

CASE STUDY

Resolution of Chronic Headaches Following Reduction of Vertebral Subluxation in an 8-Year-Old Utilizing Chiropractic Biophysics Technique

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Abstract

Objective: To describe the outcome of Chiropractic Biophysics (CBP) technique along with dietary changes performed on an 8-year old with chronic headaches as well as chronic sore throat, fatigue, dizziness, queasiness, and radiographic diagnosed cervical subluxation.

Clinical Features: An 8-year old male presented with chronic headaches for two years. He also suffered from sore throat, fatigue, queasiness, aches, pains, and dizziness. He had been seen by a neurologist, psychologist and nutritionist with limited health improvements. Radiographs of the cervical spine revealed a cervical spine second harmonic S-shaped neck with upper spine kyphosis and lower spine hyperlordosis.

Interventions and Outcomes: The boy was treated with CBP mirror-image isokinetic exercises, postural adjustments, and cervical spine extension traction. Spinal manipulation, cervical mobilization and hydrotherapy were provided. One month into care, a food diary analysis prompted dietary modifications along with nutritional supplementation. The child was originally seen on a three times per week schedule as per CBP protocol then progressed to a maintenance schedule of two times per month, a total of 86. A lateral cervical radiograph taken 6-months after initiating care revealed that his cervical lordosis was improved to near normal for his age.

Conclusion: This case presents the successful outcome in an 8-year old with a variety of health issues as well as headaches. This case and others suggests CBP cervical extension traction as well as manipulation is a safe and effective intervention for the pediatric headache.

Key Words: *CBP, cervical lordosis, cervical hypolordosis, cervical kyphosis, extension traction, headaches, vertebral subluxation, pediatrics*

Introduction

Pediatric headache remains a frequent health problem for children and their families.¹ In fact, headache is a common complaint in childhood with up to 75% of children reporting a notable headache by the age of 15 years.²

Cervical subluxation (hypolordosis/kyphosis) has been implicated as a contributing factor to headaches.³⁻⁶ For example, Nagasawa et al.⁶ evaluated the presence of straightened cervical spines in headache patients as compared to controls and concluded that a straightened cervical spine may play an important role in the pathogenesis of tension-type headache.

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Also, Vernon et al.⁵ determined that a ‘greatly reduced or absent cervical curve’ was a high occurrence characteristic in those who suffered from tension headaches and migraines.

Consequently, the correction of cervical spine lordosis has been documented to alleviate headache symptoms in pediatric cases.⁷⁻¹⁰ This case presents the successful outcome in a pediatric who suffered from headaches as well as other health problems having cervical subluxation (hyperlordosis/kyphosis) who received treatments aimed at the restoration of the cervical lordosis using Chiropractic Biophysics technique.^{10,11}

Case Report

Clinical Features

An 8-year old male (67 kg) presented with headaches, muscle aches, fatigue, allergies, and digestive problems. It was reported that he suffered daily from headache, sore throat, and fatigue, suffered most days from queasiness, and some days from aches, pains, and dizziness. His headaches would range from a 6-10/10 (0=no complaint, 10=worst pain/sensation ever) on an 11-point numerical rating scale (NRS), his sore throat a 4-8/10, fatigue a 7-8/10, dizziness a 6/10, and queasiness a 3-4/10 when bothered by these symptoms.

The headaches were described as sharp and throbbing, worse with noise, better when lying down, and located in the frontal skull area and reported to occasionally last an entire day where he is sometimes awakened because of them at night.

Health history revealed that during delivery he was unable to breath after cutting of the cord. The attending staff gave him ‘something’ and he seemed normal thereafter. The mother took medications to ease delivery pains approximately 45 minutes prior to birthing. The child received all the regular recommended vaccinations, had been on antibiotics approximately 6 or more times mostly due to sinus infections. He was breast fed for 6-months, formula fed for 2-months following, and solid foods were first introduced at 4-months. His development was described as normal and he was able to walk alone at 11.5-months.

Over the last year the child had felt too sick to partake in activities he used to such as rock climbing. Due to his declining health the parents had taken him to a pediatric neurologist-headache specialist, an allergist, a nutritionist, and a psychologist. Despite the guidance from these medical practitioners throughout the Annapolis and Baltimore area, the boy’s health continued to fail. Any recommended medications, dietary restrictions, and relaxation techniques only gave slight and temporary relief if any at all.

Chiropractic Examination

During examination palpation revealed tenderness in upper cervical (C1-Co) and lower cervical (C3-T1) areas, paravertebral muscle spasms were present through the entire cervical spine (C0-C7), and motion palpation revealed dyskinesia in the upper cervical spine (Co-C1), mid cervical spine (C3-6), and upper thoracic spine (T2-T5).

Radiographs of the cervical spine (Fig 1) revealed a cervical spine second harmonic configuration,¹²⁻¹³ that is, an S-shaped neck with upper spine kyphosis (C2-3= +6.1°) and lower spine hyperlordosis (C3-7= -36.2°) creating an absolute rotation angle (ARA) from C2-7 of -30.1°. The atlas plane line was 21.8°. Lumbar radiographs revealed pelvic unleveling indicative of an anatomical short left leg. The primary diagnosis was cervicogenic headache resulting from global subluxation of the cervical spine. One month into care, a food diary analysis was performed with the help of his mother. Food diary analysis revealed a diet that consisted primarily of processed grains, dairy and meats, such as hot dogs and lunch meats, and lacking in fresh fruits and vegetables with no addition of nutritional supplements.

Intervention and Outcome

The child was given a total of 86 treatments over the course of a year and two thirds. Initially he was on 3-times per week schedule progressing to a maintenance schedule of 2-times per month. Two nutritional consultation visits were scheduled to discuss findings of the food diary and the recommendations for dietary modifications, which included elimination of dairy and gluten-containing grain products and the introduction of fresh fruits and vegetables. Additional supplementation included a pediatric serving (1/2 oz) of a liquid organic multivitamin and 1 Tbsp daily of cod liver oil and a daily pediatric serving of powdered magnesium and calcium.

Cervical spine extension traction was applied via 2-way counter stressing mechanical traction¹⁴ performed for initially 5 minutes and progressing to 15 minutes with weight of 5lbs on the front and 2.5 lbs on the back. Spinal manipulation was occasionally performed and cervical mobilization was provided. Isokinetic mirror-image exercises were also given for the cervical spine and thoracolumbar spine. To normalize cell metabolism, speed up tissue repair, and enhance muscular vasodilation, hydrotherapy was done for 10 minutes duration.

Radiology

A lateral cervical radiograph taken revealed that cervical spine lordosis had improved in shape, the C2-3 kyphosis was reduced to +2.2° (from +6.1°) and the C3-7 hyperlordosis reduced to -27.7° (from -36.2°); overall, the absolute rotation angle C2-7 was reduced to -25.6°(from -30.1°) much closer to approximating a normal 8-year old lordosis (-22.1°^{10,15}). The child was ‘graduated’ to a maintenance care program of twice a month as his symptoms had subsided concomitant with the improvement in distribution of lordosis throughout his cervical spine.

An assessment revealed that, although the child had been in an automobile collision since his last assessment, he had no complaints. Upon examination there was deep spastic paraspinal musculature bilaterally in the lower cervical spine with articular fixations in the cervical, lower thoracic and lumbar areas. All spinal ranges of motion were normal; all orthopedic tests were also negative. It was recommended that moving forward he be treated on an ‘as-needed’ basis for continued care.

Discussion

Pediatric headache is a common complaint² and accordingly, the chiropractor must practice due diligence to ensure a comprehensive exam and diagnosis. This is because, although rare, there is an increased likelihood of a serious pathology with pediatric headache presentations such as benign and malignant tumours, cerebrovascular disease, primary disorders of raised intracranial pressure and depression. However, this risk is reduced if a diagnosis of a primary headache disorder can be made.¹⁶

Cervical Lordosis

Lack of cervical lordosis, such as kyphosis or hypolordosis, is commonly associated with presence of headache symptomatology³⁻⁶ and should be targeted for correction as it is a prime suspect in headache pathogenesis. Although the cervical spine in adults has been well studied and modeled,¹⁷⁻²⁰ the pediatric spine has not been. Bagnall et al. demonstrated the cervical lordosis is present in 83% of fetuses and illustrates a fetus having a clearly established lordosis at 91/2 weeks in utero.²¹ Data from Kasai et al.²² indicates the lordosis is most prominent in ages 2-4, where it decreases steadily from ages 4 - 9, then the lordosis steadily increases up to age 18 approaching normal adult lordosis.

The adult cervical lordosis has been determined to be normal in the range of 31° through to 42°, the upper end being the CBP 'ideal' or essentially the gold standard. Re-analyzing the data from Kasai,²² Harrison et al.¹⁰ presents a table of normal Cobb and ARA values for pediatrics aged 2-18 years. In a letter to the editor, Oakley¹⁵ has pointed out the fault of applying the CBP adult lordosis of 42° in the evaluation of children as it may result in gross 'over-corrections' if consideration for pediatric lordosis is neglected.

Although there are clinical trials documenting routine correction to the cervical spine in adults receiving extension cervical traction^{12,23-24} (in conjunction with chiropractic manipulation and exercise) there are only a few sporadic case reports documenting restoration of lordosis by CBP technique in relief of headaches in the pediatric population.⁷⁻¹⁰

In fact, we located only eight documented cases where CBP technique was successfully employed in the pediatric headache population. These eight cases came from four different sources.⁷⁻¹⁰ The cases ranged in ages from 4-16yrs, including males and females. The treatment periods to restore the pediatric cervical lordosis in these cases ranged from 4-weeks to 12-weeks, and the number of treatments ranged from 22 to 30 treatments for the 'correction phase.' Most cases did not include any maintenance treatments, as is the case with the current report.

It should be noted, however, that in two of the cases reported by Harrison et al.¹⁰ after correction and resolution of headache, trauma to the cervical spine resulted in both subluxation and concomitant headache symptomatology. In one of these cases, (Harrison case #1) a subsequent second round of 4-weeks treatments including extension traction was required to both correct the lordosis and alleviate the headaches. This points to a direct causal relationship.

The current case as well as the others discussed point to a connection between cervical lordosis and pediatric health. Further, likened to the association between cervical hypolordosis/kyphosis and headache in adults, it seems prudent to suggest that a plausible pathogenesis to headache in pediatrics is cervical subluxation in all its variations, i.e. hypolordosis; kyphosis; buckled configurations. Although a caveat is that more research needs to be done, it seems that evidence points to the cervical spine and it's alignment as a critical factor in the diagnosis, treatment and prevention of cervicogenic headache in the pediatric population.

Dietary Effects

While structure is undoubtedly of importance when discussing causation of chronic headaches, it is impossible to ignore the effect of diet. The efficacy of magnesium as a safe method of alleviation of headaches and migraines has been documented in the literature.^{26,27, 28, 29} Magnesium is utilized in hundreds of chemical pathways in the body and is known to relax tension of any muscle in the body, including that of the heart and blood vessel walls. This may partly explain its positive impact on headaches. The best source of magnesium is from green leafy vegetables.

Harel et al.,³⁰ reported on the significant reduction of headache frequency in adolescents after consuming fish oil over a 2-month period. Simopoulos³¹ also reports on the impact that omega 3 fatty acids have on lowering inflammation and reducing migraine headaches, along with positively impacting many other inflammatory and autoimmune diseases. Huss³² et al. reported in a cohort study the significantly positive outcomes of omega-3 and magnesium consumption over a 12-week period on the behavior of a pediatric and adolescent population displaying sleep and behavioral disturbances, including ADHD and impulsivity.

This study emphasizes the importance of essential fatty acids on brain development, hormone balance and general cell membrane function. Cod liver oil contains both EPA and DHA, as well as vitamin D. Vitamin D has also been shown to be efficacious in the amelioration of mental outlook, energy, and headaches.³³

Monosodium glutamate (MSG) has been shown to be a causal factor in pericranial muscle tenderness and headaches.³⁴ MSG is found in an increasing number of foods and glutamate may be found in many other ingredients in processed foods and thus listed as ingredients other than MSG. Common foods containing MSG include processed meats, fast foods and many commercially flavored and processed snack foods, soups, sauces and dressings.

Conclusion

This case presented the successful outcome in an 8-year old with a variety of health issues as well as headaches. This case and others suggests CBP cervical extension traction as well as manipulation may be an effective intervention for the pediatric headache, along with diet modification specifically targeting improvement of brain and nerve health and function and reduction of inflammation.

Since prior nutritional and dietary counseling alone did not positively impact the headaches of this subject, it is likely that either the CBP treatments alone, or the combination of both CBP treatments and the dietary changes implemented created the complete resolution of the complaints of the subject. Further research is needed to determine what subset of pediatric patients presenting with headaches may be best suited for structural-based chiropractic care.

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Figures



Fig. 1: Pre-lateral cervical radiograph. Note the mild kyphosis (C2-3), overall straight alignment (C2-5), and hyperlordosis (C5-7). Curved line represents adult ideal from Harrison et al.¹⁷



Fig. 2: Post-lateral cervical radiograph. Note the improved shape, the C2-3 kyphosis was reduced to $+2.2^\circ$ (from $+6.1^\circ$) and the C3-7 hyperlordosis reduced to -27.7° (from -36.2°); overall, the absolute rotation angle C2-7 was reduced to -25.6° (from -30.1°) much closer to approximating a normal 8-year old lordosis (-22.1° ^{10,15}).