

CASE STUDY

Improvement in Cystic Fibrosis in a Child Undergoing Subluxation-Based Chiropractic Care: A Case Study

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Abstract

Objective: The objective of this report is to retrospectively document subluxation-based chiropractic care provided to an 8 year old male who was seen for a year and a half.

Clinical Features: An 8 year old male presented for care with complains of recurring infections, inability to sleep, and inability to participate in age-appropriate sports. He was diagnosed with cystic fibrosis at birth.

Intervention & Outcomes: The course of care involved chiropractic spinal adjustments, Network Spinal Analysis care, and trigger point therapy. Improvements were observed in the patient's resistance to recurrent infection, activity level, sleep ability, and overall quality of life.

Conclusion: With previous studies examining the relationship between subluxation reduction and autonomic function, immune function and somatovisceral reflexes, this case suggests that more research is needed to examine the short and long-term impact of subluxation-based care for those children with cystic fibrosis.

Key words: *subluxation, subluxation-based chiropractic care, cystic fibrosis alternative care, CAM treatment of cystic fibrosis.*

Introduction

Cystic Fibrosis (CF) is a serious autosomal recessive disorder than occurs frequently in Caucasian populations, with a prevalence of 1 in 3500 live births.² The prognosis for this condition involves a shortened life span, recurrent infections and imposing medical costs.³ When first diagnosed in 1931, the average life expectancy was less than two years.⁴ Due to more modern practices, the current median predicted age of survival has increased to 37 years for populations in North America and European countries.^{2,5} Among children, CF is

more common than phenylketonuria and galactosemia and less common than congenital hypothyroidism and sickle cell disease.⁶ While treatment has significantly improved the life span of CF patients, the pathophysiology of the condition is still burdensome to treat with current therapies and involves a multidisciplinary approach to provide a high level of care.

CF begins as a recessive genetic mutation effecting over 1,000 genes that produce a transmembrane conductance protein. This results in abnormal salt transportation in epithelial cells, causing a variety of other deleterious effects to the normal function of the body.²

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Diagnosis of CF is primarily made shortly after birth using the sweat test (pilocarpine iontophoresis).⁵ While the diagnosis of CF is not immediately life-threatening, there are life-threatening sources of concern due to abnormal lung function and pancreatic insufficiency which rely heavily upon proper cellular excretion.

The health of the lungs is of particular importance to CF patients because they produce thick, sticky mucus that can block small airways leading to acute inflammation, chronic respiratory infections, and airway obstructions.⁵ The relative importance of lung function can be demonstrated by the fact that forced expiratory volume (FEV₁) is the strongest indicator for mortality from CF. The other major predictor for lung function in CF is peak oxygen uptake (peak VO₂).^{7,8} These two measurements are improved through increased activity and decreased incidence of pulmonary infection, both of which are inherently limited by the chronic obstruction seen in CF.

Pancreatic insufficiency is of concern for the reason that the pancreatic enzymes are vital for the proper digestion of most foods. The decrease in absorption of nutrients can lead to low absorption of fat soluble vitamins, an inability to meet appropriate energy demands and can cause a failure to thrive.⁵ This can be further exacerbated by the fact that there is an increase in resting energy expenditure is also noted in CF kids. Higher energy demand creates a higher demand for nutritional balance, further complicating improper digestion.

Nutritional factors have been seen as a limiting reason for age-associated growth of kids, with 25% of CF children in the <5th percentile for height, and 20% in the <5th percentile for weight.⁹ Whether low weight is a cause or an effect of declining pulmonary function has yet to be determined.⁷ Another significant finding in CF patients is that diabetes has been associated with many moderate to severe cases of CF. This refers to the fact that pancreatic function is highly dependent upon the secretion of circulating hormones, and the secretion mechanism in CF patients has been genetically altered.

Children have an additional variety of symptoms due to CF, including shortness of breath, salty-tasting skin, persistent coughing, and decreased activity level. Bone dysfunction is also prevalent with decreased bone mineral density and content, increased fractures, excessive kyphosis and arthritis. Back pain is also evident in 94% of all CF patients.¹⁰

No cure has been developed for cystic fibrosis. The Cystic Fibrosis Foundation currently recommends a multidisciplinary approach to care mainly focused on lung clearance, pancreatic function, and proper nutrition.² The current care provided includes routine antibiotic therapy, lung clearance exercises and pancreatic enzyme supplementation.

Lung clearance exercises have been shown to help decrease exacerbations, but despite several methods attempting to clear the lungs, no single lung clearance has been proven to be the most effective at clearance.^{3,11,12} As is consistent with long-term obstructive pulmonary disease, lung transplant is commonly used in end-stage CF patients.

Conservative chiropractic treatment of CF has been limited in peer reviewed publications, but is increasingly being used by CF patients. Complementary and alternative medicine (CAM) treatment for CF is being used by 75% of patients in some form, with 14.5% seeking manual therapy of some sort. Ten percent of CAM patients sought chiropractic care specifically.¹

A literature search of peer reviewed journals also found two articles citing the use of chiropractic care with CF. Stern et al. reported relief from back pain and arthralgia in CF patients, including a high perceived benefit from care and no indicated risks associated.¹³ Wittman et al. demonstrated a case of a 10 month old Caucasian male who had increases in physical development and growth, behavior, diet, sleep and social development as a result of subluxation-based chiropractic care.¹⁴

Case Report

History

An 8 year old Caucasian male presented at a chiropractic office with parents interested in improving, "the quality of life" for the patient. The areas of major concern included recurring infections, the lack of ability by the patient to participate in age-related activities, and an inability to sleep. The patient was diagnosed with CF at birth and was confirmed at 30 days old using the sweat test.

Since birth, the patient's father reported an average of 3 hospitalizations per year due to infections and respiratory distress, totaling between 2-8 weeks of hospitalization per annum. He was diagnosed as having a *Pseudomonas aeruginosa* infection in his lungs at 3 months old, and Methicillin Resistant *Staphylococcus Aureus* (MRSA) in his lungs at age 5. The patient also was diagnosed as having nasal polyps. The patient reported having gastrointestinal distress as a regular occurrence.

He was also diagnosed as having an impaired glucose tolerance level with a glucose tolerance test reading around 200 mg/dl. His most recent hospitalization was a two week course of treatment for a respiratory tract infection completed several days prior to initial chiropractic examination.

The patient's main caretaker is his grandmother. She supplied a list of active medications for the patient. He was taking an antibiotic-antiviral-antifungal cocktail (sulfamethoxazole-trimethoprim, cefuroxime, azithromycin, tobramycin, domase alfa and itraconazole), a chewable multivitamin, two liquid laxatives (ethylene glycol and polyethylene glycol), a steroid hormone (mometasone), a proton pump inhibitor (omeprazole), and lung function medications (Singulair, atrovent, advair). Despite this regimen, the grandmother reported that the patient was often struck with illness. He would feel ill with a change of the seasons and caught most sicknesses that are endemic to his age group. She reported a significant number of school days missed each year due to illnesses.

Due to his respiratory illness, the patient was frequently short of breath and unable to participate in athletic activities such as

gym class, sports, and regular neighborhood group play. He also had difficulty falling asleep and remaining asleep, as his caretakers reported him staying up until 4 AM routinely. His attention span and focus were both said to be limited.

Physical Exam

A physical exam was performed including range of motion study, electromyography, thermography, orthopedic exams, cranial nerve evaluation, palpation and sensory exams. The child was found to have significant decreases in ranges of motion of cervical flexion, extension, right lateral flexion, right rotation and left rotation, as well as thoracic extension restriction and bilateral lumbar lateral flexion restrictions.

Thermal scan identified moderate to severe heat imbalance throughout the cervical and upper thoracic regions. Surface EMG found hypertonic musculature at the mid-cervical, mid-thoracic, and upper lumbar regions. Tenderness upon palpation was observed at the levels of C1, C2 and C5, T3-6 and T11, and L1. Faber-Patrick test elicited a positive sign on the right side. The child presented with short, rapid breaths and severe thoracic cage tension. Subluxations were identified at the levels of C1, C5, T5, T11 and L3.

Intervention

The child's initial treatment plan included chiropractic adjustments and Network Spinal Analysis (NSA) care three times per week to address presenting vertebral subluxations. Cervical adjustments, thoracic adjustments and NSA treatments were administered on every visit. Lumbar adjustments were administered routinely, but not every visit as the cervical or thoracic adjustments were.

An Erchonia Percussor and Adjuster were occasionally used to address trigger points and fibrotic adhesions of the thoracic cage. Cervical adjustments were performed using side posture upper cervical specific corrections, as well as supine cervical corrections, thoracic adjustments were delivered using diversified prone techniques and lumbar adjustments were administered in a side-posture position.

The NSA care was used according to the method developed by Donald Epstein, DC. NSA is a technique that utilizes systemic indicators to identify specific locations of adverse mechanical tension in the spinal cord and, using a specific low-force contact to release these adhesions. NSA incorporates both doctor's use of adjustment techniques and patient's innate self-directed corrective force.¹⁵

For this child, NSA care was specifically important for the emphasis on improving respiratory wave function. Spinal cord tension release and increased cerebrospinal fluid flow are entrained to ventilation, providing an opportunity for the practicing chiropractors to improve the respiratory function of the child through subluxation correction.¹⁶

Outcomes

Over the course of the first few months of chiropractic care, reassessments were made after 9 visits and the care plan remained consistent. Improvement in breathing function was

reported by the patient on several occasions. The patient was able to fall asleep easier and remain sleeping throughout the night. A recommendation for an increase in caloric consumption as well as the addition of a probiotic supplement (LactoFlamX, produced by Metagenix) was made 3 months into care.

The child's improvement was documented in the notations of the chiropractor and observations by the child's care takers. After 1.5 years of continuous care ranging from 1-2 adjustments per week, there was a significant alteration in the physical findings and in the patient's lifestyle. Thermal scan showed a significant reduction in the imbalance demonstrated by temperature readings for the cervical and upper thoracic region. Surface EMG was improved yet hypertonic muscular was noted in the mid-thoracic and upper lumbar regions. Range of motion studies provided no significant changes in age-related degree norms.

The patient significantly increased his physical activity, demonstrated by his actively seeking and attaining a black belt in karate. He was free from hospitalization for over 8 months, had reduced absences from school, and increased in both height and weight. He still had occasional cold symptoms, but when they did arise, chiropractic care was sought and symptoms resolved within a day, as reported by the care takers. Long-standing cold symptoms, including respiratory distress, have ceased according to the patient's care providers and to the attending medical physicians' notes of care. There was also a decrease in the number of hospital visits for exacerbations.

While under care, caloric intake was adjusted to reduce weight gain due to significant increase in appetite and weight gain. The care providers also reported actively seeking to reduce medications being taken by the patient under recommendations from their acting medical physician due to the recent surge in energy, activity and decrease in clinical symptoms.

Improvement was noted in the child's sleeping ability throughout the course of care. His care takers reported him falling asleep in a normal fashion, as well as sleeping through the night consistently. This has resulted in an increase in focus by the patient, coupled with a decrease in the number of absent school days.

Objective measures taken in a hospital setting are summarized in Table 1. These measures display an increase in weight and height, a slight decrease in BMI and relatively no change in FVC and FEV₁ during the course of chiropractic care.

Discussion

Cystic fibrosis is an underlying genetic mutation that impacts the function of all cells in the body through impacting salt transportation in epithelial cells. This manifests most severely on the visceral function of both the lungs and the pancreas. This dysfunction results in a decreasing innate ability by the patient to exercise, move and digest optimally. The standard course of treatment for this disease aims at combating the recurrence of bacterial infection and nutritional concerns, but is limited in addressing visceral function improvement within

the constrictions of the patient's condition.¹⁷⁻¹⁹

Evidence suggests that correction of vertebral subluxations or vertebral subluxation complexes (VSC) positively impact the function of a multitude of visceral functions.^{20,21} Cases have been reported in which cervical VSC corrections led to the resolution of vascular complaints and where lumbar VSC correction was found to positively influence the recurrence of dysmenorrhea. Both conditions are similar to this case in that they are not pathological in nature, but instances of dysfunctional (pathophysiological) manifestations of the body.²⁰

CF has specific dysfunctional issues related to the secretion of mucus and malproduction of enzymes. These visceral functions are directly impacted by both the autonomic nervous system and somatovisceral reflexes. The centers for these functions are located at the individual spinal level, the supraspinal reflex center, and the central nervous system, all areas of impact from VSC.²² Chiropractic adjustments have been illustrated to have an ability to alter the function of the autonomic nervous system and somatovisceral reflexes due to subluxation correction in the spine and its effects on the spinal cord and peripheral nerves.^{23,24}

Through the application of chiropractic adjustments, it is plausible that the improvements in respiratory function seen in this patient were made due to correction of subluxations. Research findings have suggested this connection through examination of VSC correction and its impact on asthma patients and pulmonary function in several previous studies.²⁵⁻²⁸

CF visceral dysfunctions are propagated by the lack of a patient's ability to exercise, breath fully, and consume proper nutrients as a result of the limitations of the disease. This often leads to a negative spiral that can increase health maintenance costs and decrease the patient's quality of life. Through the application of subluxation-based chiropractic care and improvement of visceral function, the patient in this case was able to halt the negative feedback loop of symptomatology and re-establish positive lifestyle gains. This was seen in the patient's increase in physical activity through martial arts, a decrease in hospitalizations, and significant gains in height and weight.

There are several suggestions to the cause of such a drastic reversal in condition given that the child was under chiropractic and medicinal treatment simultaneously. However, due to the fact that no new methods were implemented by the attending medical doctor that have been proven to have a significant impact in the symptomatology of CF during the time period that he received care, the indication is that VSC correction reduced the recurrence of symptoms.

VSC correction has been previously demonstrated to have a positive response in autonomic function in long-standing diseases. Specifically with cerebral palsy, chiropractic care has shown increased ability to perform activities of daily living, mobility and feeding, all of which are also limiting factors in patients with cystic fibrosis.²⁹ These findings suggest that even in permanent conditions, improvements can be made to motor and visceral function. The method by which

this occurs is currently unknown, but several theories on the impact of VSC on the autonomic system are covered thoroughly by Rome.²¹

Another major factor to consider with the application of chiropractic care to CF children is the impact of immune system function. Chiropractic has been extensively reported to increase the effectiveness of the immune system through application of VSC correction.³⁰⁻⁴¹ For CF patients, this would immediately impact the patient's ability to resist and fight chronic infections that result in a high incidence of chronic obstructive pulmonary disease.

In this case, the patient's immune function was increased as demonstrated by a much better response to seasonal pathogen exposure, as the child had not been burdened with major illness which required any hospitalization for over 8 months for the first time in his life. Also, the quick resolution of cold symptoms is significant given the fact previous to chiropractic care, similar symptoms would exist for several weeks at a time.

Objective measures taken during this study have serious challenges to validity. Firstly, there are a relatively few number of data points for pre-chiropractic treatment compared to during chiropractic treatment, giving a bias towards the chiropractic treatment period. Secondly, a single measurement does not reflect the overall function of the patient. Despite increases or decreases in FVC or FEV₁ during quarterly evaluations, the daily functional rate of these measurements cannot be determined due to insufficient data.

Therefore, an overall improvement in quality of lung function cannot be directly inferred from these measurements. It is noted that even though the FVC and FEV₁ measurements did not improve during the chiropractic treatment period, physician notes in the quarterly hospital reports reflected the care takers' observations of increased energy, sleep balance and overall improvement.

Conclusion

Chiropractic care through specific upper cervical adjustments, diversified adjusting, and Network Spinal Analysis appears to facilitate and improve the visceral and immune function of the body. The emphasis on increased ventilation through NSA and vertebral subluxation correction produced a marked difference in the physiological function and the quality of life of this CF patient.

There is research emerging that fills the void of why this is happening, but there is a high demand for more studies to understand the underlying mechanisms of correction. With more children with CF living into adulthood, the possibility of improving physiological and visceral function through chiropractic care represents a major ability to improve the quality of life of individuals with CF over decades of time. Long term studies involving the use of chiropractic care in CF patients will be needed to better determine the role of the chiropractor in the standard course of treatment for this disease.

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TABLE 1: Rates of change taken during in-hospital visits

Objective Measure	Pre-chiropractic care		During chiropractic care	
	Total units	Per month	Total units	Per month
Weight (lbs)	+ 1.7	+ 0.200	+ 4.6	+ 0.263
Height (cm)	+ 1.5	+ 0.176	+ 9.3	+ 0.531
BMI (kg/m²)	+ 0.73	+ 0.086	- 0.050	- 0.003
FVC (L)	+ 0.1	+ 0.012	+ 0.07	+ 0.004
FEV₁ (L)	+ 0.17	+ 0.020	- 0.03	- 0.002

Instrumentation

Figure 1 – Initial Thermal Scan

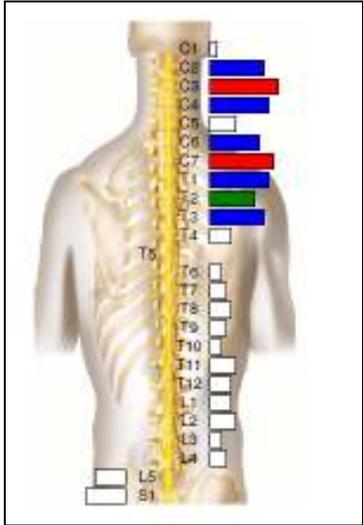


Figure 3 –Thermal Scan – 4 Months After Care Began

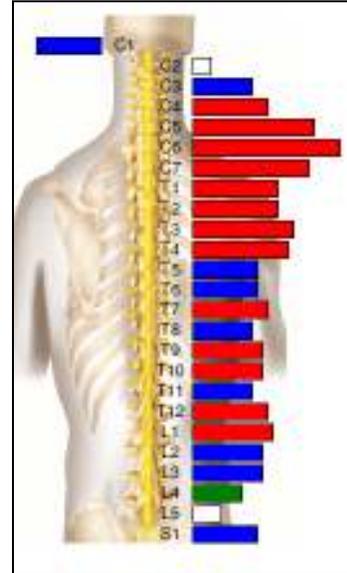


Figure 2 –Thermal Scan – 2 Months After Care Began

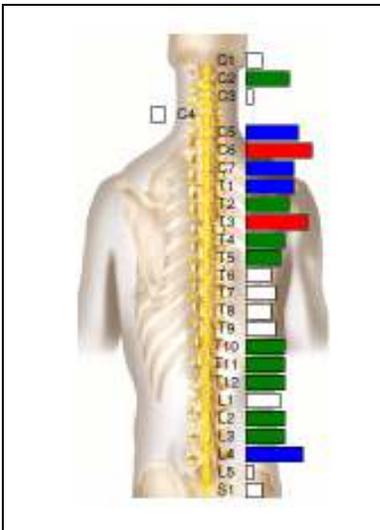


Figure 4 –Thermal Scan – 10 Months After Care Began

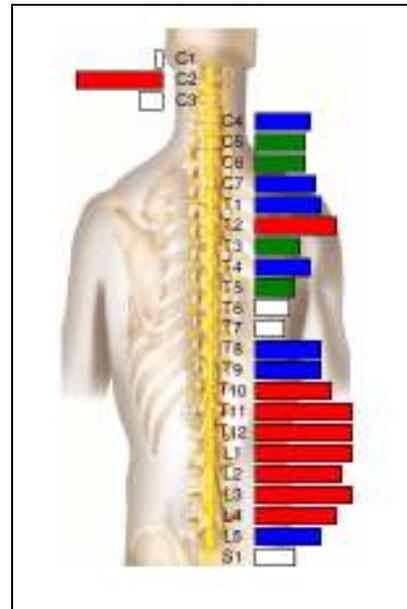


Figure 5 –Thermal Scan – 22 Months After Care Began

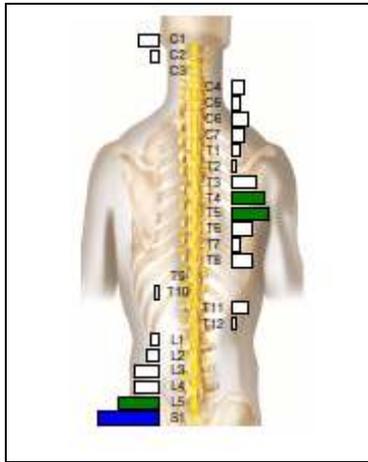


Figure 8 –Surface Electromyography Scan – 4 Months After Care Began

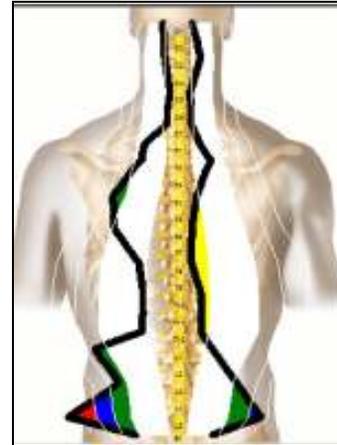


Figure 6 – Initial Surface Electromyography Scan

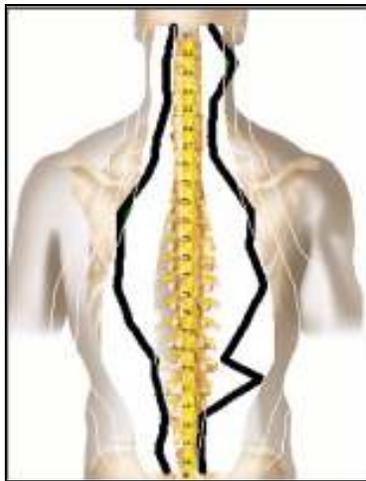


Figure 9 –Surface Electromyography Scan – 10 Months After Care Began

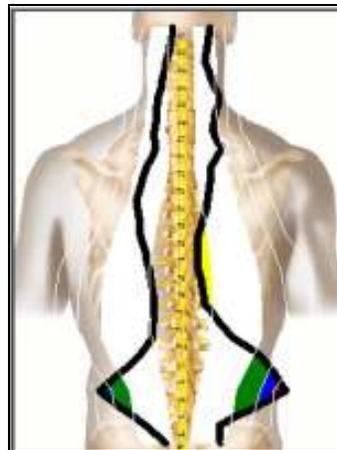


Figure 7 –Surface Electromyography Scan – 2 Months After Care Began

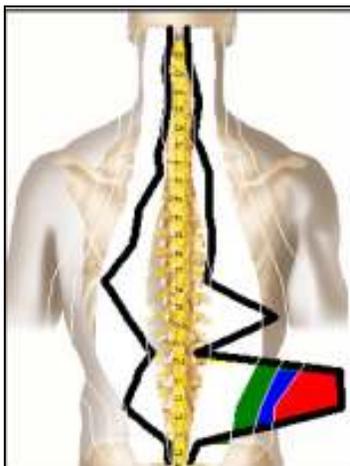


Figure 10 –Surface Electromyography Scan – 22 Months After Care Began

