CASE STUDY

Curve Improvement in a Patient with Adolescent Idiopathic Scoliosis Following Chiropractic Care: A Case Report

Cathy Wendland-Colby, D.C. & Davy Lucius Addison, D.C.

Abstract

Objective: To report thoracolumbar scoliosis improvement in an 11-year-old female receiving diversified adjustments and gravity assisted traction.

Clinical Features: The patient was an 11-year-old female with a scoliosis that was undetected at a routine school screening. Objective findings indicated vertebral subluxation and scoliotic curvature through palpation, leg length inequality, thermal scans, and radiographs. She had a 22 degree thoracolumbar curvature obtained using the Cobb method and positive orthopedic tests.

Intervention and outcomes: She was treated with diversified chiropractic adjustments and gravity assisted traction on a weekly basis to total 31 visits over a three month period. Subsequent thermal scans reveal a decrease in paraspinal skin temperature and follow-up radiographs revealed a three degree reduction in the Cobb measurement.

Conclusions: A case of an 11-year-old female with scoliosis is presented. After 31 visits, a Cobb angle reduction of three degrees was achieved. Further investigation into the relationship between chiropractic adjustments and traction procedures is warranted. A long-term follow-up with the presenting patient is also desirable.

Keywords: Scoliosis, Chiropractic, Posture, Cobb angle, Traction, Diversified

Introduction

To date, Adolescent Idiopathic Scoliosis (AIS), which accounts for approximately 80% of the reported cases, is the most common orthopedic deformity affecting children. Idiopathic scoliosis is subdivided into three groups; infantile, when detected before age 3, juvenile, when detected between the ages of 3 and 10 and, adolescent, when detected after 10 years of age and until bone maturity. A diagnosis of AIS is made when all other causative factors including malformation, trauma, neoplasm, and neuromuscular dysfunction have been ruled out. It is estimated that 3% to 5% of the adolescent subgroup is affected by scoliosis, with an increased prevalence noted in the female population.

By convention, scoliosis is described in the literature as a lateral deviation of the spine with a curvature measuring greater than 10 degrees utilizing the Cobb method of measurement. The major concern clinically, regardless of

1. Private Practice of Chiropractic, Woodstock, GA
2. Private Practice of Chiropractic, Nashville, TN
cause, is curve progression. As an early detection measure, mandatory school scoliosis screenings are required in 26 states.

In an effort to determine the effectiveness of such screening programs, a retrospective cohort study was conducted which followed children from kindergarten or first grade until 19 years of age. From the screenings included in the study, 92 children were referred for scoliosis treatment or opinion. At follow-up, 68 children were compliant with referral and sought treatment. Of those 68, it was determined that 41 did not have scoliosis, 11 had curves measuring between 11 and 19 degrees, 10 had curves measuring between 20 and 39 degrees and 6 had curves greater than or equal to 40 degrees.7

The standard treatment options available for AIS are observation for curves between 0 and 20 degrees, bracing for curves between 20 and 40 degrees and spinal surgery for curves greater than 40 degrees. In interviews conducted by Sapouni-Z-Krepsia et al. to determine the experiences of brace treated children, a majority (11 out of 12) reported feelings of stress, fear, anger and shame with regards to wearing a brace.8 Support for bracing is mixed because of a low rate of compliance. This poor compliance rate stems from the time required to wear a brace (up to 23 hours per day), psychosocial factors (including embarrassment, stress and poor body image), back pain, skin irritation and a decrease in quality of life.7 8

With regards to surgery, it has been concluded that case control studies supporting surgical intervention did not exist. The literature also estimated that for 4 surgeries, an AIS patient could potentially spend upwards of $500,000 over 40 years.7

Alternative forms of treatment such as chiropractic adjustments, osteopathic manipulations and exercise have not proven to be effective in the treatment of AIS in regards to curvature measurements.9 However, although limited in number, a few cases have shown promise. Morningstar et al. reported an average Cobb angle reduction of 17 degrees in 19 patients following 4 to 6 weeks of manipulative and postural therapies,10 while Khauv and Dickholtz reported a 12 degree curve reduction in a 15-year-old female following 5 months of conservative care utilizing the NUCCA technique.7 Intervention included one atlas adjustment and 15 subsequent follow-up appointments requiring no adjusting procedures based on NUCCA protocol. Post care x-rays were obtained 5 months after the initial exam and revealed the reduction in curve magnitude.7

Case Report

History

An 11-year-old female presented with her mother to a private chiropractic practice. The mother was concerned about postural abnormalities that she had noticed even though the child had been checked during a routine school screening which revealed no indication of scoliosis. Additionally, the child indicated discomfort in the left trapezius muscle which extended down to the inferior border of the scapula and over to the spine. She described feeling a “knot” in the scapulothoracic region at times. The patient reported being thrown from a horse twice in addition to involvement in an auto accident at age 7 with no known residual injuries. She denied any use of medication.

Examination

A static visual posture exam revealed anterior head translation, right lateral flexion of the head, a high left shoulder and a high left hip. Upon visual inspection of cervical ranges of motion, a decrease was noted in right rotation and right lateral flexion. Mild discomfort was reported with active right rotation, right lateral flexion and palpation. Palpatory muscle spasm and edema were recorded at cervical segments, C3 & C4, as well as thoracic segments, T5 & T6. Muscle hypertonicity without palpatory pain or edema was recorded at C7, T1 and T2.

Visual inspection of lumbar spine ranges of motion revealed a decrease in flexion and extension. Adam’s test was positive. A full spine thermal scan, using Myovision software, indicated a medium to high variation in temperature on the left at C1-C3. Medium to low variations in temperature were indicated on the left from C4-C6, on the right at T8, T9, and L1-L2.

Standing anterior to posterior and lateral cervical, thoracic, and lumbar x-rays were taken. A left convex thoracolumbar scoliosis measuring 22 degrees and a right convex curve measuring 16 degrees was noted in the thoracic spine. These measurements were obtained using the Cobb method. The thoracolumbar measurement was derived by using the superior end plate of T11 and the inferior end plate of L4. The thoracic measure was derived by using the superior end plate of T4 and the inferior end plate of T11. In addition to the above scoliotic curves, the lateral cervical films revealed a loss of the normal cervical curve.

Interventions

The patient was treated with full spine/diversified adjustments and gravity assisted traction three times per week. Over the course of three months she was seen 31 times. Adjustments were applied to 3-4 regions of the spine on each visit. In addition to chiropractic adjustments, the patient underwent in-office traction.

To achieve traction, dense foam rolls were utilized as fulcums under the patient’s side-lying torso in order to pre-stress the spine with a goal of stress relaxation and ligament deformation.10 Traction was introduced gradually beginning on the first visit utilizing a form of traction referred to in office as the “push” position due to its intention to “push” the convexity of the curvature toward the concavity with a goal of stretching the soft tissue.

Initially, the patient was laying in a left side down position on top of a dense foam roll positioned at the level of the apex of the thoracolumbar curvature. Foam blocks were utilized between the knees to maintain a neutral pelvis and under the head to support the head and cervical spine in line with the thoracic spine, with careful positioning to avoid introducing any rotations or lateral flexions into other regions of the spine.

This position was maintained for three minutes. On each
subsequent visit, traction was increased by 2-3 minutes, based on patient tolerance, up to a maximum of 20 minutes. During office visits 10 - 26, the patient performed traction in the left side down “push” position for 20 minutes each visit prior to her adjustment.

Beginning on office visit 27, she progressed to the second level of traction which is referred to in office as the “hang” position. The placement of the patient was with the convex side up and unsupported with specific block placement to allow gravity to pull the weight of the convexity of the curvature toward the concavity, again with a goal of stretching the soft tissue.

This traction position involved having the patient lay right side down with one foam roller positioned directly under the right ilium and a second foam roller positioned under the apex of the thoracic curvature. Again, foam blocks were utilized between the knees to maintain a neutral pelvis and under the head to support the head and cervical spine in line with the thoracic spine, with careful positioning to avoid introducing any rotations or lateral flexions into other regions of the spine. This position was maintained for 3 minutes. During office visits 28 - 31, patient was able to tolerate the traction position for a maximum of 5 minutes each visit, prior to her adjustment.

**Outcomes**

The patient was compliant with recommendations for care and reported an increase in quality of sleep and a decrease in overall pain and discomfort, with the exception of pain at the placement site of the foam roller. A re-exam was performed following three months of the above described interventions. A static visual posture exam revealed anterior head translation and a high left shoulder. All cervical and lumbar ranges of motion were noted as within normal limits.

Palpatory muscle spasms were recorded from C5-, T1-T3, L3-L5. A full spine Myovision scan indicated medium to low variations in temperature on the left at C5, C6, and L5. On the patient’s right, the scan indicated a variation in paraspinal temperature at T1, T12, L1, and L2. These findings indicated an overall decrease in paraspinal skin temperature difference.

Post intervention radiographs revealed a three degree reduction in the thoracolumbar scoliosis (from 22 degrees to 19 degrees). The thoracic curve remained unchanged at 16 degrees. These measures were derived utilizing the same methods as previously described.

**Discussion**

To relay the implications of the treatment methods applied (i.e. traction) and the diagnostic tools utilized (Myovision), it is important to describe the reasoning behind the use of said treatment measures and tools utilized. Gravity assisted traction was used in the treatment of this patient and achieved with dense foam rolls as previously described. The goal of this treatment was to pre-stress the spine into a predetermined position, with the expected result of stress relaxation and ligament deformation. A Myovision unit was used to determine paraspinal temperature variations. It is thought that a variation in skin temperature patterns is a result of aberrant function of the portion of the sympathetic nervous system that innervates the vascular beds of the integument. Additionally, it is theorized that this diagnostic tool is a measure of the patient's response to intervention and restoration of nervous system function.

In a study published by McCoy et al., additional data was presented indicating the reliability of paraspinal thermal scanning, furthering the evidence for the use of thermal scanning as a diagnostic tool.

Adolescent patients demonstrating scoliotic curves present a clinic with many challenges. In addition to the largely ineffective treatments such as bracing and surgery, curve progression is of major concern. Predicting curve progression is virtually impossible given the varying prognostic degrees of individual cases. Although an exact cause has yet to be determined, Niesluchowski hypothesized that asymmetrical cerebral hemispheres may induce head tilt and asymmetric blocking of the atlanto-occipital joint, perpetuating the development of compensatory curves further down the spine.

The various treatment options for idiopathic scoliosis present many challenges as well. The effectiveness of bracing, the most widely used treatment for curves between 25 and 40 degrees, has been routinely questioned. Many patients have rejected the recommendations of bracing or surgery. In a group of patients, 50% of those prescribed brace treatment and 50% of those prescribed surgery rejected such intervention. The results of a study published by Patil et al., utilizing the National Inpatient Sample data, indicated a 14.9% in hospital complication rate, a 0.17% in hospital mortality rate and a 2.3% adverse outcome rate for adolescent patients that underwent spinal fusion for idiopathic scoliosis.

As stated previously, it is noteworthy to report that, to date, chiropractic manipulation has also proven largely ineffective for the treatment of idiopathic scoliosis in regards to curvature measurements. However, a limited number of case studies do exist that describe positive outcomes. Jaszewski described a 62% curve improvement in a 7-year-old female following one month of chiropractic care utilizing the Pierce technique. Also, Morningstar relayed the case of a 23-year-old female that achieved a curve reduction from 37 degrees to 16 degrees after 4 months of active treatment and 10 months of home care rehabilitation. Additionally, Chen reported a 16 degree reduction in Cobb angle in a 15-year-old female following 18 months of spinal manipulation. Given these outcomes, it is of interest to note that in a telephone survey conducted by Feise, it was concluded that the average chiropractor would provide 6 months of intensive care followed by maintenance care until skeletal maturity for a patient presenting with idiopathic scoliosis. Eighty percent of respondents would use diversified technique and advise on exercise and a majority of the respondents would not consider research findings when choosing a treatment plan for their patients.
Conclusion

The case of an 11-year-old female with idiopathic scoliosis was presented. A curve reduction of three degrees was achieved after 31 visits. Each visit consisted of chiropractic adjustments and traction. In addition to the reduction in the thoracolumbar measurement, this patient experienced decreased pain, increased range of motion and improved quality of sleep.

Further investigation into the possible relationship between chiropractic adjustments and traction is warranted. Given the lack of evidence supporting chiropractic for the management of scoliosis, a long-term, multiple subject follow-up is desirable. An investigation into positive research outcomes, with a focus on treatment methods, is also desirable for exploring future treatment options.

References