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Cortical Blindness, Cerebral Palsy, Epilepsy, and Recurring Otitis Media: A Case Study in Chiropractic Management.

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ABSTRACT

The role of chiropractic in the management of visceral disorders remains clouded with regards to possible benefits. Observations of one patient presenting with cortical blindness, cerebral palsy, epilepsy, and recurrent otitis media are reported. Relief of symptoms is noted subsequent to correction of biomechanical aberrations of the occipito-atlanto-axial complex. The author suggests a relationship between biomechanical faults in the upper cervical spine and the manifestation of abnormal central neurophysiological processing.

Key Indexing Terms: Upper Cervical Spine, Epilepsy, Cerebral Palsy, Blindness, Otitis Media, Imaging, Infrared.

INTRODUCTION

The role of the upper cervical spine in the etiology of visceral conditions remains controversial. The standard medical etiological paradigm of cortical blindness, cerebral palsy, and epilepsy is accepted as permanent damage to the cerebral cortex and/or cerebellum secondary to either anoxia, trauma, perinatal injuries, disorders of metabolism, space occupying lesions, degenerative disorders, infectious diseases, or entities unknown (1,2). In the case of otitis media it is accepted that a bacterial or viral infection is secondary to prolonged effusion or immune suppression (1,2). Thus, it can be understood that the contribution of aberrant upper cervical arthrokinematics has largely been ignored by most, considered to be of no significance by many, and emphasized by only a few. Even so, the body of literature detailing a possible upper cervical etiology, or at least contribution, is substantial; and the case made for greater recognition of the involvement of the upper cervical spine is compelling.

This article has three main objectives. The first is to present the clinical picture of a patient, with a constellation of medically diagnosed conditions, that has been given almost no hope of improvement. Secondly, the presentation of a chiropractic evaluation method focusing upon the detection of abnormal upper cervical biomechanics and neuropathophysiology. And lastly, to detail the management and outcome of the patient via correction of occipito-atlanto-axial

biomechanics using a specific upper cervical approach which combines specialized adjusting procedures with objective neurophysiological monitoring.

CASE REPORT

A 5 year old male was referred to the author with the chief complaint of recurring middle ear infections at one month intervals. His parents advised that the patient had also been diagnosed with cortical blindness, cerebral palsy, epilepsy, and severe brain damage secondary to possible abort SIDS or viral encephalitis. The patient's medical records noted an extensive work up from a team consisting of pediatric neurologists, orthopedists, ophthalmologists, and internists.

His mother reported that he had been very healthy with good visual contact, social interaction, and normal development until an acute illness at three months of age. Two days following a well-child checkup with an inoculation, the patient became "colicky" and developed a mild upper respiratory infection with fever. His mother recalls that he was a little fussy, not eating, but alert when she put him down for a nap before leaving for work. About fifteen minutes later, the baby-sitter found him cyanotic, gasping for air, and nonresponsive. She called 911 and paramedics responded to the home. In the emergency room he was found to be cyanotic, shocky, and unresponsive with grunting respirations. He was immediately resuscitated and given IV antibiotics.

A septic workup was performed with no evidence of infection. A cranial CT scan was obtained and found to be grossly abnormal along with cerebral edema. The results of the scan were noted as compatible with either an ischemic insult or sepsis. The child was treated and seemed fairly stable until 24 hours later when he began to have seizures. He remained hospitalized for over 1 1/2 weeks during which time multiple medication combinations were tried to finally control the seizures. Upon release, he was given a diagnosis of severe hypoxemic encephalopathy secondary to a possible near SIDS or viral encephalitis.

Due to the severity of the seizures, he remained on phenobarbitol for over 1 1/2 years. When finally placed on dylantin, his personality noticeably improved, but the seizures increased in frequency. Over the next 2 years, examinations from multiple specialists formed the conclusion that he would never walk, speak, regain his vision, or progress in school.

At the time of consultation, the patient had been experiencing otitis media once per month over the last 9 months with administration of amoxicillin every month. Myringotomy with tube placement was to be scheduled if the infections continued to occur. The patient was also having 30 seizures per day in combinations of grand mal and complex partials. At the time the patient was seen in our clinic he had been receiving OT and PT three times a week for over 3 years. He was also enrolled in a special school where he was taken daily for behavioral therapy.

Upon examination, the patient presented as non-ambulatory, uncommunicative, and non-

responsive with a constant loud vocal drone and almost constant writhing torsocephalic motions. His gross motor coordination included reaching out with his hands and rolling over onto all fours. If held, the patient could support his weight on both feet and stand momentarily. He kept his thumbs cortically tucked with occasional fisting and showed no signs of fine motor skills. Ear, nose, and throat examinations were unremarkable with the exception of bilateral pretympanic serous effusion noted along with a normal light reflex.

Orthopedic examination revealed significant palpatory hypertonicity of the paraspinal musculature from the occiput to C3 bilaterally. A combination of crying and arched extension of the spine suggested tenderness in the same areas. The patient demonstrated a reduction in passive cervical flexion, right lateral flexion, and right rotation. Overall muscular spasticity was noted in all extremities. Lumbosacral evaluation was unremarkable.

Figure 1

Neurologic evaluation revealed markedly increased DTRs at 4+ along with a bilateral Babinski's and 6-8 beats of ankle clonus bilaterally. Cranial nerves were of note in that he showed no bright light avoidance, did not visually fixate or follow, and a significant decrease in direct and consentual pupillary reflexes. A paraspinal digital infrared imaging analysis was performed from the level of S1 to the occiput in accordance to thermographic protocol (3-5) (Fig.1).

A continuous paraspinal scan consisting of approximately 300 infrared samples was taken and the data analyzed against established normal values (6-9). The paraspinal scan was found to contain wide thermal asymmetries indicating abnormal autonomic regulation or neuropathophysiology (Fig.2 & 3).

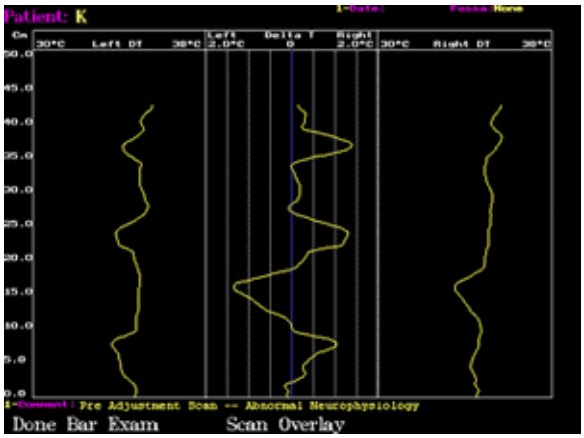

Figure 2

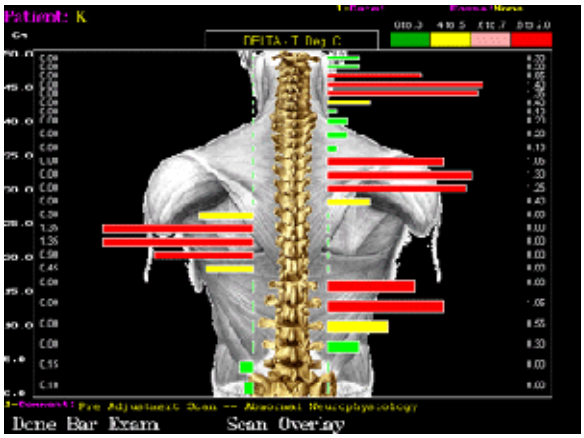

Figure 3

The above information lead to suspected abnormal upper cervical arthrokinematics. A precision upper cervical radiographic series was performed for an accurate analysis of specific segmental biomechanics (10). Since positioning chairs and head clamps cannot be used with infants or uncooperative children, precision alignment of the patient to the central ray was facilitated with an on-patient laser-optic alignment system (Fig.4 & 5). With this system any patient can be accurately aligned from the source of the X-ray beam rather than the bucky.

Figure 4

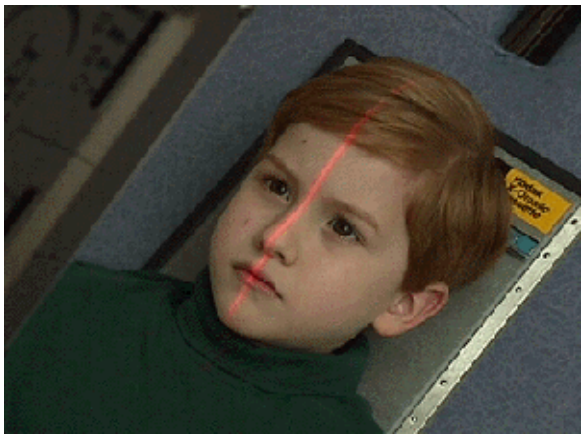

Figure 5

An analytical radiographic method consisting of mensuration combined with arthrokinematics was performed (10). Biomechanical abnormalities were noted at the atlanto-occipital and atlanto-axial articulations.

CHIROPRACTIC MANAGEMENT

Correction of the atlanto-occipital subluxation was chosen as the first to be adjusted from the accumulated degree of aberrant biomechanics noted at this level. Before treatment was rendered, the parents were counseled that they may expect exacerbations in symptomatology as part of the normal response to care. Even though a remote possibility, Goodman reported a case in which seizures had increased to almost 100 per day before subsiding (11).

To correct the subluxation, the patient was placed on a specially designed knee-chest table with the posterior arch of atlas as the contact point. An adjusting force was introduced using a specialized upper cervical adjusting procedure (12). The patient was then placed in a post-adjustment recuperation suite for 15 minutes as per thermographic protocol (3-5). The success of the adjustment was determined from the post-adjustment infrared scan noting resolution of the patient's presenting neuropathophysiology (Fig.6 & 7). All subsequent office visits included an initial infrared scan, and if care was rendered another scan was performed to determine if normal neurophysiology was restored.

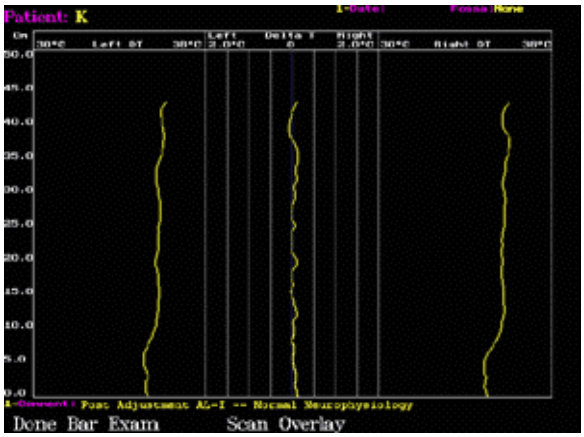

Figure 6

Figure 7

The patient was adjusted twice during the first week of care. After the first adjustment, the patient's mother noted that he had his first good night sleep in weeks. After the second adjustment, the patient's seizures reduced dramatically to only 10 per day, his vocal drone became a quiet intermittent moan, and he began to clap his hands. During the next week the patient was adjusted only once. His mother noted that he had become more alert, continued to sleep more soundly, began sitting up and looking around, responded to sounds by looking toward the source, and continued with a decrease in seizures to only 5 per day. His consentual pupillary reflexes returned to normal with some improvement on direct. He also responded to bright light with closure and appeared to follow. Almost all of his writhing motions had ceased. An examination of his ears found them to be clear of effusion.

During the third and fourth week of care the patient was adjusted three times. The seizures continued to occur at 5 per day, but all grand mals had ceased. He was sleeping completely through the nights now. For the first time in his life he vocalized "dada" and began engaging in

echolalia with vowel sounds. By the end of the fourth week, his therapists suspected that his vision was suddenly improving. His mother was told that he had unexpectedly and repeatedly mimicked the answering of a phone by copying the therapist and holding the receiver to his ear.

A re-examination of the patient was also performed at this time. There were no signs of any: vocal drone, writhing motions, occipital myohypertonicity or tenderness, restricted cervical ranges of motion, or pretympanic effusion. Overall muscular spasticity was markedly decreased in all extremities. He was now capable of sitting up on his own and his mother reported that for the first time he pulled himself up and stood for over one minute. He began showing fine motor skills this week by grabbing his own pacifier and placing it in his mouth. The patient's DTRs had also improved to 3 along with a decreased bilateral Babinski's and only 4 beats of right ankle clonus. The patient now showed avoidance to bright light, visual fixation and following, and normal direct and consentual pupillary reflexes. His mother noted that this was his first month free from otitis media in 9 months. In light of these findings, it was determined that an objective visual evaluation should be made as soon as possible.

The fifth week of care was marked by a change in the patient's response to treatment. He was adjusted twice, but did not exhibit the resolution of neuropathophysiology previously demonstrated. He was still having 5 seizures per day, but only petit-mals. From the information gained in his paraspinal infrared scans, it was decided to change the adjustment to axis. The post-adjustment scan noted a resolution of the abnormal thermal emissions and a return of normal neurophysiology as seen before (Fig.6 & 7). By the end of the fifth week of care the patient was seen by his neurologist and ophthalmologist. His ophthalmologist noted a drastic improvement with a recovery of central field vision. The patient's neurologist reported that his CP had greatly improved and that he would be requesting further tests to evaluate his seizure condition.

With a change in the adjustments to axis, the patient's response to care was immediate. His seizures reduced to only 3 per day during the sixth week of care. Only one adjustment was given during this time. He continued to improve with increased alertness, vocalization with the addition of the word "eat", and fine motor coordination with handling toys. His mother advised that he was now responding to verbal commands with placing the phone receiver to his ear by saying "hello". The patient's follow-up examination with his pediatrician noted that his ears were normal and that tubes would not be necessary.

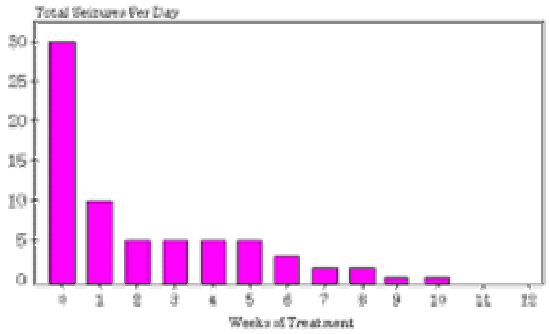

Figure 8

During the time period between the seventh and twelfth week, the patient's seizures steadily reduced to the point of staring episodes (Fig.8).

His mother noted that the patient could be brought out of these episodes by calling out his name. A re-examination was performed at eight weeks with noted continued improvement in all his signs of upper motor neuron dysfunction. There were no outward signs of seizures by the end of the twelfth week.

Over the next 10 months, the patient continued to improve. His neurologist slowly reduced his medication causing his staring episodes to ebade. With further testing, the patient was eventually classified as non-epileptic and final withdrawal of all medication was made. He never experienced another episode of otitis media. His vision improved to the point where he was prescribed glasses. The patient continued to learn simple words with clear pronunciation of "dada, mama, eat, and food". His fine motor coordination improved such that he was learning to feed himself. The patient's mother noted that he was also potty training. His gross motor coordination continually progressed to the point that he was able to walk slowly with the assistance of holding one hand.

NEUROBIOLOGICAL MECHANISMS

Many theories have been propounded to explain the effects seen in chiropractic patients. However, there are two extensively studied neurophysiological mechanisms which may explain the profound changes in this patient. The first is CNS facilitation resulting from hyperafferency (13-17). This arises from an initial trauma causing entrapment of meniscoids, articular hypomobility, and finally compensatory hypermobility. Consequently, hyperexcitation of periarticular mechanoreceptors and nociceptors occurs. Over time, this bombardment of the central nervous system can cause facilitation. Facilitation results in an exponential rise in the afferent signals to the cord and/or brain. This may cause a loss of central neural integration at the level of the cord, brainstem, and/or higher centers. The upper cervical spine is uniquely suited to this condition as it possesses poor biomechanical stability and the greatest concentration of spinal mechanoreceptors.

Cerebral penumbra, or brain cell hibernation, is proposed as the second mechanism (18-24). It was previously thought that the neuron had two basic states of existence, function and dysfunction. However, a third state was discovered which may explain the rapid and profound changes seen in patients. The neuronal state of hibernation occurs when a certain threshold

of ischemia is reached; the cell remains alive, but ceases to perform its designated purpose. Entire functional areas of the cerebral cortex or cerebellum may be affected. The mechanism of hyperafferancy, as mentioned above, plays an initiating role. Hyperafferant activation of the central regulating center for sympathetic function in the brain may cause differing levels of cerebral ischemia. A second route via the superior cervical sympathetic ganglia, may also cause higher center ischemia.

CONCLUSION

The most important factor in this case was our ability to objectively monitor the adjustment's affects on the patient's neurophysiology. Many different types of tests have been used in our profession such as leg length, cervical challenge, motion and static palpation, and others. However, these tests lack objectivity, posses inherent errors, and have no literature confirmation of their ability to monitor neurophysiology (25-28). Infrared imaging, however, has been researched for over 30 years compiling almost 9,000 peer-reviewed and indexed articles confirming its use as an objective measure of neurophysiology. This method of nervous system monitoring was responsible for the adjustment changes seen in this case and the resulting positive impact on the patient's physiology. By using this technology, our clinic has been able to consistently determine the correct adjustive procedures that produce positive neurophysiological improvements. If the foundation of our profession stands on the principle that homeostasis is dependent upon coordinated neurophysiology, then we must strive to directly monitor this system as an outcome measure to our care.

The role of the upper cervical spine in the etiology of visceral conditions remains controversial. In a climate where much of the public see chiropractic as only a treatment for neck and back pain, patients with complex visceral disorders are left unaware of the possible benefits of care. The body of literature detailing a possible upper cervical etiology, or at least contribution, to visceral disorders is substantial. Further research into this area of the spine, combined with objective monitoring of the nervous system, may reveal that chiropractic does indeed offer consistent conservative management of visceral disorders.

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REFERENCES

1.) Schroeder, S., Krupp, M., Tierney, L. *Current Medical Diagnosis and Treatment*. Norwalk, CT: Appleton & Lang; 1988

2.) Andreoli, T., Carpenter, C., Plum, F. *Essentials of Medicine*. 2nd ed. Philadelphia: W.B. Saunders; 1990.

3.) Thermography Protocols - *International Thermographic Society* 1997.

4.) Thermography Protocols - *American Academy of Thermology* 1984.

5.) Thermography Protocols - *American Academy of Medical Infrared Imaging* 1997.

6.) Uematsu, S., Edwin, D., et al. *Quantification of Thermal Asymmetry. Part 1: Normal Values and Reproducibility*. J Neurosurg 1988;69:552-555.

7.) Feldman, F., Nickoloff, E. *Normal Thermographic Standards in the Cervical Spine and Upper Extremities*. Skeletal Radiol 1984;12:235-249.

8.) Clark RP. *Human Skin Temperature and its Relevance in Physiology and Clinical Assessment*. In: Francis E, Ring J, Phillips B, et al, Recent Advances in Medical Thermology, New York: Plenum Press, 1984:5-15.

9.) Uematsu S. *Symmetry of Skin Temperature Comparing One Side of the Body to the Other*. Thermology 1985;1:4-7.

10.) Amalu, W., Tiscareno, L., et al. *Precision Radiology: Module 1 and 5 -- Applied Upper Cervical Biomechanics Course*. International Upper Cervical Chiropractic Association, 1993.

11.) Goodman, R., Mosby, J., *Cessation of a Seizure Disorder: Correction of the Atlas Subluxation Complex*. JCRCI 1990, Vol. 6, No. 2; 43-46.

12.) Amalu, W., Tiscareno, L., et al. *Precision Multivector Adjusting: Module 3 and 7 -- Applied Upper Cervical Biomechanics Course*. International Upper Cervical Chiropractic Association, 1993.

13.) Gardner, E. *Pathways to the Cerebral Cortex for Nerve Impulses from Joints*. Acta Anat 1969;56:203-216.

14.) Wyke, B. *The Neurology of Joints: A Review of General Principles*. Clin Rheum Dis 1981;7:223-239.

15.) Coote, J. *Somatic Sources of Afferent Input as Factors in Aberrant Autonomic, Sensory, and Motor Function*. In: Korr, I., ed. The Neurobiologic Mechanisms in Manipulative Therapy. New York: Plenum, 1978:91-127.

16.) Denslow, J., Korr, I., Krems, A. *Quantitative Studies of Chronic Facilitation in Human Motorneuron Pools*. Am J Physiol 1987;150:229-238

17.) Korr, I. *Proprioceptors and the Behavior of Lesioned Segments*. In: Stark, E. ed.

Osteopathic Medicine. Acton, Mass.: Publication Sciences Group, 1975:183-199.

18.) Heiss, W., Hayakawa, T., Waltz, A., *Cortical Neuronal Function During Ischeamia*. Arch Neurol 1976;33:813-20

19.) Astrup, J., Siesjo, B., Symon, L. *Thresholds in Cerebral Ischemia -- The Ischemic Penumbra*. Stroke 1981;12:723-5

20.) Roski, R., Spetzler, R., Owen, M., et al. *Reversal of Seven Year Old Visual Field Defect with Extracranial-Intracranial Anastomosis*. Surg Neurol 1978;10:267-8

21.) Mathew, R., Meyer, J., et al. *Cerebral Blood Flow in Depression*. Lancet 1980;1(818):1308

22.) Mathew, R., Weinmann, M., Barr, D. *Personality and Regional Cerebral Blood Flow*. Br J Psychiatry 1984;144:529-32

23.) Jacques, S. Garner, J. *Reversal of Aphasia with Superficial Temporal Artery to Middle Cerebral Artery Anastomosis*. Surg Neurol 1976;5:143-5

24.) Lee, M., Ausman, J., et al. *Superficial Temporal to Middle Cerebral Artery Anastomosis. Clinical Outcome in Patients with Ischemia of Infarction in Internal Carotid Artery Distribution*. Arch Neurol 1979;36:1-4

25.) DeBoer, K., Harmon, R., et al. *Inter- and Intra-examiner Reliability of Leg Length Differential Measurement: A Preliminary Study*. J Manipulative Physiol Therap 1983;6:61-66

26.) Falltrick, D., Pierson, S. *Precise Measurement of Functional Leg Length Inequality and Changes Due To Cervical Spine Rotation in Pain-Free Students*. J Manipulative Physiol Therap 1989;12:364-368

27.) Keating, J. *Inter-examiner Reliability of Motion Palpation of the Lumbar Spine: A Review of Quantitative Literature*. Am J Chiro Med 1989;2:107-110

28.) Nansel, D., Peneff, A., Jansen, R., et al. *Interexaminer Concordance in Detecting Joint-Play Asymmetries in the Cervical Spines of Otherwise Asymptomatic Subjects*. J Manipulative Physiol Therap 1989;12:428-433