PALPATORY FINDINGS OF SOMATIC DYSFUNCTION IN THE THORACIC SPINE AS PREDICTORS FOR VISCERAL DISORDER/DISEASE

A REVIEW OF CASE STUDIES

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ABSTRACT

This paper discusses somatic dysfunction and how it can sometimes be an indicator for an ongoing visceral disease/disorder. With the use of palpation, the areas of somatic dysfunction can be isolated and further be investigated with regards to their etiology.

Segmental dysfunction is the term of choice in this paper, because it is a term that can be universally understood in the context this paper is written. The purpose of this paper is to show that segmental dysfunctions that keep re-occuring despite correction should be investigated for the possibility of visceral involvement via the viscerosomatic reflex. The thoracic spine was chosen because it can easily be palpated and the findings are easy to interprete.

The Osteopaths have done research on the correlation of somatic dysfunction to visceral disease and their cases are summarized as evidence to support the notion that palpatory findings of somatic dysfunction in the thoracic spine can be a predictor for visceral disorder/ disease.

KEY INDEXING TERMS:
PALPATION, SOMATIC DYSFUNCTION, SEGMENTAL DYSFUNCTION, THORACIC SPINE, VISCERAL DISEASE, VISCERAL DISORDER, VISCEROSOMATIC REFLEX.

INTRODUCTION

PALPATION

Generally speaking, palpation is the exploration of the body for analytic purposes by the use of the sense of touch. Specifically, as it relates to chiropractic, the term refers to the use of the chiropractor's fingers to detect irregularities in the bony alignment, particularly of the vertebral column.

In chiropractic there are three basic and fundamental forms of palpation, categorized as follows: Tactile, Visual and Motion Palpation.(6)

In visual palpation, the examiner mentally reconstructs a vertebra and its position, normal or abnormal by using his knowledge gained from the study of orthopedy.

Through tactile palpation, one is going to actually feel and interpret through the sense of touch, the osseous structures of the entire spinal column. This includes the pelvic region and adjacent tissue paravertebrally, namely the musculature.

Motion palpation is very significant in establishing areas of muscular fixation throughout the entire spinal column. Each vertebra of the spinal column is put through a testing procedure, which in turn establishes the integrity of the particular segment.

Through palpation, researchers and clinicians are able to locate areas of segmental dysfunction in the spinal column. Terms such as somatic dysfunction (osteopathy), spinal joint dysfunction (manual medicine) and spinal fixation (chiropratic) are used to describe manipulable lesions found in the spinal column.(13) In this paper, the term segmental dysfunction will be used.

SEGMENTAL DYSFUNCTION

Segmental dysfunction in chiropractic refers to a localized lesion that exhibits asymmetry or reduction in motion, associated with disturbed muscular activity, sensitivity to percussion and sensitivity to deep pressure.(13)

Clinically, when the practitioner locates a tender spinous, "taut" erector spinae muscles and isolates the restriction in joint motion, the diagnosis of segmental dysfunction is established.(14) Qualitatively and quantitativley however, the operational defination of this lesion has yet to be established.

Osteopathic research indicates that in palpatory diagnosis, a precise spinal segmental level is localized where the findings of local dysfunction are more noticable and more clinically significant. Descriptions of the palpable features of segmental dysfunction include alterations in bony positions, soft tissue fluid content, muscular tone and joint mobility.(3)

A primary segmental dysfuntion is identified by asymmetric responses to opposing directions of each motion test and the presence of mirror image asymmetries in immediately adjacent segments. Thus, the location of segmental dysfunction is verified by comparison of asymmetries within a dysfunctional unit involving three spinal segments.(7)

The diagnostic site of the primary segmental asymmetry provides the physician with a specific locus for treatment of somatic dysfunction. The anatomic concept of a joint: one bone in relation to adjacent ones, has often been useful for describing palpable

findings of disturbed position and mobility at a spinal joint. The meaning of specific segmental asymmetries observed during palpatory tests begin to provide a description of segmental dysfunction as a clinical focus within the more general diagnostic category of somatic dysfunction. The findings suggest in turn, a frame of reference for an approach to treatment and the evaluation of response to treatment.

In most cases, segmental dysfunction is a result of anatomic structural changes, trauma, infection and many others. However, these days, researchers are beginning to find that visceral changes have been known to cause somatic segmental dysfunction via the viscerosomatic reflexes.(9)

Viscerosomatic relationships are widely recognized as patterns of referred pain. For example, pain associated with heart attack is often felt in the left shoulder and radiating down the left arm. Kidney degeneration refers pain to the lower back, while pancreatic degeneration refers pain to the right shoulder. Skilled examiners can palpate soft tissue changes associated with ischemic heart disease and differenciate those associated with other heart conditions.(15)

PURPOSE

The pupose for this research, is to review case studies of somatic dysfunction in the thoracic spine that indicates presence of visceral disorders. The thoracic spine was chosen because of two fascinating ingredients. The first is that the palpatory findings are easy to find and interpret, and the second is that it isan area of the spine that produces symptoms that can mimic many of the pains of visceral disorder. Frequently,

the endeavor to prove that a patient's abdominal pain is or is not vertebral in origin is extremely challenging. Patience and care with assessment is of the utmost importance, particularly when the symptoms have both vertebral and visceral components. It is important to take great care determining the area of the patient's symptoms and their behavior, particularly in relation to the effect of rest on the pain. A patient with visceral pain rarely seeks lying down as a position to adopt to gain relief.

Furthermore, patients who have intermittent difficulty with breathing are far more likely to have an intercostal, costovertebral or intervertebral segmental problem than a pleural disorder.(9) In chiropractic, the dysfunction of the spine has been known to be the original source of visceral disorder, however it has yet to be proven that the thoracic spine can cause visceral pain. This is due to the fact that there are far fewer occurences of nerve root compression in the thoracic spine.(14)

It has been my concern through my clinical experience to always further investigate unresolving, re-occuring segmental dysfunctions in the thoracic spine. I have used the segmental dysfunction findings as markers for investigation of a possibility of visceral disorder. Research to support somatic dysfunction in the thoracic spine as a predictor for visceral disease has been well documented by the osteopaths and their case studies show the correlation of somatic dysfunction to visceral disease. This correlation is explained via the viscerosomatic reflex.

THE VISCEROSOMATIC REFLEX (SEE ILLUSTRATION ON PAGE 15)

The viscerosomatic reflex explains the correlation of somatic dysfunction to visceral

disorder. The viscerosomatic reflex is the resultant of the effect of afferent stimuli arising a visceral disorder on the somatic tissues. The reflex is initiated by afferent impulses from visceral receptors. These impulses are transmitted to the dorsal horn of the spinal cord, where they synapse with interconnected neurons. These interconnected neurons in turn, convey the stimulus to sympathetic and peripheral motor efferents, thus resulting in sensory and motor changes in somatic tissues. These somatic changes are seen in skeletal muscles, blood vessels, ligaments of the spine and the skin.(1)

Impulses from visceral receptors travel along afterent nerve fibers that parallel sympathetic efferent nerve fibers arising from the same spinal cord segment and that have similar distribution to the region.(9) However, it has been found that symptoms do not always correspond to the expected meric anatomy. It is believed that the vast predisposing spinal nerve branches and integration of the sympathetic and parasympathetic systems cause this to be true.(17) The following are abstracts of case studies done by osteopathes indicating through their findings the correlation of somatic dysfunction to visceral disease.

Case I

Somatic Dysfunction as a Predictor of Coronary Artery Disease(2)

Palpatory findings of somatic dysfunction in the upper thoracic spine have been reported in patients with cardiac disease. These findings have been ascribed to a viscerosomatic reflex; and it is conceptualized that afferent nerve stimuli from heart

disease result in sensory and motor changes in somatic tissues. A typical spinal reflex pattern has been characterized as consisting of two or more adjacent segments from T1 to T5 on the left side that have a ddep muscle splinting reaction over the lateral half of the transverse process and a resistence to segmental spinal motion.

In this study, ninety-five patients who were scheduled for cardiac catheterization tests were examined for palpatory evidence of somatic dysfunction on the day preceeding angiography. The palpatory examination was carried out without knowledge of the patient's history. Somatic dysfunction was found on the left side from T1 to T5 in seventy patients, who were found to have coronary artery disease. The efficiency of the palpatory test, supporting a diagnosis of somatic dysfunction, were accurate in determining the presence or the absence of coronary artery disease in 79% of the patients studied.

Case II

Correlation of Palpatory Observations with the Anatomic Locus of Acute Myocardial Infarction(16)

The purposes of this clinical study were to correlate the physiologic findings among three experimental groups: 25 subjects with acute myocardial infarction (MI), 15 subjects with heart disease other than MI , and 22 subjects without known cardiovascular disease and to determine whether there was any correlation between the terminology chosen to describe the somatic component and the location of the infarction site in the myocardium.

Osteopaths have observed patients who have developed visceral disturbances present with lesions of the paraspinal musculature (that is, the somatic component). The somatic component has been defined as altered function of related components of the somatic system, i.e.: neuromuscular, arthoidal and myofascial structures and related vascular and lymphatic systems. Upon analyzing the physician's usage of given terms of describing the altered site, it was found that some of the terms chosen correlated distinctly and significantly with the location of the infarction of the myocardium.

All descriptions were used more frequently for anterior wall infarctions than for other infarction sites i.e.: posterior wall, inferior wall and septum. This suggested that the somatic component of the MI was more palpable when an anterior wall infarction was present. In contrast, the somatic component associated with an inferior wall locus appeared to be more difficult to describe and detect (at least within the limitations imposed on the physicians during palpatory examination). The descriptors, ropiness and edematous somatic tissue present no significant difference in distribution with respect to the infarction site; their association with the various sites tended to follow the pattern of the other descriptors.

Physiologic findings associated with visceral disturbances extended to the neuro-musculoskeletal system i.e.: somatic component of visceral disease. In this study it was found that the somatic components associated with acute MI, was described as "resistant - tense firm" and "temperature warm", most frequently occured when there

was an anterior wall infarction as compared to other infarction sites. The somatic component associated with inferior wall MI was more difficult to categorize.

Case II

Somatic Manifestations in Renal Disease: A Clinical Research Study(10)

The kidney receives preganglionic sympathetic fibers from the 10th thoracic through the 1st lumbar sympathetic ganglia, and afferent fibers from the kidney enter mainly at cord levels T10-T12. There should be an allowance of one or two segments deviation, because the visceral nervous system shows some variability in location and has some variation in its structural development.

This study reported on clinically useful signs in patients with renal disease. In a controlled clinical trial, three groups of patients were examined to test the assumption that somatic manifestations of renal disease would be present in the spinal region T9-T12.

One group of patients has advanced renal disease; the two control groups consisted of hypertensive and normotensive patients without signs of renal disease. Patients were excluded from the study if they had other conditions that would cause similar findings. Recorded findings of both palpatory examination and thermography of the thoracic spinal region revealed a significantly higher frequency of segmental dysfunction and areas of elevated skin temperature in the region T9-T12 for the renal group. These data support the presence of somatic motor and vasomotor changes as reflex components of renal disease. The clinicians who use reflex findings in

identification of renal disease will need to give diagnostic consideration to other sources of findings, including such false-positives as somatic and non-visceral stimuli.

Case IV

A Somatic Component to Myocardial Infarction(15)

Sixty-two patients were randomized to be seen by osteopathic physicians for palpation of the thoracic paravertebral soft tissue, T1-T8. Twenty-five patients had clinically confirmed acute myocardial infarction . Of the remainder, 22 without known cardiovascular disease served as controls and 15 were placed in an excluded group because of diagnosed cardiovascular disease other than MI. Observations were described in predetermined standard terminology.

The control group was found to have a low incidence of palpable changes throughout the thoracic dorsum and these changes were uniformaly distributed from T1-T8 Examination of the group with MI disclosed a significantly higher incidence of soft tissue changes (increased warmness, firmness, ropiness, edematous changes and heavy musculature), confined almost entirely to the upper four thoracic levels. The 15 patients who were excluded from the experimental group because they had various cardiovascular diseases other than MI also showed significantly different changes on palpation compared with the group with MI.

These findings suggested that MI is accompanied by characteristic paravertebral s soft tissue changes which are readily detected by palpation.

Case VIII

Palpable Musculoskeletal Findings in Coronary Artery Disease(5)

Musculoskeletal findings were studied in 97 consecutive patients with symptoms suggestive of coronary artery disease, who underwent cardiac catheterization. Within one week of angiography, the patients underwent a standardized musculoskeletal examination consisting of segmental evaluation of pain, range of motion soft tissue texture and "red reflex" by an examiner unaware of the patient's clinical status. Univariant and multivariant analysis of the above information and historical data revealed a high correlation between coronary atherosclerosis and abnormalities of range of motion and soft tissue texture in the fourth thoracic vertebral se information was later used as a noninvasive cardiac diagnostic tool.

DISCUSSION

Epidemiological studies of the incidence of somatic dysfunction in a asymptomatic population are needed to evaluate somatic dysfunction a factor or as in the case of this paper a reflection of disease. The factors that have been identified as influencing the incidence of somatic dysfunction are posture, short leg, pronation syndrome, handedness, transitional areas of the spine and visceral reflexes. It is important that we know the natural history of somatic dysfunction, the stimuli that initiate it, what influences exacerbations, its stability and how it is maintained.

Palpable features of segmental dysfunction include alterations in bony position, muscular tone and joint mobility.(6) In view of the frequency with which these kinds of

changes, individually, can be palpated throughout the musculoskeletal system, however, the terms can be somewhat nonspecific. The problem is to distinguish the many areas of compensatory or minor alterations from those fewer primary areas of more major dysfunction that are focused at precise spinal levels. Terms such as "athritis", "myositis", "fascitis" and "neuritis" are convenient to refer to inflammation in separate tissue components of the somatic system, but they are inadequate to describe the clinical condition reflected by disturbance in each of these tissues, in concert, at a dysfunctional spinal segment.

SUMMARY

Linkage exists between somatic dysfunction of visceral origin, when there was identical motion asymmetries at a vertebral and a costal dysfunction at the same thoracic segmental level.(1) For this characteristic of linkage to be even considered as visceral origin, certain clinical criteria have to be present. The motor component of reflex activity along specific visceral afferent pathways should be expected to register the following features: 1. similar segmental location in different patients with the same visceral problem (9)(anatomic differences could account for variance in vertebral findings of one segment above or below); and 2. similar identity in motion characteristics for a given segmental location with a specific visceral relationship.(9)

Certainly, when clinical observation reveals asymmetric spinal findings with similar motion characteristics at identical locations, occuring with increasing frequency in the presence of a particular disease entity, a firm clinical relationship between the spinal

and visceral findings must be considered.

Attention to differential diagnosis evaluating palpatory findings consistent with multiple etiologic variants should give greater clarity to the importance of the factors encompassed in the diagnosis of somatic dysfunction and how it relates to visceral disease. Coupling diagnostic information with an analysis of the response of a segment dysfunction to manipulative treatment should further lead into whether to rule in or rule out a visceral disease.

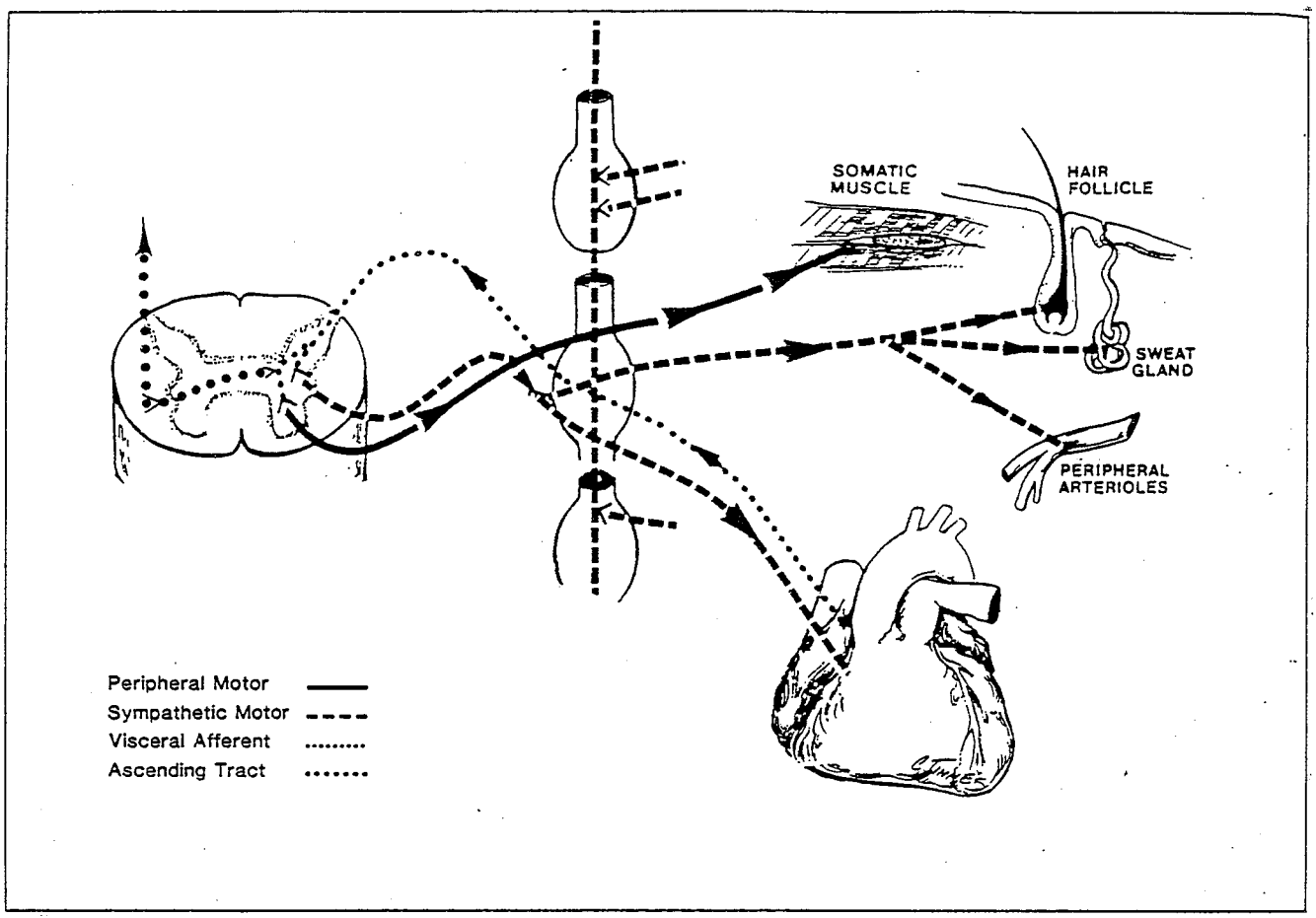

Fig. 1. *Schematic representation of the viscerosomatic reflex.*

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