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The Mechanism of the Chiropractic Spinal Adjustment/Manipulation: Subluxation Degeneration - Part 4 of a 5-Part Series

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

Effect of Sagittal Alignment on Kinematic Changes and Degree of Disc Degeneratio in the Lumbar Spine

Part 4 of a 5 Part Series

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A report on the scientific literature

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 founding doctors had used very specific techniques to analyze the spine from a functional perspective and mo of our contemporary treatment techniques came out of these analysis, which are the basis for many of our most common techniques taught in today's chiropractic academia. It seems in hindsight, that the major discussions of t time [early chiropractic] were about "identification" of the lesion to adjust, then evolved into the best WAY to delive the adjustment.

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. T 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 specif 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 st outside of the mainstream healthcare system we had no platform to take a leadership position or be heard.

Medicine at both the academic and clinical levels are embracing chiropractic as the primary solution to mechanical spine issues (no fracture, tumor or infection) because as one primary care provider shared with us "traditional medical therapies inclusive of physical therapy has no basis in reality in how to treat these patients, which has led in part, to the opiate crisis." Part of the validation of what chiropractic offers in a biomechanical paradigm comes from surgical journals in the medical community.

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 a 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]

They continue by stating "Alterations in the stress distribution may ultimately influence the occurrence of spinal degeneration. Moreover, changes in sagittal morphology may alter the mechanics of the lumbar spine, affecting mobility. Nevertheless, the relationships of sagittal alignment on lumbar degeneration and segmental motion have not been fully defined." [pg. 893] This is precisely what our founding fathers called "Subluxation and Subluxation Degeneration!"

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 severit of lumbar disc degeneration using the Pfirrmann classification system. [See Appendix A if you are not familiar]. Thi 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.

Appendix A

Grade	Structure	Distinction of nucleus and annulus	Signal Intensity	Height of intervertebral disc
I	Homogenous, bright white	Clear	Hyperintense, isointense to cerebrospinal fluid	Normal
II	Inhomogenous with or without horizontal bands	Clear	Hyperintense, isointense to cerebrospinal fluid	Normal
III	Inhomogenous, grey	Unclear	Intermediate	Normal to slightly decreased
IV	Inhomogenous, grey to black	Lost	Intermediate to hypointense	Normal to moderately decreased
V	Inhomogenous, black	Lost	Hypointense	Collapsed disc space

*Adapted from Pfirrmann et al. (2001) (8)

Note. Teichtahl, A. J., Urquhart, D. M., Wang, Y., Wluka, A. E., Heritier, S. & Cicuttini, F. M. (2015). A dose-response relationship between severity of disc degeneration and intervertebral disc height in the lumbosacral spine. *Arthritis Research & Therapy, 17*(297). Retrieved from https://openi.nlm.nih.gov/detailedresult.php?img=PMC4619538_13075_2015_820_Fig1_HTML&req=4

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 establishe 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 an L1–L2). The severity of disc degeneration tended to increase with increased mobility at the segments predisposed t greater degeneration (border segments of straight or kyphotic spines and apical segments of hyperlordotic spines) [pg. 897]

The scientific literature and medicine is now validating (proving) what chiropractic has championed for 122+ years, that the human spine is a living neurobiomechanical entity, which responds to the changes in the external

environment and compensates perpetually seeking a homeostatic equilibrium. We can now have verification that changes or compensation within the spinal system as a result of a bio-neuro-mechanical lesion (vertebral subluxation) results in degeneration (subluxation degeneration) of individual motion segments.

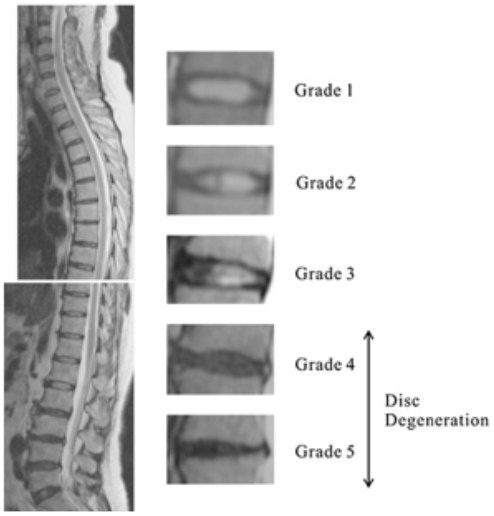
In conclusion, the authors state…

"Changes in sagittal alignment may lead to kinematic changes and influence load bearing and the distribution of di 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 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]

Appendix B



Note. Teraguchi, M., Yoshimura, N., Hashizume, H., Muraki,S., Yamada, H.,Minamide, A., Oka, H., Ishimoto, Y., Nagata, K. Kagotani, R., Takiguchi, N., Akune, T., Kawaguchi, H., Nakamura, K., & Yoshida, M. (2014). Prevalence and distribution of intervertebral disc degeneration over the entire spine in a population-based cohort: the Wakayama Spine Study. *Osteoarthritis and Cartilage, 22*(1). Retrieved from http://www.sciencedirect.com/science/article/pii/S1063458413010029

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.

When communicating with patients and medical professionals it is critically important to educate them on what "current research" is showing and why it is important that this chiropractic approach to spine care is the future of spine care in the United States.

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