CASE STUDY

Resolution of Neurological Tics and Reduction in Vertebral Subluxation in a Pediatric Patient Undergoing Chiropractic Care: A Case Report

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Abstract

Objective: To discuss the case of a pediatric patient with neurological tics who received effective chiropractic care.

Clinical Features: The patient was a 7-year-old male seeking chiropractic care for neurological tics. Physical examination revealed vertebral subluxations in the cervical and thoracic regions.

Intervention and Outcome: Diversified chiropractic technique, along with Activator Methods was used to reduce vertebral subluxations in the cervical and thoracic regions. Over the course of care, the frequency of the tics reduced.

Conclusion: Resolution of neurological tics is described in a 7 year old male along with reduction of vertebral subluxations. More research is warranted in this area.

Key Words: *Neurological tics, chiropractic, vertebral subluxation, motor tics, Tourette's*

Introduction

Neurological tics in children are considered common and treatable. Transient neurological tic disorders are usually single motor and/or vocal tics that occur many times per day for 4 weeks but no longer than 12 consecutive months. The onset is before 18 years of age and the disturbance is not due to physiologic effects of a substance or general medical condition.[1] These disorders are treated pharmacologically as well as non-pharmacologically. The medical treatment algorithm is such that these children should be screened for Obsessive Compulsive Disorders (OCD) and Attention Deficit Hyperactivity Disorders (ADHD) to determine if the two aforementioned disorders are causing more impairment and therefore should be treated first.

The three medications usually employed are adrenergic agonists, followed by non-dopamine receptor blocking medications and finally dopamine receptor blocking medications. These are used in that particular order based on response from the patient. In addition to pharmacological treatment, psychological treatment is also suggested. [2, 3]

Some non-pharmacological approaches involve nutritional protocols including supplementation, elimination diets, and chiropractic care. It is suggested that neurological involvement from the vertebral subluxation complex could be a contributing factor to the involuntary control of muscle groups in the tic-related disorders. The treatment that was employed on this patient was focused on the cervical spine. This was an

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area of interest because of the extensive neurological involvement of the occiput, atlas (C1), and axis (C2) joints. The joint complex aforementioned influences cranial nerves, specifically the vagus nerve and sympathetic portion of cranial nerves VII, X, and XII. The upper thoracic spine was investigated with specific focus on the C_7-T_1 junction and it's relation to the stellate ganglion, which also has a role in sympathetic responses of the nervous system. [4-6] The purpose of this paper is to report on the successful chiropractic care of a 7-year old male with neurological tics.

Case Report

Clinical Features

Patient presented for chiropractic care complaining of a frequent "tickle" in his throat that caused him to clear his throat. His father reported that he only noticed this for the last few months. The patient reported that his throat was not painful or sore and drinking water made it feel better. The "tickle" in his throat seemed to vary in frequency from a couple of times per day up to several times per hour. The parents also related that they had observed symptoms of head jerking, grunting, and eye blinking. The patient did not report any musculoskeletal complaints in the cervical or thoracic spine.

The patient was born vaginally and although his APGAR score at 1 minute was reported to be high (score unknown), his 5 minute APGAR was much lower. He did aspirate amniotic fluid into his lungs upon birth. The patient was placed under heat lamps and was given oxygen for 12 hours. The patient was also hospitalized at the age of 6 weeks for respiratory synctial virus (RSV). He was hospitalized for 2 days and has had no recurrence of RSV since.

The patient's maternal grandfather has atrial fibrillation and is borderline diabetic. His paternal grandmother has been diagnosed with high blood pressure. His mother states that all the other immediate family members are in good health. The patient sleeps 10-11 hours per night, has a good diet, and gets plenty of exercise.

Examination

Upon physical exam, significant findings were noted. Examination of the eye movements revealed bilateral hypometric saccades, slow short movement nystagmus, more pronounced on the right side. Left extensors were weak globally, noticeable left upper extremity internal rotation, and a left decrease in diadochokinesia. The right pupil was sluggish and a left hippus, rapid contraction and dilatation of the pupil, was also noted. All other physical exam findings were normal.

There was no significant reduction in active or passive range of motion in the cervical and thoracic spine. X-ray analysis was not performed in this particular case because of age. Based on physical exam findings, the patient was diagnosed with cervical and thoracic vertebral subluxation complexes.

Intervention

Upon obtaining informed consent from his parents, chiropractic care began at a frequency of once a month using Diversified technique for approximately 4 months. Diversified double transverse was used for the thoracics and supine set for the cervicals. For the thoracic adjustment, the patient was prone and doctor placed his hands on either side of the child's spine at the level to be adjusted. Each adjustment was delivered by applying a thrust superior and anterior with the force modified for the child's weight and frame. The cervical adjustment was performed with the patient supine and the doctor standing superior and to the side that the adjustment was going to be applied. The first metacarpal was placed on the level of the cervical spine that was to be adjusted and a thrust was applied posterior to anterior and inferior to superior. The thrust was modified for the child's weight and frame.

Unsatisfied with the response, during the next several months a trial of Activator Methods was implemented but abandoned because no noticeable change was appreciated. After another trial of Diversified it was decided to focus the care on the upper cervical spine using the Activator instrument to adjust C1 using thermal scanning as the basis for adjusting. Temperatures were recorded at the styloid fossa for each pre-adjustment encounter with the patient needing to be in pattern, fossa temperatures at least >0.50 °C difference, positive leg length differentials and palpation findings all suggesting the need for an adjustment.[7]

Using the Activator instrument to adjust only Atlas according to this protocol yielded positive noticeable improvements in the patient. The improvements included dramatic reduction in frequency and intensity of the neurological tics, which later progressed to complete resolution.

Outcome

During the course of care, the patient made positive improvements, mainly after receiving upper cervical adjustments via Activator instrument adjusting to C1. His parents remarked that there was noticeable improvement in his symptoms. They observed that he had reduced head jerking, grunting, and eye blinking. The parents were asked to keep track of the amount of tics per hour and per day on a daily basis. These "tally" sheets were returned on a weekly basis. (See Figure 1)

Another observation noted was during high stress situations the child's neurological tics seemed to increase in frequency. When the child was asked to focus on stopping the tics, the frequency would reduce but the magnitude of the tics would increase. If the child was head jerking and asked to focus on stopping the tic then the frequency would reduce but the magnitude of motion would increase greatly. After the initiation of care there was a reduction in the tics, however after about two weeks the tics began to return. The parents expressed that things had returned to their previous state.

Following this period, there was an erratic period of where the tic frequency was increased and unpredictable based on previous progress. Then the tics all but disappeared.

Additionally during this period of chiropractic care, the parents began experimenting with alternative diets, namely removing certain foods from the child's diet with the idea that a food allergy or sensitivity might be a cause of these issues.

After intensive care focused on the upper cervical region, the symptoms seemed to resolve. There was no clear record of symptoms at the onset and the tracking of the symptoms was not done closely until later in care. Also the care was varied and the types of adjustments were not consistent. The natural, transient nature of tics make it hard to quantify the impact of the adjustments.[8] The child remains under regular chiropractic care and has had no recurring neurological tic episodes.

Discussion

Chiropractic Literature

There have been cases cited in the literature that directly discuss chiropractic care and neurological tics.[5,9,10] Elster describes a case of a 9 year old male with Tourettes Syndrome and several other ailments who was successfully treated with upper cervical chiropractic care. He started experiencing tics at the age of 7 and they progressively increased until they were continuous on a daily basis. Dramatic reductions in the tics were noted just two days after the first adjustment; after 6 weeks of care, he was asymptomatic which continued even five months post treatment.[5]

Alcantara et al., discussed a case of a child who was medically diagnosed with transient motor tics. She was under chiropractic care for 5 weeks at which time, the tics completely resolved.[9] The authors went on to explain that the involvement of the thalamus in tic disorders are derived from lesions to thalamic nuclei and procedures isolating regions of the prefrontal cortex leads to amelioration of tic behavior.[8]

In their paper, Stone-McCoy and Mulenkamp describe a patient with both motor and vocal tics undergoing chiropractic care.[10] The patient was seen over the course of a year with significant reduction in the severity and frequency of the tics, allowing her to function better throughout the day.[10]

Mechanism

Neurologically, the vestibular and cervical proprioceptive inputs converge at the vestibular nuclei, thalamus, cerebral cortex, and with the afferent inputs from the extraoccular muscles at the superior colliculus. This suggests that subluxation of the cervical spine produces direct signals that interact with neurological signals to the eye muscles. Also the signals that are sent back from the higher brain centers after interpretation is complete, and efferent signals are discharged, will then be inhibited by additional afferent signals from proprioceptive overload by cervical muscle spindles.

In other words the overactive muscle spindles in the cervical musculature are sending aberrant signals back to the brain which can then interfere with the input from the extraoccular muscles causing interruption in the normal function of those muscles.[11]

Cervical manipulative therapy can inhibit the aberrant signals produced from the muscle spindles in the cervical spine musculature. By focusing treatment on the cause of these aberrant signals (subluxation) the resolution of normal function to the eye muscles can be achieved. These signals also emanate from the disc, joint capsule, and ligaments of the cervical spine. By addressing the misalignment or dysfunction of particular joint complexes, aberrant signals can be reduced by reinstating the healthy normal function of that joint complex through chiropractic adjustment.[12]

Conclusion

This paper describes the case of a seven year old male with past history of neurological tics. After several trials of Diversified and Activator techniques, care was directed toward upper cervical subluxation using the Activator instrument. Improvement was noted after the introduction of this protocol concomitant with a reduction in indicators of vertebral subluxation.

Due to chronicity, symptoms may wax and wane and therefore the child should be under long term care to monitor the effects of the adjustment over time. The frequency of care may also have had some relationship to the resolution of tic related symptoms. This case provides some evidence suggesting effectiveness of chiropractic care in those with neurological tics. More research is encouraged in this area.

References

1. Gilbert, D. Treatment of children and adolescents with tics and tourette syndrome. J Child Neurol. Vol 21, Number 8: 690-700.
2. Piacentini, J., Himle, M., Chang, S., et al. Reactivity of tic observation procedures to situation and setting. J Abnorm Psychol. Oct. 2006.
3. Panc, R. Comorbidity of dyslexia, dyspraxia, attention deficit disorder (ADD), attention deficit hyperactive disorder (ADHD), obsessive compulsive disorder (OCD), and Tourette's syndrome in children: a prospective epidemiological study. Clin Chiropr. May 2005, 8:189-198.
4. Trotta, N. The response of an adult tourette patient to life upper cervical adjustments. CRJ, 1989, Vol. 1:43-48.
5. Elster, E. Upper cervical chiropractic care for a nine-year-old male with tourette syndrome, attention deficit hyperactivity disorder, depression, asthma, insomnia, and headaches: a case report. J Vert Sublux Res, July 12, 2003, p1-11.
6. LaBarbara, J. Tourette case study. ICPA Newsletter. March/April 1998.
7. Plaugher, G. Skin temperature assessment for neuromusculoskeletal abnormalities of the spinal column. J Manipulative Physiol Ther. 1992 Jul-Aug; 15(6): 365-81.
8. Tourette syndrome, case study. ICPA Newsletter. March/April 1998
9. Alcantara J, Davis A, Oman RE. The effects of chiropractic on a child with transient motor tics using gonstead and toggle techniques. J Pediatr Matern & Fam Health-Chiropr. 2009:2; 1-9.

10. Stone-McCoy P, Mulenkamp K. Reduction of vocal and motor tics in a female undergoing chiropractic care to reduce vertebral subluxation. J Pediatr Matern & Fam Health-Chiropr. 2009:3; 1-6.
11. Kulkarni V, OwensEF, Hart JF, et al. Quantitative study of muscle spindles in suboccipital muscles of human fetuses. Neurol India. Dec. 2001, 49:355-359.
12. Holm S., et al. Sensorimotor control of the spine. J Electromyogr Kinesiol. June 2002, Vol12, Issue 3:219-234.

Figure 1. Tracking Sheet Used by Parents to Record the Number of Tics Per Day

RATE EACH SYMPTOM BY PUTTING THE APPROPRIATE NUMBER IN THE BOX FOR EACH DAY.

(Use the reverse side for any detailed comments.)

0 = Not at all or symptom free.
1 = Just a little = about once every 45 minutes or less often.
2 = Pretty much = about once every 15-44 minutes.
3 = Very much = about once every 5-14 minutes.
4 = Extreme = about once every 1-4 minutes.
5 = Almost always = once every minute or more often.

Date (month/day/year)	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1. Eyeblinking							
2. Other facial-tics							
3. Head Jerks							
4. Shoulder Jerks							
5. Arm movements							
6. Finger or hand movements							
7. Stomach Jerks							
8. Kicking							
9. Other leg movements							
10. Tense parts of body							
11. **OVERALL MOTOR TICS**							
12. Coprolalia (obscene words)							
13. Noises							
14. Grunting							
15. Throat clearing							
16. Coughing							
17. Says words							
18. Repeats own words/sentences							
19. Repeats others speech							
20. **OVERALL PHONIC SYMPTOMS**							
21. Touching part of body							
22. Touching other people							
23. Touching objects							
24. Can't start actions							
25. Hurts self							
26. Finger or hand tapping							
27. Hopping							
28. Picks at things (clothing, etc.)							
29. Argumentative							
30. Frustration tolerance							
31. Anger, temper fits							
32. **OVERALL BEHAVIORAL PROBLEMS**							
33.							
34. MEDICATION							
35. MEDICATION							
36. **TOTAL DAILY DOSE OF MEDICATION**							