

Facet Tropism and Disc Bulge

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The Gonstead system is an interrelated set of thoughts and tools that, when used properly as a system, allows the practitioner to make a much more thorough and accurate assessment of a patient's spine for the detection and correction of the vertebral subluxation than a practitioner who does not use all these tools. The symptoms, patient history, visualization, palpation, instrumentation and x-ray combine to form a multifaceted and complete picture.

How these tools and ideas interrelate, is often talked about during the workshops and seminars that all Gonstead practitioners have attended, but it has not been written about nearly enough. Each part of the system has a direct relationship with all the others and without any one of them, or without a proper utilization of any one of them, the analysis and the patient care suffer.

Taking x-ray is still under attack, not from the medical profession, but from within the chiropractic profession. The American Chiropractic Association, in releasing their "choose wisely" guidelines has stated that, "in the absence of red flags, do not obtain spinal imaging (x-rays) for patients with acute low back pain during the six weeks after the onset of pain", and "do not perform repeat spinal imaging to monitor patient's progress". This demonstrates an unnerving misunderstanding of everything a chiropractor SHOULD be doing and is based on the faulty premise that the amount of radiation contained in not only our x-rays but any and all x-rays is a danger to people. At some point in our careers, we all have likely fallen into that trap and justified our taking of x-rays as, "the benefit is worth the risk", but this simply is not true. The truth is that due to the effects of testing something that is possibly dangerous to humans, we have no studies confirming, nor denying the dangers of low-level radiation exposure. What does exist is some anecdotal evidence and theoretical evidence that it may even be beneficial. I will discuss this in a future article.

In x-rays, we have the most objective tool in all of the profession. Literally black and white with subtle shades of gray, they are measured to the millimeter and the degree. The repeatability, both intra-and inter-examiner is extremely high, so much so, that even students with a basic instruction on analysis have high repeatability scores. They are also the one tool that has the least number of variables, not being affected by mood, drugs, ice, heat, swelling. ¹

The suggested alternative to x-ray is palpation, but there are many things that palpation will not reveal, in particular for this discussion is the relationship between facet tropism and disc bulge. It stands to reason that there is a very strong relationship between all the parts of any one motion segment of the spine. Older studies have found that, "disc degeneration precedes facet joint osteoarthritis", and speculate that it may do so by 20 years ². That more sagittally oriented facet joints and more significant facet joint tropism contributes to degenerative spondylolisthesis ^{3, 4}. The Gonstead chapters, on page 52, in the section (trauma initiates subluxation) has six points

elucidating the cause of the interference of the vertebral subluxation: 1. Trauma misaligned the vertebra, shifting it into a sustained position; 2. The shifting vertebral body compresses the disc and exerts pressure on the nucleus. Since the nucleus has a high water content, and is noncompressible, it is forced against annulus; 3. The annulus fibers are stretched beyond their elastic limit by the bulging nucleus, resulting in damaged or deranged fibers; 4. Tissue damage induces an inflammatory reaction. Intracellular edema infuses the disc, causing it to expand and protrude; 5. Protrusion of the disc produces compression upon neural structures within the neural canal, or in the inter-vertebral foramen; 6. The nerve pressure thereby produced results in the nerve dysfunction. The following paragraphs, entitled (disorder of the disc) goes on to state how the apophyseal joints are freely movable and “are not in any way causative to the condition of the subluxation. The dis-relationship of the facets as a result of, and secondary to, the misalignment at the fibro cartilaginous joint; that is, at the intervertebral disc.”⁵ It is interesting to note that this chapter was published in 1970, 29 years before Fujiwara et al came to the same conclusion.

In 2009 *Spine* published a paper entitled, “Dynamic Bulging of Intervertebral Discs in the Degenerative Lumbar Spine.”⁶ In this paper they looked at symptomatic lumbar disc degeneration with MRI. They found that moderately degenerated discs showed greater bulging than mildly degenerated discs and that severely degenerated discs also had a greater tendency to bulge but it was not quite significant. Most importantly they found that healthy, grade 1 discs, which show some bulging in the posterior during flexion but not during extension. As discs progressively degenerated there was an increased tendency to bulge at the posterior during extension, rather than flexion. This is again, something that Dr. Gonstead had surmised and probably observed during his years of study both in his clinic and when performing spine dissections at Lincoln College of Chiropractic.

In 2011 the *European Spine Journal* published an article titled, “*The Relationship between Degree of Facet Tropism and Amount of Dynamic Disc Bulge and Lumbar Spine of Patients Symptomatic for Low Back Pain.*”⁷ This study again used MRI and looked at the presence and degree of facet tropism and its effect on disc bulging in both the static and dynamic positions. It is the first paper to look at the effect of facet tropism on disc bulging. In the past it is been demonstrated that there is a relationship between posterior annular tears and facet asymmetry and a high association between the coronal facet in the side of disc herniation.

The authors looked at the relationship between facet tropism, which they divided into three groups: no tropism-less than 6°, mild facet tropism-6° to 11° and severe facet tropism which was greater than or equal to 11°, disc bulge in the neutral, flexed and extended positions and patient age. In this study of symptomatic patients they found that the mean static bulge increased significantly with age at the L3 and L4 disc but the mean dynamic bulge did not increase with age at any level. A significant increase in the dynamic bulge when going from extension to neutral was seen at both the L3 and L4 desks in the group with severe facet tropism and as age increased.

It is interesting to note that throughout this study, the L5 disc is the least likely to have any significant changes in the size of the bulge from motion. Yet, if one looks in the notes of Gonstead chiropractors, it would be the most commonly and earliest degenerated disc as well as the most adjusted lumbar

vertebra. I find this particularly interesting. I had incorrectly assumed that L5 would have had the biggest change in bulge size not only due to how often that disc is thin/degenerated but also because of it being the last movable segment in the spine. It would seem that the extra ligamentous attachments of L5 to the sacrum and ilia stabilize this motion segment and minimize the dynamic bulging.

Lastly, the authors made an interesting observation that a large limitation of this study is that there is a lack of asymptomatic controls and they acknowledge that they know of no studies that measure the extent of disc bulge in asymptomatic patients. Dr. Gonstead also mentions this in chapter 5 of the *Gonstead Chiropractic Science and Art*, stating that there are very few x-rays taken of healthy or asymptomatic patients. I looked but was unable to find a study that compared MRI findings with x-ray to determine the degree of tropism that must be present to be evident on a film.

From a chiropractic standpoint, this information would indicate that the presence of facet tropism, disc degeneration and older age predisposes that individual to bulging, if not herniated discs which would call for further (MRI) imaging. This would aid in management of the patient as well as minimizing malpractice exposure.

During our analysis, having a patient complain of increased pain when going from extension to neutral would be an indicator to look more closely for facet tropism especially in older aged individuals. The presence of tropism would automatically change your expected palpation findings and would probably lead the practitioner who does not x-ray to believe that a fixation still exists when one does not. In this and similar cases, instrumentation, symptomatology and visualization would not be changed. The x-ray alone would be the one factor that would change how the adjustment is delivered for all, with the possible exception of the most savvy and seasoned practitioner. The presence of degenerated discs, spondylolisthesis and compression fractures are all very common findings that by their very nature would have to change palpation and yet in almost 22 years of practice I have yet to hear anybody talk about how to differentiate the fixation part of the M.P.I. subluxation model from the aberrant motion that would be caused by a degenerated disc or a compression fracture.

In closing I would like to thank all of you for your support of GCSS and for the wonderful work you do in the field, taking care of patients. Keep studying the tools of our craft and most importantly thinking precisely about what it is and what we are doing. I do believe that we are the future of the profession and that we have barely scratched the surface of our potential. I look forward to seeing all of you at several seminars in 2018, the Gonstead Extravaganza in Mount Horeb in April, Meeting of the Minds in October and if I may plug a very important side project, the adaptability research symposium in Chicago in September. I hope you all had happy holidays and here's to a terrific 2018.

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