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The Mechanism of the Chiropractic Spinal Adjustment/Manipulation: Subluxation Degeneration

By William Owens and Mark Studin | October 2017

More and more evidence is coming forward demonstrating both spinal stability and biomechanical balance as an important aspect of spine care. The good news is this is well within chiropractic's scope, however many doctors of chiropractic are missing the education to accurately evaluate and objectify these types of biomechanical lesions. Our profession has spent most the last 122 years focused on TREATING these biomechanical lesions (Vertebral Subluxation, Joint Fixation, etc.) with little regard to the "assessment" component. The reason that is a critical statement, is that too often we treat compensation vs. the unstable joint.

Our roots and subsequently the true value and expertise of the doctor of chiropractic is in the assessment with treatment far secondary to an accurate diagnosis The medical community that both the authors and the doctors we teach no longer confuse our delivering of chiropractic care with a physical therapy manipulation or mobilization. The reason, our focus is on the diagnosis, prognosis and treatment plan BEFORE we render our treatment.

With medical specialists who understand spine, our conversation centers on spinal biomechanics and how a specific chiropractic spinal adjustment will restore sagittal/coronal alignment and coupled motion balance the spine. We discuss spinal biomechanics and have the literature and credentials to validate our diagnosis, prognosis and treatment plan. Chiropractic has been the leader in this treatment for over a century, but since we had chosen to stay outside of the mainstream healthcare system we had no platform to take a leadership position or be heard.

Keorochana et al, (2011) published in Spine and out of UCLA, titled "*To determine the effects of total sagittal lordosis on spinal kinematics and degree of disc degeneration in the lumbar spine. An analysis using positional MRI*." Remember that this article was 8 years ago and as a concept has evolved considerably since it was first discussed in the late 1990s. This is the clinical component of what Panjabi had successfully described and reproduced in the laboratory. It is now starting to become mainstream in clinical practice.

Many people ask why would surgeons care about the biomechanics of the spine when they are looking simply for an anatomical lesion to stabilize [fracture, tumor, infection, cord compression]? The authors answer this question by stating "It has also been a topic of great interest in the management of lumbar degenerative pathologies, especially when focusing on the role it may play in accelerating adjacent degeneration after spinal fusionand non-fusion procedures such as dynamic stabilization and total disc replacement." [pg. 893]

Regarding the type and number of patients in the study, the authors reported the following, "pMRIs [positional MRI] of the lumbar spine were obtained for 430 consecutive patients (241 males and 189 females) from February 2007 to February 2008. All patients were referred for pMRI [positional MRI – which included compression in both flexion and extension with a particular focus on segmentation translation and angular motions] due to complaints of low back pain with or without leg pain." [pg. 894] This is the part where they looked for **hypermobility**.

In the first step in the analysis, the authors reviewed data regarding the global sagittal curvature as well as the individual angular segmental contributions to the curvature. The next step involved the classification of the severity of

lumbar disc degeneration using the Pfirrmann classification system. [See Appendix A if you are not familiar]. This is where they looked for **segmental degeneration**. The patients were then classified based on the lordosis angle [T12-S1]. The groups were as follows:

Group A – Straight Spine or Kyphosis – [lordosis angle <20°]

Group B – Normal Lordosis – [lordosis angle 20° to < 50°]

Group C – Hyperlordosis – [lordosis angle >50°]

There is a **structural** categorization [lordosis] and a **degenerative** categorization [Pfirrmann] in this paper and the authors sought to see if there was a predictable relationship.

The results of this study were interesting and validated much of what the chiropractic profession has discussed relating to segmental "compensation" in the spine. Meaning, when one segment is hypomobile, adjacent segments will increase motility to compensate. The authors stated, "The sagittal lumbar spine curvature has been established as an important parameter when evaluating intervertebral disc loads and stresses in both clinical and cadaveric biomechanical investigations." [pg. 896] They continue by stating "In vitro [in the laboratory or outside of the living organism] biomechanical tests do not take into account the influence of ligaments and musculature, and may not adequately address the complex biomechanics of the spine." [pg. 896]

When it comes to spinal balance and distribution of loads in the spine, the authors reported "Our results may indicate that the border segments of lordosis, especially in the upper lumbar spine (L1–L2, L2–L3, and L3–L4), have greater motion in straight or kyphotic spines, and less segmental motion in hyperlordotic patients." [pg. 896]

They continued by stating, "A greater degree of rigidity is found at the apical portion of straight or kyphotic spines, and more mobility is seen at the apical portion of hyperlordotic spines." [pg. 897] **Therefore, in both cases we see that changes in the sagittal configuration of the human spine has consequences for the individual segments involved.**

This raises the question, "how does this related to accelerated degeneration of the motion segments involved?" [Subluxation Degeneration] The authors reported, **"Regarding the relationship between the degree of disc degeneration and posture, subjects with straight or kyphotic spines tended to have a greater degree of disc degeneration at border segments, with statistical significance in the lower spine (L5–S1).** On the other hand, hyperlordotic spines had a significantly greater degree of disc degeneration at the apex and upper spine (L4–L5 and L1–L2). The severity of disc degeneration tended to increase with increased mobility at the segments predisposed to greater degeneration (border segments of straight or kyphotic spines and apical segments of hyperlordotic spines)." [pg. 897]

In conclusion, the authors state… **"Changes in sagittal alignment may lead to kinematic changes and influence load bearing and the distribution of disc degeneration at each level."** [pg. 897]
"Sagittal alignment may alter spinal load and mobility, possibly influencing segmental degeneration." [pg. 897]
"Motion and the segmental contribution to the total mobility tended to be lower at the border of lordosis, especially at the upper segments, and higher at the apex of lordosis in more lordotic spines, whereas the opposite was seen in straight or kyphotic spines." [pg. 897]
Although medicine is addressing this at the surgical level, as a profession they realize they have no conservative solutions, which has "opened the door" for the credentialed doctor of chiropractic to be in a leadership role in both teaching medicine about the role of the chiropractor as the primary spine care provider and the central focus of the care path for mechanical spine issues.