Resolution of Motor Tics, ADHD and Discontinuation of Medications in a 10 Year Old Male Twin Following Upper Cervical Chiropractic Care: A Case Study

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ABSTRACT

Objective: The reduction of an upper cervical subluxation through chiropractic care in the case of a child with ADHD and involuntary motor tics is described.

Clinical Features: A 10-year-old boy presents with attention deficit hyperactivity disorder along with involuntary motor tics. Patient is a twin born vaginally with the assistance of vacuum extraction. History revealed prior diagnoses of macrocephaly and underdevelopment of C2 at 4 months of age. The child was administered slow release stimulant medication for management of ADHD symptoms by a medical doctor since 8 years of age.

Intervention and Outcomes: High velocity, low force adjustments (Toggle technique) were applied to the first cervical vertebra over 10 months of care along with passive cervical mechanical traction following each adjustment. After the first adjustment, patient showed improvements in behavior and focus. Patient was able to cease use of medication after 2 months. Reduction in ADHD symptoms along with complete resolution of motor tics were also noted over the duration of care. Cervical curve as seen on x-ray improved 10 months from the start of care.

Conclusion: This case report demonstrates a reduction in signs and symptoms associated with ADHD and involuntary motor tics in a child following upper cervical chiropractic treatment.

Key Words: Chiropractic, attention deficit hyperactivity disorder, ADHD, subluxation, birth trauma, chiropractic adjustment, Upper cervical, Toggle Technique

Introduction

ADHD

Attention deficit hyperactivity disorder (ADHD) is a persistent pattern of inattention, hyperactivity and impulsivity displayed more frequently than typically observed at a comparative level of development. The prevalence of ADHD has been found to range from 3%-12% in varying studies of school-aged children. It has been found that there is an increase in diagnosis among first degree biological relatives as well as children with minor physical anomalies.

ADHD treatment is approached as a chronic lifelong condition which can affect the patients in learning, behavior and family function for their entire life. Treatment consists primarily of stimulant medication in order to reduce symptoms as well as

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behavior therapy. Side effects and the stimulant medication can consist of decreased appetite, stomachache, headaches, delayed sleep onset, jitteriness or social withdrawal. 3

**ADHD and tic disorders**

Tics can be expressed as motor or vocalizations and are classified based on duration, age of onset as well as the type of tic. Motor tics are defined as sudden, rapid recurrent non-rhythmic motor movement motor tics which must be present for 12 months or longer in order to be diagnosed as chronic. 1

Tic disorders have been linked to ADHD as well as other psychopathological conditions including Obsessive Compulsive Disorder (OCD) and Tourette’s syndrome. ADHD along with tics have been shown to be genetically related if the tics precede the symptoms. This correlation illustrates an etiological relationship between ADHD and tic disorders. 4 5

The purpose of this study is to document the relationship between ADHD with involuntary motor tics and the management of the upper cervical subluxation as it relates to these conditions.

**Case Report**

**History**

The patient was a 10 year old male brought into the chiropractic clinic by his mother. The patient presented with ADHD and involuntary motor tics. Macrocephaly and underdevelopment of C2 were diagnosed at 4 months old and were not the major complaints for seeking treatment. The primary complaint was ADHD along with involuntary motor tics of the face and head. The patient had been taking Vyance, a central nervous system stimulant, indicated for the treatment of attention hyperactivity disorder since the diagnosis 2 years prior. 6 Looking for an alternative to drug therapy for ADHD and resolution of involuntary tic movement, the patient’s mother sought upper cervical care.

The case history revealed that the patient’s involuntary movements began in infancy with patient having tics of arms and legs. His mother described them as “Parkinson’s like jerking movements” which then developed into facial and head tics. She also mentioned this patient was a fraternal twin and was positioned head down, unable to turn or move while in the womb. The patient was born vaginally with the underdevelopment of C2 were diagnosed at 4 months old and were not the major complaints for seeking treatment. The primary complaint was ADHD along with involuntary motor tics of the face and head. The patient had been taking Vyance, a central nervous system stimulant, indicated for the treatment of attention hyperactivity disorder since the diagnosis 2 years prior. 6 Looking for an alternative to drug therapy for ADHD and resolution of involuntary tic movement, the patient’s mother sought upper cervical care.

Previous treatment includes massage and craniosacral therapy at 4 months old and inconsistent full spine chiropractic care since 9 months of age. While the patient was under chiropractic care his mother noted he experienced a reduction of symptoms, which returned after treatment ended.

**Chiropractic Care**

**Examination**

The technique used in this case was Toggle technique, a specific upper cervical analysis and adjustment developed by B.J. Palmer in 1918. 7 The toggle adjustment consists of a high velocity low amplitude thrust with recoil delivered to the lateral mass of C1 or the spinolaminar junction of C2. 8 The patient is positioned in the lateral recumbent position on a specialized table designed with a headpiece that drops away as the thrust is delivered in order to introduce a sheer force in order to move the intended vertebra. 9

The analysis used to determine if there is an upper cervical subluxation includes leg length inequality, thermography instrumentation, and x-ray analysis.

Leg length inequality is noted while the patient lays supine with their head supported in slight flexion up to 20 degrees. 10 The doctor then brings the patients legs as close together as possible bringing the calf just slightly off the table to bring the leg to center. The legs are then compared visually by looking down the medial inferior aspects of the heel to determine if the legs are balanced or if there is an inequality. 11 During the exam it was noted the patient had an inequality with the right leg ¾ inch shorter than the left leg.

Thermal scans were obtained using the Tytron C-3000 noting a temperature asymmetry in the cervical region as well as mastoid fossa difference showing heat decrease to the right. Thermal scanning is used to help support the presence of a vertebral subluxation under the theory that in a healthy patient, skin temperature pattern will change but remain symmetrical as the body adapts to their environment. 12 Since the nervous system controls the temperature of the skin, if there is an interference the adaptive changes are less likely to occur which will show asymmetry. 13 In upper cervical techniques this thermographic pattern, or break is used in order to determine if there is neurologcal compromise. 14 The Tytron C-3000 is a dual probe thermography technology in order to record paraspinal temperature. [Tytronics Research and Development, oxford, Iowa].

Based on the information gathered in the history and examination it was determined that the patient was a candidate for upper cervical care and a lateral cervical x-ray was taken. The patient was placed with his right shoulder closest to the film with the central ray aimed at the fourth cervical vertebra. It was noted on the film that the patient had superior movement of the atlas as determined by the atlas plane line measuring 20 degrees. X-ray also revealed a cervical curve measuring 14 degrees while ideal cervical curve measurement is 42 degrees. 15

The results of the lateral x-ray were used along with thermography and motion palpation to determine laterality of the subluxation. The atlas listing was determined to be ASR with the atlas moving in a three directions of subluxation including leg length inequality, thermography instrumentation, and x-ray analysis.

The initial atlas adjustment was given followed by 8 additional adjustments over a 10 month time period. At each of the 15
office visits the following protocol was used, paraspinal computerized infrared thermography using the Tyron C-3000, leg length inequality assessment, and motion palpation of the upper cervical region. If a subluxation was found an adjustment was performed and the patient then rested for twenty minutes in a supine position with a cervical support pillow.

Outcomes
The patient’s symptoms decreased following the first visit as reported by his mother. His mother reported his behavior and focus on task had improved and as a result he was able to cease use of medication after 2 months of care. Patient’s mother also reported his involuntary movements had completely resolved. An updated lateral cervical x-ray was taken 10 months after beginning care and showed an improvement in cervical curve measuring 29 degrees for an overall improvement of 15 degrees. Patient is still currently under care, the frequency of care is an average of one visit per month.

Discussion
One possible mechanism of the development of ADHD and motor tics is traction of the spinal cord along with distortion of the vertebral column resulting in subluxation. A subluxation is defined as “the condition of a vertebra that has lost its proper juxtaposition with the one above or the one below, or both: to an extent less than a luxation; which impinges nerves and interferes with the transmission of mental impulses”. 16

Grostic, in his dentate ligament cord distortion theory, explains how spinal cord distortion can adversely affect the conduction of neural impulses in the central nervous system. This distortion also causes venous occlusion and local blood stasis with ischemia in the upper cervical spinal cord. The correct location and removal of an upper cervical subluxation can release tension in the cord, directly affecting the central nervous system. By removing the central nervous system interference, a resulting improvement conduction of neural impulses and improving circulation in the area will occur.17

Case Studies in the Literature
A review of the literature was conducted to include cases of ADHD, ADHD with motor tics, and upper cervical chiropractic. There is limited information showing a relationship between ADHD with involuntary motor tics and the management of the upper cervical subluxation. The current information available shows that more research is needed.

One study by Elster reported a resolution of symptoms and cessation of medication in a nine year old boy with Tourette’s syndrome, ADHD, depression, asthma, insomnia and headaches following upper cervical chiropractic care. The patient history revealed he was born six weeks prematurely and was delivered using forceps. In this case the patient was able to cease use of all but one medication after 6 weeks and stop the last medication after 5 months of chiropractic care. 18

Wolfertz and Dahlberg presented a study for a sixteen-year-old boy with Bipolar disorder and ADHD who showed improvement following seven weeks of upper cervical care. Patient’s birth history revealed he was born with the umbilical cord around his neck and delivered with the assistance of forceps. At the conclusion of 15 weeks of care, patient had resolution of anxiety attacks, anger outbursts, irrational social interaction, and general anxiety. Sleep and focus also improved allowing the patient to discontinue use of medication. 19

Another by Stone-McCoy and Przybysz showed a 3 ½ year old child diagnosed with ADHD with a history of birth trauma, ear infections show improvements in paraspinal thermography, decrease in hyperactivity and increase in attention following one month of upper cervical care. Birth trauma included prolonged labor with crowning lasting 3 hours and the child having a broken clavicle during the birth process. In this case the parents were also advised on decreasing food additives and sugar as well as adding Omega-3 supplements. The mother also noted she observed an increase in hyperactivity symptoms if she waited longer than two weeks to get him adjusted. 20

One other case was found showing a relationship between ADHD, motor tics and by Basrecki, Harrison and Hass who found improvement in a 5 year old with ADHD, motor tics and behavior problems using Chiropractic Biophysics (CBP) protocol with drop table adjustments as well as toggle maneuvers. According to the patient history there were birth complications and a prolonged and stressful labor. Patient had a cervical curve measuring 12 degrees at the beginning of care and 32 degrees showing a 20 degree improvement after 8 weeks. At this time the patient also showed improvement in facials and no longer exhibited ADHD symptoms. 21

Implications of Chiropractic
It was found that in this case presentation and the cases reviewed in the literature that all of the births were traumatic in nature. The use of forceps and vacuum extraction puts traction on the upper cervical spine and spinal cord. The newborn’s vertebral column is not completely ossified and can be distorted by natural uterine contractions. The added un-physiological assistance of traction or torsion during delivery increased the infant’s susceptibility to injury of the central nervous system. 22

While the direct cause of ADHD is not completely understood, researchers are considering genetics, environmental factors, brain injuries, nutrition and social environment as probably causes.23 Ischemic-hypoxic conditions in-utero from birth asphyxia, breech/transverse presentation, and cord complications have also shown to moderately increase the risk of ADHD.24

The development of chronic motor tics and its related tic disorders involve genetic, neurobiologic, and environmental factors. 25 The tics experienced in this case could have come from environmental or birth trauma causing cranial bone distortion affecting cranial nerves as well as the spinal cord affecting the spinal nerves innervating the involved face and head musculature.

The susceptibility of the infant to injury during the birthing
process with a possible resulting subluxation and Grostic’s finding of cord distortion adversely affecting the condition of neural impulses may contribute to the development of ADHD as well as motor tics.

Conclusion

The case of a 10 year old male with ADHD and involuntary motor tics was presented. Significant improvements were noted following the introduction of upper cervical chiropractic care utilizing Toggle technique. The patient showed improvements in behavior and focus and was able to cease use of medication to manage ADHD symptoms which he had been taking for 2 years. Patient also showed complete resolution of involuntary motor tics which had been present since infancy following removal of upper cervical subluxation. This study adds to the evidence of chiropractic care and ADHD as well as motor tics. More research is needed to be done to support the importance of removal of upper cervical subluxations in the management of ADHD and motor tics.

References

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