Chapter 1

Spontaneous release by positioning

CHAPTER CONTENTS

POSITIONAL RELEASE TECHNIQUES (PRT)

Positional release techniques (PRT) offer practical ways of managing pain and biomechanical dysfunction. They are also intellectually satisfying because they do not *impose* solutions on dysfunctional tissues; instead they are designed to offer the opportunity for a spontaneous resolution of pain, spasm, hypertonicity and restriction.

One of the major forms of PRT: strain/counterstrain (SCS, or simply counterstrain, CS), was initially known as 'spontaneous release by positioning' (Jones 1964).

The essence of all forms of PRT is to gently support tissues in a position of comfort or 'ease', until a spontaneous beneficial change ('release') occurs. The differences between the various forms of PRT reflect the variety of ways in which 'ease' may be achieved.

SCS, as well as other models of positional release methodology, are fully described later in this book, while in this chapter, a broad descriptive overview is offered, of a variety of ways in which the practical application of positional release methods can be used therapeutically.

The concept behind the techniques is simple, as are some of its protocols, to the extent that some can be taught to patients for self-application (see Chapter 4). However, more often, PRT in clinical practice requires patience, skill and delicacy of touch.

A painful example

If a symptomatic patient presents with tissues that are excessively tense, indurated, hypertonic, shortened or contracted – and most probably painful, therapeutic objectives are likely to include reduction in pain, as well as removal or reduction of barriers to free movement. Of course there are times when hypertonicity or spasm may be appropriately protective – and in such cases (e.g. where there is underlying pathology such as osteoporosis), there should be no attempt to remove such protective support, by means of positional release or anything else.

Many therapeutic approaches, confronted with restricted soft-tissue or joint dysfunction, employ methods of a direct nature – in which barriers are engaged, in one way or another, obliging these to retreat. The soft tissue in question may be stretched, massaged, mobilized or manipulated, using any of dozens of perfectly appropriate techniques, such as 'muscle energy technique' or 'passive stretching' (as examples). However, if the tissues are painful, in spasm, inflamed or have recently been traumatized, or if the direct manual method causes discomfort, then an alternative approach is required.

Take for example a restricted joint where an osteopath, physiotherapist or chiropractor might introduce a high-velocity, low-amplitude (HVLA) thrust, in order to normalize motion. In particular situations, HVLA methods might be considered inappropriate – for any number of reasons, ranging from patient preference, to safety – as in an osteoporotic condition. However, a frequently efficient alternative choice might be the use of a positional release method that involves placing and maintaining (possibly for several minutes), the joint in a pain-free, balanced, unstressed position.

Descriptions as to how and why enhanced pain-free movement of the previously restricted joint might be achieved by positional release methods, will be explained further in later chapters.

Positional release approaches to treatment of hypertonic, contracted soft tissues would not involve lengthening or stretching methods, but would attempt to find a way (depending on which PRT variation was selected) of offering an 'opportunity for change' to those tissues. This would commonly involve disengagement from the barrier, and holding or supporting the hypertonic, contracted tissues in a painless but even more shortened state, 'inviting' a spontaneous change to take place.

The cluster of methods that can be grouped together as *positional release techniques* (PRTs), which this text describes, offer just such possibilities of *encouraging positive* changes in dysfunctional tissues – soft tissue – or joints (see in particular, Chapters 4–6 and 8).

The mechanisms whereby these changes occur seem to involve a combination of the neurological and circulatory changes that take place when a distressed area is placed into its most comfortable, its most 'easy', most pain-free position.

Descriptions of the major variations of PRT methods are given below. Many of these have chapters devoted entirely to exploring their individual methodology.

Some PRT variations

As will become clear, there are a variety of ways of incorporating indirect, extremely gentle, methods into a treatment protocol. Osteopathic medicine has contributed the main positional release approaches – including:

- Strain/counterstrain (SCS) (Jones 1964; Wong et al. 2013) – see Chapters 3 and 4 for details of this powerful therapeutic tool.
- Functional technique (FT) – and its variants – facilitated positional release (FPR) (Johnstone 1997; McPartland & Zigler 1993; Schiowitz 1990) and indirect myofascial release – are all described in Chapter 5.
- Balanced ligamentous tension (BLT) is a variant of PRT that uses skilled palpation to ease dysfunctional joint structures – to a position in which ligamentous tensions are equally balanced, in order to encourage improvement or resolution of underlying dysfunction – see Chapter 8.
- Visceral technique, involves the same principles of disengagement – directed at assisting in improved function of organs – see Chapter 9 for explanations and descriptions.

Physiotherapy has also contributed to this indirect approach to dysfunction.

- The important work of McKenzie, involving as it does rehabilitation methods that encourage movement into comfortable, and not painful positions – for example in management of low back pain – clearly relates to positional release, and is described in Chapter 10.
- Physical therapy has also produced a number of innovative concepts and methods that unload soft tissues and joints, and which then supports them in this unloaded state, by means of taping, as described in Chapter 11.
- A combination of these methods have been successfully applied to animals, most effectively in treatment of horses, and equine positional release methods are discussed in Chapter 12.

As this (growing) list of variations suggests, there are a number of different methods involving the positioning of an area of the body, or the whole body, in such a way as to evoke a therapeutically significant physiological response that – evidence suggests – can assist in resolving musculoskeletal dysfunction. Mounting evidence for the clinical efficacy of SCS is provided in Chapter 3, where proposed mechanisms are also examined. For a summary of these methods and definitions, see Chapter 8, Table 8.1.

Therapeutic benefit of reduced stimulus?

In a different context entirely, reduced environmental stimulus has been shown to have the potential to offer therapeutic benefit.

Use of the effects of being placed into a flotation tank – described as 'restricted environmental stimulation technique' (REST) – has been used in the treatment of anxiety and depression in individuals suffering chronic pain.

Such treatment involves individuals spending time immersed in a tank filled with neutral temperature water (i.e. body heat), of an extremely high salt concentration to increase buoyancy. In one study, 37 patients (14 men and 23 women) suffering from chronic pain, were randomly assigned to either a control group (17 participants) or an experimental group (20 participants). The experimental group received nine flotation – (REST) – treatments, over a 3-week period. The results indicated that the most severely perceived pain intensity was significantly reduced, whereas low perceived pain intensity was not influenced. Flotation-REST treatment elevated the participants' optimism and reduced the degree of anxiety or depression and improved the sleep pattern.

This example of reduced stimulus, leading to spontaneous change, should be kept in mind as we explore the equivalent, when applied (without the flotation tank) to distressed somatic tissues that are carefully placed into comfort/ease positions.

Additional theoretical models that attempt to explain the effects of the various forms of positional release are outlined in Chapters 4–9.

Terminology – 'ease' and 'bind'

As explanations and descriptions are offered for the spontaneous physiological responses that take place when tissues are placed into a balanced state, in this and later chapters (Chapter 3 in particular), the terms 'ease' and 'bind' will frequently be used to describe the extremes of restriction (bind) and freedom of movement (ease).

The term 'dynamic neutral' may be considered as being interchangeable with 'maximal ease'. Hoover (1969), the developer of functional technique (Chapter 5), one of the major methods of spontaneous positional release, used the term, 'dynamic neutral', to describe what is being aimed for, as the tissues associated with a structurally disturbed joint or area are positioned into a state of comfort or 'ease'.

Bowles (1969) has also discussed this phenomenon, stating:

> *Dynamic neutral is a state in which tissues find themselves when the motion of the structures they serve are free, unrestricted and within the range of normal physiological limits …. Dynamic neutral is not a static condition … it is a continuing state of normal, during living motion, during living activity … it is the state and condition to be restored to a dysfunctional area.*

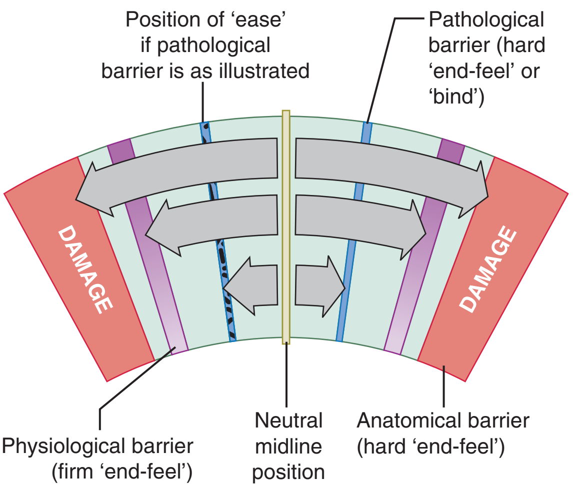

Figure 1.1 Illustrating mid-range between ends of range of motion in dysfunctional tissues.

Finding the 'easy' barrier

In normal tissues there exists, in the mid-range of motion, an area of 'ease' or 'balance', where the tissues are at their least tense. However, when there is a restriction in the normal range of motion of tissues, whether of osseous or of soft-tissue origin, the now limited range will almost always still have a position, a moment, a point of maximum comfort or ease, lying somewhere between the new restriction barrier in one direction, and the physiological barrier in the other.

Finding this 'balance point' is a key element in PRT application. And, it is suggested, maintaining such an 'ease' state, for an appropriate length of time (see below), may well offer restrictions a chance to release or normalize (Fig. 1.1).

The process of positioning – by the practitioner – of distressed tissues into a three-dimensional comfort, or 'ease', position creates the environment of reduced proprioceptive stimulus during which time self-regulating changes are invited to occur. The 'treatment' itself can therefore be seen to be self-generated by tissues, as they respond to being supported in their ease position. Inevitably, some degree of neurological – proprioceptive – feedback, as well as circulatory, and possibly mechanotransduction (see Chapter 7) related changes, are likely to be involved in the responses to the positioning process. Jones's original name for what became known as strain/counterstrain, was 'spontaneous release by positioning' (Greenman 1996).

Jones's contribution

The impetus towards the use of this most basic and non-invasive of treatment approaches, in a coherent, rather than a hit-and-miss manner, lies in the work of Lawrence Jones DO, who developed an approach to somatic dysfunction (Jones 1981) that he termed 'strain and counterstrain' (SCS) (described in detail in Chapters 3 and 4).

Walther (1988) describes the moment of discovery in these words:

> ***Jones's initial observation of the efficacy of counterstrain was with a patient who was unresponsive to treatment. The patient had been unable to sleep because of pain. Jones attempted to find a comfortable position for the patient to aid him in sleeping. After 20 minutes of trial and error, a position was finally achieved in which the patient's pain was relieved. Leaving the patient in this position for a short time, Jones was astonished when the patient came out of the position and was able to stand comfortably erect. The relief of pain was lasting and the patient made an uneventful recovery.***

The position of 'ease' that Jones identified for this patient was an exaggeration of the position in which spasm was holding him, and this provided Jones with an insight into the possible mechanisms involved.

Over the years since Jones first made the observation, that a position which exaggerated a patient's distortion could provide the opportunity for a release of spasm and hypertonicity, many variations on this basic theme have emerged, some building logically on that first insight, with others moving in new directions.

Upledger & Vredevoogd (1983) offered a practical explanation of indirect methods of treatment, especially as related to cranial therapy (see Chapter 5). The idea of moving a restricted area into its directions of ease is, they say, *'a sort of "unlatching" principle. Often in order to open a latch we must first exaggerate its closure'*.

Most of the variations on the theme of PRT, described briefly in this chapter, are discussed in greater detail later in the book.

What are 'tender points'?

Jones (1981) described localized areas, associated with distressed and dysfunctional tissues, as 'tender points'. A possibility exists for confusion when identifying areas of unusual tenderness during examination or palpation. The characteristics of tender points, as used in positional release, as well as those used in the diagnosis of fibromyalgia, and the similarities and differences between these and myofascial trigger points are discussed in Box 1.1.

Common basis

The positional release methods summarized later in this chapter are as comprehensive as possible at the time of writing; however, new variants are regularly appearing, and the author acknowledges that it has been impossible to exhaustively detail all versions.

The need for the existence of variations of PRT should be obvious, as different clinical settings require the availability of a variety of therapeutic approaches – ranging (as examples) from those suitable during a clinical office appointment, to someone who is bedridden – possibly hospitalized, to an athlete lying at the trackside after injury.

Although PRT approaches have a broad commonality, in that they involve passive movement of the patient, or the affected tissues, away from any restricted, uncomfortable, resistance barriers ('bind'), and towards positions of increased comfort and 'ease' – subtle differences allow their use in distinctly contrasting settings.

Examples of positional release methods that are described in more detail in later chapters, include outlines of methods used in the care of severely ill, pre- and post-operative, bedridden (see Chapter 6) patients, treated for their current pain and discomfort, without leaving their beds. In such settings, no rigid application of procedures can be adhered to, and flexibility can best be achieved by the practitioner/therapist having available a set of skills for achieving the same ends – enhanced function and diminished pain (Schwartz 1986; O-Yurvati et al. 2005).

The use of a selection of indirect and direct modalities during one treatment session is common to all forms of manual therapy – including massage, physiotherapy, chiropractic and osteopathy. It is obvious that in real-life clinical settings, when a selection of different treatment approaches are used during one treatment session, it becomes impossible to say which of the methods had any particular effect. Indeed, it may be that maximum benefit would only be experienced when a combination of methods are being employed.

What if patients cannot communicate verbally?

The form of PRT that has been most widely researched is SCS – and much of the evidence for its value is described in Chapter 3. SCS requires verbal feedback from the patient as to the degree of sensitivity of a 'tender' point, which is being used as a monitor, and which the practitioner/therapist is palpating while attempting to find a position of ease, where tissue-tension reduces and reported discomfort is minimized. Where pain provocation is deliberately being avoided – or where the individual is unable to report to the practitioner changes in pain levels – the palpated sense of tension in the tissues can be used to identify the position of maximum comfort/ease.

It is possible to imagine such situations, for example, in the case of someone who had lost the ability to communicate verbally; or who does not speak the same language as the therapist; or who is too young or too ill to offer

Box 1.1 'Tender points' in the context of positional release – and other conditions

As tissues adapt and modify due to the effects of age, overuse, misuse, disuse, etc. (see Chapter 2 for discussion of the evolution of soft-tissue dysfunction), localized areas of ischaemic, sensitized tissues emerge.

A variety of biomechanical, biochemical, neurological, circulatory and psychological influences are associated with such changes, which gradually evolve from sensitivity to discomfort, and eventually pain (Mense & Simons 2001).

A general term that can be applied to such tissues, whatever level of the spectrum of dysfunction happens to be operating, is 'hyperalgesia'. Lewit (1999) described the phenomenon as a 'hyperalgesic skin zone'. A simpler, more user-friendly word, is 'tender point' (Jones 1964).

Whether such localized areas ('points') are in their early embryonic formative stages, or have reached a state where they display the characteristics of active myofascial trigger points (see Chapter 2), they will undoubtedly be sensitive or 'tender', and this is the term given to them in SCS methodology, in which they are used as a major feature of the protocol of assessment and treatment (see Chapter 4).

Myofascial trigger points are, by definition, localized, tender areas that are painful when compressed and, when active, display the significant characteristic of being able to radiate or refer pain, as well as other sensations, to adjacent or even distant tissues – reproducing symptoms that are familiar to the patient.

A potential for confusion lies in the use of the term 'tender points' in the diagnostic procedures involved in assessment of individuals suspected of having fibromyalgia.

In 1990, the American College of Rheumatology issued criteria for the diagnosis of fibromyalgia that included identification of tenderness in at least 11 out of 18 prescribed palpated sites (Wolfe et al. 1990). These tender areas may simply be tender, and may not display the 'spreading' characteristics of myofascial trigger points. However, this distinction may not be easily made, since, because fibromyalgia involves widespread diffuse pain, pressure on tender points in someone with fibromyalgia may easily reproduce pain familiar to that individual.

In other words *tender points* may also be active *trigger points*, and trigger points will always be tender. However, in the context of PRT in general, and strain/counterstrain in particular, tender points are more usually described as simply tender, without the ability to refer or radiate symptoms.

Another major distinction is that while trigger points become a target for treatment, manually or via needling or laser treatment – the 'tender points' in fibromyalgia assessment are used purely for diagnostic purposes, as compared with those in PRT that are used as key elements in guiding the practitioner towards identification of 'positions of ease'.

Nevertheless, as will become clear in later chapters, all tender or painful areas may be used when following SCS treatment protocols – whether or not they are active trigger points, and whether or not they are 'tender points' identified during a fibromyalgia assessment.

verbal feedback; or in the case of animals (see Chapter 12). In such cases, a need would be apparent for a method that allows the practitioner/therapist to achieve the same objective – of achieving an 'ease' position – without verbal communication.

This is possible, as will be demonstrated, using either 'functional' methods or facilitated positional release approaches, that involve the practitioner/therapist identifying a position of maximum ease by means of palpation alone, assessing for a state of 'ease' in the tissues. See Chapter 5 for more detail of this approach, which epitomizes some of the methodology of an SCS derivative, Ortho-Bionomy, which is briefly described later in this chapter.

Outcomes in different clinical settings

It is important to note that if PRT methods are being applied to chronically indurated or fibrosed tissues, the results may well be expected to produce a reduction in hypertonicity, but would not result in any reduction in structural changes in the tissues, such as fibrosis.

Pain relief or improved mobility may therefore be only temporary or partial in such cases. This does not nullify the usefulness of PRT in chronic settings, but emphasizes the need to use such methods as part of an integrated approach.

Integrated methods will be seen to be of particular value in deactivation of myofascial trigger points, using a combination of manual methods in a sequence known as integrated neuromuscular inhibition technique – INIT (see below, and in more detail in Chapter 5).

Clinical considerations

Exaggeration of distortion

The concept of exaggerating an existing degree of distortion is a common aspect of clinical reasoning in PRT/SCS methodology. Take the example of an individual bent forward in psoas spasm/lumbago. This would involve someone in considerable discomfort or pain, who is posturally distorted – bent forward into flexion, together with rotation and side-bending. Any attempt by the person (or the practitioner) to straighten the individual towards a more physiologically normal posture would be met by increased pain and a great deal of resistance. Movement toward, or engagement of, the resistance barrier would therefore not be an ideal first option.

However, moving the area *away from* the restriction barrier in such a situation is not usually a problem. Clinical experience has shown that the position required to find the position of 'ease' for someone in this state normally involves painlessly, and usually passively, increasing the degree of distortion displayed, placing the person (in the example given) into some variation based on forward bending (possibly supine or while side-lying, rather than weight-bearing – see examples in Chapter 4) until pain is found to reduce or resolve.

After 60–90 seconds in this 'position of ease', a slow return to neutral would be carried out and – theoretically, and commonly in practice – the patient would be somewhat or completely relieved of pain and spasm.

Replication of position of strain

This is another feature of PRT/SCS clinical reasoning. Take for example that someone describes the onset of their problem as starting when bending to lift a load, during which process an emergency stabilization was required – as the load shifted (see notes on the mechanisms involved in SCS, in Chapter 4). The patient was then locked in a position of 'lumbago-like' antalgic spasm and distortion, as described in the previous few paragraphs.

If, as PRT in general, and SCS in particular, suggests, the position of ease commonly equals the position of strain – then the patient needs to be taken back into flexion – in supported, passive, slow-motion – until tenderness vanishes from the monitored tender point, and/or a sense of ease is perceived in the previously hypertonic shortened tissues. Adding small 'fine-tuning' positioning to the initial position of ease – achieved by flexion – usually achieves a situation in which just such a maximum reduction in pain is possible.

This position would be held for 60–90 seconds before slowly returning the patient to neutral, at which time, as in the example above, a partial or total resolution of hypertonicity, spasm and pain may result.

It should be obvious that the position of strain, as just described, is probably going to be a duplication of the position of exaggeration of distortion.

These two elements of SCS – 'exaggeration of existing distortion' and 'replication of the position of strain' – are described as examples only, since patients can rarely describe precisely the way in which their symptoms developed. Nor is obvious spasm, such as torticollis or acute antalgic spasm ('lumbago'), the norm, however it is strongly recommended that attention be paid to chronic distortion patterns, where adaptive shortening and crowding may have occurred over a period of years. PRT applied to chronic holding patterns can be a valuable approach in patient management. The evolution of such patterns is a feature discussed in Chapter 2.

The methods of McKenzie (Chapter 10), in which movement in directions that are free and easy (relatively) rather than in directions that are restricted or painful, carries echoes of the positions that emerge when incorporating 'exaggeration' or 'strain replication' into management of dysfunction. An addition of supportive taping to hold tissues in 'easy' exaggerated distortion (Chapter 11) can be seen to be an amplification of the approach offered manually in SCS or functional technique, as described below.

POSITIONAL RELEASE VARIATIONS

(see also Chapter 8, Table 8.1)

1. Functional positional release (FuPR)

(Bowles 1981; Hoover 1969)

Osteopathic functional technique ignores pain as its guide to the position of ease, and relies instead on a reduction in palpated tone in stressed (hypertonic, spasmed, restricted) tissues, as the body (or part) is being positioned, or fine-tuned, towards three-dimensional 'ease' involving use of different vectors of force.

A position of palpated ease is achieved using what is known as a 'stacking' sequence, explained and described in more detail in Chapter 5.

One hand palpates the affected tissues without invasive pressure. This is described as the 'listening' hand, since it assesses changes in tone as the practitioner/therapist guides the patient (or part) through a sequence of positions that are aimed at enhancing ease and reducing bind.

A sequence of evaluations are carried out, involving different directions/vectors of movement (flexion/extension, rotation right and left, side-bending right and left, distraction, compression, etc.), with each new movement starting at the point of maximum ease established during the previous evaluation; or combined position of ease involving a number of previous evaluations. In this way, one position of ease is 'stacked' onto another, until all directions of movement have been assessed for ease, and their combined positions incorporated into the final 'position of ease'.

Functional low back approach

If an individual with a low back problem, as previously described, was being treated using the functional technique, the tense tissues in the low back, would be the ones palpated.

With the patient seated or side-lying, following a sequence of supported passive movements involving flexion/extension, side-bending and rotation, in each direction, translation right and left, translation anterior and posterior and compression/distraction (so involving all available directions of movement of the area) – a position of maximum ease would be arrived at. This 'stacked' position of ease would then be held for 30–90 seconds, so that a release of hypertonicity and/or a reduction in pain, might result.

The precise sequence in which the various directions of motion are evaluated seems to be irrelevant, as long as all possibilities are included.

Theoretically (and usually, in practice) the position of palpated maximum ease (reduced tone) in the distressed tissues should correspond with the position that would have been identified if pain was being used as a guide, or if the more basic 'exaggeration of distortion' or 'replication of position of strain' were being used as guides to positioning.

Functional 'diaphragm release'

For a simple functional exercise – using only one direction of 'ease' (Noll et al. 2008), see Figure 1.2.

1. The patient lies supine.
2. One of the operator's hands is placed under the patient's back, at the level of the thoracolumbar junction.
3. The other hand is placed on the abdominal epigastric area.

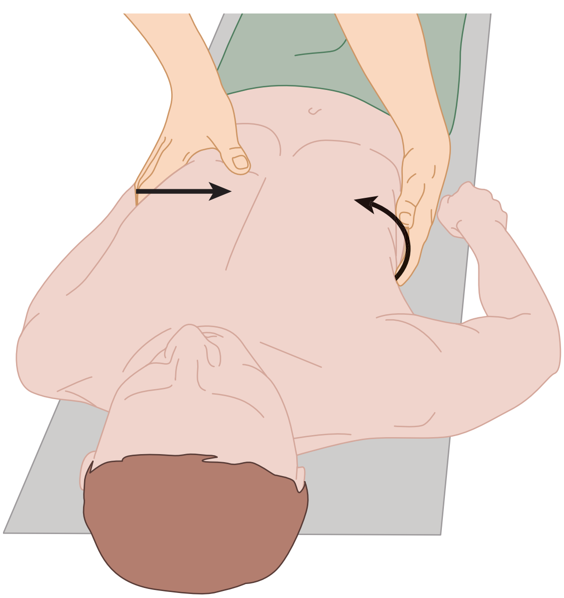

Figure 1.2 Functional treatment of the lower thorax/diaphragm area.

4. The operator rotates the tissues to one side and then the other to determine the direction of greatest freedom of movement.
5. The tissues are then rotated towards the direction of greatest freedom, to a point of 'balance' – where minimal tension is noted – and held there until a release is palpated, allowing a more symmetrical rotation in both directions.
6. As this position is held, the patient may be requested to produce a full cycle of breathing, and the patient should be asked to maintain (for as long as is comfortable) the position where – in that cycle – the operator determines the tissues to be even more 'relaxed'.

The maintenance of an 'ease' stage of the breathing cycle is thought to have a potentially facilitating influence on the release process.

More complex 'stacking' procedures to determine maximum ease – in use of functional technique – are described in Chapter 7.

A functional technique variation: integrated neuromuscular release

(Danto 2003)

Integrated neuromuscular release is a form of FuPR involving a segmental, antero-posterior approach that aims to correct muscular, fascial and neural imbalances. 'Osteopathic manipulative treatment has been concerned, purposefully or not, with manipulation of the fascia' (Danto 2003).

- With the patient seated, the practitioner's hands are placed anteriorly and posteriorly, where – independently – they perform evaluations of tissue direction preferences (Fig. 1.3).
- Each direction sequence is asking the same question – in which direction do the tissues move most freely – with each change in direction commencing from the position(s) of ease previously identified?
- Superior/inferior?
- Lateral to the left/lateral to the right?
- Clockwise/anticlockwise?
- In this way, the palpated tissues are taken into their preferred directions of motion, towards a combined 'ease' position, at which time compression is added. This is held for 60–90 seconds – or longer if changes in the tissues are being sensed – pulsation, rhythmic motion, etc. – before a slow release.

2. Facilitated positional release (FPR)

(Schiowitz 1990)

This variation on the theme of functional methods involves the positioning of the distressed area into the direction of

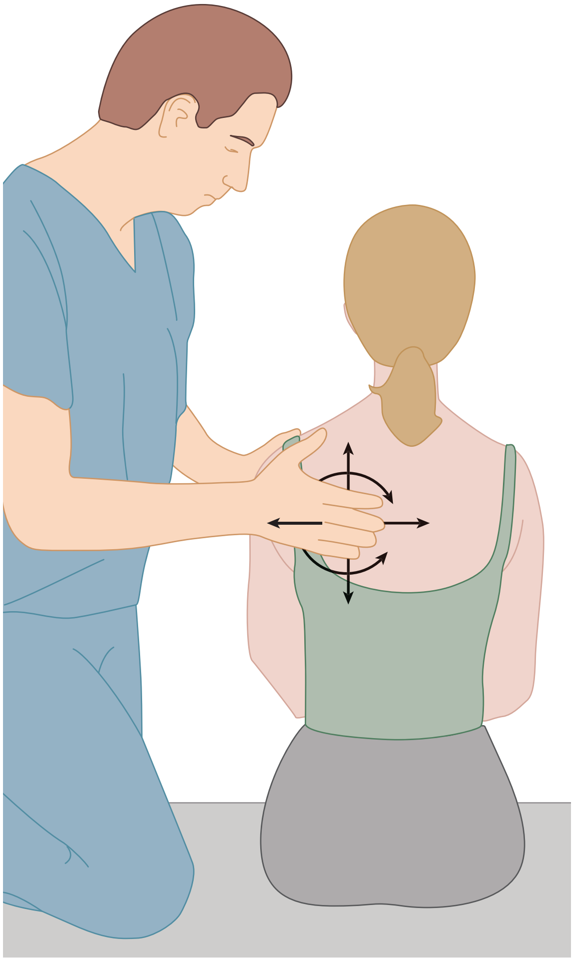

Figure 1.3 Each hand independently stacks positions of ease onto each other as all directions are assessed for 'ease'. The final combined position of ease is held for 90 seconds, during which circulatory, proprioceptive and viscoelastic effects are thought to start a self-regulating process.

its greatest freedom of movement, starting from a position of 'neutral' in terms of the overall body position.

To start with, the seated patient's sagittal posture might be modified to take the body or the part (neck, for example) into a more 'neutral' position – a balance between flexion and extension – following which, an application of a facilitating force (usually a crowding of the tissues) would be introduced. No pain monitor is used in FPR but rather a palpating/listening hand is applied (as in functional technique), which senses for changes in ease and bind in distressed tissues as the body/part is carefully positioned and repositioned.

The final 'crowding' of the tissues, to encourage a 'slackening' of local tension, is the facilitating aspect of the

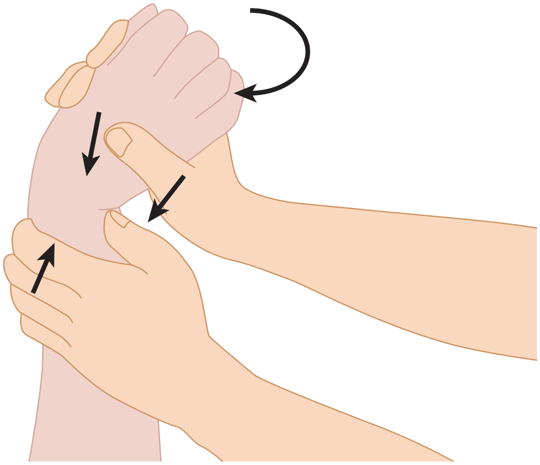

Figure 1.4 Facilitated positional release for hypertonic medial wrist musculature.

process, according to its developers. This 'crowding' might involve compression applied through the long axis of a limb, or directly downwards through the spine via cranially applied pressure, or some such variation.

Once a facilitating force is added to positioning into 'ease', the length of time the position of ease is held is usually suggested to be around ≤5 seconds. It is claimed that altered tissue texture, either surface or deep, can be successfully treated in this way (Schiowitz 1990).

FPR is evaluated and discussed in greater detail in Chapter 5. It can also be employed as part of SCS methodology (where it more closely resembles 'Ortho-Bionomy', see item 6 below).

Facilitated positional release exercise: hypertonic medial right wrist muscles:

1. The practitioner holds the patient's hand with his right hand (Fig. 1.4).
2. The practitioner's left hand holds the patient's wrist while the thumb of that hand palpates the degree of hypertonicity.
3. The practitioner 'crowds' the wrist by approximating his hands, as he assesses the reduction in tone of the palpated tissues.
4. When an optimal degree of relaxation is perceived, the wrist is taken into radial deviation and slightly pronated – until further reduction in tone is perceived.
5. This should be held for up to 5 seconds before releasing and re-evaluating.
6. *Note*: Different aspects of the wrist musculature would require variations of wrist deviation, rotation and degree of compression – always seeking maximal reduction in tone.

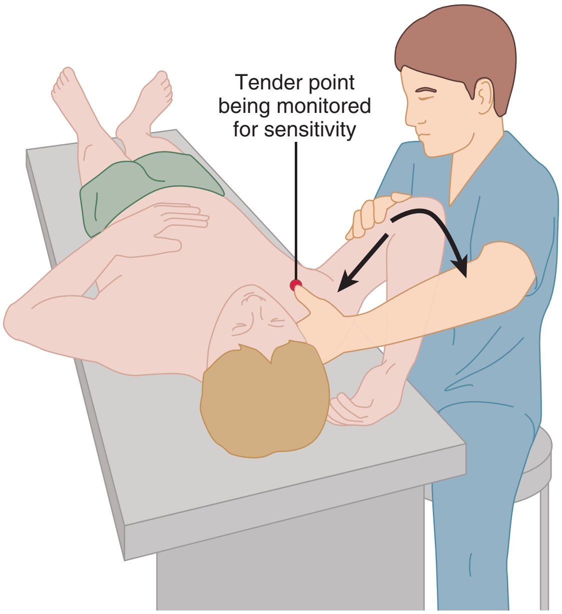

Figure 1.5 Strain/counterstrain for shoulder using a tender point on anterior aspect, as the arm is positioned into 'ease', to reduce sensitivity.

3. Strain/counterstrain (SCS): using Jones's tender points as monitors

(Jones 1981)

Over many years of clinical experience, Jones compiled charts and lists of specific tender point areas, relating to every imaginable strain, involving most of the joints and muscles of the body (Fig. 1.5).

These are his 'proven' (by clinical experience) points. The tender points that he described are usually found in tissues that were in a shortened state at the time of strain (or are chronically shortened), rather than those that were stretched, and in tissues that have become chronically shortened over time.

New points – outside of Jones's lists and charts – have been periodically reported in the literature; for example, a group of sacral foramen points relating to sacroiliac strains were identified and described by Ramirez et al. (1989); see Chapter 4.

Jones and his followers provided strict guidelines for achieving ease in any tender points being palpated (the position of ease usually involving a 'folding' or 'crowding' of the tissues in which the tender point lies), which neatly incorporates the concept of 'exaggeration of distortion', discussed earlier – since it makes what is already short, shorter.

This method is described in detail in Chapter 4 and involves maintaining pressure on the monitored tender point, or periodically probing it, as a position is achieved in which:

- there is no additional pain in whatever area is symptomatic
- pain in the monitored point reduces by at least 70%.

This ease-position is then held for an appropriate length of time, which is 90 seconds, according to Jones; however, there are marked variations in the suggested length of time that tissues need to be held in the position of ease, as will become apparent in the discussions of the many variables available in positional release methodology.

In the example of the person with acute low back pain – locked in flexion – tender points will usually be located on the anterior surface of the abdomen, in the muscle structures that were shortened at the time of strain (when the patient was in flexion), and the position that removes tenderness from such a tender point will, as in previous examples, usually require flexion and possibly some fine-tuning involving rotation and/or side-bending.

4. Goodheart's approach to SCS: avoiding formulaic and prescriptive approaches

(Goodheart 1985; Walther 1988)

If there is a problem with Jones's formulaic approach, it is that, while he is frequently correct as to the position of ease recommended for particular points, he is sometimes wrong. Or, to put it differently, the mechanics of the particular strain with which the practitioner/therapist is confronted may not coincide with Jones's guidelines.

A practitioner/therapist who relies solely on Jones's 'menus' or formulae, could find difficulty in handling a situation in which use of the prescribed tender points, and accompanying prescribed direction to achieve 'ease', fails to produce the desired results. Reliance on Jones's menu of points and positions can therefore lead to the practitioner/therapist becoming dependent on them, and it is suggested that the use of palpation skills, and other variations on Jones's original observations, offers a more rounded approach to dealing with strain and pain.

Fortunately, Goodheart and others have offered less rigid frameworks within which to work using positional release mechanisms – avoiding prescriptions. Goodheart (1985) has described an almost universally applicable formula that relies more on the individual features displayed by the patient, and less on rigid formulae, as used in Jones's approach.

Goodheart suggests that a suitable tender point be sought in tissues *antagonistic* to those that are active when pain or restriction is noted. For example, if pain or restriction is reported, or is apparent, on any given movement, the *antagonist* muscles to those operating at the time that pain is noted will be those that house the tender point(s).

Thus, for example, pain (*wherever it is experienced*) that occurs when the neck is being turned to the left, will require that a tender point be located in the muscles that would turn the head to the right – and there may well be a number of such locally sensitive areas – all equally appropriate for use as monitors.

In the earlier example of a person locked in forward bending with acute pain and spasm, if the Goodheart's approach was being used, pain and restriction would be experienced as the person attempted to straighten up (i.e. moving into extension) from the position of enforced anteflexion.

The action of straightening up would almost certainly cause pain, probably in the back, however, *irrespective of where the pain is noted*, the tender point would be sought in the muscles *antagonistic to those working when pain was experienced*, i.e. it would lie in the flexor muscles – such as psoas or rectus abdominis – in this example. Once identified, it would be used as a monitor during treatment, as in all SCS protocols.

Note: It is important to emphasize that tender points that are going to be used as 'monitors' during the positioning phase of treatment are not searched for in the muscles opposite those where pain is experienced, but in the muscles antagonistic to those that are actively involved in moving the patient or body part, when pain or restriction is noted.

5. Any painful point as a starting place for SCS

(McPartland & Zigler 1993)

All areas that palpate as painful are responding to, or are associated with, some degree of imbalance, dysfunction or reflexive activity that may well involve acute strain or chronic adaptation. However, it may not always be possible to identify the complex strain pattern that is responsible for the dysfunction.

The Jones's approach identifies the likely position of tender points relating to particular strain patterns (everted ankle, lumbar flexion strain, torticollis, etc.).

However, it makes just as much sense to consider that any painful point identified during soft-tissue evaluation, massage or palpation (including a search for trigger points) can be treated by positional release, *whether we know what strain produced it or not, and whether the problem is acute or chronic*.

Experience, and simple logic, tells us that the response to positional release of a chronically fibrosed area will be less dramatic than that from tissues that are in spasm or are hypertonic. Nevertheless, even in chronic settings, a degree of release and ease can commonly be produced, allowing for easier access to deeper fibrosis.

This approach, of being able to treat any painful tissue using positional release, is valid whether the pain is being monitored via feedback from the patient (using reducing levels of pain in the palpated point as a guide, i.e. strain/counterstrain) or whether the functional technique concept of assessing a reduction in tone in the tissues by palpation is being used.

A period of 60–90 seconds is recommended as the time for holding the position of maximum ease – although some (such as Schiowitz (1990); see discussion of FPR, above, and notes on Ortho-Bionomy, below), suggest that a very much reduced holding time may be just as efficient at times.

6. Ortho-Bionomy

British osteopath Arthur Pauls modified Jones's SCS approach by adding facilitating forces to the ease position that was identified using a 'tender point' as a monitor during positioning. He called the method 'Ortho-Bionomy'.

The addition of crowding or distraction is similar to the approach formalized in facilitated positional release (FPR), as developed by Schiowitz – described above – where such additional forces are added to positioning into ease achieved functionally (see discussion of functional technique above).

Figure 1.3, illustrating SCS involving an anterior shoulder tender point, can be seen to involve long-axis compression of the humerus – and so can be seen to match the Ortho-Bionomy as well as the facilitated positional release (FPR) protocol.

Ortho-Bionomy is not explored further in this text, and those interested should read Pauls' 2002 book on the subject.

7. Integrated neuromuscular inhibition technique (INIT)

INIT (Chaitow 1994) uses a 'position of ease' involving tissues housing a trigger point, as part of a sequence for its deactivation ('trigger point release') (Mense & Simons 2001).

Note: A detailed INIT protocol is given in Chapter 6, and the outline below describes the basic framework.

- The sequence commences with the identification of a tender/pain/trigger point.
- This is followed by application of ischaemic compression (this is optional and is avoided if pain is too intense or the patient too fragile or sensitive).
- Following the period of intermittent or constant pressure, a positional release of the tissues is

introduced (as in the SCS methodology described above).

- After an appropriate length of time, during which the tissues are held in 'ease', the patient is asked to introduce an isometric contraction into the affected tissues (muscle energy technique) for approximately 5 seconds.
- After the contraction, the local tissues surrounding the trigger point are stretched for up to 30 seconds.
- An isometric contraction and stretch involving the whole muscle is then performed – again for up to 30 seconds.
- Methods to facilitate activation of the antagonists to the muscles involved are then introduced.

A number of studies have validated the INIT method, for example Nagrale et al. (2010).

8. Proprioceptive taping

A quite different approach (the practical aspects of which will be outlined in Chapter 11) is 'unloading' taping; a physiotherapy variant of PRT (Fig. 1.6).

This is a method that incorporates many of the principles associated with PRT.

In recent years, for example, physiotherapists have treated specific conditions, commonly involving knee and/or shoulder dysfunction, by applying supportive taping to 'unload' the affected joints (spinal unloading is also used at times). Morrissey (2000) explains:

> ***Proprioception is a critical component of co-ordinated shoulder movement with significant deficits having been identified in pathological and fatigued shoulders (Carpenter 1998). It is an integral part of rehabilitation programs to attempt to minimize or reverse these proprioceptive deficits. Taping is a useful adjunct to a patient-specific integrated treatment approach aiming to restore full pain-free movement to the shoulder girdle. Taping is particularly useful in addressing movement faults at the scapulo-thoracic, gleno-humeral and acromio-clavicular joints. The exact mechanisms by which shoulder taping is effective is not yet clear but the suggestion is that the effects are both proprioceptive and mechanical.***

It is interesting to note that some of the methods used in taping deliberately place distressed joints and tissues into ease positions for hours, or even days, with marked benefit. Additional information regarding this approach can be found in Chapter 11.

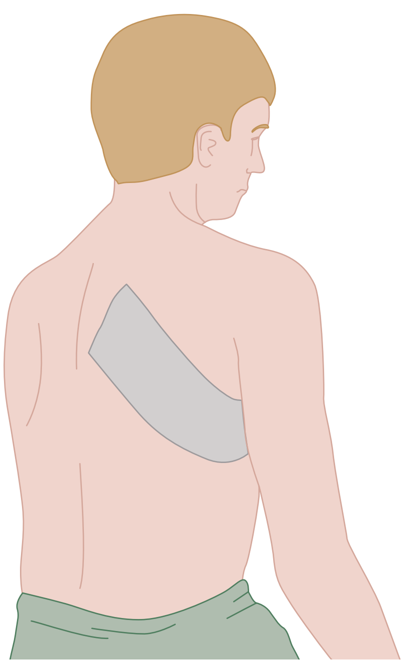

Figure 1.6 Proprioceptive taping for serratus anterior facilitation and inferior scapula angle abduction.

9. McKenzie's method

By careful assessment of the effects of different movements and positions, on existing pain (commonly involving extension of the spine), the McKenzie method attempts to identify those that effectively centralize pain (Fig. 1.7).

Those movements or positions that centralize peripheral or extremity symptoms are prescribed as self-treatment (McKenzie 1990). For example, in a patient with sciatica (referred symptoms in the leg coming from the spinal S1 nerve root), movements or positions are explored in the hope of finding those that 'centralize' symptoms towards the low back. Symptom centralization is seen to be a positive prognostic sign (Timm 1994).

The McKenzie concept is fully described in Chapter 10.

10. Sacro-occipital 'blocking' technique (SOT)

In 1964, DeJarnette (1967) introduced the use of pelvic wedges (padded blocks, made from foam or wood) to allow gentle repositioning of the pelvis or spine. This method is largely used in the chiropractic profession.

The reclining patient (supine or prone – decided based on establishment of 'categories' of the dysfunction being treated) is positioned and supported by blocks or wedges to allow changes to take place spontaneously and to assess changes in symptoms (Fig. 1.8).

DeJarnette is reported as saying: 'the tableboard provided the foundation for the blocks, so that when the patient

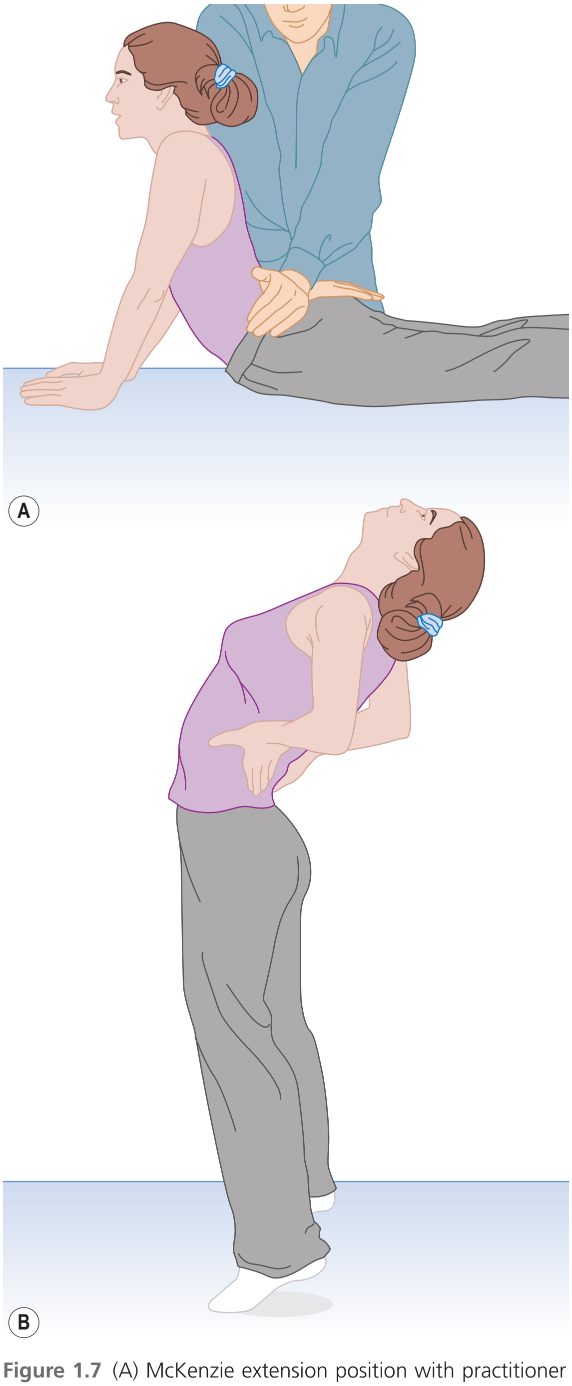

Figure 1.7 (A) McKenzie extension position with practitioner adding overpressure. (B) Patient self-application of extension.

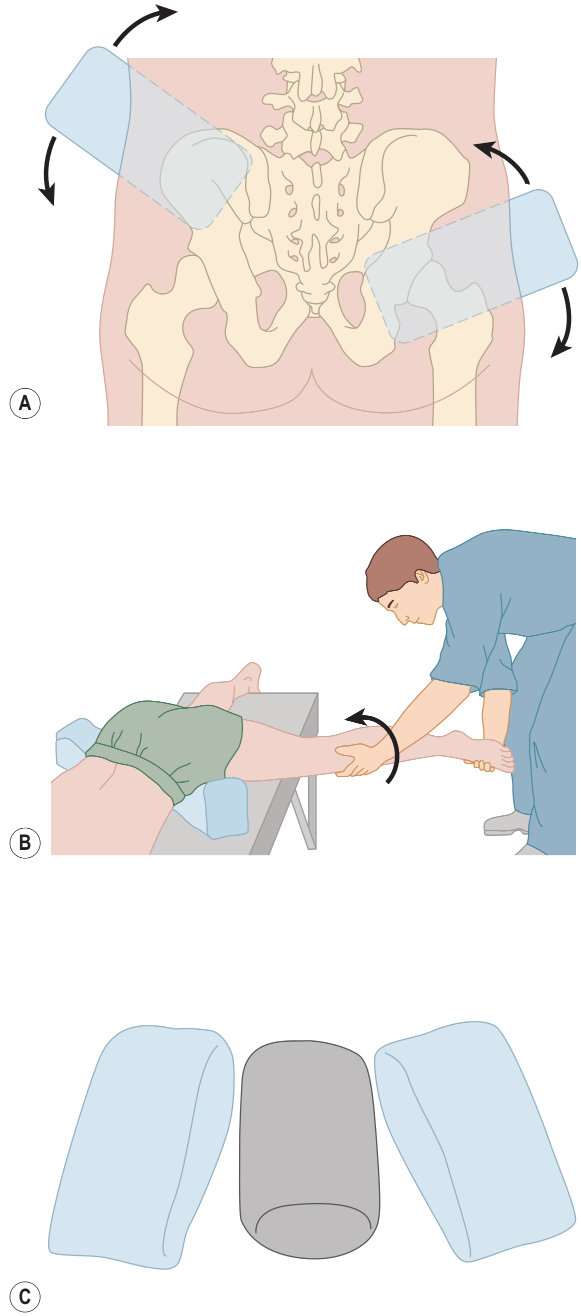

Figure 1.8 (A) Placement of blocks for particular assessment. (B) Treatment or assessment while positionally blocked. (C) Various typically shaped solid and 'air' blocks.

breathes this energy can be transmitted to motion for correction of the subluxation dysfunction' (Heese 1991).

Cooperstein (2000) has described the use of padded wedges for what he terms 'provocation testing'. One procedure involves identifying a tender or painful monitoring point – for example in the low back, and then placing the patient on the blocks in various positions that act as fulcrums, to evaluate the influence of different force vectors, by noting changes in reported pain or tenderness.

A simpler approach has also been described by Cooperstein (2007), which he suggests is more conducive to clinical practice. Instead of evaluating reported changes in a tender or painful monitoring point, the patient is asked to decide which position is more comfortable, which is preferred to the other and when different patterns of blocking are used – diagonal or sagittal, for example. SOT methods are not described more fully in this text.

11. Balanced ligamentous tension (BLT)

Tozzi (2014) has described balanced ligamentous tension (BLT) as follows:

> *BLT is a non-invasive, safe and fairly common technique in the osteopathic profession (Sleszynski and Glonek, 2005). According to BLT principles, all joints in the body are balanced ligamentous articular mechanisms that may be altered after injury, infection or mechanical stress. Therefore BLT was originally conceived as an indirect technique to address articular strains. This initially required a disengagement of tissues from their guarding position, then an exaggeration of the dysfunctional pattern into the direction of ease, up to the point when a ligamentous tensional compromise is achieved – where a tensional ligamentous balance is achieved, and a release is felt. Although specifically proposed for articular disturbances, the same principles have been applied to membranous, body fluid flow, fascial and visceral dysfunctions.*

Balanced ligamentous tension is fully described in Chapter 8.

12. Visceral techniques

(see Chapter 9)

Just as in treatment of somatic dysfunction – involving joint, muscle and fascial structures – there are indirect positional release methods that are applicable to organ/visceral dysfunction. Both functional and FPR-like approaches are used, where tone and tissue tensions are evaluated or where a 'tender' area is used as a monitor.

Visceral techniques are fully described in Chapter 9.

Visceral techniques are fully described in Chapter 8, from a counterstrain perspective.

OTHER APPROACHES

There are a variety of methods involving positional release that do not quite fit into any of the categories listed above. These range from an effective rib-release technique devised by the founder of cranial osteopathy, W. G. Sutherland and described by P. E. Kimberley (1980), to various cranial techniques described by Upledger & Vredevoogd (1983) and others, as well as fascial restriction techniques described by Dickey (1989) and variations of myofascial release methodology, modified by George Goodheart (Walther 1988) and others.

Reducing the time the position of ease is held

Goodheart (Walther 1988) has suggested that it is possible to reduce the length of time during which a 'position of ease' is maintained, without losing the therapeutic benefits potentially offered by that position being maintained for 90 seconds, or more.

There are two elements to Goodheart's suggested approach:

1. When the position of ease has been located, a 'respiration assist' is added. The nature of the respiratory strategy used depends upon the location of the tender point: if it lies on the anterior surface of the body, inhalation is used, and if on the posterior aspect, exhalation is used. This phase of breathing is held for as long as is comfortable, during which time the practitioner adds the following element.
2. A stretching of the tissues being palpated (the tender point) is introduced by means of the practitioner's fingers being spread over the tissues (Fig. 1.9).

Walther explains this approach as follows:

> *The patient takes a deep breath [the inhalation or exhalation phase being held, depending on anterior or posterior location of point] and holds it while the physician spreads his fingers over the previously tender point. The patient is maintained in the 'fine-tuned' position-of-ease with the practitioner's fingers spreading the point and respiration assist for 30 seconds, as opposed to 90 seconds required without the assisting factors. On completion the patient is slowly and passively returned to a neutral position.*

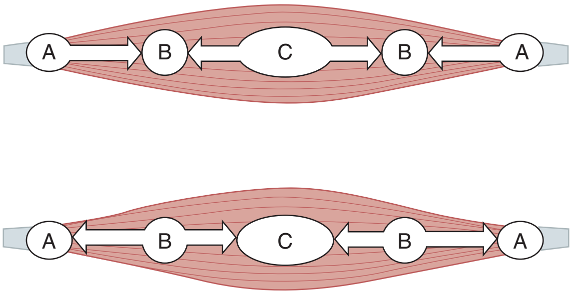

Figure 1.9 Proprioceptive manipulation of muscles. Upper: Pressure directed towards the belly of a muscle (B) from the region of the Golgi tendon organs (A) produces a toning effect, i.e.'strengthens' it. Pressure from the spindle (C) towards the belly (B) also 'strengthens' it. Lower: Pressure directed from the belly of a muscle (B) towards the Golgi tendon organs (A) produces relaxation of the muscle. Pressure towards the muscle spindle (C) from the belly of the muscle (B) also weakens the muscle.

Is Goodheart's 'respiration assist' instruction too simplistic?

It is necessary to look a little beyond the fact that clinical experience often supports Goodheart's breathing guidelines in application of counterstrain methods, in order to gain an understanding of what might be happening physiologically.

Cummings & Howell (1990) have demonstrated the effects of respiration on myofascial tension, showing that there is a mechanical effect of respiration on resting myofascial tissue (using the elbow flexors as the tissue being evaluated). They quote the work of Kisselkova & Georgiev (1976), who reported that resting EMG activity of the biceps brachii, quadriceps femoris and gastrocnemius muscles, for example 'cycled with respiration following bicycle ergometer exercise, thus demonstrating that non-respiratory muscles receive input from the respiratory centres'.

The conclusion was that:

> ***These studies document both a mechanically and a neurologically mediated influence on the tension produced by myofascial tissues, which gives objective verification of the clinically observed influence of respiration on the musculoskeletal system and validation of its potential role in manipulative therapy.***

But what is that role?

Lewit (1999) has helped to create subdivisions in the simplistic picture of 'inhalation enhances effort' and 'exhalation enhances movement'.

Among the relationships Lewit has identified are:

- movement into flexion of the lumbar and cervical spines is assisted by exhalation, and
- movement into extension of the lumbar and cervical spine is assisted by inhalation, whereas
- movement into extension of the thoracic spine is assisted by exhalation, while
- thoracic flexion is enhanced by inhalation.

The influences of breathing on the tone of extensor and flexor muscles would therefore seem to be somewhat more complex than Goodheart's suggestions indicate, with an increase in tone being evident in the extensors of the thoracic spine during exhalation, while, at the same time, the flexors of the cervical and lumbar spine are also toned.

Similarly, inhalation increases tone in the flexors of the thoracic spine and the extensors of the cervical and lumbar regions.

Goodheart's proposed pattern of breathing during application of SCS would therefore increase tone in some of the tissues being treated, while inhibiting their antagonists.

Since the 'finger spread', which he also advocates during SCS, increases strength/tone in the tissues being treated, the use of a held breath would seem to require more discrimination than the simple injunction to hold the breath during inhalation when treating flexor muscles, and during exhalation when treating extensors.

What does the finger spread do?

SCS methods act upon the muscle spindles that lie throughout the muscle, with greatest concentration in the centre, around the belly (Gowitzke & Milner 1980).

There are many more spindles found in muscles with an active (phasic) function than are found in those with a stabilizing, postural (tonic) function.

The role of spindles (based on the complex interplay between intra- and extrafusal fibres) is as a length comparator, as well as a means for supplying the central nervous system with information as to the rate of change (Fig. 1.10). Spindles also exert an effect on the strength displayed by the muscle, a phenomenon used in applied kinesiology (AK) and which Goodheart has incorporated into his version of counterstrain methodology.

Spindle density is not uniform; for example, muscles in the cervical region contain a high density of muscle spindles, especially the deep suboccipital muscles.

Peck et al. (1984) report that:

- Rectus capitis posterior minor muscles are rich in proprioceptors, containing an average of 36 spindles/g muscle.
- Rectus capitis posterior major muscles average 30.5 spindles/g muscle.

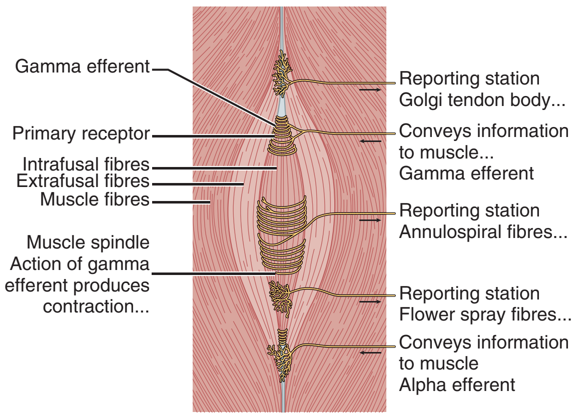

Figure 1.10 Illustration of muscle spindles, showing Golgi tendon organs and neural pathways to and from these reporting stations.

- In contrast, the splenius capitis contains 7.6 spindles/g muscle.
- Gluteus maximus contains only 0.8 spindles/g muscle.

'Manipulating' the spindles

If the practitioner's thumbs are placed about 5 cm apart over the belly of the muscle, where spindles are most densely sited, and pressure is exerted by the thumbs pushing towards each other – parallel with the fibres of the muscle in question – a weakening effect will be noted if the muscle has been previously tested and is now tested again (Fig. 1.9).

The explanation lies in the neurology, as Walther (1988) explains:

> ***The digital maneuver appears to take pressure off the intrafusal muscle fibers, causing a decrease in the afferent nerve impulse and, in turn, causing temporary [minutes at most] inhibition of the extrafusal fibers.***

This effect of 'weakening' a muscle can be reversed by means of the precisely opposite manipulation of the spindles, in which the thumbs pressing into the tissues are 'pulled' apart. This will only 'strengthen' a hypotonic or inhibited, weak muscle and will not enhance the strength of an already strong one.

The introduction of a spread of the fingers over the spindle cells, during the time when the tissues, in which the spindles lie, are being held in a position of ease, strengthens the muscle and inhibits the antagonist to that muscle; a combination of influences that it is suggested enhances the process of balancing neuromuscular function and reducing the time required for the spindle to 're-set'.

COMMONALITIES, DIFFERENCES – AND TIMING

Many of the PRT methods have in common an objective of reduction in the tone of distressed tissues associated with the dysfunction being treated.

The means whereby this is achieved vary, some (strain/counterstrain) using reduced pain levels as a guide to the comfort/ease position, and others using variations on palpated change (functional and facilitated positional release methods).

Some methods are entirely passive (SCS, functional, FPR, SOT blocks, taping), while some are active (McKenzie methods) and a few involve a combination of active and passive activity.

Apart from the variations of application, the protocol differences between the various methods often relate to details concerning how long the ease position should be held, including guideline timings such as:

- Under 5 seconds for facilitated positional release (FPR)
- 90 seconds for strain/counterstrain and functional technique
- 3 minutes or more for treatment of neurological conditions (Weiselfish 1993)
- Up to 20 minutes with some aspects of positional release therapy (D'Ambrogio & Roth 1997)
- Hours or days in taping.

Timing in clinical settings is explored in later chapters.

In Chapter 2, an outline is offered of the ways in which dysfunction evolves as a process of (failed or failing) adaptation, and how positional release methods may offer some solutions.

THIS CHAPTER

This chapter has introduced some of the history, and concepts, of 'spontaneous release by positioning', as well as many of the different versions of PRT.

NEXT CHAPTER

An overview is provided of the ways in which local and global dysfunction emerges from a background of failed or failing adaptation – offering therapeutic opportunities for interventions that include PRT.

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Chapter | 2 |

Somatic dysfunction and positional release

CHAPTER CONTENTS

The vast majority of individuals consulting manual therapists do so because of pain and/or musculoskeletal restriction. In the absence of actual pathology a useful nonspecific term that describes the background to such pain and restriction is 'somatic dysfunction'. A major purpose of this chapter is to suggest means of improving or normalizing somatic dysfunction – with the emphasis on positional release techniques (PRT), based on published evidence.

Palpation and assessment methods that help to identify *local dysfunction* – a requirement in some forms of positional release, such as counterstrain (SCS) – are detailed later in this chapter, and elsewhere in this book.

Since problems associated with 'somatic dysfunction' are the target of therapeutic intervention, that term requires definition (Box 2.1).

FAILED OR FAILING ADAPTATION AND SOMATIC DYSFUNCTION

Somatic dysfunction almost always involves failed or failing biomechanical adaptation, possibly involving:

- Overuse, e.g. repetitive strain
- Misuse, e.g. poor posture
- Underuse and disuse, e.g. lack of exercise
- Abuse, e.g. trauma or surgery.

Ageing, inflammation, fibrosis and adhesions, as well as pathologies (e.g. arthritic changes), may all be involved in the evolution and/or maintenance of somatic dysfunctions, as may a variety of biochemical (nutritional, toxic, hormonal, etc.) and psychosocial (chronic depression, anxiety, anger, fear, etc.) factors.

Selye (1956) described both local and general adaptation models that help to inform our understanding of a common feature of all our lives. The 'non-specific response of the body to any demand placed upon it' – was summarized by Selye with the word 'stress'.

Box 2.1 **Somatic dysfunction defined (AACOM 2011)**

Somatic dysfunction involves impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial and myofascial structures, and their related vascular, lymphatic and neural elements.

As a rule, when somatic dysfunction is discussed, it is in the absence of pathology. In other words dysfunction is not disease. Rather, it is an altered state of functionality that may result in symptoms, such as restriction, discomfort or pain – in the absence of pathological changes.

Somatic dysfunction, acute or chronic, may therefore be correctable, using manual treatment methods.

- The characteristics of *acute* somatic dysfunction may include tenderness, asymmetry of motion or relative position, reduced range of motion, tissue texture changes and possibly altered temperature (warmer than surrounding tissues if inflamed).
- The characteristics of *chronic* somatic dysfunction may include tenderness, fibrosis, paraesthesias and tissue contraction, restricted motion and possibly altered temperature (cooler than surrounding tissues if ischaemic).

The positional and motion aspects of somatic dysfunction are best described using at least one of three variables:

1. The position of a body part, as determined by palpation, in relation to adjacent defined structures … as, for example, 'the 4th lumbar vertebral segment is rotated left in relation to the 5th lumbar segment'.
2. The directions in which motion is freer … as, for example, in this same situation: 'the 4th lumbar segment demonstrates greater freedom in rotation to the left'.
3. The directions in which motion is more restricted … as, for example, in this same situation: 'the 4th lumbar segment demonstrates greater restriction in rotation to the right'.

These defining features of somatic dysfunction help to identify essential features that might need to be targeted clinically – whether by positional release or other methodologies – in order to restore greater freedom of motion and reduce pain.

- Apart from conditions where instability – excessive motion – may be a factor, most examples of somatic dysfunction – whether soft tissue or joint-related – involve partial or total restriction, a reduction of free motion (Wolf 1970).
- When a barrier exists that cannot painlessly be passed, unless that restriction is a structural obstacle, for example pathological changes in a joint, such as arthritis – it is likely that soft tissues are preventing further movement (see Fig. 1.1).
- Kappler & Jones (2003) have explained that: 'The word "barrier" may be misleading if it is interpreted as a wall or rigid obstacle to be overcome with a push. As a joint reaches a restriction barrier, restraints in the form *of tight muscles and fascia*, serve to inhibit further motion. We are pulling against restraints rather than pushing against some anatomic structure'.
- In the example of the fourth lumbar segment being rotated left in relation to L5 – it is possible that the barrier to free movement towards the right might be intra-articular – for example an actual arthritic change. It is more likely however, that soft-tissue features would be preventing free motion.

It is these restraints to free motion that require releasing, relaxing, modifying – and as the evidence makes clear (see Chapter 3) – PRT/SCS methods are efficiently designed to achieve or assist in achieving just such effects.

Palpation/assessment methods, outlined later in this chapter (see TARTT discussion) have, as one of their major targets, identification of reduced freedom of motion.

The ingredients of 'stress' may include any combination of biomechanical, biochemical and/or psychosocial features – interacting with the individual's unique inherited and acquired features – including the common compensatory pattern (Box 2.2).

Selye demonstrated that stress (anything to which the body is obliged to adapt) results in a pattern of adaptation, unique to each individual.

The results of the repeated postural and traumatic insults of a lifetime, combined with the effects of emotional and psychological distress, as well as the unique inherited and acquired biochemical status of each individual, will often present a confusing pattern of tense, contracted, bunched, fatigued and ultimately fibrous tissue.

Symptoms of restriction and/or pain, may involve features that are acute, subacute, chronic or that relate to acute aggravation of chronic changes.

Within those categories, clinical interventions are likely to require variations of direct and indirect modalities (such as positional release) as well as health education and rehabilitation. Our focus in this text is clearly on indirect options.

Box 2.2 Common compensatory patterns (Zink & Lawson 1979)

Fascial compensation is seen as a useful, beneficial and above all functional (i.e. no obvious symptoms result) response on the part of the musculoskeletal system, for example as a result of anomalies, such as a short leg or overuse.

Decompensation describes the same phenomenon where adaptive changes are seen to be dysfunctional, to produce symptoms, evidencing a failure of homeostatic mechanisms (i.e. adaptation and self-repair).

Zink & Lawson (1979) have described a model of postural patterning resulting from the progression towards fascial decompensation.

By testing the tissue 'preferences' (tight–loose) in different areas, Zink & Lawson maintain that it is possible to classify patterns in clinically useful ways:

- Ideal patterns (resulting in adaptive load being safely transferred to other regions)
- Well compensated patterns, which alternate in the direction of greater movement, from one spinal transition area to the next (e.g. atlanto-occipital–cervicothoracic–thoracolumbar–lumbosacral) – and which are commonly adaptive in nature
- Uncompensated patterns which do not alternate in the direction of greater movement, from one spinal transition area to the next, possibly as a result of trauma, congenital anomalies or failed adaptation.

Zink & Lawson described four transitional crossover sites where fascial tension patterns can most easily be assessed for rotation and side-bending preferences:

1. Occipito-atlantal (OA) – which correlates with the tentorium cerebelli.
2. Cervico-thoracic (CT) – which correlates with the thoracic outlet.
3. Thoracolumbar (TL) – which correlates with the respiratory diaphragm.
4. Lumbosacral (LS) – which correlates with the pelvic floor.

Their research showed that most people display alternating patterns of rotatory preference with about 80% of people showing a common pattern of L-R-L-R (termed the 'common compensatory pattern' or CCP) (Fig. 2.1A).

In their evaluation of over 1000 hospitalized patients Zink & Lawson observed that the 20% of people whose compensatory pattern did not alternate (Fig. 2.1B) had the worst health histories.

Treatment of either CCP, or uncompensated fascial patterns, has the objective of trying, as far as is possible, to create a symmetrical degree of rotatory motion at the key transitional crossover sites. The methods used to achieve symmetrical motion range from direct muscle energy approaches, to indirect positional release techniques.

It has been suggested that the origin of the common fascial compensatory pattern may be the result of fetal

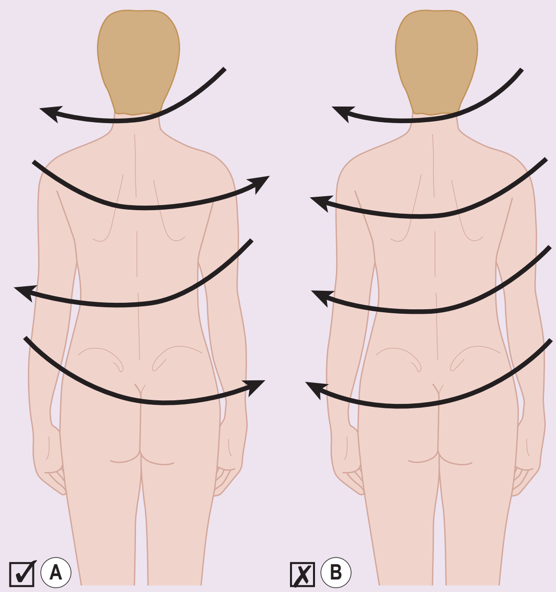

Figure 2.1 (A,B) Common compensatory pattern (CCP).

stresses, possibly relating to the position in the womb, as well as the birthing process. Pope (2003) notes that 'it is possible to observe the similarity between the fascial bias of the fetus and the common compensatory pattern in the adult'.

Davis et al. (2007) have confirmed the clinical relevance of CCP evaluation in different juvenile populations, for example in children with cerebral palsy as well as otitis media.

Assessment of tissue preference in the Zink & Lawson sequence

Occipito-atlantal area (Fig. 2.2A)

- Patient is supine.
- Practitioner/therapist sits or stands at the head of the table.
- The head is supported at the occiput and the neck is taken into full flexion so that rotation is restricted to C1/C2 only.
- The neck is gently rotated left and right to evaluate the side to which it travels more freely.

Cervico-thoracic area (Fig. 2.2B)

- With the patient supine, the first thoracic segment is examined by the practitioner (who is seated or standing at the head of the table).

Box 2.2 **Continued**

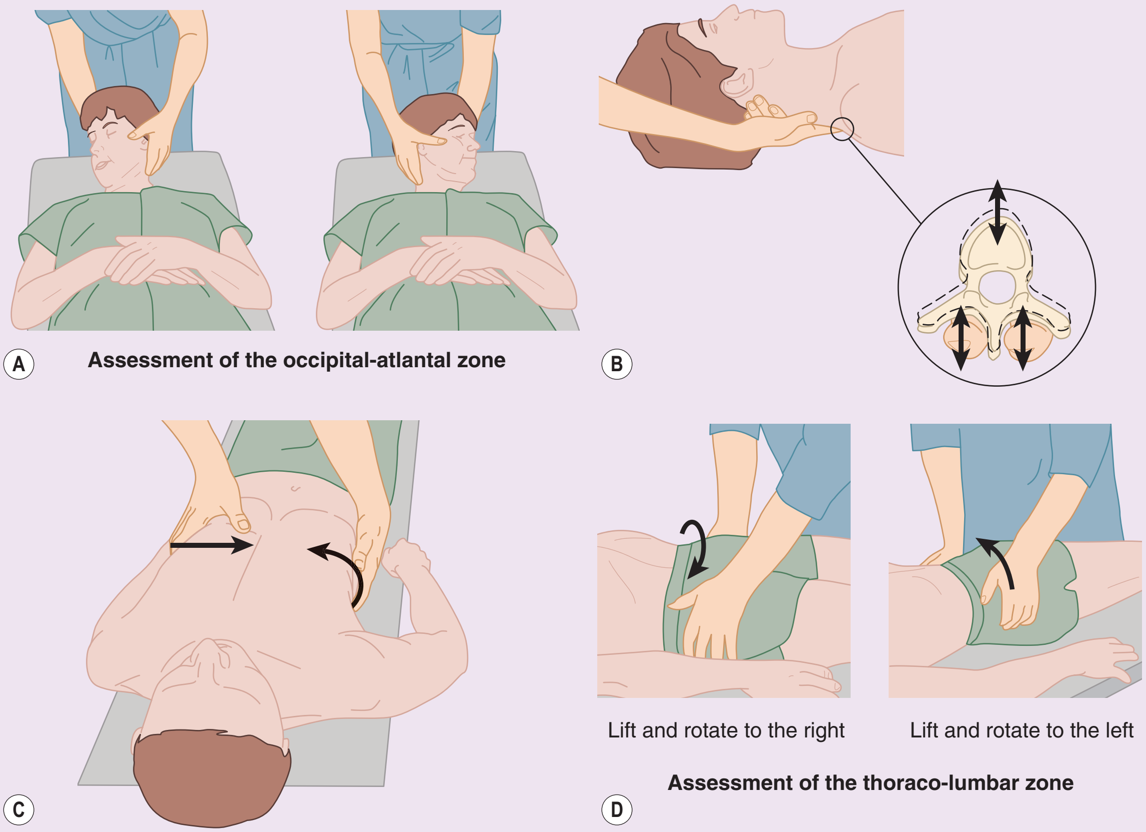

Figure 2.2 (A) Assessment of the occipital-atlantal zone. (B) Upper thoracic spring test. (C) Thoracolumbar area. (D) Assessment of the lumbo-sacral zone.

- The fingers of one hand are placed so that the upper thoracic transverse processes are lying on the palmer surface of the index and middle fingers of that hand, with the other hand supporting the patient's neck.
- An anterior compressive force is applied to the left and right transverse processes individually (Fig. 2.2B) to assess their responses to the 'springing' – in order to evaluate the preference to rotate more freely to one side or the other?
- An alternative assessment for this area is demonstrated on the accompanying video.

Thoracolumbar area (Fig. 2.2C)

- Patient is supine, practitioner/therapist at waist level faces cephalad and places hands over lower thoracic structures, fingers along lower rib shafts laterally.
- Treating the structure being palpated as a cylinder, the hands test the preference this has to rotate around its central axis, one way and then the other.
- As an additional assessment, once this has been established, the preference to side-bend one way or the other is evaluated, so that combined ('stacked') positions of ease or bind, can be established.
- By holding tissues in their 'loose' or ease positions (or by holding tissues in their 'tight' or 'bind' positions – and introducing isometric contractions, or by just waiting for a release), changes can be encouraged. (See Video 1, Chapter 1: Diaphragm release, to see this assessment used therapeutically.)

Lumbosacral area (Fig. 2.2D)

- Patient is supine, practitioner/therapist stands below waist level facing cephalad and places hands on left and right ilia, using these contacts as a 'steering wheel' to evaluate tissue preference as the pelvis is

Box 2.2 **Continued**

rotated around its central axis seeking information as to its 'tightness–looseness' (see above) preferences.

- Once this has been established, the preference to side-bend one way or the other is evaluated, so that combined ('stacked') positions of ease or bind, can be established.
- By holding tissues in their 'loose' or ease positions (or by holding tissues in their 'tight' or 'bind' positions – and introducing isometric contractions, or by just waiting for a release) changes can be encouraged.
- These general evaluation approaches, which seek evidence of compensation and of global adaptation patterns involving loose and tight tissues, offer a broad means of commencing rehabilitation, by altering structural features associated with dysfunction.

Why awareness of the patient's CCP status can be useful in considering employment of positional release methodology

As an individual's adaptation potential becomes exhausted, at some point, if stresses (adaptation demands) are constant or increasing, symptoms will emerge. Just as an elastic band will fray then snap when stretched too far.

How is the practitioner to know when an individual, or a particular region, joint or area, has reached its 'elastic' limit?

Overlying adaptation patterns, such as the CCP, together with ageing and whatever unique adaptive changes have been acquired, or are current (overuse, misuse, disuse, trauma), inevitably lead to tissue failure and symptoms – generally or locally.

The potential implication for an individual who demonstrates a decompensated pattern (see Box 2.2 for details of this, particularly Fig. 2.1B) may have direct implications relative for use of indirect – positional release – treatment choices.

Zink and Lawson's findings were partly based on the findings after evaluating the health status of well over 1000 individuals. They were able to correlate poor (i.e. non-alternating) compensation patterns with poor general health. Clinical experience suggests that these are the same individuals who are likely to be poor responders to adaptive demands resulting from manual therapies, in which changes are forcibly induced, for example when high velocity manipulation, or passive stretching methods, are employed.

On the other hand – where indirect modalities are used, as outlined in Chapter 1, Box 1.1 – in which dysfunctional tissues *are not forcibly modified, where responses are invited rather than demanded* – negative adaptive demands appear to be minimized.

Note: The clinical implications are therefore that, where a decompensated pattern exists, positional release methods should be the first choice when attempting to modify somatic dysfunction.

Conclusion and clinical implications

The more dysfunctional the individual, and the greater the adaptive burden, the more appropriate indirect, positional release methods become – since they impose the least additional adaptive demand on the system.

PRT: INVITING CHANGE RATHER THAN DEMANDING IT

It is useful to recognize that all forms of treatment, manual, chemical, psychological, etc., invite responses, some more forcibly than others.

> ***In other words all treatment is a form of imposed stress.***

When an individual's self-regulating, homeostatic, functions respond to such therapeutic demands positively, the method used can be seen to have matched the adaptation potential of the individual.

When results are poor, the treatment methods used may have misjudged the degree of remaining resilience in the system – the potential for a positive response – or may simply be inappropriate to the situation.

In manual therapy, indirect positional release methods (see below for discussion of barriers), such as those described in Chapter 1, provide an *opportunity* for a beneficial response – they do not impose change, they offer it. In other words, indirect positional release methods cannot overwhelm remaining local or general adaptation reserves, since they provide an environment ('position of ease') for spontaneous changes and so avoid forcing a response.

In contrast, direct methods, such as high velocity manipulation or muscle energy techniques and passive or active stretching, impose demands – sometimes beneficially, and sometimes not.

This does not make direct methods inappropriate in all situations, however it does make indirect methods less stressful – and frequently successful – in all situations.

The acute/chronic spectrum

Therapeutic interventions need to take account of these variables, since it is obviously undesirable to apply the same manual methods that may be suitable for chronic indurated tissues, to acutely irritated ones.

- 'Acute' can be defined as recently acquired pain, and/or dysfunction, with implications of some degree of inflammation.
- 'Acute' can also relate to aggravation of pre-existing chronic dysfunction.

As will become clear in later chapters, while PRT/SCS methods are potentially clinically useful in both acute and chronic dysfunctional states, there is a great deal of evidence (see Chapter 3 in particular), suggesting that the value of PRT/SCS may be particularly valuable in acute settings.

In summary therefore, PRT variations are more likely to be of greatest clinical value in acute, painful conditions, or when treating frail, sensitive, compromised individuals, rather than in low-grade chronic situations.

Terminology

Barriers, bind, ease, tight, loose, etc.

In osteopathic positional release methodology (strain/counterstrain, functional technique, etc.) the terms 'bind' and 'ease' are often used to describe what is noted as unduly 'tight' or too 'loose' (Jones 1981).

In manual medicine generally, when joint and soft-tissue 'end-feel' is being evaluated, it is common practice to make sense of such findings by comparing sides – identifying assymetry, which is one of the main features of the spectrum of palpation/assessment findings, described below in the notes on TARTT.

The characterization of features described as having a soft or hard end-feel; or as being 'tight or loose'; or as demonstrating feelings of ease or bind, may be a deciding factor as to which therapeutic approaches are introduced, and in what sequence (Kaltenborn 1985).

These findings (tight–loose, ease–bind, etc.) have an intimate relationship with the concept of barriers, which need to be identified in preparation for direct treatment methods (i.e. where action is forcefully directed towards the restriction barrier, towards bind, tightness) or indirect techniques (where action involves movement away from barriers of restriction, towards ease, looseness and comfort in order to allow change to evolve).

Ward (1997) has noted, 'tightness suggests tethering, while looseness suggests joint and/or soft tissue laxity, with or without neural inhibition'.

It is worth re-emphasizing that the tighter side may be the more normal side, and also that clinically, it is possible that in some circumstances, restriction barriers may best be left unchallenged, in case they are offering a degree of protective benefit (see Fig. 1.1).

A therapeutic formula

When confronted with acute or chronic symptoms, emerging from a background of failed or failing adaptation, a suggested formula for management can be summarized:

- Reduce or remove adaptive demands without imposing excessive additional adaptive load.
- Enhance functionality so that adaptive demands can be better managed – possibly by encouraging a more resilient adaptation potential (see below).
- Treat symptoms, for example modify pain in situations where neither of the other options are possible.

PALPATORY LITERACY: INTRODUCING 'TARTT'

The application of positional release methodology requires a high degree of palpation skill – *palpatory literacy* – since the ability to 'read' the responses of tissues to positioning is critical, especially in application of functional methodology.

Skilful palpation allows for discrimination between the various states and stages of dysfunction, with some degree of accuracy.

When somatic dysfunction is palpated, a number of characteristic qualities are usually identifiable.

To remember these features, various acronyms have been suggested involving the first letters of keywords, such as sensitivity (or tenderness); tissue texture changes; asymmetry and range of motion – resulting variously in STAR, ARTT or TART. By adding a fifth element – temperature, we end up with our preferred acronym, TARTT:

T = 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 clinicians to be able to distinguish normal from abnormal (Fryer & Johnson 2005).

A = asymmetry. DiGiovanna (1991) links the criteria of asymmetry to a positional focus stating that the 'position of the vertebra or other bone is asymmetrical'. Greenman (1996) broadens the concept of asymmetry by including functional in addition to structural asymmetry.

R = restricted range of motion. Alteration in range of motion can apply to a single joint, several joints or a region of the musculoskeletal system. The abnormality may relate to either restriction or increased mobility, and includes assessment of *quality* of movement and 'end-feel'.

T = tenderness to palpation pressure. Undue tissue tenderness may be evident – such local areas of sensitivity have been termed 'hyperalgesic skin zones' (Lewit 1999). Pain provocation and reproduction of familiar symptoms are often used to localize somatic dysfunction.

T = temperature change (most probably warmer if acute; cooler if chronic).

Not all these features are always apparent on palpation of somatic dysfunction, however changes in tissue texture and range of motion are almost always apparent (Gibbons & Tehan 2009).

A TARTT shortcut: drag palpation

Czech physical medicine pioneer, Karel Lewit (1999), suggested that:

- A light stroking of the skin that produces a sensation of 'drag' (apparently the result of increased hydrosis), may offer pinpoint accuracy of location of local dysfunction. The degree of pressure required is minimal – skin touching skin is all that is necessary – a 'feather-light touch'. Try removing a watch or bracelet and then lightly run a finger across the skin that was under the strap, as well as over the adjacent skin. 'Drag' will be immediately apparent as a result of increased friction/resistance.
- Reflexogenic activity may be involved, indicating the possible presence of a 'hyperalgesic skin zone', potentially related to dysfunction, such as myofascial trigger points.
- Other features of hyperalgesic skin zones ('tender point areas') include local loss of skin elasticity – as well as resistance to smooth gliding of skin as it is moved on underlying tissues. These palpation methods can be used to refine identification of the location of tender points that may reflect underlying dysfunction.
- And of course they also contain the major elements of TARTT – altered texture, asymmetry, tenderness and reduced range of motion.

Note: TARTT palpation exercises can be found in Chapter 6, together with video demonstrations.

COMPARING SCS PALPATION WITH STANDARD METHODS

McPartland & Goodridge (1997) tested the value of osteopathic palpation procedures (modifying the acronym STAR or ARTT to TART) specifically to evaluate the accuracy of positional release palpation, using Jones's strain/counterstrain methodology.

This study addresses five questions:

1. What is the inter-examiner reliability of diagnostic tests used in strain/counterstrain technique?
2. How does this compare with the reliability of the traditional osteopathic examination ('TARTT' exam)?
3. How reliable are different aspects of the TARTT exam?
4. Do positive findings of Jones's points correlate with positive findings of spinal dysfunction?
5. Do osteopathic students find TARTT tests reliable when using SCS?

In this study examiners palpated for tender points which corresponded to those listed by Jones (1981) for the first three cervical segments (Fig. 2.3). (See also Figure 4.4, Chapter 4.)

These points were located by means of their anatomical position as described in Jones's original strain/counterstrain textbook, and were characterized as being areas of 'tight' nodular myofascial tissue.

The TART examination did not palpate for temperature, but comprised assessment for:

- Tender paraspinal muscles
- Asymmetry of joints
- Restriction in ROM
- Tissue texture abnormalities.

Of these, zygapophyseal joint tenderness and tissue texture changes were the most accurate.

In Jones's methodology, the location of the tender point is meant to define the *nature* of the dysfunction.

However, McPartland & Goodridge found that: '*Few Jones points correlated well with the cervical articulations that they presumably represent*'. Nevertheless, they did find that overall use of Jones's tender points (i.e. seeking soft-tissue tenderness) was a more accurate method of localizing dysfunction in symptomatic patients, than use of joint tenderness evaluation in the TARTT exam, and that '*students performed much better at SCS diagnosis than TARTT diagnosis*'.

Paulet & Fryer (2009) evaluated the reliability of palpation for tissue texture changes paraspinally in the TARTT examination, in individuals with reported tenderness, and found that agreement between therapists was 'fair'.

It is suggested that practitioners and therapists should have the opportunity to evaluate and palpate normal individuals and tissues, where pliable musculature, mobile joint structures and sound respiratory function is evident, so that when dysfunctional examples are assessed, these can be more readily identified.

Apart from standard functional examination, it is important for practitioners and therapists to acquire the abilities to assess by observation and touch, re-learning skills familiar to older generations of 'low-tech' healthcare providers.

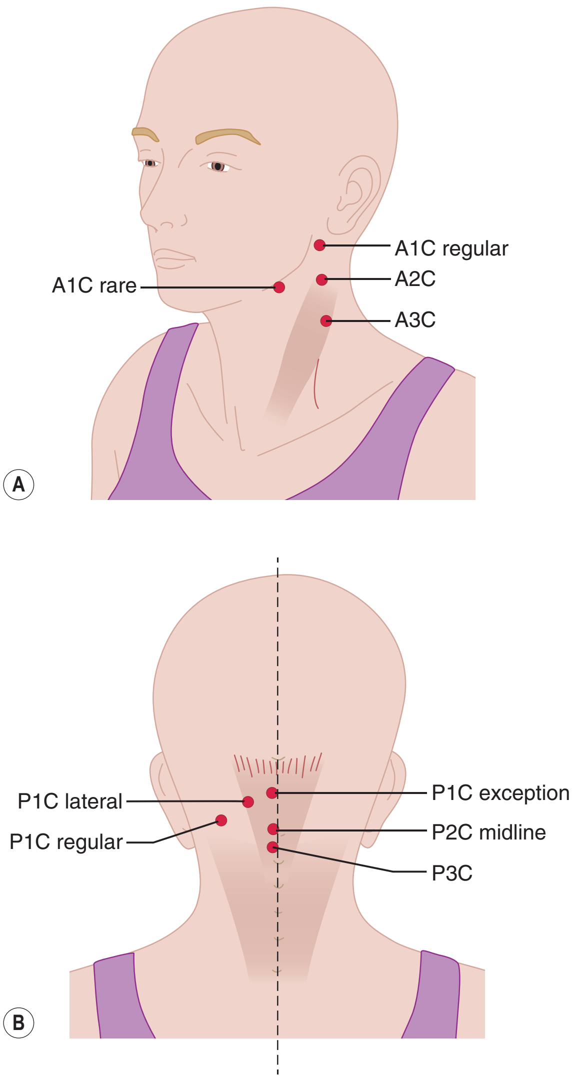

Figure 2.3 (A,B) Location of left-sided tender points. Right-sided Jones's tender points are located at mirror-image positions. A, anterior; P, posterior.

WHAT ARE THE LOCAL SIGNS AND FEATURES OF DYSFUNCTION?

Evaluation of global, whole-body patterns by observation, palpation and assessment should seek evidence of:

- What's short?
- What's tight?
- What's contracted?
- What's restricted?
- What's weak?
- What's out of balance?
- Are firing sequences abnormal?
- What has happened – overuse, misuse, trauma (abuse), disuse – to encourage or maintain dysfunction?
- What is the patient doing, or not doing, that aggravates these changes?
- What can be done to help these changes to improve or to normalize?

The question of *why* tissues become '*functionally and structurally, three-dimensionally asymmetrical*' needs some consideration, since out of the reasons for the development of somatic dysfunction emerge possible therapeutic and rehabilitation strategies.

The therapeutic objectives include the need to reduce the adaptive burden that is making demands on the structures of the body, while, at the same time, attempting to enhance functional integrity, so that the structures and tissues involved can better handle the abuses and misuses to which they are routinely subjected.

Once assessment and palpation evidence is available the application of clinical reasoning is required, based on a combination of evidence and experience, in order to determine optimal treatment approaches – in particular whether positional release methods are pertinent to the patient's needs.

Identifying general somatic dysfunction

The identification of local dysfunction – utilizing the TARTT approach – has been described because a key element of the successful use of SCS involves identification and monitoring of localized inappropriate areas of tissue tenderness – tender points.

In some cases, it may be necessary and useful to assess individual joints for their ranges of motion, and individual muscles, and groups of muscles, for flexibility, strength, stamina, shortness, etc., as well as for the presence or not of myofascial trigger points within them.

Investigation of the nature and character of general somatic dysfunction is not a feature of this book, as it is assumed that practitioners and therapists will have been trained in the skills required to identify and differentiate the multiple forms of musculoskeletal distress with which they are regularly confronted.

Observation, palpation, functional assessments and tests, as well as the use of imaging in relation to clinically relevant symptoms – provide the evidence from which to build a clinical picture.

All such assessments and evaluations are necessary in specific circumstances, however it is also useful to have – along with the Zink sequence (Box 2.2) – a number of more general screening tools which indicate current levels of functionality, and that can be repeated over time to evaluate progress, as outlined in Box 2.3.

Box 2.3 **General dysfunction indicators**

Three general indicators that offer rapid, clinically useful indications of function/dysfunction, are briefly outlined in this section:

- Crossed syndrome patterns – indicators of relative postural alignment (Janda 1983) together with representative functional assessments.
- Assessment of one-legged balance, eyes open and eyes closed – indicator of neurological integration between intero- and exteroceptor input, central processing efficiency and motor control (Bohannon et al. 1984).
- Evaluation of core stability – an indicator of relative efficiency of core muscles in protection of the spine (Norris 2000).

Crossed syndrome patterns

Upper crossed syndrome (Fig. 2.4)

This pattern is characterized by the following features:

- shortness and tightness of pectoralis major and minor, upper trapezius, levator scapulae, the cervical erector spinae and sub-occipital muscles, along with
- lengthening and weakening of the deep neck flexors, serratus anterior, lower and middle trapezii.

As a result, the following features develop:

1. The occiput and C1/2 become hyperextended with the head pushed forward ('chin-poke').
2. The lower cervical to fourth thoracic vertebrae becomes posturally stressed as a result.
3. The scapulae becomes rotated and abducted.
4. This alters the direction of the axis of the glenoid fossa, resulting in the humerus needing to be stabilized by additional levator scapula and upper trapezius activity, together with additional activity from supraspinatus.

The result of these changes is greater cervical segment strain plus referred pain to the chest, shoulders and arms. Pain mimicking angina may be noted plus a decline in respiratory efficiency.

The solution, according to Janda, is to be able to identify the shortened structures and to release (stretch and relax) them, followed by re-education towards more appropriate function. Positional release alternatives are described in later chapters.

Lower crossed syndrome (Fig. 2.4)

This pattern is characterized by the following features:

- shortness and tightness of quadratus lumborum, psoas, lumbar erector spinae, hamstrings, tensor fascia lata and possibly piriformis, along with
- lengthening and weakening of the gluteal and the abdominal muscles.

The result of these changes is that the pelvis tips forward on the frontal plane, flexing the hip joints and producing lumbar lordosis and stress at L5–S1 with pain and irritation.

A further stress commonly appears in the sagittal plane leading the pelvis to be held in increased elevation, accentuated when walking, resulting in L5–S1 stress in the sagittal plane. One result of this is low back pain. The combined stresses described produce instability at the lumbodorsal junction, an unstable transition point at best.

Part of the solution for an all too common pattern such as this, is to identify the shortened structures and to

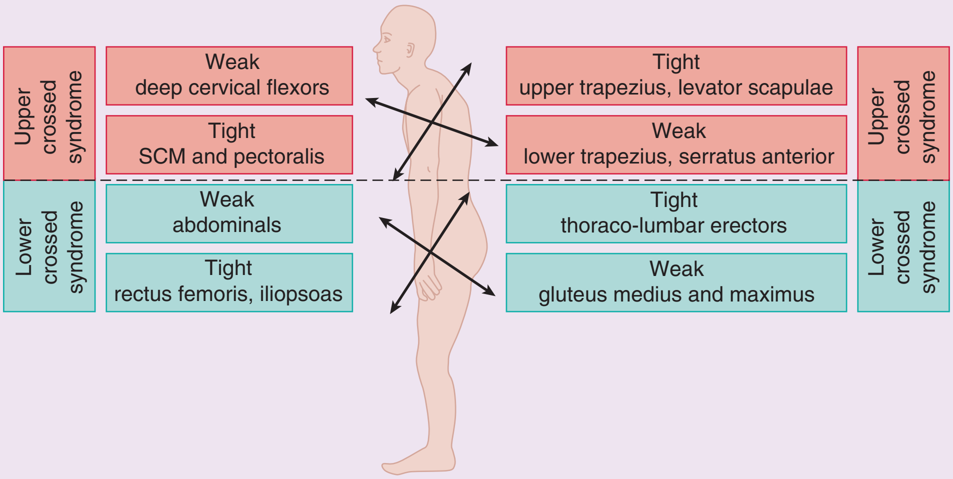

Figure 2.4 Upper and lower crossed syndromes.

Box 2.3 **Continued**

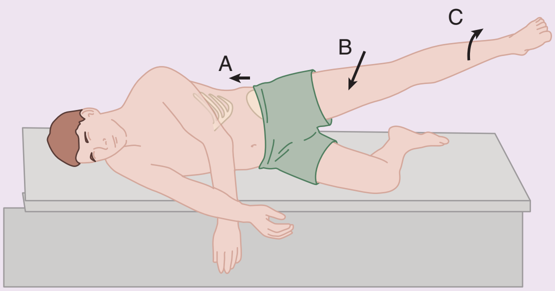

Figure 2.5 Janda's hip abduction test which, if normal, occurs without: A, 'hip hike'; B, hip flexion or C, hip external rotation.

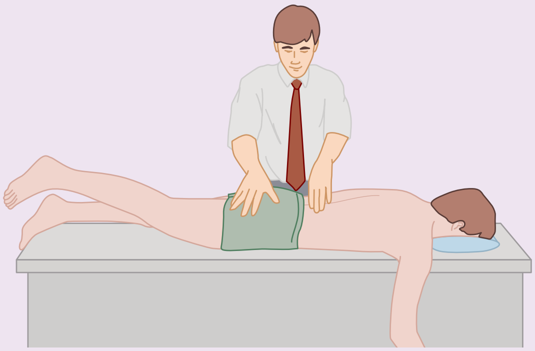

Figure 2.6 Janda's hip extension test. The normal activation sequence is thought to be gluteus maximus, hamstrings, contralateral erector spinae, ipsilateral erector spinae (Janda 1986).

release them, followed by re-education of posture and use. Positional release approaches are described in later chapters.

Upper and lower crossed syndromes

Specific functional assessments

Hip abduction test (Janda 1983) (Fig. 2.5)

Observation assessment and/or palpation assessment may be utilized.

Observation:

- The patient lies on the side, ideally with head on a cushion, with the upper leg straight and the lower leg flexed at hip and knee, for balance.
- The practitioner, who is observing, not palpating, stands in front of the person and toward the head end of the table.

Normal is represented by pure hip abduction to 45° with 'hinging' occurring at the hip joint level.

Abnormal is represented by hinging occurring at the waist level and/or:

- hip flexion during abduction, suggesting tensor fascia lata (TFL) shortness
- the leg externally rotating during abduction, suggesting piriformis shortness
- 'hip-hiking', suggesting quadratus lumborum shortness (and gluteus medius weakness)
- posterior pelvic rotation, suggesting short antagonistic hip adductors.

Palpation:

- The practitioner stands behind the side-lying patient, with one or two finger pads of the cephalad hand on the tissues overlying quadratus lumborum (QL), approximately 2 inches (5 cm) lateral to the spinous process of L3.
- The caudad hand is placed so that the heel rests on gluteus medius and the finger pads on tensor fascia lata (TFL).
- The firing sequence of these muscles is assessed during hip abduction.
- If the QL fires first (indicated by a strong twitch or 'jump' against the palpating fingers), it is overactive and short.
- The ideal sequence is the TFL contracting first, followed by gluteus medius and finally QL (but not until about 20–25° of abduction of the leg).
- If either TFL or QL are overactive (fire out of sequence) then they will have shortened, and gluteus medius will be inhibited and weakened (Janda 1986).

Hip extension test (Fig. 2.6)

- The patient lies prone and the therapist stands to the side, at waist level, with the cephalad hand spanning the lower lumbar musculature and assessing erector spinae activity, left and right (Fig. 2.6).
- The caudal hand is placed so that its heel lies on the gluteal muscle mass, with the fingertips resting on the hamstrings on the same side.
- The person is asked to raise that leg into extension as the therapist assesses the firing sequence.
- Which muscle fires (contracts) first?
- The normal activation sequence is: (1) gluteus maximus, (2) hamstrings, followed by (3) contralateral erector spinae and then (4) ipsilateral erector spinae.
- *Note*: Not all clinicians agree that this sequence is correct; some believe the hamstrings should fire first, or that there should be a simultaneous contraction of hamstrings and gluteus maximus – but all agree that the erector spinae should not contract first.
- If the erectors on either side fire (contract) first, and take on the role of gluteus maximus as the prime movers in the task of extending the leg, they will

Box 2.3 **Continued**

become shortened and will further inhibit/weaken the gluteus maximus.

- Janda et al. (1996) observed: '*The poorest pattern occurs when the erector spinae on the ipsilateral side, or even the shoulder girdle muscles, initiate the movement and activation of gluteus maximus is weak and substantially delayed … the leg lift is achieved by pelvic forward tilt and hyperlordosis of the lumbar spine, which undoubtedly stresses this region*'.
- If on extension of the leg hinging occurs in the low back rather than at the hip, this is regarded as indicating an imbalanced response.

Assessment of balance

The extremely complex relationship between balance and the nervous system (with its interoceptive, proprioceptive and exteroceptive mechanisms) also involves a variety of somatic and visceral motor output pathways (Charney & Deutsch 1996). Maintaining body balance and equilibrium is a primary role of functionally coordinated muscles, acting in task specific patterns, and this is dependent on normal motor control (Winters & Crago 2000).

Single leg stance balance tests (Bohannon et al. 1984)

This is a reliable procedure for information regarding vulnerability and stability, as well as regarding neurological integration and efficiency (Fig. 2.7).

Method:

- The barefoot patient is instructed to raise one foot up without touching it to the support leg.
- The knee can be raised to any comfortable height.
- The patient is asked to balance for up to 30 seconds with eyes open.
- After testing standing on one leg, the other should be tested.
- When single leg standing with eyes open is successful for 30 seconds, the patient is asked to:
  - identify something on a wall opposite, and to then close the eyes while visualizing that spot
  - an attempt should be made to balance for 30 seconds.

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) practising this balance exercise, the time achieved in balance with eyes closed will increase.

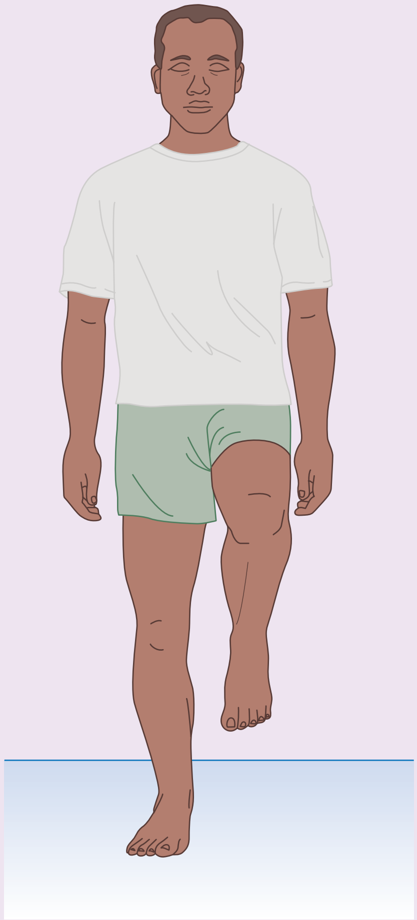

Figure 2.7 Single legged stance for balance assessment.

More challenging balance exercises can also be introduced, including use of wobble boards and balance sandals.

As relative imbalances between antagonist muscle groups are normalized ('tight–loose'), eyes closed balance as a function dependent on proprioceptive input and interpretation should improve spontaneously. Positional release methods can assist in this process.

Core stability assessment

Core stabilization assessment and exercises

Both the abdominal musculature and the trunk extensors are important in offering stability to the spine (Cholewicki & McGill 1996).

Box 2.3 **Continued**

A variety of exercises have been developed to achieve core stability involving the corset of muscles which surround, stabilize and, to an extent, move the lumbar spine, such as transversus abdominis, the abdominal oblique muscles, diaphragm, erector spinae, multifidi, etc. (Liebenson 2004).

In order to evaluate the current efficiency of stabilization the following method can be used (it can also be turned into a training exercise if core stability is deficient).

Basic 'dead-bug' exercise/test

A 'coordination' test that assists in evaluating the patient's ability to maintain the lumbar spine in a steady state during different degrees of loading has been developed by Hodges & Richardson (1999).

This 'dead-bug' exercise easily becomes a core stability exercise if repeated regularly:

- The patient adopts a supine hook-lying position (Fig. 2.8).
- One of the patient's hands can usefully be placed in the small of the back so that (s)he can be constantly aware of the pressure of the spine towards the floor – an essential aspect of the exercise.
- The patient is asked to hollow the back, bringing the umbilicus toward the spine/floor, so initiating co-contraction of transversus abdominis and multifidus, and to maintain this position as increasing degrees of load are applied by either:
    a. Gradually straightening one leg by sliding the heel along the floor. This causes the hip flexors to work eccentrically and if this overrides the stability of the pelvis it will tilt. Therefore, if a pelvic tilting/increased lumbar lordosis is observed or palpated before the leg is fully extended, this suggests *deep abdominal muscular insufficiency* involving transversus abdominis and internal obliques.
    b. Once the basic stabilization exercise of hollowing the abdomen – while maintaining pressure to the floor, is achievable without the breath being held, more advanced stabilization exercises may be introduced.
    c. These involve, in a graduated way, introducing variations on lower limb or trunk loading – for example raising one leg from the floor, then when this is easily achieved, both legs, then when this is easily achieved raising these further and 'cycling' – all the while maintaining a braced core abdominal region, with the lumbar spine pressed toward the floor (confirmed by observation) while breathing normally.

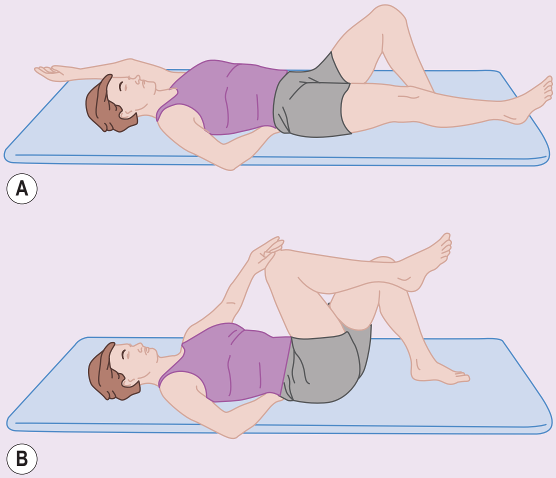

Figure 2.8 (A,B) Basic 'dead-bug' exercise to test and enhance core stability.

As well as abdominal tone and stability, it is necessary to encourage extensor function to be optimal and coordinated with abdominal muscle function.

All these toning and stabilizing activities are enhanced by normalizing the imbalances demonstrated in the crossed syndrome patterns (above), and positional release methodology can be a key element in those processes.

Recommended further reading:
Cook G. 2010. Movement: functional movement systems: screening, assessment, corrective strategies. Lotus Publishing, Chichester, UK.
Johnson J. 2012. Postural assessment. Human Kinetics, Champaign, IL.
Key J. 2010. Back pain – a movement problem: a clinical approach incorporating relevant research and practice. Elsevier, Edinburgh.
Myers T. 2008. Anatomy trains: myofascial meridians for manual and movement therapists, 2nd edn. Elsevier, Edinburgh.
Page P, Frank C, Lardner R. 2012. Assessment and treatment of muscle imbalance. Human Kinetics, Champaign, IL.

Myofascial trigger point assessment

In addition to these assessments, the presence of localized dysfunction, such as myofascial trigger points, within the soft tissues requires identification, for example using the TARTT approach. A question arises as to the similarities and differences between 'tender points' and 'trigger points' and this is discussed in Box 2.4.

Box 2.4 Trigger points–tender points – similarities and differences

The most basic comparison of tender and myofascial trigger points (MTP) can be:

- Trigger points are always tender.
- Tender points are not always trigger points.

In the therapeutic use of SCS, a tender point is employed as a monitor during positioning of the associated tissues – in an attempt to reduce perceived discomfort by 70% or more – in order to identify the 'position of ease'.

In that context – whether the tender point is or is not also a trigger point is irrelevant.

In the context of the treatment of myofascial pain, where MTP are thought to be major factors in pain production, the level of pain or tenderness of the point, when compressed or stretched, may be used as a means of establishing pain levels before and after treatment – whatever form that takes.

In some instances, SCS alone is used to attempt deactivation of trigger points. In Chapter 6, an integrated sequence of manual methods, including SCS, is described (INIT – integrated neuromuscular inhibition technique).

A variety of other manual – and instrument assisted – methods are also used in treatment of MTP.

Simons et al. (1999) discussed a variety of what they term *'trigger point release' procedures, ranging from direct pressure to a range of stretching possibilities, and including PRT routines (such as SCS), which they refer to as 'indirect techniques'*. They conclude that the most successful use of PRT in treating trigger points is likely to be for those points which are close to attachments, rather than the triggers found in the belly of muscles, which Simons and Travell suggest are likely to benefit from more robust treatment methods.

Positional release in general and SCS in particular, as well as further details on the trigger point phenomenon are outlined in Chapter 6.

GENERAL TREATMENT OPTIONS

PRT and a broad therapeutic approach

Ward (1997) has described methods for restoration of '*three-dimensionally patterned functional symmetry*'.

Identification of patterns of ease–bind or loose–tight, in a given body area, or the body as a whole, should emerge from sequential assessment of muscle shortness and restriction, palpation or any comprehensive evaluation of the status of the soft tissues of the body.

- Appropriate methods for release of areas identified as tight, restricted or tethered might usefully involve soft-tissue manipulation methods, such as myofascial release (MFR) – direct or indirect; muscle energy techniques (MET); neuromuscular technique (NMT); positional release technique (PRT), singly or in combination, plus other effective manual approaches.
- Identification and appropriate deactivation of myofascial trigger points contained within these soft tissue structures should be a priority (Box 2.4).
- If joints fail to respond adequately to soft-tissue mobilization, the use of articulation/mobilization or high-velocity thrust methods may be incorporated, as appropriate to the status (age, structural integrity, inflammatory status, pain levels, etc.) of the individual.
- It is suggested, however, that in sensitive or acute situations, positional release methods offer a useful first-line of treatment with little or no risk of exacerbating the condition.
- Re-education and rehabilitation (including homework) of posture, breathing and patterns of use, in order to restore functional integrity and prevent recurrence, as far as is possible.
- Exercise (homework) has to be focussed, time-efficient and within the patient's easy comprehension and capabilities, if compliance is to be achieved.

A study that illustrates the potential clinical benefit of use of positional release methods was conducted by Barnes et al. in 2013 and this is described in Box 2.5.

What we can learn from this study

The study detailed in Box 2.5 emphasizes several important points. First, that the palpation of somatic dysfunction can be accurate and relevant clinically, and that quantification of the degree of soft-tissue change may be enhanced by use of modern technology, such as – in this case – a durometer. Second, and possibly counterintuitively, one of the least invasive approaches, an indirect counterstain method, produced the most immediate changes in stiffness in dysfunctional tissues.

Box 2.5 **The Barnes study**

One way of evaluating the potential for manual treatment methods is to measure the degree of 'tissue stiffness' – before and after treatment – to evaluate change. Any change – whether an increase or a reduction in stiffness in tissues, following treatment or activity, is termed *hysteresis*. A study to measure hysteresis (fascial stiffness modification), in response to different manual methods, was undertaken by Barnes et al. (2013).

The protocol was as follows:

1. Cervical articular somatic dysfunction (SD) was identified in 240 individuals, using carefully controlled palpation assessment methods – involving the TART(T) palpation protocol – as described earlier in this chapter.
2. Once SD had been identified, and before treatment (or sham treatment) was applied, tissue stiffness was measured using an instrument designed for that purpose – a durometer.
3. Four different techniques (balanced ligamentous tension – as described in Chapter 8; muscle energy technique – which is not discussed in this book covering indirect methods; high velocity manipulation, also not discussed; and strain/counterstrain, see Chapters 3 and 4. These four methods, as well as a sham technique, were randomly applied (once) to the participants in the study, to the most severe area of identified somatic dysfunction – after which (10 minutes after treatment) the changes in tissue 'stiffness' (i.e. hysteresis) were measured, using a durometer.
4. The durometer measurement of the myofascial structures overlying each cervical segment (pre- and post-treatment) used a single consistent piezoelectric impulse. This helped to identify four different characteristics: fixation, mobility, frequency and motoricity (described as '*the overall degree of change of a segment*'), including 'resistance' and range of motion. Put simply, the measurement identified changes on mobility and stiffness.
5. When the degree of restriction/stiffness present, before and after the single use of one of the four (or sham) methods were used, the results showed that strain/counterstrain (see Chapters 3 and 4 in particular) produced the greatest changes, compared with the other methods used, or sham treatment.

The results of this study suggest that the behaviour of soft tissues associated with restricted joints (neck in this case) can be rapidly modified (becoming 'less stiff') using *any of the four methods* tested – *with the greatest effect observed following strain/counterstrain*.

Of possible interest are some of the concluding remarks of the researchers in this study:

- '*It became apparent that in many instances, treating a single identified key dysfunction sometimes modified other underlying or adjacent somatic dysfunctions*'.
- The results 'seemed to suggest that different cervical levels responded better to specific treatments'.
- '*Classification of the dysfunctions as "acute" (ostensibly containing more fluid in the tissues) or "chronic" (ostensibly stiffer tissues) might also lead to sub analysis and better interpretation of the … changes*'.

But how could such significant changes in 'stiff' tissues result from what is effectively a 'non-treatment', where tissues are simply placed into a position of reduced tension for a brief period?

A series of research studies are discussed in Box 2.6 and Chapter 3, which offer possible explanations of mechanisms involved when indirect methods, such as counterstrain, and indirect myofascial release, are used clinically.

Both of these positional release variants – and others – are described in Chapter 4.

Precautions

Positional release methods, such as SCS should be used with care in cases involving:

- Open wounds
- Recent sutures
- Healing fractures
- Haematoma
- Hypersensitivity of the skin
- Systemic localized infection
- Where soft tissue rigidity/extreme stiffness may represent protective guarding of vulnerable structures.

THIS CHAPTER

The focus of this chapter has been to offer an overview of some of the key elements that lead to somatic dysfunction, together with options for identifying the patterns that develop locally and globally.

Therapeutic options emerge from that background – with evidence that positional release methodology should be considered in a wide range of conditions and situations, in isolation or in combination with other methods, since these methods impose a minimal adaptive load on already decompensated tissues or systems.

NEXT CHAPTER

Christopher Kevin Wong offers a detailed evaluation of the research evidence that supports the use of strain/counterstrain.

Box 2.6 **Understanding the effects of SCS**

Various explanations have been suggested that may account for the clinical effects of positional release in general, and SCS in particular, for example:

- *Neurological changes* might involve muscle, fascial and joint mechanoreceptors (such as Ruffini corpuscles, Golgi tendon organs, muscle spindles) (Jones 1995) as well as pain receptors (Howell et al. 2006). Alterations in load application, for varying durations, have been shown to modify neural function (Collins 2007; Peters et al. 2013). To what degree these features are operating during application of PRT/SCS remains to be more definitively established.
- *Proprioceptive theory* is probably the most commonly discussed explanation for the efficacy of SCS. It is suggested that when a disturbed relationship exists between muscles and their antagonists, following strain, the positioning of these tissues into an unloaded, ease position, may allow spindle re-setting and partial or total resolution of inappropriate motor impairment. See Chapter 3 for further discussion of this concept (Huijing & Baar 2008; Kreulen et al. 2003).
- *Altered fibroblast responses* – Changes in the shape and architecture of cells by means of mechanotransduction (cellular responses to different degrees and forms of load) can lead to reduced inflammation. Meltzer et al. (2010) have observed that traumatized fascia disrupts the normal functions of the body, causing myofascial pain and reducing ranges of motion. They found that resulting inflammatory responses – involving fibroblast cells – can be reversed by changes in load on the tissues, delivered either by counterstrain or myofascial release, and that such changes may take as little as 60 seconds to manifest. In 2007, Standley & Meltzer observed that: 'fibroblast proliferation and expression/secretion of pro-inflammatory and anti-inflammatory interleukins may contribute to the clinical efficacy of indirect osteopathic manipulative techniques … such as SCS'. Standley & Meltzer (2008) reported that 'it is clear that strain direction, frequency and duration, impact important fibroblast physiological functions known to mediate pain, inflammation and range of motion'.
- *Ligamentous reflexes* – Solomonow (2009) spent many years researching the functions of ligaments. He identified their sensory potential and major ligamentomuscular reflexes that have inhibitory effects on associated muscles. He states: '*If you apply only 60–90 seconds of relaxing compression on a joint … an hour plus of relaxation of muscles may result. This may come not only from ligaments, but also from capsules and tendon*' (personal communication 2009).
  - A possible clinical application of this ligamentous feature may be seen when joint crowding is induced as part of facilitated positional release and/or strain/counterstrain protocols. Such effects would be temporary (20–30 minutes) but this would be sufficient time to allow an enhanced ability to mobilize or exercise previously restricted structures.
  - Wong (2012) summarizes current thinking regarding ligamentomuscular reflexes and SCS: ligamentous strain inhibits muscle contractions that increase strain, or stimulates muscles that reduce strain, to protect the ligament (Krogsgaard et al. 2002). For instance, anterior cruciate ligament strain inhibits quadriceps and stimulates hamstring contractions to reduce anterior tibial distraction (Dyhre-Poulsen & Krogsgaard 2000). Ligamentous reflex activation also elicits regional muscle responses that indirectly influence joints (Solomonow & Lewis 2002). Research is needed to explore whether SCS may alter the protective ligamentomuscular reflex and thus reduce dysfunction by shortening joint ligaments or synergistic muscles (Chaitow 2009).
- *Water and SCS* – Coincidentally, crowding (compression) of soft tissues would have an effect on the water content of fascia, leading to temporary (also 20–30 minutes) of reduced stiffness of fascial structures – with similar enhanced mobility during that period (Klingler & Schleip 2004).

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