

Case Studies

Adolescent Idiopathic Scoliosis Treated by Spinal Manipulation: A Case Study

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Abstract

Objective: This report of one case illustrates the potential effect of chiropractic manipulative therapy on back pain and curve progression in the at-risk, skeletally immature patient with adolescent idiopathic scoliosis.

Clinical features: A 15-year-old girl experienced right thoracic scoliosis for 4 years. She received regular rehabilitation and brace treatment for 4 years, but the curvature of the thoracic spine still progressed. The Cobb angle was 46° and surgical intervention was suggested to prevent significant deformity, which may be accompanied by cardiopulmonary compromise.

Intervention and outcome: This patient was treated with spinal manipulation two times per week for 6 weeks at the outset, which was gradually decreased in frequency. After 18 months of consecutive treatment, follow-up radiographs and examinations were conducted. The Cobb angle decreased by 16°. Meanwhile, the patient's lower backache eased and there was also an improvement in defecation frequency, which had been problematic.

Conclusions: Chiropractic treatment was associated with a reduction in the degree of curvature of adolescent idiopathic scoliosis in this case, after half a year of conventional medical treatment had failed to stop curve progression. This suggests that in at least some severe and progressive cases of scoliosis, chiropractic treatment including spinal manipulation may decrease the need for surgery.

Introduction

Scoliosis is defined as a lateral curvature of the spine that is usually accompanied by rotation. Progression of the curvature during periods of rapid growth may result in significant deformity, which may be accompanied by cardiopulmonary compromise. Curves progress in approximately two thirds of skeletally immature patients before they reach skeletal maturity.¹ Scoliosis can continue to progress after skeletal maturity in untreated patients, particularly in those with curves measuring >40° at the end of growth. Curves >50° generally progress 1° per year after skeletal maturity.²

Most patients with adolescent idiopathic scoliosis (AIS) have little functional limitation or pain in adulthood.² Back pain is slightly more common than in the general population. Radiographs are required to confirm the diagnosis of

scoliosis, to determine the type (congenital, neuromuscular, and idiopathic) and severity.³ The treatments of AIS include observation, bracing, surgery, physical therapy, chiropractic treatment, and electrical stimulation. The choice of therapy depends upon the degree of curvature and potential for further growth. Skeletally immature patients with Cobb angles between 40° and 50° may be managed with bracing or surgery.

We present a case of right thoracic scoliosis with a Cobb angle of 46°, which was reduced curvature to 30° after 18 months' manipulation treatment.

Case Report

A 15-year-old girl complained of episodic low back pain for 4 years, aggravated by prolonged standing or extensive walking. Sitting and recumbent positions relieved her pain.

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No bowel, bladder, or sexual dysfunction was reported except that frequency of defecation was less than two times per week. Her family history was negative for scoliosis. Low back pain worsened starting in her junior high school years. In the summer of 2005, the patient's mother accidentally found asymmetry of her shoulders and scapulae. Soon, she was taken to the orthopedic clinic for evaluation, and the thoracolumbar spine x-ray film showed right thoracic scoliosis. The Milwaukee brace and regular rehabilitation treatment were arranged. However, the Cobb angle in the thoracic spine continued to progress, leading the orthopedist to suggest surgical intervention, to avoid possible cardiopulmonary compromise in the future. Due to the fear of surgical complications, the patient turned to the conservative treatment of spinal manipulation.

On physical examination, a prominent right posterior rib hump was noted. In the frontal plane, she also displayed a markedly high right shoulder. A supine leg check revealed evidence of leg length inequality. Given these preliminary findings, along with the positive past history of scoliosis, a plain film study was ordered to locate and calculate the nature and severity of the scoliosis. Initial standing sectional radiographs showed a 46° right thoracic scoliosis, measured from the superior endplate of the T7 vertebra and the inferior endplate of the L1 vertebra. Prominent feces and bowel gas is demonstrated in Figure 1A.

The patient began a treatment course of two visits per week for 6 weeks, followed by once-weekly visits for 6 weeks. Goals of treatment included (1) improvement of sagittal spine alignment, and (2) reduction in pain and symptoms.

Each visit began with a brief (less than 15 minutes) session of deep tissue massage therapy applied to the postural muscles. Following these procedures, manipulative intervention took place, including anterior thoracic manipulation and lumbopelvic adjustments that were delivered bilaterally. The manipulative procedures were similar to those in a prior report⁴ but did not use any mechanical assist or placement to mobilize the alignment of the spine except bracing.

After 3 months of the aforementioned treatment, a post-intervention radiographic study was conducted. The patient was again re-evaluated using static spinal radiography, which demonstrated a 34° right thoracic scoliosis in supine view. Her pre- and post-treatment radiographs are shown in a merged format in Figure 1. The follow-up radiograph was taken after 18 months' treatment. The Cobb angle of the right thoracic scoliosis measured 30°. In addition, her lower back-ache eased somewhat and frequency of defecation improved.

Discussion

Coordinated manual therapies for scoliosis treatment have been increasingly investigated in recent years. Spinal manipulation, bracing, and rehabilitative procedures seem to alter spinal structure when applied in combination. The incidence of progression of untreated AIS with a Cobb angle greater than 30° is 30%. However, patients with curves between 40° and 50° fall in a gray area for surgical intervention.⁵ In this case, curve progression stopped and reduced to 34° after 3 months' treatment and to 30° after 18 months' treatment, respectively.

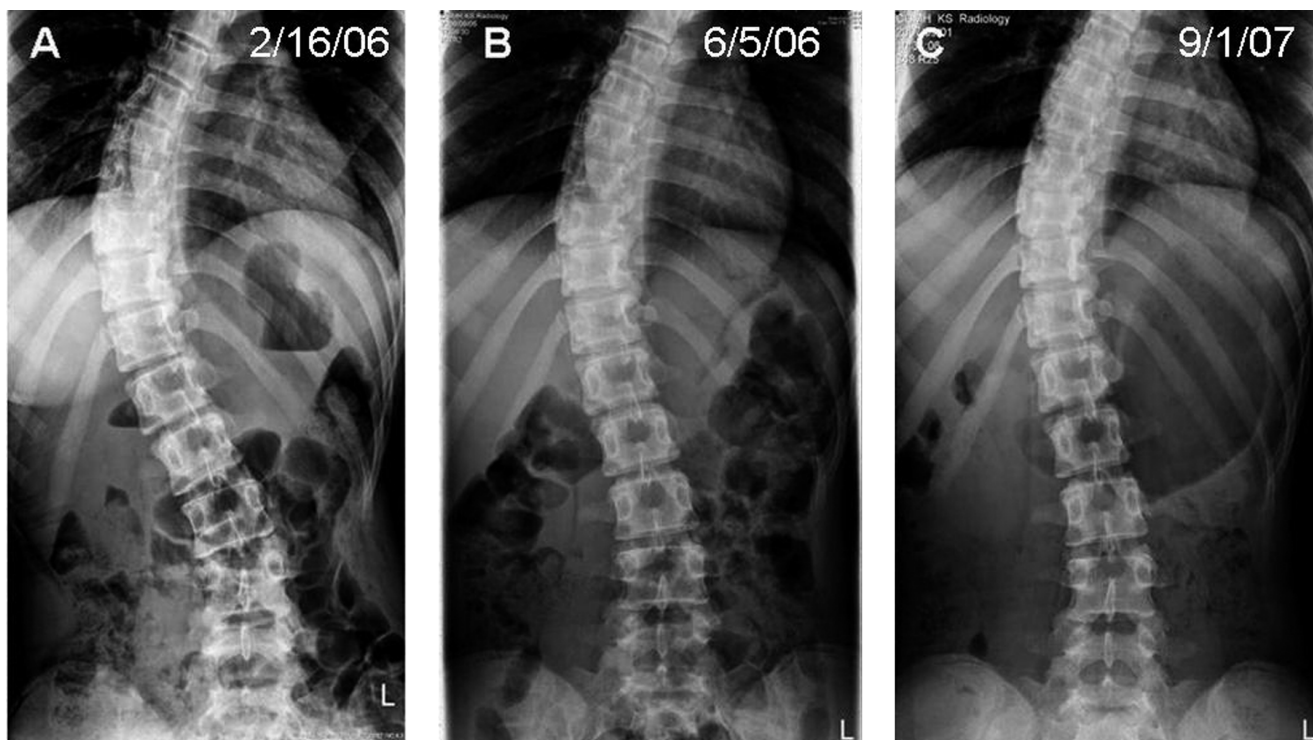


FIG. 1. Thoracolumbar X-ray films (A–C) demonstrating decrease in scoliosis in a 15-year-old girl during 18 months following the addition of spinal manipulation to therapeutic regimen of bracing and rehabilitation. Part C also shows a significant decrease in feces and bowel gas, coinciding with improved bowel function.

The treatment of patients who have AIS with Cobb angle greater than 40° may be managed with bracing or surgical intervention. If bracing is not effective, surgery will be suggested in patients with Cobb angles of >40°.⁵ Possible complications of surgery include blood loss, infection, hardware failure, and pseudarthrosis (failure of fusion). Reducing scoliotic curvatures through conservative treatment methods to avoid surgery is worthy of consideration, and spinal manipulation can provide an additional option for treatment of AIS where the Cobb angle exceeds 40°.

Bracing for AIS is believed to outperform observation or other nonsurgical therapies. However, some studies and reviews call this conclusion into question. There is some evidence that bracing does not correct curvature of the spine⁶ and does not reduce the need for surgery.⁷ Thus, when bracing fails to stop the progression of curvature, chiropractic may be considered as a conservative care option.

In general, spinal manipulation is thought to be a relatively safe procedure, although it may be associated with a number of minor complaints and, rarely, serious adverse events, including disk herniation, the cauda equina syndrome.⁸ In this case, the patient did not experience any adverse events except tenderness of local musculature after manipulation.

The goal to reduce the curvature of the spine was achieved in this case. The patient's scoliosis improvement was observed at physical examination subsequent to the study's observation period; she continues to receive spinal manipulation once a month. In this study, the adolescent patient's scoliosis improved markedly while under chiropractic care. Future experimental studies should be done to examine the effectiveness of chiropractic care for AIS, given the relative scarcity of research on this topic.

Conclusions

Chiropractic treatment was associated with a reduction in the degree of curvature of AIS in this case, after half a

year of conventional medical treatment had failed to stop curve progression. This suggests that in at least some severe and progressive cases of scoliosis, chiropractic treatment including spinal manipulation may decrease the need for surgery.

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