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Fascia, Tensegrity and Assessment

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Fascia is the organ of structure. It is the overall fabric that makes up our body. It includes the dense planar tissue sheets such as septa, joint capsules, aponeuroses, organ capsules and retinacula. It also encompasses local classifications of the network in the form of ligaments and tendons. It includes the softer collagenous connective tissues as well as the dura mater, the periosteum surrounding bones, the perineurium, surrounding nerves, the fibrous capsular layer of the vertebral discs, the organ capsules, the mesentery of the abdomen and the bronchial connective tissue. It is the fibrous connective tissue enveloping, separating and binding together our muscles, organs and all of the structures within the body. Fascia has normally been thought of as a passive structure that transmits mechanical tension generated by muscular activities or external forces throughout the body.

Recent research by Robert Schleip, director of the fascial research group at Ulm University, suggests that fasciae might be able to contract independently and thus actively influence muscle dynamics (Schleip, Klingler and Horn 2005). Dysfunctions within this organ may exist higher or lower in the structural chain than the location of emanating pain complaints. Often there cannot be long-lasting resolution of symptoms in many cases until the whole pattern of dysfunction in the fascial system is identified, evaluated and treated accordingly. Meanwhile, no one is looking at the fascial system, a structure of connective tissue that surrounds muscles, groups of muscles, blood vessels and nerves, binding some structures together while permitting others to slide smoothly over each other.

Dr Ida Rolf was one of the first scientists to emphasize the importance of the fascial network within the anatomical system. She called it 'the organ of structure.' Rolf was a research biochemist whose concepts are taught through the Rolf Institute of Structural Integration. She observed that when the body organized itself around a vertical line it was better able to respond to all of life's demands and to accommodate the ceaseless influence of gravity. She saw that structure and function are interdependent and that change at the structural level of organization will inevitably evoke changes at all other levels, including the functional, emotional, psychological and perhaps even spiritual. In *Rolfing: The Integration of Human Structures* (1977), Rolf wrote:

> In the myofascial system as a whole, each muscle, each visceral organ, is encased in its own fascial wrapping. These wrappings in turn form part of a ubiquitous web that supports as well as enwraps, connects as well as separates all functional units of the body. Finally, these elastic, sturdy sheets also form a superficial wrapping, serving as container and restraining support for the whole body. This is the so-called superficial fascia, lying just under the skin. **[AQ]**

Fascial researchers and clinicians are beginning to further understand and recognize the crucial role played by the fascial network in creating efficient movement patterns and optimal functional abilities.

Fascia has existed all along, but we could not see the relationship of its connections clearly until now. It has been impossible to see the role of active fascia directly in preserved dissection and so we have ignored it in our primary evaluations, when we should have been treating it, possibly, as our primary intervention. Now, with endoscopic visualization in live tissue, we can see the complex connective tissue matrix in the whole system and its organization or disorganization in the entire body.

The work of Jean Claude Guimberteau, a French hand surgeon, demonstrates the existence of this complex extracelluar matrix throughout the whole organism. Guimberteau documented his in vivo endoscopic exploration of fascia while studying flexor tendon excursion in his film *Strolling under the Skin: Images of Living Matter Architectures* (2005) and has since gone on to study in vivo tissue endoscopically as it covers other connective tissues such as muscles, skin and scars. Guimberteau and others have shown that fascia exists as a superficial layer below skin, then dives into and encapsulates compartments of muscle, then individual muscles and then myofibrils themselves. Fascia also exists on a cellular level; it provides structure in a three-dimensional way both macroscopically and microscopically throughout the body's systems.

Tensegrity

Connective tissue determines our shape through its actions, restrictions, inhibitions and performance. We are tension-based structures: fascia imparts a continuous tension to our system. Donald Ingber, a pioneering scientist who works with the biological application of tensegrity, describes it as 'a system that stabilizes itself mechanically because of the way in which tensional and compressive forces are distributed and balanced within the structure' (1998, p.48). Fascia holds together all tissue – muscular, skeletal, neural, visceral, lymphatic and vascular. It also provides communicating links, both mechanical and chemical, between the body's parts through the extracellular matrix. Connective tissue transmits these tensegrity forces.

An understanding of biotensegrity is especially relevant to the Bowen practitioner who treats a client with issues in their upper extremity because our upper extremities are responsible for executing such a vast majority of our body's everyday tasks. When clients present with pain or dysfunction in the upper extremity, fascial imbalances – and imbalances in the biotensegrity of their fascia throughout their whole body – are often an underlying root cause of their pain.

Viewed as a model for the skeletal system of any vertebrate species, the tensegrity model of the icosahedron, with the bones acting as the compressive elements and the soft tissue as the tension elements, will allow the whole organism to be stable in any position. Therefore, shortening one soft-tissue element will have a rippling effect throughout the whole structure. We see this in nature: when a tree stands up to the forces of wind in a continuous manner, that tree will then modify its growing pattern and distort into a structure that is altered in its vertical alignment by laying down more bark and trunk growth in a different plane of motion to withstand the forces. The human body will do the same and transform into the positioning that is required to perform a task repeatedly. The body will lay down additional tissue in a particular region to create stability; such is the case with a dowagers' hump to support the weight of the head in an individual with forward head posture. Our biology becomes our biography as we perform repetitive activities over time and our tensegrital alignment of compression forces and tensioned forces will modify themselves to meet the demands of the environment.

One of the first clinicians to start applying tensegrity concepts to complex biological organisms was Dr Stephen Levin, an orthopaedic surgeon. He developed the term 'biotensegrity' to describe the application of tensegrity principles to biological systems, including our bodies. Biotensegrity represents a significant conceptual shift from the simpler view that our bones are the load-bearing structures in our bodies, like the framing of a house. Levin makes the compelling point that if our bones operated as a system of continuous compression members, like the beams and rafters of a house, then the force of regular, daily loads on our bodies would result in the shearing and crushing of our bones. It is only by modelling the transmission of forces in the tensional members of our bodies – the muscles and connective tissue – that we can account for our ability to perform everyday tasks.

In addition to Ingber and Levin, other scientists have taken this further by training in clinical practice that integrates the effects of fascia. One such scientist is Louis Schultz, a former biology professor and an advanced certified Rolfer. Schultz states in *The Endless Web: Fascial Anatomy and Physical Reality* (1996, p.32) that:

> The old paradigm of looking at the body was one of the skeleton as being the organizing force of the body which was surrounded by connective tissue. The new paradigm which explains and confirms mobility and agility is the concept of connective tissue as the actual supportive aspect of the structure. Bones are spacers, serving to position and relate different areas of the connective tissue.

> Bones are not the supporting structures of the body; the connective tissue serves this function. Muscles provide the source of directional movement and execute motility. The spinal column is lengthened by a combination of the narrower coiling of the connective tissue and the pressure of the compressed fluid between bones. Support in a moving structure arises from the organization and arrangement of the connective tissues – the reciprocal, balanced planes of connective tissue supporting both muscle and bones by their elastic capability. All joints should lengthen with movement as the connective tissue wraps and supports the joint capsule.

Research during the past 30 years by Ingber, Levin, Schultz and others has taken these concepts of tensegrity and biotensegrity to new heights of understanding of how to apply this knowledge to clinical practice. There has been an exponential increase in the number of scientific presentations and publications which investigate various aspects of these concepts, beginning with the First International Fascia Research Congress held at Harvard University in 2007, where clinicians and researchers from various fields came together to develop novel approaches to understanding and researching fascia. Ingber presented the following at the 2007 Fascia Research Congress:

> Anyone who is skilled in the art of physical therapy knows that the mechanical properties, behavior and movement of our bodies are as important for human health as chemicals and genes. However, only recently have scientists and physicians begun to appreciate the key role which mechanical forces play in biological control at the molecular and cellular levels. … Molecules, cells, tissues, organs, and our entire bodies use 'tensegrity' architecture to mechanically stabilize their shape, and to seamlessly integrate structure and function at all size scales. Through the use of this tension-dependent building system, mechanical forces applied at the macroscale produce changes in biochemistry and gene expression within individual living cells. This structure-based system provides a mechanistic basis to explain how application of physical therapies might influence cell and tissue physiology. (Ingber 2008, p.198)

Clearly, the biotensegrity model of the body's structure, with its support coming from the prestressed, tensioned members of our connective tissue and fascia, provides the most complete explanation for the structural functioning of our bodies. And if fascia truly supplies the majority of the body's structure and function, then the role of fascia in any kind of injury or presentation of pain must become central to our assessment and treatment approach.

As we transpose these tensional and compressive elements to the biotensegrity model of the body, we can see that the disruption to one part of the body's fascia necessitates tugging and pulling on the body's connective tissues. The balance of compression and distraction forces within the overall system determines how much overall give the structure has to weather such disruptions. Once the fascia is severely disrupted, physical interventions in the form of bodywork or movement therapies are necessary to return the body's structure to its original state of optimum support for the entire body.

Within the fascial system lie the musculoskeletal, vascular, nervous and lymphatic systems. Any adverse presentation of those isolated or combined systems would be directly influenced by the health and positioning of the connective tissue matrix. By treating the fascial system directly, all these systems will potentially be self-regulating and restored by returning the body's fascia to its original length, strength and function.

Fascial Lines, Postural Assessment and Myofascial Length Testing

Thomas Myers, a structural integrator and founder of the Kinesis school of Structural Integration, describes common pathways of functional force transmission through a term he coined, 'anatomy trains'. In his book, *Anatomy Trains: Myofascial Meridians for Manual and Movement Therapists* (2009), he describes in detail the concepts of tensegrity and myofascial meridians. He follows the grain of the myofascial fabric from structure to structure and labels common force patterns that not only make up our structure but allow for stability, reciprocal movement patterns and alignment of the joints and surrounding structures. These anatomy trains, or myofascial meridians, are common, continuous networks of fascial fabric throughout the body.

In vivo human surgical dissections using light microscopy (magnification x 25), undertaken and video-recorded by Guimberteau (2005) have confirmed the complexity of fascia and its multidirectional influence on the musculoskeletal system. In his film we see that a tug in the fascial web is communicated across the entire fascial 'fabric' like a snag in a sweater or a pull in the corner of an empty woven hammock. One disruption to the tensional network can have far-reaching effects in other parts of the system, but multiple 'snags' in the structure can have a devastating impact on the stability and mobility of the whole body system. Though Myers describes nine common lines that intersect throughout the system, connecting the upper body to the lower body, many other fascial lines exist within the body.

Fascial Lines

Each of these fascial lines warrants discussion in further detail as they relate to pathology that we may see in our clinic settings as Bowen workers. Tissue treatment and assessment is performed from a superficial to deep manner, making sure that the superficial structures are restored to their ideal balance of mobility and tensegrity before the deeper layers are addressed.

These diagnoses listed in each later section are not mutually exclusive to each of these lines because a change in one line will directly affect the tensegrity balance of the other lines. This is why treatments such as Bowen work can be so effective in so many conditions because it is based on the premise of balancing out the body three-dimensionally.

Back and Front Functional Lines

The first and most superficial of these lines are the back and front functional lines. These lines act like an overcoat on the body. These continuous fascial networks consist of the vastus lateralis, gluteus maximus and the opposite latissimus dorsi posteriorly, and the adductor longus, rectus abdominus and the opposite pectoralis major. The functional front and back lines are important for reciprocal movements involving power of the shoulder and hip. These lines become important to assess and treat with injuries to the back, hip and shoulder, and they need to be considered first in treatment sessions because of their superficial nature. Just as mobility can be altered if one is wearing too small an overgarment, the functional line's overall mobility and length is important to obtain full range of motion between the relationship of the hips and the shoulders.

Superficial Front and Back Lines

The next two lines, which also need to be balanced in their length and strength, include the superficial front and back lines. The superficial back line includes the plantar fascia at the bottom of the feet, the gastrocnemius and soleus, the hamstrings and the sacrotuberous ligament into the paraspinals, ending at the scalp fascia. This line is balanced by the superficial front line, which begins at the dorsum of the foot and includes the muscles within the anterior crural compartment of the lower leg, the quadriceps, the rectus abdominus and into the sternalis and sternocleidomastoid (SCM). These lines can be altered through many causes, such as engaging in habitual repetitive activities, having poor core stabilization strength, or undergoing abdominal or back surgeries, to name a few. A single alteration within one of these lines will affect the tensegrity balance of the corresponding muscles of the other line, which together create a 'force couple' to promote stability within the joints and overall structure.

Lateral Line

The next line, which provides a base of support for the shoulder and hip, is the lateral line. The lateral line begins at the fibularis and extends through the iliotibial (IT) band and tensor fasciae latae (TFL) into the internal and external obliques and through the axillary fascia into the SCM and splenius capitus. Injuries or changes to the balance of this line will lead to disruptions to the base of support of the hip, shoulder and/or head positioning.

Spiral Line

The spiral line is a bit more complex in description. It begins on one side of the head at the splenius capitus. It then crosses over to the opposite rhomboid and into the serratus anterior and from the internal oblique to external oblique. It then goes down to the TFL and IT band, the fibularis and the base of the first metatarsal, where it connects to the anterior tibialis, to the lateral hamstring of the biceps femoris, to the sacrotuberous ligament, into the paraspinals, and then back to the base of the skull. As you may notice, many of these fascial lines have intersecting muscles that can be found in other lines, but it is their fibre direction and the forces placed on them which determine their functional pattern. Spiral line issues present at foot and ankle rotations and pelvic and thoracic rotations.

Arm Lines

The arm lines are two superficial and two deep lines within each arm. The superficial back and front arm lines balance the rotational aspects of external rotation and supination. The deep arm lines promote internal rotation and pronation.

Superficial Back Arm Line

The superficial back arm line (SBAL) begins on the wide origin of the trapezius muscle, the nuchal line of the occipital bone, nuchal ligament (nuchal line to C7) and spinous processes of C7–T12. All of the fibres of the trapezius muscle converge on the spine of the scapula and then continue into the deltoid muscle. The middle and lower trapezius fibres continue into the posterior deltoid, the cervical trapezius fibres are continuous with the middle deltoid and the occipital trapezius fibres continue into the anterior deltoid. The three heads of the deltoid converge on the deltoid tubercle on the humerus. The SBAL then continues along the lateral intramuscular septum to the lateral epicondyle of the humerus. From here, the line melds into the common extensor origin and follows the wrist and hand extensor muscles under the dorsal retinaculum and then on to insert on the carpals and phalanges. Common diagnoses seen within this line include shoulder pain, lateral epicondylitis and dorsal wrist tendonitis. It is balanced by the superficial front arm line.

Superficial Front Arm Line

The superficial front arm line (SFAL) begins on the sternum, clavicle and ribs at the origin of the pectoralis major muscle. Although the latissimus dorsi comes from the back of the body, it is a part of the SFAL due to its anatomical and functional relationship to the pectoralis major. The latissimus dorsi inserts on the medial bicipital groove and, along with the pectoralis major, connect here to the medial intramuscular septum along the humerus. The intramuscular septum is then continuous with the common flexor tendons that originate at the medial epicondyle of the ulna. Finally, the SFAL passes through the carpal tunnel and ends in the insertion into the palmar surface of the fingers. The common diagnoses seen in this line include medial epicondylitis, forearm and wrist tendonitis, as well as carpal tunnel syndrome.

Deep Back Arm Line

The deep back arm line has two origins. One begins at the origin of the rhomboids (C7–T5 spinous processes) and follows the rhomboids over to their insertion on the medial border of the scapula. From here, the line continues on the fibres of the infraspinatus and teres minor muscles (two of the rotator cuff muscles). The second origin of the deep back arm line begins on the lateral occiput at the origin of the rectus capitus lateralis and continues to the transverse processes of the cervical vertebrae. From here the line continues down the fibres of the levator scapula to the superior angle of the scapula and melds into the supraspinatus muscle in the supraspinous fossa of the scapula. The supraspinatus is another rotator cuff muscle, and it is here that the two origins converge on the head of the humerus. The rotator cuff muscles keep the ball of the humerus in the socket of the glenoid fossa of the scapula. From here, the deep back arm line connects into the triceps brachii muscle and proceeds down to the olecranon process of the ulna. The line continues along the periosteum of the ulna to the hypothenar eminence. Diagnoses commonly seen here include thoracic outlet syndrome (TOS), ulnar nerve compressions and ulnar sided wrist disorders.

Deep Front Arm Line

The deep front arm line begins on the third, fourth and fifth ribs at the origin of the pectoralis minor, which inserts on the coracoid process of the scapula. From there, it is continuous with the short head of the biceps brachaii muscle all the way to its insertion on the radius and deep along the periosteum of the radius, across the scaphoid to the thenar eminence of the thumb. The deep front arm line includes the pectoralis minor, biceps, brachialis, into the supinator and radial periosteum to the thenar musculature. Disorders to this line include nerve entrapments to the median and radial nerve in the forearm, thumb tendonitis and carpometacarpal (CMC) arthritis of the thumb.

Deep Front Line

Last and most core is the deep front line. The functional implications of this are vast. The involvement of the respiratory diaphragm is an integral part of our core stabilization, and therefore our breath. This also alludes to the core stabilizing function of the hyoid muscles, the core implications of our pharyngeal raphe (throat) and scalene muscles, and lastly the importance of the activation of the longus colli and longus capitus in anterior neck stabilization.

The deep front line is not only the most complex, but is perhaps the most important myofascial network in our body. The last important piece is the connection of the pelvic floor to the pubic bone (via the pubococcygeus muscle) and on to the linea alba up to the umbilicus (navel). At the deepest level, this connection wraps around the entire abdomen via the transversus abdominis muscle (the deepest of the abdominal muscles). This line begins at the intrinsics of the foot and extends into the deep compartment of the lower leg, including the posterior tibialis, the adductors of the thigh, into the pelvic floor, the psoas, quadratus lumborum, the diaphragm, the mediastinum, the deep cervical musculature including the scalenes, longus colli and capitus, the jaw muscles, and finally into the tentorium (part of the dural membranes) of the skull. Some of the diagnoses within this line may include bunions, leg asymmetries affecting the knee and hip joints, pelvic floor dysfunction, breathing disorders, TOS, temporomandibular joint disorders (TMJD) and headaches.

Posture

Posture is the position of the body with respect to its surrounding space. It is determined and maintained by coordination of the various muscles that move the limbs, by proprioception and by our sense of balance. It is also an attitude of the body that is usually considered to be the natural and comfortable bearing of the body. It can also be described as the body mass distribution in relation to the force of gravity.

When the integrity of postural muscles is compromised, the whole skeletal system is affected and misalignments lead to abnormal wear and tear on joints. Additionally, misalignments will cause musculoskeletal breakdown, injury and pain, affecting the optimal functioning of internal systems. Compensated and dysfunctional posture can result in the body's joints bearing weight abnormally. The muscles can become imbalanced and may not function to their optimal levels. The nervous system can become tractioned, compressed, or often both.

A typical client that we might see in our clinic would be one with tight upper cervicals and weak neck flexors which would result in a forward head posture, a kyphotic thoracic spine with tight upper chest and pectorals that would put the scapula into protraction and the glenohumeral joints into internal rotation, weak abdominal and tight erectors which could lead to low back discomfort and tight ankles which would create a poor base of support to the whole body. A client presenting in this pattern may have a diagnosis or site of pain anywhere within their body's structure, but each of these previously listed factors of postural asymmetry will have a directly adverse effect on the client's structure. Treatment, however, cannot have long-term success without addressing the whole system and the tensegrital balance of all of these structures in relation to each other.

This is the reason why postural assessment is so important. Assessment tells the practitioner what is happening, where to find the origin of the problem, how to organize the application of the Bowen moves and why one would choose those procedures.

How to Perform a Standing Postural Assessment

There are five aspects of performing a standing postural assessment:

1. Look globally at the client, obtaining a general silhouette of their overall structural condition, observing the big picture of their organization.
2. Examine the organizational relationship of the body parts through joints in gravity.
3. Examine the kinaesthetic experience of 'taking on the client's posture,' thus allowing the practitioner to feel the kinaesthetic and emotional general being of the client.
4. Assess the movement available within the client's structure by trying to place the body manually into alignment.
5. Perform myofascial length testing (MFLT) both in and out of gravity to determine the specific limitations in fascial mobility, at specific areas, which will affect the overall structural balance of the system. For more information on MFLT, see later section in this chapter.

The practitioner must also understand what normal alignment looks like:

- The head should be neutral over the yoke of the shoulders.
- The cervical spine should have a normal curve, with a slight concavity anteriorly.
- The scapula should lie flat against the thorax, with the medial borders being perpendicular with the spine.
- The thoracic spine should have a normal primary curve, slightly convex posteriorly.
- The lumbar spine should also have a normal curve, slightly concave anteriorly.
- The pelvis should be in a neutral position, anterior superior spines in the same vertical plane as the symphesis pubis. There is some debate among different schools of thought and between the sexes, what these exact angles should be, but, in general, we are looking at a level pelvis.
- The hip joints should be in a neutral position, neither flexed nor extended.

- The knee joints should also be in a neutral position, neither flexed nor hyperextended, and the ankle joints in neutral.

Common Postural Patterns

There are four common postural patterns that are typically seen in the human body.

1. The first pattern is normal alignment, as outlined above.
2. The second is the kyphosis-lordosis posture, which is an excessive exaggeration of the primary and secondary curves of the spine. The primary curve of the thoracic spine becomes excessively convex posteriorly, which will drive the secondary curve of the lumbar spine excessively concave. This will lead to changes throughout the structure, including scapular protraction and a forward head posture.
3. The next common postural pattern is the sway back posture. This is usually driven by an anteriorly tilted pelvis with excessive lordosis, followed by a posteriorly displaced thorax. This will also lead to a forward head posture and often hyperextension at the knees.
4. Last is the flat back posture, which is a loss of the normal primary and secondary curvatures of the spine, leading to an appearance of a 'flat back.' This will also lead to scapular and glenohumeral dysfunctions, secondary to the loss of a proper base of support of the scapula, and may limit the excursion of spinal mobility overall.

During the movement assessment portion of the evaluation, assuming the client's habitual standing patterns in your own structure can create a kinaesthetic experience within the practitioner's own body, allowing one to experience the 'stress points' or areas of tension which are required to maintain a particular posture in gravity. The practitioner can then attempt to reorganize the client's standing posture through palpation with the intention of establishing the best alignment to gravity as possible. This can help identify what parts of the structure can and cannot move and the compensation that may be necessary to obtain vertical alignment.

Myofascial Length Testing

Up until this point, we have had no way to measure the influence of fascia during evaluation or as a means of tracking client progress and outcomes. Practitioners have been limited to relying on a client's report of pain and function as well as a clinical evaluation of the isolated location of pain. However, a diagnostic procedure has been developed, called myofascial length testing (MFLT), which objectively measures the function of the muscles and fascia in an individual's whole body.

MFLT, an objective measure and evaluative technique, provides quantifiable physical measurements, pre- and post-treatment, to determine the direct effects of the therapeutic intervention on the connective tissue system. When used in addition to the client's objective reports, standing postural assessment, provocative testing measures and functional outcomes, MFLT can lead to a comprehensive picture of the client's overall state of physical health. Combining these sources of data collection and tracking provides detailed, comprehensive information that can provide accurate assessment of a client's state and rate of progress over time, leading to greater whole body outcomes. By further understanding the importance of global and specific evaluative measure, therapeutic interventions and treatments directed at balancing the whole system, we are then able to restore not only the muscular and fascial system back to its tensegrity balance but also potentially all systems to a more self-regulating level of homeostasis.

Donna Bajelis, PT, CHP, SMS, the founder and owner of the Institute for Structural Medicine, developed myofascial length testing as a way to test objectively the fascial restrictions within the body (Bajelis and Duben 2012). She combined principles of muscle testing taken from physical therapy with proprioceptive neuromuscular facilitation (PNF) patterning and the fascial lines, to determine where primary restrictions may be located, as well as the compensatory patterns that have developed which may be contributing to pain symptoms. By utilizing a formal objective assessment technique for both pre- and post-treatment testing, the practitioner is able to determine exactly where the restrictions are located within the structure and thus can target the treatment to these areas, making treatment more efficient and cost-effective. This also gives the practitioner tools of objective testing that can be used in documentation, allowing greater communication between the practitioner and the referral source, insurance companies, or other providers involved in the client's overall care.

Following a standing postural assessment, specific passive MFLT is performed. For the upper extremity, the scapula is addressed first, assessing the ability of the scapula to organize itself toward depression, allowing the shoulder to passively flex and adduct. This biomechanical pattern is paramount in normal functioning of the shoulder which creates the normal scapula/glenohumeral rhythm in shoulder mobility. The scapular mobility is 100 per cent dependent upon the thoracic alignment because of its floating position on the rib cage.

Once the scapula's ability to 'seat' is evaluated, meaning its ability to depress, then the testing procedures for the superficial front and back arm line can be performed. This testing will include passive shoulder flexion, external rotation and adduction, while maintaining the forearm in full supination and wrist in a neutral position.

- For the superficial back arm line (Figure 2.1), while the scapula is placed in its end range depression position, the arm is passively flexed and horizontally adducted while maintaining end-range external rotation and forearm supination. This tests the total end-range capacity of the fascial fibres of the superficial line.

Figure 2.1 Superficial back arm line (SBAL) testing

- Likewise, the superficial front arm line (Figure 2.2) is tested with the scapula seated, while maintaining the external rotation and supination components of the 'wind up.' The arm is then passively moved into shoulder extension at approximately 30 degrees of abduction. The practitioner must ensure that the client is not positioning the elbow in valgus to achieve this orientation.

Figure 2.2 Superficial front arm line (SFAL) testing

The deep front and back arm lines are tested in the same fashion, except the shoulder is positioned this time in full internal rotation and with the forearm in pronation.

By approaching the client in this systematic manner, taking into consideration the whole body's fascial alignment both in and out of gravity, the practitioner is able to effectively and efficiently determine which procedures are appropriate to effect whole body change and to honour Tom Bowen's theory of providing 'less is more' within the treatment session.

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