

A Structural Approach to Improve Idiopathic Scoliosis in a 16 year old Female: A Case Study Using Chiropractic BioPhysics® Technique Combined with SpineCor Bracing

Introduction/Objective:

Case report of a patient having persistent low back pain, mid back pain and anterior rib pain associated with severe Idiopathic Scoliosis who underwent Chiropractic BioPhysics (CBP®) treatment protocol as well as SpineCor Scoliosis brace system.

Clinical Features:

At the time of the first chiropractic evaluation in our office, a 16 year old female complained of low back pain, mid back pain, neck pain, headaches and anterior rib pain. These symptoms began insidiously over the last 2-4 years but had gotten significantly worse over the course of 6 weeks prior to the patient's initial visit. Prior to her first evaluation, the patient had seen a chiropractor who performed general manipulation, a physical therapist and several primary care physicians who prescribed pain medication and therapy for pain. The patient consulted an orthopedic surgeon who recommended hard bracing and/or surgery. The patient elected to undergo conservative treatment before surgery.

The low back pain, mid back pain and anterior rib pain were rated on a numerical rating scale (NRS) as 8/10 (0= no pain: 10= bed ridden). The neck pain/headaches were rated a 5/10 on an NRS scale. All lumbar ranges of motion values were limited and painful except left lateral flexion. All cervical ranges of motion values were normal except bilateral lateral flexion. Muscle strength testing was normal, except core muscle testing showed weakness in transverse abdominus, pelvic floor and multifidus musculature. All deep tendon reflexes were normal. All sensory testing was normal. Positive orthopedic tests included Adams Thoracic and Lumbar. Scoliometer readings were 14 degrees right thoracic and 12 degrees left lumbar. Posture evaluation revealed the following: Forward head translation (+TzH), Left thoracic lateral bending (-RzT), Right thoracic translation (-TxT), Right thoracic rotation (-RyT), Right pelvic lateral flexion (+RzP), Left pelvic rotation (+RyP).

Radiographic evaluation was determined to be free of pathology. Radiographic mensuration procedures demonstrated a right thoracic curvature of 46 degrees with a right lateral translation of 52mm, a left lumbar curvature of 38 degrees with 15mm of left lateral translation relative to the S1 tubercle. The patient was categorized as Risser 4 on radiographs. Figure 1B demonstrates the initial radiograph.

Intervention

The patient underwent a series of stress study radiographs to assess patient mobility and corrective pattern of movement to identify the proper sequence of movements needed to reduce the curvatures. Identifying the proper sequence of movements to reduce scoliotic angles is an application of the non-commutative property of finite rotation angles under addition as taught in the procedures of CBP Technique. The thoracic curve reduced to 12 degrees and the lumbar curve reduced to 0 degrees. Figure 1A demonstrates stress study views. Based on these radiographs, the patient's thoracic corrective pattern of movement was determined in the following order: Left thoracic translation (+TxT), Right thoracic lateral bending (+RzT), Left thoracic rotation (+RyT). Based on these radiographs, the patient's lumbar corrective pattern of movement was determined in the following order:

Right lumbar rotation (-RyP), Right lumbar translation (+TxT and -TxP), Left lumbar lateral bend (-RzP)

Based on radiographs, the patient was given a 9mm heel lift on the right side. The patient began CBP protocol utilizing order specific mirror image[®] adjustments, exercises and traction procedures. During the initial phase of care, cervical, thoracic and lumbar manipulations were performed to decrease pain and increase mobility. In addition, core stabilization exercises were given to increase stability. During the course of treatment, the patient was fitted for a SpineCor scoliosis brace.

The patient began CBP structural rehabilitation protocol within two weeks of the initial visit. Due to the progressive nature of the curve, the patient was seen initially 4 visits per week and reduced to 3 visits per week as the patients curvature improved. Patient began with isometric exercises broken down into the corrective pattern of movement and then progressed these exercises to a stability ball. Mirror image adjustments and manipulations were performed. The patient began with three corrective tractions. The first traction was with the patient seated in the thoracic corrective pattern of motion (determined from the stress studies) with the major force applied at the apex of the thoracic curvature through the disc plane line and a force opposing the lumbar curve. The second traction was done recumbent on the right with the lumbar corrective pattern of movement (determined from the stress studies) and the force applied at the apex of the lumbar curve with a force opposing the thoracic curve. In the third traction the patient was placed supine with a posterior to anterior force placed at the transitional segment (T12-L1) of the curve providing a lordotic/anterior translation to the patient. (based on current research, *Spine*, April 2008).

Traction durations began with a few minutes progressing to 20 minutes for maximum ligamentous creep. The patient had updated radiographs every 18-20 tractions through the initial course of treatment. As the patient progressed radiographs and progress exams were done every 12 tractions.

Six weeks after the initial evaluation, the patient was fitted for a SpineCor scoliosis brace. The patient was fitted according to SpineCor protocol in a right thoracic, left lumbar type 3 brace. A radiograph was taken in the brace to assess proper fitting and category. The patient showed significant improvement in the brace on the day of the fitting. The patient was instructed to wear the brace 4 hours per day to start for the first week. Then the patient was instructed to progress time in the brace until they reached 18-20 hours per day in the brace. The patient was encouraged to maintain her current level of physical activity while in the brace such as sports and running. The patient would have progress evaluations and tightening of the brace monthly for the first three months and then every three months after. The patient had radiograph examinations periodically concurrent with traction radiograph examinations to assess traction and bracing progress. The patient was instructed not to wear the brace for 24 hours prior to the radiograph examinations.

Outcome:

A progress evaluation was performed four weeks after initial evaluation. The patient reported low back pain, mid back pain and anterior rib pain had decreased to a 4/10 on a NRS. The patient reported the neck pain/headaches had decreased to a 2/10 on a NRS. Lumbar range of motion had improved since the initial evaluation. The patient had a marked increase in core muscle strength with weakness still present. The patient had improvement in all areas of postural distortions especially in right thoracic translation. Scoliometer readings improved measuring 8 degrees left lumbar and 12 degrees right thoracic. Radiograph analysis indicated right thoracic curvature of 40 degrees with right

thoracic translation of 42mm, left thoracic curvature of 35 degrees with left lumbar translation of 9mm.

After 5-6 months of treatment including SpineCor bracing and 82 visits of corrective traction the patient's radiograph analysis indicated significant improvement with the following measurements: right thoracic curvature of 31 degrees with right thoracic translation of 28 mm, left thoracic curvature of 20 degrees with left lumbar translation of 7 mm. In addition, the patient indicated a 0/10 on a numerical rating scale for low back pain, mid back pain and anterior rib pain. The patient indicated that she experienced occasional mild anterior rib pain. The patient indicated mild to moderate headaches mostly attributed to an unrelated injury suffered mid treatment. The patient was instructed to continue wearing the SpineCor brace 18-20 hours per day. It was recommended that she would be seen for a maintenance traction visit once every 2-4 weeks to maintain correction. She stated she will return to corrective care as her schedule permits. The patient will continue to be seen for progress examinations to check the brace one time every three months. The patient will continue corrective exercises at home.

6 months after the last traction visit, the patient was seen for a progressive radiograph evaluation to assess curvature. The patient has only been seen one time per 4-6 weeks for maintenance traction and reports that she has only been wearing the brace about 25-50% of the recommended time. Radiograph analysis indicated stabilization with the following measurements: right thoracic curvature of 29 degrees with right thoracic translation of 26 mm, left thoracic curvature of 22 degrees with left lumbar translation of 8 mm. The patient will continue to do maintenance traction one time per 4 weeks as well as at home exercises. The patient plans to return to corrective care as her schedule permits.

Conclusion:

The patient was a 16 year old female with moderate to severe low back pain, mid back pain, anterior rib pain, and neck pain/headaches. The patient's radiograph analysis showed severe right thoracic left lumbar idiopathic scoliosis. The patient was treated with Chiropractic BioPhysics, CBP, order specific mirror image methods (exercise, adjustment, and traction) as well as the SpineCor scoliosis brace for 5-6 months and core stabilization exercises. The patient showed significant improvement on radiograph studies indicating a 16 degree reduction of curvature and a 26 mm reduction of lateral translation in the thoracic spine. The lumbar spine radiographic studies indicated a 16 degree reduction of curvature and a 7mm reduction of lateral translation. These improvements were shown to be stable in a 6 month follow up study as well. In addition the patient showed significant improvement in range of motion, scoliometer readings and subjective pain scale findings showing no pain post treatment.

X-RAY IMAGES:

1A) Stress X-Rays showing corrective movement to reduce curvature:

Lumbar Corrective Movement:

- 1-Right lumbar rotation
- 2-Right lumbar translation
- 3-Left lateral bend



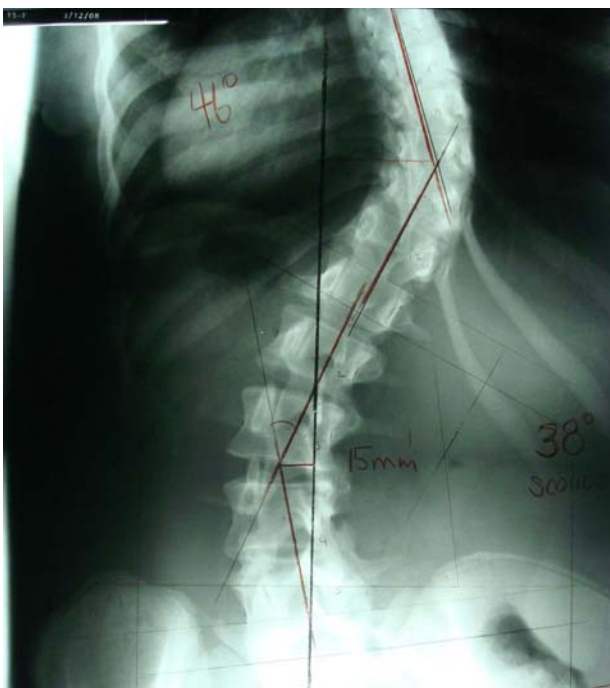
Thoracic Corrective Movement

- 1-Left thoracic translation
- 2-Right lateral bend
- 3-Left thoracic rotation



1B) Initial visit/Pre Treatment and 6 month follow up, Post-treatment X-Rays

Initial X-Ray/Pre Treatment



6 Month post treatment X-ray

