

Chiropractic management as conservative care for adolescent idiopathic scoliosis: A cases report

Kevin Huang, Kingsley Leung and Eric Chun-Pu Chu

Abstract: Scoliosis is a medical condition in which the spine has a permanent lateral curve. During the rapid growth stage, adolescent idiopathic scoliosis (AIS) is the most frequent and potentially severe form of scoliosis. AIS is a complex condition influenced by genetic, hormonal, neuromuscular, and environmental variables, according to most experts. Six scoliotic teenagers with AIS were treated with chiropractic care in 2020 and 2021. For 6-9 months, chiropractic therapy was administered three times/twice a week. Both discomfort and mobility have been demonstrated to improve when the spine is adjusted and managed by chiropractors. On subsequent radiographs, an average correction in Cobb angle is 59% improvement. Because the medical community does not give any treatment for such a mild scoliosis, this research demonstrates the benefit of chiropractic in the adjustment of early scoliosis. A randomized trial is needed to confirm the efficacy of this treatment for adolescent idiopathic scoliosis.

Indexing terms: adolescent idiopathic scoliosis, Cobb's angle, chiropractic, spinal curvature, conservative care.

Introduction

Adolescent idiopathic scoliosis (AIS) is a spinal deformity which is commonly diagnosed in females from ages ten to fifteen. It accounts for over 80% of all cases of idiopathic scoliosis and has serious consequences for quality of life, limiting activities, causing pain, and significantly influencing respiratory function and self-esteem. The severity of the scoliotic curve determines the current therapy options and surgery is recommended with a Cobb angle of more than 40°. Observation is the mainstream therapy in patients with a Cobb angle of less than 25° who are still growing. [1]. A recent study found that chiropractic can improve scoliosis curvature and discomfort conservatively [2], possibly by moving areas of the spine that are difficult to reach with other methods.

... 'Because scoliosis is more likely to worsen in growing children, early conservative intervention is suggested in AIS. Chiropractic appears to play a role in the correction and monitoring of early-stage scoliosis'.

Methods

Study design and patients

From January 2019 to September 2021, we have treated 10 patients with AIS, using the NYMG Scoliosis Protocol (EC Healthcare, Hong Kong, China). However, six patients finished the complete protocol and all of them showed evidence of improvement. The mean age of the patients at the time of initial consultation was 9 years (7 to 12). The mean duration of NYMG Scoliosis Protocol from first examination to re-evaluation was 6.5 months (6 to 9). The mean age at evaluation was 10 years (7



to 13). This study is a retrospective analysis of prospectively gathered data from these six patients.

Informed consent was obtained from both the patients and parents for EOS x-rays to be taken. Retrieval analysis was performed with our radiology department. Posture analysis was performed on the EOS imaging system.

Chiropractic procedure and follow-up protocol

The NYMG scoliosis protocol comprises massage therapy, spinal manipulation, motorized spinal flexion-distraction, and soft tissue treatments such as Active Release Technique. For the first two months, chiropractic care was offered three times a week, then twice a week for the next four months. The treatments started with a 5-minute general massage on the postural muscles with a G5 Machine to relax the muscles and allow for manual manipulation of the area. The patient was then placed face down on the table with both ankles shackled, and the caudal section of the motorized table was slowly raised and lowered to provide intermittent traction to the spine. At each treatment, spinal manipulation was used for 10 minutes during the flexion-distraction process. Robotic spinal distraction (Spinal Decompression, MID, Korea) was used at lumbosacral junction for lumbar scoliosis. Pre- and post-treatment Adam's tests were performed in all patients.

Results

A total of six AIS patients completed the protocol for analysis from the ten patients. All patients showed significant improvement of Cobb's angle.

- ▶ Patient 1 (boy, 8 years old), pre-treatment dextro convexity of the thoracic curve was measured with a Cobb angle (T1-T7) of 23°. 6-months follow-up radiograph after chiropractic treatments showed a reduction of the thoracic curve to 12°. Total reduction of 11° and 42% was achieved. (Figure 1)
- ▶ Patient 2, (girl, 12 years old) who presented with a thoracolumbar curve at a Cobb angle of 17°. Repeat radiograph after chiropractic care showed a reduction of the thoracolumbar curve to 12° (Figure 2). A total reduction of curvature at 5° and 29% was indicated
- ▶ Patient 3, (9 years old female) patient's Cobb angles measured by consecutive radiographs were entirely corrected by 12° (85%) in the thoracic curve (from 14° down to 2°) (Figure 3) at the 9-month follow-up. The patient reported less pain, improved mobility, and increased confidence, as well as improved muscle tone and a reduction in her spinal curvature
- ▶ Patient 4, (boy, 8 years old) thoracic convexity of the thoracolumbar curve was measured with a Cobb angle of 13°. Repeat radiograph after chiropractic treatment showed a reduction of the thoracolumbar curve to 2° on the 6th months. A total reduction of 11° and 84% was obtained. (Figure 4)
- ▶ Patient 5, (9 years old female) patient's Cobb angles measured by consecutive radiographs were entirely corrected by 7° (38%) in the thoracic curve (from 18° down to 11°) (Figure 5) at the 6-month follow-up. The patient reported less pain, improved mobility, and increased confidence, as well as improved muscle tone and a reduction in her spinal curvature.
- ▶ Patient 6, (12 years old female) patient's Cobb angles measured by consecutive radiographs were entirely corrected by 7° (77%) in the thoracic curve (from 9° down to 2°) at the 6-month follow-up. The patient reported less pain, improved mobility, and increased confidence, as well as improved muscle tone and a reduction in her spinal curvature. (Figure 6)

The results are summarised in Table1. All patients showed no significant side effects and obtained improvement of the curve. An average improvement of 59% of Cobb's angle was recorded.

Results summary

Table 1: Summary of results

	Age	Sex	Treatment Duration	Pre-Treatment	Post-Treatment	Angle Change	Percent Change
Patient 1	8	M	6 months	23°	12°	11°	42%
Patient 2	12	F	6 months	17°	12°	5°	29%
Patient 3	9	F	9 months	14°	2°	12°	85%
Patient 4	8	M	6 months	13°	2°	11°	84%
Patient 5	9	F	6 months	18°	11°	7°	38%
Patient 6	12	F	6 months	9°	2°	7°	77%

Images

Figure 1: 8 years old male with standing full spine frontal images. Dextro convexity of the thoracic curve was seen with a Cobb angle (T1-T7) of 23°(Left). Repeat radiograph after chiropractic treatments showed a reduction of the thoracic curve to 12° (Right)



Figure 2: 12 years female with standing spine frontal images. Lumbar convexity of the thoracolumbar curve was seen with a Cobb angle of 17°(Left). Repeat radiograph after chiropractic care showed a reduction of the thoracolumbar curve to 12° (Right)

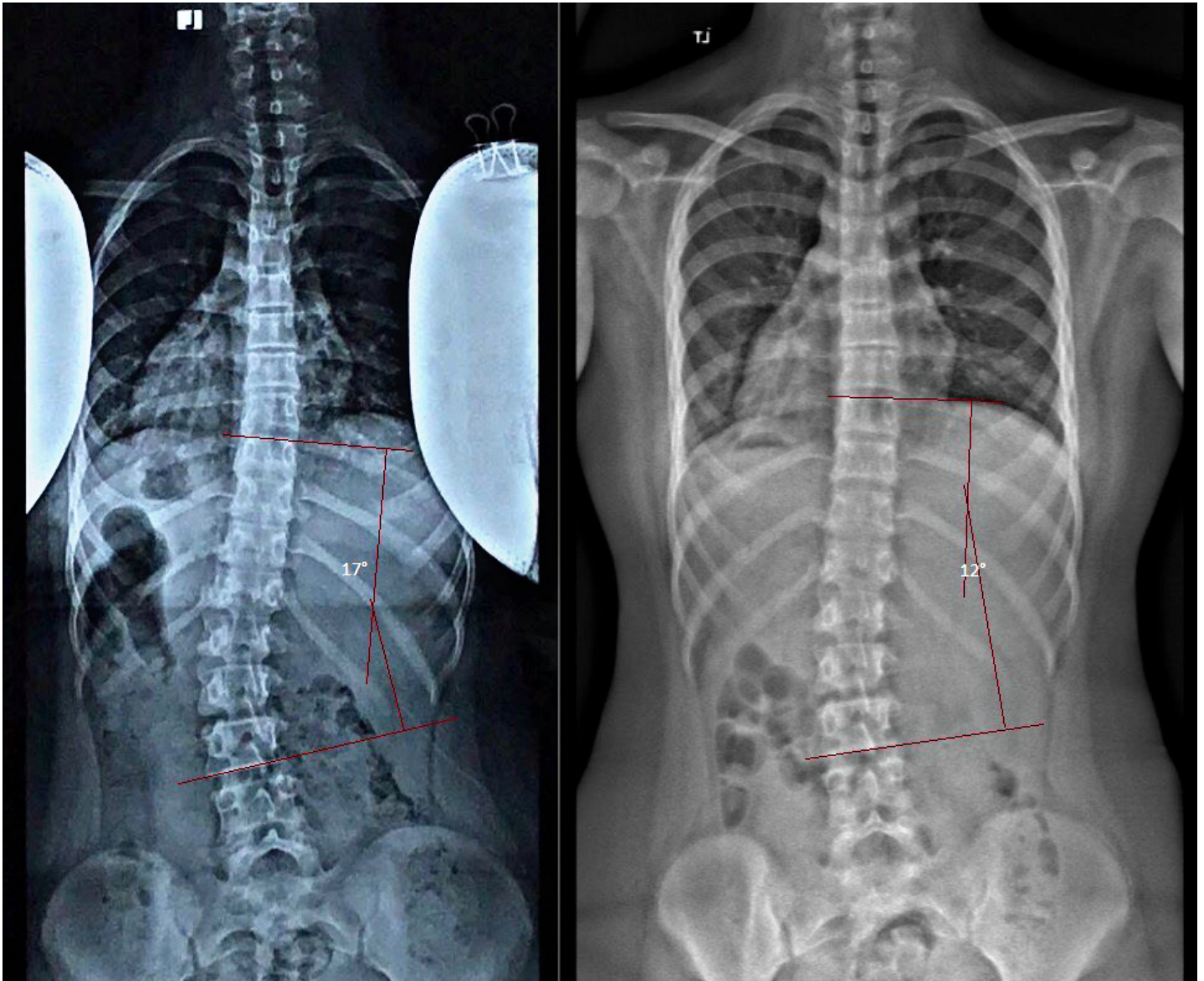


Figure 3: 9 years old female with standing spine frontal images. Thoracic convexity of was seen with a Cobb angle of 14° (left). Repeat radiograph after chiropractic care showed a reduction of the thoracolumbar curve to 2° (right)

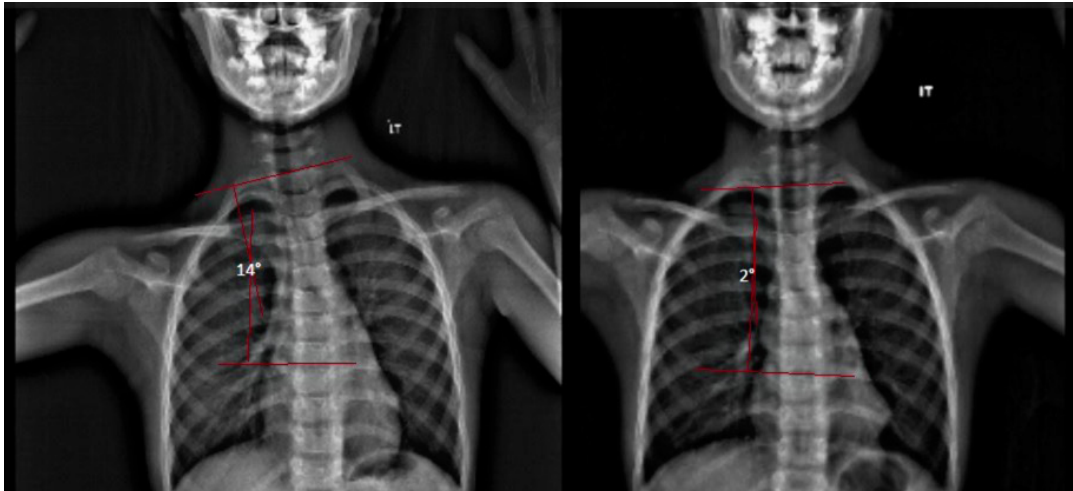


Figure 4: 8 years old male with standing spine frontal images. Thoracic convexity of the thoracolumbar curve was seen with a Cobb angle of 13° (left). Repeat radiograph after chiropractic treatment showed a reduction of the thoracolumbar curve to 2° (right)

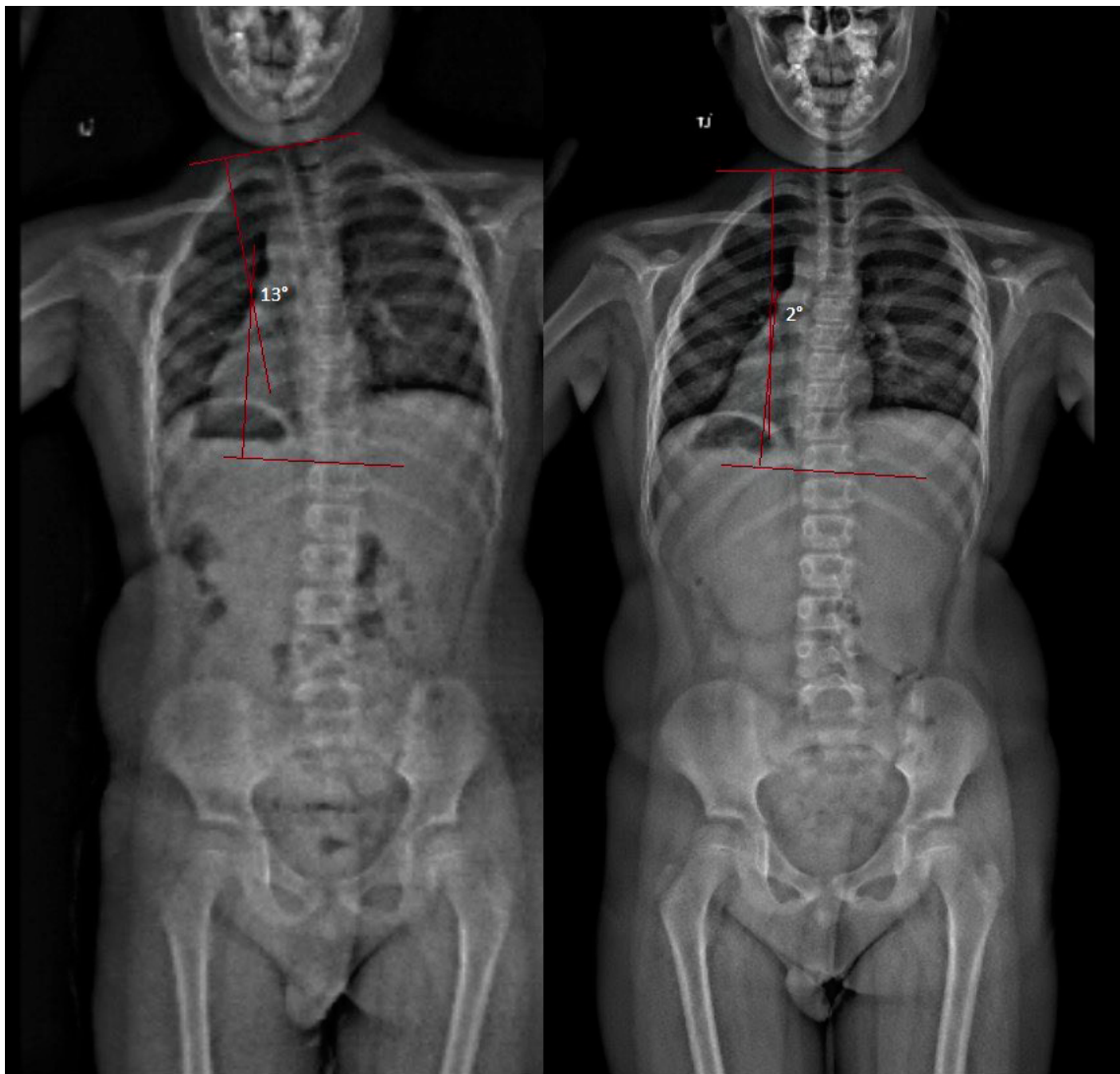


Figure 5: 9 years-old female with standing spine frontal images. Thoracumbar convexity of the thoracolumbar curve was measured with a Cobb angle of 18° (left). Repeat radiograph after chiropractic treatments showed a reduction of the thoracolumbar curve to 11° (right)



Figure 6: 12 years-old female with standing frontal images. Convexity of the thoracolumbar curve was measured with a Cobb angle of 9° (left). Repeat radiograph after chiropractic treatments showed a reduction of the thoracolumbar curve to 2° (right)



Discussion

The mechanisms that cause scoliotic curves to form and propagate are not totally understood. Several potential genes have been related to AIS, but confirmation of these relationships is still inconclusive and requires more research. (3) Minor spinal injuries, uncorrected subluxations, congenital abnormality are thought to be the cause of scoliosis. (4) A vicious mechanical cycle drives the advancement of scoliosis after a crucial degree of curvature has formed, which accelerates during periods of rapid spinal growth. (5) Although both men and women are affected by AIS, females are eight times more likely to advance to a stage where treatment is required. Estrogens cause the tendons, ligaments, and muscles to preserve flexibility in order to allow for rapid growth, (6) and curve progression is most likely during periods of significant hormonal change. Early detection is critical for preventing scoliosis from developing or worsening, as well as receiving the best therapy.

Asymmetry of the trunk, such as unequal shoulders or hips, humpback, or listing to one side, may be seen on physical examination. Scoliosis will be diagnosed and monitored using an anteroposterior radiograph of the whole spine in standing position. (7) The Cobb angle, which is generated by perpendiculars to the lines drawn from the superior endplate of the upper-end vertebra and the inferior endplate of the lower-end vertebra, (7), is used to determine the degree of scoliotic curvature. A curvature of 10 to 15 degrees usually does not require treatment other than monthly check-ups until the patient reaches puberty. When the difference between two successive X-ray scans is less than 5 degrees, it is considered a real development that requires control. (8)

Depending on the severity of the scoliosis, current treatment options include observation, bracing, and surgery. Because some degree of scoliosis is widespread in the general population, in patients with a Cobb angle of less than 25 degrees, observation is the basis of treatment [3]. Brace treatment may be necessary between 20 and 40 degrees to prevent the curve from progressing. If the curve is more than 40 degrees, surgery may be required. A recent retrospective review was undertaken to investigate the role of chiropractic management for patients with AIS. The Cobb angles are reduced from average 29.7° down to average 23.4° (average 21.2% correction) from pre-treatment and post-treatment xrays. Mild and moderate AIS was identified with better results with conservative treatment. (9). A change in Cobb angle of less than 5° is considered clinically significant. (10). Our patients are categorized as the mild AIS without congenital abnormality and all got correction over 5°, with an average improvement of 59%. Scoliosis has traditionally been treated with chiropractic spinal manipulation, enhanced exercise, posture coaching, and heel lifts. Increased spine mobility and ligamentous lengthening of scoliotic curves could be the processes behind our findings. (11) Concrete empirical evidence supporting the efficacy of manual therapy for AIS, such as osteopathic, chiropractic, and massage therapies, is currently insufficient. (2)

Conclusion

Because scoliosis is more likely to worsen in growing children, early conservative intervention is suggested in AIS. Chiropractic appears to play a role in the correction and monitoring of early-stage scoliosis, despite the fact that there is no treatment for mild scoliosis in the medical community.

Conflicts of interest

There are no conflicts of interest.

Kevin H.K. Huang

BSc, DC

New York Chiropractic and
Physiotherapy Centre
Hong Kong

Kingsley Leung

BSc, BClinChiro

New York Chiropractic and
Physiotherapy Centre
Hong Kong

Eric Chun Pu Chu

BSc, DC, MHA, PhD (Hon), ICCSP, FRCC

Hong Kong, China
eric@nymg.com.hk

Cite: Huang KHK, Leung L, Chu ECP. Chiropractic management as conservative care for adolescent idiopathic scoliosis [Cases Report]. *Asia-Pac Chiropr J.* 2021;2.2. URL <http://www.apcj.net/papers-issue-2-2/#HuangScoliosis>

References

1. Weinstein SL, Dolan LA, Cheng JC, et al.: Adolescent idiopathic scoliosis. *Lancet*, 2008, 371: 1527–1537.
2. Pu Chu EC, Kai Huang KH. Bridging the gap between observation and brace treatment for adolescent idiopathic scoliosis. *J Family Med Prim Care* 2017;6:447-9.
3. Samaan MC, Missiuna P, Peterson D, Thabane L. Understanding the role of the immune system in adolescent idiopathic scoliosis: Immunometabolic CONnections to Scoliosis (ICONS) study protocol. *BMJ Open*. 2016;6:e011812.
4. Chu ECP, Huang KHK, Shum JSF. Lumbosacral transitional vertebra as a potential contributing factor to scoliosis: a report of two cases. *Asia-Pac Chiropr J.* 2020;1:007
5. Cassar-Pullicino VN, Eisenstein SM. Imaging in scoliosis: What, why and how? *Clin Radiol*. 2002;57:543–62.
6. Leboeuf D, Letellier K, Alos N, Edery P, Moldovan F. Do estrogens impact adolescent idiopathic scoliosis? *Trends Endocrinol Metab*. 2009;20:147–52.
7. Malfair D, Flemming AK, Dvorak MF, Munk PL, Vertinsky AT, Heran MK, et al. Radiographic evaluation of scoliosis: Review. *AJR Am J Roentgenol*. 2010;194(3 Suppl):S8–22.
8. Kim H, Kim HS, Moon ES, Yoon CS, Chung TS, Song HT, et al. Scoliosis imaging: What radiologists should know. *Radiographics*. 2010;30:1823–42.
9. Chu ECP, Chakkaravarthy DM, Huang KHK, Ho VWK, Lo F-S, Bhaumik A. Changes in Radiographic Parameters Following Chiropractic Treatment in 10 Patients with Adolescent Idiopathic Scoliosis: A Retrospective Chart Review. *Clinics and Practice*. 2020; 10(3):70-73. <https://doi.org/10.4081/cp.2020.1258>
10. Morrissy RT, Goldsmith GS, Hall EC, Kehl D, Cowie GH. Measurement of the Cobb angle on radiographs of patients who have scoliosis. Evaluation of intrinsic error. *J Bone Joint Surg Am*. 1990;72:320–7.
11. Villafañe JH, Silva GB, Dughera A. Manipulative and rehabilitative therapy as a treatment of idiopathic scoliosis without psychological sequelae: A case report. *J Chiropr Med*. 2012;11:109–14.