CASE STUDY

Resolution of Juvenile Idiopathic Arthritis & Improved Immune Function in a 16 year old Undergoing Chiropractic Care: A Case Study

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Abstract

Objective: To describe the remission of oligoarticular Juvenile Idiopathic Arthritis in a 16 year old female undergoing chiropractic care.

Clinical Features: A sixteen year old female medically diagnosed with Juvenile Idiopathic Arthritis presented to a chiropractic clinic for care with a chief complaint of joint pain. Medical management up to that point included symptomatic relief through prescription medication which had little effect.

Intervention and Outcome: The patient’s spine was analyzed through the use of static palpation, a weight-bearing postural evaluation, paraspinal thermography, and Activator Methods Chiropractic Technique analysis. Vertebral subluxations were found at spinal levels C1, C5, T4, L5 and sacrum. Cervical segments were adjusted using Activator Methods Chiropractic Technique, while all other vertebral subluxations were adjusted using Diversified Technique. After six weeks of chiropractic care, the patient was considered in remission and taken off of her medications by her rheumatologist.

Conclusion: The results documented in this case study suggests that chiropractic care may be successful in the non-traditional management of Juvenile Idiopathic Arthritis.

Key words: Chiropractic, Juvenile Idiopathic Arthritis, Diversified Technique, Activator Methods Chiropractic Technique, paraspinal thermography, vertebral subluxation

Introduction

Juvenile Idiopathic Arthritis (JIA), also known as Juvenile Rheumatoid Arthritis or Juvenile Chronic Arthritis, is a chronic inflammatory disease that can begin anywhere from infancy to age 17.1,2 Although there are many theories on the etiology of JIA, a definite cause has yet to be proven. The effects of JIA include joint pain and decreased range of motion in the effected joints, which over time can result in significant disability.1 As the most common inflammatory arthritis of childhood, it is estimated that one in every one thousand children world-wide develop JIA.3,4 Depending on the source, between 33-60% of JIA patients never achieve remission, and residual symptomatology continues into adulthood.2,4

There are four main subtypes of JIA including oligoarticular, polyarticular, systemic onset, and enthesitis-related.3 This case focuses on oligoarticular JIA, which is defined as JIA that

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effects up to four joints. The average onset of oligoarticular JIA is 5 years of age and is predominant in the female population.

This case study will explain the chiropractic management of a sixteen year old female with oligoarticular JIA and vertebral subluxation. It will explore the effects of vertebral subluxation on the autonomic nervous system and immune system, and describe how the correction of those vertebral subluxations may result in the remission of JIA.

Case Report

Patient History

The patient is a 16 year old female with a chief complaint of low back and joint pain, and a secondary complaint of digestive dysfunction. The patient also suffered from seasonal allergies and asthma. She was diagnosed with oligoarticular Juvenile Idiopathic Arthritis at the age of 12 after presenting to her medical doctor with joint pain. The patient denies any family history of Rheumatoid Arthritis. She was prescribed Nabumetone and Neurontin in an attempt to diminish the inflammation and pain associated with JIA.

The patient history also revealed daily bouts of diarrhea and significant abdominal pain. It is unclear as to whether these symptoms were secondary visceral effects of JIA or resulting side effects of the above prescribed medications. According to Physician’s Desk Reference, the side effects of Nabumetone can include but are not limited to diarrhea and abdominal pain.

Blood work was ordered by her rheumatologist and several significant findings were revealed with regards to the patient’s immune system. An anti-nuclear antibody test was positive, indicating that the immune system had begun to attack the tissues within the patient’s own body. A low white blood cell count was also found. Because white blood cells, or leukocytes, are the main disease-fighting cells of the immune system, it can be concluded that fewer leukocytes in the blood stream leads to a compromised immune system. Vitamin D, a modulator of the immune system, was also found to be less than the normal limit. SCL-70, a marker for systemic sclerosis, was present. Systemic sclerosis is a subtype of scleroderma, which is another category of autoimmune disease.

Thermography

Because paraspinal thermography provides a window into the physiology of the nervous system, it is often used to measure the presence of vertebral subluxation. One of the neurological components of the vertebral subluxation is dysautonomia, or dysfunction of the autonomic nervous system. An unique effect of dysautonomia includes the inability of the body to regulate skin temperature, which can be observed using the infrared technology of the Insight Subluxation Station. The Insight Subluxation Station paraspinal thermography is performed by running an instrument up the spine, comparing differences in the temperature of the skin from right to left at each spinal segment. Ideally at each level, the temperature readings would be symmetrical when comparing right to left. Greater than 1°F of asymmetry is considered significant, and is directly correlated to dysautonomia and vertebral subluxation. Paraspinal thermography has been shown to be a reliable technique. A study was performed to test the intra-examiner and inter-examiner reliability specifically when using the Insight Subluxation Station. It was concluded that both intra and inter-examiner reliability were deemed exceptional.

Paraspinal thermography was performed using the Insight Subluxation Station during the initial examination. The scan revealed mild asymmetries present at the C1, C2 and C6 spinal levels which indicate irregular function of the sympathetic nervous system and vertebral subluxation. After approximately four months of regular chiropractic care, a second thermal scan was performed which displayed one area of mild asymmetry present at the spinal level T2.

Chiropractic Examination

A weight-bearing postural evaluation revealed anterior head translation, left head rotation, a high right ilium and left pelvic rotation. Active lumbar range of motion revealed a decrease in lumbar extension with pinpoint pain at the L5-S1 junction. All other active and passive cervical and lumbar ranges of motion were within normal limits. Muscle testing of the upper and lower extremities corresponding with each spinal nerve root were graded at a 5 out of 5. Reflex testing of the biceps, brachioradialis, triceps, patellar and achilles tendons were all within normal limits at 2+. Static palpation of the upper cervical spine revealed hypertonicity of the right paraspinal musculature, with point tenderness at the right atlas transverse process. Edema was noted at the inferior aspect of the L5 spinous process, with point tenderness at the L5-S1 articulation and the left SI joint.

The analysis of Activator Methods Chiropractic Technique (AMCT) was used to evaluate the presence of vertebral subluxation. The AMCT analysis is based off the idea that the prone leg check is altered when the specific articulation being evaluated is not moving appropriately, or is fixated. While lying prone, a baseline leg check is performed at the start of each visit. The patient is then taken through a series of stress tests, pressure tests, and isolation tests to evaluate certain articulations of the spine for vertebral subluxation. The doctor performs a stress test by applying a light force with the thumb or index finger over an articulation in the direction of the subluxation, while a pressure test occurs in the direction of correction. An isolation test is a provocative test that is actively performed by the patient. Observation of the prone leg check is completed after each of these tests are performed. Based on findings of the prone leg check, the doctor is able to pinpoint the level/s of subluxation.

Diagnoses

After compiling data from the weight-bearing postural analysis, paraspinal thermography, static palpation, and AMCT analysis, it was determined that the patient had vertebral subluxations present at spinal levels C1, C5, T4, L5 and sacrum.

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Intervention

The patient was evaluated three times per week for six weeks and adjusted as necessary. During that first phase of care, AMCT analysis regularly revealed subluxations at C1, C5, T4, L5 and sacrum. Two of the most commonly used chiropractic techniques for patient care are Diversified Technique and instrument assisted adjusting using the Activator Adjusting Instrument (AAI). The cervical spine subluxations were adjusted using an AAI, the Activator 4, which delivers a thrust with a low duration with a low peak force. Because of the low force and low amplitude nature of the AAI, it is considered to have a relatively low risk of injury as compared to other adjusting techniques.

Due to the possibility of upper cervical instability associated with ligament laxity, the AAI was chosen to adjust the cervical segments. The thoracic, lumbar and sacral subluxations were adjusted using Diversified Technique, which is a technique integrating an assortment of adjustments created by several different chiropractors. The one thing in common with every Diversified Technique adjustment is that before the delivery of the thrust, the affected joint is pre-stressed by taking the slack out of the tissue that overlies the joint. Once the slack is removed, joint tension is achieved and a high velocity, low amplitude adjustment is delivered.

Outcomes

The patient began chiropractic care while under the co-management of her rheumatologist for JIA. After six weeks of care, the rheumatologist declared that the patient’s JIA was in remission. The patient ended her JIA medication regimen at that time per recommendations of her rheumatologist. The most recent blood work revealed that the white blood cell count was now within normal limits, and there was no longer a concern for systemic sclerosis as her lab workup was “essentially normal”. It was recommended that the patient be seen by her rheumatologist for a follow up visit in 2-3 months.

Chiropractic evaluation also showed marked improvements. As previously mentioned, a second paraspinous thermography scan was performed to assess the patient’s progress. There was a single level of mild asymmetry reported as compared to her initial scan showing three levels. Static palpation and AMCT analysis has also shown an increase in the ability of the patient to hold an adjustment. Therefore, she is currently being evaluated one time per week for vertebral subluxation. At the latest reassessment, the patient shared that she is no longer taking medication for allergies and asthma as the symptoms have resolved. She also stated that her bowel movements have been of regular consistency with no abdominal pain.

Discussion

Medical Management

The goal of traditional medical management of JIA includes pain relief, maintaining function, minimizing toxicity, and reducing the inflammatory process with an end goal of achieving remission. The treatment itself is focused around a regimen of medications and injections. Nonsteroidal anti-inflammatory drugs are recommended for patients that have JIA showing little activity, excluding those that also show evidence of joint contracture; this particular treatment is not to exceed two months duration. Methotrexate, classified as a disease-modifying anti-rheumatic drug (DMARD), is also recommended for the treatment of JIA, particularly those with the oligoarticular type. Methotrexate is effective in decreasing the pain and swelling of affected joints and has also been shown to decrease long-term joint damage. Lastly, intra-articular corticosteroid injections, most commonly used for oligoarticular JIA, are used for patients in the active stage of arthritis. Although these three drug therapies are standard in treating JIA, many patients never achieve remission and continue in the active stage of the disease.

Review of Literature

Although there are few studies to suggest the positive effects of chiropractic adjustments on JIA, research has shown favor in successfully managing Rheumatoid Arthritis (RA), the adult form of JIA, with conservative chiropractic adjustments. In a case study done by Pero and Jockers, a 54 year old woman presented to a chiropractic office with a chief complaint of bilateral pain in her hands and fingers with concomitant swelling and myalgia in her hands, fingers, knees, feet and toes.

She was diagnosed with RA seven years prior to her examination in the chiropractic office. At the time of her initial visit, she was being medically managed through the use of Methotrexate to decrease the pain and swelling, as well as Prednisone which is meant to suppress the immune system. When asked to rate the severity of her joint pain on a scale from 0 to 10 with 0 being no pain and 10 being the worst possible pain, she described her pain as 9/10 when she did not take her medication, and 3/10 when she did.

The patient was evaluated and adjusted as needed utilizing Diversified Technique three times per week for three months. In addition to her weekly adjustments, she was also performing Pettibon cervical traction to restore the cervical lordotic curve. After that initial intensive phase of care, her frequency was reduced to one time per week due to marked improvements in pain, the reduction of swelling, and partial restoration of the cervical curve. It was at that time she requested that she be taken off the medication regimen for RA, and her medical doctor approved the request. After ten months of regular care, the patient rated her joint pain as 1/10. Activities of daily living such as dancing, exercising, and walking up her stairs could now be done without pain.

Pathophysiology

The autonomic nervous system is composed of the sympathetic nervous system and the parasympathetic nervous system. Along with the hypothalamic-pituitary-adrenal axis of the brain, the autonomic nervous system is responsible for regulating inflammation in tissues of the body. In JIA patients, autonomic dysfunction is characterized by an increase in overall sympathetic tone and decreased activity of the vagus nerve. The immune system is highly affected by immune cells that are created and released by the spleen into
the body's bloodstream.\textsuperscript{19} The spleen is under direct innervation of the sympathetic nervous system, and lacks any innervation by the vagus nerve.\textsuperscript{19} Increased sympathetic activity forces the spleen to increase production of T helper cells (TH1 cells), which attack the body's own tissues.\textsuperscript{19}

An increase in sympathetic function also leads to an increased production of cortisol from the adrenal cortex, decreasing the number of receptor sites available to bind Vitamin D3.\textsuperscript{20} With fewer binding sites, there is an overall decrease in absorption of Vitamin D3 which is noteworthy because Vitamin D3 is an important component of regulating the immune system.\textsuperscript{3,20} Normal physiology says that an increased production of Vitamin D3 has been shown to decrease the body's TH1 immune response by down-regulating inflammatory cytokines such as interleukin-2 (IL-2).\textsuperscript{21} However, because an increase in the production of cortisol leads to a vitamin D3 deficiency in the body, there is an increase in TH1 cells and ultimately an increase of autoimmune attacks on the tissues of the body.

\textit{Vertebral Subluxation}

Vertebral subluxation is a term commonly used in the chiropractic profession to describe the misalignment of spinal bones. When the spinal bones are not in their proper alignment, there is partial occlusion of the intervertebral foraminae which house the exiting nerve roots.\textsuperscript{22} There may be impingement of the nerve roots when a misalignment is present, and the impulses being sent through the affected nerves are hindered, resulting in disease or dysfunction.\textsuperscript{22} The neurodystrophic model of vertebral subluxation “suggests that neural dysfunction is stressful to body tissues and that lowered tissue resistance can modulate specific and nonspecific immune responses”.\textsuperscript{23}

A chiropractic adjustment is performed to realign the spinal bones to their proper position, restoring suitable motion to that joint. The optimal size and shape of the intervertebral foraminae is also restored when appropriate alignment of the vertebrae is reinstated, which ultimately reduces interference on the nervous system and neural dysfunction.\textsuperscript{22} Research has shown that a chiropractic adjustment has many positive effects on the autonomic nervous system with regards to neural dysfunction.

A study performed by Welch and Boone\textsuperscript{24} was completed to observe the effects of a chiropractic adjustment on blood pressure, because blood pressure is controlled by the autonomic nervous system and is elevated specifically by sympathetic stimulation. It was concluded that the cervical adjustment decreased the diastolic blood pressure, suggesting that a parasympathetic dominance was achieved.

For this reason, by adjusting the spine to remove vertebral subluxations and restore neurological homeostasis, it is hypothesized that sympathetic overload can be decreased. Because the pathophysiology of JIA is focused around an increase in sympathetic tone, the chiropractic adjustment should in theory decrease the body's autoimmune attack on its tissues and maintain the balance between TH1 and TH2 immunity by introducing a parasympathetic dominance.\textsuperscript{24,25}

\textbf{Conclusion}

The purpose of this case study was to explore the role of non-traditional management of JIA through chiropractic care. This study showed favorable results in the remission of JIA, as well as the reduction of several other unrelated symptoms (asthma, allergies, diarrhea and abdominal pain).

The patient was initially assessed three times per week for six weeks and was adjusted based on the presence of vertebral subluxation. Because no other lifestyle changes were made throughout those six weeks, it is suggested that chiropractic adjustments may play a role in the remission of JIA. Further research should be conducted on the effects of chiropractic care with regards to overall immune function, specifically in an individual with JIA.

\textbf{References}


17. American College of Rheumatology [Internet]. American College of Rheumatology; c2012 [cited 2013 May 20]. Available from: http://www.rheumatology.org/Practice/Clinical/Patients/Medications/Methotrexate_(Rheumatrex,_Trexall) /.


