

Chiropractic Rehabilitation of Scoliosis: Establishing An Identity and Direction From the Current Literature

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Spinal deformities such as scoliosis are perhaps the visual epitome of what it is that chiropractors do...at least in the eyes of the general public. However, scoliosis has not been highly studied among the chiropractic profession at large. In the PubMed database, a keyword search “chiropractic AND scoliosis” yields only 63 results. Filtering these 63 studies to include only interventional chiropractic studies resulted in a total of 13 studies.

Most of the studies retrieved under these searches have already been reviewed by the Council on Chiropractic Guidelines and Practice Parameters (CCGPP). The council reviewed chiropractic scoliosis literature through 2005. Due to the paucity of chiropractic scoliosis literature, they adopted the guidelines for scoliosis treatment created by the Society on Scoliosis Orthopedic and Rehabilitation Treatment (SOSORT) as well as the Italian guidelines on scoliosis treatment. With this in mind, it is imperative that the chiropractic profession take a serious look at developing treatments, protocols, and guidelines for non-surgical scoliosis treatment. In the years since the CCGPP thoracic spine guidelines were published, only 3 PubMed studies have been published on scoliosis by chiropractic authors, not including literature reviews.

As an example of the relative lack of knowledge on the subject of scoliosis, the literature regarding scoliosis was contained in the thoracic spine section of CCGPP as a subcategory. Scoliosis is a multifactorial disorder, with neurological origins.¹ It also affects the lumbar spine, with perhaps a much larger incidence than that of the idiopathic variety that affects the thoracic spine. Eventually the topic of scoliosis should become its own CCGPP guideline.

Chiropractic treatment of scoliosis seems to have fallen into the same trap as the rest of western medicine. We tend to view scoliosis as primarily an orthopedic disorder, for which orthopedic-style treatments are typically recommended, including exercises, bracing, or surgery. None of these interventions addresses some of the neurological abnormalities now being identified in patients with scoliosis, including both the idiopathic and adult degenerative versions of the disorder.

ScoliScore (www.scoliscore.com), a genetic laboratory test owned by TransGenomic, is a salivary test that evaluates 53 different genetic markers for scoliosis. This test can determine the genetic risk of a mild scoliosis (defined as a Cobb angle of 10-25 degrees) progressing to the level where surgical intervention would historically be recommended (between 40-60 degrees). This test essentially risk stratifies each scoliosis patient. Patients who are genetically high risk may need to pursue an aggressive form of exercise-based treatment or surgical intervention on a more immediate basis with the goal of stabilizing the scoliosis before significant progression occurs. On the other end, patients who are genetically low risk may only need observation and/or home care management strategies during the growing years to prevent curve progression. This conservative strategy would also help to eliminate over-treating patients who otherwise would not need more aggressive or invasive therapies.

Metabolic contributions to scoliosis have also been introduced into the literature more recently. Melatonin deficiency² and melatonin signaling dysfunction³ have been detailed as at least contributory to scoliosis. Leptin signaling dysfunctions and bioavailability have also been suggested.⁴ Finally, neurological contributions have also been discussed, from brain stem abnormalities⁵ to asymmetric sympathetic stimulation⁶ causing abnormal skeletal growth patterns and postural control. To date, chiropractic researchers have not been involved in studying these aspects of scoliosis. Rather, focus has been on the treatment of scoliosis from a completely orthopedic perspective.

Conventionally speaking, only a few studies have been published by chiropractic authors that have studied the combination of chiropractic therapies and scoliosis bracing, including the SpineCor brace,⁷ and the TLSO brace.^{8,9} All three of these studies showed an improved response to the bracing treatment when chiropractic interventions were included.

This presents an opportunity for chiropractors to become involved in the day-to-day management of scoliosis bracing patients, and ultimately begin working with orthopedic surgeons and orthotists rather than the adversarial relationship

many scoliosis surgeons and chiropractors often have. In light of this preliminary chiropractic data, I hope that this incentive is enough for more chiropractic academic and clinical researchers to begin looking at scoliosis research, and fostering inter-professional dialogue for the good of the scoliosis patient.

The Current Scoliosis Treatment Pathway

The current model for scoliosis treatment is mainly based upon the Cobb angle of the scoliosis. The pitfalls and limitations of the two-dimensional Cobb analysis of scoliosis are many, and have been discussed previously.¹⁰ However, likely due to its ease of use, the Cobb angle continues today to be the gold standard by which scoliosis patient care is governed. Essentially, there are three phases of the scoliosis care continuum: 1) observation, 2) bracing, and 3) surgery.

Observation is typically prescribed when the Cobb angle is measured between 10 and 25 degrees. On individual cases, the numbers may be slightly altered based upon age and Risser sign. As long as the patient stays within this Cobb range, no further treatment is recommended. The limitation of the observation phase of scoliosis care is that it does not account for genetic risk, and does not account for some of the biomechanical factors linked to scoliosis, such as sagittal profile changes,^{11,12} flat back deformity,¹³ and poor postural habits.¹⁴ Addressing these biomechanical factors may help prevent curve progression, although this needs to be directly tested.

If a scoliosis progresses, bracing is initiated when the Cobb angle reaches 25-30 degrees. Bracing treatment, however, is only begun if skeletal growth still remains. Therefore, adult patients who have a moderate scoliosis between the 25-40 degree range are not afforded this option. They are likely to be prescribed physical therapy or pain management for their scoliosis symptoms. Various bracing strategies are available, depending upon geographic location and orthotist background. Various authors have suggested that certain braces are better than others. However, rigid bracing typically works the same no matter which style of brace is chosen. Bracing acts as a barrier to push against the spine, through the rib cage, in various translational directions.

The type of brace and scoliosis curve pattern will dictate the direction of these force vectors. The goal of rigid or dynamic bracing is to ultimately prevent progression to surgical threshold. Various types of bracing produce various results,¹⁵ and it has been determined that rigid bracing accomplishes this goal better than dynamic bracing. Again, however, none of these bracing studies reported the use of chiropractic treatment in concert with bracing.

The sole study directly comparing bracing to bracing plus chiropractic manipulation showed that the combination of the two provided a superior result, although the study was very small.⁹ Additionally, bracing does not account for the metabolic and biomechanical factors that may be involved in scoliosis etiology and/or progression. Combining this treatment option with other therapies designed to address these factors may also prove superior to bracing alone. This also needs to be tested.

Finally, surgery is usually recommended when the Cobb angle reaches 40-60 degrees. This also varies by geographic region and training background of the surgeon.^{16,17} Although this option is available for skeletally mature adult patients, it is often not recommended to due lack of rapid progression risk associated with growth spurts. Although surgery has consistently shown to reduce the size of the Cobb angle, there is debate about the safety of the surgery,¹⁸ as well as the long-term sustainability of its treatment effects.¹⁹

Surgical fusion also does not address the metabolic aspects of scoliosis. Although this has not been studied, neglecting the metabolic and other biomechanical factors of scoliosis may account for the high rate of revision surgery necessary for juvenile and adolescent idiopathic scoliosis patients, since the curve continues to progress even after surgical fusion is completed.²⁰

Looking to the Future: Blazing a New Scoliosis Treatment Trail

With the creation of genetic risk stratification,²¹ and other predictive laboratory assessments being studied,²² it is quite feasible to begin looking at scoliosis treatment purely on a patient-by-patient basis. Patients who are genetically or otherwise predictably high risk for scoliosis development or progression may be identified early in their life cycle, so that appropriate treatment may be initiated early in childhood to prevent the progressing spinal orthopedic deformity and all its ramifications.

Patients with mild curves who carry a low genetic or predictive risk may opt for home care management with emphasis on normalizing the metabolic and biomechanical aspects of scoliosis that bracing or surgery do not address, such as those outlined earlier. Predictive testing, early intervention, and neuroendocrine treatments may be the next generation of scoliosis management.

Chiropractic education places a great emphasis on the importance of normal neurologic function. Scoliosis is a neurologic disorder with an orthopedic symptom. If chiropractors begin looking at scoliosis through this frame, it may open doors for the profession to test new ideas and management strategies unique to our training.

The fields of functional medicine and clinical nutrition may also play an important role in addressing the metabolic abnormalities associated with this disorder, and many chiropractors are already well versed in these subjects and poised to help patients with idiopathic scoliosis from this perspective. We have an opportunity to really offer scoliosis patients a viable, comprehensive treatment approach, one not found in any other singular specialty.

I encourage my chiropractic colleagues to contribute to the growing body of non-surgical scoliosis literature. Our collective efforts can dictate how and why scoliosis patients are treated, using the most comprehensive approaches possible, resulting in superior clinical outcomes and more satisfied scoliosis patients and parents.

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