Case Study

An Epidemiological Approach to the Effects of Subluxation-Based Chiropractic Care on the Management of ADHD, Depression and Learning Disabilities in an 8-Year Old: A Case Study

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Abstract

Objective: To present the findings in which an eight-year boy diagnosed with ADHD and learning disability experienced marked improvement in response to subluxation-based chiropractic management.

Clinical Features: Eight-year male presented into the office with a chief complaint of ADHD (inattentive type) and learning disability regarding working memory and processing speed. Seven months prior he was diagnosed via private psycho-educational testing validating these conditions. The patient's mother brought him into for chiropractic care for an alternative treatment plan to managing these concerns. His mother reported that his medications appeared to be ineffective, causing nausea, heart palpitations and low appetite.

Intervention and Outcomes: Subluxation-based chiropractic was initiated utilizing Chiropractic Biophysics (CBP) and Turner Cranial techniques, which resulted in significant improvements in the following areas: irritability, mood swings, social interaction, temper, energy, memory and immune function. After eight months of care he continues to progress as evidenced by positive reports from his school teachers and parents.

Conclusions: The improved outcomes of a child with ADHD, learning disability, and social behavior disturbance undergoing chiropractic management to reduce vertebral subluxation are described. We suggest that clinical trials formally testing the efficacy of these findings in a controlled setting be conducted to confirm whether or not chiropractic care should be part of the multidisciplinary management of these conditions.

Key Words: *chiropractic, subluxation, adjustment, CBP, ADHD, learning disability, SHINE*

Introduction

It is through the lens of epidemiology that we approach the case of an eight-year old boy who experienced significant improvement as a chiropractic patient with attention deficit hyperactivity disorder (ADHD). Evaluating the wide-spectrum of factors relating to a disorder as complicated as ADHD in this way not only lends itself to providing thorough explanations to the proposed mechanisms of this phenomenon, it sets up the framework for a better understanding of the condition itself and the variety of ways chiropractors can modify their care plans accordingly. In our opinion, any other strategy would be a disservice to the profound effect subluxation-based chiropractic care has on health concerns such as described in this case study.

Epidemiological Approach

One of the more broadly accepted definitions of epidemiology describes this public health initiative as, "The study of the

distribution and determinants of health-related states or events in specified populations and the *application* of this study to control of health problems" [emphasis ours].[1-2] It is critical to highlight that two key underlying premises are included in this definition. First, a description of the discipline itself and, second, the inherent purpose for which said investigations are conducted.[1]

In our opinion, the focus on *application* – to apply the knowledge gained from epidemiological research for the betterment of public health through enhanced clinical recommendations, updated policy and effective prevention programs – is paramount. Essentially – because it is rooted in the concept that diseases and illnesses are not randomly distributed, but generally affected by a combination of environmental and genetic factors – we suggest that it is critical for chiropractors to approach case studies and other clinical research designs through the *lens of epidemiology* to ensure that objective and anecdotal data are not lost in the tomes of literature libraries. This way, research can be more effectively utilized to affect preventative measures and the first-line approach to disease management.

How should this be best accomplished? In our opinion, first, by identifying the etiological or causal factors related to illness and disease. Then, by implementing strategies to reduce or eliminate exposure to said factors. Finally, by developing prevention strategies supported by the data through local and national endeavors. It is interesting to note that, in regards to traditional epidemiological prevention systems, subluxation-based chiropractic adjustments are one of the few interventions that could be applied to all three defined strategies: *primary prevention*, which is prevention in its truest sense in that it focuses on disease prevention before the initial development or onset of disease; *secondary prevention*, which focuses on early detection of people (i.e. during the preclinical phase) and, thus, reducing severity of existing disease; and *tertiary prevention*, which mostly centers on treating disease in an attempt to reverse and/or reduce the long-term effects.[1]

Therefore, it is our opinion that public health circles would be very open to reviewing chiropractic data, which is applicable on such a wide scale. Subsequently, this will help ensure that the proper foundation is built for the development of chiropractic-centered public policy relating to controlling and reversing the environmental and genetic factors that have been observed.

Ultimately, we suggest that chiropractic case studies hold a critical place to help accomplish what Gordis defines as the "ultimate goal" of epidemiology; that is, reducing morbidity and mortality from disease process through systematic interventions.[1] Specifically – because "many diseases do not yet have the biologic, clinical, and epidemiological data on which to base effective primary prevention programs" – case studies offer vital data and potential recommendations to the types of interventions that work for a variety of at-risk populations.[1]

Present in the literature since Sir Alexander Crichton's 1798 description of a *mental derangement disorder*, the history of ADHD officially began with Sir George Frederic Still's Goulstonian Lectures in 1902. This series of three lectures given to the Royal College of Physicians of London discussed what Still referred to as "particular psychical conditions…which are concerned with an abnormal defect of *moral control* in children" [emphasis ours].[3] Still argued that "moral control…is dependent upon three psychical factors, a cognitive relation to environment, moral consciousness, and volition."[3]

However, as Lange et al. clarifies, "Still's concept of a 'defect of moral control' is not consistent with the disorder we now acknowledge as ADHD. Particularly, Still did not refer to inattentive-impulsive children, but rather described several types of deviant behavior observed in children."[4] Nonetheless, Still's description held ground and paved the way for researchers to consider ADHD-type behavior as "minimal brain dysfunction" up until Kessler officially coined it as such in 1980.[5] Interestingly, this concept is the predominant theory in various circles today as some claim that hyperactive behavior is caused by minimal brain damage, regardless if it is objectively observable or not.[6]

Until 1967 – when the U.S. National Institute of Mental Health first provided funding to study the effects stimulants had on children with hyperactivity – clinical research was quite limited in regards to investigating the pathophysiology of ADHD. However, as more people are diagnosed with the condition than ever before, research has been growing at an unprecedented rate.

Considered to have reached epidemic proportions, it is suspected that the data are somewhat skewed because of gross under-diagnosis and confusing it for other problems. For instance, the National Institute of Health (NIH) states that,

> Parents and teachers can miss the fact that children with symptoms of inattention have ADHD because they are often quiet and less likely to act out. They may sit quietly, seeming to work, but they are often not paying attention to what they are doing. They may get along well with other children, whereas children who have more symptoms of hyperactivity or impulsivity tend to have social problems. But children with the inattentive kind of ADHD are not the only ones whose disorders can be missed. For example, adults may think that children with the hyperactive and impulsive symptoms just have disciplinary problems.[7]

At present, the Centers for Disease Control and Prevention (CDC) reports that approximately 12% of children are affected by the disorder, making it one of the most common childhood mental disorders in America.[8]

Additionally, the CDC notes that males are almost three times more likely to be affected than females and prevalence varies considerably from state to state.[8] For instance, North Carolina has the highest prevalence at 15.6% and Nevada 5.6%. Overall, the Southeast and Mideast report more ADHD cases than any other section in the country and the Southwest reports the lowest.[8]

It is important to note that although a vast number of the people

diagnosed with ADHD are children, many adults are affected. Particularly, with the surge of diagnoses the past 30 years, America is experiencing a unique time in which more adults are being treated for ADHD than ever before.

Etiology

Described by the American Psychological Association (APA) as "behavioral condition that makes focusing on everyday requests and routines challenging," children and adults with ADHD experience trouble with present-moment activities like being organized and maintaining focus to complete daily tasks in addition to making realistic plans and thinking before acting.[9] Oftentimes people with ADHD are fidgety, noisy and unable to adapt to changing situations. Moreover, the APA notes that children with ADHD can be aggressive, defiant, and have poor social skills.[9] The reasons for this are debated, but a clue may be that children with the disorder have been characterized by delayed maturation of their prefrontal cortical thickness, which is critical for control of cognitive processes including attention and motor planning.[10-11]

To test this hypothesis, Shaw et al. evaluated 824 magnetic resonance scans of 223 children with ADHD and 223 children without the disorder. After estimating cortical thickness based off of more than 40,000 cerebral points, they discovered that, "There was a marked delay in ADHD in attaining peak thickness throughout most of the cerebrum: the median age by which 50% of the cortical points attained peak thickness for this group was 10.5 years, which was significantly later than the median age of 7.5 years." [11] Being the first study to ever document neuroanatomic cortical maturation in an ADHD population, Shaw et al. helped lay the foundation for future research to investigate this phenomenon.

For example, 837 magnetic resonance images of 234 child with ADHD and 231 children without the disorder were evaluated and similar results were documented. It was observed that the median age at which 50% of right prefrontal cortical vertices attained peak development was 14.6 years in children with ADHD, which was significantly lower than the 12.7 years observed in the control group.[12] Delays not too profound were also observed in the left hemispheric lobes, but no differences were seen in the cortical gyrification. The suggestion that, "The congruent delay in cortical thickness and surface area direct attention away from processes that selectively affect one cortical component toward mechanisms controlling the maturation of multiple cortical dimensions" offers some clues to the pathophysiological response many ADHD patients experience.[12]

Nonetheless, the cause of ADHD is still reportedly *unknown*[7] in spite of mounting evidence that suggests otherwise.[10-14] For instance, researchers are reporting that genetic variations not necessarily inherited, such as duplications or deletions of DNA segments, are etiological factors related to the development of ADHD. Referred to as "copy number variations" (CNVs), it has been observed that people with ADHD are affected more often than people who do not have the disorder, which suggests a potential role in pathogenesis.[14,15]

Studies also suggest that environmental factors such as cigarette smoke and alcohol use in utero,[16-17] and high levels of lead exposure found in preschool buildings could lead to a higher risk of developing ADHD. Moreover, a growing body of research also suggests that vertebral subluxations play a key role in the pathogenesis of ADHD.[18-22]

Medical Management

According to the NIH, "No single test can diagnose a child as having ADHD. Instead, a licensed health professional needs to gather information about the child, and his or her behavior and environment."[7] Generally, medical management for ADHD centers on behavioral therapy and drug intervention. Currently, medical treatments only focus on symptom reduction and not disease reversal. Common treatment protocols include:

- Amphetamines, such as Ritalin;
- Non-stimulants like atomoxetine, guanfacine, and clonidine;
- Various types of psychotherapy;
- Occupational therapy;
- Education and training;
- And a combination of these treatments.

The risks associated with using amphetamines to treat ADHD are of particular interest and has been widely known for decades. Some of the more common side effects include the following:

- Hypertension, palpitations, irregular heartbeat and cardiovascular disease.
- Gastrointestinal issues like nausea, loss of appetite, stomach pain, and vomiting.
- Aggression, dizziness, restlessness, insomnia, and hallucinations.
- Hyperesthesia: numbness and tingling in extremities indicating nerve damage.
- Muscle twitches, sweating, and weight loss.

Case Report

An eight-year boy presented with symptoms of ADHD (inattentive type) and learning disability regarding working memory and processing speed. Subsequently, he was enrolled in the Special Education program at school for the class he struggled with the most, which was English. Seven months prior he was diagnosed via private psycho-educational testing validating these conditions, which permitted several accommodations to be utilized in school such as the following: requesting paraphrasing of instructions to ensure comprehension, allowing extra time to complete assignments, having printed material read to him, and several others.

The patient's frustration with his friends and challenges with other students at school caused him considerable anger and frequent outbursts in class. This necessitated the need to leave his peers and calm down or visit the Resource Teacher who was trained to support behavior of this nature. It was reported by the patient's parents that he had difficulty letting "small things" go and often allowed them to escalate beyond reason; i.e. aggressive behavior such as punching other students if he thought that they are looked at him or teased him. Additionally, he also worried about adult problems, future life and when he would die.

The patient's mother brought him into the office for chiropractic care as an alternative treatment plan to manage these concerns. His mother reported that his medications appeared to be ineffective causing nausea, heart palpitations and low appetite. Her opinion was that the medications were not a long-term solution and, in addition to finding an effective treatment, brought the patient in for care to have another resource for her son (i.e. someone to "talk to," "be counseled by").

The following exams were conducted when the patient presented into the office:

Neurological Examination

The neurological development assessment from this section came from *A Dr. Hallowell's Protocol SHINE for Doctors: Special Help Integrating Neurological Experience™*. This course for chiropractors reportedly focuses on identifying, supporting and treating patients with ADHD.[23] However, a literature search for research regarding this program revealed that there is no peer-reviewed analyses of the reliability and validity substantiating these claims.

Nonetheless, this section offers a detailed description of the patient's experience with ADHD. Below, you will find various behaviors, which will serve as clues and help outline some key commonalities to all children suffering from ADHD. This information will help provide the epidemiological clues we discussed above to better understand the multifactorial and the seemingly complicated presentations of ADHD.

Family History

The patient's family history included post-partum depression (mother) and learning disorders (mother's brother).

Birth History

The patient's mother reported having a healthy pregnancy and denies receiving any vaccinations or dental work during the pregnancy. However, Rh factor problems, long/difficult labor, epidural administration and drugs to induce the birth complicated the birthing process. At the time of birth, the patient presented with minor jaundice that was resolved quickly and had no reportable birth defects.

As an infant the parents report that the child's temperament was alert, cranky, hypersensitive, irritable, and sociable. During the first 9 months, the child was breastfed and he remained alert, sociable and relatively easy to be on a schedule. However, during this time, he suffered from the following difficulties: getting to sleep and being comforted and irritability. No food intolerance was observed during the first year of his life.

Developmental History

The patient's development history included delays in sitting (8 months), walking (18-19 months) and toilet training (4 years). Milestones he did meet were saying his first words (10-11 months) and beginning to speak in sentences (15-18 months).

Speech and Language

According to the parents, the patient had his hearing tested at birth and passed appropriately. He reportedly has never had tubes placed in his ears nor suffered from frequent ear infections.

Other than milestone delays, no problems were observed in the child's ability to speak including, being able to understand what was being said to him. Subsequently, he was never referred to a speech/language therapist.

Motor Skills

The patient presented with fine motor problems (writing and drawing), yet never saw an Occupational Therapist for his issues. Other than delayed milestones in walking, the patient did not experience marked signs of gross motor problems and, subsequently, was never treated by a physical therapist for any issues.

Vision

The patient reportedly wore glasses for computer and schoolwork and for reading.

Medical History

The patient denied any problems related to eating, skin conditions and reported getting 10 – 12 hours of uninterrupted sleep per night and waking up well rested in the morning. However, the patient did report experiencing frequent stomachaches and occasional growing pains. There were no major accidents, hospitalizations, or exposure to toxic environments (including passive smoking) besides falling out the bed as a toddler while sleeping with no apparent complications.

Regarding past medical and vaccination interventions the patient received one course of antibiotics for a streptococcal pharyngitis infection two years prior to receiving preventative inoculations for the following: DTP, Meningococcal Group C (Menjugate), and varicella. At the time of presenting into the office, the patient was taking 10 mg of Ritalin and Methylphenidate daily.

Social History

According to his parents, the patient "often has trouble socially, he writes very slowly and labored, has trouble keeping attention and saying on task." Of all the academic courses that patient has been exposed to he displayed strengths in art, math and science and weaknesses in English, gym/sports, history and other languages

Additionally, the child displayed the following:

<u>Strengths:</u>

- Reading comprehension
- Reading quickly
- Test preparation
- Understanding concepts

Weaknesses:

- Concentration
- Creative writing
- Getting assignments done on time
- Getting homework done
- "Good" behavior
- Handwriting
- Memorizing
- Organization
- Paying attention
- Planning
- Spelling

Behavior/Mental Health

At the time of presenting into the office, the patient was involved with karate (3 times weekly) and swimming (1 time per week).

Regarding "screen time" the child used:

- Computer: 2 hours weekly
- Computer games: 1 hour weekly
- Smart Device (phone, iPad, etc.) – 2 hours weekly
- Television: 6 hours max

The child's home environment was described as "loving and caring" and the patient regularly expressed concern if a family member were upset. Although reported as having many friends, the patient reported "struggling" building relationships with peers because of the difficulty he had with other children "bossing" and teasing him due to his tendency to internalize these comments. Subsequently, the patient reported having self-esteem issues due to being rejected by peers and being bullied.

According to his parents, the child exhibited the following symptoms "more often than is typical:"

- Often touchy/easily annoyed
- Often defies adult rules
- Often angry/resentful
- Often argues with adults
- Often loses temper
- Blames others for mistakes
- Often spiteful/vindictive
- Unusual fears
- Excessive need for reassurance
- Worry of future events
- Somatic complaints (stomach)
- Physically cruel to others
- Extreme mood swings
- Poor social interactions
- Often irritable
- Changes in appetite
- Restlessness or slowed down
- Feels worthless
- Becomes tearful easily
- Often sad
- Thinks about death
- Can't stop thinking about things

Additionally, the parents indicated that the patient "pretty much" or "very much" exhibited the following:

- Often fails to give close to attention to details or makes careless mistakes in schoolwork or other activities.
- Often has difficulty sustaining attention in tasks or play activities.
- Often does not see to listen when spoken to directly.
- Often does not follow through on instructions and fails to finish schoolwork, or chores (not due to oppositional behavioral failure to understand directions).
- Often has difficulty organizing tasks and activities.
- Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework).
- Often loses things necessary for tasks or activities (toys, school assignments, pencils or books).
- Is often easily distracted by extraneous stimuli.
- Is often forgetful in daily activities.
- Often fidgets in daily activities.
- Often fidgets with hands or feet or squirms in seat.
- Often leaves seat in classroom or in other situation in which remaining seated is expected.
- Often has difficulty playing or engaging in leisure activities easily.
- Often blurts out answers before questions have been completed.
- Often has difficulty waiting turn.
- Often interrupts or intrudes on others (butts into conversations or games).

Chiropractic Examination

Chiropractic examination revealed through palpatory findings that the patient had limited C0-C1 separation on flexion and vertebral subluxations were detected at C1, L3, L5, and pelvis (posterior ilium). Additionally, a considerable frontal overlapping of the frontal and parietal sutures was also discovered in conjunction with an increased space in the central area of the left sphenoid.

Posture examination demonstrated severe right head tilt, right rotation and left thoracic shift.

A radiographic examination was used via anterior to posterior, lateral, and flexion cervical views, which illustrated 9 mm of anterior head translation, 3.9 degree C2-7 kyphosis, and limited C0-C1 separation on flexion.

Thermography was utilized using MyoVision, Version 3.0. Before care began a pre-thermography scan indicated "medium-low" readings at C3, L2, L3 and "low" readings throughout the entire spine.

Intervention

Chiropractic Biophysics (CBP) and Turner Cranial adjustments were utilized with the following care plan: 1-2 visits per week.

The patient also received nutritional counseling and was provided with omega-3 and vitamin D supplements. The

patient took 1 capsule daily of Omega Sufficiency™ produced by Innate Choice™ , which contained 1000mg of fish oil and 180mg of Eicosapentaenoic Acid (EPA), 120 mg of Docosahexaenoic Acid (DHA), and 50 mg of other omega-3s. The patient also took D Sufficiency™ distributed by Innate Choice™, which consisted of 500 IU of cholecalciferol daily. According to the Innate Choice™ website, these products have not been evaluated by the Food and Drug Administration and are not intended to diagnose, treat, cure, or prevent any disease.[24-25]

Outcomes

According to the boy's mother, the patient started improving after the second visit. Two months after care was initiated, a re-evaluation was performed and the patient presented with vertebral subluxations at C1 and pelvis (posterior ilium). Postural exam revealed that he had right head tilt and left cervical shift. At this time, the patient's parents reported that he was not as irritable as he was when he first presented into the office.

One month later, a chiropractic reevaluation revealed that the patient presented with vertebral subluxations at T3, right cervical flexion and palpatory findings indicated that the patient still had limited C0-C1 separation on flexion. Postural evaluation revealed that anterior head translation was completely restored to normal. During this visit, the patient's parents reported that he was improving considerably in the following areas: mood swings, social interaction, temper, energy, and immune function.

In fact, his mother insisted that the patient experienced, "A complete turnaround in mood. [He] has made lots of friends and is not having any social difficulty. He is smiling and laughing and appears 'normal' now. We have yet to see how well his grades are affected, but he is staying in class and keeping up with work and expectations!" According to his mother, he improved to the point where he started to enjoy school as he showed marked improvement in managing his emotions, especially when facing various challenges with friends and peers that once easily set him off in an aggressive, erratic manner.

Three months later, a progress examination revealed that the patient presented not only with sustained improvement in the areas above, his memory function markedly improved. According to the chiropractic reevaluation at this time, the patient presented with vertebral subluxations at T4 and a posterior ilium. The Postural evaluation revealed right cervical flexion and right cervical shift (translation), left high shoulder, right head tilt, left and right sided frontal bone over parietal bone, and increased space in the central area of the left sphenoid. By this time, the left thoracic translation was completely corrected and rotation of the patient's skull markedly improved.

Discussion

Chiropractic & Pediatrics

Although no statistics exist on the precise number of U.S. children under chiropractic care, it is safe to assume that the number is extremely low. One of the few datasets we have to draw from is a 2012 article published in the *Journal of Manipulative and Physiological Therapeutics*, which estimates a meager 5.2% of the U.S. adult population visited chiropractors regularly in 2008.[26] Granted, the 2007 National Health Interview Survey indicated that 2.3% of children received either a chiropractic or osteopath manipulation, but the study does not differentiate between the two.[27] Taken from this survey, the following was observed from the reported use of chiropractic or osteopathic manipulation (C/OM) by children for specific health conditions:

- Older children aged 12-18 years were more likely to receive C/OM than were younger age groups.
- Children in whom both parents were under care were more likely to receive C/OM.
- No trends were observed regarding the use of C/OM by gender or racial categories.
- The most common reason children received C/OM were for back/neck pain treatment.
- Other conditions for which children received C/OM included musculoskeletal conditions, sinusitis, allergies, and non-migraine headaches.
- C/OM was the most common complementary and alternative medicine (CAM) procedure and was primarily used for back and neck pain.
- Homeopathy (1.2%), massage (1.0%), and naturopathy (0.3%) were the next most common procedures.[27]

From these data, it appears that the patient in this case study did not fit the general demographic visiting chiropractors for ADHD management. This does not surprise us as only a few, albeit, growing number of case studies exist in the literature regarding a possible association between the two. [19-22, 28]

We contend, however, that this does not preclude that such an association exists.

Possible Mechanisms

One possible explanation seen in the growing number of chiropractic case studies substantiating the effects subluxation-based adjustments have on ADHD centers on cervical curve restoration. Bastecki et al., for example, reported the case of a 5-year old patient diagnosed with ADHD that underwent a series of chiropractic adjustments to normalize aberrant curve presentation and to remove vertebral subluxation.[28] After 8 weeks of care, a change from 12 degree C2-7 kyphosis to 32 degree C2-7 lordosis was observed with marked clinical manifestations. According to the study, "During chiropractic care, the child's facial tics resolved and his behavior vastly improved. After 27 chiropractic visits, the child's pediatrician stated that the child no longer exhibited symptoms of ADHD."

Presenting with 9 mm of anterior head translation and 3.9 degree C2-7 kyphosis, we suspect that one reason our patient experienced such dramatic results is due to the correction of these abnormalities, and subsequent correction of spinal cord irritation, as seen in Bastecki's case. We suggest, therefore, that various case series be conducted to evaluate the possible connection of cervical curve with ADHD, learning disability, and social behavior disturbance risk.

Another possible explanation centers on the "Star-Gazing" phenomena and children presenting with anterior-superior (AS) occiput subluxations at birth. Commonly observed in extreme brow or facial fetal presentations, anecdotal evidence has reported for decades that these children are more susceptible to suffer from autism spectrum disorder (ASD).[29-30] Although quite different in their diagnostic criteria, ASD and ADHD share several commonalities; namely hyperactivity, impulsivity and inattention.[31] According to Murray, "Recent work has established that about half of the ASD population also meets diagnostic criteria for ADHD, although the comorbid diagnoses are precluded by the DSM-IV-TR… Recent work has also demonstrated high rates of ASD symptoms in a subset of children with ADHD."[31]

We consider the patient from this case study, with 9 mm of anterior head translation and limited C0-C1 separation on flexion, presented with an AS occiput and, therefore, was at risk of developing ADHD/ASD characteristics from birth. Although no data exists in the literature to support this conclusion, we suspect that AS occiput subluxation caused brain stem irritation in our patient, as evident by restoration of proper head translation and decreased ADHD symptoms, was corrected due to chiropractic care. It is our recommendation that a cohort of infants presenting with AS occiput subluxations be evaluated via a prospective longitudinal study to confirm or deny this suspicion.

Limitations

First and foremost, because nutritional supplementation and chiropractic adjustments were administered concurrently, there is no way of determining whether or not the patient experienced the outcome that he did because of either intervention or a combination of the two. We recommended, therefore, that a clinical trial be conducted where nutritional supplementation and subluxation-based chiropractic adjustments be measured against random controls to answer these questions.

The second limitation to our hypothesis that subluxation-based chiropractic care can help manage ADHD, learning disability, and social behavior disturbance is that there are no clinical trials in the literature confirming or denying these phenomena. A random control cohort study or some equivalent would be most useful as we will never be completely sure what exactly caused the significant decrease to the patient's symptoms from this study.

Conclusion

The improved outcomes of a child with ADHD (inattentive type), learning disability, and social behavior disturbances undergoing chiropractic management to reduce vertebral subluxation are described. We suggest that clinical trials formally testing the efficacy of these findings in a controlled setting be conducted to confirm whether or not chiropractic care should be part of the multidisciplinary management of these conditions.

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