CASE STUDY

Resolution of Chronic Otitis Media, Neck Pain, Headaches & Sinus Infection in a Child Following an Increase in Cervical Curvature & Reduction of Vertebral Subluxation

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Abstract

Objective: This paper describes the chiropractic care of an 8 year old female with a 3-year history of otitis media, cephalgia, cervicalgia, and sinus infections.

Clinical Features: An 8-year old female presented with complaints of severe, debilitating otitis media with constant bilateral sub-occipital headaches and sinus pressure for the last 3 years. Previous treatment included 2 tympanectomy surgeries bilaterally, several rounds of antibiotics, and sinus surgery. Due to persistent headaches, neck pain, continued otitis media, and sinus infections the patient's parents sought chiropractic care for their child. X-ray of the cervical spine revealed severe segmental kyphosis from C2-C4.

Interventions and Outcomes: Chiropractic care over 29 visits included m irror image adjustments, exercises, and traction to the cervical spine. The patient reported a decrease in headaches, sinus, and ear pain. The patient also demonstrated a significant improvement in her cervical curve upon review of a follow-up radiograph.

Conclusion: The patient experienced subjective and objective improvement from Clinical Biomechanics of Posture (CBP) chiropractic care. Further research is recommended.

Key Words: *Vertebral subluxation, tympanectomy, ear/sinus infection, surface electromyography, CBP technique, kyphosis, chiropractic*

Introduction

Next to the common cold, ear infection is the most commonly diagnosed childhood illness in the United States. More than three out of four children have had at least one ear infection by the time they reach 3 years of age.[1] The traditional medical approach is the early use of antibiotics, which provides only modest benefit for acute otitis media (OM).[2]

Many cases that fail to resolve medically are brought to a chiropractor.[3] Despite this, nowhere in the medical literature is it found that in the diagnostic process for OM do children undergo analysis for the detection of spinal and/or postural abnormalities. When seeing a chiropractor these children are typically examined for vertebral subluxation, which has been defined by the Association of Chiropractic Colleges as: "A complex of functional and/or structural and/or pathological articular changes that compromises neural integrity and may

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influence organ system function and general health. A subluxation is evaluated, diagnosed, and managed through the use of chiropractic procedures based on the best available rationale and empirical evidence."[4]

In the case presented, an 8-year old female presented with complaints of severe, debilitating otitis media with constant bilateral sub-occipital headaches, and sinus pressure for 3 years. Initial emergency room visits and continued pediatric treatment protocols included two tympanectomy surgeries bilaterally, several rounds of antibiotics, and sinus surgery. After repeated infections and treatment failures for all her diagnoses, the parents brought the child in for a chiropractic evaluation.

Case Report

History

The patient had no history of trauma but presented with a history of chronic headaches and neck pain in the occipital region. She also suffered from multiple years of bilateral ear infections and frontal sinus pain as diagnosed by her pediatrician. The parents reported no trauma but the mother of the child did say while the vaginal birth process required no forceps, or vacuum assistance, the umbilical cord was wrapped around the child's neck, and she did not cry or breathe for about 2 minutes. An emergency team intervened, but what exactly was done, the mother did not know. This stress and strain on the cervical region could have led the child to a hypoxic state, which could have caused obstruction in the laryngeal airway. [5]

In the past four years she received several rounds of antibiotics, sinus surgery, and two tympanectomy surgeries bilaterally. All symptoms persisted, during which time the parents sought more medical treatment. The next suggested procedure from her pediatrician was another tympanectomy and continued antibiotics. The parents were quite concerned that this was not helping their child long term. They came in to the office seeking an answer to their daughter's health challenges.

Examination

After a review of the child's history a postural exam was done. From the front view there were no gross postural distortions that were noted in the transverse plane in either the cervical or thoracic region. Palpation of the cervical spine was then completed. For the age and size of the child she had severe muscle tension in her neck bilaterally from occiput to the mid cervical spine. To rule out guarding, she was placed in a supine position on the adjusting table and palpation of the cervicals was done again. The degree of restriction was so significant and obvious that the examiner was unable to laterally flex her neck to the left. While flexion was normal, extension was restricted in both active and passive ranges of motion. These limitations in regional ranges of motion may be associated with vertebral subluxation.[6] Considering the severity of the patients restricted range of motion in the cervical spine, muscle spasm, and headaches along with her persistent and reoccurring clinical presentation, both radiographic and SEMG exams were performed.

When the patients' radiographs were compared to the published normal (Figure 1 & 2) her study showed a reversal of the cervical lordosis. The child's forward head carriage measured less than 6 mm (See Table 1B), but an obvious cervical kyphosis was observed. There was also a significant amount of displacement intersegmentally in the cervical spine. (See Table 1A) The measurements of spinal displacements, utilized here, are mathematical utilizing geometric methods. This geometric line drawing analysis has been shown to be reliable and valid.[7-17] The patient's radiographic study is not normal as the cervical region in a human spine, whether child [18] or adult, [17] should have a lordosis maintained throughout their life.

Figure 1

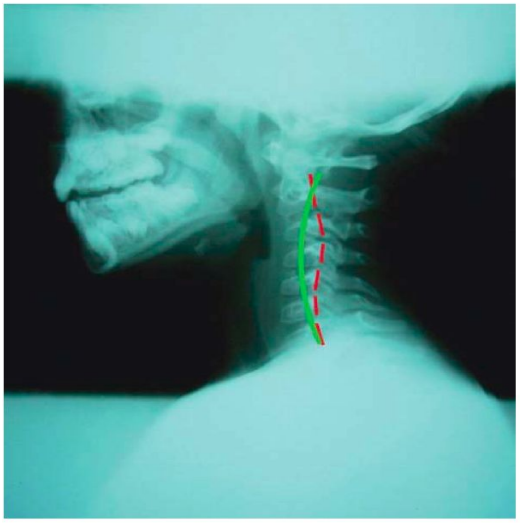


Figure 2

Following radiographs, a surface EMG was performed utilizing an Insight Subluxation Station, in accordance with published protocols. The purpose of the test was to assess paraspinal muscle activity and compare it to published norms.[19] This technology has been shown to be reliable.[20]

The patient's diagnosis included: cervical kyphosis, muscle spasms, cephalgia, cervicalgia, sinusitis, otitis media, cervical subluxation, and thoracic subluxation.

A total of 29 visits were completed in a three-month period. The first four visits consisted of trigger point therapy, Activator instrument (not Activator Method) adjustments, and mirror image adjustments. The trigger point therapy was used in the cervical spine and sub-occipital region to reduce muscle spasm and decrease restrictions. Following trigger point therapy the patient's head was set up for a diversified cervical adjustment, but due to the severe amount of muscle spasm the Activator instrument was used over the segmental contact point. Following this adjustment the child was then put into head extension for a mirror image adjustment. The instrument was used to stimulate proprioceptive firing at C1 bilaterally and at both acetabulums while the patients head was in extension. At the 5th visit, we began supine diversified chiropractic adjustments that were done by hand and the patient started to show signs of improved segmental mobility.

On the 8th visit, CBP protocol was used, including mirror image adjustments, mirror image exercises, and mirror image extension compression traction.[21-26] These spinal adjustment forces were applied via diversified, drop table, and toggle maneuvers. CBP protocol consisted of specific chiropractic adjustments while placing the patient in her postural mirror image position before and during the application of any adjusting force.

Mirror image adjustments were done on each of the 29 visits, but diversified adjustments were done on 12 visits. Traction was done on a traction unit designed by Curve Solutions. See Figure 3. The unit was used for only 2 minutes to start. Progression on time and pressure, as always, is done according to patient tolerance, and in this case, she was unable to progress past 4 minutes for 6 visits. It should be noted, no weight was applied to the child's head, but a strap was placed, using a very thin foam pad in her mid to upper posterior cervical region. A total of 16 in-house traction sessions were completed and the patient was instructed to do home traction daily. The parent reported compliance at home with the traction unit.

Figure 3

Outcome

After 1 month of care, the patient reported an absence of headaches, sinus, and ear pain. A third scheduled surgery was cancelled at that time. While SEMG scans showed some improvement from previous scans (See Figure 4 & 5), care was continued.

Figure 4 – SEMG Pre scan

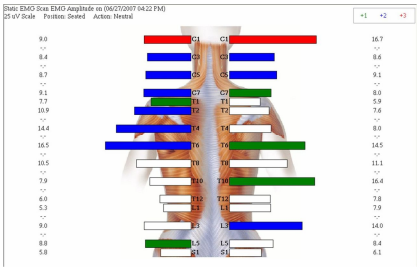
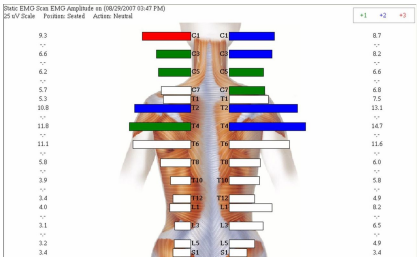


Figure 5 – SEMG Post Scan



After 3 months of care, post x-rays were taken (See Figure 6 & 7) and compared to normal.

Figure 6

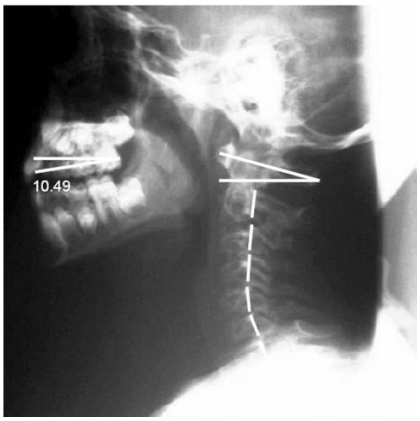


Figure 7

The intersegmental measurements were calculated and compared to the previous geometric lines and the results indicated improvement. (See Table 2A and 2B)

Headaches and neck pain were absent and ear and sinus infections resolved according to her pediatrician. In addition to supportive in-office care, home protocols were prescribed for continued curve correction and spinal hygiene. After a follow-up 12 months after care the patient remains symptom free of all prior complaints.

Discussion

There is some evidence in the literature to support the chiropractic management of otitis media.[27-41] The results in this case indicate a relationship between the correction of subluxation and the resolution of symptoms in this patient by utilizing CBP protocol.

A proposed reason for success is that the innervation of the tensor veli palatini (tvp) muscle (See Figure 7), is through the motor fibers of the mandibular branch of the trigeminal nerve, and this can be influenced by aberrant mechanical stimuli from subluxations. These fibers unite to form portions of the superior cervical ganglion located between the C-1 and C-4 nerve roots, which is the region where the patients' spine was subluxated. See Figure 8.

Figure 7

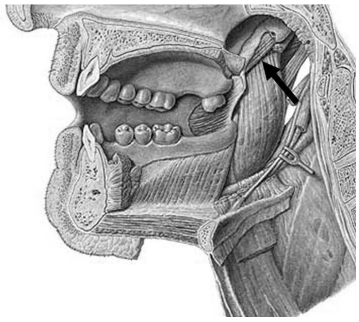
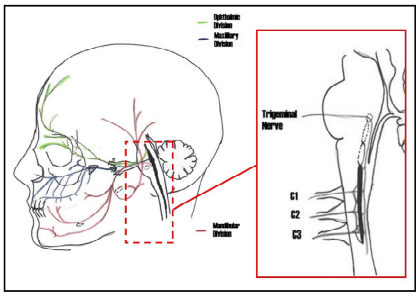


Figure 8



Neurological compromise may contribute to the malfunction of the TVP muscle causing inadequate patency of the Eustachian tube resulting in the pathological response of otitis media. (See Figure 9)

Note that the measurement of the hard palette was done using software that is accurate up to .02 degrees. (See Figure 10)

Figure 9

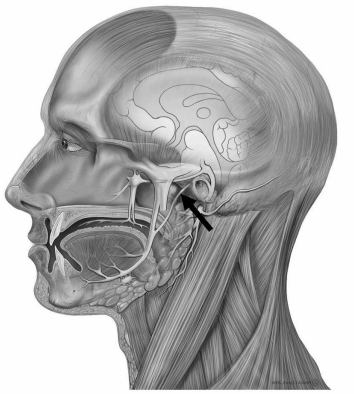
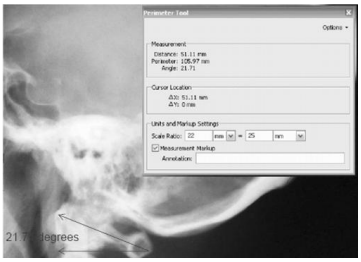


Figure 10



The level hard palette on the post film shows a change of only 6.3 degrees. It has been shown that for slight head extension (<13 degrees) in kyphotic cervical spines this does not produce a normal lordosis.[42] So the slight amount of head tilt (6.3 degrees, change in hard palette angle) would not be able to produce the substantial change that took place.

It should be noted one study did find that the average ARA in the cervical spine for 20 subjects that were 8 years old was 22.5 degrees.[43] While according to our post x-rays the total cervical curve has reached 100%, there are still segments that have loss of curve. (See Table 3A and 3B)

A study to evaluate kyphosis in the cervical spine and if it causes predisposition to otitis media and other maladies could be done utilizing computerized analysis of the radiographs and careful correlation of findings to patient symptom presentation. Thus if analyzed early enough, patients could be evaluated for kyphosis in the cervical spine and treated before symptoms manifest. It is the authors' opinion that this method should be a fixed protocol as the current approach for otitis media is to distribute antibiotics for the infection, which is not only expensive but is known to cause allergies and asthma in young children.[44]

In the United States alone more than 3.5 billion dollars is spent to treat otitis media.[45] Economic analysis of chiropractic care compared to medical management is encouraged.

More importantly than cost are the health issues related to the prescribing of antibiotics to young children. Statistics show children age 5–17 are missing school most commonly because

of asthma related issues. These missed school days are leading to an annual loss of more than 14.7 million school days per year and more hospitalizations than any other childhood disease.[46] Further it has also been shown that the risk of getting asthma by age 7 was nearly twice as likely in children taking antibiotics than in those who took no antibiotics from birth to age 1 year.[47] If we can change our approach towards healthcare and treating young children with otitis media than we may be able to improve their overall quality of life.

Given that the parents reported no other major traumatic injuries to the child other than a difficult birth, we propose that the cause of the abnormal spinal configuration was a result of difficult labor. The cord could have put significant amount of strain on the atlanto-occipital junction. Towbin addressed the clinical significance of spinal cord and brain stem injury at birth, noting that such damage is often latent and undiagnosed.[48] In her paper, "Physical stresses of childhood that could lead to need for chiropractic care," presented at the first National Conference on Chiropractic and Pediatrics, McMullen stated:

> "Any condition that arises to change the normal birth process...frequently results in subluxation at the level of greatest stress. Severe subluxation resulting in nerve damage may be clinically obvious at birth (e.g. Bell's, Erb's, and Klumpke's palsies), however more frequently the trauma remains sub-clinical with symptoms arising at a later time. These symptoms include, but are not limited to, irritability, colic, failure-to-thrive syndromes, and those syndromes associated with lowered immune responses. These subluxations should be analyzed and corrected as soon as possible after birth to prevent these associated conditions."[49]

It is for this reason that we suggest that every child be checked for the presence of vertebral subluxation.

Finally, to our knowledge this is the first paper showing documented structural changes on x-ray along with improved SEMG readings. In the authors' opinion, using SEMG is important because it can be used to measure the innate responses to gravitational stress from subluxation.[50]

Conclusion

Radiographs provided objective evidence of upper cervical kyphosis and other components of chiropractic subluxation in this case. The radiographs also guided us to use a systematic approach, which led to a successful outcome. In this case, the chiropractic care and CBP protocols were modified to suite the child which led to the resolution of her chronic headaches, neck pain, and concurrently - her otitis media, and sinus infections resolved during the same time frame. Radiographs of the spine are invaluable tools that when measured and analyzed appropriately provide objective evidence of a component of the chiropractic subluxation. Further investigation in this area is needed to further substantiate the deleterious effects abnormal biomechanics have on health because the changes in structure and function may be related to a reduction in cervical kyphosis.

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Table 1A: Initial Relative Rotational Angle (RRA) of Measurement Vs Normal Values

RRA Per Segment	Normal Values	X-ray 1 Values	Difference to Normal
C1- Horizontal	-29°	-8°	72.3%
C2-C3	-10°	-3.5°	65.1%
C3-C4	-8°	14.7°	283.8%
C4-C5	-8°	3.5°	143.9%
C5-C6	-8°	11.7°	46.0%
C6-C7	-8°	10.00°	24.4%

Table 1B: Initial Absolute Rotational Angle ARA of Measurement vs Normal Values

Global Analysis	Normal Values	Patient Values	Difference From Normal
ARA C2-C7	-42	-6.9	83.5%
Translation C2-C7	0 mm	5.6 mm	5.66

Table 2A: Post Relative Rotational Angle (RRA) of Measurement Vs Normal Values

RRA Per Segment	Normal Values	X-ray 2 Values	Difference to Normal
C1- Horizontal	-29°	-17.0	41.5%
C2-C3	-10°	-3.8	62.4%
C3-C4	-8°	-3.4	57.9%
C4-C5	-8°	0.00	100.0%
C5-C6	-8°	-11.3	41.4%
C6-C7	-8°	-13.5	68.3%

Table 2B: Post Relative Rotational Angle (RRA) of Measurement Vs Normal Values

Global Analysis	Normal Values	Patient Values	Difference From Normal
ARA C2-C7	-42	-31.9	24.0%
Translation C2-C7	0 mm	5.6 mm	5.66

Table 3A: Comparative Intersegmental Measurement Values of Pre and Post Radiographs

RRA Per Segment	Normal Values	X-ray 1 Values	X-ray 2 Values	% Change X-ray 1-2	Translation Per Segment	X-ray 1 Values	X-ray 2 Values	% Change X-ray 1 to 2
C1- Horizontal	-29°	-8	-17.0	212.0%				
C2-C3	-10°	-3.5	-3.8	7.6%	C2-C3	-.3 mm	-1.4 mm	301.5%
C3-C4	-8°	14.7	-3.4	532%	C3-C4	-1.4 mm	-1.4 mm	3.2%
C4-C5	-8°	3.5	0.00	100.00%	C4-C5	-2.6 mm	-0.8 mm	67.6%
C5-C6	-8°	11.7	-11.3	200%	C5-C6	-1.1 mm	-0.6 mm	48.6%
C6-C7	-8°	10	-13.5	235 %	C6-C7	-0.1 mm	-0.1	96.3%

Table 3B: Comparative Absolute Rotational Angle Values of Pre and Post Radiographs

Global Analysis	Normal Values	Patient Values	Difference From Normal	Patient Values	Difference From Normal	% Change X-ray 1 to 2
ARA C2-C7	-42	-6.9	83.5%	-31.9	24.0%	462%
Translation C2-C7	0 mm	5.6 mm	5.66	5.6 mm	5.66	0.00