

THE EFFECT OF CHIROPRACTIC CARE FOR A 30-YEAR-OLD MALE WITH ADVANCED ANKYLOSING SPONDYLITIS: A TIME SERIES CASE REPORT

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ABSTRACT

Background: Manipulative treatment for ankylosing spondylitis is a controversial subject, and no literature on using this therapy for advanced cases with fusion of the spine could be found.

Objective: To discuss the case presentation of a patient with advanced ankylosing spondylitis who was treated with chiropractic manipulation and mobilization.

Clinical Features: The patient was a 30-year-old Asian male who was first diagnosed with ankylosing spondylitis at age 12. Despite medical intervention, a series of exacerbations had fused his sacroiliac joints and the facet joints in his lumbar and cervical spine. He presented with local moderate-to-severe pain in his low back and neck and lack of mobility.

Intervention and Outcome: The patient was treated with grade 5 manipulation of his thoracic spine and grade 3 mobilization of his lumbar and cervical spine, along with physical therapy and stretches for a period of 12 weeks. He reported some improvement of his condition as measured by the SF-36 Health Survey and several measures of spinal flexibility.

Conclusions: This case shows that even advanced cases of ankylosing spondylitis may show a favorable response to chiropractic manipulative therapy. (*J Manipulative Physiol Ther* 2003;26:e18)

Key Indexing Terms: *Chiropractic Manipulation; Ankylosing Spondylitis; Radiography*

INTRODUCTION

Ankylosing spondylitis (AS) is a seronegative spondyloarthropathy of unknown origin. It is postulated that the etiology may be a cross-reaction by antibodies for certain bacteria in individuals with the HLA-B27 gene.¹ The spondyloarthropathies as a group are characterized by enthesopathy, as opposed to synovitis as in rheumatoid arthritis (RA).² AS affects about 0.1% of the population,³ and it is 3 times more common in men than in women.² It is a disease of young adults, with the onset most often between 20 and 40 years of age.⁴

The most common symptoms of AS are back pain and stiffness and fatigue. As with most rheumatic diseases, symptoms tend to vary greatly over time with periodic

flare-ups.⁵ AS primarily affects the sacroiliac (SI) joints and the spine. Peripheral joint involvement occurs in one third of cases, most commonly affecting the hips and shoulders.⁴ The most common nonneuromusculoskeletal manifestation of AS is uveitis, which occurs in 20% to 40% of cases.²

The course of progression of AS is variable. Most cases result in only mild disease. The average AS patient suffers from fewer symptoms and less disability than the average RA patient.⁵ Predictors of more progressive disease include male gender, peripheral joint involvement (particularly the hip), early age of onset, poor response to nonsteroidal anti-inflammatory drugs (NSAIDs), and the presence of the HLA-B27 gene.^{1,2,6} With progression, there is gradual stiffening of the spine, with loss of the lumbar lordosis and increase in the thoracic kyphosis. There is usually decreased chest expansion due to costotransverse joint involvement. In severe cases, there is fusion of the spinal joints, with resulting lack of mobility and disability.⁵

AS should be suspected when a young male has chronic back pain and stiffness that is relieved by exercise but not with rest. Diagnosing AS at an early stage requires a high degree of clinical suspicion, because there will often be few positive findings (Table 1). Orthopedic and neurologic test-

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Table 1. Modified New York criteria for diagnosis of ankylosing spondylitis^{2,3}

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| <ol style="list-style-type: none"> 1. Clinical criteria <ol style="list-style-type: none"> a. Low back pain and stiffness for more than 3 months which improves with exercise, but is not relieved by rest. b. Limitation of motion of the lumbar spine both the sagittal and frontal planes. c. Limitation of chest expansion relative to normal values corrected for age and sex. 2. Radiological criterion <ol style="list-style-type: none"> a. Sacroiliitis grade 2 bilaterally or sacroiliitis grade 3-4 unilaterally |
|---|

ing are usually normal. The erythrocyte sedimentation rate (ESR) and C-reactive protein tests will often be elevated, although neither is an accurate predictor of the course of the disease.⁶ Although 95% of patients with AS will have the HLA-B27 gene, this test is nonspecific and is not necessary to formulate the diagnosis. The hallmark of diagnosis has traditionally been plain film radiographs showing sacroiliitis. When the diagnosis is in doubt, computed tomography (CT) or magnetic resonance imaging (MRI) of the pelvis may show earlier changes.^{1,6}

The management of advanced AS is a medical dilemma, with no clear consensus that meaningful results can be obtained.^{6,7} Most commonly, a combination of education, medications, physical therapy, and exercise is recommended.⁶⁻⁸ The main goal of medical management is often to control pain, so that exercises can be performed by the patient.⁶ The goals of physical therapy and exercise are to maintain function and relieve pain. There is some anecdotal evidence that manipulation may help relieve pain and enhance function in cases where there is no active inflammation.^{9,10} No literature could be found describing the outcomes of chiropractic care specifically for advanced cases of AS.

This study was conducted to describe the effect broad scope chiropractic treatment could have on the quality of life and spinal flexibility of a patient with advanced AS.

CASE REPORT

The subject of this study was a 30-year-old Asian man who presented to a chiropractic college outpatient clinic with the chief complaints of low back pain, neck pain, and bilateral hip pain. He was a part-time student and worked part-time in an office. He first experienced difficulty in sitting due to bilateral hip pain and stiffness when he was 12 years old. He was diagnosed with AS by a medical doctor in Korea when he was 20 years old, based on radiographic evidence of SI joint erosions. He did not know if an HLA-B27 test was performed. His condition was managed with medications and a stretching program. He experienced a series of exacerbations of his condition while in his 20s that left him with severe stiffness in his low back, hips, and neck. He had had no previous chiropractic treatment.

**Fig 1.** Cervical spine, anterior-posterior view.

At presentation, the patient's pain was described as constant and rated as 8 cm on a 10-cm visual analog scale. He rated his usual pain as 4/10 but stated his hip pain would go up to 10/10 at its worst. His pain was worse in the morning. It was exacerbated before a rain, causing him to seek relief with hot showers and massage. There was no radiation of the pain. He took prescribed analgesics as needed for pain and Pepcid AC for indigestion.

A physical examination revealed that the patient appeared thin and pale. He was 68 in tall and weighed 108 lb. His hair lacked luster, and acne was noted on his face, chest, shoulders, and upper back. General atrophy of the muscles of the back was observed. The patient was observed to move his whole spine as one unit when performing activities such as lying down on the examining table.

Examination findings of the back included decreased thoracic kyphosis and lumbar lordosis. All lumbar ranges of motion were markedly restricted. There was bilateral hip pain produced with Patrick's test. Other orthopedic testing was unremarkable. Neurological function of the upper and lower extremities was intact. In the cervical spine, bilateral



Fig 2. *Cervical spine, lateral view.*

rotation was limited to 40 degrees, and there was almost no movement in bilateral lateral flexion and forward flexion. Motion palpation testing of all of the spinal joints conveyed an impression of reduced mobility with generalized capsular fixation, particularly in the lumbar and cervical spine. Chest expansion was reduced at the T4 level but within normal range at the T10 level.

An arthritic laboratory panel revealed that C-reactive protein was highly elevated (7.5/0.0-0.4 mg/dL). Five-view cervical, 2-view thoracic, and 2-view lumbar radiographic series were taken (Figs 1-5). Bony ankylosis was evident in both SI joints and the facet joints of the cervical and lumbar spine, confirming the diagnosis of advanced AS. There was also osteoarthritis of the hip joints bilaterally. The joints of the thoracic spine appeared intact. A 3-day diet analysis revealed a deficiency in meeting the recommended daily allowances of calories, fruits, vegetables, complex carbohydrates, and fiber. His diet contained excessive meats and sweets.

An AB (basic single-case design) time series design single-subject study was planned and conducted. Written

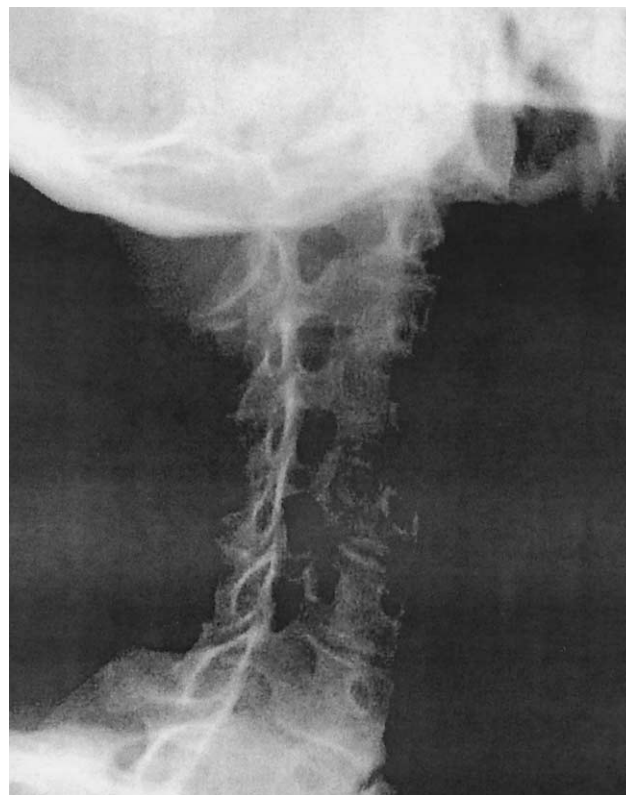


Fig 3. *Cervical spine, oblique view.*

informed consent was obtained from the patient for participating in this study in exchange for a reduced clinic fee.

Outcome measurements were taken throughout the entire 14 weeks of the study. Subjective changes in the patient's quality of life were measured twice a week using the SF-36 Health Survey. This instrument has been shown to have high reliability and validity for patients with spinal disorders.¹¹ Objective changes in flexibility were measured by mensuration of the spine and chest with a tape measure, which was performed once a week. Mensuration of the spine with a tape measure has been shown to have good reliability¹² and has been found to be a valid outcome measure in cases of AS to measure mobility of specific sections of the spine.^{6,13} Heikkilä et al¹⁴ found that the 2 measurements that were the most sensitive for measuring changes in the mobility of patients with spondyloarthropathies after a course of physiotherapy and exercise were fingertip-to-floor distance and chest expansion. Dalyan et al¹⁵ found that there was a strong correlation between spinal mobility and functional disability in patients with AS. The following measurements were obtained in this study:

1. Fingertip-to-floor measurement;
2. The modified Schober method¹⁶ (lumbar spine);
3. Thoracic flexibility in forward flexion and extension;
4. Measurements of chest expansion at the level of the 4th and 10th intercostal spaces;



Fig 4. Lumbar spine, anterior-posterior view.

During the first 2 weeks of the study; no treatment was performed, and a baseline was established

For the next 12 weeks, the patient was treated twice a week. Each treatment consisted of the following:

1. Electrical muscle stimulation (80-120 MHz, motor level stimulus, with 2 electrodes at the T4 level and 2 at the L5 level), along with hot packs on the full spine for 15 minutes;
2. Gentle diversified chiropractic adjustments to the midthoracic spine, with the patient prone;
3. Grade 3 mobilization of the SI joints and lumbar/lower thoracic spine, with the patient in the side-lying position, 30 times on each side;
4. Grade 3 mobilization of the cervical spine with the patient in the supine position, 30 times on each side;
5. Five minutes of mechanical massage, along with an analgesic cream;
6. Prone McKenzie extension exercises for the low back, 1 set of 10 repetitions;

The length of a typical office visit was about 45 minutes.

The patient was also counseled in lifestyle changes that could reduce the onset of future exacerbations. Stretches of the erector spinae, trapezius, levator scapula, rhomboid, hamstring, piriformis, and pectoralis muscles and the ili-otibial band were shown for home exercise. He was encour-

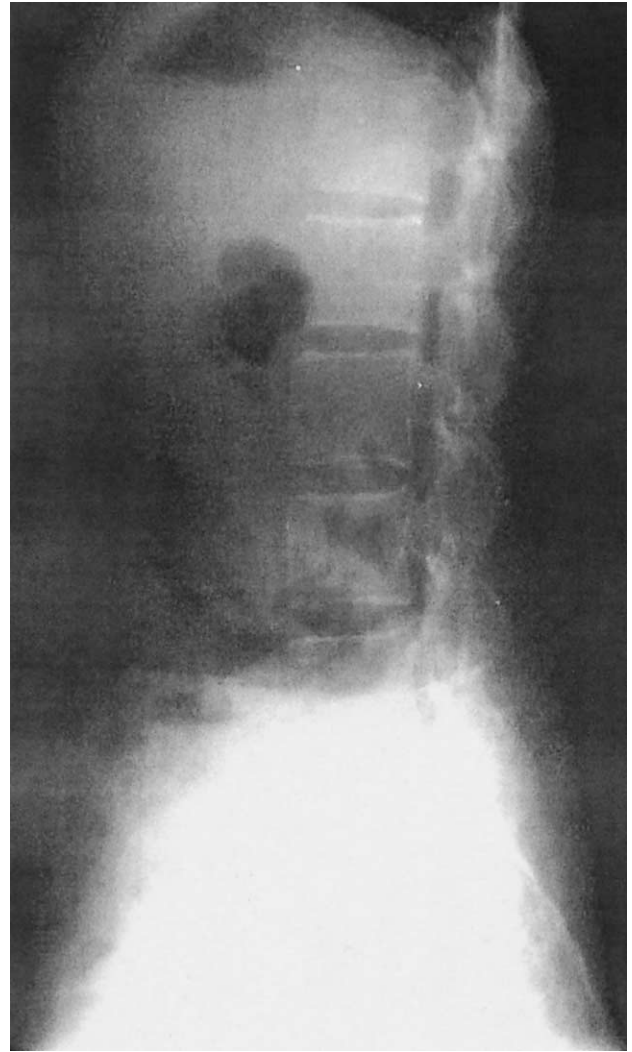


Fig 5. Lumbar spine, lateral view.

aged to swim for aerobic exercise and general mobilization twice a week. He was advised to increase his intake of fruits, vegetables, and whole grains and to substitute fish for meat.

The results of this study are charted in Figures 6, 7, and 8. The patient stated that he felt a small global improvement in his condition through most of the study. During the period of his last visit date, he experienced an exacerbation of his condition. The SF-36, finger-to-floor distance, modified Schober test, thoracic flexibility, and chest expansion measurements all confirm this assessment.

The patient's compliance with his treatment schedule was good. His compliance with the recommended home exercise program and dietary changes was reported to be fair to poor. The only side effect reported from the intervention was some temporary localized soreness after manipulation and mobilization of his spine.

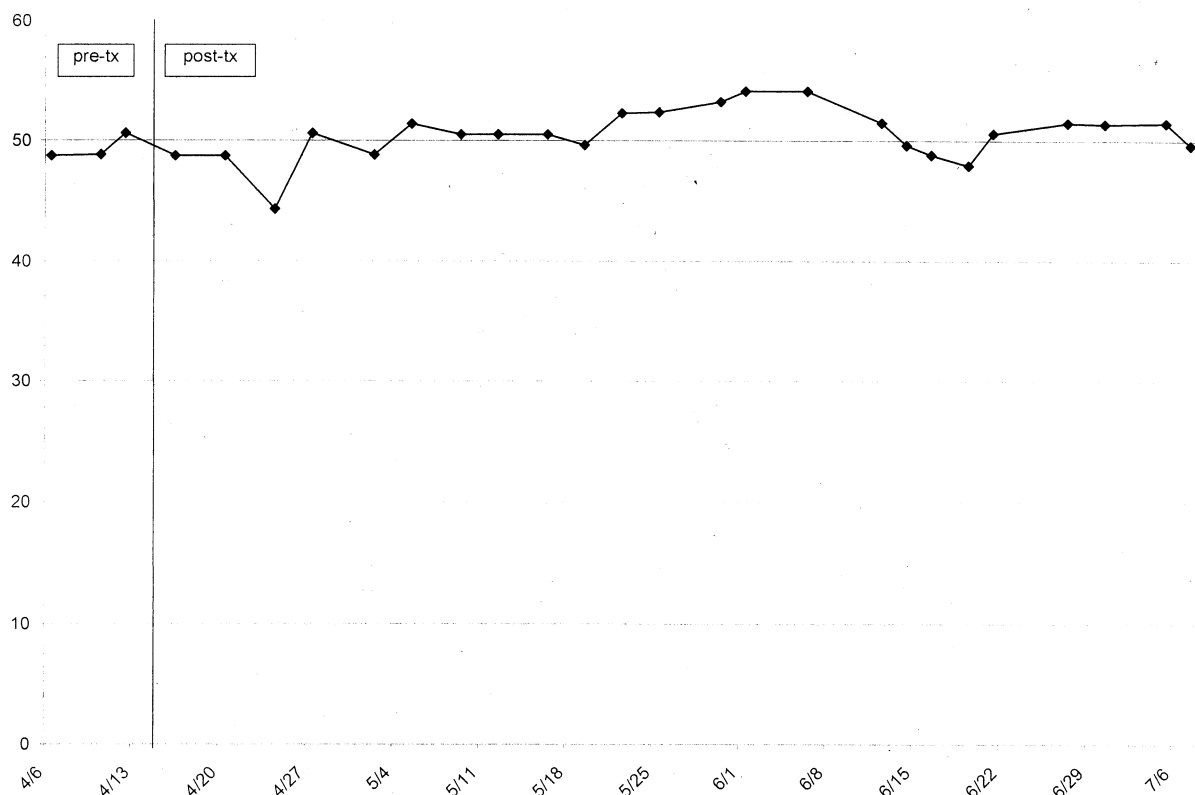


Fig 6. SF-36 Health Questionnaire.

DISCUSSION

This patient presented with a rapidly progressive case of AS that had led to marked limitation of mobility of his spine. The early age of onset of his disease and bilateral hip joint involvement are both risk factors for advanced progression. His case was interesting in that he had perceived a marked increase of loss of mobility immediately following specific exacerbations of his condition.

Chiropractic treatment over the course of 12 weeks may have contributed to a small increase of both the quality of life and the flexibility of the spine in this patient. With routine low back conditions, small changes in spinal mobility are considered to be of minimal clinical significance. However, in cases of AS, even small improvements of mobility may be important if they are maintained, because the main goal of therapy is to prevent progression and the subsequent development of disability.¹⁴

Although it is a long-established practice to use physical therapy for AS patients to preserve mobility and prevent deformity, data to support this practice are scarce. A Cochrane-supported systematic review of the literature on the use of physiotherapy interventions for AS was conducted by Dagfinrud and Hagen.¹⁷ The interventions utilized in the

studies they found included supervised and unsupervised exercises, manual therapy, massage, hydrotherapy, electrotherapy, educational interventions, and acupuncture. Only 3 randomized controlled trials (RCTs) were found that were deemed of sufficient quality to be included in their systematic review. All 3 of these studies used exercise as the primary treatment modality. The results of these studies were mixed, with some short-term benefits shown for improving mobility and decreasing pain and stiffness. Other studies have also found that exercise has a positive effect for patients with AS.^{3,7,8}

There have been limited studies examining the effects of other physiotherapy modalities on patients with AS. Van Tubergen et al¹⁸ conducted an RCT that found that adding bathing in a spa resort to an exercise and medication therapy program improved outcomes in a group of 120 patients with AS up to 20 weeks after the start of the study. The authors postulated that the heat therapy led to increased muscle relaxation and joint mobility.

There is little in the literature beyond case reports examining the effects of manipulation on patients with AS. Proctor and LaFrance¹⁰ performed a case series to describe the use of chiropractic manipulation for patients with AS. Their 14 patients were treated with manipulation of the lumbar spine and sacroiliac joints. The

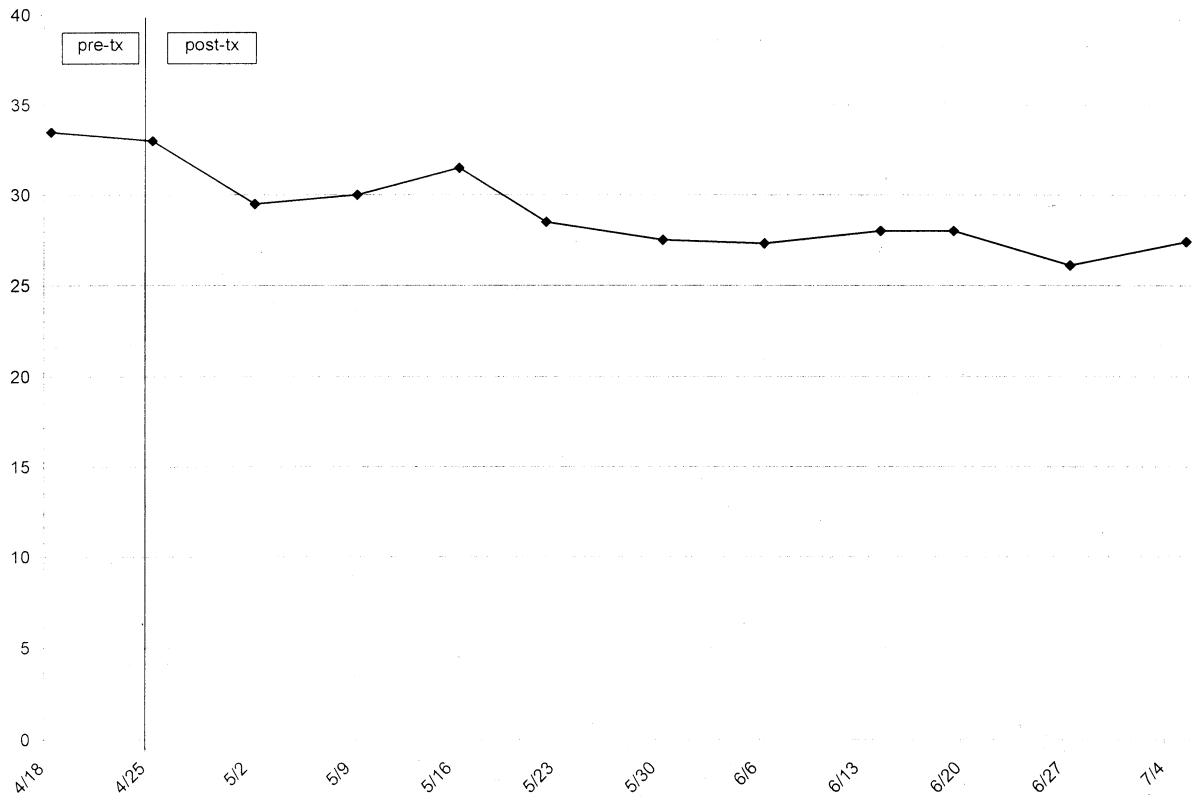


Fig 7. Fingertip-to-floor distance.

authors state that this led to improvements in flexibility, pain, and medication usage by the participants. There was no change in the underlying inflammatory process as measured by the ESR. McDermid and Mior⁹ published a report of 2 cases of AS treated in a chiropractic college clinic. The 2 cases were both in early stages of the disease with no bony ankylosis. Neither patient appeared to have a clear-cut reaction to manipulation of the spine.

There are numerous commentaries in the literature on why patients with AS should not be manipulated. Osteoporosis frequently accompanies AS, and occult fractures are common.¹ Manipulation is commonly assumed to be contraindicated when there is acute inflammation of joints.⁹ For these reasons, patients with AS are often counseled to avoid chiropractic care by both medical professionals^{19,20} and lay organizations.²¹ In this present case, only mobilization was used on the patient's neck and back, as fusion was already present. Manipulation was limited to his thoracic spine, which was not fused and did not appear to be in a state of active inflammation at the time of the study.

Of all the above studies, only Helliwell et al²² stratified participants based on disease severity, as determined by a composite measurement of cervical rotation, chest expansion,

and Schober test. They reported similar changes in study participants after either inpatient therapy or outpatient home exercises with or without hydrotherapy, regardless of disease severity at baseline. They attributed increases in range of motion (ROM) in advanced cases to stretching of muscles and mechanical creep within intervertebral ligaments. The McDermid and Mior⁹ participants were both in an early stage of AS. The other studies listed above did not comment on the disease severity of their participants. This shows a need for future studies to determine if different strategies in physical medicine should be followed depending on the stage of the disease.

Limitations

There are several threats to the internal validity of this study that must be considered. Measurement error is one possible threat. Although measurement of spinal motion with a tape measure has been found to have acceptable accuracy, the interns involved found this to be time-consuming, because on each visit the landmarks used for measurement (T1, T4, T10, T12 and L5) had to be manually located. In order to improve speed and reliability, a new procedure for locating landmarks was instituted after the third session. The vertebra listed above were first located and then marked on the patient's back with a grease pencil.

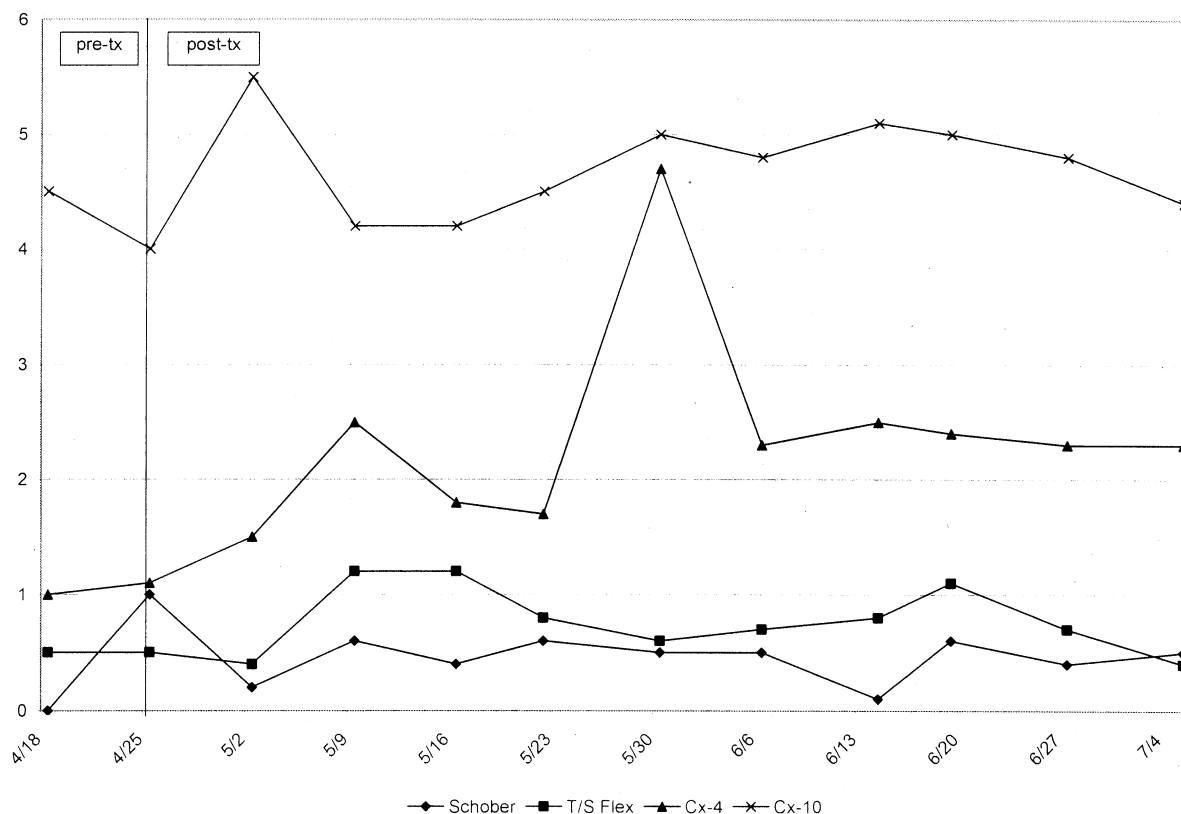


Fig 8. Modified Schober, thoracic spine flexibility, and chest expansion measurements.

A prominent mole lying close to the spine at the T3 level was then marked on the patient's back. The distance between each marked spinal level and the mole was measured with a tape measure (Fig 9). During each of the remaining sessions, the spinal levels were found by measurement instead of manual palpation. This procedure greatly decreased the time and effort needed to perform the mensuration measurements and hopefully increased their accuracy as well.

With any single-subject study, we must consider other possible causes for the results besides the treatment intervention. Examples in this case include concurrent events that might have affected the patient's condition, such as his level of stress with classes or the weather. Although the patient was compliant with the in-clinic portion of his treatment program, his compliance with his exercise program and the recommended dietary changes was problematic. As AS patients typically experience a series of exacerbations and remissions, it is possible that the observed results were just part of the natural history of his condition. A longer course of treatment may have led to more definitive conclusions. Unfortunately, as often happens in chiropractic college clinics, the patient discontinued treatment when the discount ended, and the intern who had recruited him graduated.

After the study was underway, we learned of the availability of the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI).⁶ Although the use of this instrument may have been a valuable addition to this study, this case reflects the reality of clinician-based research. Patients often present unexpectedly with interesting conditions that lend themselves to a single-case study, and they may not be willing to wait for a literature review to be conducted on the best outcome measurements to be used for their condition before treatment commences.

CONCLUSION

Chiropractic treatment including manipulation and mobilization appears to have been somewhat effective in promoting the quality of life and the flexibility of the spine in this subject with advanced AS. Further research is needed to better determine the role of chiropractic treatments in treating advanced AS. Ideas for future studies include group trials, utilizing the BASDAI as an outcome measure, and treating for longer time frames. The aim of these studies would be to develop practical treatment protocols for field practitioners attempting to improve the quality of life and prevent disability in patients with advanced AS.

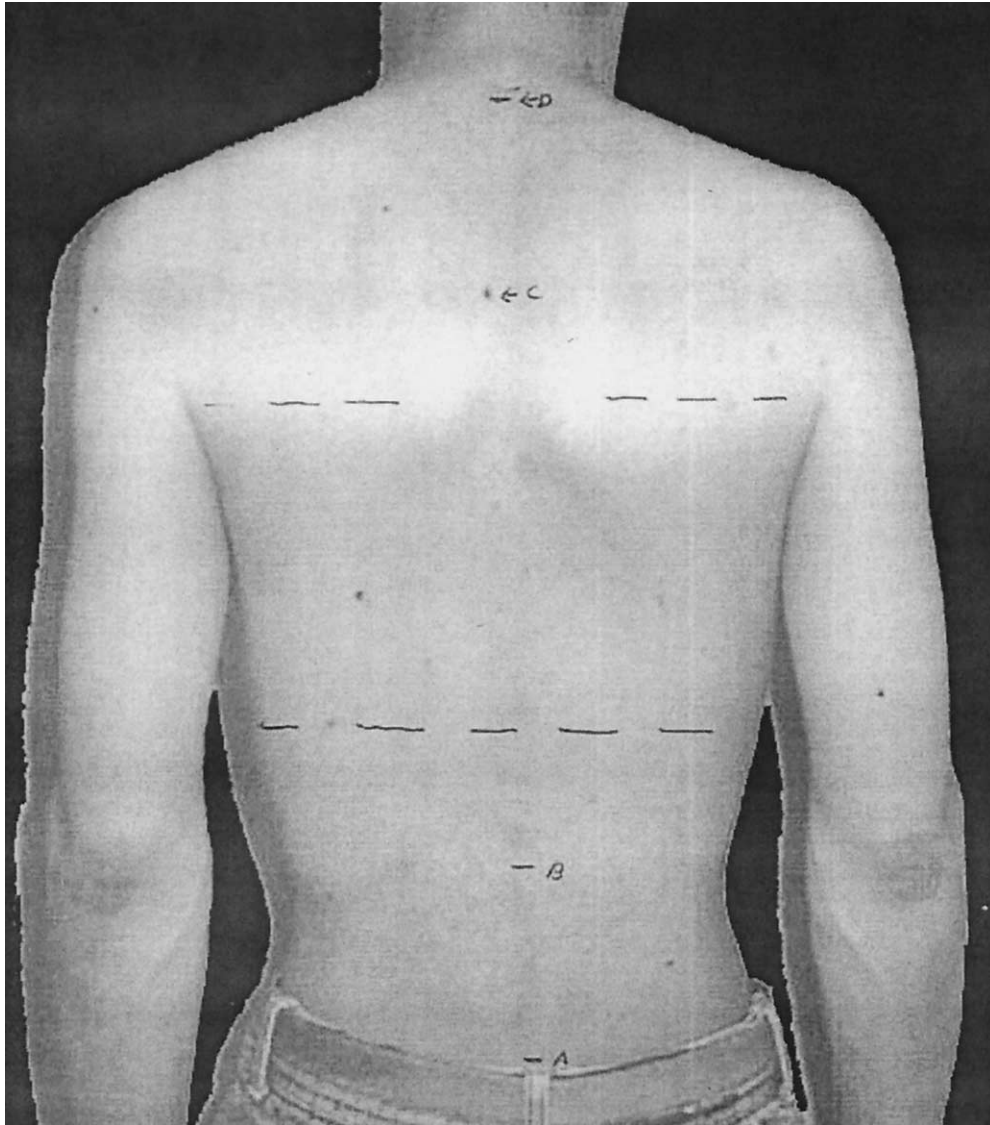


Fig 9. *Mensuration aid.*

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