Alliance of UK CHIROPRACTORS

THE VERTEBRAL SUBLUXATION COMPLEX

The History, Science, Evolution and Current Quantum Thinking on a Chiropractic Tenet

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The Vertebral Subluxation Complex A Position Statement

One of the more controversial issues involving chiropractic is the existence of vertebral Subluxation. A few people maintain there is no evidence for Subluxation and even go so far as to give the impression that "belief" in the vertebral Subluxation is limited to some "fringe" group within the chiropractic profession dominated by the monocausal theory of subluxation espoused by early Chiropractors. Unfortunately this has recently become the case in the UK where one of the Chiropractic associations and the Chiropractic colleges have denied the existence of the VSC and indeed have released statements saying that there is no evidence for the involvement of the VSC in' health and disease' (note not the traditionally used Chiropractic term, dis-ease) . Far from this position being a mainstream thought within the profession, recent events have highlighted that this denial of the existence of the VSC and the research substantiating its existence is indeed a 'radical' departure from contemporary Chiropractic and indeed current biomedical health thinking.

It appears that this decision by General Council and subsequent release of statements is more politically based than scientifically based. In reviewing literature presented by other organisations, the General Chiropractic Council and relevant educational reviewers have chosen to find flaw with the research design rather than assess that there is clinical evidence for the existence of the Vertebral Subluxation Complex. Evidence to the contrary, that is, supporting the claim that there is no such thing as the VSC, has not yet been forthcoming.

It has also been mentioned frequently in discussions on this subject that the advice note is only regarding advertising and the necessity for evidence at the level of RCTs in order to make claims in advertising. This raises two important points which were overlooked when this decision and advice note was produced. Firstly, if one cannot advertise what one does, this constitutes a limitation on scope of practice no matter what may be stated. Secondly, and perhaps more importantly given the current debate, the Copy Advice Team (CAP) states that although RCTs are recommended as evidence for claims made by Chiropractors, they are not exclusively recommended (Appendix 1). There has been no subsequent advice note released by CAP to our knowledge which states otherwise. Yet still this advice note was released by GCC.

Historical Considerations

The term “subluxation” has a long history in the healing arts literature. According to Haldeman[1] it was used at the time of Hippocrates [2] while the earliest English definition is attributed to Randall Holme in 1688. Holme[3] defined subluxation as “a dislocation or putting out of joynt.”Watkins[4] and Terrett[5] refer to a 1746 definition of the term. The matter is further complicated by the diverse array of alternative terms used to describe subluxation. Rome[6] listed 296 variations and synonyms used by medical, chiropractic, and other professions. Rome concluded the abstract of his paper by stating, “It is suggested that, with so many attempts to establish a term for such a clinical and biological finding, an entity of some significance must exist.”

The possible neurological consequences of subluxation were described by Harrison in 1821, as quoted by Terrett[5]:“When any of the vertebrae become displaced or too prominent, the patient experiences inconvenience from a local derangement in the nerves of the part. He, in consequence, is tormented with a train of nervous symptoms, which are as obscure in their origin as they are stubborn in their nature...” Although medical authorities acknowledge that neurological complications may result from subluxation [7] classical chiropractic definitions mandate the presence of a neurological component. D. D. Palmer and B. J. Palmer[8] defined subluxation as follows: “A (sub)luxation of a joint, to a Chiropractor, means pressure on nerves, abnormal functions creating a lesion in some portion of the body, either in its action, or makeup.”According to Stephenson’s[9] 1927 text the following must occur for the term “vertebral subluxation” to be properly applied:

1. Loss of juxtaposition of a vertebra with the one above, the one below, or both.
2. Occlusion of an opening.
3. Nerve impingement.
4. Interference with the transmission of mental impulses.

As Lantz[10] noted, “Common to all concepts of subluxation are some form of kinesiologic dysfunction and some form of neurologic involvement.”

It has been argued that DD Palmer applied the term in a strictly biomechanical sense. However, he clearly emphasised the neurological implications of the Subluxation in his text of 1910. The Chiropractic profession has avoided the purely mechanistic image of a Subluxation by stressing a total complex that involved all related structures. The connotations of a purely osseous Subluxation are both limiting and misleading. Such a structural interpretation tends to overlook involvement of adjacent soft tissue structures and their functions which may be affected in such a derangement.

The range of synonyms (almost 300) for the VSC also underlines the necessity for a clear and succinct term for Subluxation. The most significant substantiation of the term Subluxation in recent times is that the World Health Organisation (WHO) has now accepted it as listing in the latest International Classification of Disease – M99.1 – Subluxation complex (vertebral).

Component Models of Subluxation

Dishman[11] and Lantz[12-13] developed and popularized the five component model of the "vertebral subluxation complex" attributed to Faye. [10] However, the model was presented in a text by Flesia[14] dated 1982, while the Faye notes bear a 1983 date.

The original model has five components:

1. Spinal kinesiopathology
2. Neuropathology
3. Myopathology
4. Histopathology
5. Biochemical changes.

The "vertebral subluxation complex" model includes tissue specific manifestations described by Herfert[15] which include:

1. Osseous component
2. Connective tissue involvement, including disc, other ligaments, fascia, and muscles
3. The neurological component, including nerve roots and spinal cord
4. Altered biomechanics
5. Advancing complications in the innervated tissues and/or the patient's symptoms. This is sometimes termed the "end tissue phenomenon" of the vertebral subluxation complex.

Lantz[10, 16] has since revised and expanded the "vertebral subluxation complex" model to include nine components:

1. Kinesiology
2. Neurology
3. Myology
4. Connective tissue physiology
5. Angiology
6. Inflammatory response
7. Anatomy
8. Physiology
9. Biochemistry.

Lantz[10] summarized his objectives in expanding the model:

"The VSC allows for every aspect of chiropractic clinical management to be integrated into a single conceptual model, a sort of 'unified field theory' of chiropractic...Each component can, in turn, be described in terms of precise details of anatomic, physiologic, and biochemical alterations inherent in subluxation degeneration and parallel changes involved in normalization of structure and function through adjustive procedures." Whether this model will realize these objectives remains to be seen.

Subluxation Degeneration Model

Subluxation degeneration has been described as a progressive process associated with abnormal spinal mechanics. The degenerative changes are associated with various mechanisms of neurological dysfunction. [14] Progressive degeneration of the cervical spine is thought to begin with the intervertebral discs progressing to changes in the cervical vertebrae and contiguous soft tissues.[16] Several early investigators explored the relationship of spinal degenerative disease to neurological compromise. In 1838, Key[17] described a case of cord pressure due to degenerative changes causing spinal canal stenosis. Bailey and Casamajor[18] reported that cord compression could result from spinal osteoarthritis. They suggested that disc thinning was the basic pathology underlying degenerative change. As early as 1926, Elliott[19] gave an account of how radicular symptoms could be caused by foraminal stenosis secondary to arthritic changes.

Several mechanisms have been suggested which may be operative in cervical spine degeneration. Resnick and Niwayama[20] used the term “intervertebral (osteo)chondrosis” to describe abnormalities which predominate in the nucleus pulposus. Osteoarthritis of the uncovertebral and zygapophyseal joints is another manifestation of cervical spine degeneration. Spondylosis is the term these authors applied to degenerative changes which occur as a result of enlarging annular defects which lead to disruption of the attachment sites of the disc to the vertebral body. This leads to the appearance of osteophytes. O’Connell[21] employed the term “spondylosis” in a broader context. Three lesions were described: disc protrusion into the intervertebral canal; primary spondylosis, characterized by degenerative changes between the vertebral bodies and zygapophyseal joints; and secondary spondylosis, associated with disc protrusion at a single spinal level.

In the lumbar spine, pathomechanics and torsional stress have been implicated as aetiological factors in spinal degeneration. [22-23] It is likely that these factors are operative in the pathogenesis of cervical spine degeneration as well. Although it has been suggested that aging is responsible for degenerative changes in the spine, this appears to be an oversimplification. [24] For example, Lestini and Weisel[16] report that there is a high statistical correlation between disc degeneration and posterior osteophyte formation. Furthermore, it is noted that the incidence of degenerative changes varies from one segmental level to another. The C5/C6 level is most frequently involved, with C6/C7 being the level next most frequently affected. The C2/C3 level is the one least likely to exhibit degenerative changes. [25] Since the prevalence of cervical spine degenerative change is not uniform throughout the region, the hypothesis that degenerative change is associated with spinal pathomechanics deserves consideration.

Hadley[25] suggests that both aging and pathomechanics are operative in the pathogenesis of cervical spine degeneration. Age related disc degeneration causes hypermobilty, resulting in greater tractional forces on ligaments. This is said to result in the formation of reactive osteophytes. Trauma can result in local spondylotic changes. This is similar to MacNab’s description of traction spur formation in the lumbar spine. [26]

Pesch et al. [27] measured the dimensions of the fifth, sixth, and seventh cervical vertebral bodies in 105 cadavers aged 16 to 91 years. Similar measurements were made on the third, fourth, and fifth lumbar vertebral bodies. The authors suggest that dynamic stressing of the cervical vertebral bodies leads laterally to friction between vertebral bodies at the uncovertebral joints, causing osteophytosis. Anteriorly, osteophytic formation is attributed weakness of the anterior longitudinal ligament, leading to anterior disc protrusion.

Neurological Consequences of Spinal Degeneration

Neurological manifestations of spinal degeneration may be due to a variety of mechanisms. These include:

1. *Cord compression.* Compression of the spinal cord may result from disc protrusion, ligamentum flavum hypertrophy/corrugation, or osteophytosis. Myelopathy may result in cord pressure and/or pressure which interferes with the arterial supply. [21, 28-30] Payne and Spillane[31] found that myelopathy was more likely to occur in persons with congenitally small spinal canals who subsequently develop spondylosis. Hayashi et al. [32] report that in the cervical region, dynamic canal stenosis occurs most commonly in the upper disc levels of C3/C4 and C4/C5.

2. *Nerve root compression.* Compromise of the nerve roots may develop following disc protrusion or osteophytosis. [33] Symptoms are related to the nerve root(s) involved.

3. *Local irritation.* This includes irritation of mechanoreceptive and nociceptive fibres within the intervertebral motion segments. MacNab[33] reports that arm pain may occur without evidence of root compression. The pain is attributed to cervical disc degeneration associated with segmental instability.

4. *Vertebral artery compromise.* MacNab[33] advises that osteophytes may cause vertebral artery compression. Furthermore, Smirnov[34] studied 145 patients with pathology of the cervical spine and cerebral symptoms. Fifty nine percent had vertebrobasilar circulatory disorders.

5. *Autonomic dysfunction.* Symptoms associated with the autonomic nervous system have been reported. The Barre'-Lieou syndrome includes blurred vision, tinnitus, vertigo, temporary deafness, and shoulder pain. This phenomenon occurs following some cervical injuries, and is also known as the posterior cervical syndrome. [35] Stimulation of sympathetic nerves has been implicated in the pathogenesis of this syndrome. [36] Another manifestation of autonomic involvement, reflex sympathetic dystrophy, results in shoulder and arm pain accompanied by trophic changes. [37]

Nerve Root Compression Model

Compression of spinal nerves has traditionally been proposed as a mechanism associated with spinal subluxation [38] although attempts have been made to discredit the premise that subluxations cause nerve interference by mechanical compression. [39] Results of early animal studies of nerve compression reported that pressures ranging from 130 mm Hg to over 1000 mm Hg were required to produce a significant compression block. [40-42] However, these older studies dealt with peripheral nerves, not spinal roots.

Sunderland and Bradley[43] reported that spinal roots may be more susceptible to mechanical effects because of their lack of the perineurium and funicular plexus formations present in peripheral nerves. However, few experimental studies involving compression of nerve roots were reported in the literature. [44] Those which were reported were criticized. [45]

In 1975, Sharpless[45] reported the results of a series of animal experiments to determine the susceptibility of spinal roots to compression block. These investigations were supported by the ICA and the ACA. The results were published in a monograph by the National Institutes of Health. Sharpless described his results as "astonishing" and "spectacular." According to the report "A pressure of only 10 mm Hg produced a significant conduction block, the potential falling to 60% of its initial value in 15 minutes, and to half of its initial value in 30 minutes. After such a small compressive force is removed, nearly complete recovery occurs in 15 to 30 minutes. With higher levels of pressure, we have observed incomplete recovery after many hours of recording." Korr[46] listed factors which render nerve roots more vulnerable to mechanical effects than peripheral nerves:

1. Their location within the intervertebral foramen is in itself a great hazard.
2. Spinal roots lack the protection of epineurium and perineurium.
3. Since each root is dependent on a single radicular artery entering via the foramen, the margin of safety provided by collateral pathways is minimal.
4. Venous congestion may be more common in the roots because the radicular veins would probably be immediately compressed by any reduction in foraminal diameter. There is also the possibility of reflux from the segmental veins through pressure damaged valves; and venous congestion would have additional consequences because the swelling, being within the foramen, would contribute to compression of the other intraforaminal structures.
5. Circulation to the dorsal root ganglion is especially vulnerable.

Contemporary papers have been published concerning nerve root compression. In 1995, Konno et al. [47] reported results similar to those of Sharpless, noting that compression of the nerve roots of the cauda equina with as little as 10 mm Hg of pressure resulted in decreased action potentials. Rydevik[48] described other adverse effects of nerve root compression: "Venous blood flow to spinal roots was blocked with 5-10 mm Hg of pressure. The resultant retrograde venous stasis due to venous congestion is suggested as a significant cause of nerve root compression. Impairment of nutrient flow to spinal nerves is present with similar low pressure." Hause[49] observed that compressed nerve roots can exist without causing pain. Also described in the paper was a proposed mechanism of progression, where mechanical changes lead to circulatory changes, and inflammatogenic agents may result in chemical radiculitis. This may be followed by disturbed CSF flow, defective fibrinolysis and resulting cellular changes. The influence of the sympathetic system may result in synaptic sensitization of the CNS and peripheral nerves, creating a "vicious circle" resulting in radicular pain.

Kuslich, Ulstrom, and Michael[50] discussed the importance of mechanical compromise of nerve roots in the production of radicular symptoms. Their human surgical studies revealed that "Stimulation of compressed or stretched nerve roots consistently produced the same sciatic distribution of pain as the patient experienced preoperatively...we were never able to reproduce a patient's sciatica except by finding and stimulating a stretched, compressed, or swollen nerve root."The importance of asymptomatic lesions was reported by Wilberger and Pang[51] who followed 108 asymptomatic patients with evidence of herniated discs. They reported that within three years, 64% of these patients developed symptoms of lumbosacral radiculopathy. Schlegal et al., [52] Kirkaldy-Willis[53] and Manelfe[54] noted that subluxation of the facet joints may be associated with nerve root entrapment and spinal stenosis, particularly when degenerative disease is present. The degenerative changes are described as a progressive "cascade." Nerve root compression is one of many mechanisms of neural disruption which may be associated with vertebral subluxation. While some may criticize the "garden hose" model as being overly simplistic, the nerve root compression hypothesis is far from obsolete.

Dysafferentation Model

The neurological dysfunction associated with the vertebral subluxation may take other forms. The intervertebral motion segment is richly endowed by nociceptive and mechanoreceptive structures. As a consequence, biomechanical dysfunction may result in an alteration in normal nociception and/or mechanoreception. Aberrant afferent input to the CNS may lead to dysponesis or to use the contemporary jargon of the computer industry, "garbage in—garbage out."Appreciation of these processes begins with an understanding of the neuroanatomy of the tissues of the intervertebral motion segment.

Several papers have described the innervation of human cervical and lumbar intervertebral discs. Bogduk et al. [55] observed that the lumbar intervertebral discs are supplied by a variety of nerves. According to Bogduk, the sinuvertebral nerve supplies the posterior aspect of the disc and the posterior longitudinal ligament. The posterolateral aspects are innervated by adjacent ventral primary rami and from the grey rami communicantes. The lateral aspects of the disc are innervated by the rami communicantes. The anterior longitudinal ligament is innervated by recurrent branches of rami communicantes. Clinically, Bogduk[56] stated that intervertebral discs can be a source of pain without rupture or herniation. Torsional stress may result in circumferential tears in the innervated outer third of the annulus. Compression injuries may lead to internal disruption of the disc, resulting in mechanical or chemical stimulation of the nerve endings in the annulus.

Nakamura et al. [57] reported that the anterior portion of lumbar intervertebral discs is innervated by sympathetic fibres alone. Sympathetic afferents return through the sympathetic trunks and the rami communicantes and pass through the same dorsal horn as the somatosensory afferents. The posterior portion of the disc is innervated by sinuvertebral nerves derived from the recurrent branch of the spinal nerve, or both the recurrent spinal nerve and sympathetic nerve. These authors observed that dual innervation exists in the intervertebral discs of the lumbar region, and that no other organs are known to have such dual innervation.

Bogduk et al. [58] examined the nerve supply to the cervical intervertebral discs. The sinuvertebral nerves were found to supply the disc at their level of entry as well as the disc above. Nerve fibres were found as deeply as the outer third of the annulus. Mendel[59] et al. stated that nerves were seen throughout the annulus. In addition, receptors resembling Pacinian corpuscles and Golgi tendon organs were seen in the posterolateral region of the disc. The authors conclude that human cervical intervertebral discs are supplied with both nerve fibres and mechanoreceptors.

Human cervical facet joints are also equipped with mechanoreceptors. McLain[60] found Type I, Type II, and Type III mechanoreceptors, as well as unencapsulated nerve endings in the cervical facet joints of normal subjects. The author stated, "The presence of mechanoreceptive and nociceptive nerve endings in cervical facet capsules proves that these tissues are monitored by the central nervous system and implies that neural input from the facets is important to proprioception and pain sensation in the cervical spine. Previous studies have suggested that protection muscular reflexes modulated by these types of mechanoreceptors are important in preventing joint instability and degeneration."Wyke[61-62] has described articular mechanoreceptors, and explored the clinical implications of dysafferentation in pain perception.

Besides the discs and articular capsules, mechanoreceptors and other neural tissues have been described in the ligaments attached to the spine. Jiang et al. [63] noted that Pacinian corpuscles were scattered randomly, close to blood vessels, whereas Ruffini corpuscles were seen in the periphery of human supraspinal and interspinal ligaments. Rhalmi et al. [64] found nerve fibres in the ligamentum flavum, the supraspinal ligament, and the lumbodorsal fascia.

Alterations in mechanoreceptor function may affect postural tone. Murphy[65] summarized the neurological pathways associated with the maintenance of background postural tone: "Weight bearing disc and mechanoreceptor functional integrity regulates and drives background postural neurologic information and function (muscular) through the unconscious mechanoreception anterior and posterior spinocerebellar

tract, cerebellum, vestibular nuclei, descending medial longitudinal fasciculus (medial and lateral vestibulospinal tracts), regulatory anterior horn cell pathway."The anterior horn cells provide motor output which travels via motor nerves to muscle fibres.

Although stimulation of articular mechanoreceptors may exert an analgesic effect, use of manipulation for the episodic, symptomatic treatment of pain is not chiropractic. The authors of the remarkable book Segmental Neuropathy [66] published in the 1960's by Canadian Memorial Chiropractic College, proposed the concept of a "neural image," dependent upon the integrity of neural receptors and afferent pathways. If afferent input is compromised, efferent response may be qualitatively and quantitatively compromised. Correcting the specific vertebral subluxation cause is paramount to restoring normal afferent input to the CNS, and allowing the body to correctly perceive itself and its environment.

Neurodystophic Model

The "neurodystrophic" model suggests that neural dysfunction is stressful to body tissues and that "lowered tissue resistance" can modulate specific and nonspecific immune responses and may alter the trophic function of the involved nerves. A growing number of investigators are exploring the common denominators in disease processes, and the role of the nervous, immune, and endocrine systems in pathogenesis. [67]

Korr[68] proposed that spinal "lesions" (analogous to the vertebral subluxation) are associated with exaggerated sympathetic activity as well as exaggerated paraspinal muscle tone. It is interesting that Korr, like D.D. Palmer, employed the term "tone" in reference to ambient nervous system activity. According to Korr, "High sympathetic tone may alter organ and tissue responses to hormones, infectious agents, and blood components." The mechanism postulated by Korr was one of segmental facilitation. Decreased thresholds in efferent neurons arising from the anterior and lateral horn cells are postulated to result in increased impulse traffic to the somatic and visceral structures innervated by the affected neurons.

More recently, other authors have explored the relationship of sympathetic activity to immune system function in greater depth. Murray et al. [69] examined the effect of sympathetic stimulation on the immune system. Sympathetic stimulation was induced in human volunteers by exhaustive exercise. They found that acute sympathetic stimulation leads to selective release of immunoregulatory cells into the circulation, with subsequent alterations in cellular immune function. These authors stated, "Growing evidence suggests that immune function is regulated in part by the sympathetic nervous system. Sympathetic nerve endings densely innervate lymphoid tissue such as the spleen, lymph nodes and thymus, and lymphoid cells have beta 2 andregenergic receptors." In their experiments, there was a sharp rise in T suppressor/cytotoxic cells and natural killer cells following sympathetic stimulation. However, only modest rises were seen in T helper and B cells. The cells most affected, the T suppressor/cytotoxic cells and the natural killer cells, are those with the largest density of beta receptors."

Felten et al. [70] reported that the neurotransmitter norepinephrine is present in postganglionic sympathetic fibres which innervate lymphoid organs and act on the spleen. Furthermore, there are available receptors on cells in the white pulp and the localized neurotransmitter terminal which directly contact T lymphocytes in the periarticular lymphatic sheath. The authors propose that norepinephrine in lymphoid organs fulfils the criteria for neurotransmission, and plays a significant role in the modulation of immune responses. They state, "Stressful conditions lead to altered measures of immune function, and altered susceptibility to a variety of diseases. Many stimuli, which primarily act on the central nervous system, can profoundly alter immune responses. The two routes available to the central nervous system for communication with peripheral organs are neuroendocrine channels and autonomic nerve channels." In a more recent paper, Felten's team[71] reviewed aspects of neural-immune signalling. Noradrenergic and peptidergic nerve fibres

abundantly innervate the parenchyma of both primary (bone marrow) and secondary (spleen, lymph nodes) lymphoid organs. Nerve fibres distribute within the parenchyma of these organs, as well as along smooth muscle compartments. Both noradrenaline and peptides such as substance P have been shown to fulfil the basic criteria for neurotransmission with lymphocytes, macrophages, and other immunocytes as targets.

Denervation or pharmacological manipulation of these neurotransmitters can profoundly alter immunological reactivity at the individual cellular level, at the level of complex multicellular interactions (such as antibody response), and at the level of host responses to a disease-producing challenge."

The relationship between the nervous system and the immune system has attracted the attention of the popular press. An article in the New York Times[72] stated, "Scientists have found the first evidence of an anatomical connection between the nervous system and the immune system. Nerve cell endings in the skin and white blood cells of the immune system are in intimate contact, and chemicals secreted by the nerves can shut down immune system cells nearby."The New York Times author was describing the findings of a paper written by Hossi et al. [73]

Inflammatory disease is influenced by the nervous system. Undem[74] noted that nerve stimulation can affect the growth and function of inflammatory cells. Sternberg et al. [75] stated, "The central nervous system may coordinate both behavioural and immunologic adaptation during stressful situations. The pathophysiologic perturbation of this feedback loop, through various mechanisms, results in the development of inflammatory syndromes, such as rheumatoid arthritis, and behavioural syndromes, such as depression. Thus, diseases characterized by both inflammatory and emotional disturbances may derive from common alteration in specific central nervous system pathways. Fricchoine and Stefano[76] also reviewed what they termed the "neuroendocrine-neuroimmune stress response system." 9 Central nervous system influences on lymphocyte migration was addressed by Ottaway and Husband. [77] These authors suggested that "Many of the alterations in immunity resulting from CNS activity may be explained in terms of changes in lymphocyte migration patterns in response to endocrine signals, neural signals via neurotransmitter release, or direct contacts between nerves and cells of the immune system."Weihe and Krekel[78] observed that "peptides, being present in small-diameter nerve fibres, could exert an indirect immunoregulatory role by influencing vascular tone and/or permeability."

A very interesting hypothesis proposed by Grossman et al. [79] is that cells can learn to associate responsiveness to antigens and other immunoactive agents, with responsiveness to signals originating in the CNS delivered via neuroendocrine or autonomic nervous channels. They propose storage (memory) of stimuli in the immune system rather than in the brain. Just what does this mean to the chiropractor? Can spinal adjustments alter immune system activity? Brennan et al. [80] found that when a thoracic "manipulation" was applied, the response of polymorphonuclear neutrophils isolated from blood collected 15 minutes after the manipulation was significantly higher than blood collected 15 minutes before and 30 and 45 minutes after manipulation. A slight, but significant rise in substance P was also observed.

What are the clinical implications of the nervous system— immune system link? A small controlled study of HIV positive patients was conducted by Selano et al. [81] The effects of specific upper cervical adjustments on the immune system CD4 cell counts of HIV positive individuals was studied. Half the patients received atlas adjustments based upon Grostic upper cervical analysis. The other half received a placebo in the form of an inactive adjusting instrument applied to the mastoid bone. Over the six month period of the study, the control group experienced a 7.96% decrease in CD4 cell counts, while the adjusted group experienced a 48% increase in CD4 cell counts over the same period. Contemporary research is beginning to shed light on the neurobiological mechanisms which may explain the outstanding clinical results chiropractors have experienced when managing patients with infectious diseases. The popular press has been filled with stories describing the emergence of antibiotic resistant pathogens, and the futility of the long term strategy of developing new, stronger antibiotics. [82- 83] As author Geoffrey Cowley observed, "Drug resistant microbes don't threaten us all equally. A healthy immune system easily repels most bacterial invaders, regardless of their susceptibility to drugs." [84] Maintaining a healthy immune system depends upon maintaining a healthy nervous system.

Clinical Applications

It is obvious that these neurobiological models are not mutually exclusive, and that any or all may be operative in a given patient. Clinical practice requires that theoretical models of nerve dysfunction be operationalised. This process has resulted in the development of clinical operational models. Selection of outcomes assessments is dependent upon the nature of the model employed by the practitioner.

Cooperstein[85] described two broad approaches to chiropractic technique, the segmental approach and the postural approach. Murphy[86] added a third, the tonal approach. These conceptual models determine the nature of the analytical procedures employed, the type of adjustments applied, and the criteria for determining the success or failure of a given intervention.

A summary of each follows:

1. *The segmental model.* Subluxation is described in terms of alterations in specific intervertebral motion segments. In segmental approaches, the involved motion segments may be identified by radiographic procedures which assess intersegmental disrelationships, or by clinical examination procedures such as motion palpation. Examples of segmental approaches are the Gonstead[87] and Diversified techniques. [88]

2. *Postural approaches.* In postural approaches, subluxation is seen as a postural distortion. Practitioners of postural approaches assess "global" subluxations using postural analysis and radiographic techniques which evaluate spinal curves and their relationship to the spine as a whole. Examples of techniques emphasizing a postural approach are Pettibon Spinal Biomechanics[89] and Applied Spinal Bioengineering. [90- 91]

3. *Tonal approaches.* In 1910, D. D. Palmer[92] wrote, "Life is an expression of tone. Tone is the normal degree of nerve tension. Tone is expressed in function by normal elasticity, strength, and excitability...the cause of disease is any variation in tone."Tonal approaches tend to view the spine and nervous system as a functional unit. Tonal approaches emphasize the importance of functional outcomes, and acknowledge that clinical objectives may be achieved using a variety of adjusting methods. Examples of tonal approaches include Network Spinal Analysis [92-93] and Torque-release Technique. [94]

The VSC and an integrative viewpoint

Before we complete a historical review of VSC and have an understanding of the science and philosophy of a fundamental tenet of the Chiropractic profession, we must look at the VSC from an integrative standpoint. In reviewing the five traditional components of the VSC as proposed by Flesia in 1982 from an actual acute traumatic episode, we can look at the subsequent stages of healing and repair and the consequential residuals without the correction of the traumatic or pathomechanical event.

Component 1 – Spinal Kinesiopathology – pathomechanics of the spine including spinal misalignments and motion irregularities

Component 2 – Neuropathophysiology/neuropathology – compressed or facilitated nerve tissue

Component 3 – Myopathology – muscle spasm, weakness or atrophy

Component 4 – Histopathology – inflammation, oedema and swelling of tissue which is usually local to the traumatized area

Component 5 – Pathophysiology/Pathology – pathophysiologic and pathoanatomical changes due to the previous 4 components usually seen locally as degeneration, fibrous tissue and/or erosion locally and peripherally as a loss of global homeostasis

The First Traumatic Episode
As the first traumatic episode occurs, simultaneously the first four components of the vertebral subluxation complex become active. The first component, spinal kinesiopathology, occurs – that is, the joint is sprained. Component 4, histopathology occurs and inflammation, swelling and oedema appear around the sprained joint. Just as would happen with an ankle that had been twisted, an area of swelling a malfunction occur at the site of the VSC. Uncorrected, a series of events usually occur –

1. The sprained joint is initially hypermobile
2. Without care, this heals with hypomobility (fixation)
3. This is accompanied by fibrosis (scarring) and in time, degeneration and remodelling local to the site of the VSC
4. Compensation and adaptation occur and the original site of involvement extends to the joint above and occasionally to the joint below. As a result, the entire biomechanics of the spine must adapt forcing a less than optimum spinal biomechanical profile. To think about this metaphorically, think about the local swelling evolving to fibrotic/calcific enlargement visible initially on MRI studies and later on x-ray imaging
5. With repeated trauma resulting in repeated incidents of VSC, the spine accumulates an increasing number of pathoanatomical sites. These sites can be visualised on MRI studies as soft tissue and fibrotic/calcific enlarged areas up to one inch thick. From the orthopaedics standpoint, the repeatedly traumatised spine results in the deteriorating spinal function or ‘abnormal orthopaedic functional programmes’ mediated by gravitational stress (adaptation) and by the adaptational needs of the nervous system

Component 3, myopathology, also occurs immediately. Uncorrected, myopathology leads to long-term spasm or hypotonicity and atrophy. This results in the spinal biomechanical profile to acquire patterns which result in long-term deeply embedded neuromuscular habit patterns which are an integral component to the longer term orthopaedic and neurological damage of the uncorrected VSC.

Neuropathophysiology or neuropathology (component 2) also occurs immediately in cases of the VSC (as in cases of the sprained ankle). There is also nerve damage at the site of the VSC. This brings into consideration the various conditions that nerve damage causes, local to the traumatised site and peripherally. Knowing that nerves transit perceptual and adaptational data from the brain to the body and back, disturbances in this mechanism are clinically significant. Uncorrected, this leads to a deteriorating whole body homeostasis forcing the body to be a better host for stresses and challenges of any kind.

Histopathology (component 4) on the neurological level can permanently alter and destroy nerve tissue. With the deteriorating spinal function discussed and the 'remembered' abnormal nerve system habit patterns of spinal function of each succeeding episode and the entire condition takes on a new neurological level of seriousness. After each traumatic episode, or VSC, the functional neuromuscular habit patterns of the body compensate and adapt to the new altered spinal biomechanical profile. In a matter of a few months after each traumatic episode, the proprioceptive area, the cerebellum and the local levels of the spinal cord 'remember' the new abnormal spinal function as normal.

Each uncorrected episode of the VSC carries with it the need for local and global compensation and adaptation, creating a downward spiral of spinal function. This can be explained by the fact that persistent new data is perceived and processed in such a way as to create new or altered programmes of function (self-contained, automatic, local and or global responses to specific classes of stimuli). With each new episode of uncorrected VSC, new negative data is persistently received and processed from the site of the uncorrected injury and a new dominant programme of spinal function is created. This new programme is reflective of the compensation and adaptation data caused by the uncorrected injury. As a patient sustains multiples traumatic injuries (macrotraumatic or microtraumatic) that go uncorrected, spinal function becomes less than optimal. Spinal integrity is lost and the process of functional degeneration and pathoanatomical changes begin and continue, putting the patient more and more at risk for further spinal injury and functional collapse (just as with an uncorrected ankle sprain).

On a strictly spinal level, the new data from the uncorrected VSC and the subsequent negative dominant programmes of spinal function are stored at the spinal cord level in the form of the facilitated segment and persistent reflex arcs. At the level of the cerebellum this causes spinal balance and fine muscle movement to deteriorate as well as in the proprioceptive area of the cerebral hemispheres altering the sense of position from articular proprioception to global spinal positional adaptation.

At some point after the first four components occur, the 5th component of the VSC, pathophysiology or pathology, becomes a clinical reality. This can be immediately in the event of an acute traumatic sprain/ strain complex or over a period of time in the case of significant deterioration of the global and local homeostatic function in the form of spinal degeneration and loss of normal health index.

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The Guidance released by the General Chiropractic Council with regards to VSC

ADVICE ON THE RESEARCH BASE FOR THE CHIROPRACTIC VERTEBRAL SUBLUXATION COMPLEX

1 Introduction

1.1 A member of the public has requested information on the GCC's view on the strength of the research evidence that the chiropractic vertebral subluxation complex is the cause of disease and many health conditions.

1.2 Attention was drawn to the fact that programme outcome 4(a) in the current version of the Criteria for Recognition of Degrees in Chiropractic, which requires that students must *"understand the history, theory and principles of chiropractic in a contemporary context"*, is accompanied by guidance that includes reference to *"vertebral subluxation-centred models"*.

2 Action to date

2.1 In the first instance, each of the current providers of chiropractic degree programmes recognised by the GCC was asked to provide the following information

- how the chiropractic vertebral subluxation complex (VSC) is covered in the detailed curriculum
- what relevant research they draw from

2.2 The responses to these questions were as follows

2.3 Anglo-European College of Chiropractic

At the AECC the use of the terminology of 'chiropractic vertebral subluxation complex' would occur only within the context of our students reviewing the historical development of chiropractic. Otherwise it does not feature within our curriculum or teaching.

The terminology does not appear within our unit directory for the MChiro programme. It is not being used within the clinical settings in our teaching clinics and we certainly do not teach our students about any causal links to certain health conditions on the basis of this historical concept.

As such we are unable to provide you with any specific relevant or supportive research of high or moderate quality for the 'chiropractic vertebral subluxation complex' from which we draw for our teaching.

2.4 McTimoney College of Chiropractic

The term vertebral subluxation complex occurs in our syllabus on only two occasions:

in Year 1 with reference to the history and development of the profession
in Year 3 where various models of chiropractic are discussed in the context of historical and modern practice.

The College does not encourage the use of vertebral subluxation-centred models but rather draws out the problems with this model in the context of other approaches such as the biopsychosocial model.

The College certainly does not teach that the vertebral subluxation complex is the cause of disease as this could not be justified on the clinical evidence.

2.5 Welsh Institute of Chiropractic

To the best of our knowledge, there is currently no relevant high or moderate quality research to support the vertebral subluxation complex (VSC) and its clinical manifestations.

At this institution, we introduce the VSC in an historical context which is important for students to understand how the profession has developed over the years and how and why these belief systems were formulated. We also discuss the VSC in light of the development of rational scientific thinking and contemporary clinical research which underpins a modern health care provider's approach to patient care. The VSC model sits in the periphery and is not included in the manipulative sciences until such time that the research demonstrating its existence is conducted.

2.6 This information was provided to the Education Committee and it was asked to provide advice to Council.

3 Advice to Council

3.1 At the meeting of the Education Committee held on 13 April 2010 it was agreed to advise Council as follows.

- The chiropractic vertebral subluxation complex is taught only as an historical concept.
- There is no clinical research base to support the belief that it is the cause of disease or health concerns.

4 Members' action

4.1 Members are asked to

- accept the advice of the Education Committee
- agree that GCC guidance should be produced on this matter and that support for compliance with the guidance should be sought from the chiropractic professional associations.

The Statement

GUIDANCE ON CLAIMS MADE FOR THE
CHIROPRACTIC VERTEBRAL SUBLUXATION COMPLEX

The chiropractic vertebral subluxation complex is an historical concept but it remains a theoretical model. It is not supported by any clinical research evidence that would allow claims to be made that it is the cause of disease or health concerns.

Chiropractors are reminded that

- they must make sure their own beliefs and values do not prejudice the patients' care (GCC Code of Practice section A3)
- they must provide evidence based care, which is clinical practice that incorporates the best available evidence from research, the preferences of the patient and the expertise of practitioners, including the individual chiropractor her/himself (GCC Standard of Proficiency section A2.3 and the glossary)
- any advertised claims for chiropractic care must be based only on best research of the highest standard (GCC Guidance on Advertising issued March 2010)

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The General Chiropractic Council (GCC) has resorted to a “straw man” fallacy in their “Guidance on Claims Made for the Chiropractic Vertebral Subluxation Complex” (VSC Guidance).

A straw man argument is based on misrepresentation of an opponent's position. To "attack a straw man" is to create the illusion of having refuted a proposition by substituting a superficially similar yet weaker proposition (the "straw man"), and refuting it, without ever having actually refuted the original position.[1] A handful of chiropractors representing the radical fringe of the profession, and a self-described cadre of “skeptics” are suggesting that the term and concept of vertebral subluxation be abandoned. They erroneously claim that subluxation-based chiropractic is based on the antiquated monocausal theory espoused by early chiropractors, or the limited model of intraforaminal nerve-root compression. Anyone with even a passing knowledge of the literature knows this is not true.[2]

The VSC Guidance document states, *inter alia*, that the vertebral subluxation complex “is not supported by any clinical research evidence that would allow claims to be made that it is the cause of disease or health concerns.” Chiropractors do not claim that VSC is ***the*** cause of disease (emphasis added). Had the sentence ended with “the cause of disease,” there would be no issue. However, by using the term “any,” and adding “health concerns,” the statement is falsified. Furthermore, the inference that a chiropractor who acknowledges VSC believes that it is ***the*** cause of disease is untrue.

Use of the adjective “any” in relation to evidence, and failure to define “health concerns” places the GCC in an utterly indefensible position. The existence of a single piece of evidence linking VSC to a perceived health benefit falsifies the statement. The World Health Organization[3] defines “health” as follows: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” The Definition has not been amended since 1948. Therefore, ***any*** clinical research evidence supporting a relationship between VSC and “physical, mental, or social well-being” falsifies the statement.

Clinical research evidence exists to support a nexus between vertebral subluxation and health concerns.

A comprehensive review of the literature supporting this relationship is beyond the scope of this paper. Suffice it to say that entire textbooks from mainstream medical publishers have addressed it.[4-7] At least one peer-reviewed journal indexed in CINAL, MANTIS, and ICL is devoted to the subject.[8] Furthermore, only one citation is necessary to falsify the GCC statement.

A three arm randomized clinical trial with two control groups (one receiving usual medical care and the other placebo controlled) investigated the effect of subluxation-based chiropractic care on persons undergoing inpatient addiction treatment in a residential addiction care setting.[9] Chiropractic care, consisting of spinal adjustments directed to vertebral subluxations was administered five days per week over a period of 30 days, for a total of 20 care encounters. A total of 98 subjects (14 female and 84 male) were enrolled in the year-and-a-half long study. 100% of the Active (chiropractic) group completed the 30-day program, while only 24 (75%) of the Placebo group receiving a simulated chiropractic adjustment and 19 (56%) of the Usual Care group completed 30 days.

The Active group showed a significant decrease in anxiety while the placebo group showed no decrease in anxiety. The frequency of visits to the Nurse's station was monitored during the course of the study. Of those in the Active care group, only 9% made one or more visits, while 56% of the Placebo group and 48% in the Usual Care group made such visits. This poor performance by the Placebo group suggests that the favourable results obtained in those persons receiving chiropractic care are not attributable to a placebo effect. A 100% retention rate was achieved in a residential care setting using subluxation-centred chiropractic. The possible physical and neurological mechanisms for such a response are described in an earlier paper by Holder et al, in which they describe the Brain Reward Cascade in relationship to vertebral subluxation and its role in resolving Reward Deficiency Syndrome (RDS).[10]

A large retrospective study of subluxation-based chiropractic care on self-related health, wellness and quality of life was published.[11] After surveying 2,818 respondents in 156 clinics, a strong connection was found between persons receiving chiropractic care and self-reported improvement in health, wellness and quality-of-life. 95% of respondents reported that their expectations had been met, and 99% wished to continue care. Furthermore, improvements in health related behaviours were noted in subjects under long-term chiropractic care.

In a case-controlled retrospective study, chiropractors collaborating with researchers at the University of Lund found that chiropractic care could influence basic physiological processes affecting oxidative stress and DNA repair.[12] Serum thiol levels were used as a surrogate indicator of DNA repair and oxidative stress. The study examined serum thiols in patients under short-term and long-term chiropractic care. Serum thiols are primary antioxidants, and serve as a measure of human health status. The test provides a surrogate estimate of DNA repair enzyme activity, which has been shown to correlate with lifespan and aging.

Comparing serum thiol levels in nearly 50 patients receiving short- or long-term chiropractic care with controls, researchers found that independent of age, sex or taking nutritional supplements, long-term chiropractic care of two or more years re-established a normal physiological state in patients. Ability to repair damaged DNA is an important factor in health and longevity. Oxidative stress is now a broadly accepted theory of how persons age and develop disease. Oxidative stress results in DNA damage, and inhibits DNA repair. According to the authors, “it was concluded that musculoskeletal stress discomfort, associated with vertebral subluxation, could induce an in vivo oxidative stress effect estimated by reduced thiol levels in plasma, but it could also be reversed by long term chiropractic care.”

Another study[13, 14] looked at the degree to which chiropractic intervention affected a change in a healthy lifestyle. The study found that chiropractic care users do tend towards the practice of a positive health lifestyle, which also has a direct effect on reported improvements in wellness. These empirical links are relative to the sociodemographic characteristics of this population and show that use of chiropractic care is an aspect of a wellness lifestyle.

In a review of literature related to objective physiological changes following chiropractic care, Hannon[15] discussed more than twenty studies documenting objective health benefits in subjects who were specifically described as “asymptomatic,” “healthy,” “normal,” or “free from physical injury.” Nearly an equal number of studies were found documenting objectively measured health benefits in subjects in which no symptomatic presentation was described.

In a comprehensive review of over 1200 papers addressing neurovertebral influences on visceral and autonomic nervous system function, Rome[16,17] notes, “Evidential support for the association of a neurovertebral influence upon visceral symptoms, function and dysfunction does exist in the referenced literature. This includes the higher levels of evidential assessments, and would seem to negate claims that there are no formal research studies in the manipulative sciences…The importance of this clinical entity – the VSC, is worthy of separate mention.” (See Appendices 2 and 3 for a complete list of references from these papers).

Evidence-based practice (EBP) is not limited to those interventions supported by randomized controlled trials (RCTs).

Sackett [18]defines evidence-based practice as: "The conscientious, explicit, and judicious use of the current best evidence in making decisions about the care of individual patients. ... [It] is not restricted to randomized trials and meta-analyses. It involves tracking down the best external evidence with which to answer our clinical questions."

EBP is not a revolutionary idea. As Baltzan[19] wrote, "What's new about that? Certainly that is what I learned from my instructors when I went to medical school nearly 50 years ago and what my father told me he learned in medical school 80 years ago. In fact, Hippocrates understood the concept."

The problem is not, as Sackett[20] proposed, "integrating individual clinical expertise and the best external evidence." Every doctor does that. The problem is the cavalier dismissal of evidence that doesn't fit into a rigid hierarchy and the compartmentalizing of the profession into two classes: (1) an oligarchy of researchers; and (2) doctors who are reduced to mere technicians following the flow charts and algorithms promulgated by the elite. There is grave danger that the heart and soul of the healing encounter - the doctor-patient relationship - may be a casualty of the more extreme application of this mechanistic approach.

Although there is some minor variation in evidence hierarchies, the randomized clinical trial (RCT) is usually at the top. Significant problems are inherent in the RCT. Furthermore, for chiropractic, which does not treat specific diseases and emphasizes the individual needs of each patient, RCTs are an expensive exercise in futility.

The randomized clinical trial was first proposed by the British statistician Austin Bradford Hill in the 1930s.[21] Since then, the RCT has received a plethora of praise and a paucity of criticism. The Office of Technology Assessment[22] noted, "Objections are rarely if ever raised to the principles of controlled experimentation on which RCTs are based."

Despite such widespread enthusiasm, A.B. Hill[23] recognized that clinical research must answer the following question: "Can we identify the individual patient for whom one or the other of the treatments is the right answer? Clearly this is what we want to do. ... There are very few signs that they [investigators] are doing so." Herein lies the fatal flaw in RCTs.

As Coulter[24] observed, "We consider the controlled clinical trial to be a wrongheaded attempt by man to subjugate nature. Its advocates hope to overcome the innate and ineluctable heterogeneity of the human species in both sickness and health merely by applying a rigid procedure." Inability of the RCT to deal with patient heterogeneity makes it impossible to use RCT results to determine if a given intervention will achieve a specified result in an individual patient.

There are other problems associated with the application of evidence-based practice. Black[25] listed the following: the lack of generalisability of scientific evidence to individual patients, the lack of attention to third-party interests, the threat to the "art" of medicine, and the dangers of an over-simplistic approach. Although EBM clearly has a place, it does not have all the answers.

Holmes, et al., [26] are even harsher in their criticism of evidence-based health sciences (EBHS): "EBHS comes to be widely considered as the truth. When only one method of knowledge production is promoted and validated, the implication is that health sciences are gradually reduced to EBHS. Indeed, the legitimacy of research designs comes to be questioned, if not dismissed altogether. In the starkest terms, we are currently witnessing the health sciences engaged in a strange process of eliminating some ways of knowing. EBHS becomes a 'regime of truth,' as Foucault would say - a regimented and institutionalized version of 'truth.' The ossifying discourse that supports EBM is the result of an ideology that has been promoted to the rank of an immutable truth and is considered, in learned circles, as essential to real science."

The authors further note, "The all-embracing economy of such ideology lends the ... disciples a profound sense of entitlement, what they take as a universal right to control the scientific agenda. By so-called scientific consensus, this 'regime truth' ostracizes those with 'deviant' forms of knowledge, labelling them as rebels and rejecting their work as scientifically unsound."

However, the most damning aspect of evidence-based practice is the lack of scientific evidence that it improves clinical outcomes. According to Haneline, [27] "It should be noted that the process of EBP itself has not been rigorously tested, so we do not know for sure if it actually results in improved health." No RCTs that have compared EBP with standard methods or practice have been carried out in any of the health care professions because of the methodological difficulties and exorbitantly high costs that would be associated with attempting to execute such studies."

With tongue firmly planted in cheek, Smith and Pell[28] probably said it best: "As with many interventions intended to prevent ill health, the effectiveness of parachutes has not been subjected to rigorous evaluation by using randomized controlled trials. Advocates of evidence-based medicine have criticized the adoption of interventions evaluated by using only observational data. We think that everyone might benefit if the most radical protagonists of evidence-based medicine organized and participated in a double blind, randomized, placebo-controlled, crossover trial of the parachute."

Sackett[29] stated, “Evidence Based Medicine is the integration of clinical expertise, patient values, and the best evidence into the decision making process for patient care. Clinical expertise refers to the clinician's cumulated experience, education and clinical skills. The patient brings to the encounter his or her own personal and unique concerns, expectations, and values.

In the Chiropractic setting, perhaps the question of EBP is best answered by reviewing the recent Editorial by Young[42] in the recent edition of Clinical Chiropractic. Entitled ‘Evidence-Based Balderdash’, he succinctly defines the challenges of evidence-based practice in Chiropractic clinics, most notably the different interpretations of EBM for researchers (and it appears Educational Institutions and GCC) where the only evidence that matters is that from RCTs whereas for clinicians, the traditional model of a knowledge base working in harmony with their own clinical experiences and patients’ expectations is what matters. The nature of the questions being asked by researchers is also brought into question by Young[42] who implies that our profession’s future scope of practice risks being determined by research that is “as meaningless as it is detrimental”. Of particular note is the recently commissioned review by Bronfort et al [43] which, as noted by Young [42] has demonstrated that researchers have been singularly poor at asking the right questions. Unfortunately, it appears that poorly defined and executed research is what is now driving policy making in UK Chiropractic.

Perhaps Baruss[30] said it best: "If we are serious about coming to know something, then our research methods will have to be adapted to the nature of the phenomenon that we are trying to understand. The purpose of science should take precedence over established methodologies ... Similarly, belief in a universal, inflexible scientific method that can guarantee truth belongs to scientism. If one is authentic, one's effort to develop one's understanding by changing opinions into questions may cut so deeply that traditional research methods themselves are called into question and are replaced by others that serve one's purpose better. One may need to draw on the totality of one's experience and not just on that subset that consists of observations made through the process of traditional scientific discovery."

Subluxation-centred care and patient-centred care are not mutually exclusive. The suggestion that subluxation-centred chiropractors do not or cannot practice in an evidence-based model is another "straw man" fallacy.

A report by the Economic and Social Research Institute of the W.K. Kellogg Foundation[31] listed the characteristics of patient-centred care:

A. *Welcoming environment*: provide a physical space and an initial personal interaction that is "welcoming," familiar, and not intimidating;

B *Respect for patients' values and expressed needs*: obtain information about patient's care preferences and priorities; inform and involve patient and family/caregivers in decision making; tailor care to the individual; promote a mutually-respectful, consistent patient provider relationship;

C. *Patient empowerment or "activation"*: educate and encourage patient to expand their role in decision-making, health-related behaviours, and self-management;

D. *Socio-cultural competence*: understand and consider culture, economic and educational status, health literacy level, family patterns/situation, and traditions (including alternative/folk remedies); communicate in a language and at a level that the patient understands;

E. *Coordination and integration of care*: assess need for formal and informal services that will have an impact on health or treatment, provide team-based care and care management, advocate for the patient and family, make appropriate referrals and ensure smooth transitions between different providers and phases of care;

F. *Comfort and support*: emphasize physical comfort, privacy, emotional support, and of family and friends;

G. *Access and navigation skills*: provide what patient can consider a "medical home," keep waiting times to a minimum, provide convenient service hours, promote access and patient flow; help patient attain skills to better navigate the health care system;

H. *Community outreach*: make demonstrable, proactive efforts to understand and reach out to the local community.

These characteristics are applicable to any healthcare provider, and are appropriate for both musculoskeletal and subluxation/wellness oriented chiropractic practices. To suggest that subluxation-centred care and patient-centred care are incompatible, mutually exclusive, or contradictory is disingenuous.

Imposing a more burdensome evidence standard on subluxation centred chiropractors than on musculoskeletal/pain treatment oriented chiropractors, or medical practitioners, is unacceptable, discriminatory, and an application of the fallacy of "special pleading."

Special pleading is a logical fallacy where a double standard is applied. One flawed premise that has resulted in a cultural barrier to the broader application of distinctively chiropractic principles and methods is the belief that allopathic interventions universally enjoy strong research support for their safety and effectiveness. Chiropractic, along with other non-allopathic approaches, is dismissed as lacking scientific support. Thus, allopathic medicine has become the *de facto* standard and enjoys largely uncritical acceptance by policy-makers.

According to a 1991 statement by David Eddy, [32] "There are perhaps 30,000 biomedical journals in the world and they have grown steadily by 7% a year since the seventeenth century. Yet only about 15% of medical interventions are supported by, solid scientific evidence", David Eddy, professor, of health policy and management at Duke University, North Carolina, told a conference in Manchester earlier this year. This is partly because only 1% of the articles in medical journals are scientifically sound, and partly because many treatments have never been assessed at all.

Pelletier[33] wrote, "To provide a baseline against which to measure CAM, it is important to point out that as much as 20 percent to 50 percent of conventional care, and virtually all surgery, has not been evaluated by RCTs." An analysis was published in the journal *Clinical Evidence*.[34] Of 2,404 treatments used in medical practice, 360 (12 percent) were rated as beneficial, 538 (23 percent) likely to be beneficial, 180 (8 percent) as a trade-off between benefits and harms, 115 (6 percent) unlikely to be beneficial, 89 (4 percent) likely to be ineffective or harmful, and 1,122 (46 percent) as unknown effectiveness. In other words, only 35 percent of conventional therapies were found to be beneficial or even likely to be helpful.

Kilo and Larson[35] wrote, "On balance, the data remain imprecise, and the benefits that U.S. health care currently deliver[s] may not outweigh the aggregate health harm it imparts ... it is time to address possibility of net health harm by elucidating more fully aggregate health benefits and harms of current health care."

This isn't gratuitous medical-bashing; it's merely an acknowledgement of the current state of the art. We cannot allow policy-makers to demand a more burdensome standard of safety and effectiveness for chiropractic than is demanded of allopathic medicine. On a level playing field, subluxation-based chiropractic will establish a rightful place in the culture.

Regarding musculoskeletal chiropractic, some chiropractic leaders have suggested that low back pain should be our point of entry into the health care system. They frequently base this opinion on the premise that there is sound, incontrovertible scientific evidence that chiropractic care represents a superior approach to low back pain. In actuality, the evidence is equivocal at best.

First, manipulative therapy is not synonymous with chiropractic care. A growing number of practitioners, particularly physical therapists and osteopathic practitioners, offer this service. While adjustment of vertebral subluxation is a unique service provided by chiropractors, spinal manipulative therapy is a common-domain procedure. How frequently do we see trials on one profession's interventions being extrapolated to cover spinal manipulation as a whole or manual therapy in general without any evidence stating that these assumptions are valid? As Young state, Chiropractors are "not (a) spinal manipulative therapist".

In addition, the scientific evidence supporting manipulation as a treatment for low back pain is equivocal. A review in the Cochrane Database[36] sought "to resolve the discrepancies related to the use of spinal manipulative therapy and to update previous estimates of effectiveness, by comparing spinal manipulative therapy with other therapies and then incorporating data from recent high-quality randomized controlled trials."

What did these investigators conclude? "Spinal manipulative therapy had no statistically or clinically significant advantage over general practitioner care, analgesics, physical therapy, exercises, or back school. ... There is no evidence that spinal manipulative therapy is superior to other standard treatments for patients with acute or chronic low-back pain." And what of the claim that chiropractors offer more effective manipulative treatment for back pain than other providers? The authors note: "[P]rofession of manipulator ... did not affect these results."

Chiropractic Care for Low Back Pain: A Cochrane Review Update[37] concluded, “Combined chiropractic interventions slightly improved pain and disability in the short-term and pain in the medium-term for acute and subacute LBP. However, there is currently no evidence that supports or refutes that these interventions provide a clinically meaningful difference for pain or disability in people with LBP when compared to other interventions.”

Regarding cervical and thoracic manipulation, the Cochrane Review[38] was lukewarm at best, noting primarily low quality evidence. The authors concluded, “Cervical manipulation and mobilisation produced similar changes. Either may provide immediate- or short-term change; no long-term data are available. Thoracic manipulation may improve pain and function. Optimal techniques and dose are unresolved. Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.”

Vertebral subluxation is recognized by the World Health Organization and major chiropractic organizations worldwide.

The World Health Organization (WHO) has promulgated guidelines on basic training and safety in chiropractic.[39] This document discusses philosophy and the basic theories of chiropractic, noting that:

> Chiropractic is a health care profession concerned with the diagnosis, treatment and prevention of disorders of the neuromusculoskeletal system and the effects of these disorders on general health. There is an emphasis on manual techniques, including joint adjustment and/or manipulation, with a particular focus on the subluxation.
>
> The concepts and principles that distinguish and differentiate the philosophy of chiropractic from other health care professions are of major significance to most chiropractors and strongly influence their attitude and approach towards health care.
>
> A majority of practitioners within the profession would maintain that the philosophy of chiropractic includes, but is not limited to, concepts of holism, vitalism, naturalism, conservatism, critical rationalism, humanism and ethics. (p. 5)

The core syllabus for full chiropractic education includes the following:

> ***He/she should possess a comprehensive understanding and command of the skills and knowledge that constitute the basis of chiropractic in its role as a health care profession, as follows:***
>
> > • achieve a fundamental knowledge of health sciences, with a particular emphasis on those related to vertebral subluxation and the neuromusculoskeletal systems… (p. 10)

Furthermore, in the World Health Organization's International Classification of Diseases (ICD-10)[40] codes, ICD Code M99.1 is assigned to "Subluxation complex (vertebral)."

The "unique paradigm of chiropractic care" has been articulated by the Association of Chiropractic Colleges[41] (ACC), and accepted by major chiropractic organizations, including:

- The Council on Chiropractic Education
- The International Chiropractor's Association
- The American Chiropractic Association
- The World Federation of Chiropractic
- The Congress of Chiropractic State Associations
- The Association of Chiropractic Colleges
- The Federation of Chiropractic Licensing Boards
- National Board of Chiropractic Examiners
- The National Association of Chiropractic Attorneys
- The Council on Chiropractic Practice

The ACC Paradigm states the following concerning the subluxation:

> ***4.0 THE SUBLUXATION***
> Chiropractic is concerned with the preservation and restoration of health, and focuses particular attention on the subluxation.
>
> A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health.
>
> A subluxation is evaluated, diagnosed and managed through the use of chiropractic procedures based on the best available rational and empirical evidence.

Manifestations of vertebral subluxation may be assessed utilizing reliable and valid examination procedures.

Reliable and valid clinical assessments exist for the biomechanical and functional components of vertebral subluxation. These include radiographic mensuration, instrumentation for evaluation of function, and "paper and pencil" instruments to evaluate self-reported quality-of-life.

These technologies are described in internationally recognized practice guidelines, which have qualified for inclusion in the National Guideline Clearinghouse.

Council on Chiropractic Practice (CCP) Clinical Practice Guideline No. 1, ***Vertebral Subluxation in Chiropractic Practice*****,** has undergone three revisions. In addition to being included in the National Guideline Clearinghouse in the United States (NGC), the guideline is included in Healthcare ***Standards: Official Directory,*** published by ECRI, a Collaborating Centre for the World Health Organization, and the official WHO healthcare standards and guidelines archive. The CCP Guideline may be obtained online at no cost at:

http://www.ccp-guidelines.org/guideline-2008.pdf

The NGC summary of recommendations is available at:

http://www.ngc.gov/summary/summary.aspx?doc_id=13617&nbr=006978&string=vertebral+AND+subluxation

Guidelines addressing the use of spinal radiography for biomechanical analysis related to vertebral subluxation have been promulgated by the Practicing Chiropractors' Committee on Radiological Protocols (PCCRP) For Biomechanical Assessment of Spinal Subluxation in Chiropractic Clinical Practice. This guideline document may be accessed without charge at: http://www.pccrp.org

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The Vertebral Subluxation Complex – The Issues in Clinical Practice

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Issue 1: **Vertebral Subluxations**

Do vertebral subluxations exist?

Nothing could be further from the truth.

In the United States alone, there is ample support that the vertebral subluxation is a very a real and verifiable entity. State laws, the US Federal Government, the World Chiropractic Alliance, the Council on Chiropractic Practice, the International Chiropractor's Association, the American Chiropractor's Association, the Federation of Straight Chiropractic Organizations, and the Association of Chiropractic Colleges ***all*** define the responsibility of chiropractors as the detection and correction of vertebral subluxation and its resultant neurological interference.

The chiropractic guideline document: *Vertebral Subluxation in Chiropractic Practice*, produced by the Council on Chiropractic Practice CCP) was reviewed by an independent research agency (ECRI) which is a Collaborating Center of the World Health Organization. Based on this review it was accepted for inclusion in the National Guideline Clearinghouse of the Agency for Health Care Policy and Research of the United States Federal Government.[1-3]

The CCP and its official published documents were accepted for inclusion in the Healthcare Standards Database and the printed version of the *Healthcare Standards: Official Directory.* Healthcare Standards is a comprehensive list of published standards, guidelines recommendations, position papers, policy statements, technology assessments, and other authoritative documents. This is the World Health Organization's official healthcare standards and guidelines archive.

The existence of subluxation is in accordance with the published paradigm statement of The Association of Chiropractic Colleges, which was accepted and signed by every Chiropractic College President in North America.[4-6] This statement has been endorsed and/or adopted by every major national and international chiropractic organization in the chiropractic profession including:

- The World Chiropractic Alliance
- The Council on Chiropractic Practice
- The Council on Chiropractic Education
- The International Chiropractor's Association
- The American Chiropractor's Association
- The World Federation of Chiropractic
- The Congress of Chiropractic State Associations
- The Association of Chiropractic Colleges
- The Foundation for Chiropractic Education & Research
- The Federation of Chiropractic Licensing Boards
- National Board of Chiropractic Examiners
- The National Association of Chiropractic Attorneys

The ACC defines the purpose, principles and practice of chiropractic as the finding and reduction of vertebral subluxations, which will prevent and restore health by removing interference to the body's inherent recuperative powers. This document, among other things, states that chiropractic as a profession "focuses particular attention on the subluxation."

The assessment and management of vertebral subluxation is either taught as part of the regular curriculum of chiropractic colleges in North America or as part of their post graduate programs. All of these programs, including the general curriculum of the chiropractic colleges and the post graduate programs are approved and Accredited by the Council on Chiropractic Education which is subject to the rules and authority of the United States Federal Government's Department of Education. These schools also hold accreditation through various local and regional accrediting bodies. The Council on Chiropractic Education, mentioned above, accredits all of the chiropractic programs in the United States and has reciprocal arrangements with accrediting bodies in Europe and Australia. According to the Policies document of the CCE:[7]

> "The Council on Chiropractic Education (CCE) accepts the physiological principles of organization in living things and the manifestation of the self-regulatory mechanisms inherent in the body.
>
> CCE accepts that the nervous system is vulnerable to disturbances resulting from derangements of the neurobiomechanical system, including the vertebral column and vertebral subluxation.
>
> The educational process should be a reinforcement of the validity of the basic principles of chiropractic and an encouragement to the student to apply those principles in his or her clinical programs, with emphasis given to detection and correction of derangements of the neurobiomechanical system, including vertebral subluxation."

The American Medical Association, in its *Guides to the Evaluation of Permanent Impairment,* lists the following as acceptable means to rate impairment:[8]

- Impairment due to loss of muscle power and motor function,
- Impairment due to abnormal motion of the spine,
- Impairment due to loss of motion segment integrity,
- Impairment due to disc problems,
- Impairment due to pain or sensory deficit,
- Impairment due to segmental instability.

These are, in fact, components of the Vertebral Subluxation Complex.

The Guidelines for Evaluation and Management Services published by the Health Care Financing Administration of the United States Federal Government and the American Medical Association (May 1997) outline what an objective examination should consist of and these include commonly used neuromusculoskeletal exam procedures within chiropractic such as: postural analysis, palpation, assessment for subluxation, range of motion and assessment of muscle tone. All of these are used to assess and manage subluxation.[9]

The Federal Government of the United States specifically defines what chiropractors do as the detection and correction of subluxation under Medicare and Federal worker's compensation laws. Common to all state statutes is the adjustive process being utilized to reduce subluxation and the resultant interference to nerve transmission. No less than 38 states employ the term adjustment in licensing laws in reference to the procedures applied by chiropractors. Eighteen state statutes additionally include the concept of manipulation, 34 states contain specific references to responsibility for neurological complications of biomechanical origin (subluxation) and over half the chiropractic profession practice in these states. In addition, 11 states specifically discuss the concept of subluxation in their statutes by using the term and for those that do not specifically use the term there is an implied understanding of the concept in their statutes.

The existence of subluxation and its acceptance is spelled out in explicit detail by published policy statements of chiropractic organizations as well as federal and state laws regulating the practice of chiropractic. The epidemiology of subluxation has been researched since the inception of chiropractic over 100 years ago with basic science and clinical research to further elucidate the nature of it continuing to this day.

A few individuals within the profession contend that the existence of subluxation is questionable and have chided the profession for not addressing their contention. While most acknowledge that certain individuals and groups within the profession do make such an assertion, such contentions are not taken seriously. The above review of the subluxation within the chiropractic profession, government, state law, chiropractic educational bodies and scientific literature serves as evidence of its entrenched status. Further, according to Rome there are 296 variations and synonyms of subluxation used by medical, chiropractic and other professions leading him to remark "It is suggested that with so many attempts to establish a term for such a clinical and biological finding, an entity of some significance must exist."[10]

According to Kent's paper *Models of Vertebral Subluxation* the term subluxation has a long history in the healing arts literature and it may be used differently outside of the chiropractic profession. The earliest non-chiropractic English definition is attributed to Randall Holme in 1668. Holme defined subluxation as "a dislocation or putting out of joint." In medical literature, subluxation often refers to an osseous disrelationship which is less than a dislocation. However, B.J. Palmer, the developer of chiropractic, hypothesized that the "vertebral subluxation" was unique from the medical use of the term "subluxation" in that it also interfered with the transmission of neurological information independent of what has come to be recognized as the action potential. Since this component has yet to be identified in a quantitative sense, practitioners currently assess the presence and correction of vertebral subluxation through parameters which measure its other components. These may include some type of vertebral biomechanical abnormality, soft tissue insult of the spinal cord and/or associated structures and some form of neurological dysfunction involving the synapse separate from the transmission of neurological information referred to by Palmer.[11]

As noted, chiropractic definitions of subluxation include a neurological component. In this regard, Lantz stated "common to all concepts of subluxation are some form of kinesiological dysfunction and some form of neurological involvement."[12-14] In the position paper of The Association of Chiropractic Colleges they define subluxation as follows:

> "A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health."

The ACC goes on to state:

> "A subluxation is evaluated, diagnosed, and managed through the use of chiropractic procedures based on the best available rational and empirical evidence."

Other concepts of vertebral subluxation consider it consequent to a neurological response to physical, emotional, or environmental stress. The neurological response may precipitate or be precipitated by misalignment(s) between articulations of the spinal column or its immediate weight bearing components of the axial skeleton. The integrity of the nervous system is diminished as changes occur in morphology/ oscillation/tension of the tissues occupying the neural canal and/or intervertebral foramina.

In a survey of North American Chiropractors completed by the Institute for Social Research at Ohio Northern University and published in 2003 their research found that:

- 88.1% of chiropractors stated that the term vertebral subluxation complex should be retained.
- 89.8% stated the adjustment should not be limited to musculoskeletal conditions.
- The respondents rated the subluxation as a significant contributing factor in 62.1% of visceral ailments.
- 93.6% recommend maintenance/wellness care
- 76.5% Teach a relationship between spinal subluxation and visceral health
- 88.6% stated thermography was appropriate for use in practice

The researchers concluded that any differences in practitioners' attitudes were associated with four variables:

- The chiropractic college attended
- Whether or not the chiropractor had chiropractic treatment prior to college
- The number of patients the chiropractor treats each week
- The chiropractors self rated philosophy (broad, middle or focused scope)

They further concluded:

"The profession as a whole presents a united front regarding the subluxation and adjustment."[15]

The natural history of vertebral subluxation

Another claim that is occasionally heard is that the natural history of vertebral subluxation is unknown. In fact, we know a great deal about the natural history of vertebral subluxation.[16-17] This knowledge is based on a combination of basic science, clinical research, technique, objective assessment of physiological function/structural changes and quality of life issues. These parameters overlap with various models of vertebral subluxation that practitioners choose to address in clinical practice. In this regard there are two components of subluxation that are common to all models. These components are Kinesiopathology and Neuropathology.

Kinesiopathology deals with issues related to misalignment and/or abnormal motion and neuropathology deals with the neurological changes related to the abnormal motion and/or misalignment.

In discussing kinesiopathology the most significant basic science information relative to this is Wolf's Law, which states:

> As bones are subjected to stress demands in weight bearing posture, they will model or alter their shape accordingly.[18]
>
> Wolf's Law has a less well-known corollary for soft tissue called: Davis' Law that states:
> Soft tissue will model according to imposed demands.[19]

These two Laws form the foundation of the rheology associated with subluxation and these rheological properties are essential elements in the epidemiology and natural history of vertebral subluxation, which must be considered with regards to care planning, especially in regards to those involving structural changes. Rheology is the study of the change in form and the flow of matter including elasticity, viscosity and plasticity. The longer a subluxation is allowed to set in the further along the path of immobilization degeneration the subluxation is allowed to progress.

The extent of immobilization degeneration and the patient's individual ability to reverse it may be a determining factor in the frequency of the initial care plan and its duration. This will also affect long term care whether from a palliative or wellness perspective once a substantial correction has been made.

The other significant basic science issue related to frequency and duration of care has to do with neuroplasticity. This has to do with the nervous system's propensity to undergo "plastic" changes and learn to habituate a response and is a fundamental aspect of the nature of self-regulating repair processes that use the plasticity of the nervous system as its conduit. In order to overcome plastic neurological changes that have set in secondary to subluxation the nervous system will need to "rewire" in order to create new plastic changes for the better. This may necessitate frequent adjustments and other inputs into the CNS over a long duration in order to make these changes.

This neuroplasticity and the accompanying rheological changes discussed above secondary to subluxation are what need to be overcome in order for the patient to have a reduction in vertebral subluxation.

The natural history of spinal degeneration secondary to pathoanatomical aberrations is well entrenched, not only in the chiropractic literature, but also within the broad domains of biomechanics and spinal pathology.

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ISSUE 2: **Thermal Scanning as a method for evaluating the VSC**

The literature supports the use of thermography in chiropractic practice including the existence of normative data and reliability studies.[1-40] Furthermore, according to the CCP guidelines:

> Temperature reading devices employing thermocouples, infrared thermometry, or thermography (liquid crystal, telethermography, multiple IR detector, etc.) may be used to detect temperature changes in spinal and paraspinal tissues related to vertebral subluxation.
>
> The measurement of paraspinal cutaneous thermal asymmetries and other measurements of anomalies have been shown to be a mode of sympathetic nervous system assessment, which may be used as one indicator of vertebral subluxation. Demonstrable changes in thermal patterns have been observed following chiropractic adjustment. Thermocouple instruments have been shown to demonstrate an acceptable level of reliability and clinical utility applicable to the assessment of vertebral subluxation related temperature changes.
>
> Normative data have been collected concerning the degree of thermal asymmetry in the human body in healthy subjects. These values may serve as one standard in the assessment of sympathetic nerve function and the degree of asymmetry as a quantifiable indicator of possible dysfunction.

The ICA practice guidelines[41] additionally support the use of thermal scanning in chiropractic practice:

Temperature reading devices

Highly significant temperature changes have been noted in spinal and paraspinal tissues following a chiropractic adjustment. Hand-held thermographic devices "have been evaluated and shown to have moderate to excellent inter-examiner reliability over short time durations."

Early chiropractic investigators recognized three basic physiological concepts that underlie the value of cutaneous thermography:

- the body is segmented into "dermatomes";
- side-to-side skin temperatures are generally symmetrical unless dysfunction exists; and
- any anomalous deviation from a gradually increasing paraspinal skin temperature from S-2 to C-1 may be indicative of the vertebral subluxation and other malpositioned articulations and structures or other dysfunction.

1. Thermocouple: The use of thermocouple instrumentation in chiropractic practice is well established.

2. a. Single-channel (e.g., chirometer)
   b. Dual-channel (e.g., Neurocalograph (NCGH), Thermoscribe, Analograph)

The dual probe devices give a bilateral comparative temperature reading of the paraspinal tissues. However, the instrument requires skin contact.

16.6.1. **Rating**: Established
Evidence: E, L

2. Infrared Thermography

Infrared instruments detect and record changes in temperature rapidly and require no skin contact, and are relevant to chiropractic practice.

1. Single-channel (dermathermagraph) double-channel (e.g., Accolade, Tytron C-2000, VT 2000)

16.6.2. **Rating**: Established
Evidence: E, L

B. Multi(channel (e.g., Visitherm II)

16.7.1 **Rating**: Established
Evidence: E, L

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ISSUE 3: **Can Chiropractic Promote Health?**

Since many DCs have witnessed first-hand the benefits of chiropractic, they often educate patients about the need for subluxation correction to promote and enhance health and wellness.

This type of patient-education approach has at times been attacked by those who see chiropractic solely as a treatment for specific disease conditions. These critics claim there is no evidence to support the contention that chiropractic can promote health.

However, a review of the literature shows a number of significant studies and documents available that easily refute that unfounded contention.

The 1996 Paradigm Statement by the Association of Chiropractic College includes a section titled "Health Promotion" where it states that:

> "Doctors of Chiropractic advise and educate patients and communities in structural and spinal hygiene and healthful living practices."

Another key aspect articulated in the ACC document concerns case management issues. It outlines, in a generic way, how chiropractors conduct themselves on a clinical level:

> "Doctors of Chiropractic establish a doctor/patient relationship and utilize adjustive and other clinical procedures unique to the chiropractic discipline. Doctors of Chiropractic may also use other conservative patient care procedures, and, when appropriate, collaborate with and/or refer to other health care providers."

Chiropractic clinicians have a distinct manner in which they utilize the information, feedback and empirical results each patient case accumulates. For this reason, chiropractic care, especially subluxation based care, is not linked to various diseases or conditions the patient may or may not have, before or after care has initiated. The World Health Organization defines health as being "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity."

Given this broad definition of health, epistemological constructs borrowed from the social sciences may demonstrate health benefits not disclosed by randomized clinical trials. Health benefits such as improvement in self-reported quality-of-life, decreased health care costs, behaviours associated with decreased morbidity, and patient satisfaction may be evaluated using such methods.

This performance-based domain focuses the doctor-patient relationship on the standards set by personal baselines and establishes guidelines for the utility of various chiropractic techniques. This type of chiropractic care is in a context with other non-invasive disciplines and is stratified into discrete application-based domains across a spectrum of parameters related to well-being.

Techniques and methods for correcting subluxation must be judged on their intended outcome and most if not all chiropractic techniques have some physiological and/or structural outcome that measures their results.[1] Further, some techniques have as their goals - improvement in quality of life, an improved sense of well-being and a better sense of relationship with the patient's environment and society.

Several studies warrant further discussion in this context. Blanks, Schuster and Dobson published the results of a retrospective assessment of subluxation-based chiropractic care on self-related health, wellness and quality of life.[2] This is the largest study of its kind ever undertaken regarding a chiropractic population. After surveying 2,818 respondents in 156 clinics, a strong connection was found between persons receiving chiropractic care and self-reported improvement in health, wellness and quality-of-life. 95% of respondents reported that their expectations had been met, and 99% wished to continue care.

Coulter et al performed an analysis of an insurance database, comparing persons receiving chiropractic care with non-chiropractic patients. The study consisted of senior citizens over 75 years of age. It was reported that the persons receiving chiropractic care reported better overall health, spent fewer days in hospitals and nursing homes, used fewer prescription drugs, and were more active than the non-chiropractic patients.[3]

Rupert, Manello, and Sandefur surveyed 311 chiropractic patients, aged 65 years and older, who had received "maintenance care" for five years or longer. Chiropractic patients receiving maintenance care, when compared with US citizens of the same age, spent only 31% of the national average for health care services. There was a 50% reduction in medical provider visits. The health habits of patients receiving maintenance care were better overall than the general population, including decreased use of cigarettes and decreased use of non-prescription drugs. Furthermore, 95.8% believed the care to be either "considerably" or "extremely" valuable. Rupert reports that 79% of chiropractic patients have maintenance care recommended to them, and nearly half of those comply.[4]

In an online survey with 3018 respondents by Miller, 62% responded affirmatively when asked, "Although you feel healthy, would you follow your family member's lead and visit a doctor who focuses on wellness and prevention just so you can stay feeling that way?"[5]

Three additional studies have addressed this issue. One of the studies consisted of a three arm randomized clinical trial with two control groups (one of which was placebo controlled).[6] This was a single blind study utilizing subluxation-centred chiropractic care implemented in a residential addiction treatment setting. A total of 98 subjects (14 female and 84 male) were enrolled in the year and a half study. 100% of the Active (chiropractic) group completed the 30-day program, while only 24 (75%) of the Placebo group and 19 (56%) of the Usual Care group completed 30 days.

The Active group showed a significant decrease in anxiety while the Placebo group showed no decrease in anxiety. The frequency of visits to the Nurse's station was monitored during the course of the study and among the Active treatment group only 9% made one or more visits, while 56% of the Placebo group and 48% in the Usual Care group made such visits. This poor performance by the placebo group suggests that the chiropractic care had no positive placebo effect.

Treatment was five days per week over a period of 30 days, for a total of 20 treatment encounters. Therefore, a 100% retention rate was achieved in a residential treatment setting using subluxation-centred chiropractic. The possible mechanism for such a response is elaborated on in an earlier paper by Holder et al, in which they describe the Brain Reward Cascade in relationship to vertebral subluxation and its role in resolving (RDS) Reward Deficiency Syndrome.[7]

A third study by Blanks et al. looked at the degree to which chiropractic intervention affected a change in a healthy lifestyle. The study found that chiropractic care users do tend towards the practice of a positive health lifestyle, which also has a direct effect on reported improvements in wellness. These empirical links are relative to the sociodemographic characteristics of this population and show that use of chiropractic care is an aspect of a wellness lifestyle.[8-9]

There are numerous studies on chiropractic care in general and chiropractic care directed at reduction of vertebral subluxation that have demonstrated positive effects on physiological outcome measures.

In a review of literature related to objective physiological changes following chiropractic care, Hannon discusses more than twenty studies documenting objective health benefits in subjects who were specifically described as "asymptomatic," "healthy," "normal," or "free from physical injury." Nearly an equal number of studies were found documenting objectively measured health benefits in subjects in which no symptomatic presentation was described.[10]

Chiropractors have historically recommended initial care plans that involve a high frequency of visits as well as extended care plans of long duration to encompass corrective care and wellness based care. Care plans that do not base care solely on the presence or absence of symptoms have as their basis some very fundamental scientific laws that govern the connective tissue and neurological responses to abnormal biomechanical loads and neurological interference while also addressing the quality of life issues discussed above. The goal of care becomes the reversal of these insidious processes and an enhanced sense of well-being so that any judgment of that care must take into consideration those outcomes as well as outcomes related to the technique being applied.

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Issue 4: **Diagnosis of Vertebral Subluxation**

Some critics maintain that the diagnosis of vertebral subluxation and measurement of its reduction cannot be done. Numerous issue related to this have already been discussed. What these critics really refer to is, in more modern terms, the concept of *Outcome Assessment.*

Vertebral subluxations have general effects on the mechanics and physiology of the spine and body:

A. Immediate local effects which may include irritation, inflammation, and degeneration at the vertebral level.

B. Mechanical effects which include aberrations in motion, posture and overall mechanical function of the spine.

C. Physiologic effects which especially include disturbances in the nervous and circulatory systems.

These general effects of the vertebral subluxation are focused into five categories with specific outcomes measures that are used to determine whether or not the patient is getting better, staying the same or getting worse in terms of their subluxation outcome. All of the following are taught in the curriculum of accredited chiropractic college programs:

1. Spinal Kinesiopathology which generally refers to the abnormal position and motion of the vertebra involved in the subluxation. Outcomes assessment parameters here would include:

- Palpation analyses
- X-ray analyses,
- Computed tomography
- MRI imaging
- Postural aberrations
- Goniometric assessment,
- Videofloroscopic analyses
- Range of motion assessment
- Leg length check analyses.

2. Neuropathophysiology refers to abnormal nervous system function which is the most significant component of the vertebral subluxation. Assessment criteria here would include:

- Somatic pain
- Paraesthesia, hyperaesthesia, hypoaesthesia through case history and questionnaire determination
- Somatic motor assessment through muscle analyses and complete neurologic assessment of the neuraxis as well as complete afferent and efferent assessment.
- MRI and CT Scans provide evidence of nerve structural damage which correlates with the neuropathophysiologic component.
- Visceromotor determinations via heat sensitive devices, thermography and thermometry.

3. Myopathology refers to the abnormal changes in muscle function due to the vertebral subluxation. Outcomes assessment criteria here include:

- Palpation
- Dynamometer testing
- Surface EMG
- Neuropressure algometry and pain sensitivity,
- Range of motion determination
- Paraspinal tissue compliance

4. Histopathology represents the abnormal changes to soft tissues involved in the vertebral subluxation. Assessment protocols here primarily include the determination of disc and ligament-integrity by means of X-ray and other imaging methods.

5. Pathophysiology refers to the generalized abnormal changes generated in the spine and body as a consequence of the vertebral subluxation. Spinal pathophysiology is assessed primarily through radiographic and other imaging determinations of bone degeneration.

The basic chiropractic analysis consists of manual palpation of the bony elements of the spine, manual assessment of the motion of the spine and individual vertebra, and palpation of the numerous muscles which attach and control spine and vertebral motion.

Additional analytic tools for the field chiropractor would include X-ray, devices to assess spinal and vertebral motion and posture, as well as instruments used to assess muscle function and skin temperature.

ISSUE 5: **Journal of Vertebral Subluxation Research**

There is a critical need for valid, scientific chiropractic research and one of the more distinguished journals is the *Journal of Vertebral Subluxation*. The *Journal of Vertebral Subluxation Research* is a peer reviewed, indexed, scientific journal that began publication in 1996. The journal is indexed by the Cumulative Index to Nursing and Allied Health Literature (CINAHL), MANTIS and by the Index to Chiropractic Literature.

The Editorial Board consists of a number of well respected and world renowned researchers, academicians, medical physicians, chiropractors, attorneys and health policy experts. The Board includes individuals who have worked within the National Institutes of Health, the Max Planck Institute for Brain Research, the Department of Anatomy at Harvard Medical School, contributing author to the AMA Guides for Permanent Impairment, the discoverer of the opiate receptor, an Oxford Scholar, current and past Directors of Research at chiropractic institutions, several current and former faculty from chiropractic institutions, and two former chiropractic college presidents.

New Science and Quantum Biophysics are proving that DD Palmer the Philosophy of Chiropractic is correct

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One of the primary reasons behind the enduring rift between conventional medical science and chiropractic is the contrasting nature of their basic philosophies. Philosophical “truths” in Western civilization are validated through a process employing scientific methodology. “Truths” related to health science, until recently, have only been generated through research conducted by organismal, cellular and molecular biologists, biochemists, pharmacologists and medical doctors. Consequently, chiropractic has been at a distinct disadvantage in acquiring recognition as a valid healing art. However, the leading edge of cellular and molecular biology research is heralding a radical departure from its traditional theories and is in turn, creating a new philosophy.

The mission statement of Modern Science was defined by English philosopher Francis Bacon and adopted shortly after the Scientific Revolution (1543). Accordingly, science’s purpose was to “control and dominate Nature.” The primary purpose of scientific inquiry was to gain an understanding of the “natural laws” of bodily action. Through this process, it was expected that man would obtain mastery over Nature.

Before humans would be able to “control” Nature, it was first necessary to identify what “controls” the expression of a living organism. Western civilization has focused its attention on two mutually exclusive sources of this “control.” Control from without and control from within. These two discordant philosophies were first elaborated during the Golden Age of Greece. Plato divided humans into two parts: body and soul. Soul is generally regarded as an entity related to but distinguishable from the body—the spiritual part of human beings that animates their physical existence and survives death. The soul, often referred to as the psyche, spirit, or life force, represents an externalized vitalizing force that activates the human body.

In contrast, followers of Democritus, called atomists, believed that living organisms were “machine-like” structures made out of atoms. The character and quality of life was thought to be controlled by the interaction of the physical atoms that comprised the body. Atomists were “materialists” that believed life was controlled by the chemistry within. Consequently, atomists rejected all supernatural sanctions of human behaviour. Additionally, the atomists’ perception of a machine-like quality to life led to the concept of healing as representing a “mechanistic” process.

The debate over whether life is controlled by spiritual or material forces peaked in the nineteenth century. By this time, scientists endorsing “spiritual” control began to refer to themselves as “vitalists.” Vitalism, according to the Merriam-Webster dictionary, is the doctrine that the processes of life are not explainable by the laws of physics and chemistry alone and that life is in some part self-determining. Vitalists contended that some vital factor, as distinct from physiochemical factors, was involved with “controlling” the body’s structure and function. Since the definition of vitalism emphasizes that its character is beyond the laws of physics (measurement), vitalistic mechanisms were outside of the defined parameters of modern science. In spite of its metaphysical nature, vitalism was still endorsed by many traditional nineteenth century scientists.

The support for vitalism was soundly shaken in 1859 when Charles Darwin published his Origin of Species. In his treatise on evolution theory, Darwin emphasized that internalized “hereditary factors” (the existence of genes had not yet been recognized) were responsible for controlling the character of evolving species. Within a decade of its presentation, Darwinian theory was endorsed by the majority of conventional scientists. Darwin’s theory of evolution denied the role of spirit or life force in the unfoldment of life on this planet. Consequently, scientists myopically focused on the search for the internalized material elements that “controlled” biological organisms.

D. D. Palmer was very sensitive to scientists' displeasure concerning concepts related to spirit and vital forces. In formulating the original science of Chiropractic, he coined the terms Universal Intelligence and Innate Intelligence to refer to the inherent organizing intelligence of the Universe and of life.

"In the early years of Chiropractic I used the terms Innate (Spirit), Innate Intelligence (Spiritual Intellect), Universal Intelligence (God) because they were comprehensive, and the world was not prepared to receive the latter terms just mentioned in parentheses. It may be even now premature to use them." (page 542, The Science, Art and Philosophy of Chiropractic, 1910).

Since vitalism is at the heart of chiropractic philosophy, and vitalism is perceived as metaphysics, the philosophy of chiropractic is not recognized by conventional medical science. Though modern medicine considers chiropractic as "unscientific," it has not been able to ignore the large number of their patients that have been increasingly satisfied with chiropractic care. The success of Chiropractic in recent years has fuelled the antagonism between conventional medical physicians and chiropractors. Biomedical research scientists are at a loss to explain the efficacy of chiropractic adjustment for it is in direct opposition to contemporary knowledge concerning biological "control" mechanisms.

Ever since the nature of DNA had been revealed, biomedical science has been grounded in the belief that the structure, function and health of an organism is directly or indirectly regulated by its genes. This has led to the concept of the Primacy of DNA, the belief that our physical and behavioural traits are controlled by genes. Scientists took a leap to the next level and subsequently evolved the idea of genetic determinism, the notion that our health and fate are "predetermined" in our heredity. Consequently, the fact that an "externalized" chiropractic adjustment can alter the expression of the system flies in the face of conventional medicine.

A principal source of dissension between practitioners of allopathic medicine and chiropractic is evident when one examines how each practice perceives the flow of information in living systems. The schema for allopathic medicine is as follows: Genes represent the internalized source of control; gene-mediated cell expression of peripheral tissues and organs is relayed internally to the spinal cord. That information is then sent up the cord to the brain. Essentially this path can be described as Outside>Inside> (from) Down> (to) Above (O-I-D-A).

In contrast, the basic philosophy of Chiropractic, as defined by D. D. Palmer (before its modification by B. J. Palmer), perceives the flow of information from an externalized source, Universal Intelligence. An eternal "metamerized" portion of that intelligence, referred to as Innate, is needed by each individualized being (pages 494 and 496, The Science, Art and Philosophy of Chiropractic, 1910). Although Innate is not localized, its seat of control is the brain. From the brain, Innate's intelligence travels down the spinal cord, and from the spinal cord outward to the periphery, a pathway referred to as Above>Down>Inside>Out (A-D-I-O).

The crux of the controversy lies in the philosophical foundation of each practice. The A-D-I-O principle of Chiropractic is diametrically opposed to the O-I-D-A principle in medicine. By virtue of "might makes right," the populous membership of conventional science acknowledges its certitude in its dogma and disavows the beliefs of the smaller group of chiropractors.

However, profound philosophical changes are in the air. Leading edge research in cellular and molecular biology is currently offering a radically new understanding of the mechanisms that "control" life and evolution. These new findings will inevitably integrate and unify the truths of both biomedical scientists and chiropractors.

Conventional medical research has emphasized that genes are the responsible elements "controlling" health and disease. It is implied in the Primacy of DNA dogma that genes function as self-regulatory elements. Fundamental to this assumed truth is the requirement that genes must be capable of "controlling" their own expression. By definition, genes must be able to switch themselves on and off, as suggested in the concept of a cancer gene "turning itself on."

However, the notion of the Primacy of DNA has been soundly challenged by current research which reveals that the existence of a self-regulatory property for genes is a patently incorrect assumption. An important article by H. F. Nijhout[1] describes how concepts concerning genetic "controls" and "programs" were originally conceived as a metaphor to help define and direct avenues of research. Widespread repetition of this compelling hypothesis over time has resulted in the "metaphor of the model" becoming the "truth of the mechanism," despite the absence of substantiative supporting evidence.

Nijhout[1] elegantly and succinctly redefined the truth as follows, "When a gene product is needed, a signal from its environment, not a self-emergent property of the gene itself, activates expression of that gene (emphasis mine)." Simply stated, a gene cannot turn itself on or off; it is dependent upon a signal from its environment to control its expression. Genes are indeed involved with the structure and behaviour of an organism; however they are not the source of "control."

Gene expression is under the influence of specialized proteins referred to as regulatory proteins. Regulatory proteins bind to DNA and mask the activity of genes. In order to activate a specific gene, its regulatory proteins must be removed from the DNA strand. The binding and release of DNA regulatory proteins is controlled by "environmental" signals. Rather than recognizing the Primacy of DNA, it is more correct to acknowledge the Primacy of the Environment as causal in shaping biological expression.

The fact that the cell's nucleus and its enclosed genes do not represent the controlling element or "brain" of the cell is easily verified in studies wherein the cell is structurally or functionally enucleated. Cells in such experiments continue to express complex behavioural repertoires and purposeful interactions with their environment and may survive for months despite the absence of functional genes. Consequently, genes cannot be invoked to be the source of "control" in regulating cell behaviour.

Even though genes are not self-regulating, they do encode the characteristics of our physical body. All of our genes are derived from parental DNA; therefore it could still be argued that our expression (physiology, health, behaviour) is "predetermined" by our genetic heritage. Even that assumption has now gone by the wayside. In 1988, geneticist John Cairns[2] published what has since become a revolutionary paper entitled On the Origin of Mutants. Cairns recognized that gene mutations were not solely the result of random chemical events as is currently perceived.

Cairns placed bacteria, possessing a defective gene for the enzyme lactase, in Petri dishes that contained only lactose as a food source. The mutant bacteria were not able to metabolize the substrate. After a short period, the stressed, non-replicating bacteria began to thrive and proliferate. Upon examination, it was found that the bacteria specifically mutated the unresponsive lactase gene and repaired its function. Cairns' research revealed that, in response to environmental stresses, organism's can actively induce genetic mutations in selected genes in an effort to survive. These mutations would represent mechanical "adaptations" that are induced by the organism's response to life experiences.[2]

Though Cairns' results have been vehemently challenged by traditionalists, a molecular mechanism accounting for his observations was substantiated by Harris, et al.,[3] in a paper entitled Recombination in Adaptive Mutation. This latter publication revealed that organisms, as primitive as bacteria, contain "genetic engineering genes." This newly identified class of genes can be actively accessed by the organism to selectively mutate existing genes. Through successful "adaptive" mutations of selected genes, organisms are able to create new proteins, whose altered structures or functions may afford a better opportunity in surviving stressful environments.

Based upon this new perspective, David Thaler[4] published an important revisionist article entitled The Evolution of Genetic Intelligence. Thaler's new perspective recognizes that biological expression is actively defined by the individual's perception of their life experiences. Thaler emphasizes the significance of perception, not only in its ability to regulate the body's expression by dynamically switching gene programs, but also in its ability to induce the "rewriting" of existing gene programs in order to better adapt to environmental stresses.

When put into perspective, the newly emerging view of conventional biomedicine reveals a profound change in fundamental beliefs. The Primacy of DNA is giving way to the Primacy of the Environment. Essentially, conventional science has shifted the source of intelligent control from the internalized genes to the externalized environmental "signals." These regulatory "environmental" signals appear to be, in part, related to D. D. Palmer's concept of Universal and Innate Intelligence.

In addition, it has been demonstrated that in response to life experiences, the organism may actively alter "Innate" gene programs as a means of mechanical adaptation to perceived environmental conditions. When perception of the environment is biased by the "educated" brain, then "educated" may bother or worry Innate by selecting inappropriate gene programs and producing dis-ease. Conventional medicine is now recognizing that "educated" may also induce a rewriting (mutation) of Innate programs. Consequently, a perceptual bias by "educated" may lead to genetic dysfunction and cancer.

There is clearly an upheaval of conventional thought brewing in the allopathic ranks. The interesting nature of these new considerations is that it is bringing conventional biomedicine into closer alliance with D. D. Palmer's original Chiropractic Philosophy. The uniqueness of chiropractic is that it has a vitalistic foundation. Leading edge cellular and molecular research is now proving that Chiropractic should embrace and promote its vitalistic roots.

The chiropractic philosophy of D. D. Palmer provided an understanding of the principles employed in his healing art. Palmer declared that life's vital functions were "controlled" by Innate Intelligence, which was under the guidance of an eternal Innate (spirit). He further defined Educated as an "intelligence" that is acquired through one's life experiences. Educated provides Innate with an awareness of the body's environment and in the process, it serves to "keep, fix, and adjust the skeletal frame…" in an ever changing environment.

The perceptions acquired by Educated represent one's "beliefs," and these beliefs guide the behaviour of Innate. According to Palmer, "The Educated impresses its thoughts upon Innate, directing its functions more or less." If learning experiences are fraught with errors and misperceptions, then Educated would inadvertently misdirect the activities of all-knowing Innate. Palmer stated that "Educated bothers and worries Innate when trying to direct that of which Innate knows far more of than Educated will ever know." He was referring to the fact that misperceptions in the Educated mind would cause dis-ease if the Innate was misinformed. Palmer further asserted that Auto-suggestion, the process of "self-talk" by Educated, represented one of the primary causes of dis-ease.

D. D. Palmer was expelled from the Palmer School of Chiropractic eleven years after he founded the science. His chiropractic philosophy was subsequently altered, removing the concept of "spirit" from Innate and eliminating Auto-suggestion, the role of mind over matter, as a cause of dis-ease. These notions, considered too metaphysical or religious, were eliminated in an effort to make Chiropractic more "scientific," more acceptable to the "conventional" world.

Over the last eighty years, the profession has experienced an undercurrent effort to align chiropractic with allopathic science, for biologists have obviously made great strides in understanding the mechanisms of life. Currently, conventional biology recognizes that the physical character and behaviour of an organism is defined by its protein building blocks. Since the nature of proteins is "programmed" in DNA, medical science recognizes the following hierarchy in regard to information flow in living systems: DNA>RNA>Protein. Based upon this flow, contemporary biomedical thought is preoccupied with the concept of genetic determinism, the belief that an organism's expression is primarily under the "control" of its genes.

As we approach the new millennium, leading edge cell research now reveals a profoundly different story. The primary difference concerns the fact that genes are not self-emergent. This means that genes are unable to turn "themselves" on and off, genes cannot "control" their own expression. Obviously, this challenges the concept that genes "determine" our character.

How then are genes controlled? Within the cell's nucleus, DNA (gene) molecules are ensheathed within a layer of regulatory proteins. Concealed (i.e., protein-encased) genes are inactive. Removing the protein "sleeve" exposes the gene and allows for its activation. The binding and release of regulatory protein is controlled by "environmental signals. " Consequently, active "control" of cell expression is in the hands of the environment and is not in the domain of the genes.

In contrast to genetic regulation, the "revised" version of information flow reveals that environment represents the prime source of control:

Environment>Regulatory Protein>DNA>RNA>Protein

The processing of environmental information and its translation into biological behaviour is carried out by the cell membrane, the "skin" of the cell. The membrane separates the external non-self environment from the internal self, the cytoplasm.

The cell's input devices are the protein receptors which extend from both of the cell membrane's surfaces. Receptors facing inwards "read" the status of the cytoplasm's environmental conditions. These receptors receive information concerning cytoplasmic pH, salt balance, membrane potential, the availability of metabolites and energy molecules and other parameters related to the cell's physiology. Protein receptors displayed on the outer surface of the membrane provide the cell with awareness of the external environment. Cells use information derived from external receptors to "navigate" through their world. Internal membrane receptors are concerned with visceral needs; externally deployed receptors primarily regulate somatic behaviours. Consequently, information of the external environmental profoundly influences the cell's cytoskeleton and behaviour.

In order to process the environmental information (i.e., convert signals into biological responses) "activated" receptors couple with complementary effector proteins. The activity of membrane effector proteins, which include ion channels, enzymes and components of the cytoskeleton, is controlled by receptor proteins. The output behaviour is mediated by activated effector proteins. Effector proteins primarily serve as "switches" or "second messengers" that turn on or off more complex protein pathways deployed within the cell. Effector proteins regulate cytoplasmic pathways, which include motility, digestion, excretion, and respiration among others.

The memory system of the cell, the genes, is also controlled by the membrane. Sometimes cells receive environmental signals necessitating specific responses however the cell may not have the necessary proteins in the cytoplasm to enact the required behaviour. In this case, activated receptor-effector protein complexes are able to target the regulatory proteins that mask specific genes. These membrane "messengers," known as transcription factors, alter the binding of regulatory proteins causing them to detach from the DNA, exposing specific genes that need to be read. This is how "environmental signals" control gene expression. As the cell experiences new environments, it is capable of dynamically adjusting its genetic readout to accommodate any environmental exigencies. Consequently, the structural and behavioural expression of the cell is a reflection of the organism's environment.

The primal role of "environment" in controlling gene expression is revealed in recent studies of newly discovered stem cells. Stem cells, akin to multipotential embryonic cells, proliferate forming large colonies of undifferentiated cells. The developmental destiny of stem cell progeny can be experimentally "controlled" by regulating their environment. Environmental signals activate stem cell transcription factors, which in turn select specific gene programs controlling the differentiation of these cells. Genes are coded "programs" that enable the organism as an individual, and the species as a whole, to survive. Gene programs can be subdivided into two functional groups. One group, representing "growth" mechanisms, is expressly designed to provide for the physical construction and physiologic maintenance of the body. However, an organism possessing only "growth" mechanisms would most likely be called "food," and would soon become extinct. Environmental threats are managed by the second group of genes which code for "protection" programs. These genes provide for physical mechanisms and behaviours that are deployed in life-threatening situations.

Survival = Growth Programs + Protection Programs

Protection behaviours do not provide growth, and vice-versa. Both growth and protection behaviours require an energy expenditure on the part of the organism. An individual's ability to grow and reproduce is ultimately based upon the amount of energy available to support those processes. However, their ability to protect themselves is also dependent upon the same energy source. Organisms engaging in protection behaviours utilize energy from their reserves, leaving less energy for growth processes. Under extreme environmental stress, protection demands may deplete the energy budget to the extent that the organism dies from an inability to sustain normal metabolic functions. In simple economics, survival is inversely related to the need for protection. More protection equates to less growth.

Survival = Growth/Protection

Growth behaviours are associated with the character of attraction. Organisms are "attracted" toward elements of the environment that support their life (e.g., food, water, air and mates). In contrast, protective behaviours are most frequently associated with repulsion. Protection responses to threatening stimuli are characterized by a "posture" that reflects an avoidance reaction. Growth and protective behaviours can readily be distinguished by observing the cell's motility. Cells expressing growth move toward (attraction) life-sustaining environmental stimuli. In contrast, cells expressing protection move away from (repulsion) life-threatening stimuli. The behaviour of single-celled organisms appears "digital," they either move toward positive (+) stimuli or away from negative (-) stimuli.

Recent studies on molecular control mechanisms support this "digital" nature of regulating behaviour. It has been recognized that cells possess "gang" switches which collectively shunt growth pathways into protection behaviours in response to environmental stress.

Growth and protection appear to be mutually exclusive behaviours in single cells; a cell cannot be in growth and protection at the same time. Simply, a cell cannot move forwards and backwards simultaneously. The dynamic interaction between environmental signals and growth-protection genes evolved an "Innate Intelligence" which enabled cells to "read" environmental signals and invoke appropriate survival mechanisms. For the first three billion years of life, the Earth was inhabited by unicellular organisms that survived by employing individualized Innate Intelligence. Five hundred million years ago, single cells came together forming "colonies," wherein cells could collectively share awareness of their environment. More awareness increases an organism's chance at survival. The first communities were just "loose associations" of cells with all individuals expressing the same functions. At any time, a single cell could leave the colony, divide and start a new one on its own. Original cell colonies contained as few as four and up to several hundred participating cells. Multicellular communities necessitated a language of communication, for survival depends upon organization and coordination of community activities. In small groups of cells, coordinating communications consisted of the first neurotransmitters, as well as vibrational frequencies, that were freely exchanged among the close knit cells.

As communal intelligence mechanisms evolved, successful colonies could support larger cell populations. A point came wherein colonies were so physically large that it was inefficient for all cells to do the same "work." Larger communities began to subdivide survival-related labours among their population. This resulted in differentiation, a process wherein cells began to express specialized functions such as skin, bone, and nerve.

In physically large cell communities, most of the constituent cells are not in direct contact with the environment. Out of necessity, a subset of the cellular population became specialized in reading the environment and relaying their "perceptions" to cells internalized within the community. These information handling cells became the organism's nervous system. Today, individual cellular communities may be comprised of trillions of cells. For example, human beings represent a social community of from 50 to 70 trillion cellular citizens. Each human cell, like an amoeba, is a free-living entity, possessing Innate Intelligence and capable of appropriately responding to its "local" (i.e., tissue-specific) environment. Through the action of the nervous system, each individual cell is also influenced by a much larger environment, that experienced by the whole organism. Your liver cell knows what's going on in your liver, but through the nervous system, it also aware of what's going on in your job or in your relationships.

As illustrated, the cells receive environmental signals via the central nervous system. In truth, the cells receive a "perception" of the environment as interpreted by the Educated brain.

Our nervous system tabulates approximately four billion environmental signals per second. Its primary role is to "read" the environment and make appropriate adjustments of growth and protection behaviours in order to ensure survival. Memory systems evolved to facilitate information handling by storing previously "learned" experiences. Memories, which represent perceptions, are scored on the basis of whether they support growth or require a protection response. In chiropractic philosophy, these learned perceptions constitute the Educated Intellect, which is by evolutionary design, a derivative of the collective Innate Intelligence.

As described above, the switch between growth and protection behaviours in unicellular organisms is "digital." An individual cell moves either forward or backward. In organisms comprised of large numbers of cells, environmental signals can elicit a graded, "analogue" response, wherein some cells are in growth and others are in protection.

The more relevant a stimulus is to the organism's survival, the more polarized (either + or –) the resulting response. In humans, the extremes of the two polarities might appropriately be described as LOVE (+) and FEAR (-). Love fuels growth. In contrast, fear stunts growth. In fact, someone can literally be "scared to death."

Perception of environmental threats suppresses a cell's growth activities and causes it to modify its cytoskeletal in adopting a protection "posture." Suppressing growth mechanisms conserves valuable energy needed in exercising life-saving protection behaviours. In humans, a similar systemic switch functions to shut down our growth processes and prepares us for launching a protection response. This switching mechanism is represented by the Hypothalamus-Pituitary-Adrenal (HPA) axis. The brain's hypothalamus is instrumental in perceiving and assessing environmental signals. The perception of stress causes the hypothalamus to secrete corticotropin-releasing factor (CRF), which in turn, activates certain pituitary cells to release adrenocorticotropic hormone (ACTH) into the blood.

ACTH stimulates the adrenal gland to secrete adrenal hormones. These hormones constitute a "master switch" that regulates the systems growth-protection activity and routes vascular flow in preparation for "fight or flight" reactions. Firstly, adrenal hormones shunt blood from the viscera and redirect it toward the body's somatic tissues, which adopt a protective posture. Reduced blood flow to the viscera, by definition, implies a suppression of growth-related behaviours.

Secondly, adrenal hormones directly inhibit the action of the immune system, the internal "protection" mechanism.

The adrenal system's function is to protect the body from threats it perceives in the external environment. Adrenal suppression of the high budget immune system makes more energy available to the somatic system. Consequently, the more stress one experiences, the more susceptible they will be to dis-ease.

Adrenal hormones also reroute brain blood flow by constricting forebrain blood vessels and dilating hindbrain vessels. Fight or flight situations are more successfully handled using hindbrain-mediated reflex behaviours. Constriction of forebrain blood flow suppresses "logic" or "executive reasoning," since slower thinking responses ultimately jeopardize fight-flight reactions. Have you ever experienced a loss of intelligence in response to adrenal-mediated "exam stress?" Collectively, HPA stress suppresses visceral-mediated growth, inhibits the immune system and stunts intelligence. The degree of expression of these influences is directly related to the level of perceived stress. The more stress, the less growth. The interference with growth due to chronic stress leads to dis-ease, since the body is unable to adequately maintain its metabolic vitality. In conclusion, conventional allopathic medicine is now beginning to realize that genetic expression, which influences the character of the body, is under the control of the environment. However, the growth or protection posture of an individual's tissues and organs is mediated by the nervous system's perception of its environment. Perceptions are beliefs. Misperceptions can inappropriately increase or decrease physiologic mechanisms and produce dis-ease. The role of perception and mind is now becoming a point of focus in allopathic healthcare, as they try to unravel the mysteries of the placebo effect and the role of pyschosomatic stress.

The power of perceptions or beliefs in promoting health or disease was originally recognized by D. D. Palmer. In chiropractic, perceptions constitute the Educated, and it is this Educated that so worries and bothers Innate. He wrote, "The determining causes of dis-ease are traumatism, poison and auto-suggestion", about 95% of the source of dis-ease ie trauma, toxins and thoughts (physical, chemical and mental/emotional stressors or signals)." The educated mind getting in the way of the innate mind is what causes the Subluxation.

Auto-suggestion (personal beliefs, self-talk) produces "auto-traumatic action directed to any organ or portion of the body, thereby modifying bodily functions, exciting or relieving morbid conditions by mental processes independently of external influence."

When Educated perceives an environmental stress, it will signal the requirement for a protection response. Protection behaviours, mediated by the somatic nervous system will adjust the spine to provide a defensive posture. Consider the relationship between a powerful alpha-male dog and a dog of lesser rank. The latter will acquire a protective submissive posture, lowered head and body, in order to avoid inciting the wrath of the alpha-male. After holding this posture for a long time (i.e., a chronic protection response), the dog's spine will acquire obvious subluxations that would adversely impact its health. A spinal adjustment would alleviate these subluxations. However, if the dog returns to the same environment, it will continue to perceive a need for a protection posture. Under such circumstances, the dog's Educated mind will employ auto-suggestion mechanisms that will return the spine to its subluxated condition. In addition to the adjustment, the dog will need to either alter its environment (signal) or alter its perceptions, in order to remain free of dis-ease.

Summary

1. Conventional allopathy is based on Newtonian Physics, on materialism and reductionism where anything allopathic is scientific and true and everything else is perceived as being metaphysical and questionable.
2. Healing actually occurs through the field, through energy and entanglement of those energy fields
3. Matter and field together make structure.
4. The 'Field'(mind) is the sole governing agency of the particle (body) – Albert Einstein
5. Signal (environmental intelligence/signal) plus protein (matter) generates behaviour (force)
6. Vitalism is primal – the signal comes from above, down into the cell, causes genetic expression (inside) and an external reaction or behaviour (out) – Above/Down/Inside/Out
7. Vitalism involves environmental signals (trauma/toxins/thoughts) perceived by the brain – the mind causes the brain to react to the environment and to change behaviour through changing blood chemistry.
8. The VSC distorts the signal.

As Palmer suggests, the chiropractor needs to seriously consider the role of auto-suggestion in the healing process. While adjustments alone can alleviate subluxations, problems generated by an erring Educated, may require the need for "re-education" as a means of reversing dis-ease producing beliefs. In 1907, chiropractors rejected D. D. Palmer's philosophy as being too religious or metaphysical. In an effort to present themselves in a more "scientific" light, the profession has been gradually moving toward allopathic science for the last ninety years. Interestingly, allopaths have now begun to realize Palmer's truths.

The philosophical concepts of Chiropractic in regard to emphasizing the signal and distortions of the signal or the VSC over the conventional focus on defects in the physical mechanism are more in line with current science than the vision pursued by 'evidence-based' Chiropractors, Chiropractic institutions and allopathic practitioners. Quantum biophysics fully endorses the concepts of 'vitalism' and subluxations (as representing an 'interference' in consciousness). Sadly, if things continue as they are, allopaths may soon be practicing more in line with 'Chiropractic' than Chiropractors!

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The Vertebral Subluxation Complex is the chiropractic profession's unique contribution to the healthcare system.

Several articles have recently appeared in both the chiropractic trade press and peer-reviewed journals questioning the very existence of vertebral subluxations.[1,2] Several clinical practice guidelines or "best practices" documents have addressed vertebral subluxation and reviewed the scientific literature supporting objective assessment of vertebral subluxation.[44-46] All major chiropractic organizations including the ACA, ICA and WFC have accepted the Association of Chiropractic Colleges Paradigm,[1] which adopted the following statement concerning subluxation:

"Chiropractic is concerned with the preservation and restoration of health, and focuses particular attention on the subluxation. A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health. A subluxation is evaluated, diagnosed, and managed through the use of chiropractic procedures based on the best available rational and empirical evidence."

An overwhelming majority of chiropractors accept the term and the concept. Smith and Carber[6] noted that more than 70 percent of chiropractors surveyed report that subluxation is important to their clinical decisions and guides their clinical care of patients. McDonald, et al.,[7] reported that more than 88 percent of their surveyed chiropractors favour retaining the term vertebral *subluxation complex*.

By bantering about terms such as *integration* and *evidence-based practice*, members of a fringe element have achieved a degree of success in hijacking some colleges and political organizations in an apparent attempt to pander to politics and fit into the medical system.

There is an organization known as the Flat Earth Society[8] whose members stubbornly choose to ignore the overwhelming evidence contrary to their position and deny the spherical nature of the Earth. Ironically, they use Internet technology to propagate this belief. Apparently the Flat-Earth folks have no problem using orbiting communications satellites to spread the word. The subluxation deniers would fit in splendidly. Again, dogma over data.

What of the notion that DCs should abandon subluxation and the traditional philosophy of chiropractic? The fundamental issues are simple: Are we a profession with a clearly defined mission or are we a profession simply seeking some niche which offers access to a slice of the health care pie? Are we driven by principles or politics? Does our mission statement define our political position or do we grovel to get whatever crumbs are tossed our way? Do we have an identity defined by our purpose or are we chameleons who change our colours to blend into the existing environment?

Medical anthropologist EA Morinis[9] wrote, "Only the chiropractic philosophy significantly distinguishes the chiropractic practitioner. And yet the philosophy is kept hidden away. It has done so in fear of being labelled quackery, and this was undoubtedly a good strategy to follow at one time. The public knows next to nothing of [the] chiropractic philosophy of healing and its mechanisms: If hospitals offer spinal manipulation, a chiropractor offers nothing else. This distortion of the chiropractic tradition can only be overcome by a re-evaluation of the place of theory in chiropractic. ... Dispossessed of its philosophy, chiropractic is dispossessed of its uniqueness, and perhaps its future."

Physiologist I.M. Korr[10] admonished the osteopathic profession to hold fast to its principles: "There are misapprehensions about the source of your strength. Your profession appears to believe that its strength is to be found more in the stamps of approval by self-appointed magistrates of medicine. ... As a result, you often act as though you believed your strength is to be nurtured by mimicry, by cloaks of protective coloration, by compromise of principles, by organized compliance, by appeasement, and by adaptation to what is prescribed for you by organizations of another profession. ... Recent events loudly proclaim the futility of this approach." Korr[11] also stated, "I think we need, in some way, to re-infuse into the profession an appreciation of the immensity of the idea, of the profession's responsibility to it, and of the vast opportunities to serve it."

If this profession is to remain distinct, we must retain an identity and live by our own terms, techniques and results. It is up to others to come to understand, investigate and accept our substantiated concepts and terms. If we do not have these terms, we do not have Chiropractic – we have a profession by another name that has adopted other professions' terminology. Can we claim to be different and unique if we use different procedures and different concepts but not different terminology? If we are not going to use Chiropractic terms then we might as well call ourselves something else – either we are a distinct profession or we are not. Our techniques, rationale, concepts and results would be indistinguishable from other professions.

What is certain is that is trying to move the profession from its vitalistic roots to a reductionistic mechanistic standpoint is not only denying the philosophical tenet of Chiropractic but is increasingly being shown to be non-scientific. Without philosophy and science in Chiropractic, what do we have? The vertebral Subluxation complex incorporates the philosophy of Chiropractic as a healing art but just as importantly can be incorporated into the quantum biophysics understanding of healing, repair and dysfunction or dis-ease.

We must make sure everyone understands vertebral subluxation, wellness, and our unique approach to unleashing human potential or the Chiropractic profession as we know it could die with barely a whimper.

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Appendix 1

Advice note for Chiropractors from the CAP Team

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Committee of Advertising Practice
(Non-broadcast)

Help Note on Substantiation for Health, Beauty and Slimming Claims

CAP Help Notes offer guidance for non-broadcast marketing communications under the British Code of Advertising, Sales Promotions and Direct Marketing (the CAP Code). For advice on the rules for TV or radio commercials, contact Clearcast www.clearcast.co.uk for TV ads or the RACC www.racc.co.uk for radio ads.

Background

These guidelines, drawn up by the Copy Advice team, are intended to help marketers, agencies and media interpret the rules in the British Code of Advertising, Sales Promotion and Direct Marketing as far as they relate to the subject discussed. They are based on past ASA cases and neither constitute new rules nor bind the ASA Council in the event of a complaint about a marketing communication that follows them.

The Code states:

> "Medical and scientific claims made about beauty and health-related products should be backed by evidence, where appropriate consisting of trials conducted on people. Substantiation will be assessed by the ASA on the basis of available scientific knowledge" (**Clause 50.1**);
>
> "Any claims made for the effectiveness or action of a weight reduction method or product should be backed where appropriate by rigorous trials on people…" (**Clause 51.1**);
>
> "The adequacy of evidence will be judged on whether it supports both the detailed claims and the overall impression created by the marketing communication" (**Clause 3.1**); and

"If there is a significant division of informed opinion about any claims made in a marketing communication they should not be portrayed as universally agreed" (**Clause 3.2**).

Three types of health, beauty and slimming claims are made for products (or services): sensory or impressionistic subjective claims; uncontroversial or established objective claims; and "new" objective claims.

1. Sensory/impressionistic subjective claims

Claims that cannot be proved objectively, such as "no other shower gel leaves you feeling fresher", might be understood to be opinion or might only require satisfactory consumer research to back them up.

2. Uncontroversial/established objective claims

These might constitute satisfactory proof for uncontroversial/established claims:

2.1 A clear and concise account of the physiological effect of a product on the intended subjects, perhaps supported by an expert opinion (provided this reflects general scientific opinion, i.e. is accepted, or likely to be accepted, by most relevant experts);

2.2 Information contained in authoritative reports, reputable guidelines or other published material that represents or reflects general scientific opinion. For example, in relation to health and slimming claims, reports published by COMA, the Food Advisory Committee, CODEX, and the Scientific Committee for Foods; and in relation to beauty claims, reports published by the Journal of the Society of Cosmetic Chemists, the British Journal of Dermatology and the Journal of Investigative Dermatology.

3. "New" objective claims

For "new" or "breakthrough" claims, sound data, relevant to the claim made, should be collated to form a body of evidence. The "totality" of this evidence is important; marketers should not ignore sound data that does not support the "new" claim. There are now generally recognised ways of collating existing data (where it is not immediately available) by conducting a systematic review of all available scientific evidence and evaluating it for its relevance (e.g. by using standardised data extraction procedures and electronic databases).

3.1 evidence for health and slimming claims

A body of evidence might consist of one or more of these categories (though read 3.3 and 3.4 as well):

3.1.1 experimental human studies in which an "intervention" group (or groups) of human subjects uses the product under examination and a "control" group uses a control, with neither subjects (single-blind) nor researchers taking the measurements (double-blind) knowing which subjects are in which group (sometimes referred to as clinical studies or placebo-controlled trials);

3.1.2 observational human studies in which a group or groups of people are studied in their environment (sometimes called epidemiological studies);

3.1.3 an appropriate expert's extrapolation of relevant findings from seemingly irrelevant human studies (e.g. where a product's proven effect on ill people provides the basis of proving the proposed effect on those healthy people that the marketers wish to target);

3.1.4 studies without human subjects (e.g. biochemical, cellular or animal studies);

3.1.5 before and after studies with little or no control;

3.1.6 self-assessment studies (to support objective statements that can be ascertained only by consumer observation);

3.1.7 published and unpublished literature (perhaps supporting the rationale behind a claim);

3.1.8 anecdotal evidence such as testimonials and endorsements.

3.2 evidence for beauty claims

A body of evidence might consist of one or more of these categories (though read 3.3 and 3.4 as well):

3.2.1 experimental human studies;

3.2.2 within-subject comparisons of treated and untreated sites;

3.2.3 studies without human subjects;

3.2.4 before and after studies with little or no control;

3.2.5 self-assessment studies;

3.2.6 published and unpublished literature;

3.2.7 anecdotal evidence.

3.3 quality of data

The body of evidence should normally include at least one adequately controlled experimental human study but an adequately controlled observational human study might be sufficient in some circumstances. To consider acceptable a body of evidence that does not include at least one adequately controlled experimental human study, the ASA's or CAP's experts will usually need to be convinced of the soundness of the data provided and the futility or impracticality of commissioning an experimental human study. Before and after studies with little or no control, studies without human subjects, self-assessment studies, published and unpublished literature and anecdotal evidence are unlikely to be considered acceptable as sole support

for a “new” claim relating to physiological action in humans (though in vitro studies may provide sole support for inherent activity, e.g. anti-oxidant action).

Sound individual studies should:

3.3.1 follow a recognised methodology (see 3.1.1) that controls both for the “placebo” effect and for other factors unconnected with the proposed action of the product (e.g. effects brought about by the way in which a medical device is used or a cream is applied). The most reliable method of allocating subjects to different groups in experimental human studies is by random allocation (“randomised” studies). Reliability can also normally be gained by incorporating a “cross-over” element (the subjects in the two groups swap with each other after a sufficient period in their respective groups and with a sufficient period of “rest” in between). Similarly, some designs for observational human studies are more reliable than others; for example, studies that are planned in advance and undertaken prospectively are less likely to be biased than studies carried out retrospectively. The validity of data, however, depends not only on the protocol of the study but also on how well the study was designed, carried out and analysed;

3.3.2 be large enough to demonstrate the proposed effect. A desirable size for a study can be assessed using standard statistical formulae (though meta-analysis, the pooling of results from several studies, might allow valid conclusions to be drawn from two or more small studies);

3.3.3 normally be carried out on a representative cross-section of a population similar to that of the UK or on a representative sample of the sector of the population at which the product is targeted (though see 3.1.3);

3.3.4 involve the intervention group consuming, applying or using a reasonable and, as far as possible, quantified amount of the product at a reasonable frequency (this should reflect the normal usage proposed for the product);

3.3.5 where appropriate, be of sufficient duration to ensure that any beneficial effect is maintained over a reasonable period of time and is

not a short-term response to which the body or mind adjusts. A follow up period might also be needed depending on the nature of the effect studied;

3.3.6 where appropriate, take into account confounding factors (e.g. smoking) and other relevant variables;

3.3.7 produce statistically, and physiologically, significant results by tests selected before the studies began;

3.4 credibility of data

If studies have not been published in reputable, peer-reviewed journals (and indeed studies often have not), an objective review should be carried out by a suitably qualified individual possessing relevant expertise before the data is submitted to the ASA or CAP.

3.5 submitting data

Where possible, the body of evidence should be provided in a clearly set out indexed dossier. This might include:

3.5.1 the “new” or “breakthrough” claims to be supported;

3.5.2 the composition of the product and an explanation of how it works;

3.5.3 precise details of who might benefit and why;

3.5.4 the quantity of product consumed, applied or used and its frequency of use;

3.5.5 the preferred experimental human studies (ideally, with greater emphasis given to those that have been published or subjected to assessment by a suitably qualified expert). If several studies are provided to back up several claims, it should be clear which study supports which claim;

3.5.6 data supporting the experimental human studies (e.g. observational, cellular, animal and self-assessment studies);

3.5.7 anecdotal evidence.

Matters of opinion

Marketers who do not hold satisfactory evidence of the purported qualities of their product can ask the CAP Copy Advice team for help in devising an acceptable marketing platform. This might involve the marketers giving their opinion on the desirability of their product, though they must clearly be expressing their opinion and not stating fact. Claims that go beyond subjective opinions are subject to the Code' rules on substantiation.

Division of opinion

If informed opinion about the acceptability of a "new" claim is divided, the claim should not be portrayed as universally agreed. Such a claim might be acceptable if prefixed by "some experts believe…", or similar. To confirm that a division of informed opinion exists, documentary evidence, perhaps in the form of published articles, conference minutes, studies or published correspondence, should be provided. This should show that the acceptability of the "new" claim is under debate, with a reasonable number of suitably qualified, competent experts believing it to have been adequately supported.

Guidance

Information about recognised methodology for studies to support health and slimming claims can be sought from those medical journals that review papers for publication. Marketers wishing to support beauty claims may wish to consult the European Cosmetic, Toiletry and Perfumery Association (COLIPA) Guidelines for the Evaluation of the Efficacy of Cosmetic Products. Please note that the COLIPA Guidelines endorse the use of some tests, most notably the consumer self-assessment test, that are unlikely to be considered by the ASA's or CAP's experts as satisfactory sole supporting data for proving "new" claims.

Advice on specific marketing communications is available from the Copy Advice team by telephone on 020 7492 2100, by fax on 020 7404 3404 or by email on copyadvice@cap.org.uk. The CAP website at www.cap.org.uk contains a full list of Help Notes as well as access to the AdviceOnline database, which has links through to relevant Code rules and ASA adjudications.

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Appendix 2

Research supporting the existence of a nexus between VSC (or synonym) and health – Somato-Autonomic Papers Part 1

References to Dr Peter Rome's
NEUROVERTEBRAL INFLUENCE UPON THE AUTONOMIC NERVOUS SYSTEM: SOME OF THE SOMATO-AUTONOMIC EVIDENCE TO DATE -
Chiropractic Journal Of Australia. 2009;39 (1):2-17

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Appendix 3

Research supporting the existence of a nexus between VSC (or synonym) and health – Somato-Autonomic Papers Part 2

Rome PL. **Neurovertebral influence on visceral and ANS function: some of the evidence to date - Part II: Somatovisceral.** Chiropr J Aust 2010;40(1):9-33.

APPENDIX C (This is the complete version of the abridged **Table 1**)

NEUROSPINAL RELATED VISCERAL CONDITIONS - NOMINATED ORGANIC CONDITION S

This table represents papers of interest to the manipulative sciences, they may involver the management of particular cases and do not necessarily involve spinal manipulation. Such management may involve dietary advice, exercise recommendations, life style changes and weight loss recommendations.

PRIMARY AUTHOR	SPECIFIED CONDITION	JOURNAL	YEAR
CARDIOVASCULAR SYSTEM			
ANGINA – CHIROPRACTIC			
Christensen HW, et al	Angina pectoris (1)	JMPT	2005 [78]
Christensen HW et al	Angina pectoris (2)	JMPT	2005 [79]
Kumarathurai P, et al	Angina pectoris	JMPT	2008[80]
CONGESTIVE HEART FAILURE			
Osterhouse MD, et al.	Symptom/multidisciplinary management	JMPT	2005 [81]
CIRCULATORY - CHIROPRACTIC			
Budgell B, Sato A.	Regional circulation, cervical VSC	JMPT	1997 [82]
Dudley WN	Cranial circulation/ cervical adjustment	J Am Chiropr Assoc	1996 [83]
Harris W, Wagnon RJ	SMT/Peripheral circulation	JMPT	1987 [84]
Knutson GA	Intracranial hypotension/headache	JMPT	2006 [85]
Weston JP	Abdominal aortic aneurysm	J Can Chiropr Assoc	1995 [86]
HEART PHYSIOLOGY -CHIROPRACTIC			
Bhuta K, et al	Sensory afferents/pericardium	Int'l Conf	2002 [87]
Budgell B, Polus B.	Heart rate variability	JMPT	2006 [88]
Budgell B, Hirano F.	Heart rate variability/mechanoreceptors	Auton Neurosci	2001 [89]
Dimmick KR, Young MF, Newell D	Systolic Blood pressure	JMPT	2006 [90]
Driscoll MD et al	Autonomic activity/cardiovascular	JMPT	2000 [91]
Driscoll MD et al	Arterial tonometry	JMPT	1997 [92]
Freedman LJ	Premature ventricular contractions	Res Forum	1985 [93]
Igarashi Y et al	Arrhythmia/ECG	Chiropr J Aust	2000 [94]
Knutson GA	BP changes/spinal adjustment	JMPT	2001 [95]
Lott GS, et al	ECG/management/SMT	J Chiro Res Clin Inv	1990 [96]
McKnight ME, Deboer KF	.BP in normotensive subjects	JMPT	1988 [97]
Palmer BJ	ECG changes/1500 cases (Historical)	Dig Chiropr Econ	1991 [98]
Spano D, Darling P	Cardiac Instrumentation Tests	Chiropr Interprof Res	1982 [99]
Tran TA et al	Heart physiology	ACA J Chiropr	1977 [100]
Watanabe N, Polus B	BP changes – not rate & variability	CJA	2007 [1011]
Zhang J et al.	Heart rate variability/SMT	JMPT	2006 [102]

Zhang J	Heart Rate Variability	JMPT	2007 [103]
HYPERTENSION – CHIROPRACTIC			
Goodman R	Hypertension	J Chiro Res Clin Inv	1992 [104]
Nansel D et al	Blood pressure/heart rate/catecholamine	JMPT	1991 [105]
Osterbauer P, Fuhr A	Blood pressure/anxiety	JMPT	1991 [106]
Plaugher G	Hypertension	JMPT	2002 [107]
Plaugher G et al	Hypertensive	JMPT	1993 [108]
Thompson K et al	Normotensive BP	Europ J Chiropr	2002 [109]
Yates RG et al	Blood pressure and anxiety	JMPT	1988 [110]
CARDIOVASCULAR – MEDICAL			
ANGINA – MEDICAL			
Booth R et al	Cervical angina	Spine	1976 [111]
Eddicks S, et al	Thoracic spine/electrical stimulation/angina pectoris	Heart	2007 [112]
DeLandsheere C, et al	Spinal cord stimulation/electrical stiumulation	An J Cardiol	1992[113]
Lindahl O et al	Angina pectoris	Acta Med Scand	1981[114]
Rychlikova E	Ischemic heart disease	Int'l Fed Manip Med	1975 [115]
Rychlikova E	Ischemic heart disease.	Moncher Medizinische Wochenschrift	1975 [116]
CIRCULATORY – MEDICAL			
Figar S et al	Plethysmographic examination	Acta Neuroveg	1967 [117]
Figar S et al	Plethysmographic study	Acta Universitatis Carolinae	1965 [118]
HYPERTENSION – MEDICAL			
Bakris G, et al	Atlas vertebra/hypertension	J Human Hyperetension	2007 [119]
Fujimoto T et al	Heart rate and blood pressure	J Auton Nerv Syst	1999 [120]
Goertz CH, Grimm RH et al.	Hypertension/Alternative Therapies	J Hypertension	2002 [121]
HEART PHYSIOLOGY/PATHOPHYSIOL			
Ansara A	Pseudoheart disease	Clin Cardiol	1985 [122]
Boiardi A et al,	Cardiovascular reflexes/headache	Headache	1988 [123]
Chandler MJ, et al.	Cervical spine/cardiopulmonary	J Neurophysiol	2002 [124]
Gooch AS et al	Cardiac diagnosis	Am Heart J.	1967 [125]
Koch LE, Koch H	Heart rate/cervical spine	Forensic Sci Int	2002 [126]
Rychlikova E.	Vertebrocardial syndrome	Man.Med	1975 [127]
Sato A, Sato Y, Schmidt RF.	Somatosensory/cardiovascular.	In Blaustein MP. et al.	1997 [128]
HEART – CATHETERISTION			
McNamara ME, et al.	Nursing/back massage prior	Altern Ther	2003 [129]
CARDIOVASCULAR DISEASE-–	**OSTEOPATHIC**		
Beal MC, et al	Coronary artery disease	JAOA	1985 [130]
Beal MC.	Cardiovascular disease	JAOA	1983 [131]

Cox JM et al	Coronary artery disease	JAOA	1983 [132]
Howell RK, et al	Cardiopulmonary	JAOA	1973 [133]
Rogers FJ, et al	Post-surgical management	JAOA	1989 [134]
Strobl DJ, et al.	OMT/infarction.	JAOA	1981 [135]
CIRCULATORY – OSTEOPATHIC			
Karason AB, Drysdale IP	Cutaneous blood flow	JMPT	2003 [136]
Walko EJ, et al.	Pain/thermography/OMT	JAOA	1994 [137]
HEART PHYSIOLOGY – OSTEOPATHIC			
Burchett GD.	OMT/Cardiovascular function	JAOA	1984 [138]
Henley CE, et al	OMT/ANS/Heart Rate Variability	Osteop Med PrimaryCare	2008[64]
HYPERTENSION – OSTEOPATHIC			
Johnston WL, et al.	Hypertension	JAOA	1995 [139]
Johnston WL, et al.	Hypertension	JAOA	1995 [140]
Johnston WL, et al.	Hypertension	JAOA	2001 [141]
Morgan JP, et al	Hypertension	JAOA	1985 [142]
Spiegel AJ, et al	Hypertension	JAOA	2003 [143]
CARDIOVASCULAR – PHYSIOTHERAPY			
McGuiness J et al	SNS/Respiratory/cardiovascular function	Manual Ther	1997 [144]
Vicenzino B, et al.	Cardiovascular/respiratory changes	Manual Ther	1998 [145]
ENDOCRINE SYSTEM			
PANCREAS – CHIROPRACTIC			
Arbiloff B.	Hypoglycemia	J Clin Chiropr	1969 [146]
Nelson WA.	Diabetes mellitus	Chiropr Tech	1989 [147]
PANCREAS – OSTEOPATHIC			
Licciardona JC, et al	Diabetes/palpation	Osteop Med Prim	1998 [148]
Radjieski JM et l	Pancreatitis	JAOA	2007 [149]
ENDOCRINE – MEDICAL			
Sato A, Sato Y, Schmidt RF.	Somatosensory/hormonal.	In Blaustein MP. et al.	1997 [150]
THYROID – CHIROPRACTIC			
Gökpinar E, et al	Posture changes/Cervical spine/goitre	JMPT	1998 [151]
Sehnert KW, Croft AC.	Basal Metabolic Temp/Whiplash	JMPT	1996 [152]
EAR NOSE & THROAT			
CHIROPRACTIC			
Cowin R, et al.	Hearing deficit. Otalgia/Neck pain	Chiropr J Aust	2002 [153]
Di Duro JO.	Hearing improvement	Chiropr & Osteop	2006 [154]
Di Duro JO.	Vestibular migraine	Neurol Sci	2003 [155]
Fallon J.	Otitis media/332 cases	J Clin Chiro Paed	1997 [156]
Folweiler DS et al	Sinusitis	JMPT	1995 [157]
Froehle RM	Otitis media/earache	JMPT	1996 [158]
Fysh PN	Chronic recurrent Otitis Media	J Clin Chiro Pediatr	1998 [159]

Hendricks C	Otitis media	J Chiro Res Clin Inv	1989 [160]
Hobbs DA, et al	Chronic otitis media	ACA J Chiropr	1991 [161]
Kessinger RC et al	Vertigo, tinnitus, hearing deficit	JMPT	2000 [162]
Phillips N	Otitis media	J Chiro Res Clin Inv	1992 [163]
Sawyer CE et al	Otitis media	JMPT	1999 [164]
Snyder B, et al.	Otitis Media	Intern'l Conf	2002 [165]
Terrett AGJ	Hearing deficit	CJA	2002 [166]
Wood K.	Spasmodic Dysphonia	Proc Int Conf SMT	1990 [167]
Zerillo G, Lynch M	Oto-vestibular Study	Chiropr Interprof Res	1982 [168]

ENT – MEDICAL

Lewit K, et al	Tonsillitis	[Sb Lek]	1975 [169]
Mills MV, et al	Acute otitis media	Arch Pediatr Adolesc Med	2003 [170]
Seifert K	Otolaryngology	[Laryngorhinootologie]	1996 [171]
Wagner UA	Sudden deafness	Man Medizin	1998 [172]

ENT – OSTEOPATHIC

Degenhardt BF, et al.	Otitis Media/morbidity	JAOA	2006 [173]
Paul FA, Buser BR	Sinusitis (& asthma)	JAOA	1996 [174]
Ruddy TJ	Eye, ear, nose and throat disease.	AAO Yearbook	1962 [175]
Sept K.	Sinusitis & OMT	AAOJ	1998 [176]
Shrum KM et al	Sinusitis	JAOA	2001 [177]

GASTROINTESTINAL

BOWEL – CHIROPRACTIC

Arbiloff B.	Colitis	J Clin Chiropr	1968 [178]
Byrnes D.	Anal sphincter paralysis	A/Asian J Clin Chiropr	2000 [179]
Erikseti K.	Constipation	Chiro Res J	1994 [180]
Falk JW.	Bowel and bladder dysfunction	Chiropr Tech	1990 [181]
Wagner T, et al.	Irritable bowel	Chiropr Tech	1995 [182]

BOWEL – MEDICAL

Gania E, et al.	Fecal incontinence	Dis Colon Rectum	2001 [183]
Varma JS, et al	Anal sphincter/Colorectal motility	Br J Surg	1986 [184]

COLIC – CHIROPRACTIC

Klougart N et al	Infantile colic	JMPT	1989 [185]
Wiberg J et al	Infantile colic	JMPT	1999 [186]

COLIC – MEDICAL (NURSING)

Margolius FR	Infantile colic	Evid-Based Nursing	2000 [187]

GASTROINTESTINAL GENERAL

CHIROPRACTIC

Bryner P et al	Indigestion/Heartburn	JMPT	1996 [188]
DeBoer KF et al	Gastrointestinal myoelectric activity	Man Med	1988 [189]
Isabeau A	Gastric mucosa barrier	Conference Paper	1984 [190]

Pikalov AA et al	Duodenal ulcer	JMPT	1994 [191]
Pollard HP, et al	Ileocecal valve	Chiropr J Aust	2006 [192]
Rome PL.	Indigestion	Chiropr J Aust	2000 [193]
Wiles MR	Electrogastrogram	JMPT.	1989 [194]
Young MF, McCarthy PW, King S.	Dyspepsia	Eur J Gastroent Hepat	2009 [195]
GASTROINTESTINAL – MEDICAL			
Hep A, Dolina A, et al.	Peristalsis restoration/incl manual med	Hepatogastroenterology	2000 [196]
Krag E.	Dyspepsia/Abdominal pain	Scand J Gastroent	1982 [197]
Lewit K, et al	Peptic ulcer	In:Lewit K	1975 [198]
Miyakoshi N, et al	Kyphosis/Gastric reflux	Osteoporosis Int	2008 [199]
Rychlikova E, et al	Peptic ulcer	[Vnitr Lek]	1976 [200]
Sato A et al	Somatosensory/digestive	In: Blaustein MP	1997 [201]
GASTROINTESTINAL – OSTEOPATHIC			
Friedman MHF, et al	Gastrointestinal reflexes	JAOA	1979 [202]
GENERAL CATEGORY			
GENERAL – CHIROPRACTIC			
Budgell BS.	Visceral disorders/SMT	Chiropr J Aust	1999 [203]
Cameron K, Mierau D.	Stickler's syndrome	J Can Chiropr Assoc	1995 [204]
Coulter ID et al	Geriatric Health	Topics Clin Chiropr	1996 [205]
Garner MJ, et al	Muscleskeletal pain & health status	JMPT	2007 [206]
Goldstone AS, et al	Systemic Lupus Erythematosus	Chiropr Technique	1992 [207]
Haavik-Taylor H, Murphy B.	Cervical SMT/cortical somatosensory	Clin Neurophysiol	2007 [6]
Haldeman S.	Principles and practice	Text	2007 [208]
Hawk C, et al	"Non-musculoskeletal" complaints	JMPT	2001 [209]
Hoiriis KT et al	Cervical spine/ health status	Chiropr Res J	1998 [210]
Knutson GA.	Thermal asymmetry/scalenus anticus syndrome	JMPT	1997 [211]
Leach RA	General Discussion	In: Leach RA	1994 [8]
Leboeuf-Yde C et al	Non-musculoskeletal symptoms	JMPT	1999 [212]
Masarsky CS et al	Somatovisceral aspects	In: Masarsky C	2001 [31]
Plaugher G et al	General Discussion	In:Plaugher G.	1993 [213]
Smart LJ, Smith DL.	Posture/motion sickness	JMPT	2001 [214]
Van Breda WM & JM	Health status	J Chiropr Res	1989 [215]
Walsh MJ, Reece J,Donnoli F	Health status	Chiropr J Aust	2008 [216]
Wiles MR	Visceral disorders	In Gatterman M.	1990 [217]
Wilson BK.	Disease management	J Am Chiropr Assoc	1997 [218]
Zhang J, Snyder RJ.	SMT/electromagnetic field	JMPT	2005 [219]
PSORIATIC ARTHRITIS			
Lantz CA	Psoriatic arthritis	Proc Int Conf	1991 [220]
SUDOMOTOR – CHIROPRACTIC			
Nunno-Wiltsie LV	Hyperhidrosis	ICA Review	1997 [221]

GENERAL – MEDICAL

Daffner SD, et al	Neck & Arm Pain/General Health/Psychol	Spine	2003 [222]
Goldthwait JE, et al.	General health conditions/posture	In: Text	1952. [34]
Kado DM, et al.	Mortality/hyperkyphosis	J Am Geriatr Soc	2004 [223]
Kado DM, et al	Health status/hyperkyphosis	Ann Int Med	2007 [224]
Kouwenhoven J-WM, et al	Organ anatomy/vertebral rotation	Spine	2007 [225]
Kunert W	Internal organs	CIBA	1965 [226]
Lennon J, et al.	Posture/Respiration/ANS/Health	Am J Pain	1994 [227]
Lewit K.	Vertebrovisceral relations	In: Lewit K	1999 [71]
Maigne R.	General discussion	In: Maigne	1972 [72]
Miyakoshi N, et al	Posture/mobility/Quality of life	Osteoporosis Int	2003.[228]
O'Donovan D.	Scoliosis/General effects	Ann Allergy	1951 [229]
Schey WL.	Vertebral/somatovisceral abnormalities	Clin Radiol	1976 [56]
Schott GD.	Visceral afferents	Brain	1994 [230]
Sjöström H, et al	Postural stability (sway)/whiplash	Spine	2003 [231]
Stary O.	Vertebrogenic disease	Acta Univ Carolinae M	1965 [232]
Townsend EH et al	Health and disease	Pediatrics	1952 [233]

SUDOMOTOR – MEDICAL

Korr IM et al.	Sympathetic NS/musculoskeletal	J Neural Trans	1964 [234]
Sato A, Sato Y, Schmidt RF.	Sudomotor/somatosensory/ANS	In Blaustein MP. et al	1997 [235]
Vaidya JS, et al	Posture/sweat glands	Indian J Physiol Pharmacol	1994 [236]

GENERAL OSTEOPATHIC –

Barral J-P et al	Visceral manipulation.	In: Barral J	1988 [67]
Beal MC.	Viscerosomatic reflexes	JAOA	1985 [237]
Burns L et al	Pathogenesis of visceral disease (Hist)	Text	1948 [63]
Burns L.	Somatovisceral/viscerosomatic reflexes	Osteop Ann	1985 [238]
Conley GJ	Surgery/Lesion(Subluxation)	JAOA	2001 [239]
Friedman MHF.	Somatovisceral reflexes/cerebrolimbic	JAOA	1984 [240]
Goldstein FJ, et al.	OMT/Post-operative analgesia	JAOA	2005 [241]
Greenman PE	General	Text	2003 [2421]
Greenman PE	OMT/Health care	In: Korr IM.	1978 [243]
Johnston WL.	Somatic findings/visceral reflex	JAOA	1988 [244]
Keller JA	Any medical regimen/OMT	JAOA	1993 [245]
Kelso AF, et al	Examination	JAOA	1980 [246]
Kelso AF.	Findings in hospital patients.	JAOA	1971 [247]
Korr IM	Sympathetic hyperactivity	In Text	1978 [248]
Korr IM.	Spinal cord/organiser/disease (4 Parts)	JAOA	1978 [249]
Kuchera M et al	Systemic dysfunction.	In Text	1992 [66]
Larson NJ.	Site/paraspinal soft tissue changes /ICU	JAOA	1976 [250]

Miller WD.	Visceral disorders	In: Goldstein M	1975 [65]
Nicholas NS.	Somatic dysfunction/visceral disease.	JAOA	1975 [251]
O-Yurvati AH, Carnes MS, et al	OMT/hemodynamics/coronary bypass	JAOA	2005 [252]
Patterson MM et al	Somatovisceral/viscerosomatic interaction	Am Acad Osteopathy	1992 [14]
SUDOMOTOR – OSTEOPATHIC			
Kappler RE.	OMT/Thermography	JAOA	1983 [253]
Kiyomi K.	Cutaneous-intestinal reflex	In Korr	1978 [254]
Thomas PE.	Facilitated segments	JAOA	1955 [255]
CAFFEINE WITHDRAWAL – OSTEOP			
Reeves RR, et al.	Somatic dysfunction prevalence/EEG's	JAOA	1997 [256]
GENERAL – PHYSIOTHERAPY			
Mein EA, et al.	SMT/Somatovisceral/Viscerosomatic	Phys Med Rehab	2000 [257]
GENITOURINARY SYSTEM	**(Incl. BLADDER-BOWEL)**		
CHIROPRACTIC			
Borregard PE	Neurogenic bladder/spina bifida	JMPT	1987 [258]
Falk JW.	Bowel and bladder dysfunction	Chiropr Tech	1990 [181]
Stude DE, et all.	Urinary incontinence	JMPT	1998 [259]
Thomas RJ et al	Cystitis/Adult spina bifida/management	Chiropr Technique	1990 [260]
Vallone SA.	Bladder infection	Chiropr Technique	1998 [261]
ENURESIS – CHIROPRACTIC			
Gemmell HA et al	Enuresis /time series	JMPT	1989 [262]
Henriksen HH et al	Enuresis	J Chiropr Research	1986 [263]
Kreitz B et al	Enuresis	JMPT	1994 [264]
LeBoeuf C, et al	Enuresis	JMPT	1991 [265]
Reed WR, et al	Enuresis	JMPT	1994 [266]
Sweeney A.	Enuresis	ICA Rev	1997 [267]
RENAL – OSTEOPATHIC			
Johnston WL, et al	Renal dysfunction	JAOA	2001 [268]
Rivera-Martinez S, et al.	Nephrotic syndrome	AAOJ	2001 [269]
URINARY – MEDICAL			
Dangaria TR.	Urinary frequency & urgency	Man Ther	1998 [270]
Sato A, Sato Y, Schmidt RF.	Somatosensory/urinary system	In Blaustein MP. et al.	1997 [271]
IMMUNE SYSTEM			
IMMUNOLOGICAL – CHIROPRACTIC	(See also Biochemistry Table 4[2])		
Ali A, Hayek R, et al	SMT/endocrine/Immune system	International Conf	2002 [272]
Brennan PC, et al.	Neutrophil chemiluminescence	In: Whelan WJ	1988 [273]
Brennan PC et al	Priming of neutrophils/enhanced respiratory. Burst	In: Wolk S.	1989 [274]
Christian GF et al	Immunoreactive/ACTH/β-endorphin/cortisol.	Spine	1988 [275]
Fidelbus JC.	Neuroimmunomodulation	JMPT	1989 [276]

Nansel D.	Substance P, TNF	JMPT	1993 [277]
Teodorczyk-Injeyan J, et al.	Cytokines/Substance P//SMT	JMPT.	2006 [278]
Teodorczyk-Injeyan HS, et al	Interleukin-2/SMT	JMPT	2008 [279]
Tuchin PJ.	Cortisol levels.	ACOJ	1998 [280]
Waddell SC, et al.	Anaphylactic and endotoxic shock	JMPT	1991 [281]
IMMUNOLOGICAL – MEDICAL			
Arce A, et al.	Autonomic denervation/lymphocytes	J Auton NS	1997 [282]
Cevikbas F, et al.	ANS/Neuroimmune /Skin	Curr Opin Allergy Clin Immun	2007 [283]
Elenkov IJ, et al.	ANS/Brain/Immune system	Pharmacol Rev	2000 [284]
Gordienko AN, et al.	Electrophysiological study (Hist)	Rostov-On-Don State Inst	1958 [285]
Kivioja J, et al	Systemic immune response/whiplash/ankle sprain	Clin Immunol	2001 [286]
Nagatomi R, et al.	Immune system modulation/ANS	Immunol Rev	2000.[287]
Roosterman D, et al.	Neuronal control/skin/neuroimmunoendocrine	Physiol Rev	2006 [288]
Rutkowski MD, et al	Neuroimmune response /Nerve root injury.	Spine	2002 [289]
Sato A, Sato Y, Schmidt RF.	Somatosensory modulation/immune system	In:Blaustein MP, et al	1997 [290]
IMMUNOLOGICAL – OSTEOPATHIC			
Allen TW.	OMT/Immunity	JAOA	1998 [291]
Breithaupt T, et al.	Lymphatic pumping/influenza vaccine efficacy	JAOA	2001 [292]
Jackson KM, et al.	OMT/Immune response	JAOA	1998 [293]
Knott EM, et al	Lymphatics during OMT	JAOA	2005 [294]
Mesina J et al	Transient basophilia	JAOA	1998 [295]
Noll DR, et al.	OMT/immune response/influenza vaccine	Altern Ther Health Med	2004 [296]
Noll DR, et al.	OMT/Pneumonia/Inpatients	JAOA	2000 [297]
Willard FH, et al.	Nociception/neuroendocrine/Immune	Int'l Symposium	1992 [298]
NERVOUS SYSTEM			
AUTONOMIC NS –CHIROPRACTIC			
Budgell BS,et al	Autonomic functions	Prog Brain Res	1996 [299]
Budgell BS.	Reflex effects/ANS	JMPT	2000 [300]
Giles LGF	Vertebrogenic autonomic syndromes.	JMPT	1992 [301]
Jinkins JR	Somatic/autonomic/neurogenic synd	In Giles et al	1997 [302]
Pickar JG	Neurophysiology/SMT	The Spine J	2002 [2]
Watkins RJ	The vegetative system	J Can Chiropr Assoc	1966 [303]
Vicenzino B, et al	SMT/Hypoalgesia/sympathetic stimulation	JMPT	1998 [304]
AUTONOMIC NS – MEDICAL			
Goldstein DS	ANS in health & Disease	Text	2001 [305]

Jinkins JR, et al.	Autonomic dysfunction	Am J Neuroradiol	1989 [306]
Johnson RH.	Autonomic nervous system.	OUP/Text	1983 [307]
Lindquist C, et al.	SNS/mechanical sensitivity	Brain Res	1973 [308]
Sato A, Schmidt RF,	Visceral function/Somatic afferents	Japanese J Physiol	1987 [309]
AUTONOMIC NS – OSTEOPATHIC			
Appenzeller O.	Somato-autonomic reflexes	In Korr IM	1978 [310]
Coote JH.	Somatoautonomic input	In Korr IM.	1978 [311]
Coote JH	Aberrant ANS function	In Haldeman S	1980 [312]
Koizumi K.	Autonomic nervous system	In: Korr IM	1978 [313]
Wright HT.	Somatosympathetic	JAOA	1955 [314]
Wright HT	Posture/Cutaneous temperature	JAOA	1966 [315]
BRAIN/NERVOUS SYSTEM CHIROPRACTIC NEUROLOGICAL			
Alcantara J et al	LBP/epilepsy	JMPT	1998 [316]
Alcantara J, et al	VSC/Myesthenia gravis	JMPT	1999 [317]
Araghi HJ	Oral apraxia	Nat Conf Chiropr Pediatr	1994 [318]
Bortolotto J.	Reflex Sympathetic dystrophy	JCCA	2000 [319]
Carrick FR.	Brain function	JMPT	1997 [25]
Charbonneau M, et al.	T, H, M reflexes/spinal adjustment (muscle)	Proc Int'l Conf	1990 [320]
Croft AC	Tissue injury/incl nerve	Text	2002 [321]
Duff BA	Myoclonus	J Chiropractic Research & Clinical Investigation	1992 [322]
Foreman SM	Nervous system trauma	Text	2002 [19]
Gerow G, et al	Chronic fatigue syndrome	JMPT	1992 [323]
Goodman R.	Seizure disorder	Proc Nat Confer Chiropractic Pediatrics	1991 [324]
Grod JP,Diakow PR	Vertical perception/neck pain	Arch Phys Med Rehab	2002 [325]
Haavik-Taylor H, et al	Cervical manipulation & SEP	Clin Neurophysiol	2007 [6]
Haavik-Taylor H, et al	Cortical inhibition/SMT	Chiropr J Aust	2007 [326]
Hyman CA	Petit Mal	J Clin Chiropr Pediatr	1996 [327]
Langweiler MJ, et al	Reflex sympathetic dystrophy	JNMS	1995 [328]
Lystad RP, Pollard H.	Neuroscience imaging	J Can Chiropr Assoc	2007 [329]
Manuele JD, Fysh PN	Aquired verbal aphasia	J Clin Chiropr Pediatr	1996 [330]
Niesluchowski W	Brain asymmetry/scoliosis	JMPT	1999 [331]
Owen EF, et al	Proprioception/head repositioning	Chiropr Osteop	2006 [332]
Pikula JR.	Guillain- Barré syndrome	J Can Chiropr Assoc	1995 [333]
Pistolese RA.	Epilepsy/seizure disorders	JMPT	2001 [334]
Rogers RG.	Proprioception	JMPT	1997 [335]
Seaman DR,et al	Dysafferentation	JMPT	1999 [4]

Trotta N.	Tourette Syndrome	Chiropr Res J	1989 [336]
Vicenzino B,et al	Hypoalgesia/sympathoexcitation	JMPT	1998 [304]
Woo C-C	Myoclonus	JMPT	1989 [337]
Young G	Epilepsy	ACA J Chiropr	1982 [338]
BRAIN/NEUROLOGICAL – MEDICAL			
Airapetyan A,et al	Thalamic nucleus	Neurosci Behav Physiol	1985 [339]
Boiardi A, et al	Cardiovascular/headache/ANS dysfunction	Headache	1988 [340]
Gayral L, et al.	'Oto-neuro-opththalmological	NY State Med J	1954 [341]
Gongal'skii V,et al	[Vascular and autonomic disorders]	Neirofiziologiia	1992 [342]
Heikkila H, et al.	Proprioception/vertigo	Man Ther	2000 [343]
Hooshmand H et al	Reflex sympathetic dystrophy	Pain Digest	1999 [344]
Hooshmand H.	Spine and the ANS	Pain Forum Web site	1997 [345]
Hotta H, Sato A, Schmidt RF, Suzuki A.	Joint stimulation/Cortical blood flow	Neuroreport	2005 [346]
Jinkins JR, et al.	Autonomic dysfunction	Am J Neuroradiol	1989 [306]
Johnson RH.	Autonomic nervous system	OUP	1983 [347]
Maigne R	Barré Syndrome	In Maigne R	1972 [348]
Maigne R	Nystagmus	In Maigne R	1972 [349]
Michaelis M, Janig W.	Sympathetic NS and pain.	Schmerz (Germ)	1998 [350]
Nakajami K, et al	Myelopathy	Spine	1996 [351]
Sato A, Sato Y, Schmidt RF.	Somatic afferents/ANS	In Blaustein MP. Et al.	1997 [352]
Sato A,	Sympathetic nervous system	JMPT	1984 [353]
Sato A.	Somatosympathetic reflexes	In: Goldstein M (Ed)	1975 [354]
Tait CP et al	Pruritus/cervical spine	Aust J Derm	1998 [355]
BRAIN/NEUROLOGICAL - OSTEOPATHIC			
Perrin RN, et al	Symptoms of myalgic encephalomyelitis/CFS	JAOA	1998 [356]
BRAIN/NEUROLOGICAL – PHYSIOTHERAPY			
Barr JS, Taslitz N.	Back massage/ANS	Phys Ther	1970 [357]
Gazit Y, et al	Dysautonomia/joint hypermobility	Am J Med	2003 [358]
McGuiness J, et al	Sympathetic NS/Respiratory/cardiovascular	Man Ther	1997 [359]
O'Sullivan P.	LBP/Maladaptive movement/control	Man Ther	2005 [360]
Shacklock M	Neurodynamics	Aust J Physiotherapy	1995 [361]
Sterling M Jull G, et al.	Pain/Sympathetic NS/Motor activity.	Man Ther	2001 [362]
Vicenzino B, et al.	Hypoalgesia/Sympathoexcitation/SMT	JMPT	1998 [363]
Wyke BD.	Senile disequilibrium	Age Aging	1979 [364]
Zusman M,et al	CNS/ motor & sensory responses	Aust Physioth	1992 [365]
CRANIAL NERVOUS SYSTEM			
CRANIAL NERVES General – CRANIALS CHIROPRACTIC	**Condition & (Primary Cranial N).**		

Alcantara J, et al	Bell's palsy (Cr N VII)	JMPT	2003 [366]
Blum CL	Tinnitus (Cr N VIII)	Chiropr Tech	1998 [367]
Filosa DA	Anosmia, Ageusia/SMT (Cr N I)	Research Forum	1988 [368]
Palmieri NF.	Bell's Palsy (Cr N VII)	Chiropr Tech	1990 [369]
Swain M,Pollard H, et al	Cluster-tic syndrome (Cr N V)	Chiropr J Aust	2007 [370]
Terrett AGJ.	Neck-tongue syndrome (Cr N XII/C2)	J Aust Chiropr Assoc	1984 [371]
Waddell RK	Spasmodic Dysphonia	J Chiropr Med	2005 [372]
Wood KW	Spamodic dysphonia (Cr N V)	JMPT	1991 [373]
CRANIALS – MEDICAL			
Bogduk N.	Neck-tongue syndrome. (Cr N XII/C2)	J Neurol Neurosurg Psych	1981 [374]
Chrisman OD, et al.	Otological/cervical spine /Stellate	Clin Orthop Rel Res	1962 [375]
Fredrickson TA et al	Cervicogenic headache/Pupillometric (Cr N III)	Cephalalgia	1988 [376]
Kaute BB.	Tinnitus/atlas therapy (Cr N VIII/C1	Int Tinnitus	1998 [377]
Montązem A.	Secondary tinnitus/upper cervical instability (Cr N VIII)	Int Tinn J	2000 [378]
Svatko LG et al	Hearing (Cr N VIII)	[Vestn Otolaringol]	1987 [379]
CRANIALS - OSTEOPATHIC			
Lancaster DG, et al.	Bell's palsy. (Cr N VII)	JAOA	2006 [380]
Silverstolpe L et al	Cranial/visceral symptoms (Cr N XII)	In: Paterson	1990 [381]
VERTIGO – Cr N VIII CHIROPRACTIC			
Brunarski DJ.	ANS/Cervicogenic vertigo	Textbook	1988 [382]
Christensen F.	Vertigo/Audiograms/Hearing	J Clin Chiro	1969 [68]
Lafond D, Champagne A, et al	Neck pain/Vestibular Dysfunction.	Chiropr Osteop	2008 [383]
Côte P et al.	Cervicogenic vertigo.	JCCA	1991 [384]
Fitz-Ritson D.	Cervicogenic vertigo	JMPT	1991 [385]
McConekey C, et al	Vertigo/SMT	J Chiro	1990 [386]
VERTIGO – MEDICAL			
Biesinger E.	Cervicogenic vertigo	O-R-L	1988 [387]
Davis D.	Cervical vertigo	Ann Int Med	1953 [388]
Galm R, et al	Vertigo/cervical dysfunction	Eur Spine J	1998 [389]
Heikkila M et al	Acupuncture/manipulation/NSAID/Co-ordination	Man Ther	2000 [390]
Hinoki M, et al	Sympathetic NS/Vertigo	Acta OL	1975 [391]
Ryan GMS	Cervical vertigo	Lancet	1955 [392]
Simon H, et al	SMT,otorhinolaryngology/vertigo	Man Med	1973 [393]
Wing L, et al	Cervical vertigo	Aust NZ J Surg	1974 [394]
VERTIGO – PHYSIOTHERAPY			
Reid SA, Rivett DA.	Cervicogenic dizziness	Man Med	2005 [395]
HEADACHE – CHIROPRACTIC			

Arbiloff B.	Cervicogenic headache	J Clin Chiropr	1969 [396]
Bove G, et al.	Episodic tension-type headaches	JAMA	1998 [397]
Brontfort G et al	Chronic headaches	JMPT	2001 [398]
Brontfort G, et al	Chronic, recurrent headache	Cochrane Database	2004 [399]
Gökpinar E, et al	Headache/cervical spine/posture/goitre	JMPT	1998 [400]
Hoskins WT et al.	Neurogenic pathogenesis of migraine	CJA	2006 [401]
Killinger LZ.	Headache	Palmer J Research	1995 [402]
McCrory DC, et al	Cervicogenic and tension-type headache	FCER	2001 [403]
Moore MK.	Cervicogenic headaches/Upper crossed syndrome	JMPT	2004 [404]
Mootz R, et al	Chronic episodic tension headache	J Can Chiropr	1994 [405]
Nilsson N, et al	Cervicogenic headache	JMPT	1997 [406]
Shooker CM	Models of headache	J Chiropr Med	2002 [407]
Tuchin P et al	Migraine	JMPT	2000 [408]
Tuchin P et al	Chronic headaches	ACOJ	1996 [409]
Vernon H	Headaches	JMPT	1982 [410]
Vernon H	Vertebrogenic Migraine	Conference Proc	1984 [411]
Vernon H.	Cervicogenic headache	Man Med	1991 [412]
Vernon H, et al	Muscle contraction H/A & Migraine	JMPT	1992 [413]
Whittingham W et al	Headaches	JMPT	1994 [414]
Williams S, et al	Headaches/LBP/neck pain	Chiropr Research J	1989 [415]
HEADACHE – MEDICAL	(See also Ref [53] in relation to Braaf et al.)		
Antonaci F, et al	Cervicogenic headache	Curr Pain H/ache Rep	2001 [416]
Aprill C, et al	Cervical headache	Cephalalgia	2002 [417]
Bartsch T, Goadsby PJ.	Dural afferent input/Greater Occip N.	Brain	2002 [418]
Boirdi A, Munari I, Milanesi I, et al.	Cluster H/A, Migraine/ANS/Cardiovasc.	Headache	1988 [339]
Bogduk N	Cervicogenic headaches	Curr Pain Headache	2001 [70]
Bogduk N	Cervicogenic headaches	JMPT	1992 [419]
Bogduk N	Cervical headache/dizziness	In: Grieve GP.	1986 [420]
Bogduk N, et al	Occipital headache	J Neurol Neurosurg Psy	1986 [421]
Bogduk N, et al	Cervical headaches	MJA	1985 [422]
Bogduk N.	Cervical headaches	Cephalalgia	1984 [423]
Bogduk N, et al	Cervical migraine	Cephalalgia	1981 [424]
Bogduk N	Occipital neuralgia	Clin Exp Neurol	1981 [425]
Bogduk N	Cervical manipulation/Headaches	MJA	1979 [426]
Bove G, Nilsson N.	Episodic tension-type headache	JAMA	1998 [427]
Couch JR, et al.	Neck injury/chronic headaches	Neurology	2007 [54]
Drottning M et al	Cervicogenic headache	Cephalalgia	2000 [428]
Dvorak J, Wälchi B	Cervicogenic headache	[Ther Umsch]	1997 [429]
Edmeads J.	Cervicogenic headaches	Neurology	1988 [430]

Edmeads J	Cervicogenic headaches	Med Clin North Am	1978 [431]
Fredrickson TA et al	Cervicogenic headache/ Pupillometric	Cephalalgia	1988 [376]
Gale GD.	Cervicogenic headache	Headache	2001 [432]
Gouveia RG, et al.	Cluster headaches/autonomic NS	J Headache & Pain	2005 [433]
Grimmer K, et al	Headaches/posture/Recreation	Arch Phys Med Rerhab	1999 [434]
Hack GD et al (Dental)	Cervicogenic headache	Spine	1995 [435]
Hinderaker J, Lord SM, Barnsley L, et al.	Upper cervical dysfunction/headache	Cephalalgia	1995 [69]
Jensen S.	Cervicogenic headache	Aust Fam Physician	2005.[436]
May TS.	Headache/neck injury	Am Acad Neurol	2007 [437]
Nagasawa A, et al	Roentgenographic correlation	Headache	1993 [438]
Nardone R, et al	Trigemino-cervical reflex/tensionheadaches	Eur J Neurol	2003 [439]
Nardone R, et al	Trigemino-cervical reflex/migraine/cluster	Headache	2008 [440]
Serrao M, et al.	Trigemino-cervical-spinal reflex/migraine	Headache	2005 [441]
Von Peter S, et al.	Headache usage/therapies	Cephalalgia	2002 [442]
Watson DH, Trott PH	Cervicogenic headache/postur	Cephalalgia	1993 [443]
Wöber-Bingöl C, et al.	Tension headache	Cephalalgia	1993 [444]
HEADACHE – OSTEOPATHIC			
Biondi DM.	Cervicogenic headaches	JAOA	2000 [445]
Brown CS.	Case study/chronic cephalalgia	AAOJ	2000 [446]
Flotildes KL, et al.	Headache pain/OMT	JAOA	2001 [447]
Menegos D, et al.	OMT/VSC/Dural restriction	JAOA	2001 [448]
Parikh AS, et al.	Vital signs/OMT/Headaches	JAOA	2001 [449]
HEADACHE – PHYSIOTHERAPY			
Fernández-de-las-Peñas C, et al.	Cervicogenic headaches	Headache	2005 [450]
Grant T, et al	Management techniques	Aust J Physiotherapy	2000 [451]
Grimmer K et al	Cervicogenic headache/posture	Arch Phys Med Rehab	1999 [434]
Hall T, et al.	Cervicogenic headache	Man Ther	2004 [452]
Hall T, Chan HT, et al.	C1-C2 cervicogenic headache	J Orth Sport Phys Ther	2007 [453]
Niere K.	Prognostic characteristics/SMT	Aust J Physiotherapy	1998 [454]
Ogince M, et al	Cervicogenic headache	Man Ther	2006 [455]
Watson DH et al	Cervicogenic headache/posture	Cephalalgia	1993 [456]
Whorton RL, et al	Cervicogenic headache/manual therapy	JMMT	2000 [457]
von Piekartz HJM, et al	Cervical ROM/Physical activity & H/A	Man Ther	2007 [458]
MULTIPLE SCLEROSIS – CHIROPRACTIC			
Dougherty P, et al	MS/musculoskeletal symptoms	Clin Chiropr	2005 [459]
Kirby SL.	Case study	Chiropr Research J	1994 [460]
Stude DE, Mick T.	Clinical study	JMPT	1993 [461]
MULTIPLE SCLEROSIS – OSTEOPATHIC			
Yates HA, et al.	OMT/MS	JAOA	2002 [462]
MYASTHENIA GRAVIS – CHIROPRACTIC			

Araghi HJ	Myasthenia gravis	Proc Int'l Conf Paed	1993 [463]
Alcantara J et al	Myasthenia gravis	JMPT	1999 [464]

PAIN – CHIROPRACTIC

Sanders GE, et al.	Acute low back pain/plasma β-endorphin	JMPT	1990 [465]
Vernon HT, et al	β-endorphin	JMPT	1986 [466]

PAIN – MEDICAL

Lanhevin HM, et al	Nervous System Mechanisms/LBP	Med Hypoth	2007 [467]

PARKINSON'S DISEASE – OSTEOPATHIC

Wells MR, et al.	OMT/Parkinson's gait.	JAOA	1999 [468]

PEDIATRICS

PEDIATRIC – CHIROPRACTIC

Aguilar AL, et al.	Autism	J Clin Chiropr Paediatr	2000 [469]
Anderson-Peacock ES	Headaches	J Clin Chiropr Pediatr	1996 [470]
Arme J.	Attention deficit Disorder	J Chiropr	1993 [471]
Barnes TA.	Hyperactivity	ICA Rev	1995 [472]
Bastecki AV, et al.	Cervical kyphosis/ADD/Hyperactivity	JMPT	2004 [473]
Blomerth PR.	Enuresis (See under Genitourinary)	JMPT	1994 [474]
Brzozowke WT, et al.	Attention deficit/hyperactivity	J Aust Chiropr Assoc	1979 [475]
Cochran JA.	Childhood migraine	Proc Pediatr Conf	1994 [383]
Davies NJ, Jamison J	Irritable baby syndrome	CJA	2007 [476]
Davies NJ.	Clinical Handbook	Text	2000 [477]
Davies NJ	Hydrocephalus	J Can Chiropr Assoc	1995 [478]
Davies NJ	Plagiocephaly	CJA	2002 [479]
Davies NJ	Acute febrile patient management	JACA	1987 [480]
Deutsch J, Kastner U, Lackner R.	Chronic headache	Conference Paper	1995 [481]
Fallon JM.	Pediatric management	J Clin Chiropr Pediatr	2005 [482]
Giesen JM.	Hyperactivity	JMPT	1989 [483]
Gotlib A, Rupert R.	SMT/pediatric health	Paediatr Child health	2005 [484]
Grunnet-Nilsson N.	Infantil colic/evidence base.	Confr Proc	2005.[485]
Hewitt EG.	Adolescent/headache	J Can Chiropr Assoc	1994 [486]
Hewitt EG.	Chronic constipation	Chiropr Tech	1993 [487]
Holtrop DP.	Suckling intolerance	JMPT	2000 [488]
Hyman CA.	Petit mal in 5 y-o.	J Clin Chiropr Paed	1996 [327]
Kelly S.	Bulbar Palsy	J Clin Chiropr Pediatr	2007 [489]
Klougart N, et al	Infantile colic/316 cases	JMPT	1989 [490]
Lisi AJ et al	Cervicogenic headache	JNMS System	2002 [491]
Manuele JD, Fysh PN	Verbal aphasia in 7 y-o.	J Clin Chiropr Paed	1998 [329]
Niesluchowski W, Dabrowska A, et al.	Brain asymmetry/scoliosis	JMPT	1999 [330]
Nunno-Wiltsie LV.	Eosinophilic gastroenteritis	J Clin Chiropr Pediatr	2007 [492]
Patterson D.	Encopresis	Res Forum	1986 [493]

Peet JB	Analysis of Newborn	Chiropr Pediatr	1998 [494]
Peet JB	Hyperactivity/ADD	Chiropr Pediatr	1998 [495]
Peet JB	Chronic asthma in 8 y-o.	Chiropr Pediatr	1997 [496]
Pluhar GR, Schobert PD.	Colic & VSC	JCRCI	1991 [497]
Pistolese RA.	Epilepsy/Seizure	JMPT	2001 [333]
Quezada D.	Plagiocephaly	J ClinChiropr Ped	2004 [498]
Quist DM, Duray SM,.	Chronic constipation/SMT/8 y-o	JMPT	2007 [499]
Rome PL.	Sleep pattern/behaviour.	Chiropr J Aust	1996 [500]
Rosner AL	Infant & Child Care	FCER Pubn	2003 [501]
Roswell-Kulikowski A.	Auditory neuropathy	J Clin Chiropr Pediatr	2007 [502]
Sandefur R, et al	Autism	Chiropractic J	2000 [503]
van Breda WM, van Breda JM	General Health Status	J Chiropr Res	1989 [215]
Vallone S.	Breast feeding difficulties	ICA Rev	1997 [504]
Vallone S.	Hypolactation	J Clin Chiropr Pediatr	2007 [505]
Wiberg JMM et al.	Infantile colic	JMPT	1999 [506]

PEDIATRIC – MEDICINE

Biederman H	Kinematic imbalances-CO/C1	J Man Med	1992 [507]
Biederman H	Infantile ERB's Palsy	JMPT	1994 [508]
Biederman H	Manual therapy in children.	Text	2004 [509]
Biedermann H	Manual therapy/newborn/children	Congress Paper	2009 [510]
Gutmann G	Cervical diencephalon	Man Med	1968 [511]
Gutmann G.	"Blocked atlantal nerve syndrome	ICA Int Rev Chiropr	1990 [74]
Hughes S, Bolton J.	Infantile colic	Arch Dis Child	2002 [512]
Lee AC, Li DH, et al.	Chiropractic care	Arch Pediatr Adolesc Med	2000 [513]
Margolius FR.	Infantile colic	Evidence-Based Nursing	2000 [187]

PEDIATRICS OSTEOPATHY

Colli R, et al.	Neonatology	Pediatr Med Chir	2003 [514]
Davis MF, et al.	Cerebral Palsy	JAOA	2007 [515]
Degenhardt BF, et al.	Otitis Media/OMT	JAOA	2006 [516]
Duncan B, et al	Cerebral palsy/OMT	Clin Pediatr	2004 [517]
Guiney PA	Asthma /OMT	JAOA	2005 [518]
King HH.	Prenatal care/OMT	JAOA	2003 [519]
Kline CA.	Respiratory infections/OMT	JAOA	1965 [520]
Mills MV et al	Recurrent Otitis Media/OMT	Arch Ped Adol Med	2003 [170]
Mills MV.	Plagiocephaly/OMT	J Pediatr	2006 [521]
Purse FM.	Upper respiratory infections/OMT	JAOA	1966 [522]
Zaphiris A, et al	Otitis media/OMT	JAOA	2004 [523]

PEDIATRIC – PHYSIOTHERAPY

von Pickartz HJ, et al.	Cervicogenic headache	Man Ther	2007 [458]
POSTURE- CHIROPRACTIC			
Gökpinar E, et al	Posture changes/Cervical spine/goitre	JMPT	1998 [151]
Smart LJ, Smith DL	Posture/motion sickness	JMPT	2001 [214]
POSTURE- OSTEOPATHY			
Lewit K	Posture/respiration	JAOA	1980 [524]
Van Buskirk RL	Muscle garding/nociceptive reflexes	JAOA	1990 [525]
Wright HM, et al	Posture/skin temperature on dorsum	JAOA	1966 [526]
POSTURE- MEDICAL	(See also Table 6 [2])		
Bouhuys A.	Posture/asthma	Am J Med	1963 [527]
Bouhuys A	Posture/lung/air distribution	J App Physiol	1962 [528]
Golthwaite JE et al	Body mechanics/adverse health conditions (Hist)	Text	1952 [34]
Grimmer K et al	Cervicogenic headache/posture	Arch Phys Med Rehab	1999 [433]
Kado DM, et al	Hyperkyphosis/adverse health	Ann Int Med	2007 [529]
Kado DM, et al.	Hyperkyphosis/falls	J Gerontol Biol Med Sci	2007 [530]
Kado DM, et al	Hyperkyphosis/General dysfunction	J Gerontol Biol Med Sci	2005 [531]
Kado DM, et al	Hypergyphosis/mortality	J Am Geriatr Soc	2004 [532]
Korr IM	Sudomotor activity/posture	Fed Proc	1949 [533]
Lennon J,et al.	Posture/Respiration/ANS/Health	Am J Pain	1994 [226]
Lopes EA, Fanelli-Galvani A, Prisco CC, et al.	Posture/Asthma	Eur J Pediatr	2007 [613]
Miyakoshi N, et al	Posture/mobility/Quality of life	Osteoporosis Int	2003 [227]
Miyaloshi N, et al	Kyphosis/ gastric reflex	Osteoporosis Int	2008 [199]
Mukhopadhyay J, Bates R, Manney S, et al.	Vagal tone/posture/asthma	Respir Med	2007 [612]
Nardone R, et al	Posture/Headaches	Eur J Neurol	2003 [439]
O'Donovan D.	General affects/scoliosis	Annals Allergy	1951 [227]
Sjöström H, et al	Postural stability (sway)/whiplash	Spine	2003 [534]
Storaci R, et al	Whiplash/posture/oculomotor dysfunction	Europ Spine J	2006 [20]
Vaidya JS, et al	Posture//sweat glands	Indian J Physiol Pharmacol	1994 [535]
Watson DH Trott PH	Posture/cervical headache	Cephalalgia	1993 [443]
Wyke BD	Cervical points/posture	Age Aging	1979 [364]
PSYCHOLOGY/PSYCHIATRY			
PSYCHOLOGICAL – CHIROPRACTIC			
Aguilar AL, et al	Autism	J Clin Chiro Pediatr	2000 [469]
Arme J	ADD	J Chiropr Case Rep	1993 [471]
Bablis P. Pollard H.	Anxiety/Depression profiles	J Altern Comp Med	2009 [536]
Bastecki AV, et al	ADD/Hyperactivity disorder	JMPT	2004 [473]
Giesen JM et al	Hyperactivity	JMPT	1989 [483]
Haldeman S.	Somato-psychological association	Text	1973 [537]

Hospers LA	EEG/CEEG	Proc Nat Conf Chiro	1992 [538]
Kelly DD, et al	Cortical processing/upper cervical adjustment	JMPT	2000 [539]
Koren T, Rosenwinkel E	Spinal patterns/personality profiles	Internat'l J Psychosomatics	1992 [540]
Peterson KB.	Emotional arousal/phobic subjects	JMPT	1997 [541]
Peterson KB.	Phobic stimuli muscle response	JMPT	1996 [542]
Rupert RL, et al.	Depression/Mood Profiles	Intern'l Conf	2002 [543]
Quigley WH.	Psychiatric Care/Chiropractic/hospital	Chiropr History	1983 [544]
Sandefur R, et al	Autism	Chiropr J	1987 [503]
Sullivan EC.	Abnormal psychology (Historical rev)	J Am Chiropr Assoc	1995 [545]
Sullivan EC	Anxiety/ Case report	ACA J Chiropr	1992 [546]
Walton EV	Emotion/Learning/Behaviour	ICA Review	1975 [547]
Weiant CW.	Psychoneurosis/Case study	J Clin Chiropr	1968 [548]
Yannick P	Learning disability/dyslexia/review	JVSR	2007 [549]
Yates RG et al	Anxiety/blood pressure	JMPT	1988 [110]
PSYCHOLOGICAL – MEDICAL			
Kulkarni B, et al	Joint pain/emotion/fear	Arthritis Rheum	2007 [550]
Luoto S, et al	LBP/memory/Reaction Time	Spine	1999 [551]
Riser M, et al	Osteoarthritis/cervical spine/Psychiatric Disturbance	Clin Orthop	1962 [552]
Thomas MD, Wood J.	Mental function/cervical spine	J Man Med	1992 [553]
PSYCHOLOGICAL – OSTEOPATHIC			
Blood SD, Hurwitz BA.	OMT/EEG/ADD/ADHD	AAOJ	2000 [554]
McPartland JM, et al.	OMT/cannabimimetic effects	JAOA	2005 [555]
Northup GW.	Stress relief	JAOA	1990 [556]
Plotkin BJ et al.	Depression	JAOA	2001 [557]
Tilley RM	OMT/emotions/Physical illness	Osteop Ann	1973 [558]
PSYCHOLOGICAL – PHYSIOTHERAPY			
Shacklock MO.	Pain management/psychologiy	Aust J Physioth	1999 [361]
Vicenzino B, Cartwright T, et al.	Stress/pain perception during SMT	Eur J Pain	1999 [559]
REPRODUCTIVE SYSTEM			
GYNECOLOGICAL CHIROPRACTIC			
Arbiloff B.	Dysmenorrhea/Case report	J Clin Chiropr	1969 [560]
Arnold-Frochot S.	Gynecological symptoms/Dysmenorrhea/SMT	J Aust CA	1981 [561]
Browning JE*.	Pelvic pain/organic dysfunction	Chiropractic Tech	1995 [562]
Browning JE*	Pelvic pain organ dysfunction	JMPT	1990 [563]
	*(*Two of a number of papers on this*	*topic by this author.)*	
Hains F, Batt R, et al.	Dysmenorrhea/thoracolumbar junction	FCER Proceedings	1991 [564]
Hawk C, et al.	Chronic pelvic pain	JMPT	1997 [565]

Holtzman DA, et al.	Dysmenorrhea/case series	JMPT	2008 [566]
Hondras M et al	Prostaglandin/Primary dysmenorrhea	Pain	1999 [567]
Hubbs EC.	Premenstrual Tension Syndrome	Res Forum	1986 [568]
Kokjohn K, et al	Primary dysmenorrhea/prostaglandin/SMT	JMPT	1992 [569]
Liebl NA et al	Dysmenorrhea	JMPT	1990 [570]
Newton KM, Buist DSM, et al.	Menopause symptoms/alternative therapies	Obst Gynec	2002 [571]
Robinson AG, et al.	Endometriosis	Res Forum	1985 [572]
Skaggs CD (Multi Professions)	Back pain & pregnancy	JMPT	2007 [573]
Smith D.	Primary dysmenorrhea/case report	Chiro J Aust	2007 [574]
Snyder BJ, et al	Back pain/tension headache/dysmenorrhea	Chiropr Tech	1996 [575]
Stude DE	Premenstrual tension	JMPT	1991 [576]
Stude DE.	Dysfunctional Uterine bleeding	JMPT	1991 [577]
Thomason PR, et al.	Primary dysmenorrhea	JMPT	1979 [578]
Walsh MJ et al	Premenstrual syndrome	Chiropr J Aust	1994 [579]
Walsh MJ, Polus BI	SMT/PMT	JMPT	1999 [580]
Walsh MJ Polus BI	PMT/Spinal Clinical findings	JMPT	1999 [581]
Weber M et al	Perimenopausal	JVSR	1996 [582]
Wittler M.	Premenstrual syndrome	J Chiro Res Clin Inv	1992 [583]
GYNECOLOGICAL – OSTEOPATHIC			
Boesler D, et al	Menstrual cramping	JAOA	1993 [584]
Chapman JD.	Dysmenorrhea	JAOA	1993 [585]
Dobrik I.	Gynaecological disease/iliopsoas muscle	Man Med	1989 [586]
Martin RB.	Sexual dysfunction/preventive care	JAOA	2004 [587]
GYNECOLOGICAL – PHYSIOTHERAPY			
Avery AF, et al	Pelvic floor/sacroiliac joints	Int Fed Orthop Manip Ther	2000 [588]
OBSTETRICS – CHIROPRACTIC			
Forrester JA.	3rd Trimester management	Canad Chiropr	1997 [589]
Peet JB.	Spontaneous abortion/case study	Chiropr Pediatr	1998 [590]
Phillips CJ, et al	Pregnancy/labor/delivery	JMPT	1995 [591]
OBSTETRICS – MEDICAL			
Daly JM, Frame PS, Rapoza PA.	Sacroiliac subluxation/Pregnancy Subluxation	Fam Pract Res J	1991[592]
Kanayama N et al	Hypolordosis/pre-eclampsia.	Europ J Obs Gyn Reprod Biol	1997 [593]
Lewit K.	Labour pains/spinal dysfunction	Man Med	1970 [594]
Vleeming A, et al.	Pelvic instability/Belt support	An J Obstet Gynec	1992 [595]
OBSTETRICS – OSTEOPATHIC			
Brochu L.	OMT/Pregnancy	JAOA	1992 [596]
King HH, et al.	Prenatal care/ OMT/labor/delivery	JAOA	2003 [519]

RESPIRATORY SYSTEM

RESPIRATORY – CHIROPRACTIC

Arbiloff B.	Bronchial asthma	J Clin Chiropr	1969 [597]
Brontfort G et al	Chronic pediatric asthma	JMPT	2001 [598]
Hayek R et al.	Asthma management	Proc Intl Conf	1998 [599]
Hviid C.	Respiratory Function	Bulletin Europ Chiropr	1975 [600]
Jamison JR, et al	Pilot Clinical study/ asthma	JACA	1986 [601]
Killinger L	Asthma	Palmer Journal	1995 [602]
Lines D.	Asthma management	CJA	1993 [603]
Masarsky CS et al	Spirometry	ACA J Chiropr	1989 [604]
Masarsky CS et al	Lung volumes	ACA J Chiropr	1986 [605]
Masarasky CS, et al	Somatic dyspnea	Chiropr Tech	1991 [606]
Nielsen NH, et al	Chronic asthma	Clin Exp Allergy	1995 [607]
Nielsen NH, et al	Prognostic factors/Bronchial asthma	JACA	1988 [608]
Vernon LF et al	Pediatric asthma	Chiropr Pediatrics	1995 [609]
Ziegler R, et al	Asthma (& dietary)	ACA J Chiropr	1992 [610]

RESPIRATORY – MEDICAL

Balon J, et al	Childhood asthma	NEJM	1998 [611]
Bouhuys A et al	Body posture/gas distribution/lungs	J App. Physiol	1962 [612]
Bouhuys A.	Posture/asthma	Am. J. of Med.	1963 [613]
Hurwitz EL, Morgenstern H.	Asthma/hay fever/allergy/depression/low back pain	Am J Epidemiol	1999 [614]
Koch LE, et al	Apnea	Forensic Sci Int	1998 [615]
Lennon J et al.	Posture/respiratory modulation	Am J Pain	1994 [226]

RESPIRATORY OSTEOPATHIC

Allen TW, Kelso AF.	Respiratory disease/research	JAOA	1980 [291]
Allen TW, D'Alonzo GE	OMT/Asthma	JAOA	1993 [616]
Beal MC et al	Pulmonary disease	JAOA	1984 [617]
Belcastro MR et al	Bronchiolitis	JAOA	1984 [618]
Bockenhauer SE, et al	Chronic asthma	JAOA	2002 [619]
Bratzler DW.	Pneumonia/OMT	JAOA	2001 [620]
Breithaupt T, Harris K, Ellis J, et al.	Thoracic Pump/Influenza Vaccine	JAOA	2001 [292]
Guiney PA, Chou R, et al	Pediatric asthma/RCT/OMT	JAOA	2005 [621]
Harakal JH	Upper respiratory	Osteop Ann	1981 [622]
Johnston WL	Asthma/somatic assessment	JAOA	1999 [623]
Knott EM, Tune JD, Stoll ST, Downey HF.	Pneumonia//Thoracic Pump/Dog Model	JAOA	2005 [294]
Noll DR, Degenhardt BF, et al	COPD/OMT/Elderly/Influenza Vaccine	JAOA	2008 [296]
Noll DR et al	Pneumonia	JAOA	2000 [297]
Paul FA, Buser BR.	Asthma (& Sinusitis)	JAOA	1996 [174]
Rowane W, et al.	Asthma	JAOA	1999 [624]
Schmidt IC	Upper, Middle, Pararespiratory Infection	JAOA	1982 [625]
Sept K.	Sinusitis/OMT	Am Acad Osteop	1998 [626]

Shrum KM et al.	Sinusitis/Diagnosis/Management	JAOA	2001 [177]
RESPIRATORY – PHYSIOTHERAPY			
McGuiness J, et al.	Sympathetic NS/Respiratory/cardiovascular	Man Ther	1997 [144]
O'Sullivan PB, et al.	Respiratory function/sacroiliac/pelvic floor	Spine	2002 [627]
Vicenzino B et al	Respiratory & Respiratory/Mobilisation	Man Ther	1998 [145]
VISION – CHIROPRACTIC			
Briggs K, et al	Pupillary diameter/somatovisceral response	JMPT	1988 [628]
Clarke CV et al	Autonomic neuropathy/angle closure glaucoma	Res Clin Forum	1985 [629]
Gilman G, et al	Visual recovery	Today's Chiropractic	1992 [630]
Gorman RF*.	Automated perimetry.	JMPT	1993 [631]
Gorman RF*	Monocular visual loss/head trauma:	JMPT	1993 [632]
Gorman RF* et al	Visual perception deficit	Chiropr J Aust	1994 [633]
Gorman RF*.	Presumptive optic nerve ischemia	JMPT	1995 [634]
Gorman RF*	Monocular scotoma	JMPT	1996 [635]
Kessinger R, Boneva D.	Visual acuity	JVSR	1998 [636]
Nansel D, Peneff A..	Eye closure/goniometry/cervical spine	JMPT	1990 [637]
Passmore CB	Optometric/Chiropractic Co-operation	ACA J Chiropractic	1966 [638]
Schutte BL, et al	Esophoria	J Aust Chiropr Assoc	1989 [639]
Stephens D, et al	Vision improvement	JMPT	1996 [640]
Stephens D, et al	Visual incompetence	JMPT	1997 [641]
Stephens D et al,	Visual field loss	JNMS	1998 [642]
Stephens D, et al	Optic nerve dysfunction	JMPT	1999 [643]
Stephens D, et al	Visual perception deficit	Chiropr J Aust	1996 [644]
Stephens D, et al.	Recovery of vision	JMPT	1997 [645]
Zhang C, et al	Visual disturbance	J Clin Chiropr	1985 [646]
VISION - MEDICAL			
Burke JP, et al	Visual system /whiplash	Graefes Arch Clin Exp Ophth	1992 [22]
Gayral L, Neuwirth E.	Cervicogenic Oto-neuro-ophthalmological	NY State Med J	1954 [340]
Gilman G, et al (Also ref [630])	Visual recovery	J Behav Optometry	1990 [647]
Fredrickson TA, et al	Cervicogenic headache/pupillometric findings	Cephalalgis	1998 [376]
Storaci R, et al	Oculomotor dysfunction/whiplash	Europ Spine J	2006. [20]
VISION – OSTEOPATHIC			
Burns L.	Eyes and vertebral lesions.	JAOA	1941 [648]
Burns L.	Pupillary reactions	JAOA	1937 [649]

Cipolla V, et al	Intraocular pressure	JAOA	1975 [650]
Feely RA, et al.	Introcular pressure	JAOA	1982 [651]
Misischia PJ.	Intraocular pressure	JAOA	1981 [652]

Table 1 presents a representation of published literature demonstrating aspects of spine-related SAV Triad (SAVT).

The format of Table 1 has been designed to depict the topics or condition which could be classified under this SAV Triad. By citing a number of papers under a particular area, it also reflects the weight of interest in the various conditions or systems. It can be noted that there is an overlap of categories, professions, authors, and journals as these can be interchangeable due to the inter-professional nature of journal selection and authorship of papers submitted. The year of publication has been included here to depict the degree of interest in the subject matter and its evolution over the decades.

*Includes a chiropractic author.

(Note Nominated categories tend to overlap due to an integration of authors professions and journals associated with multiple professions,)

See reference list for legend of journal abbreviations.

Appendix 4

Research supporting the existence of a nexus between VSC (or synonym) and health – Somato-Autonomic Papers Part 3

PENDING PUBLICATION

APPENDIX - European Papers

The following papers on medical manipulation relating to neurospinal and somatovisceral disorders are difficult to obtain, and to have fully translated; they are mostly extracts from Pubmed. This appendix consist mainly of European papers and are submitted for readers interest and discernment. Title translations are primarily from the Google translation facility.

CARDIOVASCULAR

Bechgaard P, Fossgreen J. [The thoracic segmental pain syndrome with special regards to pseudo-cardiac disorders.] MMW Munch Med Wochenschr. 1980;122(20):759-760. (German)

Bechgaard P. [Segmentally thoracic pain in patients admitted to a coronary care unit.] Ugeskr Laeger. 1982;144(1):13-15. (Danish)

Bechgaard P. Segmental thoracic pain in patients admitted to a medical department and a coronary unit. Acta Scand Suppl. 1981;644:87-89.

Davydov OV. [Use of reflexotherapy in patients with osteochondrosis of the spine associated with ischemic heart disease.] Voen Med Zh 1985;Sept(9):58-59. (Russian)

Figar S,Krausova L, Lewit K. [Plethysmographic investigations in the chirotherapy of vertebral disorders.] Acta Neuroveg (Wein) 1967;29(4):618-623. (German) (PMID 6082265 Pubmed)

Grgić V. [Vertebrogenic chest pain – "pseudoangina pectoris": etiopathogenesis, clinical manifestations, diagnosis, differential diagnosis and therapy.] Lijec Vjesn. 2007;129(1-2):20-25. (Croatian) (Pubmed extract)

Isaev A, Sabir'yanov A, Lichagina S, Sabir'yanova E. [Physiological mechanisms of the effect of manual therapy on the orthostatic response of the cardiovascular system.] Fiziologiya Cheloveka. 2005;31(4):65-69. (Russian) (English abstract in Human Physiology 2005;31(4):425-429.)

Rychlíková E. [Vertebrogenic functional disturbances with chronic ischemic heart disease.] Vertebragene functionelle Störungen bei chronischer ischämischer Herzkrankheit. Münchner Medizinische Wochenschrift 1975;117:127. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:283-284.) (See also MMW Munch Med Wochenschr 1975;117(4):127-130. (German) PMID 803621 – Pubmed) Rychlíková E. [Reflex changes and vertebrogenic disorders in ischemic heart disease (IHD): Their importance in therapy.] In: Lewit K, Gutmann G, eds. Rehabilitacia (Suppl 10-11), 109-114. Prague: Proceedings of the Ivth Congress of the International Federation of Man Med, 1975. (Cited in Gitelman R, Fitz-Ritson D. Somatovisceral reflexes. ACA J Chiropr 1984;18(4):63-67.)

Rychlíková E. Vertebrokardiální Syndrom. (The vertebrocardial syndrome) Praha: Avicenum. 1975 (Cited by Lewit K. The Heart. In: Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann,Oxford 1999;283-284.)

Simonenko VB, Tesiq AN, Shirokov EA, Davydov OV. [Some features of coronary artery disease combined with vertebrogenic thoracoalgias.] (Incl "vertebrogenous cardiomyalgia") Klin Med (Mosk). 2007;85(1):61-63. (Article in Russian – Pubmed abstract in English.)

Voitanik SA.[Manual therapy of vertebrogenic cardialgia] Vopr Kurortol Fizioter Lech Fiz Kult. 1985 Jan-Feb;(1):69-71. Russian (Pubmed extract)

Wei GK, He JM, Chen ZG. Treatment of 104 cases suffering from cervico-spinal hypertension with rotation-reduction method – observation of the long term effect. J Tradit ChinMed 1989;9(4):266-268

DENTAL

Steiner O. Chiropraxis – Wirbelsäulenbehandlung im zahnärzilichen sprechzimmer. (Chiropractic – vertebral treatment in the dental office. Zahnärztlichen Rundschau. 1951:60. (Cited in Weiant CW, Goldschmidt S. Medicine and chiropractic. Self Published, New York. 1966:123.)

ENT

Bechgaard P, Bentzen O. [Hearing disorders corrected from the cervical spine.] Nord Med 1963;69:673-675. (Danish) (PMID 1390040 – Pubmed)

Biesinger E, Heiden C. [Earache and functional disorders of the cervical spine.] HNO 1994;42(4):207-213. (German (Pubmed abstract)

Debain JJ. [Otorhinolaryngologic manifestations of cervical origin.] Probl Actuels Otorhinolaryngol. 1972;257-277. (French) (Pubmed listing)

Falkenau HA. [Chiropractic management of the cervical syndrome in oto-rhino-laryngology (Author's translation)] HNO 1977;25(8):269-272. (German) (Abstract Only)

Falkenau HA. [The apthogenesis and chiropractic management of cervical dysphagia) Author's translation.)] Laryngol Rhinol Otol (Stuttg) 1977;56(5)467-469. (German)

Gutman G. [The cervical spine and otorhinolaryngologic disease.] HNO 1968;16(10):289-298. (German) (PMID 5725530 – Pubmed listing)

Hülse M, Kollar A, Ganzer U. [The effect of the upper cervical spine on hearing ability.] Laryngol Rhinol Otol (Stuttg) 1988;67(10):501-505. (English abstract)

Hülse M. [Functional dysphonia following cervical spine injuries.] Laryngorhinootologie. 1991;70(11)599-603. (German)(Abstract)

Hülse M. [Cervicogenic hearing loss.] HNO. 1994;42(10):604-613. [German] (English Abstract)

Hülse M, Hölzl M. [Vestibulospinal reactions to cervicogenic disequilibrium. Cervicogenic imbalance.} HNO. 2000;48(4):295-301. [German]

Hülse M, Hölzl M. [The efficiency of spinal manipulation in otorhinolaryngology. A retrospective long-term study] HNO 2004;52(3):277-234. (German).

Kaiser G. [The cervical spine and otorhinolaryngologic diseases.] Beitr Orthop Traumatol. 1974;21(3):137-142. (German) (Pubmed listing)

Krausová L, Krejčová H, Novotný Z, Starý O, Siroký A, Jirout J. [Otoneurological symptoms associated with cervicocranial syndrome before and after manipulation therapy.] Otoneurologische Symptomatologie bei dem Cervicocranialsyndrom vor und nach der Manipulationstherapie. Manuelle Medizin 1968;6:25-32. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:324.) Krausová L, Krejčová H, Novotný Z, Starý O, Siroký A, Jirout J. [Objectivization of otoneurologic symptoms after manipulation therapy in cervicocranial syndromes with predominantly vestibular symptomatology.] Cesk Neurol 1968;31(1):49-57. (Czech)

Lewit K, Abrahamovic M. [Chronic tonsillitis and the upper cervical spine (author's translation)] Sb Lek 1975;77(1):30-32. (Czech) (English abstract – Pubmed)

Lewit K, Abrahamovič M. [Upper cervical joint blockings and chronic tonsillitis] Kopfgelenksblockierungen und chronische tonsillitis. Manuelle Medizin 1976;14:106. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:282-283.) (See also PMID 1111058 – Pubmed – Czech but English abstract)

Novotný Z, Krausová L. [Audiometric evaluation of results of manipulation therapy of the cervical spine.] Cesk Otolaryngol 1968;17(5):257-266. (Czech)

Seifert K. [Functional disorders of the craniocervical transition and ENT symptoms – a status determination.] HNO.1989;37(11):443-448.(German) (Pubmed abstract)
Seifert K. [Manual medicine in otorhinolaryngology. Theoretical principles – clinical practice – principles of therapy and prevention.] Laryngorhinootologie 1995;74(10):583-590. (German)
Seifert I. [Cervical vertebrogenic pain on deglutition in neck, nose and ear medicine. Tendonopathy of the tongue.] Cervical-vertebragene Schluckschmerzen in der Hals-Nasen-Ohren-Heilkunde – Die Zungenbeintendopathie. Manuelle Medizin 1988;19:85. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:22 Svatko LG, Ivanichev GA, Sobol' IL. [Manual therapy of various forms of auditory function disorders caused by pathology of the cervical spine]. Vest Otorinolaringal 1987;2:28-31.(Russian)
Terrahe K. [The cervico-cranial syndrome in the practice of the otorhinolaryngologist.] Larynhol Rhinol Otol (Stuttg).] 1985;64(6):292-299. [German] (Abstract)
Terrahe K. [The cervico-cranial syndrome in the practice of the otorhinolaryngologist.] Laryngol Rhinol Otol (Stuttg). 1985;64(6):292-299.
Zimmermann R. [Cervicogenic disease pictures in ENT.] HNO. 1994;42(4):199-201. (German)

GASTROINTESTINAL

Filippkin MA, Akberov RF, Vasenin BN. [Functional disorders of the digestive tract in children with vertebrogenic diseases] Vestn Rentgenol Radiol. 1995 Nov-Dec;(6):19-22. Russian. (Pubmed extract)
Gutzeit K. Das neurovaskulare problem in der Ätiologie und pathogenese von ulcus peptic und gastritis (enteritis).(The neurovascular problem in the etiology and pathogenesis of peptic ulcer and gastro-enteritis.) Münchener medizinische Wochenschrift 1951;93:47-49. (Cited in Weiant CW, Goldschmidt S. Medicine and chiropractic. Self Published, New York. 1966:120.)
Gutzeit K. [Peptic ulcer I. Incidence, pathogenesis,etiology, therapy.] Medizinische 1954;4:113-114. (German) (Extract)
Gutzeit K. [Peptic ulcer II. Incidence, pathogenesis,etiology, therapy.] Medizinische 1954;6:179-182. (German) (Extract)
Kamieth H. [Pathogenic importance of the thoracic portion of the vertebral column.] Arch. Orthop Unfallchir 1958;49(6):585-606. (German) (Pubmed extract)
Kameith H. [Diseases of the internal organs from the chiropractic point of view, represented by peptic ulcer.] Medizinische. 1957;25(46):1708-1715. (German) (PMID 13492964)
Lewit K, Rychlíková E. [Reflex and vertebrogenic disturbances in peptic ulcer.] In: Lewit K, Gutmann G, eds. Bratislava, Obzor. Functional pathology of the motor system. Rehabilitácia. 1975 Suppl. 10-11;116-119. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:284.) Filippkin MA, Akberov RF, Vasenin BN. [Functional disorders of the digestive tract in children with vertebrogenic diseases] Vestn Rentgenol Radiol. 1995 Nov-Dec;(6):19-22. Russian. (Pubmed extract)
Rychlíková E, Lewit K. [Functional disorders of the spine and reflex changes in peptic ulcer of adolescents.] Vnitr Lek. 1976;22(4):326-335.
Rychlíková E, Lewit K. [Vertebrogenic dysfunction and reflex changes in gastric and/or duodenal ulcer in adolescents.] Vertebrogenní funkěnú poruchky a reflexní změny při oõrèdové chorobé mladistrých. Vnitřni Lèkařstvi 1976;22:326-335. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:284.) (See also Pubmed: 1266094 Pubmed – Czech)

Rychlíková E. [Pain in the gall bladder region due to vertebrogenic disturbance.] Schmerzen im Gallenblasenbereich auf Grund vertebragener Störungen. Deutsches Gesundheitswesn. 1974;29:2092. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:285.)

Seuss W. Therapie des bluthochdrucks durch chiropractic. (Therapy for high blood pressure through chiropractic. Heilkunst 1960;73. (As cited in Weiant CW, Goldschmidt S. Medicine and chiropractic. Self Published, New York.1966:123.)

Tilscher H, Bogner G, Landsiedl F. [Viseral diseases as a cause of lumbar pain syndrome] Vizerale Erkrankungen als Ursache von Lumbalsyndromen. Zeitschrift für Rheumatologia 1977;36:161. (Cited in: Lewit K. Manipulative therapy in rehabilitation of the locomotor system. 3rd edn. Butterworth Heinemann, Oxford. 1999:285.)

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Biedermann F. Ganzheitsbehandlung wirbelsäulebedingter krankheiten (Holistic treatment of vertebrally conditioned diseases. Hippocrates 1954;25(10):308-313. (As cited in Weiant CW, Goldschmidt S. Medicine and chiropractic. Self Published, New York. 1966:118.)

Davydov OV.[Manual therapy in vertebrogenic diseases caused by osteochondrosis] Voen Med Zh. 1989 Jun;(6):30-32. (Russian) (Pubmed extract)

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Appendix 5

The ACC Paradigm

WORLD FEDERATION OF CHIROPRACTIC | FÉDÉRATION MONDIALE DE CHIROPRATIQUE | FEDERACIÓN MUNDIAL DE LA QUIROPRÁCTICA

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WFC POLICY STATEMENT

Adoption of the ACC Paradigm

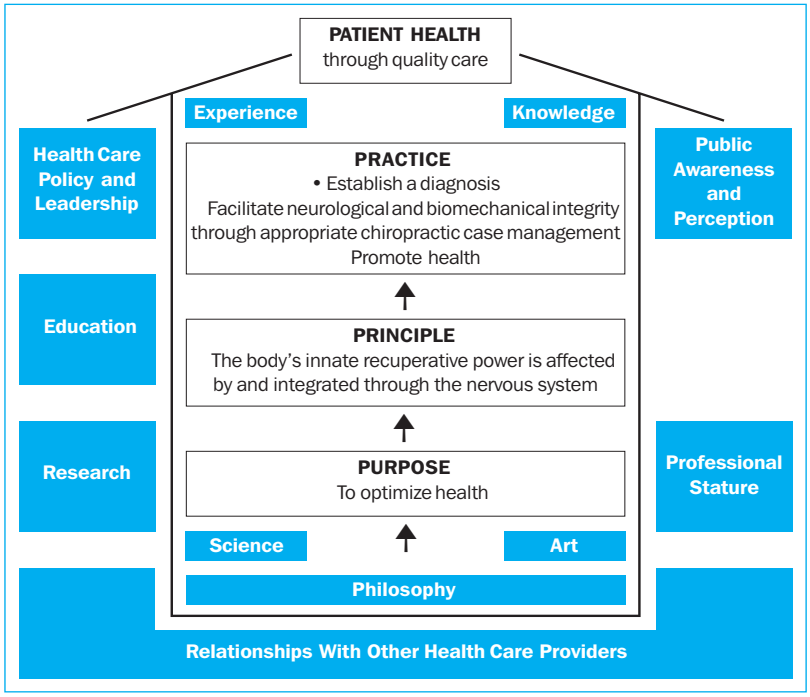
Approved by the Assembly of the World Federation of Chiropractic
Paris, May 23, 2001

Whereas the Association of Chiropractic Colleges (ACC) reached unanimous agreement on the Paradigm of Chiropractic in July 1996, as shown in Figure 1 attached hereto;

And whereas the American Chiropractic Association and the International Chiropractors' Association have jointly moved that the ACC Paradigm of Chiropractic be adopted by the World Federation of Chiropractic;

Now therefore be it resolved that the ACC Paradigm of Chiropractic be so adopted.

Figure 1 **The ACC Chiropractic Paradigm**



1.0 Preamble

The Association of Chiropractic Colleges (ACC) is committed to affirming the profession by addressing issues facing chiropractic education. The ACC brings together a wide range of perspectives on chiropractic and is uniquely positioned to help define the chiropractic role within health care.

The ACC is committed to greater public service through reaching consensus on the following issues which are important to the chiropractic profession:

- continued enhancement of educational curricula;
- strengthening chiropractic research,
- participating and providing leadership in the development of health care policy,
- fostering relationships with other health care providers,
- affirming professional confidence and conduct, and
- increasing public awareness regarding the benefits of chiropractic care.

The member Colleges of the ACC represent a broad diversity of institutional missions. The presidents have drafted a consensus statement that includes the following:

- the ACC position on chiropractic,
- a representation of the chiropractic paradigm, and
- clarification regarding the definition and clinical management of the subluxation.

Additional statements will be forthcoming as the ACC continues to provide meaning and substance regarding what is taught in chiropractic colleges and how this information influences the present and future of the profession.

2.0 ACC Position on Chiropractic

Chiropractic is a health care discipline which emphasizes the inherent recuperative power of the body to heal itself without the use of drugs or surgery.

The practice of chiropractic focuses on the relationship between structure (primarily the spine) and function (as coordinated by the nervous system) and how that relationship affects the preservation and restoration of health. In addition, Doctors of Chiropractic recognize the value and responsibility of working in cooperation with other health care practitioners when in the best interest of the patient.

The Association of Chiropractic Colleges continues to foster a unique, distinct chiropractic profession that serves as a health care discipline for all. The ACC advocates a profession that generates, develops, and utilizes the highest level of evidence possible in the provision of effective, prudent, and cost-conscious patient evaluation and care.

3.0 The Chiropractic Paradigm

PURPOSE. The purpose of chiropractic is to optimize health.

PRINCIPLE. The body's innate recuperative power is affected by and integrated through the nervous system.

PRACTICE. The practice of chiropractic includes: establishing a diagnosis, facilitating neurological and biomechanical integrity through appropriate chiropractic case management, and promoting health.

FOUNDATION. The foundation of chiropractic includes philosophy, science, art, knowledge, and clinical experience.

IMPACTS. The chiropractic paradigm directly influences the following: education; research; health care policy and leadership; relationships with other health care providers; professional stature; public awareness and perceptions; and patient health through quality care.

4.0 The Subluxation

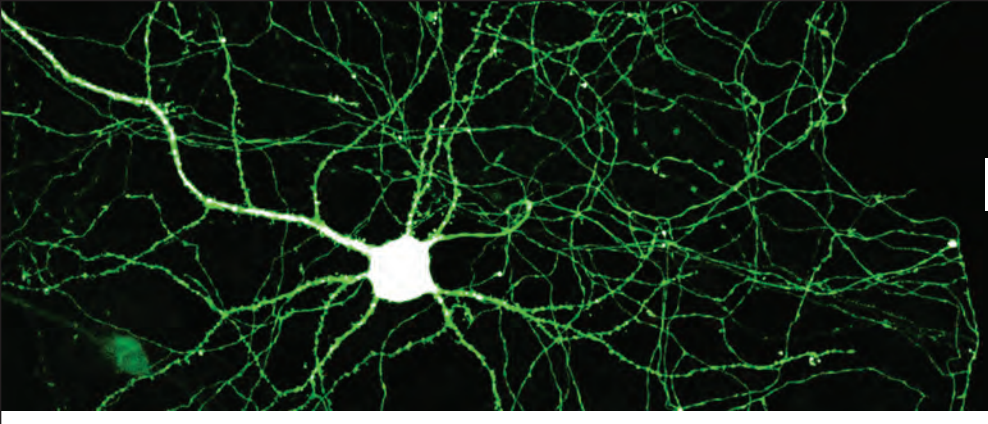
Chiropractic is concerned with the preservation and restoration of health, and focuses particular attention on the subluxation.

A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health.

A subluxation is evaluated, diagnosed, and managed through the use of chiropractic procedures based on the best available rational and empirical evidence.

Appendix 6

Important Somato-Visceral relays arising from the Upper Cervical Spine



IMPORTANT SOMATO-VISCERAL RELAYS ARISING FROM THE UPPER CERVICAL SPINE

Cerebral Cortex

4. → Hypothalamus

3. ↑

Pituitary Gland

2., 3., 4., 8. → Hormones

2., 3., 4., 8. ↑

Thalamus

3. ←

Trigeminal Cervical Nucleus

2. →

Hypothalamus

1. ↑

1. ↑

C1-C3 Anterior Primary Rami *(Disc and Alar ligaments)*

1. ↑

C1-C3 Posterior Primary Rami *(Facets)*

CN VII, IX, X

5., 6., 8. ↓

8., 17. ↓

Motor Nucleus CN V

Periaqueductal gray matter

7. ↓

Temporalis m.
Masseter m.
Medial pterygoid m.
Lateral pterygoid m.
Tensor tympani m.
(tinnitus)
Tensor veli palatini m.
(Meniere's Syndrome /Otitis Media)

17. 8. ↓

Raphe magnus nucleus

17. 8. ↓

Descending reticular formation

17. 8. ↓

Pre-ganglionic synaptic inhibition of nociception

Post-ganglionic synaptic inhibition of nociception

Locus cerelus

Rostral ventral lateral medulla 9.

Intermediate lateral column

Pre-ganglionic sympathetic

3., 8.

Post-ganglionic sympathetic

Immune organs
Blood vessels 10.
Annulus fibrosis of the disc 11., 12., 13., 14.
Viscera 8., 13., 15.
Intrafusal fiber of muscle spindle 16.

Conceptualization and references provided by Dan Murphy, D.C., DABCO

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