either refer (i.e., symptoms are felt at a distance from the point of pressure) or radiate (i.e., symptoms spread from the point of pressure).

acupuncture involves inserting and manipulating fine needles under the skin at selected points in the body; may be used to relieve chronic pain. Each point controls the pain sensation of a different part of the body. When the needle is inserted, a slight ache, dull pain, tingling, or electrical sensation is felt for a few seconds. Once the needles are in place, no further discomfort should be experienced. The needles are usually left in place for between 15 and 30 minutes, depending on the condition being treated. No discomfort is felt when the needles are removed. Acupuncture should be performed by a licensed acupuncturist. Patients who choose to have acupuncture for pain management should be encouraged to report new pain problems to their health care team before seeking palliation through acupuncture.

adaptation phase when the stressor(s) continue to operate, the body's defense mechanisms move into a stage of the body which continues until the ability of the body to compensate further is exhausted.

algometer hand-held, spring-loaded, rubber-tipped, pressure-measuring device that offers a means of achieving standardized pressure application.

angiography an imaging technique that provides a picture, called an angiogram, of blood vessels.

aura a symptom of classic migraine headache in which the patient sees flashing lights or zigzag lines, or may temporarily lose vision.

basilar artery migraine migraine, occurring primarily in young women and often associated with the menstrual cycle, that involves a disturbance of a major brain artery. Symptoms include vertigo, double vision, and poor muscular coordination.

benign exertional headache headache brought on by running, lifting, coughing, sneezing, or bending.

biofeedback a technique in which patients are trained to gain some voluntary control over, for example, blood pressure and muscle tension to promote relaxation. Thermal biofeedback helps patients consciously raise hand temperature, which can sometimes reduce the number and intensity of migraines.

breathing pattern disorder (BPD) breathing in excess of need based on activity. The extreme of a BPD is hyperventilation, which is defined as breathing in excess of metabolic requirements.

brain chemicals chemicals in the brain that result in severe head pain, stomach upset, and visual disturbances.

cluster headaches intensely painful headaches that occur suddenly and last between 30 and 45 minutes, named for their repeated occurrence in groups or clusters. They begin as minor pain around one eye and eventually spread to that side of the face.

cold or heat pain reliever a source of heat or cold used to relieve sore muscles and is comforting. Cold lessens pain sensations by numbing the painful area and reducing inflammation. Many people with prolonged pain use only heat and have never tried cold. Some people find that cold relieves pain faster, and relief may last longer. Heat and cold can be alternated for added relief.

computed tomography (CT) an imaging technique that uses X-rays and computer analysis to provide a picture of body tissues and structures.

dihydroergotamine a drug that is given by injection to treat cluster headaches. It is a form of the anti-migraine drug ergotamine tartrate.

distraction turning attention to something other than the pain. People use this method without realizing it when they watch television or listen to the radio to 'take their minds off' a worry or their pain. Distraction may be used alone to manage mild pain or used with medicine to manage brief episodes of severe pain, such as pain related to procedures. Any activity that occupies attention can be used for distraction. Distractions can be internal (e.g., counting, singing, praying, or repeating statements such as 'I can cope') or external (e.g., doing crafts such as needlework, puzzles, or painting). Reading, going to a movie, watching television, and listening to music are also good distraction methods. Slow, rhythmic breathing can be used as distraction as well as relaxation.

electroencephalogram (EEG) a technique for recording electrical activity in the brain.

electromyography (EMG) a special recording technique that detects electrical activity in muscle. Patients are sometimes offered a type of biofeedback called EMG training, in which they learn to control muscle tension in the face, neck, and shoulders.

endorphins naturally occurring painkilling chemicals. Some scientists theorize that people who suffer from severe headache have lower levels of endorphins than people who are generally pain free.

ergotamine tartrate a drug that is used to control the painful dilation stage of migraine.

exercise strengthening muscles throughout the body to improve bone strength, reduce the risk for injuries, and enhance feelings of wellbeing.

exhaustion stage the exhaustion of self-regulating/self-repair potentials (or severely strained) which results in chronic symptoms and resulting frank disease. At this stage homeostatic mechanisms may fail and decompensation features emerge. Treatment is required to slow, modify or reverse the process.

general adaptation syndrome describes a process in which the individual, with his or her unique inherited and acquired characteristics, is responding to multiple variable or constant adaptive demands.

hemiplegic migraine a type of migraine causing temporary paralysis on one side of the body (hemiplegia).

homeostatic exhaustion, or a stage of **heterostasis** when the adaptation potential fails (think of a piece of elastic that has been stretched until it starts to fray, and eventually snaps).

hypnosis a trance-like state of high concentration between sleeping and waking. In this relaxed state, a person becomes more receptive or open to suggestion. Hypnosis can be used to block the awareness of pain, to substitute another feeling for the pain, and to change the sensation to one that is not painful. Hypnosis is provided by a person trained in hypnosis, often a psychologist or psychiatrist. People can easily be taught, by a hypnotherapist, to place themselves in a hypnotic state, make positive suggestions to themselves, and to leave the hypnotic state.

imagery using imagination to create mental pictures or situations. The way imagery relieves pain is not completely understood. Imagery can be thought of as a deliberate daydream that uses all senses – sight, touch, hearing, smell, and taste. Some people believe that imagery is a form of self-hypnosis.

inflammatory headache a headache that is a symptom of another disorder, such as sinus infection, and is treated by curing the underlying problem.

initial alarm stage an example of this is the 'fight or flight' (sympathetic arousal) response, which might be triggered by a single stress event or by a number of minor stressors acting simultaneously.

magnetic resonance imaging (MRI) an imaging technique that uses radio waves, magnetic fields, and computer analysis to provide a picture of body tissues and structures.

manipulation (adjustment) used to relieve chronic pain caused by musculoskeletal conditions and nerve compression.

migraine a vascular headache believed to be caused by blood flow changes and certain chemical changes in the brain, leading to a cascade of events including constriction of arteries supplying blood to the brain and the release of certain neurotransmitters.

mode of application when the following forces are applied during massage and become the mode of application: tension loading, compression loading, bending loading, shear loading, rotation or torsion loading, and combined loading.

muscle-contraction headaches headaches caused primarily by sustained muscle tension or, possibly, by restricted blood flow to the brain. Two forms of

muscle-contraction headache are tension headache, induced by stress, and chronic muscle-contraction headache, which can last for extended periods, involves steady pain, and is usually felt on both sides of the head.

neuromuscular technique (NMT) a blend of traditional Ayurvedic (Indian) massage techniques and soft tissue methods derived from other sources and developed into techniques now known as NMT, which serves as an economical diagnostic (and therapeutic) tool.

nociceptors the endings of pain-sensitive nerves that, when stimulated by stress, muscular tension, dilated blood vessels, or other triggers, send messages up the nerve fibers to nerve cells in the brain, signaling that a part of the body hurts.

numerical rating scale (NRS) a pain method which uses a series of numbers (zero to 100, or zero to 10). No pain would equal zero; worst pain possible would equal the highest number on the scale.

ophthalmoplegic migraine a form of migraine felt around the eye and associated with a droopy eyelid, double vision, and other sight problems.

outcome-based massage when massage is used to address a specific problem or set of symptoms. Outcome-based massage relies on results instead of methods and modalities. Various methods can be combined to achieve outcomes.

pain receptors become sensitized, which results in fewer stimuli necessary to cause pain sensation.

pain relief creams, lotions, liniments, or gels that contain menthol or capsicum. When they are rubbed into the skin, they increase blood circulation to the affected area and produce a warm (sometimes cool), soothing feeling that lasts for several hours to produce counterirritation. The essential oil peppermint is often used for headaches and is rubbed on the temples and back of the neck.

pain threshold describes the least amount of pressure needed to produce a report of pain and/or referred symptoms when a trigger point is being compressed.

physical therapy therapy to reduce pain, improve function, and prevent recurrences.

placebo sugar pill, saltwater injection. Precisely how a placebo works is unknown. Pain relief may result from the power of suggestion, distraction, or optimism, or from a neurochemical reaction in the brain. Similar mechanisms are activated by relaxation and behavior modification therapy, meditation, hypnosis, and biofeedback.

primary (benign) headaches headaches with no organic or structural etiology, they include tension headache, vascular (migraine) headache, cluster headache, and medication-overuse headache (MOH).

prostaglandins naturally occurring pain-producing substances thought to be implicated in migraine attacks. Their release is triggered by the dilation of arteries. Prostaglandins are extremely potent chemicals involved in a diverse group of physiologic processes.

rebound headache type of headache suffered by those who experience tension-type headaches as well as those with migraines. The cause seems to be the result of taking prescription or nonprescription pain relievers daily or almost every day. If prescription or nonprescription pain relievers are overused, headache may 'rebound' as the last dose wears off, leading one to take more and more pills.

secondary headache due to an underlying structural or organic disease such as related to a benign or malignant brain tumor, a brain aneurysm, hematoma, meningitis, brain abscess, cerebral hemorrhage, encephalitis or other infection, or various diseases of the brain, eye, ear, nose, etc.

sensitization less stimuli creates more pain.

serotonin a key neurotransmitter that acts as a powerful constrictor of arteries, reducing the blood supply to the brain and contributing to the pain of headache.

sinus headache a sinus cavity in the face that becomes inflamed, producing localized pain with pressure and throbbing in the face as opposed to the head.

sinusitis an infection, either viral or bacterial, of the sinus cavities. The infection leads to inflammation of these cavities, causing pain and sometimes headache.

STAR Sensitivity (or 'Tenderness') (S): this is the one feature that is almost always present when there is soft tissue dysfunction. Tissue texture change (T): the tissues usually 'feel' different (e.g., they may be tense, fibrous, swollen, hot, cold, or have other 'differences' from normal). Asymmetry (A): there will commonly be an imbalance on one side, compared with the other, but this is not always the case. Range of motion reduced (R): muscles will probably not be able to reach their normal resting length, or joints may have a restricted range.

status migrainosus a rare, sustained, and severe type of migraine, characterized by intense pain and nausea and often leading to hospitalization of the patient.

sumatriptan a commonly used migraine drug that binds to receptors for the neurotransmitter serotonin.

temporomandibular joint dysfunction a disorder of the joint between the temporal bone (above the ear) and the lower jaw bone that can cause muscle-contraction headaches.

tension-type headache the most common, affecting approximately 75% of all headache sufferers. The pain is typically generalized all over the outside of the head, often with accompanying neck and shoulder pain and stiffness.

thermography a technique sometimes used for diagnosing headache in which an infrared camera converts skin temperature into a color picture, called a thermogram, with different degrees of heat appearing as different colors.

tic douloureux *see trigeminal neuralgia*.

traction headaches headaches caused by pulling or stretching pain-sensitive parts of the head, as, for example, when eye muscles are tensed to compensate for eyestrain.

trigeminal neuralgia a condition resulting from a disorder of the trigeminal nerve. Symptoms are headache and intense facial pain that comes in short, excruciating jabs.

vascular headaches headaches caused by abnormal function of the brain's blood vessels or vascular system. Migraine is a type of vascular headache.

visual analog scale (VAS) a pain scale which consists of a 10-centimeter line drawn on paper, with marks at each end, and at each centimeter. The zero end of the line equals no pain at all. The 10-centimeter end equals the worst pain possible. The patient marks the line at the level of their pain.

withdrawal headache occurs as the body adjusts to a chemical change from removing a chemical substance from the body. Typically the headache occurs from changes in vascular function, muscle tone, and detoxification.

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