

REVIEW OF LITERATURE

Autism & Chiropractic: A Selective Review of Literature

Michael W. Shreeve DC, L.C.P., D.Ph.C.S.¹ & Ariel R. Troxel DC, M.Ed.²

Abstract

Objective: To evaluate current research on chiropractic in the management of children with a diagnosis of autism.

Methods: The search included PubMed, Cochrane and Google Scholar with key word search ‘Chiropractic’ + ‘Autism’. Additionally, the references of those published materials were reviewed.

Results: Eleven studies related to the treatment and outcomes of children with autism undergoing chiropractic were retrieved.

Conclusion: Research has shown that there appears to be a relationship between chiropractic neurological intervention and positive outcomes with improved behavior in individuals with autism. Further research is necessary to explore the role of chiropractic in the management of children with autism.

Key Words: *Autism, chiropractic, adjustment, subluxation, upper-cervical, pediatric*

Introduction

The literature reviewed, highlights instances of individuals and families who found help in dealing with a diagnosis of autism. In a search for answers to “how can I help my child?”, there are instances illustrated here, which can further provide hope for families. In addition to the literature provided, the question is proposed that given the association between craniocervical junction disruptions and sensory-motor difficulties, is it important to further study this area in order to provide greater resources for parents and families as they make health care choices for their children.

Autism Defined: The DSM-V revision produced in May 2013 provided changes to the way autism and similar disorders are defined and diagnosed. Autism Spectrum Disorder (ASD) has now been designed to include Autistic Disorder (classic autism), Asperger’s Disorder, Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS), and Childhood Disintegrated Disorder. Rett’s Syndrome is no longer considered part of the ASD spectrum.¹

The new definition includes three social and communication deficits: problems reciprocating social or emotional interaction, severe problems maintaining relationships, and non-verbal communication problems. The new definition considers repetitive and restrictive behaviors. The presence of two of the following four behaviors is a strong indication of a positive diagnosis of autism: 1) extreme attachment to routines and patterns and resistance to changes in routines, 2) repetitive speech or movements, 3) intense and restrictive interests, and/or 4) difficulty integrating sensory information or strong seeking or avoiding behavior or sensory stimuli.²

Previously, language delay was a significant factor in diagnosis in classic autism, but under the new definition of ASD, language delays are not included as part of the criteria for diagnosis.¹

In reviewing the literature, various authors have discussed the definition to be a developmental disorder that shows deviance and delay in social interaction, communication and behavior. Some authors have also delved into the further definition to be a neurological disorder revealing cognitive delay, due to the

1. Private Practice of Chiropractic, Port Orange, FL
2. Private Practice of Chiropractic, Forest, VA

fact that it is reported in the majority of those diagnoses with autism. Khorshid identified that the primary problem is neurological in nature.³

Purpose of Paper

Due to the increasing incidence of autism in children, as seen in the literature and through the CDC, it is important to address the possible etiologies and effectiveness of treatments to impact this wave of developmental disorders.

The literature review is designed to evaluate current studies that discuss the sources of these neurological deficits and effectiveness of treatments, specifically chiropractic treatment, for these individuals.

Methods

The search included PubMed, Cochrane and Google Scholar with key word search 'Chiropractic' + 'Autism'. Additionally, the references of those published materials were reviewed.

Results

Eleven studies related to treatment and outcomes are included in this section. A diverse selection of chiropractic techniques was employed and a variety of positive outcomes were experienced for symptoms related and unrelated to ASD.

1. *Chiropractic Care and Behavior in Autistic Children*, authored by Andrew L. Aguilar, John D. Grostic and Bruce Pfeger. This case study was designed to demonstrate the effects of adjustments given to remove neurological interference through the correction of atlas cervical subluxations. Twenty-six children diagnosed with autism were recruited for participation. A nine-month care plan was established to determine if behavioral or neurological changes would occur with treatment. Orthospinology specific upper cervical technique was employed for correction of subluxations. X-rays were taken of each child for the purpose of determining specific treatment vectors using the Grostic chiropractic analysis. Supine leg checks and dual probe infrared heat graphs were used during each visit to determine the need for a corrective adjustment. In addition to the above, Brain Stem Evoked Potential instrumentation readings (one pre and three post readings for each patient) were used to determine changes in neurological interference in the brainstem and with the auditory nerve. Autism checklists (*Childhood Autism Rating Scale* and *Modified Autism Behavior Checklist*) were given at regular intervals to parents and teachers of each child with noted positive outcomes.⁴

2. *Clinical Efficacy of Upper Cervical Versus Full Spine Chiropractic Care on Children with Autism: A Randomized Clinical Trial*, authored by Khaled Khorshid, Roy Sweat, David Zemba and Brett Zemba. This study was designed to evaluate the clinical effectiveness of full spine adjustments versus upper cervical specific chiropractic adjustments on the behaviors of children diagnosed with autism. Fourteen children were evaluated using the Autism Treatment Evaluation Checklist (ATEC), developed and scored by the Autism Research Institute of San Diego, CA. Seven children were treated with upper cervical adjustments and seven were

treated with full spine adjustments over a period of three to five months. The results showed improvements in six of the seven children in both groups. The Upper Cervical group had 32% improvement in the ATEC score, and the full spine group had 19% improvement in the ATEC score. Two of the children in the Upper Cervical group, after the trial, no longer met the criteria of the autism diagnosis. The Atlas Orthogonal (AO) upper cervical technique was used. "The clinical improvement of autistic children under full spine chiropractic care was enhanced four-fold when the technique of adjustment was shifted to upper cervical in this study."³

3. *Improvement in a 3½-year-old Autistic Child Following Chiropractic Intervention to Reduce Vertebral Subluxation*, authored by Nick Hoffman and David Russell. Dr. Hoffman provides a case report of a young female patient who had been diagnosed with autism 12 months prior to presenting for chiropractic evaluation and care. The history obtained from her mother reported the birth included an epidural and a vacuum extraction. She had a fall at 5 months of age. The child also received all scheduled immunizations and responded "differently" from other children. When she presented to the office, she had never spoken and screaming was the only means of verbalization. She was evaluated for treatment and found to have vertebral subluxations in the upper and lower cervical spine as well as the sacrum, coccyx and pelvis. Surface EMG were attempted and difficult to achieve, due to the patient's behavior. She received 28 treatments over a period of 10 weeks. The Torque Release Technique model was used, addressing specific areas of dural attachment to the spine. Noticeable behavior changes were observed on visits 5 and 6 and verbalization occurred on the 10th visit. Her mother reported that after one month of chiropractic care, the child had more expressions of joy, better posture and increased spontaneity. She also had fewer occurrences of nightmares, fewer expressions of sadness and decreased hyperactivity. Comparable surface EMG scans were performed at 1 and 2 months after the beginning of care. There was progressive improvement of balance and symmetry in both motor and autonomic function.⁵

4. *Improvement in a 6-year-old Child with Autistic Spectrum Disorder and Nocturnal Enuresis under Upper Cervical Chiropractic Care*, authored by Allison Noriega, Jonathan Chung and Justin Brown. This case report reviews the effects of National Upper Cervical Chiropractic Association (NUCCA) procedure on a six-year-old male who had been previously diagnosed with nocturnal enuresis and autism spectrum disorder (ASD). The main goal was to reduce the upper cervical subluxation complex. After 15 weeks of care, the mother reported complete resolution of bed-wetting and a 70% improvement in his behavioral issues related to ASD. The noted improvements were seen in better school performance and a display of greater social skills.⁶

5. *Improvement in Autism in a Child Coupled with Reduction in Vertebral Subluxations: A Case Study & Selective Review of the Literature*, authored by Nicholas Marini and Stephen Marini. This Case Study was designed to report the benefits of chiropractic care of a six-year-old male who had been diagnosed with autism. The mother chose chiropractic care due to the research she had read regarding the assistance that can be provided to children with autism. The child was

assessed before treatment with the ATEC. The Thompson and Diversified Techniques were used in the treatment protocol. After 12 weeks of care, the ATEC was rescored, showing a 54% overall improvement, indicating mild autism severity.⁷

6. *The Role of Chiropractic in the Care of a Four-Year-Old Boy Diagnosed with Autism Spectrum Disorder (ASD)*, authored by Joel Alcantara and Kim McCann-Swanson. A four-year-old child, who was diagnosed with autism at age 23 months, was presented for a chiropractic evaluation by his mother for the care of his frequent ear infections. Toggle Recoil (using the Webster toggle head piece) and Logan Basic techniques were used to address subluxations in the cervical spine and sacrum. The mother noted significant improvement in her son's speech and communication skills.⁸

7. *Resolution of Autistic Symptoms in a Child Undergoing Chiropractic Care to Correct Vertebral Subluxations: A Case Study*, authored by Tai Scelfo and Patricia Chelenyak. A nine-year-old child was presented for chiropractic care by his mother for evaluation of frequent ear infections and falls due to hyperactivity. He had been diagnosed with Pervasive Developmental Disorder at age 3 and then with autism at age 3½-years-old as the final diagnosis. The patient had a chiropractic examination and cervical x-rays to determine spinal subluxations. He was treated on fourteen visits over a period of two months. Each visit he was adjusted with Toggle Recoil at the first cervical vertebra. Pelvic adjustments, trigger point work and nutritional advice were administered on some of the visits along with the toggle recoil adjustment. The Autism Treatment Evaluation Checklist was used to determine effectiveness in the patient's presentation of autism. After fourteen visits, clinical improvements were seen in all four areas of the checklist: speech, sociability, sensory/cognitive awareness and health/physical behavior. Objective improvements were also reported by the parent at each visit.⁹

8. *A Case Study of a Five-Year-Old Male with Autism/Pervasive Development Disorder who Improved Remarkably and Quickly with Chiropractic Treatment*, authored by TJ Potisk. After an initial examination and history of the child, x-rays were taken (no region specified) and based on information gathered, a series of specific chiropractic adjustments to the spine were prescribed. A subjective and objective monitoring system was established to determine response to treatment. The monitoring system revealed a 96% overall improvement in the child after two weeks. At a three and one-half year follow-up, there was 102% overall improvement in the child.¹⁰

9. *Autism and Language Delay, Integration of SOT Cranial Therapy and Tomatis Auditory Therapy to Stimulate the Auditory Cortex: A Case Report*, authored by T. Bloink. A 19-year-old female presented at the Atlantis Clinic with diagnosed autism spectrum disorder presenting with pervasive language delay for cranial treatment. The patient had been unable to speak before age 11, at which time she received Tomatis Auditory Therapy. When the patient presented for care at this time she was able to speak when her head and eyes were in a certain position. She was treated with typical blocking for a SOT category two syndrome and cranial care for craniomandibular dysfunction. Immediately following the treatment, the patient was able to speak with her head in a

normal position. Later treatment revealed the necessity of concurrent dental orthodontic co-treatment to maintain lasting benefits. Discussion of specific vestibular training exercises was also included and described as essential in the treatment and care of patients diagnosed with ASD.¹¹

10. *Developmental Delay Syndromes: Psychometric Testing Before and After Chiropractic Treatment of 157 Children*, authored by Scott Cuthbert and Michel Barras. In the case report, 157 children, ages 6-13 years old, 86 male/71 females, with classified developmental delay syndromes (but not specifically autism) were evaluated with a series of eight standardized psychometric tests by a certified speech therapist. The tests evaluated 20 separate areas of cognitive function. They were all given a chiropractic treatment plan that used the applied kinesiology (AK) chiropractic technique. Following treatment, all 157 children demonstrated improvement on all eight tests in all 20 areas. This report noted that every child had some motor dysfunction and muscle inhibition. Post treatment results indicated improvement in motor skill areas. Improvements in visual memory, spatial orientation, auditory-verbal perception and memory, sensory stimuli memory and working memory were noted following chiropractic treatment.¹²

11. *Autism, Asthma, Irritable Bowel Syndrome (IBS), Strabismus and Illness Susceptibility: A Case Study in Chiropractic Management*, authored by WC Amalu. A five-year-old child presented for Chiropractic evaluation and management with the following conditions: autism, asthma, irritable bowel syndrome, strabismus as well as a general susceptibility for illness. Her daily behavior at the time of examination included up to 25 violent temper episodes per day, with three involving self-inflicted harm. Verbal communication was limited to less than five words. She was treated for 12 weeks of care. She was checked each visit to determine if an adjustment was needed. Four adjustments were given during that period of time and correction involved a knee-chest adjustment to the posterior arch of atlas. After 12 weeks of evaluation and care, the patient's mother reported that all hyperactivity, temper and violent behavior, strabismus and asthma had resolved. Symptoms of IBS were almost absent. The patient was followed for eight additional months and continued to improve.¹³

Discussion

When dealing with autism, a difficulty for diagnosis and treatment is that every child with autism presents with unique symptoms and challenges. No one symptom is pathognomonic. Signs and symptoms of ASD are usually prevalent by 18 months to three years old and include the following: bizarre behaviors related to people and things⁴ difficulty interacting with others, developmental delay most noted in language and social communication¹⁴ cognitive delay,¹⁵ developmental deviances, such as creative thinking or imaginative thought, emotional and motor distress, gastrointestinal distress,¹⁶ nocturnal enuresis,⁶ and sleep disturbances.¹⁷

The DSM-V has provided guidelines that serve as boundaries for diagnostic criteria for autism spectrum disorder symptoms related to present persistent deficits and present or past

restricted behavior patterns. They include persistent evidence of deficits in social-emotional reciprocity, deficits in nonverbal communicative behaviors related to social interaction and deficits in regards to developing, maintaining and understanding relationships. Restricted and repetitive behavior patterns include stereotyped or repetitive motor movements or speech, ritualized patterns with insistence of adherence to routines, highly restricted and intense interests that are abnormal, or hyper- or hypo- reactivity to sensory input.¹⁸

Just as no one symptom provides direct diagnosis, no one source has been identified as the direct cause of autism. Practitioners and scholars have pointed to possible links to genetics,¹⁹ poor gastrointestinal health,²⁰ environmental toxins and vaccines³ gestational stress and neurology.

Treatment Effectiveness

In her book, *Healing our Autistic Children*, Dr. Julie Buckley, one of the top medical doctors in the United States treating autism, writes that “medical schools and hospitals teach that there is no treatment for autism” and that “recovery flies in the face of the current medical model.” This is based on the theory that autism is a mental disorder. The problem that she finds with this model is simply that it is not true. She proposes that treatments that include proper diet and supplementation cause dramatic improvement in reducing the physical symptoms of the child. She states that autism is a vicious cycle of biological and chemical cycles that have gotten severely disrupted.²¹

Dr. Melillo, a chiropractic neurologist and developer of Brain Balance centers, discusses the recovery of children on the autism spectrum through treating the neurology imbalances in the brain and through specific dietary changes in his book *Disconnected Kids*. He states that:

At one time, scientists believed that the brain cannot change or correct an errant growth pattern. This simply is not the case. Over the last several decades neuroscientists have found that the brain is actually quite plastic, meaning that it has the ability to both physically and chemically change --- if given the proper stimulation. We have seen through brain imaging scans that, when given the proper stimulation, the weak side of the brain will actually get larger and faster. Spaces between cells will get smaller, and new connections will grow. As a result, the new connections in the weak side of the brain can reconnect with the more mature cells on the functioning side and get back in rhythm.¹⁹

When there are evidences of change and recovery in children who have been diagnosed with autism, that leads to hope for the various professions and families dealing with a member who has ASD that healing can happen. So, where should families look for hope? What are the best methods? Where are the best results seen? Are these even the correct questions to ask?

In the study published in the *Journal of Manipulative and Physiological Therapeutics* regarding children receiving chiropractic treatment with developmental delay syndromes,

an interesting correlation was observed.

Upper cervical and cranial dysfunctions were the most common physical findings in this group of patients, and after correction of these dysfunctions, the quickest recoveries from the sensory-motor integration difficulties were obtained.¹⁴

Treatment involving techniques that most specifically address this area should be of higher consideration. Are these musculoskeletal dysfunctions the underlying cause or the result of the disorders (ASD/DDS).

The common thread in the cases retrieved from the literature search show the benefits from dealing with the neurological component, with emphasis on the craniocervical junction. If that is true, it would benefit those dealing with a diagnosis on the autism spectrum, the health care system, and society at large to focus research and resulting treatments on how to best address those neurological components.

Conclusions/Implications

Based on the papers that point to the upper cervical area of the spine for evaluation and correction, attention to this area may be a good source for initial conservative treatment for those who present with developmental dysfunctional disorders along the autism spectrum.

Acknowledgment

Dr. Steven Troxel, Dr. Donald Miller, Dr. Roberta Miller and Lavell Handy for editorial assistance.

Ethical approval: This article does not contain any studies with human participants performed by any of the authors.

Informed consent: Informed consent was not obtained as this is a review of published literature.

References

1. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013 pp 31-32, 50-59
2. Critchley, H., Daly, E., Bullmore, E., Williams, S., Amelvoort, T., Roberston, D., Rowe, A., Phillips, M., McAlonan, G., Howlin, P. Murphy, D. (2000). The Functional Neuroanatomy of Social Behaviour: Changes in Cerebral Blood Flow When People with Autistic Disorder process Facial Expressions. *Brain*, 123: 2203-2212.
3. Khorshid, K., Sweat, R., Zemba, D., Zemba B. (2006). Clinical Efficacy of Upper Cervical Versus Full Spine Chiropractic Care on Children with Autism: A Randomized Clinical Trial. *J Vertebral Subluxation Res.* March 9: 1-7.
4. Aguilar, A., Grostic, D., Pfeger, B. (2000). Chiropractic Care and Behavior in Autistic Children. *J Clin Chiropractic Pediatrics.* 5 (1), pp. 293-304.

5. Hoffmann, N. and Russell, D. (2008). Improvement in a 3 ½ -year-old Autistic Child Following Chiropractic Intervention to Reduce Vertebral Subluxation. *J Vertebral Subluxation Res.* March 24: 1-4.
6. Noriega, A., Chung, J., Brown, J. (2012). Improvement in a 6 year-old Child with Autistic Spectrum Disorder and Nocturnal Enuresis under Upper Cervical Chiropractic Care. *J Upper Cervical Chiropractic Research.* January 30: 1-8.
7. Marini, N., Marini, S. (2010). Improvement in Autism in a Child Coupled with Reduction in Vertebral Subluxations: A Case Study & Selective Review of the Literature. *J Ped Mat Fam Health – Chiropractic.* July 5: 107-114.
8. Alcantara, J. and McCann-Swanson, K. (). The Role of Chiropractic in the Care of a Four-Year-Old Boy Diagnosed with Autism Spectrum Disorder (ASD). Presented at Pangea: A Conference for the Wellness of Children.
9. Scelfo, T. and Chelenyak, P. (2011). Resolution of Autistic Symptoms in a Child Undergoing Chiropractic Care to Correct Vertebral Subluxations: A Case Study. *J Ped Mat Fam Health – Chiropractic.* 3(4): 106-110.
10. Potisk, T. (2001). A Case Study of a Five Year Old Male with Autism/Pervasive Development Disorder who Improved Remarkable and Quickly with Chiropractic Treatment. *Proceedings from the World Federation of Chiropractic Congress, 2001 (May);6:* 313.
11. Bloink, T. (2008). Autism and Language Delay, Integration of SOT Cranial Therapy and Tomatis Auditory Therapy to Stimulate the Auditory Cortex: A Case Report. *J Vertebral Subluxation Res.* May 7: 17.
12. Cuthbert, S. and Barras, M. (2009). Developmental Delay Syndromes: Psychometric Testing Before and After Chiropractic Treatment of 157 Children. *J Man Phys Ther.* Oct; 32 (8): 660-669.
13. Amalu, W. (1998). Autism, Asthma, Irritable Bowel Syndrome (IBS) Strabismus and Illness Susceptibility: A Case Study in Chiropractic Management. *Today's Chiropractic.* Sept/Oct: 32-47.
14. Greenspan, S., Brazelton, B., Cordero, J., Solomon, R., Bauman, M., Robinson, R., Shanker, S., Breinbauer, C. (2008). Guidelines for Early Identification, Screening, and Clinical Management of Children with Autism Spectrum Disorder. *Pediatrics;* 121; 828-830.
15. Polimeni, M., Richdale, A., Francis, A., (2005). A Survey of Sleep Problems in Autism, Asperger's Disorder and Typically Developing Children. *J Intell Disab Res,* 49 (4): 260-268.
16. Perrin, J., Coury, D., Hyman, S., Cole, L., Reynolds, A., Clemons, T. (2012). Complementary and Alternative Medicine use in a Large Pediatric Autism Sample. *Pediatrics;* 130; S77-S82.
17. Schreck, K. and Mulick, J. (2000). Parental Report of Sleep Problems in Children with Autism. *J Autism Dev Disorders,* 30 (2): 127-135.
18. ("As retrieved from autismspeaks.org/what-autism").... Accessed May 2017.
19. Melillo, R. (2009). *Disconnected Kids: The Groundbreaking Brain Balance Program for Children with Autism, ADHD, Dyslexia, and Other Neurological Disorders.* pp 4-9.
20. Hanson, L. (2010). Autism: Genetics versus Epigenetics. *Chiropractic Horizons,* 1(1): 19-21.
21. Buckley, J. (2010). *Healing Our Autistic Children: A Medical Plan for Restoring Your Child's Health.* pp 3-5.