

POSTURE: ALTERNATIVES TO THE PREVAILING PARADIGM

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In this 3-part series we will look at an overview of the modalities that can be alternatives to a standardized approach for postural assessment, that is an external orientation or what we term as an objective view that manual therapists take when assessing and intervening with postural dysfunctions. In the first part of the series we will identify what has been the prevailing view of posture from teachings of mainstream perspectives and in the second and third parts of the series introduce to you differing viewpoints that hopefully will assist you in your practice.

INTRODUCTION

All you need do is type the word posture onto an internet search engine and in .11 seconds you have about 1,720,000 hits. And as you scan the dizzying array of responses, one can retrieve information about postural related aids and devices that include postural balls, ergonomic chairs, or find information all about posture; how to maintain correct posture when meditating or how to maintain a balanced and correct posture according to a variety of disciplines and modalities.

Some self-help manuals like Kit Laughlin's have an integrated approach utilizing his background in yoga along with rehabilitation and sports exercise, dance, gymnastics and forms of martial arts he has been exposed to that assist in postural transformation.¹

Other sites prefer a health-oriented corporate workplace approach to helping employees become more productive by maintaining a conscious awareness of how they sit when performing various activities for their daily work regimen. And these tips include keeping your eyes level, shoulders level and not shrugged, elbows resting close to the torso, etc., all seemingly to take what appears to be a scientific physiotherapeutic approach to maintaining correct posture.

If one scans the responses further, there are aids to assist in assessing posture by the manual therapist and postural professional; these include a \$349 USD Postural Evaluation Kit that will include a program for keeping postural records of your client, a plastic postural grid that can be suspended from the ceiling or wall, suspension cord and plumb bob for alignment. If you so desire you can use a PALM device known as a palpation meter.

"This device combines the ease and proprioceptive of palpation with the objectivity and reliability of caliper and inclinometer measurements. The caliper determines the distance in centimetres between two palpating fingers. The inclinometer will give you accurate measurement in degrees between two palpating fingers."

As manual therapists, how do we make sense of all this information? For one thing, all of the sites I viewed seemed to convey and portray a physical orientation of what correct posture is meant to be. That is, assessing posture from an external point of view. Secondly, the sites describe how to counteract poor posture by re-educating one's muscles utilizing movement in the form of specific exercises.

Are there any other approaches to normalizing posture and how do they compliment or conflict with a standardized approach that these sites convey?

TRADITIONAL APPROACHES TO POSTURAL AND MUSCULOSKELETAL DYSFUNCTION

STATIC POSTURAL IMAGES

If we peruse various massage anatomy and physiology texts or modality manuals, we find laid out for us a process and procedure that is taught and adhered to, based upon postural assessment or analysis; that is, a step by step procedure of looking at the structural landmarks of the body, both in weight-bearing and non weight-bearing positions.

That is usually an analysis of the body form from a static standing position. If we look to analyse the body in motion, we usually refer to it as 'gait analysis'. This is the logical and normal approach that is taken, it focuses our attention and awareness on our client when they present themselves for observation and assessment of postural considerations

MUSCLE TESTING AND FUNCTION

Kendall and McCreary (1949), one of the bibles in the field for muscle testing and function have wonderfully dated black and white photographs of men and women in relation to a grid and plumb line bob. The photographs describe ideal plumb line and faulty plumb alignment.

**Ideal Postural
Alignment**



**Faulty Postural
Alignment**



Accordingly the authors state a premise about muscle function in relation to posture:

“posture is the composite of the positions of all the joints of the body at any given moment. If a position is habitual, there will be a correlation between alignment and muscle test findings. If a reasonable assessment of a joint position is made, then an assessment also can be made regarding muscles in elongated positions and that are in shortened positions. In faulty posture, those muscles in slightly shortened positions tend to be stronger, and those in slightly elongated positions tend to be weaker than the muscles that work in opposition to them.”²

With this quote we have all the components for addressing physiologic functions that affect posture and the dysfunctions that occur. We include joint play, movement, habituation (nervous system adaptation), agonist and antagonist muscle function, all of which can lead us into a discussion about sensory-motor nerve function.

So why is it we view postural dysfunction by the use of symmetrical comparison of bony landmarks and usually in context of muscle shortness and contracture? Well for reason, it suits us to consider posture in the context of symmetry. And if we can balance muscle groups there is a sense that posture can self-correct.

This is generally how manual therapists approach postural dysfunction. But is there more to postural dysfunction than asymmetry and muscle contracture? It is often more complicated and interesting than detailed extrinsic explanations.

PATTERNS OF MUSCULOSKELETAL DYSFUNCTION

Postural and tonic muscles and Janda's syndrome patterns
Anatomic and physiologic responses to stress.

No discussion on posture can occur without an understanding of the function of muscles.

One contributor to how muscle function in patterns has been a Czech researcher named Vladimir Janda. He describes the patterns that affect posture by understanding the relationship between postural type 1 muscles and phasic type 2 muscles. Predictable patterns emerge that he elaborates upon that he named Upper and Lower Crossed Syndromes.

Essentially postural or tonic muscles shorten while phasic often weaken.

Type 1 or Postural fibres contract slowly and are able to burn oxygen more efficiently than phasic muscles, which allows them to work slowly, and steadily over long periods of time. Over time with misuse and disuse, these muscles will shorten. This is a clinically important distinction in tonic muscles response to stress.³

Phasic or Type 2 fibres of which there are two main categories will weaken under prolonged stress and the fibres will tend to lengthen.

- Type 2a fast-twitch fibres which contract more speedily than type 1 and are moderately resistant to fatigue with high concentration of mitochondria (the fuel-producing refineries of the cell) and myoglobin (protein that speeds up the conversion of calcium ions) Usually used in walking and sprinting.⁴
- Type 2b fast-twitch glycolytic (uses blood sugar) are less fatigue resistant and depend on more glycolytic sources of energy. Usually used in strength training such as weight lifting.

UPPER CROSSED SYNDROME

Involves the following imbalance (see Figure 1):

Pectoralis Major/Minor, Upper Trapezius, Levator Scapulae, Sternocleidomastoid

– All tighten and shorten – Tonic or Postural Muscles

While

Lower/Middle Trapezius, Serratus Anterior, Rhomboid Major/Minor - All

Weaken – Phasic Muscles

When this occurs they alter the relative position of the head, neck and shoulders as follows:

1. Occiput with C1 and C2 hyperextend with the head translating anteriorly
2. The lower cervicals down to 4th thoracic are now stressed.
3. Rotation and abduction of the scapula occur as the upper trapezius and levator scapulae become shortened and contracted. This inhibits the lower trapezius and serratus anterior.
4. As a result the scapula loses stability, which puts excess demand on the humerus now involving the levator scapulae, upper trapezius and supraspinatus to maintain functional efficiency.

Janda believed that by identifying the shortened structures and releasing these, they will improve overall function and posture.

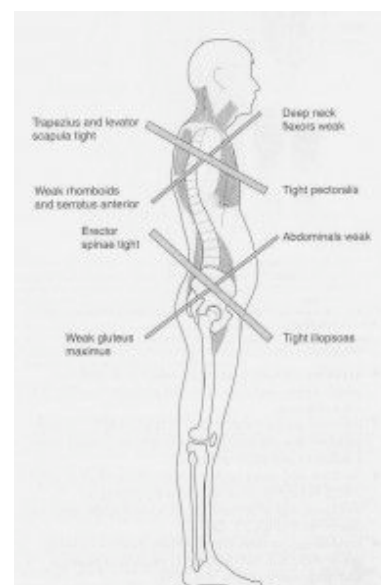


Fig 1 – Upper Crossed Syndrome

LOWER CROSSED SYNDROME

The lower-crossed syndrome involves the following imbalance:

Tonic or Postural Muscles – Iliopsoas, Rectus Femoris, Tensor Fascia Latae and Erector Spinae group – All tighten and shorten

While Phasic Muscles – Abdominal and Gluteal – All weaken

Resulting in a reaction that tilts the pelvis forward on the frontal plane. Flexing the hip and exaggerating lumbar lordosis. L5-S1 will have soft-tissue and joint distress with accompanying pain and irritation.

Also on the sagittal plane:

Quadratus Lumborum – Shortens

While Gluteus Maximus and Medius – Weaken

With the instability of the lower cross, the sacroiliac joint becomes unstable and you start to find piriformis involvement. Thus piriformis syndrome can be present.⁵

Many researchers have studied how muscle function affects posture. The understanding of the body's adaptability and how fibre types can change based upon the demands that function places upon structure has been a prevailing approach.

ANATOMIC AND PHYSIOLOGIC ADAPTATIONS TO STRESS

Several authors continue the discussion of posture by viewing physiologic changes from factors that result in a complex sequence of events activated as a result of stress responses to soft-tissue structures.⁶

1. Congenital and inborn factors
2. Overuse, misuse and abuse
3. Immobilization, disuse
4. Postural stress
5. Inappropriate breathing patterns
6. Chronic negative emotional states such as depression and anxiety
7. Reflexive influences (trigger points, facilitated segments)

Others view anatomic approaches

1. Laxity of ligamentous structures
2. Fascial tightness
3. Muscle tonus
4. Pelvic angle
5. Joint position and mobility
6. Neurologic outflow and inflow.⁶

As a result of these types of factors a sequence of events can occur that have dramatic effect and consideration for the manual therapist.

The events are systemic and physiologic. Without listing the complete list, here are the highlights:

- 'Something' leads to increased muscular tone.
- If increased tone is anything but short term you have metabolic waste build-up.
- Increased tone means simultaneous local oxygen deficiency.
- Ischemia, although not a producer of pain, is a major contributor of pain.
- Increased muscle tone over long period leads to a degree of increased oedema.
- All these factors, retention of waste/ischemia/oedema all contribute to creating pain.
- Pain reinforces hypertonicity.
- Inflammation may result.
- Neurological reporting stations in these distressed tissues bombard the CNS with information regarding their status leading in time to a degree of neural sensitisation and hyperirritability and hyper activity.
- Macrophages are activated, increased vascular and fibroblastic activity
- Connective tissue production increases with cross linkage, leading to shortened fascia
- Chronic muscular stress results in gradual development of hysteresis in which collagen fibres are rearranged to produce an altered structural pattern.
- This results in tissues that are far more easily fatigued and prone to damage, if strained.
- Since all fascia and other connective tissue is continuous throughout the body, any distortions that develop in one region can potentially cause fascial deformation elsewhere.
- Hypertonicity in any one muscle will produce inhibition of its antagonists and aberrant behaviour in its synergists.
- Energy wastage leads to unnecessarily sustained hypertonicity and an excessively active musculature leads to generalized fatigue and local energy crises, i.e. Trigger points.
- These in turn create functional changes that affect respiratory function and body posture!⁷

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When we observe the posture of a client, we have in front of us a very complex picture. We are in a sense seeing a current end product based upon a variety of factors that have caused the body form to be in the condition you presented with.

We need to look beyond assessing and observing asymmetries or contracture of certain muscle groups. We need to take into account other considerations. These considerations are those that are directly linked with our internal sensory awareness and the physiologic changes that occur from an over stimulated and highly stressed nervous system.

ALTERNATIVE POSTURAL INFLUENCES

Autonomic nervous system and soft-tissue release

Alternative postural and autonomic influences:

Sympathetic activation, habituation and response to stress

Hans Selye's theory

THE AUTONOMIC NERVOUS SYSTEM

The autonomic nervous system ANS is best known for its regulation of the sympathetic SNS "flight or fight" response and the parasympathetic PNS "rest and repose" response. The SNS and PNS work together to maintain homeostasis through a feedback loop system. Excessive sympathetic "tone" (Shea 1996) or output causes most of the stress related disorders that physicians encounter.

What is important to manual therapists is the relationship the ANS has with soft-tissue release and postural dysfunction.

All soft tissue has sympathetic innervation. There is virtually no parasympathetic innervation of your soft-tissue. All of your cardiovascular system has a sympathetic nerve attached to it. Therefore it is the regulator of your vasomotor system. The rate and flow of blood is controlled by the SNS. So neuromuscular and cardiovascular systems are sympathetically regulated.

The vagus nerve, the 10th cranial nerve that innervates the head, neck, thorax and abdomen is a mixed sensory and motor nerve and has 75% control of your parasympathetic system, and has some control over the heart and viscera. The parasympathetic part helps regulate the visceral system (digestive organs) and forms a link to your enteric (gut) nervous system.

The parasympathetic system is called the cranial-sacral system with the vagus nerve and in the pelvis the sacrococcygeal plexus. The sympathetic system is called the thoraco-lumbar based upon nerve root plexuses.

There is a tuning or mediation between the two systems. Since the sympathetic is the highest consumer of energy in the body, producing more waste, and using more oxygen, it is considered the primary system of the body. The viscera or enteric nervous system keeps digesting food and producing amino acids along with fatty acids and fuel for metabolism.

When we start to stress, abuse or misuse our bodies, not have proper exercise, all of this begins to tighten the soft-tissue. This in turn decreases activity of the viscera with much more over-stimulation of the neuromuscular system occurring. Over time this imbalance becomes the General Adaptive Response (Selye 1984). Soft-tissue dysfunction becomes prominent, including ulcers, diarrhoea, irritable bowel syndrome, constipation, etc, and with continued habituation comes adaptation and comprising the immune system.⁸

This has a profound effect on our soft-tissue and postural dysfunction.

ADAPTATION, HABITUATION AND RESPONSE TO STRESS

Selye's:

- General Adaptation Syndrome GAS
- Local Adaptation Syndrome LAS

At the heart of postural considerations is the important premise of habituation. A prominent theory introduced is based upon the research of Hans Selye (1956). Selye has contributed in understanding how adaptation and habituation –GAS and LAS is in relationship to somatic and postural dysfunction.

" That musculoskeletal dysfunction is a result of adaptive demands exceeding the capacity to absorb the load, while attempting to maintain something approaching normal function. Elastic limits may at times be exceeded, resulting in structural and functional modifications. Assessing these dysfunctions patterns-making sense of what can be observed, palpated, demonstrated- allows for detection and guidance towards remedial action." The demands that lead to dysfunction can either be forceful, violent, single events or they can be cumulative influence of numerous minor events. Each such event is a form of stress and provides its own load demand on the local area as well as the body as a whole. Selye called stress the 'non-specific element' in disease production. He described the general adaptation syndrome as being comprised of three distinct stages:

- the alarm reaction when initial defense responses occur ('flight or fight')
- the resistance (adaptation) phase
- the exhaustion phase (when adaptation fails) where frank disease emerges.

GAS affects the organism as a whole whilst LAS Local Adaptation Syndrome goes through the same steps but of course is local in its orientation. Repetitive activities over long periods of time result in somatic and muscular adaptation that can result in chronic hypertrophy of specific muscle groups. The same activity repeated over time sees the body respond to the demand by adapting to the needs placed upon it. When the demands become excessive, that is usually when we see injury or postural dysfunction. When an individual is acutely alarmed, stressed or aroused, homeostatic mechanisms are activated. If the alarm status is prolonged or if adaptive demands are excessive, long-term chronic changes can occur and these are at the expense of optimal functional integrity."

"The results of repeated postural and traumatic insults over a lifetime, combined with somatic effects of emotional and psychological origin, will often present a confusing pattern of tense, shortened, bunched, fatigued and, ultimately, fibrous tissue." ⁹

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Steven Goldstein, an American émigré to Australia in 1999, resides in Melbourne, Australia, where he holds a Bachelor of Health Science in Musculoskeletal Therapy and Bachelor of Arts in Education. He is an innovative massage educator instructing his unique blend of direct myofascial, indirect osteopathic releasing methods and somatic approaches known as Integrative Fascial Release internationally since 1995. www.fascialrelease.com

Steven has blended global lines of myofascial tension (Myers) (Schleip) (Paoletti), with articular receptor facilitation to unwrap and unwind soft-tissue with little or no force. He has drawn from the work of Michael Shea for Autonomic Nervous System approach and expression as the foundation of any soft-tissue work, and Craniosacral therapy to facilitate change to transverse planes.

Techniques include the 'Two Point', the 'Fulcrum', Static & Leverage Compressions which are introduced simply and one dimensionally, then combined by 'osteopathic stacking' to introduce more complex releasing patterns with constant autonomic nervous system awareness, expression and response. Sound structural underpinning knowledge with an indirect approach, allows the practitioner to work more quietly and effectively.

STEVEN IS PRESENTING "FIBROMYALGIA: CLINICAL APPROACHES FOR THE MANUAL THERAPIST" AT THE SMTO CONFERENCE 2011 IN EDINBURGH ON 26-27 MARCH 2011. PLACES ARE LIMITED SO CONTACT US FOR MORE INFORMATION ON HOW TO BOOK (SEE BELOW).

He will also be teaching his Integrative Fascial Release Foundations course in London from 19-21 March 2011 and his Integrative Fascial Release Intermediate course in London from 2-4 April 2011. Contact 07526 925734 or info@bodyworkcpd.co.uk for more details.

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