CASE STUDY

# Improvement in a Child with Attention Deficit Hyperactivity Disorder, Kyphotic Cervical Curve and Vertebral Subluxation Undergoing Chiropractic Care

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**ABSTRACT**

**Objective:** To report on the response of a child with attention deficit hyperactivity disorder (ADHD) using specific chiropractic spinal adjustments.

**Clinical Features:** A four-year old boy presented with a kyphotic cervical curve demonstrated by x-ray as well as an abnormal paraspinal surface electromyography (SEMG) and infra-red thermal scans. He had sleep disturbances and was diagnosed by his pediatrician with ADHD.

**Intervention and Outcome:** Specific chiropractic spinal adjustments were administered in each of 50 office visits over an eight month span. Care consisted of Pettibon negative Z, toggle recoil and Thompson techniques. There was a dramatic improvement in overall behavior, sleep times and patterns and marked improvement of SEMG, thermal scans and radiographs.

**Conclusion:** Conservative specific chiropractic spinal adjustments were found to be a safe and effective alternative form of care to for this child with ADHD.

**Key Words:** *Attention deficit hyperactivity disorder (ADHD), ADD, asthma, chiropractic, spinal adjustments, SEMG, thermography, Pettibon technique, Thompson technique, subluxation, toggle recoil*.

## Introduction

Attention deficit hyperactivity disorder is a condition defined as "a persistent pattern of inattention and/or hyperactivity and impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development" (DSM -IV).[1] Prevalence estimates among school children range from 3 to 5 percent but other estimates vary from 1.7 to as high as 16 percent.[2] Typical allopathic treatment has been prescribed use of strong psycho stimulants in the methylphenidate family. This treatment has been the focus of great controversy due to the severity of some of the side effects of these drugs, particularly when prescribed at early ages. Significant side effects include a decrease in annual growth rates and decrease in annual weight gain rates.[3] Many parents and adults concerned with these side effects seek alternative care for remediation of symptoms. Change of diet,[4-6] vitamins and minerals,[7] aromatherapy,[8] biofeedback,[9] exercise therapy[10] and chiropractic care are some examples of alternative therapy used most frequently.[11]

The use of chiropractic care as a viable protocol for decreasing the severity or leading to the remission of ADHD has been documented in the literature as having the highest level of effectiveness of 20 types of alternative care tested.[11] In this study, a sample was drawn from patients aged 5-17 years with ADHD attending Royal Children's Hospital, Melbourne outpatient clinics from May to September 2003. A 20 item survey was posted to consenting families. The results demonstrated that 50% of those who had tried chiropractic reported a favorable response, which received the highest rating. Modified diet was second with 42.4% reporting favorable results. It is the purpose of this paper to present a case of normalization of a child with diagnosed ADHD based on dramatic pre and post changes of objective testing along with concomitant subjective improvement in all areas of involvement. This paper will also serve to highlight the

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negative effects from a lack of maintenance and stabilization care.

**Case Report**

A four year-old male was brought to our office by his parents and presented with a diagnosis of attention deficit hyperactivity disorder (ADHD). His original diagnosis of ADHD was made when he was 2 years old. His pediatrician recommended several medications as options for treatment, which were refused by the parents based upon concerns about possible side effects. This child had been extremely hyperactive for two years and was discharged from daycare due to being too difficult to manage. The mother stated that he had a history of ear infections and coughing as well, and had 12 ear infections before the age of 15 months. He was prescribed a course of antibiotics with each new episode. He had tubes inserted at 18 months and had 2 ear infections since that time. This patient was diagnosed with asthma at age 2 and was put on a nebulizer at that time. The patient had disrupted sleep patterns and slept only 6 hours per night on most occasions. The mother stated that this began as a baby. She also stated that he did not eat "normal amounts of food" and frequently ate very little.

Medical history included regular assessments by his pediatrician for the ADHD. He was on Albuterol for his asthma and was put on several different cough medicines over the years.

Examination revealed an uncooperative child who had great difficulty focusing on the task at hand and was easily distracted. He was, however, able to play with new toys in the office to his satisfaction prior to moving on to other activities. Leg check demonstrated a functional short left leg. Leg check was performed in the prone position. Palpation revealed muscle tightness in the sub-occipital area on both the right and the left, extending into both trapezius muscles. Upon digital palpation of the cervical spine, four significant levels of spinal misalignment were identified, specifically C1 on the left, C2 on the left, C4 on the right and C6 on the left.

Surface EMG and thermal scans were performed using the Insight Millennium® instrument. Both SEMG as well as thermal scanning are considered valid and reliable outcome assessment tools.[12] It should be noted that the child was cooperative for this procedure when promised a specific reward by the parents. He had several significant abnormalities on both scans as seen in Figure 1.

AP and lateral cervical spine radiographs were obtained and evaluated – see Figure 2. He had anterior head translation and a kyphosis of his cervical spine of -85cm as measured with a Pierce Acu-arc instrument. The Pierce instrument (Figure 3) is a ruler which can be placed over the film and can be adjusted to exactly match the curve being measured. The radius of the curve can then be read directly off the ruler in centimeters. In the cervical and lumbar spine, lordosis is read as positive numbers and kyphosis is read as negative numbers.

Management and adjustive procedures consisted primarily of adjusting occiput on C1 using the Pettibon -Z adjusting instrument (Figure 4) and Thompson drop adjusting of the lower cervicals. The Pettibon instrument is used to reset C1 under Occiput. This is accomplished by having the patient supine with C1 placed directly on the sling of the instrument. The patient tucks their chin to their chest as much as possible with their hands on their face. A light force is applied by placing the contact hands directly over the patient's hands. A superior to inferior and anterior to posterior torquing motion is used to engage the drop mechanism of the instrument.

**Figure 1 – Initial Thermal and SEMG Scans**

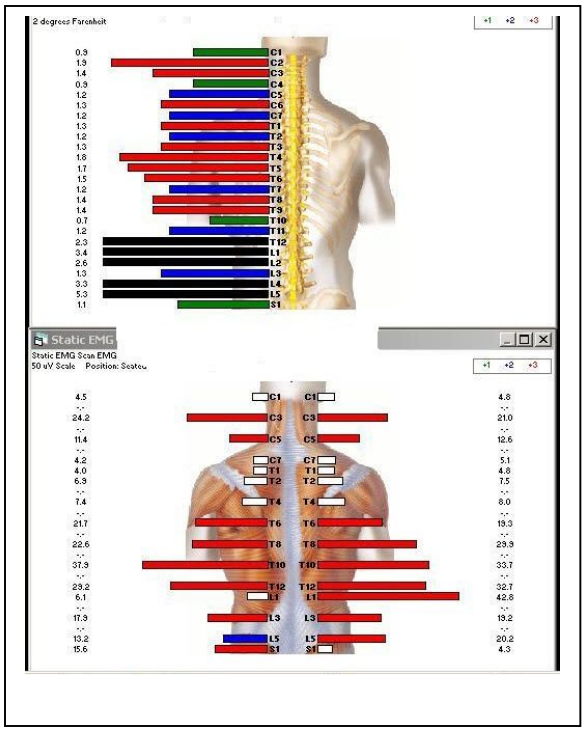



**Figure 2 – Initial Lateral Cervical Radiograph**


The patient was seen 3 times per week for 2 ½ months and was difficult to stabilize due to the very active nature of the child, particularly at the beginning of care. By 2 ½ months

he had made excellent progress symptomatically and was beginning to stabilize based on reduction of the cervical subluxations noted earlier on digital palpation and prone leg check.

Twelve days into care, the mother reported that he was eating much better. At a re-evaluation performed on the 13th visit (28 days after onset of care), his mother stated that his appetite had returned to normal. His sleep patterns were much improved. His coughing stopped and he was less hyperactive. Re-evaluation performed 24 visits later demonstrated marked improvement in his asthma and he was able to stop using all medications including cough and asthma medication. His schoolwork was much improved. He was able to focus and perform his tasks at school and his overall behavior had become a non-issue.

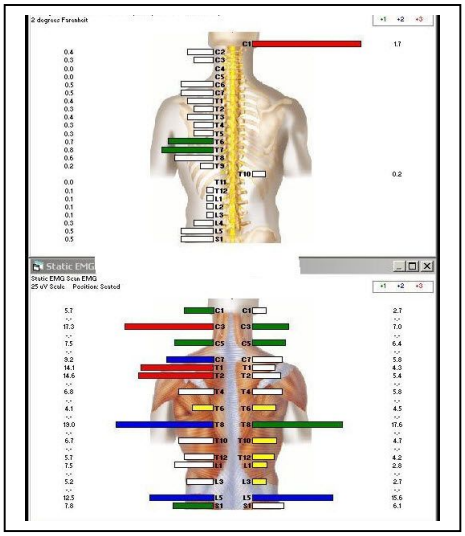
**Figure 3 – Acu Arc Ruler**

A follow-up SEMG and thermal scan were performed and were both markedly improved (See Figure 5). Post-cervical radiographs were taken and demonstrated that the abnormal -85cm kyphosis of the cervical spine had been corrected to a +17cm lordosis (See Figure 6). The anterior head translation had almost completely normalized as well. One other published case study has shown correction of cervical kyphosis to lordosis and symptoms of ADHD reduction.[13]

**Figure 4 – Pettibon Negative Z Adjusting Headpiece**

Because of the progress, it was decided he could cut back to two times per week. Care became somewhat disrupted after that due to the family moving out of state. After the move, he was seen once to twice per week for about a month and a half, then only once – one month later - and then not seen again for two months. The parents re-committed to regular care at that time and began bringing him roughly twice per week for the next 4 weeks but had to stop care after that.

**Figure 5 – Follow-up SEMG & Thermal Scans**



The father stated that as time went on without adjustments, his behavior become more difficult. So much so that he was placed on Adderall. The child was without chiropractic care for the next 16 months. Eventually they contacted us and agreed to make the trip back to our office for an evaluation.

The new SEMG and Thermal scans demonstrated increased levels of abnormal signals (Figure 7). His new x-ray revealed that his cervical lordosis had almost completely reverted back to its' original kyphosis with anterior head translation (Figure 8).

**Figure 6 – Second Radiograph**

**Figure 7 – 3rd Thermal & SEMG Scan**

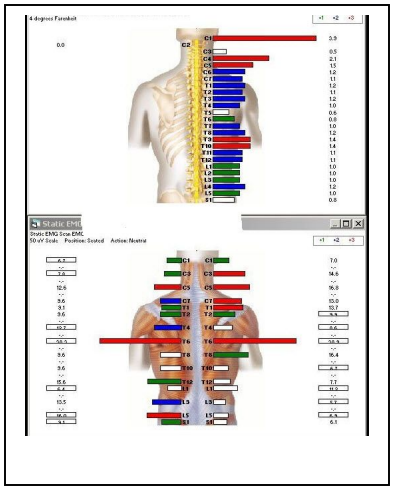


**Figure 8 – 3rd Radiograph**

**Discussion**

The etiology of ADHD has yet to be identified and objective tests such as PET scans, SPECT scans, MRI, CAT scans and blood or urine tests all fail to delineate any differences of ADHD patients from normal populations.[14] Some argue that ADHD is a misdiagnosis of symptoms commonly seen in many other conditions including food hypersensitivities,[15,16] allergies,[17] reactions to high sugar consumption,[18] particularly soda,[18] artificial colors,[90-21] and certain preservatives.[22] At this time, ADHD appears to be only a grouping of symptoms that frequently overlap symptoms of several other conditions and has no specific etiology.[23]

The original SEMG and thermal scans that were taken on this child were abnormal with multiple spinal levels which were off by 3 standard deviations. While no specific graph patterns have been established for any given condition, it is not unreasonable to propose that a specific signature of abnormal readings may be found in cases of ADHD. Further study in this regard may yield important information.

It might be that the loss of the cervical lordosis affects the neuromusculoskeletal system so much that the body's threshold for adaptation or response to stimuli is compromised and ultimately may account for the symptoms of food hypersensitivities, food allergies, and symptoms of comorbid related disorders. Cervical kyphosis as a possible link to attention-deficit/hyperactivity disorder has been discussed in the literature as well.[24] It is also suggested in the literature that specific chiropractic spinal adjustments may have a positive effect on the symptoms of ADHD.[25,26]

It is suggested by this case, particularly in light of the return of symptoms when subluxations returned, that the symptoms associated with the subluxation could be misdiagnosed as ADHD. It is very interesting that after 16 months with no chiropractic care, the weakness and instability of his cervical spine in particular regressed to the point where he was at the very beginning of care. The importance of maintenance care in helping reduce reoccurrence of initial symptoms has been reported by Rupert and Jamison.[27-29]

This appears to further confirm the possibility that cervical kyphosis and the subluxations it causes might play a role in the symptoms of ADHD. A confounding variable which should be discussed is that it is common to see cervical kyphosis in individuals who do not have ADHD, suggesting that other factors are involved. It is also possible that the pediatrician misdiagnosed the child as well

**Conclusion**

In reviewing the literature, a recurring theme is the dearth of information clearly delineating the etiology of ADHD, yet there is a predictable list of exacerbating factors that include but is not limited to certain foods, dyes, allergies, sugar, hypersensitivities, pesticides and preservatives. There is no doubt that the symptoms are real and that these irritants are exacerbating factors. The question remains, however, as to why some individuals respond so adversely to these irritants while others do not. This case discusses a relationship between cervical curve (kyphotic versus lordotic) and its affect purportedly on a child's ability to adapt, deal with and overcome chemical and physical stressors. In this case, regular maintenance care appeared to be necessary since there seemed to be a return of the presenting symptomology as time between visits increased. This may also indicate the need for the development of a specific rehabilitation program for children with these subsets of conditions and possibly involve other factors not yet determined.

It is possible that the same mechanisms associated with the child's improvement of function related to the diagnosed ADHD may be related to his improvement in asthma and sleep as well. In this one case conservative, specific chiropractic spinal adjustments were found to be a safe and effective

alternative form of care to improve function in a child with ADHD. Because this is a single case study, additional research is required to determine if chiropractic care could be a protocol of choice for care of children with ADHD.

**Acknowledgments**

I would like to thank Dr. Yannick Pauli and Dr. Charles Blum for their patient and insightful support in preparing this paper. I would also like to thank Drs. Christopher Kent and Patrick Gentempo for developing the Insight Millennium Subluxation Station which has been invaluable for me clinically.

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