
CASE STUDY

Upper Cervical Chiropractic Management of an Adult with Ankylosing Spondylitis: A Case Report

Cailen E Wells DC¹ & John Williams DC²

ABSTRACT

Objective: To describe the case of a patient with Ankylosing Spondylitis undergoing upper cervical chiropractic care.

Clinical Features: A 52 year old male presented with postural stiffness in multiple joints, mid-back pain, neck pain, bilateral shoulder pain, bilateral leg and hip pain. Past history included three motor vehicle accidents prior to the diagnosis of Ankylosing Spondylitis. Other health concerns included high blood pressure, diabetes mellitus, and ulcerative colitis.

Intervention and Outcomes: Subluxations were confirmed with upper cervical radiographs, paraspinal digital infrared imaging, and a Grostic leg check analysis. Blair and Knee Chest techniques were utilized over a 4 month period with improvements in pain, range of motion and blood pressure.

Conclusion: This case report exhibits the need for further study of both the Knee Chest and Blair corrections of an upper cervical vertebral subluxation in a patient with AS.

Key Words: *Upper cervical chiropractic, Blair technique, Knee Chest technique, Ankylosing Spondylitis, vertebral subluxation, thermography*

Introduction

Ankylosing Spondylitis (AS) is a long-term inflammatory condition of the joints in the spine and pelvis that can lead to joint fusion. It generally affects males between 20 and 40 years of age.^{1,2} It presents in 1 in 1000 people and is most commonly diagnosed by early radiographic findings of sacroiliitis.^{3,4} Concurrent symptoms associated with ankylosing spondylitis include low back pain beginning in the sacroiliac joints and stiffness that improves with activity.^{1,2,4} The

etiology of ankylosing spondylitis is not completely understood, however it is believed that a genetic predisposition exists.⁴

The pathological process of ankylosing spondylitis is linked to marker HLA-B27.⁵ This antigen marker attaches to antibodies and is then attacked by the immune system causing an autoimmune reaction. Research shows 90% of people who have ankylosing spondylitis express the HLA-B27 marker.⁵ Advances show other markers such as IL-1, ARTS1, and IL-23R also contribute to the inflammatory process.⁵

One's immune system uses T-cells, cytokines, and macrophages to fight off foreign invaders. It is when the body

1. Private Practice of Chiropractic, Midland, MI
2. Private Practice of Chiropractic, Atlanta, GA

can no longer utilize these helper cells that processes like inflammation ensue. Another part of this inflammatory process is when cells infiltrate on bone at ligamentous attachment(s), which leads to the formation of syndesmophytes.⁴ When these bony growths form, erosions manifest and cause fusion.⁵

The SI joint is the most common site of involvement.⁶ Manifestations include: fatigue, morning stiffness, and the immobility of joints. One may also experience back pain, coughing, sneezing, iritis, psoriasis, inflammatory bowel disease, vertebral compression fractures, and spinal rigidity.⁴

The best way to detect AS is via plain film radiographs which will display radiographic signs associated with the condition. The most common radiographic signs include bamboo sign, dagger sign, syndesmophyte formation, and calcification of the posterior longitudinal ligament.^{2-4,6}

Traditional medical treatment for AS focuses on the use of NSAIDs for pain control, corticosteroids to control the inflammatory process, muscle relaxants to help with muscle spasms, and physical therapy referral to improve mobility and strength.^{4,7} The literature has shown the benefits of chiropractic management as well.

One study used an SF-36 to track the quality of life of a patient with AS.² Improvements were seen after a grade 5 spinal manipulation and physical therapy intervention.² Rose and Kim discussed how chiropractors often see early stages of AS because patients seek care due to back pain associated with the condition.⁴ Another case study discussed the reabsorption of fused bone, in the cervical, thoracic, and lumbar spine, following 19 upper cervical corrections.⁸

There are no known reports of the use of upper cervical care in AS patients in the chiropractic literature. Though there has been research that shows benefit of upper cervical care in a variety of clinical presentations. Upper cervical trauma and subluxation has been discussed as a possible link to the manifestations of neurophysiology that occurs in a person with multiple sclerosis.¹⁰ Similar upper cervical subluxations have been found in those with ailments such as HIV, immune suppression, Parkinson's disease, multiple sclerosis, Tourette's, and asthma.^{10-16,22}

The purpose of this paper is to report on a patient with AS who showed improvement following upper cervical chiropractic care.

Case Report

History

A 52 year old male presented for chiropractic care. He had been previously diagnosed with AS. He had complaints of stiffness, neck and mid-back pain, bilateral shoulder pain, and leg and hip pain. He also had concurrent conditions of high blood pressure, diabetes, acid reflux, and ulcerative colitis.

He had been co-managed by his primary care physician, rheumatologist, and physical therapist. Each developed treatment plans and used prescribed medication to manage his

pain. Table 1 illustrates the nine medications he was taking upon presentation.

Past history revealed bilateral hip replacements, 7 years apart. He had also been in three motor vehicle accidents. He had sustained some minor injuries in football, and was born prematurely.

Examination

The physical examination involved a paraspinous thermal analysis to determine pattern using the Tytron C-5000. An established pattern is an integral part of the protocol of upper cervical specific care. Without establishing a patient's pattern, determining when a subluxation is present would be impossible.

Infrared imaging is a safe, and painless way to measure heat emitted from the body through the skin.¹⁰⁻¹⁷ Differences in temperature on opposite sides of the spine are compared. Significant values indicate the presence of an abnormally functioning nerve system. The subject in this case showed consistent pattern, a significant value of thermographic asymmetry and abnormal nerve system function. (Figure 1 & 2)

While supine, a Grostic leg check, based upon the Dentate Ligament theory, was performed. It revealed the right leg was short by one inch. The Dentate Ligament theory states mechanical stress to the cord creates neurologic insult from the torsion of these ligaments.¹⁸ It is hypothesized that the pressure on the cord creates irritation to the tissues and closes off the blood supply forming stasis and eventually leaving tissues without oxygen. Another part of the theory suggests that the dentate ligaments also affect the spinocerebellar tracts, which are responsible for muscle tone and position sense.¹⁷ This illustrates that a short leg may not be related to bone structure but it may be the result of a neurological compromise.

Orthopedic and neurological tests are usually negative in people with AS.² However, there were positive orthopedic tests present in this subject including, Kemps, SLR, and Iliac compression. When testing the subject's range of motion in the cervical spine, the most significant restriction was right lateral flexion and left cervical rotation restriction. (Table 2)

Specific upper cervical radiographs were taken in order to validate the finding of a vertebral subluxation. The radiographs were analyzed for Knee Chest technique and Blaire technique. The Knee Chest series of radiographs did not include protracto views; instead flat radiographs were rendered.

The lateral cervical and the APOM showed the atlas listing as ASL. This indicated that the atlas had moved anterior superior and lateral on the left. The APOM confirmed the listing and the lateral cervical view showed degenerative changes at the levels of C3-C7, and calcification of the anterior longitudinal ligament from C3-C7.

Blair analysis follows the rule of asymmetry.¹⁹ Blair is unique in the fact that it uses protracto views which look at the misalignment in three dimensions. The location of the subluxation is the articulating surfaces of the occipital condyle and the superior portion of the atlas lateral mass. These articulating surfaces should match on both sides of the protracto views. When they do not match up there will be a misalignment at that location and by determining if the surface of the atlas lateral mass is under lapped or overlapped will determine the listing.¹⁹

Blair analysis showed that atlas was under lapped on the left protracto view giving the listing a PIR atlas. It should be noted that relying on flat radiographs can increase potential errors in determining the proper listing by not taking malformation and asymmetry into consideration. It is apparent that there is a difference in listing determination in using flat and three dimensional radiographic analyses.

Intervention

The radiographs, leg check, and thermographic pattern indicated a vertebral subluxation of the upper spine. The patient's first correction utilized the ASL listing from the Knee Chest analysis. The patient was placed in the knee chest posture with his head turned to the left. The contact was a counter clockwise tissue pull using the doctor's right pisiform on the atlas posterior arch. A body drop force was applied by the doctor to the patient in a superior direction. The patient rested for 45 minutes after the correction and a follow up thermal scan was performed.

His pattern reduced and was no longer in physiological compromise. Each visit began with a thermal scan, pre rest for 15 minutes and leg check analysis to determine pattern. If in pattern, then an adjustment would be rendered during the visit. If an adjustment was rendered, the patient would post rest for 45 minutes following the correction.

After receiving a series of Knee Chest adjustments, the patient transferred treatment facilities and the primary technique of the new clinician was Blair technique. This was due to the accessibility to protracto views. Using the PIR listing taken from the left protracto view, convergence and convexity angles were calculated into the deliverance of the correction. These angles took the asymmetry findings into consideration. The patient was placed down on his left shoulder in a side lying position using a Lloyd toggle table. The contact was the doctor's right pisiform on the patient's right transverse process. A correction was given using the appropriate angles specific to the listing. The head piece dropped and no torque was applied. The patient followed the previous resting protocol.

The subject only needed one correction with the Blair technique in a 4 month time frame.

Outcomes

Post Blair correction there was improved cervical range of motion. Both techniques reduced pattern of the paraspinal temperature differentials. (Figure 1) Positive improvements were also noted in his pain and blood pressure. His pre

correction systolic reading was 133/76 mm Hg and a post correction reading of 123/75 mm Hg.

Discussion

In this case it is important to consider that prior to the diagnosis of AS, he experienced whiplash from three motor vehicle accidents. When the subluxation began is unknown, however it is possible that the motor vehicle accident(s) had a profound effect on its formation. The neurological findings of leg length inequality, paraspinal thermographic pattern and radiographic misalignment present in this case, demonstrated the existence of a vertebral subluxation. Whether the symptoms specific to AS are part of the subluxation process or not are unknown.

Elster suggests that effects of head and neck trauma have similar effects regarding formation of subluxation.¹⁰ The effects of whiplash with head trauma depend on several factors including the velocity of the motor vehicle at time of impact, the use of seatbelt/headrest, and awareness at time of accident, and the presence of any pre-existing cervical spine instability.²⁰ In this case, the subject's risk factors were significant including pre-existing cervical spine instability, no use of seat belt, and high speed. It is important to consider investigation of head trauma and motor vehicle accidents as a possible correlation to vertebral subluxation.

One theory to explain the successful outcome of this subject following a specific upper cervical adjustment is the dysafferentation model of vertebral subluxation. Following a spinal injury, joint dysfunction will cause mechanoreceptors to fire abnormally. In this case, at the atlanto-occipital joint sensory neurons could have detected sensory and distortion changes leading to increased nociception. The upper cervical spine is at risk because it lacks intervertebral discs resulting in biomechanical instability and a potential risk for a vertebral subluxation to occur.⁹ After a correction is made, mechanoreceptors reset and allow the body to perceive itself and its environment properly again.

Previously stated, IL-1, ARTS1, and IL-23R markers, directly influence inflammatory reactions in the body. It is suggested that when an adjustment is made, it stimulates the nervous system, and alters the inflammatory process that these cells carry out.⁹ This could explain why after an adjustment is made inflammatory reactions occur less frequently. Evidence also shows an increase in respiratory burst in immune fighting cells that occur after a spinal manipulation.²²

In addition to AS, the subject in this case expressed several concurrent conditions, including hypertension. One study discussed how a misalignment of the atlas links a person to having high blood pressure. The study showed a 10 mm Hg change in systolic blood pressure after the atlas was realigned from its abnormal position.²³

Limitations

There are limitations to any case study including this one. The difference in the force delivered by the Blair versus the Knee Chest corrections needs to be considered. Both techniques

utilize different patient position set ups, and both deliver different amounts of force to make the correction.

In future studies, a Stroke Ankylosing Spine Score would be an appropriate tool to utilize to check syndesmophyte progression.⁵ Also, a Bath Ankylosing Spondylitic Disease Activity Index test could be utilized to test the extent of skeletal status, and a BASRI score to measure AS disease progression.⁷

It is also important to consider taking pre and post cervical radiographic films. Perhaps the nasium view would have been the best view to detect an atlas orthogonal position. A bone scan after one year of care would help support that reabsorption of syndesmophytes does exist after a specific upper cervical correction.⁸

Conclusion

This case study details the history of a patient with AS who shows improvement following upper cervical chiropractic care. There is a need for further research of upper cervical chiropractic care in the management of patients with AS.

References

1. Lee L, Ott M, Hunter J. Skeletal Status of Men with Early and Late Ankylosing Spondylitis. *Am J Med.* 1997;103:233-241.
2. Rose K, Kim W. The Effect of Chiropractic Care for a 30-Year-Old Male with Advanced Ankylosing Spondylitis: A Time Series Case Report. *J Manipulative Physiol Ther.* 2003; 26(8) 1-9.
3. McDermaid C. Ankylosing spondylitis presenting to a chiropractic office: a report of two cases. *J Can Chiropr Assoc.* 2000; 44(2) 87-97.
4. Saeed S. Ankylosing spondylitis: recent breakthroughs in diagnosis and treatment. *J Can Chiropr Assoc.* 2007; 51(4) 249-260.
5. Thao P. Pathophysiology of ankylosing spondylitis: What's new? *Joint Bone Spine.* 2008 75; 656-660.
6. Rutherford S, Nicolson C, Crowther E. Symptomatic improvement in function and disease activity in a patient with ankylosing spondylitis utilizing a course of chiropractic therapy: a prospective case study. *J Can Chiropr Assoc.* 2005; 49 (2) 81-91.
7. Zochling J, Braun J, Heijde D. Assessments in ankylosing spondylitis. *Best Prac & Res Clin Rheum.* 2006; 20(3) 521-537.
8. Palmer BJ. *The Subluxation Specific The Adjustment Specific.* Davenport, Iowa: Palmer School of Chiropractic.1934;18
9. Kent C. Models of Vertebral Subluxation: A Review. *J of Vert Sub Res.*1996 1(1) 1-7.
10. Elster, E. Upper Cervical Chiropractic Management of a Patient with Parkinson's Disease: A Case Report. *J Manipulative Physiol Ther.* 2000; (23)8: 573-577.
11. Elster E. Sixteen Infants with Acid Reflux and Colic Undergoing Upper Cervical Chiropractic Care to Correct Vertebral Subluxation: A Retrospective Analysis of Outcome. *J. Ped, Mat, & Fam Health.* 2009;1-7.

12. Elster, E. Sixty Patients With Chronic Vertigo Undergoing Upper Cervical Chiropractic Care to Correct Vertebral Subluxation: A Retrospective Analysis. *J Vert Sublux Research.* 2006;1-9.
13. Elster, E. Eighty-One Patients with Multiple Sclerosis and Parkinson's Disease Undergoing Upper Cervical Chiropractic Care to Correct Vertebral Subluxation: A Retrospective Analysis. *J Vert Sublux Research.* 2004;
14. Elster, E. Upper Cervical Chiropractic Care for a Patient with Chronic Migraine Headaches with an Appendix Summarizing an Additional 100 Headache Cases. *J Vert Sublux Research.* 2003
15. Elster, E. Upper Cervical Chiropractic Care For A Nine-Year-Old Male with Tourette Syndrome, Attention Deficit Hyperactivity Disorder, Depression, Asthma, Insomnia, and Headaches: A Case Report. *J Vert Sublux Research.* 2003
16. Elster, E. Treatment of Bipolar, Seizure, and Sleep Disorders and Migraine Headaches Utilizing a Chiropractic Technique. *J Manipulative Physiol Ther.* 2004; (27)3: 1-8.
17. Erickson N. Electroencephaloneuromyogram. *Chir His.* 2002; 22(2) 31-44.
18. Grostic J. Dentate Ligament Cord Distortion Hypothesis. *Chir Res J.* 1988; 1(1). 47-55.
19. Selano J. The Effects of Specific Upper Cervical Adjustments On The CD4 Counts Of HIV Positive Patients. *Chir Res J.* 1994. (3)1: 32-39.
20. Burcon M. Upper Cervical Protocol to Reduce Vertebral Subluxation in Ten Subjects with Menieres: A Case Series. *J Vert Sublux Research;* 2008.
21. Alpass L. Chiropractic Management of 'intractable' chronic whiplash syndrome. *Clin Chir;* 2004(7):16-23.
22. Brennan P, Triano J. Enhanced neutrophil respiratory burst as a biological marker for manipulation forces: duration of the effect and association with substance p and tumor necrosis factor. *J Manipulative Physiol Ther.* 1992; 15(2): 83-89.
23. Bakris G, Dickholtz Sr M, Meyer PM, Atlas vertebra realignment and achievement of arterial pressure goal in hypertensive patients: a pilot study. *Journal of Human Hypertension.*2007;(21) 347-352.

Table 1 – Medication List at Presentation

Medication	Prescribed For:	More than 1 Side Effect
Robaxin	CNS depressant/muscle relaxant	X
Glucophage	Controls blood sugar levels	X
Celebrex	NSAID anti-inflammatory	X
Zocor	Cholesterol Lowering	X
Altace	Ace- Inhibitor Controls High Blood Pressure	X
Zantac	Hydrochloric Acid reducer	X
Prilosec	Gerd	X
Humira Pen	Block Tumor Necrosis Factor Receptors	X
Aspirin	Pain, Fever, Inflammation	X

Table 2 -- Cervical Range of Motion

Cervical Range of Motion	Pre-Correction	Post-Correction	Normal
Flexion	36°	35°	60°
Extension	46°	50°	50°
Right Lateral Flexion	25°	30°	45°
Left Lateral Flexion	33°	27°	45°
Right Rotation	70°	73°	80°
Left Rotation	48°	56°	80°

Figure 1 -- Pre and Post Blair Paraspinal Digital Infrared Imaging Reports

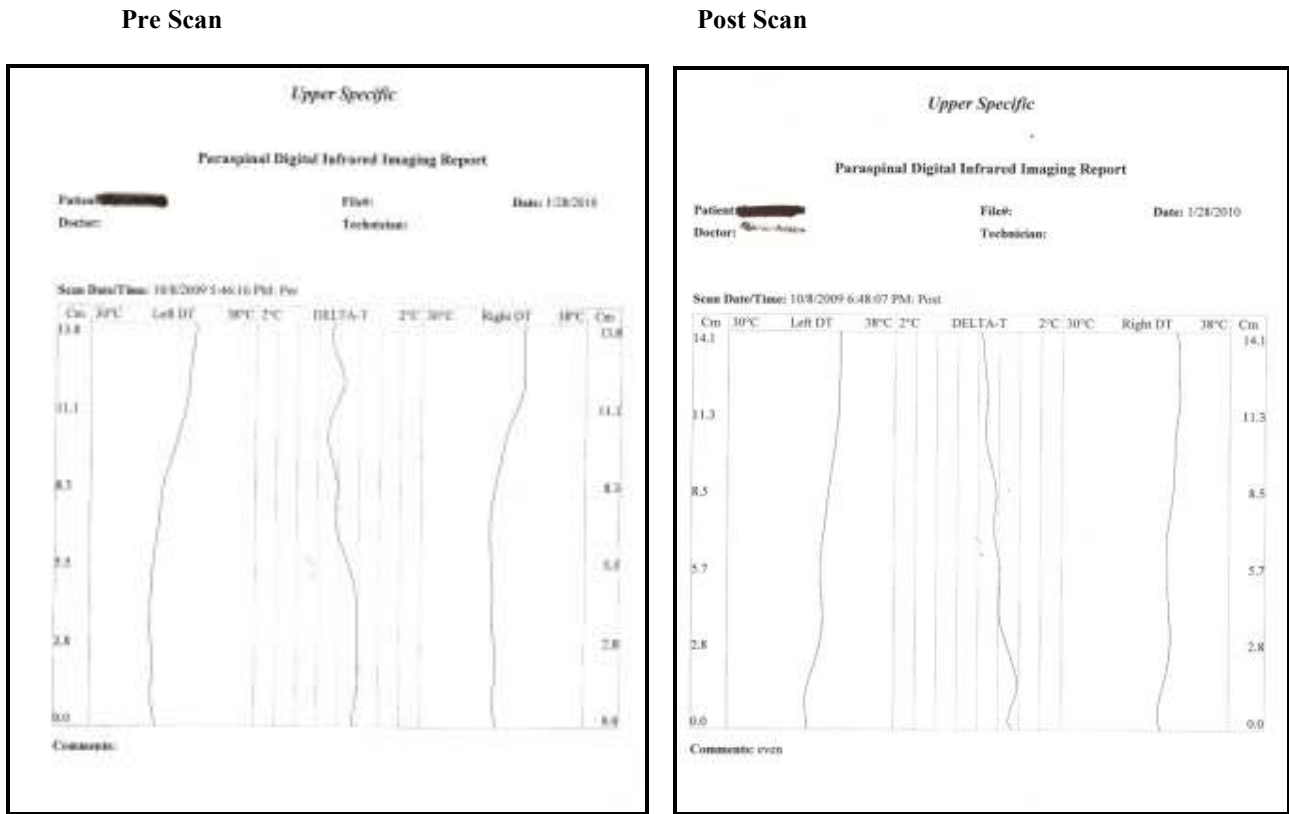


Figure 2 -- Pre and Post Knee Chest Thermography Reports

