Chapter 7

Positional release and fascia

CHAPTER CONTENTS

This short chapter provides background information as to the potential for use of positional release techniques (PRT) in management of specifically fascia-related conditions. In addition, research in which fascial function – for example mechanotransduction – offers insights into clinical effects is described.

Some of this information has been included in earlier chapters, however it is hoped that, by drawing fascia-related information together, readers may be helped to reflect on potential applications of PRT methods, in particular clinical situations.

CONNECTIVE TISSUE AND FASCIAL CONCEPTS

Fascia offers a unifying medium, a structure that literally 'ties everything together', from the soles of the feet, to the meninges surrounding the brain.

This ubiquitous material offers support, separation and structure to all other soft tissues and because of this, produces distant effects whenever dysfunction occurs in it (Schleip et al. 2012; Swanson 2013).

Levin (1986) has described fascia as comprising innumerable building blocks, shaped as icosahedrons (20-sided structures) that produce, in effect, kinetic chains in which tensions are transmitted to-and-from every part of the body, partly by hydrostatic pressure (Fig. 7.1).

Some years earlier Deane Juhan (1998) reflected on fascia's tensegrity feature:

> ***Besides this hydrostatic pressure (which is exerted by every fascial compartment, not just the outer wrapping), the connective tissue framework – in conjunction with active muscles – provides another kind of tensional force that is crucial to the upright structure of the skeleton. We are not made up of stacks of building blocks resting securely upon one another, but rather of poles and guy-wires, whose stability relies not upon flat-stacked surfaces but upon proper angles of the poles and balanced tensions on the wires. Buckminster Fuller coined the term 'tensegrity' to describe this principle of structure, and his inventive experiments with it have clarified it as one of nature's favorite devices for achieving a maximum of stability with a minimum of materials.***

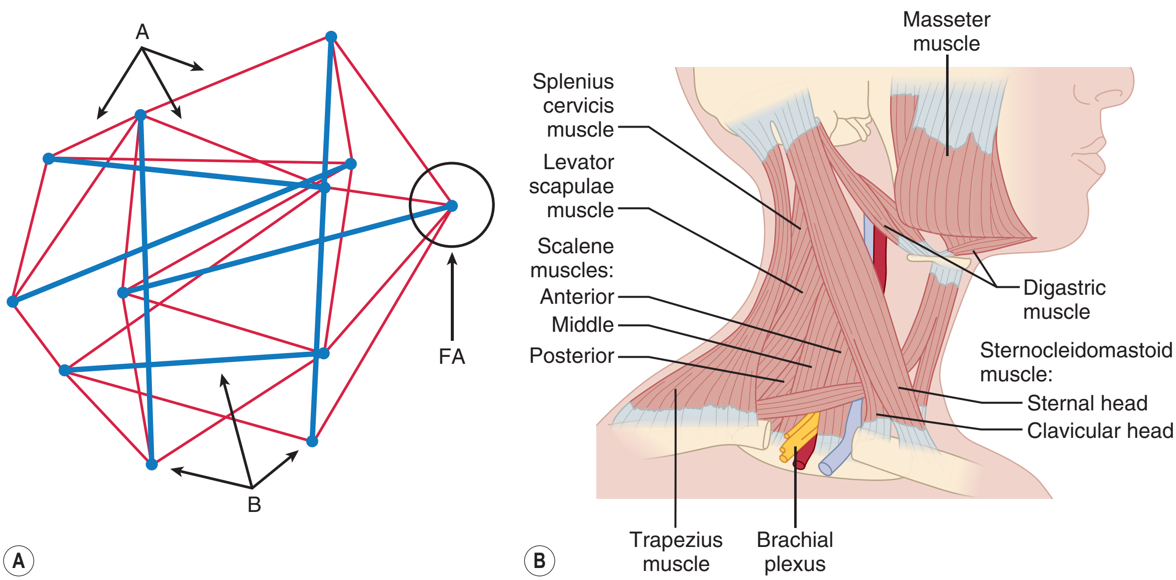

Figure 7.1 (A) Biotensegrity model (after Swanson 2013). A: Tensional elements of the biotensegrity structure, including: microfilaments, muscles, tendons, ligaments, etc. B: Compression elements of a biotensegrity structure, including DNA helix, microtubules, ribs, bones, fascia. FA: Focal adhesion complex within cells that connects the cytoskeleton and the extracellular matrix. (B) Cervical muscles and ligaments, illustrating a macro-tensegrity-like pattern to be found throughout the body.

Juhan continues:

> *This principle of tensegrity describes precisely the relationship between the connective tissues, the muscles, and the skeleton. There is not a single horizontal surface anywhere in the skeleton that provides a stable base for anything to be stacked upon it. Our design was not conceived by a stonemason. Weight applied to any bone would cause it to slide right off its joints if it were not for the tensional balances that hold it in place and control its pivoting. Like the beams in a simple tensegrity structure, our bones act more as spacers than as compressional members; more weight is actually borne by the connective system of cables than by the bony beams.*

With these models in mind, of stacked and packed icosahedrons, as well as tensegrity structures which easily comply with compressive and tension forces, and the unique plastic and elastic properties of connective tissue, we have the possibility of visualizing a structure capable of absorbing and accommodating to a variety of forces and adaptations. The beneficial effects of holding tissues at ease when stressed also emerges.

As D'Ambrogio & Roth (1997) explain:

> *A perceived condition in one area of the body may have its origin in another area and therapeutic action at the source will have an immediate effect on all secondary areas, including the site of symptom manifestation. It may also account for some of the physiologic effects that produce the [spontaneous] release phenomenon.*

FASCIAL 'MERIDIANS'

Langevin & Yandow (2002) have suggested (Box 7.1) that fascial structures provide a medium for the transmission of sensations including pain. This goes a long way to offering an explanation for a variety of apparently unconnected elements, such as:

- The similarity between acupuncture points and trigger points
- The means whereby patterns of pain relate to such points
- How distant effects may be achieved by stimulation of such points (needling or manual)
- The nature of acupuncture meridians
- How positioning of tissues can modify the behaviour of what appear to be pain-generating 'points'.

Chains, trains and positional release

Myers (1997) has described a number of clinically useful sets of myofascial chains – the connections between

Box 7.1 **Fascial signalling**

One of the important features of acupuncture theory is that needling of appropriately selected acupuncture points has predictable effects remote from the site of needle insertion, and that these effects are mediated by means of the acupuncture meridian system.

Langevin & Yandow (2002) note that: '*To date, physiological models attempting to explain these remote effects have invoked systemic mechanisms involving the nervous system*' (Pomeranz 2001).

Langevin & Yandow go on to report that their research shows that signal transduction appears to occur through connective tissue, probably involving sensory mechanoreceptors.

They hypothesize that the network of acupuncture points and meridians can be viewed as a representation of the network formed by interstitial connective tissue.

This hypothesis is supported by ultrasound images showing connective tissue cleavage planes at most traditional acupuncture points in humans.

They found that fully 80% of charted acupuncture points lie close to intermuscular or intramuscular connective tissue planes.

They see acupuncture points as representing a convergence of connective tissue planes and being involved in the 'sum of all body energetic phenomena (e.g. metabolism, movement, signalling, information exchange)'.

Implications

The implications of these concepts in relation to positional release methods seems clear – that normalization, or improved function, of connective tissue dysfunction may potentially modify this 'signalling' mechanism, and might well explain how and why positional release effects its results.

The idea that pain perceived in sensitive and distressed tissues by applied manual pressure (as in counterstrain methodology), can be relieved by positioning, suggests that the 'ease' position is one in which disturbed signalling may be able to normalize?

different structures ('long functional continuities'), which he terms 'anatomy trains'.

These are not distinct from tensegrity features, but are more specific linkages that may be seen to be connected when some positional release methods are performed. In particular, SCS methods for normalizing rib restrictions can involve some bizarre positioning of the entire body, with remarkable effects (see Chapter 4, pp. 98, 99).

These figures are examples of Myers' fascial 'trains' (and there are a number of others – for details see Myers (2013) *Anatomy Trains*).

The superficial front line (Fig. 7.2A):

- The anterior compartment and the periosteum of the tibia, link the dorsal surface of the toes to the tibial tuberosity.
- Rectus femoris, links the tibial tuberosity to the anterior inferior iliac spine and pubic tubercle.
- Rectus abdominis, as well as the pectoralis and sternalis fascia, link the pubic tubercle and the anterior inferior iliac spine with the manubrium, with sternocleidomastoid, linking the manubrium with the mastoid process of the temporal bone.

The back-of-the-arm lines (Fig. 7.2B):

- The broad sweep of trapezius links the occipital ridge and the cervical spinous processes to the spine of the scapula and the clavicle.
- The deltoid, together with the lateral intermuscular septum, connects the scapula and clavicle with the lateral epicondyle.
- The lateral epicondyle is joined to the hand and fingers by the common extensor tendon.
- Another track on the back of the arm can arise from the rhomboids, which link the thoracic transverse processes to the medial border of the scapula.
- The scapula in turn is linked to the olecranon of the ulna by infraspinatus and the triceps.
- The olecranon of the ulna connects to the small finger by means of the periosteum of the ulna.
- A 'stabilization' feature in the back of the arm involves latissimus dorsi and the thoracolumbar fascia, with its attachments to the lower limb.

The front-of-the-arm lines (Fig. 7.2C):

- Latissimus dorsi, teres major and pectoralis major attach to the humerus, close to the medial intramuscular septum (MIS), connecting it to the back of the trunk.
- The MIS connects the humerus to the medial epicondyle, which connects with the palmar hand and fingers by means of the common flexor tendon.
- An additional line on the front of the arm involves pectoralis minor, the costocoracoid ligament, the brachial neurovascular bundle and the fascia clavi-pectoralis, which attach to the coracoid process.
- The coracoid process also provides the attachment for biceps brachii (or brachialis) linking this to the radius and the thumb, by means of the flexor compartment of the forearm.
- A 'stabilization' line on the front of the arm involves pectoralis major attaching to the ribs, as do the external obliques, which then run to the pubic tubercle, where a connection is made to the contralateral adductor longus, gracilis, pes anserinus, and the tibial periosteum.

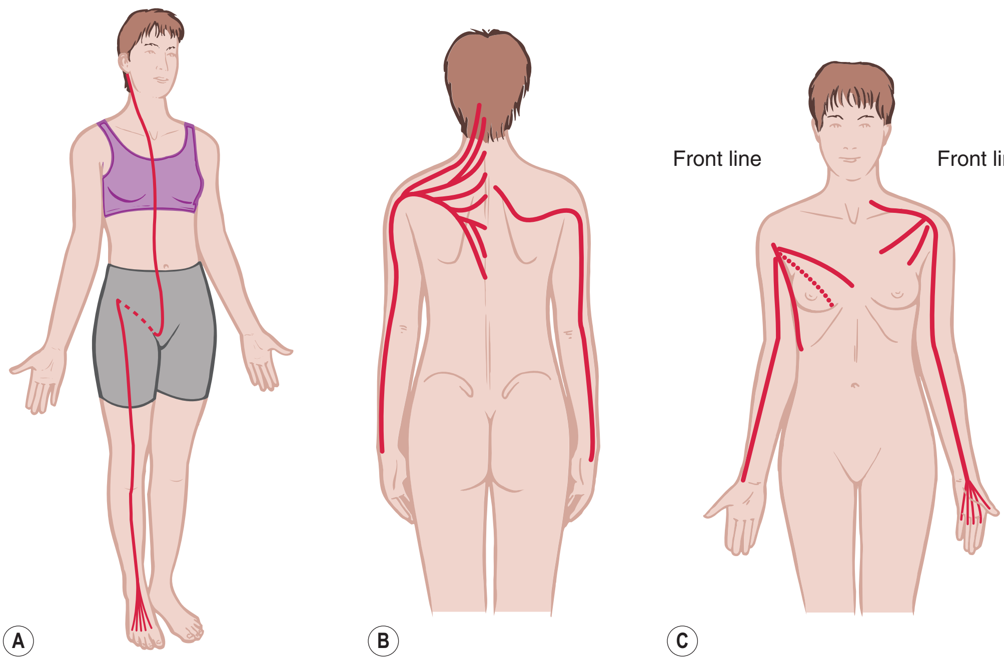

Figure 7.2 (A) Superficial front line. (B) Back-of-arm line. (C) Front-of-arm line.

It seems possible – indeed probable that in taking a distressed, strained (chronic or acute) muscle or joint painlessly into a position that allows for a reduction in tone in the tissues involved, some modification takes place of neural reporting, as well as local circulation being improved (see Chapter 2 for research discussion). Any changes in tone are then likely to be reflected in the chains to which the strained tissues belong.

D'Ambrogio & Roth (1997) summarize what is thought to happen to the fascia during PRT as follows:

> *It is hypothesized that PRT, by reducing the tension on the myofascial system, also engages the fascial components of dysfunction. The reduction in tension on the collagenous cross-linkages appears to induce a disengagement of the electrochemical bonds and a conversion back [from the gel-like] to the sol [solate] state.*

COMMON COMPENSATORY – FASCIAL – PATTERNS

In Chapter 2, the 'common compensatory pattern' was discussed and illustrated (see Box 2.2, and Fig. 2.1). According to the studies of Zink & Lawson (1979) and Pope (2003), the modified fascial status of most individuals appears to provide a well-compensated pattern.

Where the pattern is found to be poorly-compensated (see Chapter 2), individuals appear to experience less than optimal health, and may demonstrate unpredictable reactions to stress, including the inevitable adaptive demands of manual treatment.

It is suggested that roughly 20% of individuals, are ideal candidates for the non-invasive, indirect, positional release approaches as outlined in previous chapters.

This is not meant to suggest that the remaining 80% (roughly) who are 'well-compensated' would not also benefit from positional release methods, should this be indicated.

CELLULAR FASCIAL RESEARCH AND COUNTERSTRAIN

A number of laboratory studies have suggested that when 'stressed', fibroblast cells (the principal active cells of connective tissue) modify their genetic behaviour and excrete inflammatory materials.

These changes – involving a process known as mechanotransduction – are capable of being reversed by altering the load applications to the cells – mimicking either counterstrain, or myofascial release.

The architectural shape of a cell matters – and as this changes due to altered levels of load, so do its functions. Of particular relevance to this book is the importance in that change in cell-shape, of *reduced load*, such as occurs in positional release.

Also relevant, and as noted later in this chapter, these observations are reflected in clinical studies, for example involving plantar fasciitis (Urse 2012), or soft-tissue density (Barnes et al. 2013).

Studies

- Dodd et al. (2006) report that: '*Human fibroblasts respond to strain by secreting inflammatory cytokines, undergoing hyperplasia, and altering cell shape and alignment … and that biophysical [tissue changes] – whether resulting from injury, somatic dysfunction, or [soft tissue manipulation, such as SCS] – affects range of motion, pain, and local inflammation*'.
- In 2007 Standley & Meltzer observed that: '*Data from [this] study suggest that fibroblast proliferation and expression/secretion of pro-inflammatory and anti-inflammatory interleukins may contribute to the clinical efficacy of indirect osteopathic manipulative techniques*'.
- Standley & Meltzer (2008) reported on various clinically applied fascial strains (counterstrain, as well as myofascial release) used to treat somatic dysfunctions. These methods produced positive clinical outcomes, such as reduced pain, reduced analgesic use and improved range of motion. They note that '*it is clear that strain direction, frequency and duration, impact important fibroblast physiological functions known to mediate pain, inflammation and range of motion*'.
- Meltzer et al. (2010) note that traumatized fascia disrupts normal biomechanics of the body, increasing tension exerted on the system and causing myofascial pain and reduced range of motion. They found that resulting inflammatory responses by fibroblast cells can be reversed by changes in load on the tissues, delivered by either counterstrain or myofascial release, and that such changes may take only 60 seconds to manifest.

Analgesic and anti-inflammatory effects of counterstrain

Building on the laboratory evidence listed above, a number of studies and reports have indicated clinical benefits that include pain reduction and anti-inflammatory effects:

- Counterstrain has been shown to beneficially influence *plantar fasciitis*, '*Clinical improvement occurs in subjects with plantar fasciitis in response to counterstrain treatment [SCS]. The clinical response is accompanied by mechanical, but not electrical, changes in the reflex responses of the calf muscles*' (Wynne et al. 2006).
- Urse (2012) has described the counterstrain method for treatment of *plantar fasciitis* as follows: '*The supine patient's ipsilateral knee is flexed, and a plantar tender point [an area of local hypersensitivity] is identified where the fascia inserts onto the calcaneus. One thumb is used to monitor the tender point … [while] … the opposite hand plantar flexes the toes and ankle curving around the tender point. Additional adjustment to the tension may be accomplished by supination or pronation of the foot, until there is symptomatic relief of the tenderness underlying the monitoring thumb*'. This *position-of-ease* is maintained for up to 90 seconds, before a slow return to neutral and reassessment.
- In treatment of *Achilles tendonitis*, Howel (2006) noted changes in reported pain, following treatment involving counterstrain: '*subjects indicated significant clinical improvement in soreness, stiffness, and swelling, … Because subjects' soreness ratings also declined immediately after treatment, decreased nociceptor activity may play an additional role in somatic dysfunction, perhaps by altering stretch reflex amplitude*'.
- Dardzinski et al. (2000) reported: '*SCS techniques should be considered … as adjunctive therapy for patients previously unresponsive to standard treatment for myofascial pain syndrome*'. '*Symptoms of a 30-year-old distance runner with* iliotibial band friction syndrome *(ITBFS) were reduced with the help of OMT, specifically SCS. This technique allows for relief of pain at a tender point by moving the affected body part into its position of greatest comfort, aiding in the reduction of proprioceptor activity. The tender point was located from ≈2 cm proximal to the lateral femoral epicondyle. There is no prior documentation of the osteopathic manipulation of this specific tender point. Thus, this case report reflects an initial identification of a distal iliotibial band tender point, and a new therapeutic modality for ITBFS*' (Pedowitz 2005).

Counterstrain, balanced ligamentous tension and fascial stiffness

Specific therapeutic effects of both counterstrain (see Chapters 3 and 4) and balanced ligamentous tension (Chapter 8), on both symptoms, as well as 'tissue stiffness' changes, emerge from a study by Barnes et al. (2013).

Changes in 'tissue stiffness' measured before and after manual treatment is one way of evaluating the effects of the methods used. Change – whether an increase or a reduction in stiffness in tissues, is known as *hysteresis*. A 2013 study, conducted by Barnes et al., measured altered degrees of stiffness in fascia (i.e. hysteresis) after different manual methods.

The protocol was as follows:

1. Cervical articular somatic dysfunctions were identified in 240 individuals, using carefully controlled palpation assessment methods.
2. Once dysfunction (e.g. restriction or pain) had been identified, and before treatment (or sham treatment) was applied, the degree of stiffness in the dysfunctional tissues was measured, using an instrument designed for that purpose – a durometer.
3. The durometer measured the density/stiffness of the myofascial tissues overlying each cervical segment, using a single consistent piezoelectric impulse. This allowed four different tissue characteristics to be identified – 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 relative degrees of mobility and stiffness.
4. Four different techniques were used: *Balanced ligamentous tension*, as described in Chapter 8; *Muscle energy technique* (not discussed in this book apart from being an element of INIT, see Chapter 6.); *High velocity manipulation* (also not discussed); and *Counterstrain*, see Chapters 3, 4 and 9. A single application of these four methods, as well as a sham technique, were randomly applied to the most severe areas of the dysfunctional cervical tissues of all participants.
5. At 10 minutes after the single treatment, the changes in tissue 'stiffness' (i.e. hysteresis) were again measured, using a durometer.
6. When the degree of restriction/stiffness present, before and after the single use of one of the four (or sham) methods above, the results showed that counterstrain (see Chapters 3 and 4) produced the greatest changes, compared with the other methods 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 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.

What emerges from the laboratory studies of fibroblast behaviour when stressed and 'de-stressed' (e.g. by modelled counterstrain), and the studies of fasciitis and the experimental study of 'stiffness' by Barnes and colleagues – is that fascial structures appear to respond well to methods that 'de-stress' them, as in the unloading approaches of counterstrain and balanced ligamentous tension (see Chapter 8).

THE EFFECTS OF ALTERED LOAD ON LIGAMENTOUS REFLEXES

Goodheart's modified counterstrain methods (as described in Chapter 4) involve additional compressive or distraction load applied following identification of a 'position of ease'.

Schiowitz's facilitated positional release (FPR) (as described in Chapter 5) also involves an additional 'facilitating' force, applied to a functionally achieved position of ease.

One possible explanation for the effects of the 'loading' facilitating force is offered by Solomonow (2009), a leading researcher into ligament function. He notes that ligaments are sensory organs and have significant input to reflexive/synergistic activation of muscles. For example, muscular activity associated with the reflex from the anterior cruciate ligament acts to prevent distraction of the joint, while simultaneously reducing the strain in the ligament.

There is also evidence that *ligamentomuscular reflexes* have inhibitory effects on muscles associated with the related joint, inhibiting muscles that destabilize the joint, or increasing antagonist coactivation, to help stabilize the joint. One potential therapeutic use of this ligamentous function is found in any positional release method that includes crowding (compaction) of joints as part of the protocol.

The 'crowding' of ligaments

Solomonow spent many years researching the functions of ligaments, and in doing so, identified their sensory potential and many of the major ligamentomuscular reflexes that have inhibitory effects on associated muscles.

> *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 tendons.*
>
> Personal communication 8 January, 2009

Such effects would be temporary (20–30 minutes) but this would be sufficient to allow 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 and Krogsgaard, 2000).*
>
> *Ligamentous reflex activation also elicits regional muscle responses that indirectly influence joints (Solomonow and Lewis, 2002). Research is needed to explore whether Counterstrain may alter the protective ligamento-muscular reflex and thus reduce dysfunction by shortening joint ligaments or synergistic muscles (Chaitow, 2009).*

Hydraulic effects

Coincidently, 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.

THIS CHAPTER

This chapter has provided information and evidence of various fascial relationships with positional release approaches, including cellular research that suggest anti-inflammatory effects, possible 'signalling' features, the influence of 'muscle-chains', possible reflexive factors, as well as changes in stiffness/density following counterstrain – possibly involving hydraulic effects.

NEXT CHAPTER

The next chapter, by Raymond J. Hruby, DO, provides a detailed overview of balanced ligamentous tension techniques.

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Chapter 8

Balanced ligamentous tension techniques

Raymond J. Hruby

CHAPTER CONTENTS

BACKGROUND

The concepts of balanced ligamentous tension (BLT), balanced membranous tension (BMT) and the associated osteopathic manipulative treatment techniques were first described by William G. Sutherland, DO (DiGiovanna et al. 2005; Magoun 1976; Speece & Crow 2001). Sutherland was a graduate of the American School of Osteopathy and a student of Andrew Taylor Still, MD, DO, the founder of the osteopathic profession. Dr Sutherland is well known as the discoverer and developer of osteopathy in the cranial field. Although commonly referred to as 'cranial techniques', Sutherland rejected this terminology, as he felt that it implied that his techniques were separate from osteopathy as applied to the rest of the human body. Sutherland firmly believed, and always stated, that he was merely applying Still's original principles to the head. To prove his point, Sutherland taught a course to his followers in 1947, wherein he neither discussed nor demonstrated any procedures for the cranium; rather, he spent the entire time teaching his students how to apply his approach throughout the body. The concepts and techniques taught by Sutherland in this course were documented by one of his students, Howard A. Lippincott, DO, and published under the title *The Osteopathic Technique of Wm. G. Sutherland, D.O.*, in the 1949 Yearbook of the American Academy of Osteopathy (Lippincott 1949).

BASIC CONCEPTS

The principles of BLT are formulated around an understanding of ligamentous articular mechanisms. Ligaments regulate and guide the movement in all the articulatory mechanisms of the body. In most joints, they act as checks to the voluntary actions of muscles. The placement of the ligaments around a joint creates various fulcrums and checks within which the complex movements of the bones occur. Sutherland described this as a ligamentous articular mechanism. A further concept to be aware of is that, while bony position may change, the overall tensions on the ligaments remain in a symmetrical arrangement. In other words, as long as a joint is moved within its physiological range of motion, the tensions within the associated ligaments will remain in balance. Sutherland called this a 'balanced ligamentous articular mechanism'. In his model, the joints in the body are viewed as balanced ligamentous articular mechanisms. The ligaments provide proprioceptive information to guide the muscle response to joint position, and the ligaments guide the motion of the articular components.

To further elucidate this concept of balanced tensions in ligamentous structures, Sutherland introduced the terms 'reciprocal tension ligaments' and 'reciprocal tension mechanism' as additional descriptors of the ligamentous articular mechanism (Magoun 1976). A key concept is that, within the physiological range of motion of a joint, the ligamentous tension remains constant. The ligaments are neither stretched nor lax. The mechanical motion of the joint comes about as a result of a change in the shape of the joint space, rather than from any overall changes in ligamentous tension around the joint (Carriero 2003).

DEFINITIONS

In light of the above concepts, Sutherland (Magoun 1976) introduced the following terms as part of his treatment model:

1. **Balanced ligamentous tension (BLT)**: the concept that, in a normal, physiologically moving joint, the overall tension of the associated ligaments is symmetrical or balanced.
2. **Ligamentous articular strain (LAS)**: the type of somatic dysfunction characterized by abnormal tensions (strain) in some or all of a joint's ligamentous structures, as a result of trauma, inflammation or other abnormal conditions.

The reader should note that, in Sutherland's model of osteopathy in the cranial field, the dura is considered the ligamentous articular mechanism for the cranium. Accordingly, the terms 'balanced membranous tension' and 'membranous articular strain' were used by Sutherland to describe these principles as applied to the cranium. Further discussion of these cranial applications is beyond the scope of this chapter.

LIGAMENTOUS ARTICULAR STRAIN

As mentioned, ligamentous articular strain (LAS) is the name given to the specific type of somatic dysfunction associated with BLT technique. What is the nature of this type of somatic dysfunction (see Chapter 2) and how does it occur? A simple definition of LAS is that it is any somatic dysfunction resulting in abnormal ligamentous tension or strain. Lippincott (1949) explained Sutherland's original concept as follows:

> *Osteopathic lesions are strains of the tissues of the body. When they involve joints it is the ligaments that are primarily affected so the term 'ligamentous articular strain' is the one preferred by Dr. Sutherland. The ligaments of a joint are normally on a balanced, reciprocal tension and seldom if ever are they completely relaxed throughout the normal range of movement. When the motion is carried beyond that range the tension is unbalanced and the elements of the ligamentous structure which limit motion in that direction are strained and weakened. The lesion is maintained by the overbalance of the reciprocal tension by the elements, which have not been strained. This locks the articular mechanism or prevents its free and normal movement. The unbalanced tension causes the bones to assume a position that is nearer that in which the strain was produced than would be the case if the tension were normal, and the weakened part of the ligaments permits motion in the direction of the lesion in excess of normal. The range of movement in the opposite direction is limited by the more firm and unopposed tension of the elements which had not been strained.*

LAS may also be understood by first examining the characteristics associated with physiological joint motion, and then reasoning what happens to alter this motion when certain adverse conditions are put into place. Carriero (2003) offers this view:

> *The type of motion which may occur at any given articulation is determined by the shape of the joint surfaces, the position of the ligaments, and the forces of the muscles acting upon the joint. Ligaments do not stretch and contract as muscles do; consequently, the tension in a ligament has very little variation. The tension distributed throughout the ligaments of any given joint is balanced. In normal movements, as the joint changes position, the relationships between the joint's ligaments also change, but the total tension within the ligamentous articular mechanism does not. The distribution of tension between the ligaments is altered, however, when the joint is affected by injury, inflammation, and/or mechanical forces. This is what happens in somatic dysfunction. The distribution and vector of tension within any given ligament will change according to the position of strain in the joint. However, the shared tension within the ligamentous articular mechanism of any given joint remains constant as long as the ligament is not damaged. This has been called a reciprocal tension mechanism. Of course, the balance within the ligamentous articular mechanism can be strained if the joint is inappropriately moved beyond its*

physiologic range of motion. In the former case, it is the balance of tension, which is distorted. In the latter case, the fibers of the ligament are subjected to microscopic tears and stretch. While this (the latter case) will most assuredly result in a strain to the balance of the articular ligaments, the ligaments do not need to be disrupted for the balance to be distorted. The distortion in balance is a mechanical strain, which may or may not involve an anatomical one. In any somatic dysfunction, there is always a strain in the balanced ligamentous articular mechanism.

PROPOSED MECHANISM OF ACTION OF BLT

Applying the principles of BLT involves establishing fulcrums and levers that are used to direct changes to the ligamentous articular strains. The general principle involves the introduction of a fulcrum by the practitioner and then having the patient provide an activating force. The activating forces can include respiration, postural changes and induced changes in fluid pressures, for example. The practitioner balances all the forces within the ligamentous structures of the joint being treated so that a fulcrum is established. The activating forces can then be used to correct the somatic dysfunction (Carriero 2003; Crow 2011; Speece et al. 2001).

The precise mechanism of action by which physiological motion is restored using BLT is not known. A commonly held theory is that positioning the affected joint in such a way as to minimize the ligamentous tensions around it (that is, achieve a point of balanced ligamentous tension) results in a reduction in afferent input from the affected joint structures to the central nervous system. This allows for the central nervous system to respond by re-establishing a more physiological state of motor control of the joint. Activating forces, such as patient positioning, postural adjustments, and respiration appear to facilitate the reestablishment of normal motor control, and enhance the success of the treatment process (Van Buskirk 1990).

BLT AND OTHER POSITIONAL RELEASE TECHNIQUES

BLT is one of a number of manual treatment modalities that may be classified as a type of positional release technique. In general, positional release techniques all utilize a similar therapeutic principle: the involved joint or tissue is placed in a more neutral position, which is typically perceived by the practitioner as the position where there is palpable relaxation of the involved tissues, such as muscles, fascia, ligaments and tendons. The patient is maintained in this position until the involved tissues have become completely relaxed (Seffinger & Hruby 2007). Clinically, the patient perceives the neutral position as one where there is marked reduction or elimination of pain or discomfort, which persists when the treatment is completed. In order to appreciate similarities and contrasts among some commonly known positional release techniques, the reader is referred to Table 8.1, which includes definitions and brief descriptions of these techniques. (See also the discussion on positional release variations in Chapter 1.)

PRINCIPLES OF DIAGNOSIS

A specific diagnostic evaluation method for BLT has not been described. A diagnosis of LAS is arrived at by first performing an osteopathic structural examination and determining the presence of any specific joint somatic dysfunction(s). If a somatic dysfunction is found, the practitioner can use palpation in conjunction with the patient's respiratory cooperation efforts to test the dysfunctional joint in all of its planes of motion until the position of maximum ease is found. The practitioner also notes how the tissue feels at the end of range of motion testing, otherwise known as 'end feel'. The quality of the end feel indicates the most likely type of motion restriction present: articular, muscular, fascial, oedema-based or ligamentous. The end feel associated with LAS has been described as hard, abrupt and with near total loss of tissue elasticity. Such a finding thus makes BLT an excellent technique choice to treat the LAS associated with the joint in question (Ehrenfeuchter 2011).

PRINCIPLES OF TREATMENT

The first (and most critical) step in treatment using BLT is for the practitioner to place the strained articular mechanism in a position where all the tensions on the ligaments are at their minimum. This position is referred to as the point of balanced ligamentous tension (Carriero 2003). Once achieved, the practitioner can then utilize one or more of the activating forces previously described to treat the LAS in the involved joint structure. The treatment principles of BLT were first described by Lippincott (1949), as follows:

Since it is the ligaments that are primarily involved in the maintenance of the lesion it is they, not muscular leverage, that are used as the main agency for reduction. The articulation is carried in the direction of the lesion, exaggerating the lesion

Table 8.1 Some representative positional release techniques

Technique	Definition	Description
Counterstrain	A system of diagnosis and treatment that considers the dysfunction to be a continuing, inappropriate strain reflex, which is inhibited by applying a position of mild strain in the direction exactly opposite to that of the reflex; this is accomplished by specific directed positioning about the point of tenderness to achieve the desired therapeutic response.	The practitioner locates a specific counterstrain point, called a 'tender point', usually thought to be associated with musculotendinous or fascial tissues, and associated with somatic dysfunction(s) present in joint structures. While monitoring the tender point, the practitioner positions the patient until the tenderness to palpation at the counterstrain point is minimized. The practitioner holds the patient in this position for 90 seconds and then slowly and passively returns the patient to a neutral position. The tender point is reassessed to determine success of the treatment.
Facilitated positional release	A system of indirect myofascial release treatment. The component region of the body is placed into a neutral position, diminishing tissue and joint tension in all planes, and an activating force (compression or torsion) is added.	The involved joint or region placed into its neutral position in order to unload the tissue tensions that are present. An activating force, such as compression and/or torsion is applied and maintained, followed by further positioning of the somatic dysfunction into all three planes of relative freedom. The entire process up to this point only takes a few seconds. The dysfunction is then reassessed.
Functional	An indirect treatment approach that involves finding the dynamic balance point and one of the following: applying an indirect guiding force, holding the position or adding compression to exaggerate position and allowing for spontaneous readjustment. The osteopathic practitioner guides the manipulative procedure while the dysfunctional area is being palpated in order to obtain a continuous feedback of the physiological response to induced motion. The osteopathic practitioner guides the dysfunctional part so as to create a decreasing sense of tissue resistance (increased compliance).	The practitioner places the dysfunction in the position of greatest ease and maintains this position. One hand monitors the dysfunction (sensory hand) and the other hand (motor hand) positions the patient. As the sensory hand feels the tissues begin to release, the motor hand moves the body in that direction and keeps the affected area from returning to the previous position. The practitioner continues this process until the dysfunction is resolved.
Myofascial release (MFR)	A system of diagnosis and treatment first described by Andrew Taylor Still and his early students, which engages continual palpatory feedback to achieve release of myofascial tissues. With direct MFR, a myofascial tissue restrictive barrier is engaged for the myofascial tissues and the tissue is loaded with a constant force until tissue release occurs. With indirect MFR, the dysfunctional tissues are guided along the path of least resistance until free movement is achieved.	The direct form of MFR engages the restrictive barrier of the affected myofascial tissue. A constant force on the tissues is maintained until a release occurs. Direct MFR attempts to effect changes in the myofascial structures by stretching or elongation of fascia. The practitioner applies slow movements through the various layers of the fascia until the deep layers are reached. The indirect method involves applying a gentle stretch and allowing the fascia to spontaneously release, sometimes referred to as 'unwinding'. The restricted tissues are guided into the position of ease until free movement results.

Table 8.1 Continued

Technique	Definition	Description
Osteopathy in the cranial field	A system of diagnosis and treatment by an osteopathic practitioner using the primary respiratory mechanism and balanced membranous tension.	This technique involves the application of BLT principles to the cranial and/or sacral region. The dural membrane is considered the 'ligamentous' structure that is strained, and the term 'balanced membranous tension' is used to refer to the strain mechanism and the technique that is applied in this paradigm.
Visceral	A system of diagnosis and treatment directed to the viscera to improve physiological function.	Using the myofascial release principles described above, the affected organ is moved toward its position of ease, in order to minimize tensions on its associated fascial attachments. When a release occurs, the practitioner notes the presence of normal physiological motion in the fascial structures and/or a restoration of the normal inherent motion of the affected organ.

Source: Chila A G (Executive Ed.). 2011. Glossary of osteopathic terminology. In: Foundations of Osteopathic Medicine, 2nd edn. Lippincott Williams & Wilkins, Philadelphia, PA.

position as far as is necessary to cause the tension of the weakened elements of the ligamentous structure to be equal to or slightly in excess of the tension of those that were not strained. This is the point of balanced tension. Forcing the joint to move beyond that point adds to the strain which is already present. Forcing the articulation back and away from the direction of lesion strains the ligaments that are normal and unopposed, and if it is done with thrusts or jerks there is definite possibility of separating fibers of the ligaments from their bony attachments. When the tension is properly balanced the respiratory or muscular cooperation of the patient is employed to overcome the resistance of the defense mechanism of the body to the release of the lesion. If the patient holds the breath in or out as long as possible there is a period during his involuntary efforts to resume breathing when the release takes place. In appendicular lesions the patient holds the articulation in the position of exaggeration and the release occurs through the agency of the ligaments when or just before the muscles are relaxed.

More recent osteopathic authors have elaborated on these principles, based on clinical experience. For example, Speece & Crow (2001) give the following explanation of the principles of BLT:

Once an area of dysfunction has been located, compress or decompress the joint or fascial plane to disengage the injury so that the displaced bone can be moved. [This is similar to pushing in the clutch on a car to shift gears.] Then carry the injured part in the direction of least resistance, returning it to the original position to which it was forced during the injury. Carrying the injury the way it wants to go is an indirect method *of treatment and is also one that follows the direction of the somatic dysfunction. Remember that just after the initial injury, the injured part sprang back toward a normal position but was caught in limbo – part way between the position of the injury and the normal functional position. So, when correcting the injury, you must carry the injured part back to the exact position of injury and maintain that position until the body rebalances all the connective tissue surrounding the dysfunction, and draws the part back to its normal functional physiologic position. This can be done using a direct technique, and indirect technique, or a combination of direct and indirect methods.*

Practitioners of BLT (Crow 2011; DiGiovanna et al. 2005; Speece & Crow 2001) agree that there are three primary components to the application of the technique: disengagement, exaggeration and balance.

1. *Disengagement*: The practitioner applies gentle compression or traction to the dysfunctional joint or fascial plane, to obtain the maximum amount of motion available without resistance.
2. *Exaggeration*: The practitioner moves the area of dysfunction toward its position of ease or, in other words, back to the original position of injury, until the point of balanced ligamentous tension is achieved.

3. *Balance*: The practitioner maintains this position of 'ease' and may recruit the assistance of the previously discussed activating forces until a release occurs. The practitioner continuously monitors the dysfunctional joint, and may need to shift the positioning periodically in order to maintain the point of balanced ligamentous tension throughout the treatment process. The joint will move gently in the direction of exaggeration, and then back to the point of balanced ligamentous tension. When the release occurs, the affected joint will slowly move back to its normal physiological position.

INDICATIONS AND CONTRAINDICATIONS

Specific indications (Nicholas & Nicholas 2012) for the use of BLT are:

1. Acute or chronic somatic dysfunction of articular structures
2. Ligamentous sprains or strains
3. Somatic dysfunction of myofascial structures
4. Areas of lymphatic congestion or local oedema.

There are few contraindications to BLT, and most authors consider them to be relative contraindications. They are as follows:

1. Fracture, dislocation or gross instability of the region to be addressed
2. Malignancy, infection or severe osteoporosis at the site of treatment.

SAFETY AND EFFICACY

Practitioners of BLT (Nicholas & Nicholas 2012; Seffinger & Hruby 2007) consider the technique to be safe and effective. There are no known or reported injuries, side-effects or serious complications resulting from the use of BLT for the treatment of LAS.

REPRESENTATIVE TECHNIQUES

Cervical spine

Lower cervical spine (C3–C7)

(Figs 8.1, 8.2)

1. The patient is supine.
2. The practitioner is seated at the head of the treatment table.

Figure 8.1 Treatment position for lower cervical spine.

Figure 8.2 Skeleton view showing hand placement for lower cervical spine treatment.

3. The practitioner cradles the patient's occiput with both hands, with the thenar and hypothenar eminences contacting the superior nuchal line, and the pads of the middle fingers contacting the articular pillars of the cervical segment to be treated.
4. The practitioner then slides the pads of the middle fingers inferiorly to a point just below the restricted segment.
5. The practitioner then applies an anterior and superior movement with the middle finger pads, drawing the fingers toward the thenar and hypothenar eminences until the point of BLT is achieved.
6. The practitioner maintains the point of BLT by monitoring the tissue tension between the two hands.
7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.

8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Atlantoaxial (AA) joint

(Figs 8.1, 8.2)

1. The AA joint may be treated using the same hand position as for the lower cervical spine, while contacting the appropriate articular pillars.

Occipitoatlantal joint

(Figs 8.3, 8.4)

1. The patient is supine.
2. The practitioner is seated at the head of the treatment table.
3. The practitioner cradles the patient's occiput in one hand, with the thenar and hypothenar eminences contacting the superior nuchal line, and the middle finger in the midline and pointing toward the opisthion (the median point of the posterior border of the foramen magnum).
4. The index and ring fingers are lateral to the midline and approximately in the plane of the occipital condyles.
5. The practitioner's other hand is placed under the upper cervical spinal region, with the pad of the middle finger resting in the midline just superior to the C2 spinous process.
6. The patient is asked to dorsiflex the feet.
7. While the head rests comfortably in the practitioner's hands, the patient is then instructed to slowly tuck the chin toward the chest until the point of BLT is achieved.
8. At this point, the practitioner will feel the finger pad on C2 move superiorly and contact the tubercle of C1.
9. The practitioner maintains the point of BLT between C1 and the occiput by monitoring the tissue tension between the two hands.
10. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
11. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Figure 8.3 Treatment position for the occipitoatlantal joint.

Thoracic and lumbar spine

Lower thoracic and lumbar spine

(Figs 8.5–8.7)

1. The patient is supine.
2. The practitioner sits at the side of the table.

Figure 8.4 Skeletal view showing hand placement for treatment of the occipitoatlantal joint.

Figure 8.5 Physician and patient position for treatment of the lower thoracic or lumber spine.

Figure 8.6 Hand position for lower thoracic or lumbar spine treatment.

Figure 8.8 Treatment position for the upper thoracic spine.

Figure 8.7 Skeletal view showing hand placement for lower thoracic or lumbar spine treatment.

Figure 8.9 Lateral view showing hand position for upper thoracic spine treatment.

3. The practitioner places one hand on the sacrum, with the fingertips at the lumbosacral junction and the sacrum resting comfortably in the palm of the hand.
4. The practitioner's other hand is placed transversely over the vertebra to be treated, with the spinous process in the palm of the hand, the finger pads in contact with the paravertebral muscles farthest from the practitioner, and the thenar and hypothenar eminences in contact with the paravertebral muscles nearest the practitioner.
5. While maintaining the sacrum in position, the practitioner moves the affected vertebral segment in an anterior and superior direction until the point of BLT is achieved.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Upper thoracic spine

(Figs 8.8, 8.9)

1. The patient is supine.
2. The practitioner is seated at the head of the treatment table.
3. The practitioner slides his or her hands under the patient's thorax, with palms facing toward the ceiling, to the level of the restricted vertebra.
4. The pads of the index and middle fingers are placed on each side of the restricted vertebra, approximately 1.5 inches lateral to the spinous process.
5. The practitioner moves the pads of the index and middle fingers in an anterior and superior direction

Figure 8.10 Treatment position for the first rib.

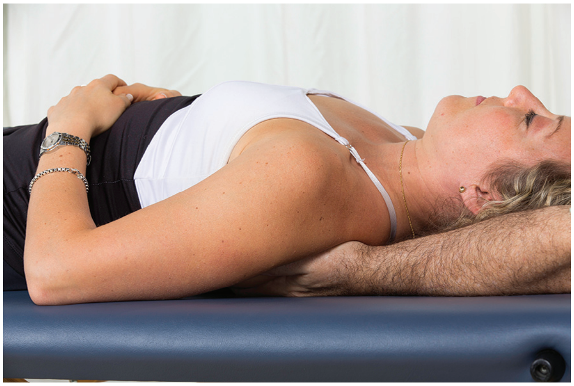

Figure 8.11 Treatment position for ribs 2–12.

bilaterally, until a point of BLT is achieved, and maintains this position.

6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Rib cage

First rib

(Fig. 8.10)

1. The patient may be seated or supine.
2. The practitioner contacts the superior surface of the first rib by placing his or her thumb just lateral to the costotransverse articulation.
3. While monitoring the first rib, the practitioner uses the opposite hand to induce any combination of flexion, extension, left or right rotation, or left or right side-bending until a point of BLT is achieved. The practitioner then maintains this position.
4. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
5. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Ribs 2–12

(Figs 8.11–8.13)

1. The patient is supine.
2. The practitioner is seated at the head of the treatment table.

Figure 8.12 Lateral view showing hand placement for treatment of ribs 2–12.

Figure 8.13 Skeletal view showing hand placement for treatment of ribs 2–12.

3. The practitioner slides his or her hands under the patient's thorax, with palms facing toward the ceiling, to the level of the restricted rib.
4. The practitioner places the index, middle and ring fingers of one hand on the angle of the restricted rib.
5. The practitioner then carries the restricted rib anteriorly, then superiorly and laterally, until a point of BLT is achieved. The practitioner then maintains this position.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Pelvis

Lumbosacral decompression

(Figs 8.14–8.16)

1. The patient is supine.
2. The practitioner sits at the side of the table at the level of the patient's pelvis.
3. The practitioner places one hand on the sacrum, with the fingertips at the lumbosacral junction and the sacrum resting comfortably in the palm of the hand.
4. The practitioner's other hand is placed transversely across the lumbar spine, with the ulnar side of the hand in contact with the fingertips of the hand on the sacrum, and the lower lumbar spinous processes resting on the palm of the hand.
5. The practitioner then applies either gentle traction to separate L5 from the sacrum, or gentle compression to bring L5 and the sacrum closer together – whichever movement allows for the achievement of a point of BLT. The practitioner then maintains this position.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Sacroiliac decompression

(Figs 8.17–8.19)

1. The patient is supine.
2. The practitioner stands at the side of the table.

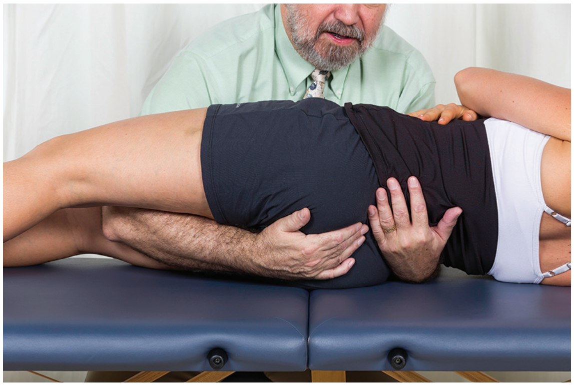

Figure 8.15 Lateral view showing hand position for treatment of lumbosacral decompression.

Figure 8.14 Physician and patient position for lumbosacral decompression.

Figure 8.16 Skeletal view showing hand position for treatment of lumbosacral decompression.

Figure 8.17 Physician and patient position for sacroiliac decompression.

Figure 8.18 Lateral view showing hand placement for sacroiliac decompression.

3. The patient is instructed to lift the buttocks off the table.
4. The practitioner reaches around the patient's pelvis, placing the finger pads of his or her hands in the sacral sulcus on each side. The patient then lowers the pelvis to the table, with the pelvis now resting comfortably in the practitioner's hands.
5. The practitioner applies gentle traction laterally and inferiorly with each hand, moving the innominates away from the sacrum until a point of BLT is achieved. The practitioner then maintains this position.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Innominate release

(Fig. 8.20)

1. The patient is supine.
2. The practitioner stands at the side of the table at the level of the patient's pelvis.
3. The practitioner places the palms of his or her hands on the patient's anterior superior iliac spines (ASISs).
4. The practitioner then gently compresses the ASISs medially.
5. The practitioner next determines in which directions the innominates prefer to move by simultaneously gently rotating one innominate anteriorly and the other one posteriorly, and then repeating this manoeuvre in the opposite directions.

Figure 8.19 Skeletal view showing hand placement for sacroiliac decompression.

Figure 8.20 Treatment position for innominate release.

6. The practitioner then rotates the innominates in the direction of least resistance (direction of ease) until a point of BLT is achieved. The practitioner then maintains this position.
7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Upper extremity

Clavicle

(Fig. 8.21)

1. The patient is seated.
2. The practitioner can be seated or standing facing the patient.
3. The practitioner places the thumb of one hand on the inferomedial aspect of the clavicle immediately lateral to the sternoclavicular joint.
4. The practitioner's other thumb is placed on the inferomedial aspect of the lateral end of the clavicle just medial and inferior to the acromioclavicular joint.
5. The patient is instructed to lean forward slightly, while the practitioner applies gentle pressure with both thumbs, moving the clavicle laterally, superiorly and slightly posteriorly.
6. At the same time, the patient is asked to turn slowly toward the unaffected side, until the practitioner determines that a point of BLT has been achieved. The practitioner then maintains this position.
7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Glenohumeral joint

(Fig. 8.22)

1. The patient lies in the lateral recumbent position with the affected shoulder closer to the ceiling.
2. The practitioner stands at the side of the table and behind the patient.
3. The practitioner places one hand on the humeral head region. The patient's elbow is flexed and the arm relaxed, and the practitioner grasps the patient's elbow with his or her other hand.
4. With the hand on the elbow, the practitioner moves the humerus slightly laterally, and then applies gentle compression toward the glenohumeral joint. At the same time, with the other hand over the glenohumeral joint region, the practitioner applies gentle inferior compression toward the patient's elbow.
5. The practitioner then uses a combination of gentle anterior and posterior motions with each hand, until a point of BLT is achieved. The practitioner then maintains this position.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Figure 8.21 Treatment position for clavicle release.

Figure 8.22 Positioning for treatment of the glenohumeral joint.

Figure 8.23 Positioning for treatment of the forearm and elbow.

Figure 8.24 Treatment position for the carpals or metacarpals.

Forearm and elbow

(Fig. 8.23)

1. The patient is supine.
2. The practitioner sits or stands at the side of the table (the same side as the affected upper extremity).
3. The practitioner grasps the patient's olecranon process with the thumb and index finger of one hand. With the other hand, the practitioner grasps the patient's wrist, flexes the patient's elbow to 90° (or as close to 90° as possible, depending on the patient's condition) and flexes the patient's wrist as fully as possible.
4. The practitioner then pronates the patient's forearm and extends the elbow until a point of BLT is achieved. The practitioner then maintains this position.
5. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
6. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Carpals and metacarpals

(Fig. 8.24)

1. The patient can be seated or supine.
2. The practitioner stands or sits facing the patient.
3. The practitioner interlaces his or her hands and places them over the patient's carpal or metacarpal region (depending on the exact joints to be treated), making contact with the thenar eminences on each side of the patient's hand.

Figure 8.25 Treatment of the phalanges.

4. The practitioner then applies gently compression to the area with his or her thenar eminences, and instructs the patient to gently flex or extend the fingers, until a point of BLT is achieved.
5. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
6. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Phalanges

(Fig. 8.25)

1. The patient can be seated or supine.
2. The practitioner stands or sits facing the patient.

3. The practitioner grasps the patient's hand and stabilizes it in pronation.
4. With the other hand, the practitioner grasps the phalanx to be treated, with the thumb on the dorsal surface and the index finger on the ventral surface of the phalanx, and just distal to the metacarpophalangeal or interphalangeal joint to be treated.
5. The practitioner applies gentle compression into the joint, and then gently moves the phalanx medially and laterally until a point of BLT is achieved.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Lower extremity

Hip

(Fig. 8.26)

1. The patient is in the lateral recumbent position with the affected hip closer to the ceiling.
2. The practitioner stands behind and facing the patient.
3. The practitioner uses one hand to stabilize the innominate.
4. With the other hand placed over the greater trochanter, the practitioner introduces gentle compression along the axis of the neck of the femur, in a medial and slightly superior direction.
5. At the same time, the practitioner introduces gentle compression medially and inferiorly with the hand that is stabilizing the innominate.
6. When a point of BLT is achieved, the practitioner maintains this position.

Figure 8.26 Treatment position for the hip joint.

7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Knee

(Figs 8.27, 8.28)

1. The patient is supine.
2. The practitioner stands at the side of the affected knee.
3. The practitioner contacts the anterior distal end of the femur with the palm of one hand, and the anterior proximal end of the tibia, over the tibial tuberosity, with the other hand.

Figure 8.27 Treatment position for the knee joint, showing compression of the femur and tibia toward the table surface.

Figure 8.28 Treatment position for the knee joint, showing compression of the tibia and femur toward each other, and the use of external and internal rotation to achieve a final position of balanced ligamentous tension.

4. The practitioner then applies gentle pressure with both hands, moving the femur and tibia toward the table surface.
5. The practitioner then applies gentle compression with both hands, approximating the femur and tibia.
6. Stabilizing the femur in this position, the practitioner next introduces gentle internal and external rotation into the tibia, until a point of BLT is achieved, and then maintains this position.
7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Fibular head

(Fig. 8.29)

1. The patient is supine.
2. The practitioner is seated on the side of the affected lower extremity.
3. The practitioner flexes the patient's hip and knee to approximately 90° each.
4. The practitioner places one elbow on the table and the web of the hand in the patient's popliteal fossa to support the leg. The thumb of this hand rests on the superior aspect of the proximal fibular head. The practitioner applies gentle pressure with the thumb, to move the fibular head inferiorly.
5. With the other hand, the practitioner inverts and slightly internally rotates the foot.
6. This position is adjusted until a point of BLT is achieved, and the practitioner then maintains this position.
7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Ankle

Anterior talus

(Figs 8.30, 8.31)

1. The patient is supine.
2. The practitioner stands on the side of the affected ankle.
3. The practitioner places the palm of one hand over the anterior distal tibia, and applies compression, carrying the tibia toward the table surface. The practitioner may use the other hand to add additional pressure as needed.

Figure 8.30 Treatment position for anterior talus, with compression of the tibia toward the table surface.

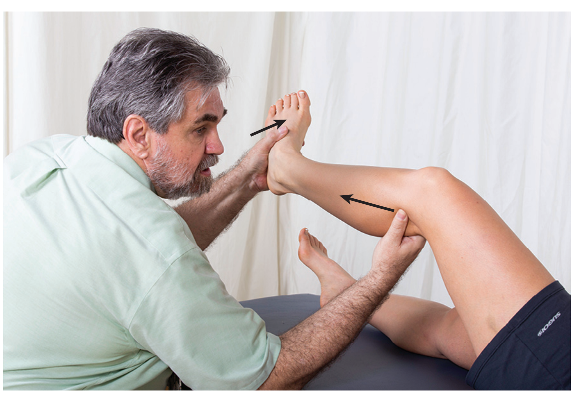

Figure 8.29 Positioning for treatment of the fibular head.

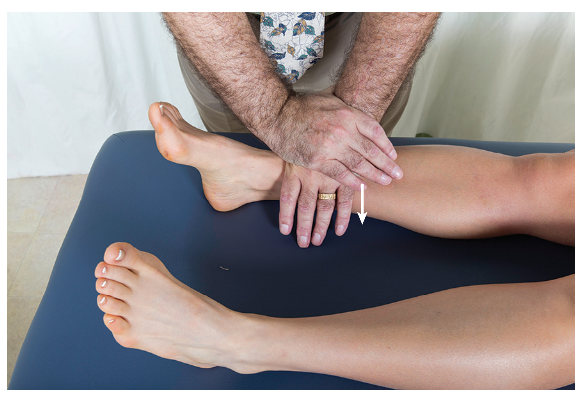

Figure 8.31 Treatment position for anterior talus, showing the use of both hands to apply compression of the tibia toward the table surface.

4. The practitioner then rolls the tibia into external and internal rotation, until a point of BLT is achieved, and then maintains this position.
5. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
6. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Posterior talus

(Fig. 8.32)

1. The patient is supine, with the heel of the affected foot just beyond the edge of the table by approximately 1 inch.
2. The practitioner stands at the foot of the table, facing toward the head of the table.
3. The practitioner grasps the patient's foot by approximating the palms over the metatarsals and phalanges, with the thumbs approximated and resting on the dorsum of the foot. The practitioner's fingers wrap around the sides of the foot, with the finger pads approximated and in contact with the sole of the foot.
4. The practitioner brings the foot into slight plantar flexion.
5. The practitioner next applies gentle compression into the entire foot, and directed toward the floor, until a point of BLT is achieved. The practitioner then maintains this position.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Calcaneus

(Fig. 8.33)

1. The patient is supine.
2. The practitioner stands at the side of the affected foot, facing the foot of the table.
3. The practitioner flexes the patient's hip and knee, and places the elbow of his or her arm that is closest to the table just above the patient's popliteal fossa.
4. Using the same hand, the practitioner grasps the patient's calcaneus with the thumb and index finger.
5. With the other hand, the practitioner grasps the patient's foot at the distal metatarsal aspect, and slightly flexes the foot toward the calcaneus.
6. The practitioner then gently moves the calcaneus inferiorly until a point of BLT is achieved.
7. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
8. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

Tarsals, metatarsals and phalanges

(Fig. 8.34)

1. The patient is supine with the heels on the table.
2. The practitioner stands at the foot of the table, facing toward the patient.

Figure 8.32 Treatment position for posterior talus, showing compression into the foot and toward the floor.

Figure 8.33 Treatment position for the calcaneus, showing the application of gentle traction directing the calcaneus inferiorly to achieve the point of balanced membranous tension.

Figure 8.34 Treatment position for the tarsals, metatarsals or phalanges, showing the application of gentle compression of the foot toward the floor to achieve the point of balanced membranous tension.

3. The practitioner grasps the patient's foot with both hands over the area of the distal metatarsals and toes, with the thumbs approximated and resting on the dorsum of the foot, and the fingers wrapped around both sides of the foot with the finger pads approximated and in contact with the sole of the foot.
4. The practitioner places the foot into slight plantar flexion.
5. The practitioner then introduces gentle compression into the foot, directing the phalanges, metatarsals, and tarsals toward the table surface, until a point of BLT is achieved. The practitioner then maintains this position.
6. The practitioner may add an activating force by having the patient hold his or her breath in either inhalation or exhalation, whichever phase facilitates the maintenance of the point of BLT.
7. Release of the ligamentous tension will be felt either prior to, or at the point when the patient can no longer hold his or her breathing.

THIS CHAPTER

This chapter has described the principles of balanced ligamentous tension (BLT) and the techniques used to treat this type of somatic dysfunction. BLT is a concept based on the idea that, in a physiologically normal joint, as movement occurs, the relationships among the joint's ligaments change, but the overall tension within the ligamentous structures remains equally distributed.

NEXT CHAPTER

The next chapter by Edward Goering, DO, describes and gives detailed descriptions of the use of counterstrain when applied to visceral dysfunction.

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