CASE STUDY

Improvement in Motor Function and Mobility in a Pediatric Cerebral Palsy Patient Following Subluxation Centered Chiropractic Care

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Abstract

Objective: This case study describes the chiropractic treatment of a 2 year old male child with spastic diplegia cerebral palsy who experienced improvement in his motor function and mobility following care.

Clinical Features: The patient’s mother brought him to receive chiropractic treatment in order to improve his physical and mental health. The patient had been receiving occupational and physical therapy for two years with little improvement, and the next step according to their doctors would be to introduce potential surgical options. At the time treatment began, the patient had never been able to crawl or walk on his own. His limited movement was achieved by pulling himself along by his arms.

Intervention and Outcomes: The chiropractic care consisted of a diversified full spine technique with the goal of detecting and reducing vertebral subluxations. After 2 visits, the patient’s mother reported that for the first time, her son had begun to pull himself up to his hands and knees and crawl on his own. He is still under chiropractic care and is still showing increased mobility.

Conclusions: Cerebral palsy is a very common and debilitating childhood condition that can negatively affect the patient and their family in a number of ways. This case study joins the already existing research in helping to show a beneficial link between chiropractic treatment and improved symptomatology in cerebral palsy patients. However, larger studies need to be performed to determine the extent of this beneficial relationship.

Key Words: Chiropractic, Cerebral Palsy, Vertebral Subluxation, Diversified Technique, Mobility, Spastic, Motor Function

Introduction

Cerebral palsy is one of the most common pathologies affecting pediatric patients today, with estimates that more than 100,000 Americans under the age of 18 have some sort of impairment or neurological disability attributed to it. The worldwide incidence of cerebral palsy has been determined to be approximately 2.5 per every 1,000 live births, while in the United States 10,000 babies are born each year who develop cerebral palsy. In fact in the state of Georgia, where this case takes place, the incidence of cerebral palsy has been determined to be nearly 4.1 out of every 1,000 children.

The term cerebral palsy does not refer specifically to one condition and symptom set, but rather it is an umbrella term, which covers a “group of nonprogressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of its development.” Current thought about the cause of cerebral

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palsy development states that the condition results from a brain injury that occurs some time before cerebral development is complete. However, since the brain continues to develop from before birth through the first two years of life, this causal brain injury can occur during the prenatal, perinatal, or postnatal periods. This injury was, for a long period of time, thought to be mainly due to hypoxia and cerebral ischemia during the birthing process, but as research progressed it was determined that at most, 10% of cerebral palsy incidence could be attributed to this cause. Risk factors now also include intrateruterine growth restriction, low birth weight, perinatal asphyxia, neonatal sepsis, and a maternal age greater than 35 years old.

Classification and presentation of cerebral palsy patients are also varied, with the basis for classification being founded on the type and distribution of motor abnormalities. The 4 main types of cerebral palsy are spastic, which is the most severe and common, as well as dyskinetic, ataxic and atonic. The clinical patterns in cerebral palsy delineate the classification even further into the specific extremities affected by the motor impairment and include: diplegia (significant leg involvement with little effect on the arms); hemiplegia (involvement of the ipsilateral arm and leg); and quadriplegia (involvement of all four limbs). These motor impairments are often accompanied by cognitive deficits, visual impairment, communication disturbances, perception disturbances, behavior disturbances, and/or by a seizure disorder such as epilepsy.

Case Report

Patient History

The patient in this case is a 2 year old male child who was diagnosed at 6 months of age with spastic diplegia cerebral palsy. He was one of triplets born through a caesarean section procedure, and there was no significant trauma during the birth process. The mother provided all of the information regarding his condition, and reported that his deficits were primarily motor in nature i.e., he does not have associated cognitive or behavioral disturbances, and there is no history of epilepsy or seizures. At the age of 2 and at the beginning of chiropractic treatment, he was unable to sit up, crawl or walk at all without assistance. What limited mobility he had was accomplished by pulling himself along by his arms. He had been attending occupational therapy and physical therapy sessions since the diagnosis was given, but had achieved no significant results or improvement according to his mother. Prior to receiving chiropractic care, the mother had reported that since the combination of occupational and physical therapy had not resulted in an improvement, they had met with an orthopedic surgeon who discussed the option of an adductor release surgery if progress goals were not met within a 12 to 18 month time frame. This procedure attempts to reduce further hip subluxation and dislocation in a pediatric patient by performing unilateral or bilateral tenotomies of the adductor longus and adductor brevis muscles, surgical release of the gracilis muscle, and a sectioning of the anterior obturator nerve.

Chiropractic Examination and Care

The chiropractic and physical examination performed on the patient was done primarily with the goal of locating and determining areas of subluxation as indicated by muscle dysfunction and motion dysfunction. Due to the patient’s presentation, motor dysfunction and age, a number of the examinations that would be performed on a typical patient were not able to be performed. This included a cervical range of motion assessment and a lumbar range of motion assessment. Radiographs of the patient’s spine were taken and were unremarkable for pathology, but they were unable to be utilized for chiropractic technique analysis due to motion blur and difficulties in positioning the patient properly. A postural assessment indicated a right high ilium. All cervical orthopedic tests performed yielded no positive findings. A prone static palpation assessment elicited tenderness over the spinous processes at the levels of C2, C5, T2, T6, T12 and L5, as well as muscle spasm and hypertonicity of the musculature in the left lumbar spine and in the pelvis bilaterally. Motion palpation was also utilized as an assessment tool, and motion restrictions were indicated at the sacroiliac joints bilaterally, as well as at the vertebral levels of T9, T5, and C5.

The patient was adjusted utilizing a diversified full-spine adjusting technique delivered using a specific contact, high velocity, low amplitude thrust primarily based on the subluxation findings determined during the physical examination. The diversified technique approach for determining where to adjust is generally based on criteria such as static palpation, motion palpation, x-ray and posture analysis. Due to some of the limitations encountered in evaluating the patient in this case, motion and static palpation were used as the primary determinants for adjustment location selection. The adjustment within the diversified technique generally focuses more on a short-lever action using a thrust angle consistent with the planes of the joints, the axis of rotation, and the direction of muscle and ligament fibers. The overall aim is to evaluate a segmental misalignment or fixation and specific sectional adaptations for intrinsic pathophysiologies, and to utilize the spinal adjustments that can best reduce them.

During the first visit, the patient was adjusted bilaterally at the sacroiliac joints, where findings indicated posterior-inferior ilium misalignments. These segments were contacted simultaneously at the posterior superior iliac spines bilaterally and the adjustment was assisted through the use of a pelvic-drop piece. The patient was also adjusted at the levels of T9 and T5 while prone, with the doctor utilizing a transverse process contact, and at the level of C5 while supine, with the doctor utilizing a lamina-pedicle junction contact. During the second adjustment, the doctor determined a posterior inferior ilium misalignment at the left sacroiliac joint only. This was again adjusted by contacting the left posterior superior iliac spine and utilizing a pelvic-drop piece. Subluxations were again found at this visit at the levels of T9, T5, and C5, and the adjustments performed utilized the same patient positioning and segmental contacts as the first visit. The first adjustment took place on February 11th, 2013 and the second adjustment took place on February 19th, 2013.

Outcome

On the third visit, the patient’s mother reported that during the evening following the second adjustment her son was able to
move himself into what she described as a ‘four point stance’, i.e. his weight supported by his hands and knees on the ground, for the first time. She also reported that shortly after moving himself into that four point stance, he began to crawl by himself for the first time in his life. At the time of this report, the patient has been seen and adjusted using subluxation based chiropractic care on 18 separate occasions over the course of a 3 month period, and has been crawling and exhibiting increased mobility ever since the second adjustment with the exception of 2 visits where increased stiffness was reported and mobility was decreased. He now crawls on a daily basis and has begun to even move himself up to his knees and use objects in his home to pull himself up to a standing position.

Discussion

Traditional allopathic treatment for patients with cerebral palsy generally begins with a dual combination of occupational and physical therapy. These types of therapies are designed to develop strength, improve coordination, and most importantly maintain the full range of motion in the hypertonic muscles and/or muscles in spasm to prevent contracture. However, patients looking for further options will typically be treated with medication, injections and/or surgery. While these forms of treatment do provide benefit, they are accompanied by some negative side effects, which can become even more pronounced when used in a pediatric patient.

The medications used to treat the symptoms of cerebral palsy include benzodiazepines, baclofen, and tizanidine. All of these tend to produce sedation and drowsiness when used. In addition, the literature and relevant studies on the efficacy of these agents is limited and dated. Injections are also utilized to treat focal muscle hyperactivity related to cerebral palsy, and botulinum toxin (BTX) is one of the primary agents that is used in this process. Again, as with the medications, there are benefits. BTX is very effective and highly predictable as a muscle weakening agent. However, benefit gradually declines requiring reinjection between 3-4 months with injections more frequently than 3 months increasing the risk for the development of neutralizing antibodies.

In addition to the previously mentioned adductor release surgery, another popular surgical treatment option for cerebral palsy patients is selective dorsal rhizotomy. This procedure involves partial sensory deafferation of the nerve rootlets at the levels of L1 through S2 in order to reduce spasticity and improve motor function. Studies have shown benefits with this type of treatment, but as with any surgical procedure, there are risks involved. Certain studies also show that in some trials selective dorsal rhizotomy followed by intensive physical therapy was not any more effective in improving gross motor function than intensive physical therapy alone.

As a result of the variety of traditional treatment options and their associated risk/benefit ratio, many parents of cerebral palsy patients have sought out chiropractic care as a complementary health approach. The chiropractic adjustment is performed with the intention of improving nervous system function, and its positive effects on children with cerebral palsy have been noted on several occasions in the literature.

In a case study described by Valente, a 2 year old child with cerebral palsy experienced improvement in his sleeping patterns, muscle strength, cognitive function and fine motor skills following a series of chiropractic adjustments. This child had undergone a series of surgeries and the mother was told that he would never walk, but after only four adjustments, the patient began to walk on his own.

In a case study described by Goodsell and Schneider, a 16 year old cerebral palsy patient with a history of poor sleep habits and muscle spasticity was treated under chiropractic care. After the sixth adjustment, the patient’s mother reported that her child was sleeping normally and uninterrupted throughout the night, and after nine visits, the patient began to exhibit decreased muscle tone asymmetry on surface electromyography (sEMG) scans.

In a case study described by Garnecki and Canty, a 13 year old patient with spastic quadriplegia cerebral palsy and urinary incontinence was treated under chiropractic care. After receiving chiropractic adjustments to the lumbar spine, the frequency of urinary incontinence accidents in the patient decreased from an average of five times per day to two times per day including some weeks where no accidents were reported. By the end of care, the patient had only had five bladder or bowel accidents over a five month period.

A retrospective case study by McCoy et al described four separate patients with cerebral palsy who all saw an improvement in their quality of life and a reduction in their symptoms following chiropractic treatment. These patients’ ages ranged from 7 to 12 and they presented with a variety of symptoms that are typically associated with cerebral palsy including, but not limited to, seizures, tremors, decreased mobility, depression, and coordination of movement. All four of the patients experienced an improvement in muscle tone and autonomic function, in addition to an improvement in their activities of daily living following chiropractic care.

A pilot study performed by Collins et al sought to determine whether chiropractic care is effective in relieving neurological dysfunctions associated with cerebral palsy. There were ten patients involved in the study, with ages ranging from 18 months to 41 years of age. These patients encompassed a wide range of neurological involvement from very mild to very severe and dysfunctions ranging from disturbances in mobility to seizures to impairments in sight, hearing or speech, and to mental retardation. Following care, there were many improvements noted in the patients who underwent chiropractic treatment. These include improvements in balance, grip strength, abnormal and asymmetrical muscle activity as indicated on sEMG, and a number of subjective improvements including improved sleep and decreased irritability.

In trying to establish a foundation for the beneficial relationship between the chiropractic adjustment and correction of subluxation with improvement in cerebral palsy patients, it’s important to note that some chiropractors theorize that biomechanical dysfunction in the spine due to subluxation can cause an alteration in normal nociception and/or mechanoreception function. These alterations provide abnormal afferent input to the CNS, leading to aberrant...
One form of dysfunction due to alterations in mechanoreceptor function by subluxation may be changes in postural tone. The functional integrity of mechanoreceptor function regulates and drives background postural neurologic information and muscular function “through the unconscious mechanoreception anterior and posterior spinocerebellar tract, cerebellum, vestibular nuclei, descending medial longitudinal fasciculus (medial and lateral vestibulospinal tracts), regulatory anterior horn cell pathway.”

This could help to explain a relationship between subluxation and some of the muscular hypertonicity and motor deficits seen in cerebral palsy. If efferent input is compromised due to subluxation affecting normal mechanoreception, then efferent response may be qualitatively and quantitatively compromised as well. The chiropractic adjustment in these cases serves to reduce the subluxation and restore normal afferent input to the CNS, which in turn allows the body to correctly perceive itself and its environment.

Conclusion

The goal of the chiropractic adjustment and treatment is to remove interference to the nervous system caused by subluxation, with the intention of assisting the body in functioning normally and optimally. It is the belief of the chiropractor that this sort of nervous interference is the basis for the majority of disease within the body. This is a case report of a pediatric patient with cerebral palsy who underwent chiropractic care and in 2 visits experienced substantial improvements in his mobility, motor function, and quality of life.

There is evidence of the beneficial effects of chiropractic treatment on cerebral palsy patients within the literature, but more research needs to be performed on this relationship. As of now, a number of case reports are available but only one pilot study has been performed by Collins et al dealing with the efficacy of chiropractic treatment on children and adults with cerebral palsy. However, the benefits outlined from this study are only part of a preliminary report and are limited by the small number of participating patients. Further research with larger patient populations needs to be performed to get the information out to more parents in order to let them know that there are options for their children and an improvement in cerebral palsy through chiropractic treatment is possible.

References