Introduction

Rheumatoid Arthritis (RA) is a idiopathic autoimmune disease categorized by systemic inflammation primarily of joints and soft tissue, but may occur in organs as well. Research performed by Silman shows that the incidence of RA is 2-3 times higher in women than men. According to the Center for Disease Control and Prevention, an estimated 1.293 million adults aged 18 and older (0.6%) had RA in 2005, down from the previous 1990 estimate of 2.1 million.

The declining prevalence is somewhat due to a more restrictive definition of RA, but also reflects well-established reduction in RA prevalence around the world. The annual incidence in the United States is 68.3 persons per 100,000.

RA is classified as a type III hypersensitivity reaction. Tissue damage, as seen in RA and other type III reactions, is caused by the activation of complement in response to relatively small antigen-antibody complexes that are deposited in joints or tissues. Deposition of the immune complexes causes an inflammatory response leading to tissue damage especially in joints (synovium), small blood vessels, and glomeruli. B-cells, T-cells, macrophages, and synovial fibroblasts are summoned to destroy the offending immune complex.
Fibroblasts promote production of several pro-inflammatory cytokines, however, IL-12 and IL-17 are the major groups that set the destructive processes in motion through their signal cascades. Because complexes adhered to tissue the result is gradual destruction of tissue or joints.

According to Masi et al, RA follows one of three different courses as a disease process. The disease may be monocyclic (least severe), polycyclic, or progressive (most severe) in the presentation of symptomatology. In 20% of people initially diagnosed with RA it is monocyclic (i.e., had one episode lasting less than two years of initial presentation and did not recur). As stated previously, an alternative course of RA is that of a polycyclic nature which occurs in 70% where there are fluctuating levels of disease activity. In the other 10% RA was said to be a progressive and constant condition.

Long Standing RA, Ankylosing Spondylitis, and Down Syndrome have been linked to a laxity of the transverse atlantoaxial ligament. Stability of this ligament is essential because it is instrumental in preventing spinal cord and brain stem myelopathy. Research demonstrates that patients with a long standing disease of the craniovertebral junction may have intractable pain, motor, and sensory neurologic deficits, and myelopathy. It is important to note that death may also be the result of instability so it is of great importance to understand the implications of long-standing RA sufferers and its correlation with atlantoaxial instability. Late sequela of RA may be atlantoaxial impaction due to instability, cranial settling, or basilar invagination which is said to occur in 5% to 34% of RA patients.

Controlling the progression of RA early is crucial in avoiding further potential life threatening sequelae. Because RA is an inflammatory condition we must focus on improving the state of the immune system by reducing pro-inflammatory substances and all other interference with the body’s healing ability. In a review of literature written by Cohn he discusses how the nervous system is responsible for localizing immune agents to specific sites of damage, infection, or inflammation to prevent a systemic or a greater response then the body needs. By reducing pro-inflammatory or interfering agents, the body better able to heal.

Cohn states that the nervous and the immune system have such a multitude of connections that they are essentially one unit. If you apply the generally agreed upon chiropractic definition of subluxation that a bone out of alignment will alter nerve impulses- then because the immune system has a multitude of connections with the nervous system- a subluxation must alter the function of the immune system. Anatomy determines physiology (i.e. structure determines function) therefore, by removing the subluxations and restoring normal curvatures to the spine, the nervous system will function more optimally so the immune system may control autoimmune diseases such as RA more effectively.

Case Report

History and Exam

A 54-year-old woman entered the health center for the treatment of rheumatoid arthritis. The patient entered the clinic complaining of severe bilateral pain in her hands and fingers. The patient also had marked swelling and myalgia systemically in her hands, fingers, knees, feet and toes. At presentation a subjective pain scale was used to determine the severity of pain out of 10, with 1 being hardly any pain at all, and 10 being the worst pain imaginable. Initially, the joint pain in her knees, hands, fingers and feet was 9/10 without medication and 3/10 with medication at presentation. The patient consumed anti-inflammatories and painkillers such as Celebrex, when first diagnosed, then that was eventually replaced with a combination of Prednisone and Methotrexate.

The patient was diagnosed seven years prior with Rheumatoid Arthritis by her medical physician. There were many mornings she awoke with pain that made standing erect a daunting task. Walking often required crutching onto the wall due to the severe magnitude of her pain.

Diagnostic Imaging

Prior to entering the clinic the patient was diagnosed with RA, so additional laboratory testing for rheumatoid factor or other lab values was not necessary in the diagnosis of this patient. The chiropractor performed full spine radiographs at 40” source image distance (SID) with the exception being the lateral cervical x-ray that was taken at 72” SID. The lateral cervical radiograph was taken to determine the degree of curvature in the neck and for an accurate analysis of anterior head translation.

Pettibon analysis protocol was used in the analysis to establish the degree of lordosis of the cervical spine. Harrison determined a normal spine to have 0mm of AHT and 42 degrees of cervical spine lordosis. Jackson’s angle was used for the determining the amount of cervical curve on the lateral radiography (i.e. the angle of intersection of the posterior C2 and C7 bodies). Anterior head carriage is determined by the difference of translation of two points of reference (i.e. the sella turcica and C4).

Surface electromyography (SEMG) was recorded using the Insight Millennium Subluxation Station to measure paraspinal muscle tone with the patient seated. SEMG is a tool for comparing the tone of the summation of paraspinal muscle action potentials to determine the presence of muscle tone changes secondary to subluxation. SEMG is a reliable chiropractic outcome assessment tool.

Interventions and Outcomes

The patient was analyzed and adjusted each visit with a weekly frequency of three visits for three months. Thereafter, the patient was given chiropractic corrective care at a frequency of one visit per week. A wobble board was used to initiate lumbar motion and pump the discs prior to adjustments. The patient performed Pettibon cervical traction exercises to stretch the anterior musculature of the cervical spine.

The patient visitation frequency was reduced as a result of improvements in pain, reduction of swelling, some degree of
restoration of the cervical lordosis, and reduction of anterior head translation. By the 4th month, under the management of a medical doctor she was able to stop taking her medications per her request and the pain was reduced to 1/10 without medications by the 10th month of care. In the approximate 3.5 months the patient was seen a total of 36 visits. The patient is now able to dance, exercise, and walk up her stairs without any pain.

The patient’s pre-management radiographs were taken on the initial visit and post-management progressive radiographs were taken 3.5 months later. Pre-and-post lateral cervical x-rays were taken to determine cervical curve. Jackson’s line was used for analysis i.e. the angle measured between the vertical lines drawn that converged from the posterior bodies of C2 and C7.

Pre-management Jackson’s angle was 11 degrees while post-management angle measured 21 degrees (a 47% increase in lordosis). Anterior head translation on the z-axis was also determined by measuring from the sella turcica to C4 vertebral body. The radiographs were also analyzed for anterior head translation (AHT), which measured 33mm and post management the AHT was reduced to 29mm. Approximately a 12% reduction of AHT. The normal value for AHT is 0mm. Figure 1 demonstrates the patient’s anterior head carriage was reduced from 33mm to 29mm and the cervical curve was increased from 11 to 21 degrees within a time period of 3.5 months.

Surface electromyography (SEMG) was used in this case report to evaluate paraspinal muscle tone. SEMG can be a powerful objective tool for measuring muscle tonicity if the examiner uses it correctly and discriminatingly. Two scans were performed on this patient pre and post-care after one month of corrective chiropractic care.

As seen in Figure 2 the initial SEMG recorded severe hypertonicities at C1 on the left, C3 on the right, C5 on the left, and C7 on the left. A hypertonicity that exceeded the normal range was noted at T8 on the left. Moderate hypertonicities were noted at C3 on the left, T4 on the right, L5 on the right and left, and S1 on the right.

A follow-up SEMG was performed following the 12th adjustment and hypertonicities of moderate amplitude were noted at L5 and S1 bilaterally. Mild hypertonicities were also noted at C1 on the left, C5 bilaterally, and L3 on the right. In comparison to the first SEMG study performed 1-month prior it is evident that paraspinal muscle tonicity in all spinal regions was reduced.

**Discussion**

This case report is an example of how a person with RA can be managed effectively with corrective chiropractic care. The body is a self-healing entity, and when given the right environment can perform all physiological processes in an ideal energy efficient manner to maintain optimal homeostasis. After seven years of management in the medical model the patient exhausted her options and was ready to take control of her health. The patient was able to gradually stop taking medication for pain and inflammation and she is now drug-free. This patient made dietary changes and underwent corrective chiropractic care to realign the spine to allow for better function.

RA is an inflammatory disease that may potentially develop into a very serious polyarthopathy if left uncontrolled. Medical doctors and chiropractors alike believe in the importance of early diagnosis and treatment of rheumatoid arthritis to prevent further destruction of joint space, compromised bone integrity, and lowering the pain threshold. According to research, the best non-CAM approach for the initial treatment of RA is to give early intensive treatment with Disease-modifying antirheumatic drugs (DMARDs) with oral glucocorticoids or biologicals.

In contrast, other science-based research has associated improved immune functioning with correction of subluxations. For example, a study by Selano et al demonstrated patients that received chiropractic care had 48% higher CD4 T cell counts in HIV patients in comparison to the control whom did not receive any form of chiropractic care.

Correction of the cervical spinal curve was the focus of management using corrective chiropractic care but it remains unclear if the hypolordosis or reversed cervical curves contribute to the development of RA. On the other hand, through the reduction of subluxations and correction of the cervical curvature the patient experienced increased function, pain reduction and improved quality of life.

Research has shown that having a hypolordosis, military neck (military), or kyphotic curve (reverse) may allow the spine to come into direct contact with the spinal cord. Dentate ligaments, which attach to the dura mater, suspend the spinal cord and any variation from the normal curvature in the spine may place undue stresses of traction or compression on the cord. Peer-reviewed literature shows improvements can be made in correcting the kyphotic cervical curve except when there are limitations of matter.

Research shows that a reduction or reversed cervical curve has several underlying causes such as chronic stress, repetitive micro-traumas, motor vehicle accidents, other macro-traumas, and whiplash. At the very least, cervical radiographs for the identification of hypolordosis, military neck, or reversed cervical curve should be taken to identify alignment and interrelationships of structure because cervical curve abnormalities have been correlated with having detrimental affects on the brainstem.

**Conclusion**

The chiropractic corrective care and management performed in this case was centered on reducing subluxations throughout the spine, reducing/eliminating anterior head translation and restoring the cervical curve. This case report demonstrates that there may be an association with restoring cervical curves, correcting subluxation, and reducing AHC to improve the quality of life in an RA patient.

Functionally, the patient is now able to dance, exercise, and walk up her stairs without any pain. It is unclear at this time if there is any correlation with reduction of subluxations, and
correction of cervical hypolordosis with changes in function and symptomatology of RA patients. More research is necessary to establish such a relationship.

References

**Figure 1.** Lateral Cervical radiographs were taken. The left is the pre-treatment x-ray and the x-ray on the right is the post-treatment radiograph taken 3.5 months later.

**Figure 2.** SEMG scans- the bottom scan is pre-treatment. The top scan was performed after one month of care. The scans represent level of hypertonicity as compared to normal. The following identifies the degree of severity: black=very severe, red=severe, green=moderate, blue=mild, and white=normal.