Chapter 6

Modalities working with massage

CHAPTER CONTENTS

In this chapter, a number of modalities that integrate well with massage therapy will be discussed, together with some practical examples and skill enhancement exercises.

The methods that will be outlined in this way include:

1 Palpation skills
2 Neuromuscular technique
3 Muscle energy technique
4 Positional release technique
5 Spray-and-stretch chilling methods
6 Integrated neuromuscular inhibition (for trigger point deactivation)
7 Rehabilitation exercise methods
8 Massage evidence.

In Chapter 7 and Chapter 8, these methods will be expanded on and described in the context of massage sessions.

PALPATION SKILLS

The ability of a therapist to regularly and accurately locate and identify somatic landmarks, and changes in function, lies at the heart of palpation skills.

Greenman (1996) has summarized the five objectives of palpation. You, the therapist, should be able to:

- detect abnormal tissue texture
- evaluate symmetry in the position of structures, both physically and visually
- detect and assess variations in range and quality of movement during the range, as well as the quality of the end of the range of any movement ('end feel')
- sense the position in space of yourself and the person being palpated
- detect and evaluate changes, whether these are improving or worsening as time passes.

Perspectives

Stone (1999) describes palpation as the 'fifth dimension':

> Palpation allows us to interpret tissue function … a muscle feels completely different from a ligament, a bone and an organ, for example. There is a 'normal' feel to healthy tissues that is different for each tissue. This has to be learned through repeated exploration of 'normal' as the [therapist] builds his/her own vocabulary of what 'normal' is. Once someone is trained to use palpation efficiently, then finer and finer differences between tissues can be felt … one must be able to differentiate when something has changed from being 'normal' to being 'too normal'.

Maitland (2001) has commented:

> In the vertebral column, it is palpation that is the most important and the most difficult skill to learn. To achieve this skill, it is necessary to be able to feel, by palpation, the difference in the spinal segments – normal to abnormal, old or new, hypomobile or hypermobile – and then to be able to relate the response, site, depth and relevance to a patient's symptoms (structure, source and causes). This requires an honest, self-critical attitude, and also applies to the testing of functional movements and combined physiological test movements.

Kappler (1997) explains:

> The art of palpation requires discipline, time, patience and practice. To be most effective and productive, palpatory findings must be correlated with a knowledge of functional anatomy, physiology and pathophysiology … Palpation with fingers and hands provides sensory information that the brain interprets as: temperature, texture, surface humidity, elasticity, turgor, tissue tension, thickness, shape, irritability, motion. To accomplish this task, it is necessary to teach the fingers to feel, think, see, and know. One feels through the palpating fingers on the patient; one sees the structures under the palpating fingers through a visual image based on knowledge of anatomy; one thinks what is normal and abnormal, and one knows with confidence acquired with practice that what is felt is real and accurate.

ARTT

In osteopathic medicine the locality of a dysfunctional musculoskeletal area is noted as having a number of common characteristics, summarized by the acronym ARTT (**A**symmetry, **R**ange of motion, **T**issue texture changes, **T**issue tenderness (sometimes rearranged as TART) (Gibbons & Tehan 2001). These characteristics describe the basis of osteopathic palpation, when assessing for somatic dysfunction:

A relates to Asymmetry
This evaluates functional or structural differences when comparing one side of the body with the other

R relates to Range of motion
Alteration in range of motion can apply to a single joint, several joints, or a muscle. The abnormality may be either restricted or increased mobility, and includes assessment of range as well as *quality* of movement and *'end feel'*.

T relates to Tissue texture changes
The identification of tissue texture change is important in the diagnosis of somatic dysfunction. Palpable changes may be noted in superficial, intermediate and deep tissues. It is important for a therapist to be able to distinguish 'normal' from 'abnormal', even if the nature of the change, or the cause(s), remain unclear.

T relates to Tissue tenderness
Unusual levels of tissue tenderness may be evident. Pain provocation and reproduction of familiar symptoms are often used to localize somatic dysfunction such as trigger points.

Skin assessment and palpation

Changes in the skin, above areas of dysfunction ('hyperalgesic skin zones'), where the tissues may be inflamed, or where there is increased hypertonicity or spasm, or where there have been trigger point changes, are easily palpated (Bischof & Elmiger 1960, Reed & Held 1988).

- The skin adheres to the underlying fascia more efficiently, and is therefore more resistant to movements such as sliding (on underlying fascia), lifting, or rolling
- The skin displays increased sympathetic activity, resulting in increased hydrosis (sweat). This sudomotor activity brings about a noticeable resistance during light stroking with (say) a finger. This resistance is known in clinical shorthand as 'skin drag'
- The skin appears to be more 'compacted', resisting effective separation, stretching, lifting methods
- The skin displays altered thermal qualities, allowing for some discrimination between such areas and normal surrounding tissue.

Tests

The three methods described below do not need to be used during the same treatment session, although they can be. The methods described can support or replace each other, with some therapists having a preference for one or the other.

Note: It is easier to displace skin against underlying tissue in slim individuals, with little fatty tissue. Obese individuals have a higher fat and water content subcutaneously, making displacement more difficult.

Skin on fascia displacement (Fig. 6.1)

- The patient lies prone with the therapist standing to the side, at hip level, contacting the patient with both hands (or the pads of several fingers of each hand) flat against the skin bilaterally, at sacral level
- Only enough pressure should be used to produce adherence between the fingertips and the skin (no lubricant should be used at this stage)
- The skin and subcutaneous tissues should be lightly moved ('slid') towards the head, simultaneously on each side, against the fascia by small pushing movements of the hands, assessing for the elastic barrier
- It is important that areas on both left and right of the spine are examined at the same time
- The two sides should be compared for symmetry of range of movement of the skin and subcutaneous tissue, to the elastic barrier
- The pattern of testing should be performed from inferior to superior

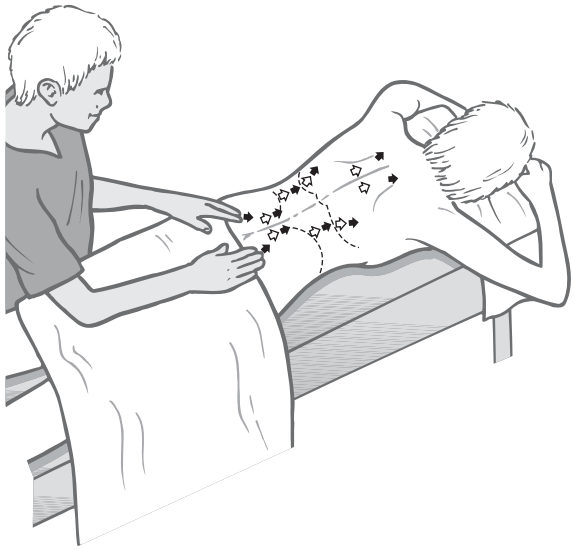


Figure 6.1 Testing and comparing skin and fascial mobility as bilateral areas are 'pushed' to their elastic barriers.

- The degree of displacement possible should be symmetrical, if the deeper tissues are normal
- It should be possible to identify local areas where the skin adherence to underlying connective tissue reveals restriction, compared with the opposite side
- This is likely to be an area where the muscles beneath the skin being tested house active myofascial trigger points (TrPs), or tissue that is dysfunctional in some other way, or hypertonic.

It is often possible to visualize these reflex areas as they may be characterized by being retracted or elevated, most commonly close to the lower thoracic border of the scapula and over the pelvic and gluteal areas.

Skin stretching assessment (Fig. 6.2)

Note: At first, this method should be practiced slowly. Eventually, it should be possible to move fairly rapidly over an area that is being searched for evidence of reflex activity (or acupuncture points). Choose an area to be assessed, where you identified abnormal degrees of skin on fascia adherence.

- To examine the back region, the patient should be lying prone
- Place your two index fingers next to each other, on the skin, side by side or pointing towards each other, with no pressure at all onto the skin, just a contact touch
- Lightly and slowly separate your fingers, feeling the skin stretch to its 'easy' limit, to the barrier where resistance is first noted
- It should be possible – in normal tissue – to 'spring' the skin further apart, to its elastic limit, from that barrier
- Release this stretch and move both fingers 1.2 cm (1/2 in) to one side, or below, or above, the first test site, and repeat the assessment again, using the same direction of pull as you separate the fingers. Add a spring assessment once the barrier is reached
- Perform exactly the same sequence over and over again, until the entire area of tissue has been searched, ensuring that the rhythm you use is neither too slow nor too rapid. Ideally, one stretch per second should be performed
- When the segment of skin being stretched is not as elastic as it was on the previous stretch a potential dysfunctional area will have been identified
- This should be marked with a skin pencil for future attention
- Light digital pressure to the center of that small zone may identify a sensitive contracture which, on sustained pressure, may radiate or refer sensations to a distant site

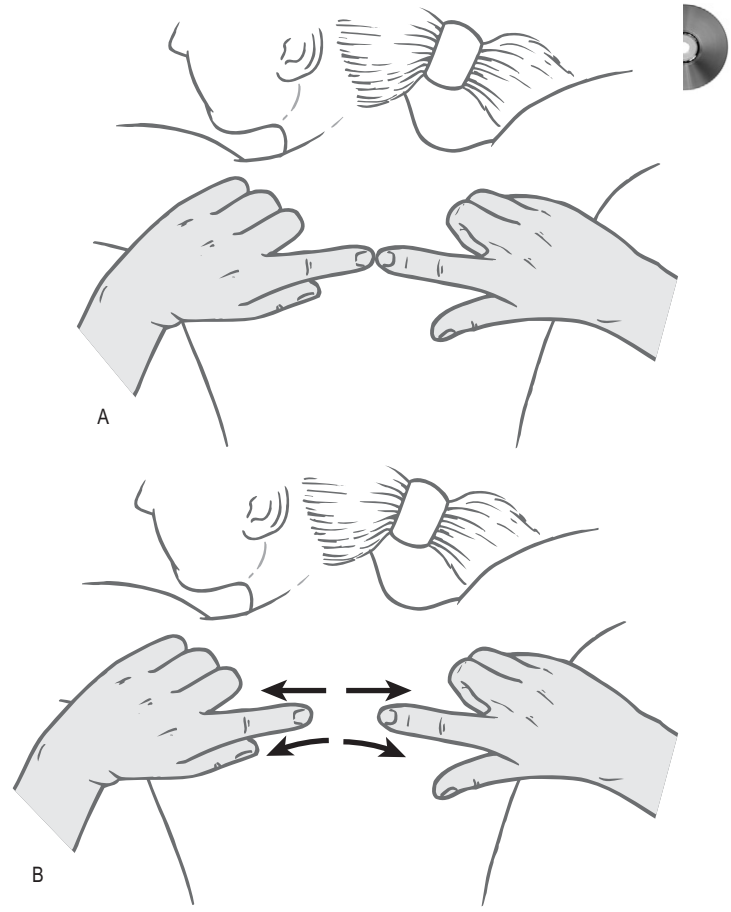


Figure 6.2 (A,B) Hyperalgesic skin zones that lie above reflexive dysfunction (e.g. trigger points) are identified by means of the sequential stretching to their elastic barrier of local areas of skin. A series of such stretches indicates precisely those areas where elasticity is reduced in comparison to surrounding tissues. These are then tested for sensitivity and potential to cause referred pain by the application of ischemic compression (inhibition). (From Chaitow 2003a.)

- If such sensations are familiar to the patient, the point being pressed is an active trigger point.

Drag palpation assessment (Fig. 6.3)

Sweat glands, controlled by the sympathetic nervous system, empty directly on the skin, creating increased hydrosis (sweat) presence, changing the behavior (e.g. elasticity) and 'feel' of the skin (Adams et al 1982).

Lewit (1999) suggests that reflex activity should be easily identified by assessing the degree of elasticity in the overlying skin, and comparing it with surrounding tissue.

The change in elasticity occurs at the same time as increased sweat activity. Before the days of electrical detection of acupuncture points, skilled acupuncturists could quickly identify 'active' points by palpation using this knowledge. It is also the reason why measuring the electrical resistance of the skin can now find acupuncture points even more rapidly. Because the skin is moist, it conducts electricity more efficiently than when it is dry.

Method

- Using an extremely light touch ('skin on skin'), without any pressure, a finger or the thumb is stroked across the skin overlaying areas suspected of housing dysfunctional changes (such as TrPs)
- The areas chosen are commonly those where skin-on-fascia movement (see previous test) was reduced, compared with surrounding skin
- When the stroking finger passes over areas where a sense of hesitation, or 'drag,' is noted, an area of increased hydrosis/sweat/sympathetic activity will have been identified
- A degree of searching pressure, into such tissues, precisely under the area of drag, may locate a taut band of tissue, and when this is compressed a painful response is common

Figure 6.3 Assessing variations in skin friction (drag, resistance).

- If pressure is maintained for 2–3 s a radiating or referred sensation (possibly pain) may be reported
- If this sensation replicates symptoms previously noted by the patient, the point located is an active TrP.

Therapeutic use of skin changes

Releasing skin changes by stretching

- Return to a hyperalgesic skin zone identified by one of the methods described above. Gently stretch the skin to its elastic barrier and hold it at the elastic barrier for 10–15 s, without force
- You should feel the skin tightness gradually release so that, as you hold the elastic barrier, your fingers separate
- If you now hold the skin in its new stretched position, at its new barrier of resistance, for a few seconds longer, it should release a little more
- This is, in effect, a mini-myofascial release process
- The tissues beneath the 'released' skin will be more pliable and have improved circulation. You will have started the process of normalization
- Larger areas, superficial to tense muscles in the low back, for example, can be treated in much the same way as the small skin areas described above (Fig. 6.4)

Box 6.1 Summary of skin palpation methods

- Movement of skin on fascia: resistance indicates general locality of reflexogenic activity, a 'hyperalgesic skin zone' such as a trigger point
- Local loss of skin elasticity: refines definition of the location
- Light stroke, seeking 'drag' sensation (increased hydrosis), offers pinpoint accuracy of location.

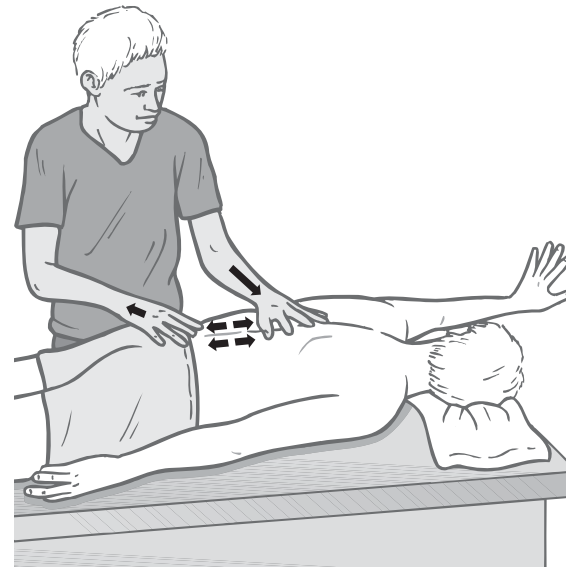


Figure 6.4 Releasing the axillary lateral fascia and pectoralis fibers (abdominal attachments). (Redrawn from Lewit 1996).

- Using a firm contact, place the full length of the sides of both hands, from the little fingers to the wrist, onto an area of skin on the low back (as an example) overlying tense muscles
- Separate the hands slowly, stretching the skin with which they are in contact, until an elastic barrier is reached
- After 15 s or so, there should be a sense of lengthening as the superficial tissues release
- If you then palpate the underlying muscles and areas of local tension you should be able to confirm that there has been a change for the better.

Adding an isometric contraction

If you had asked the patient to lightly contract the muscles under your hands for 5–7 s before starting the myofascial release, the tissues would probably have

responded more rapidly and effectively. You would have been using muscle energy technique (MET), described further later in the chapter.

Positional release method

- Locate an area of skin that tested as 'tight' when you evaluated it, using one of the assessment methods described earlier
- Place two or three finger pads onto the skin and slide the skin superiorly and then inferiorly on the underlying fascia
- In which direction did the skin slide most easily and furthest?
- Slide the skin in *that* direction and now, while holding it there, test the preference of the skin to slide medially and laterally
- Which of these is the 'easiest' direction?
- Slide the tissue towards this second position of ease
- Now introduce a gentle clockwise and anticlockwise twist to these tissues
- Which way does the skin feel most comfortable as it rotates?
- Take it in *that* direction, so that you are now holding the skin in three 'stacked' positions of ease (Fig. 6.5)
- Hold this for not less than 20 s
- Release the skin and retest; it should now display a far more symmetrical preference in all the directions which were previously 'tight'
- The underlying tissues should palpate as softer and less tense.

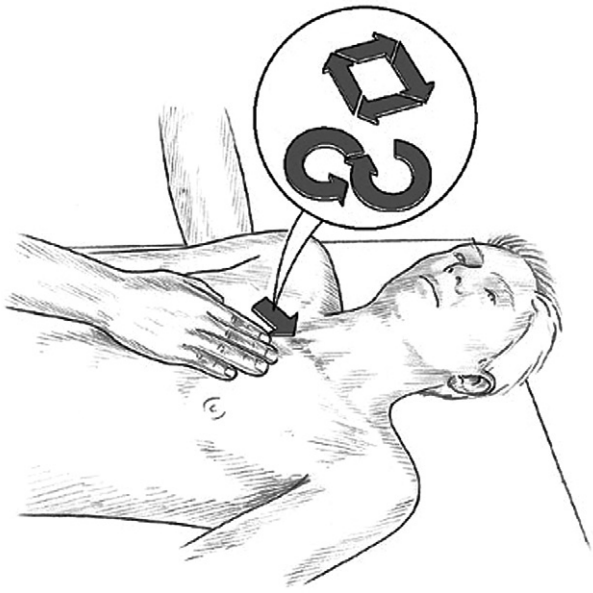


Figure 6.5 Achieving positional release of tissues – skin and fascia – by holding them in their preferred 'ease' directions. From Chaitow (2002), with permission.

Findings

1. You have now established that holding skin at its barrier (unforced) changes its function, as the skin releases
2. You will also have discovered that by adding a very light isometric contraction before the stretch it is even more effective
3. This last example will have shown you that moving tissues away from the barrier into ease (positional release technique) can also achieve a release. This last approach is more suitable for very painful, acute, situations.

NEUROMUSCULAR TECHNIQUE ASSESSMENT AND TREATMENT METHODS

The palpating hand(s) needs to uncover the locality, nature, degree and if possible the age of dysfunctional soft-tissue changes that may have taken place, and as we palpate we need to ask:

- Is this palpable change acute or chronic (or, as is often the case, an acute phase of a chronic condition)?
- If acute, is there any inflammation associated with the changes?
- How do these palpable soft tissue changes relate to the patient's symptom pattern?
- Are these palpable changes part of a pattern of stress-induced change that can be mapped and understood?
- Are these soft tissue changes painful and if so, what is the nature of that pain (constant, intermittent, sharp, dull, etc.)?
- Are these palpable changes active reflexively, and if so, are active or latent trigger points involved (that is, do they refer symptoms elsewhere, and if so does the patient recognize the pain as part of their symptom picture)?
- Are these changes present in a postural or phasic muscle group (see Ch. 1)?
- Are these palpable changes the result of joint restriction ('blockage', subluxation, lesion) or are they contributing to such dysfunction?

In other words, we need to ask ourselves 'What am I feeling, and what does it mean?'

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).

Trigger points

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

Lief (Chaitow 2003a) advocated that the same sequence of contacts be followed at each 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.

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 (Fig. 6.6).

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 (Fig. 6.7).

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

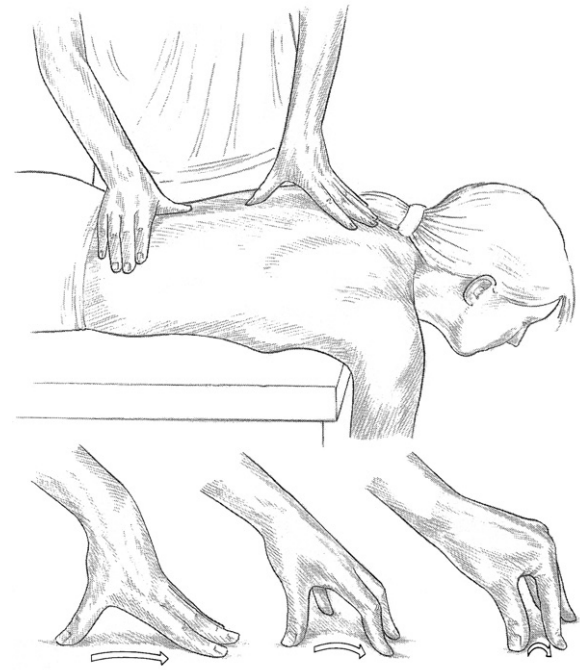


Figure 6.6 Neuromuscular (NMT) thumb technique. (From Chaitow 2003a.)

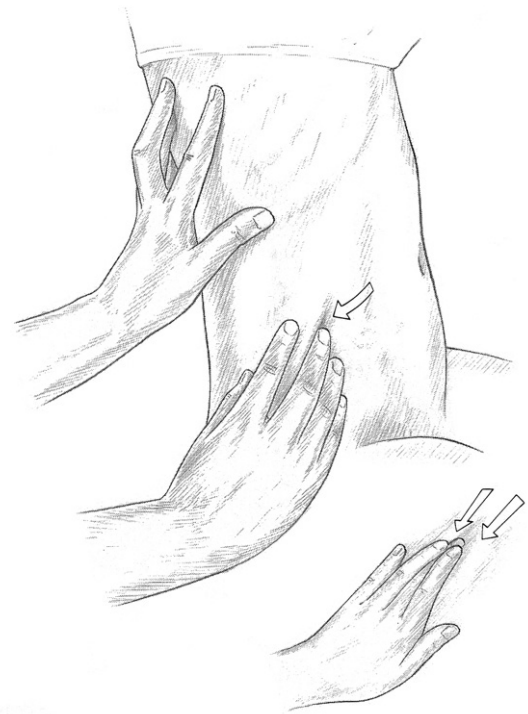


Figure 6.7 Neuromuscular (NMT) finger technique. (From Chaitow 2003a.)

Figure 6.8 Neuromuscular technique (NMT): practitioner's posture should ensure a straight treating arm for ease of transmission of body weight, as well as leg positions that allow for the easy transfer of weight and center of gravity. These postures assist in reducing energy expenditure and ease spinal stress. (From Chaitow 2003a.)

for ease of weight transference, with the assessing arm straight at the elbow. This allows the therapist's body weight 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 (Fig. 6.8).

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 (Fig. 6.6)
- 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 risk traumatizing or bruising tissues, even when heavy pressure is used.

Patterns: NMT maps

The pattern of strokes which Lief and Chaitow evolved allows maximum access to potential dysfunction in the shortest time and with least demand for altered position and wasted effort.

These strokes are applied to the low back area with the suggested therapist foot positions shown in (Figs 6.9A,B, 6.10A,B).

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 origins and insertions, and that the bellies of the muscles be searched for evidence of trigger points and other dysfunctions (fibrosis, contractions, etc.)
- A full spinal NMT assessment can be accomplished in approximately 15 min with ease, once the method is mastered
- However, a diagnostic evaluation of a localized region, e.g. covering the area above and below the crest of the pelvis, accompanied by other diagnostic and assessment modalities and methods, may be all that is necessary

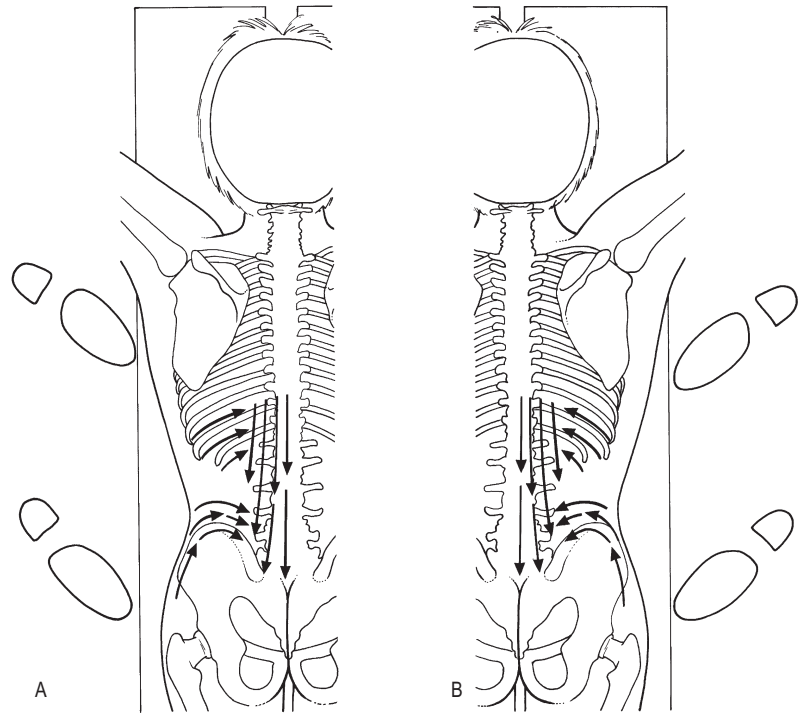


Figure 6.9 (A,B) Sixth positions of suggested sequence of applications of neuromuscular technique (NMT). (From Chaitow 2003a.)

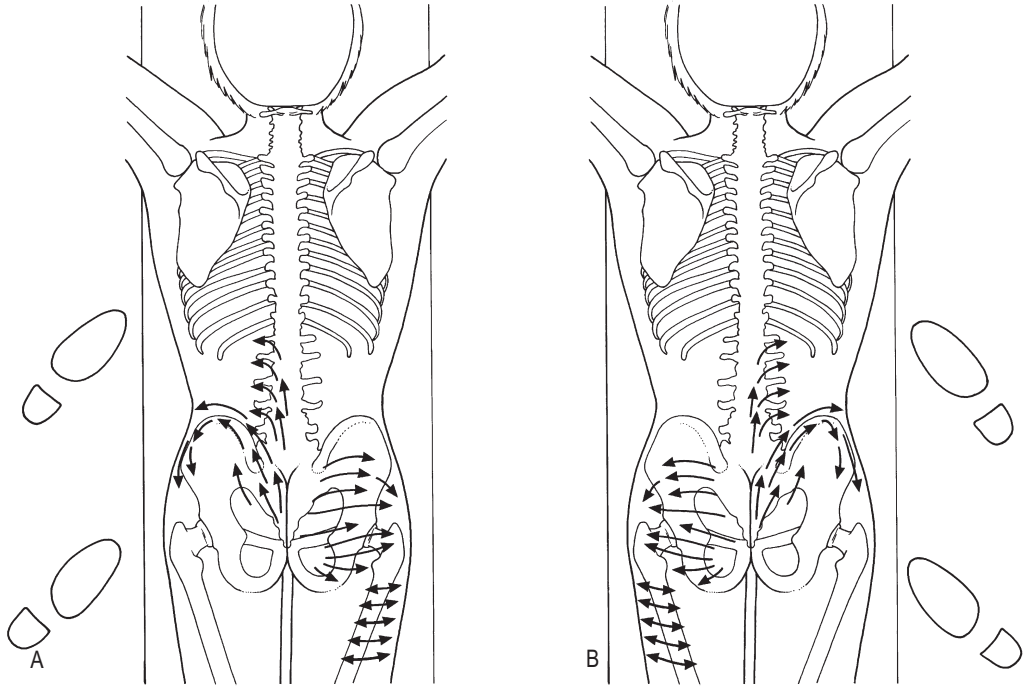


Figure 6.10 (A,B) Seventh positions of suggested sequence of applications of neuromuscular technique (NMT). (From Chaitow 2003a.)

- 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 exercises: finger and thumb strokes

- Apply a light lubricant, position yourself (Figs 6.8, 6.9), and place your treating hand 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 body weight, 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 towards yourself, in a slow, deliberate, searching manner
- Follow the strokes precisely as illustrated in Figures 6.9, 6.10, although the direction of strokes need not follow arrow directions
- The objective is to obtain information, without causing excessive discomfort to the patient, and without stressing your palpating hands
- In its treatment mode NMT involves using 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.

MUSCLE ENERGY TECHNIQUE

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 that 'Tightness suggests tethering, while looseness suggests joint and/or soft tissue laxity, with or without neural inhibition'.

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

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, see below), 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).

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, where any contraction could well trigger more pain, it might be best to avoid using these

Box 6.2 Muscle energy technique summary

- By lightly contracting a short, tight muscle isometrically (the agonist) for approximately 7 s, 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 neurological 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).

muscles, and choose the antagonists instead. Use of the antagonists (inducing RI) might therefore be your 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

- The amount of effort used in the contraction effort
- Other major variables that are controllable are, how long the contraction is allowed to continue, and how often it is repeated
- The degree of effort in isometric contractions should always be much less than the full force available from the muscles involved
- 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 you
- 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
- We want above all to achieve a controlled degree of effort at all times, and this calls for the use of only part of the available strength in a muscle or muscle group
- The timing of isometric contractions is usually such as to allow around 7 s for the contraction, from beginning to end
- It is important to remember that the start and the end of 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, assisted by the patient, you should move the muscle past its previous barrier, into a slight stretch, and this should be held for not less than 30 s 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

Before starting this exercise (Greenman 1996, Goodridge & Kuchera 1997), ensure that the patient lies supine, so that the non-tested leg is abducted slightly, with the heel over the end of the table (Fig. 6.11A,B).

Post isometric relaxation (PIR)

- The leg to be tested should be close to the edge of the table
- Ensure that the tested leg is in the anatomically correct position, knee in full extension and with no external rotation of the leg, which would negate the test
- Holding the patient's foot/ankle, you slowly ease the straight leg into abduction
- Stop the abduction when you sense that a barrier of resistance has been reached
- This 'first barrier' is sensed by an increase in the amount of effort as you move the leg into abduction (Fig. 6.11A)
- Your other (palpating) hand rests passively on the inner thigh, palpating the muscles which are being tested (adductors and medial hamstrings)
- This 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
- That palpating hand should also sense the barrier, by virtue of a feeling of increased tension/bind (Fig. 6.11B)
- Normal excursion of the straight leg into abduction is around 45°
- By testing both legs it is possible to evaluate whether the inner thigh 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.

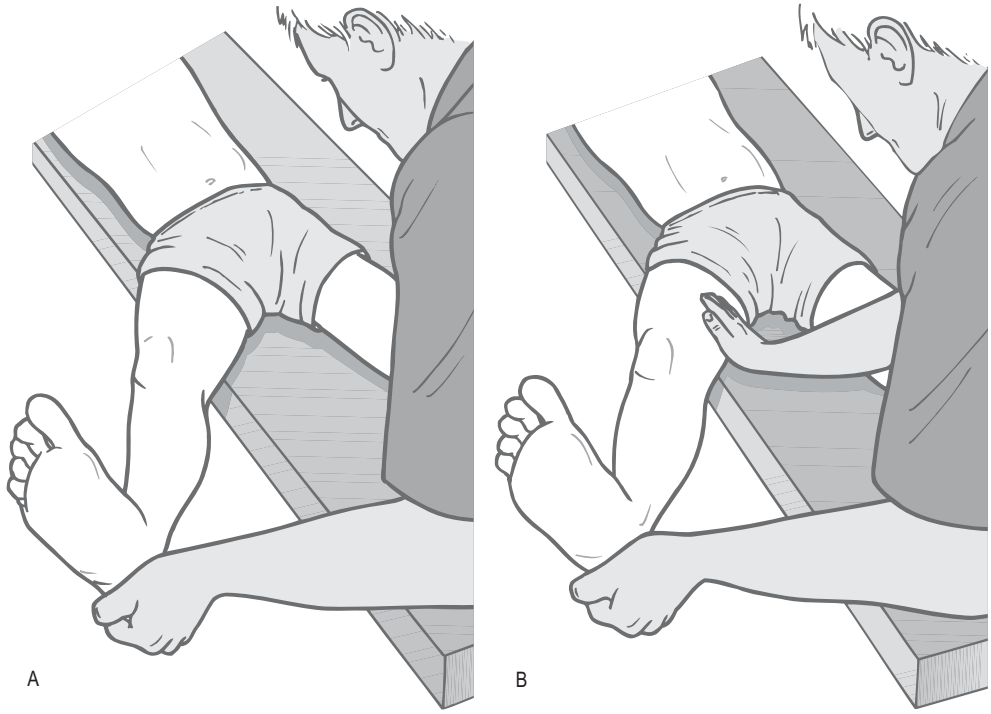


Figure 6.11 (A) Assessment of 'bind'/restriction barrier with the first sign of resistance in the adductors (medial hamstrings) of the right leg. In this example, the practitioner's perception of the transition point, where easy movement alters to demand some degree of effort, is regarded as the barrier. (B) Assessment of 'bind'/restriction barrier with the first sign of resistance in the adductors (medial hamstrings) of the right leg. In this example, the barrier is identified when the palpating hand notes a sense of bind in tissues which were relaxed (at ease) up to that point. (From Chaitow 2001a.)

Treatment of shortness using MET

- The patient is asked to use no more than 20% of available strength to attempt to take the leg gently back towards the table (i.e. to adduct the leg) against firm, unyielding resistance offered by you
- In this example, the patient is trying to take the limb away from the barrier, while you hold the limb firmly (or place yourself between the leg and the table, as in Figure 6.12)
- The patient will be contracting the agonists, the muscles which require release (and which, once released, should allow greater and less restricted abduction)
- The isometric contraction should be introduced slowly, and resisted without any jerking, wobbling, or bouncing
- Maintaining the resistance to the contraction should produce no strain in the therapist
- The contraction should be held for between 7 and 10 s. (This is thought to place 'load' on the Golgi tendon organs, neurologically influencing intrafusal

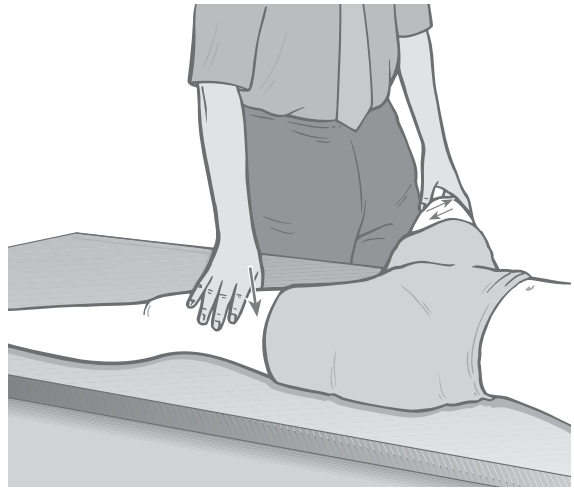


Figure 6.12 Position for treatment of shortness in adductors of the thigh. (From Chaitow 2001a.)

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 limb at the same resistance barrier
- The patient is asked to breathe in and out, and to completely relax, and as she exhales, stretch is 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 s
- The procedure of contraction, relaxation, followed by patient assisted stretch is repeated (ideally with a rest period between contractions) at least once more.

Reciprocal inhibition (RI)
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 abducted, 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 abduct the leg, using no more than 20% of strength, taking it towards the restriction barrier, while the therapist resists this effort
- After 7 s, 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 s.

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.

1 Contraction is too strong (*remedy*: give specific guidelines, e.g. 'use only 20% of strength', or whatever is more appropriate)
2 Contraction is in the wrong direction (*remedy*: give simple but accurate instructions)
3 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)
4 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
1 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)
2 Inadequate counterforce to the contraction (*remedy*: meet and match the force)
3 Counterforce is applied in an inappropriate direction (*remedy*: ensure precise direction needed for best results)
4 Moving to a new position too hastily after the contraction (take your time to have the patient relax completely before moving to a new position)
5 Inadequate patient instruction is given (*remedy*: get the instructions right so that the patient can cooperate)
6 The therapist fails to maintain the stretch position for a period of time that allows soft tissues to begin to lengthen (ideally 30 s, 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

There is another MET variation, which is powerful and useful: pulsed MET (Ruddy 1962). 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 light indeed, with no 'wobble' or 'bounce', just the barest activation of the muscles involved.

An example of self-applied pulsed MET:

- Sit at a table, rest your elbows on it, and tilt your head forwards as far as it will go comfortably and rest your hands against your forehead
- Use a pulsing rhythm of pressure of your head pushing against your *firm* hand contact, involving about 2 pulsations per second (against your hands) for 10 s
- After 20 pulsations, re-test 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 towards the barrier rhythmically
- No pain should be felt
- After 20 contractions in 10 s, 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.

MET methods for key muscles that have been identified as short are given in Chapter 7.

POSITIONAL RELEASE TECHNIQUE (PRT)

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 (Fig. 6.13)
- 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 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 s, there is often a resolution of the dysfunction which resulted from the trauma.

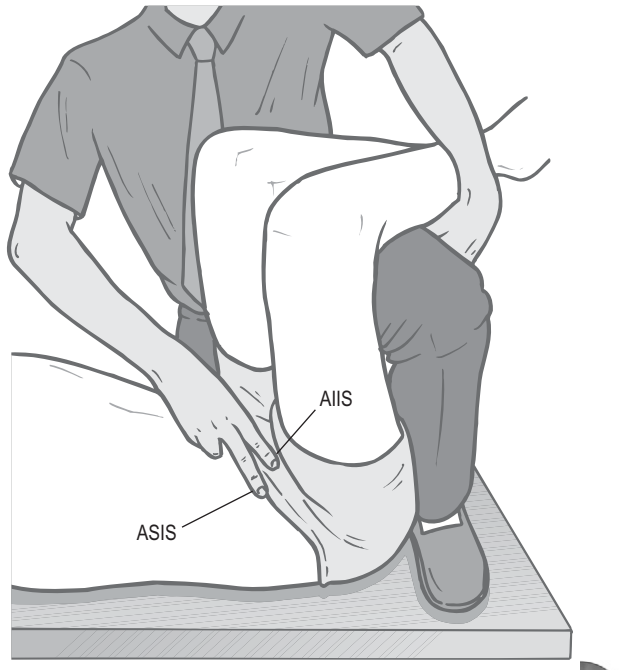


Figure 6.13 Position of ease for flexion strain of T9 to lower lumbar regions involves flexion, side-bending and rotation until ease is achieved in monitored tender point on the lower abdominal wall or the ASIS area.

Positional release exercise

- 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

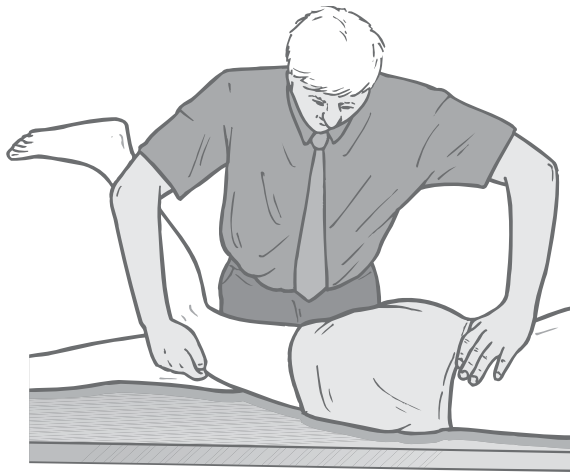


Figure 6.14 Position of ease for a tender point associated with an extension strain of the lumbar strain involves use of the legs of the prone patient as means of achieving extension and fine-tuning.

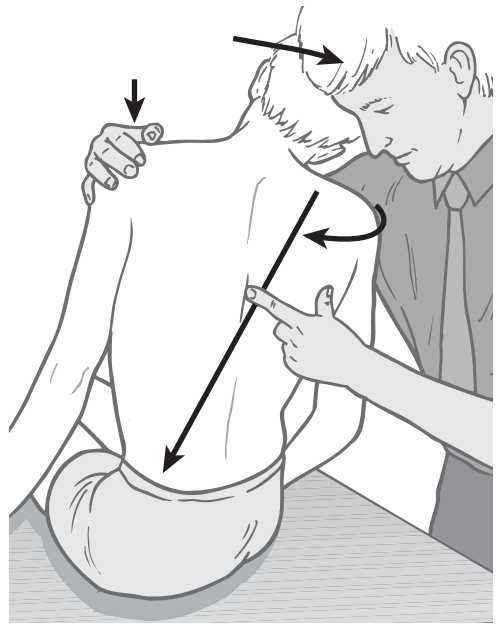


Figure 6.15 Treatment of thoracic region dysfunction (in this example 'tissue tension' to the right of the 6th thoracic vertebrae). One hand monitors tissue status as the patient is asked to 'sit straight' and to then slightly extend the spine. The operator then introduces compression from the right shoulder towards the left hip which automatically produces sidebending and rotation to the right. If ease is noted in the palpated tissues, the position is held for 30–90 seconds.

spinal trauma or strain, or which are chronically shortened as part of a longstanding problem
- 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 (Figs 6.14, 6.15)
- 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 s and then slowly return to a neutral position and re-palpate
- 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 movements are 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

1 For treatment of tender points on the anterior surface of the body, flexion, sidebending and rotation should be *towards* the palpated point, followed by fine-tuning to reduce sensitivity by at least 70%
2 For treatment of tender points on the posterior surface of the body, extension, sidebending and rotation should be *away* from the palpated point, followed by fine tuning to reduce sensitivity by 70%
3 The closer the tender point is to the midline, the less sidebending and rotation should be required, and the further from the midline, the more sidebending 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)

4 The direction towards which sidebending 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 ascribe 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
- In this example, we can imagine that the tender, or trigger, point is in the gluteus medius (Fig. 6.16)
- The patient would be prone, and the therapist would be applying sufficient pressure to the point in the gluteus medius to register pain which he/she would be told has a value of '10'
- The supported leg on the side of pain would be moved in one direction (say extension at the hip) 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 s – 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.

Figure 6.16 Treatment of pubococcygeus dysfunction.

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?

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

1 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)
2 In the comfort/ease position there is a marked improvement in blood flow and oxygenation through the tissues
3 Facilitated areas (spinal or trigger points) will be less active, less sensitized, calmer and 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:

1 The trigger point is identified by palpation.
2 Ischemic compression is applied in either a sustained or intermittent manner.
3 When referred or local pain starts to reduce in intensity, the compression treatment stops.
4 The patient should be told, e.g.:

'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'.

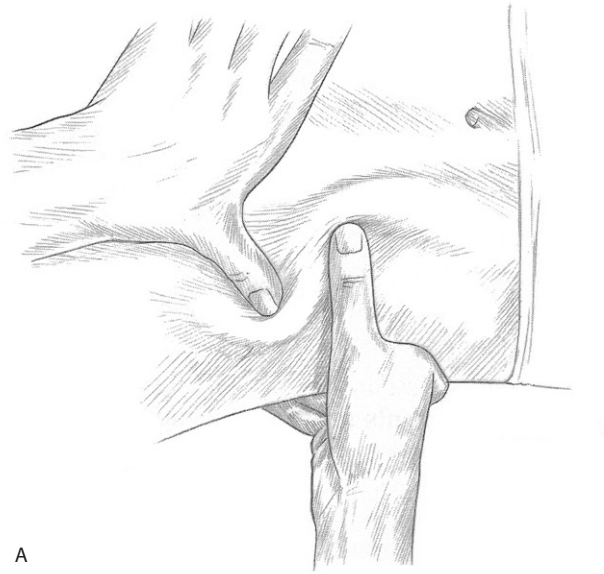
5 Using these methods (as described in the section above, on Positional Release Technique) the tissues housing the trigger point are then carefully placed in a position of ease.
6 This ease position is held for approximately 20–30 s, to allow neurological resetting, reduction in pain receptor activity, and enhanced local circulation/oxygenation.
7 An isometric contraction is then focused into the musculature around the trigger point to create post isometric relaxation (PIR), as discussed in the MET section earlier in this chapter.
8 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'.
9 At other times, if the patient is being supported in a position of ease, it may be helpful to say something like: '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.
10 After the contraction (5–7 s, with the patient using only a small amount of effort), the soft tissues housing the trigger point are stretched locally (Fig. 6.17A,B).
11 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 un-stretched, like a knot in a piece of elastic which remains knotted even though the elastic is held at stretch.
12 After holding the local stretch for approximately 30 s, the entire muscle should then be contracted and stretched – again holding that stretch for at least 30 s.
13 The patient should assist in stretching movements (whenever possible) by activating the antagonists and so facilitating the stretch.
14 A towel that has been wrung out in warm/hot water placed over the treated tissues for 5 min helps to ease the soreness that may follow this treatment.
15 Within 24 h, the trigger should have reduced in activity considerably, or no longer be active.
16 Re-testing immediately after the INIT sequence may not offer evidence of this, as tissues will be tender.

SPRAY-AND-STRETCH 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 methods (Mennell 1975).

- 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 ft. A mist-like spray is less desirable (Fig. 6.18A,B)
- 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 ft 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

Figure 6.17 (A) 'S' bend pressure applied to tense or fibrotic musculature. (B) The lower trapezius fibers are treated in the same way.



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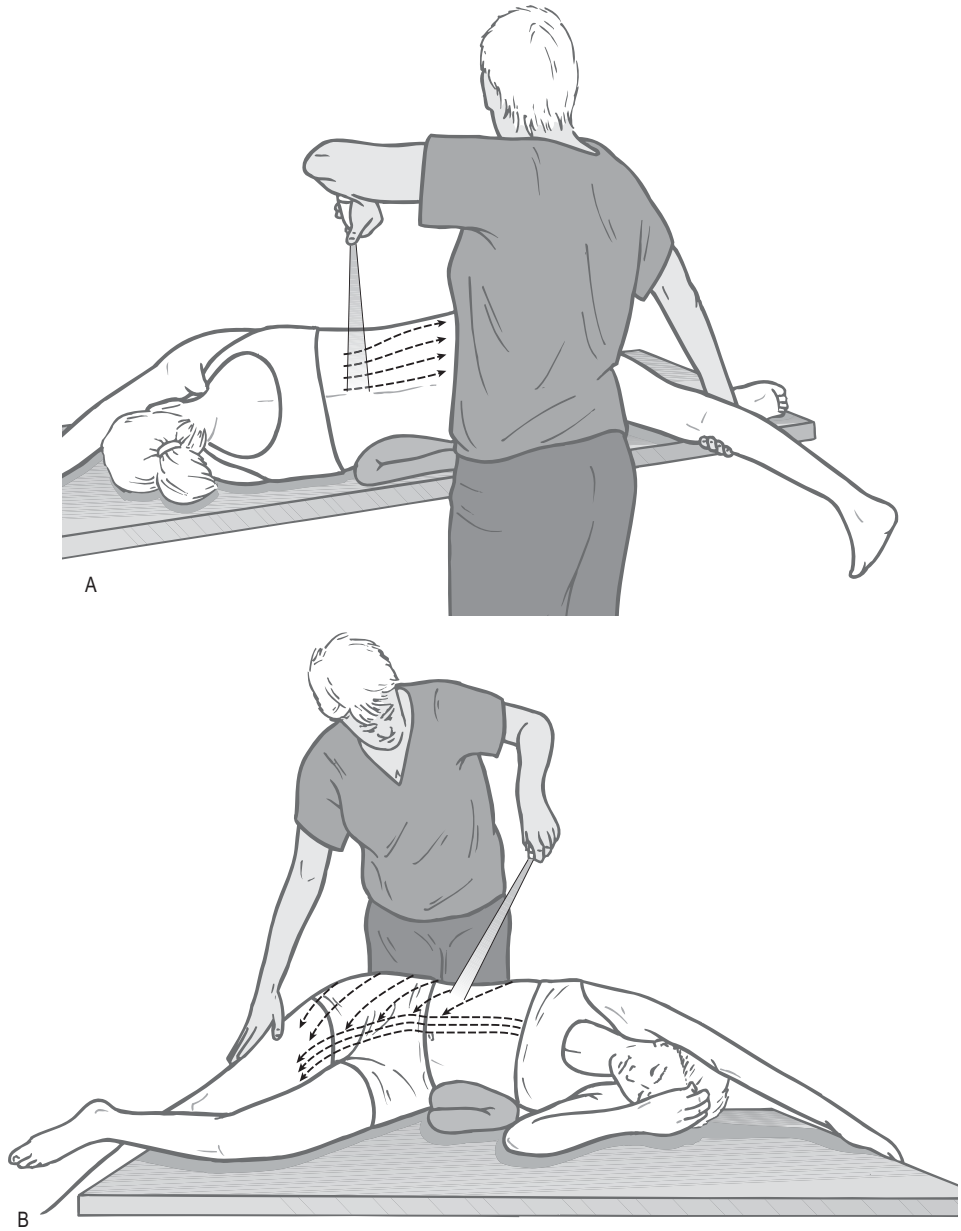

Figure 6.18 Anterior and posterior view of application of vapocoolant spray to trigger point (quadratus lumborum in this illustration). Muscles housing trigger points are placed at stretch while a coolant spray is utilized to chill the point and the area between it and the target reference area.

zone. The direction of chilling should be in line with the muscle fibers towards their insertion
- The optimum speed of movement of the sweep/roll over the skin seems to be about 4 in (10 cm) per s
- 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 trigger and reference areas has been covered once or twice
- 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 s, 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 min and should not be rushed. The importance of re-establishing normal motion in conjunction with the use of the chilling is well founded.

REHABILITATION EXERCISE METHODS

Norris (1999) advises the following guidelines for re-establishing back stability, using stabilization exercises for the different triage groups:

- *Simple backache*: Begin stability exercises and continue until fully functional
- *Nerve root compression*: Begin exercise as pain allows, but refer to specialist if there has been no improvement within 4 weeks
- *Serious pathology*: Use back stabilization exercises only after surgical or medical intervention.

There are many interlocking rehabilitation features (Liebenson 1996) that may be involved in any particular case:

- normalization of soft tissue dysfunction
- deactivation of myofascial trigger points
- strengthening weakened structures
- proprioceptive reeducation using physical therapy methods
- postural and breathing reeducation
- 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 healthcare 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 8.

MASSAGE

A variety of massage applications can be employed to accompany the methods outlined in this chapter. The primary massage techniques include:

- Effluerage
- Petrissage
- Kneading
- Inhibition pressure
- Vibration and friction
- Transverse friction.

Massage effects explained

A combination of physical effects occur, apart from the undoubted anxiety-reducing (Sandler 1983) influences that involve biochemical changes. Among the many effects of massage techniques are the following 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 displace 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.

KEY POINTS

- Good palpation skills allow a therapist to rapidly and accurately localize and identify dysfunctional tissues
- Neuromuscular technique (NMT) 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 (MET) offer useful ways of encouraging length into previously tight, short, soft tissues
- Positional release technique (PRT) offers painless ways for encouraging release of hypertonicity and spasm
- Sprain-and-stretch chilling methods are of proven value in trigger point deactivation and easing spasm
- Integrated neuromuscular inhibition (INIT) is a sequence involving pressure methods, together with MET and PRT for trigger point deactivation
- 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 back pain care.

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