

# CHIROPRACTIC NEUROLOGY RESEARCH BRIEF

A QUARTERLY NEWSLETTER FOR HEALTH CARE PROFESSIONALS BY MARK SARACINO, DC, DACAN

VOLUME SEVEN

ISSUE TWO

## Vertebral Hypomobility More Common than Subluxation

The previous issue of this research brief (issue six - number one, February 2011 on disc lesions) included new evidence that the actual vertebral disc causes spinal pain and the safety and general treatment directives of chiropractic neurologists toward spinal pain and disc herniations. This issue describes the specifics of vertebral analysis, in the absence of disc involvement, for the treatment of spinal pain.

Low back pain is one of the most common conditions known to mankind. Essential to the diagnosis is identifying the source of pain so the most appropriate treatments can be rendered.

### Definitions

Chiropractic Neurology is an exclusive sub-specialization within chiropractic that emphasizes the neurologic components of the brain and spinal cord and utilizes spinal manipulation less often.

Chiropractic philosophy espouses that vertebral subluxations cause abnormal functioning of the spine (1), similarly to how osteopathic philosophy views spinal limitations as causing fluid and blood flow variations which produce body dysfunction. Chiropractic neurologists believe in both of these principles plus other etiologies for spinal pain, namely, their neurologic influences. After organic disease and gross pathology are ruled-out from referrals to medical specialists and diagnostic facilities and summary-of-findings is fax-transmitted to the referring doctors. The patient is always sent back to the primary physician for follow-up. Long-term therapy plans are seldom implemented.

- 1) 'Vertebral Hypomobility' is when a motion segment, two mobile, articular and contiguous hard tissues, has compromised range-of-motion in any or all of its respective planes-of-motion. Only 'motion palpation' can determine if two adjacent segments have a reduction of motion and each range-of-motion should be tested. Although vertebrae may not appear 'out-of-place' from palpation or radiography its ranges may be diminished. Hypomobility is a biomechanical aberration of the spine **most commonly observed.**

- 2) 'Vertebral Subluxation', a term too often used and misinterpreted, is when a bone is juxtapositioned. This may be verified with static palpation and radiographs, however, static palpation only reveals the location of the spinus process not its articular facet from where the motion segment originates. Often, due to ossification center malformations during development, derivations of the length and midline orientation of the spinus process make the spinus process NOT a good indicator of vertebrae location. Trauma to the spine is the usual etiology of subluxation and it is seldom seen, because it is mostly a transient state of the vertebrae.
- 3) 'Vertebral Fixation' is when a vertebral is locked and not moving through all of its ranges-of-motion. 'Locking-up' is often found in severe and acute spinal conditions only. It usually progresses to hypomobility after the acute phase of therapy.

Vertebrae being out-of-place or subluxated is least often found and only one of three possibilities for a vertebrae's compromised functionality. Conversely, vertebral hypomobility is most often found. Because the dynamics of the vertebral motion segment is complex simplifying the explanation of the etiology of pain with the term subluxation has a place in patient education because it is a recognized terms that resonates well with patients. I seldom use this term because it is least often diagnosed. A detailed explanation of the pathogenesis of the causative agent, most often vertebral hypomobility, and the neurologic responses of pain and compensation is employed.

### **Etiology of Low Back Pain**

The lumbar lordosis (forward arcing curve) is an important consideration for its effect on low back pain. An abnormal lumbar lordosis increases the incidence of low back pain and the predictability of first-time onsets (2, 3) and there is a strong correlation between a reduced lumbar curve and chronic low back pain (4-9). Higher in the spine the trunk's lateral shift or lateral translation of the thorax, relative to the pelvis is frequently associated with low back pain and lumbar intervertebral disc lesions (10).

### **Pain Generating Tissue**

Virtually all tissues of the spine contain nociceptors (pain receptors). These tissues include; muscles, ligaments, tendons, articular facet capsules, dura matter, nerve tissue, AND the intervertebral discs' outer rings. Recent discoveries have found that the discs are one of the most commonly effected tissues responsible for generating pain (11-13) and they affect up to two-thirds of patients with low back pain (13).

Asymmetric loading, such as low back flexion from being bent over, slouching (hypolordosis) or sitting with a poorly-supported back rest, lateral flexion (side bending) or shear (flexion and rotation) create concentrations of stress on the disc's outer portion (annulus fibrosis) (14) which are pain sensitive. Prolonged flexion can cause fissure formation in the disc (15) which increases its predisposition to bulging (16).

An 80 millimeter anterior thorax (17) will double the L5 disc pressure. As little as a 40 millimeter anterior or posterior of the thoracic cage caused an approximate 60 percent increase in the compressive forces at the L5 disc (18).

Lateral bending of the thorax (trunk list) causes compression of the lumbar discs, on the same side. Contralaterally, bending produces an increase of tone at the paraspinal muscles not just because they are being stretched, but because the homolateral proprioceptors (joint position sense afferents) in the articular facet capsules become stimulated homolaterally (10). Mostly, the cerebellum, through connections with the vestibular system and parietal lobes, initiates compensatory tonic protective mechanisms that cause muscle spasm. This affects the verticality of the spine and causes a functional scoliosis which is best seen in an A-P x-ray view (19).

The neurologic response to this is that the nociceptors stimulation, from excess joint mechanoreceptor stimuli, reaches threshold and synapse which initiates the phasic protective mechanism of muscle spasm.

## **Normal Spinal Alignment**

Standard measures of normalcy (20, 21) are applied to the lateral lumbar view. This allows for the identification of lumbar postural aberrancies and subluxation (22-31). The lateral flexion and lateral extension views show hypomobility.

You may have noticed in recent years that radiology reports include terms like, “subluxation, lateral shift, forward curvature aberrations, accentuation of the lordosis, alteration of the kyphosis” (backward arcing thoracic curve), forward displacement or listing (anterolisthesis) and so forth. Chiropractic’s popularity brought them back into use in spinal imaging. Some originated from spinography (radiographic assessment of spinal alignment) which was developed in the early part of the last century.

Among some of the important standard radiographic measures we use are: Ferguson’s Weight-bearing line, a measure from the middle of the third lumbar vertebral body (L3) inferior to the sacrum at its anterior prominence determines A-P positioning of the lumbar spine, the Sacral Base Angle measures downward tilt of the sacral base (that part of the sacrum which articulates with the L5 disc) and the lumbosacral angle which measures the angle between the inferior end plate of L5 and the sacral base.

In fact, the A-P Open Mouth view which was invented by a chiropractor. It is a standard view of radiographic series of the cervical spine. It visualizes its top three motion segments; occiput, C1 and C2. It reveals occipital tilt or list, C1’s laterality onto C2, osteophytes, C2’s odontoid process (to rule out fracture) and its midline orientation relative to C1 among other findings.

One of chiropractic’s treatises is that a normally aligned and mobile spine produces weight-bearing which minimizes the deleterious effects on the spine which decreases the predisposition to pain and premature degeneration (32).

## Chiropractic Neurologic Treatment Protocols

Chiropractic's hands-on, drug-free treatments reduce pain by decreasing the afferentation of the spinal nociceptors by restoring the motion of vertebrae and alignment of spinal regions. Very specific manipulative forces beyond the physiologic range-of-motion with the proper angle, velocity and depth are applied to those motion segments with limited range-of-motion which sometimes creates an audible sound heard during the manipulation. Not the sound heard, but a properly-directed, high velocity, low amplitude manipulative force restores normal dynamics of the spinal motion segment by decreasing nociceptors afferentation and the resulting muscle spasm and pain one segment at a time. Physical therapists cannot apply manipulative forces beyond the normal physiologic range-of-motion.

One must determine which type of vertebral lesion is present at which motion segment and to what extent there is limitation before spinal manipulative therapy is implemented? Additionally, there are primary and secondary hypomobility, subluxation and/or fixation in the area-of-involvement and varying degrees of aberration in the compensatory, or secondary, area-of-involvement.

In my exercise rehabilitation area stretching and exercise are often used to add range-of-motion and stability which produces the best long-term outcome. Long-term treatment plans are seldom recommended and over-utilization of manipulative therapy does not occur.

## Summary

Abnormal lumbar alignment is associated with low back pain, because the additional mechanical stress and leads to pain and degenerative changes. Our approach to treating back pain is to attempt to correct its underlying cause, whether it is from hypomobility, subluxation, fixation, postural (spinal region) aberrancies after other pathologies are ruled out. This is a proven and effective alternative treatment option to NSAIDs and physical therapy for patients suffering from low back pain.

I perform manipulation less often than most other chiropractors. My emphasis is on the muscle, ligaments, tendons, capsules and neurologic aspects of joints, including the extremities, hence, the need for fewer manipulations. Since muscle move bones, without their full compliance a manipulation of it bones will not produce a long-lasting therapeutic effect. My practice is broad-in-scope and within the confines of its licensure and education. Often referrals are made to medical specialists and diagnostic facilities.

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