Chiropractic management of essential tremor and migraine: a case report

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Abstract

Objective: The purpose of this case report is to describe the chiropractic management of a 39-year-old woman with essential tremors and migraine headaches.

Clinical Features: A 39-year-old woman presented with essential tremors and migraine headaches, which occurred 2 to 3 times per week. The essential tremor was diagnosed in 2000, and migraine headaches with aura were diagnosed when she was 10. Both diagnoses were made by her general medical practitioner. Previous treatments for migraine included propranolol, isometheptene, dichloralphenazone, acetaminophen, sumatriptan, and over-the-counter pain relievers.

Intervention and Outcome: The patient received high-velocity, low-amplitude chiropractic spinal manipulation to her upper cervical spine using the Blair Upper Cervical chiropractic technique protocol. There was improvement in her tremors and migraine headaches following her initial chiropractic treatment, with a sustained improvement after 4 months of care.

Conclusion: This case study demonstrated improvement in a woman with essential tremors and migraine headaches. This suggests the need for more research to examine how upper cervical specific chiropractic care may help mitigate tremors and migraine headaches.

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Introduction

Essential tremor (ET) is defined as a syndrome of tremor in posture and movement.¹ It has also been discovered that cerebellar motor disturbances, cognitive disturbances, personality changes, hearing loss,

and olfactory deficits are associated with ET.¹ Symptoms are usually seen in the arms, head, or voice with occasional involvement of the legs, chin, and trunk.² Essential tremor is often accompanied by a family history of similar tremors^{2,3} and has also been linked to several genes.⁴ The prevalence rate of ET is 3% to 6% of those older than 40 years.² The upper extremity is affected most often, 90% to 95% of the time.^{3,5} The lower extremity is affected only 10% to 34% of the time. Essential tremor is thought

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to be due to a functional abnormality within the central nervous system. Clinically, it is a slowly progressive, monosymptomatic disorder with postural and kinetic tremors.⁴

It is hypothesized that ET is caused by a functional disturbance of the olivocerebellar circuit. Clinical evidence shows that ET disappears after lesions of the cerebellum, the pons, or the thalamus occur, which are all part of the cerebrocerebello-cerebral loop.⁴ Because there is no clear diagnostic test for ET, it must be defined in descriptive clinical terms, narrow or incomplete that may be.¹

Migraine is classified by the Headache Classification Committee of the International Headache Society as a headache that has additional components such as nausea, vomiting, photophobia, and phonophobia.⁶ The International Headache Society also reports women being affected by migraine 2 to 4 times more than men. Migraine affects the ability to perform activities of daily living as well as missed workdays.⁷ There are many theories as to the cause of migraine, including musculoskeletal and vascular disturbance. One theory defined by Moskowitz⁸ states the involvement of the trigeminovascular complex. An increase in discharge from the trigeminal nucleus from hormonal influences, environmental stressors, and low blood sugar could affect blood flow, causing a migraine with aura.

As of the writing of this report, only one article on chiropractic or spinal manipulation and ETs has been published. Jensen⁹ discussed 2 patients who experienced a decrease in resting tremor activity and vertebrobasilar arterial ischemia and in whom objective Doppler findings improved after treatment with spinal manipulation.⁹ The purpose of the present case report is to discuss the treatment of a patient with ET and concurrent migraine headache symptoms seen at a chiropractic college outpatient clinic.

Case report

A 39-year-old female patient, and coauthor of this report, presented for care. She was previously diagnosed in 2000 with ET by her general medical practitioner. Before chiropractic care, the patient had received computed tomography and magnetic resonance imaging in 2002 as well as neurological evaluation and rheumatologist evaluation to rule out brain lesion, Arnold Chiari malformation, fibromyalgia, multiple sclerosis, anxiety disorder, systemic lupus

erythematosus, and other like symptom disorders. Previous treatment included gabapentin (Pfizer Pharmaceuticals LLC, New York, NY), sertraline hydrochloride (Roerig-Pfizer, Belmont, WA), and bupropion (Biovail Corporation, Mississauga, Ontario). Although she could not recall dosage amounts, she reported not having a reduction in the frequency or duration in her tremor activity. She reported that the tremors were constant, bilaterally in the upper extremities, which were progressively becoming more severe. The patient was diagnosed at age 10 with migraine headaches with aura by her general medical practitioner. Previous treatments for migraine included propranolol oral, isometheptene/dichloralphenazone/acetaminophen, sumatriptan, and over-the-counter pain relievers. She could not recall dosage amounts and had intermittent reduction of her symptoms.

At the time of her first office visit, she reported experiencing 2 to 3 migraine headaches per week for the past 20 years. She stated that her previous chiropractic treatments, which included full-spine diversified manipulation as well as the National Upper Cervical Chiropractic Association technique, reduced the frequency of the migraine to 1 to 2 per week on an infrequent basis; however, she did not experience a reduction in the duration or frequency of her tremors.

Physical examination showed normal function in orthopedic and neurologic tests, with the exception of her upper extremity tremors. All cranial nerve test results were found to be normal. Increased muscle tone was found in the upper cervical spine bilaterally. There was a decrease in segmental passive range of motion from occiput through the second cervical vertebra bilaterally, and third cervical vertebra through seventh cervical vertebra on the left. Paraspinal musculature was hypertonic bilaterally from the occiput to the upper thoracic regions. Radiographic analysis showed an anterior misalignment of both the left and right occipitoatlantal articulations, as well as an anterior misalignment of the right C2-C3 articulation and a posterior misalignment of the left C2-C3 articulation using Blair measurement methods.

The patient received chiropractic treatment using the protocols of the Blair Upper Cervical chiropractic technique.¹⁰ At the time of the patient's first treatment, she was experiencing bilateral tremor as well as migraine. The treatment included cervical spinal adjustment to the first and second cervical vertebrae, after which the tremors ceased. An overall reduction of migraine headache intensity and frequency was reported at the next follow-up visit. The

patient was seen 2 to 3 times per week for 4 months. She received 20 spinal adjustments to her upper cervical spine over that period. The patient was not receiving any other concurrent medical or pharmacological treatment at this time.

Upon follow-up evaluation after 4 months of chiropractic treatment using Blair Upper Cervical protocols, the patient reported that her tremors were no longer constant, that is, 1 to 2 intermittent episodes per week, and were often resolved with spinal postural stretching. The spinal posture stretching was a modification of the muscle energy technique described by Murphy,¹¹ without using eye movement and deep breathing by the patient. Those episodes, which were not resolved with stretching, would cease after a spinal adjustment to her upper cervical spine. She reported that the frequency of her migraine headaches had diminished from 2 to 3 per week to 1 per month. On the patient's initial neutral lateral cervical radiograph, the Ruth-Jackson lines¹² showed a cervical curve of 17° (Fig 1). After 4 months of treatment, a follow-up neutral lateral radiograph showed a 30° angle (Fig 2) with the Ruth-Jackson lines indicating a restoration of her cervical curve. Both radiographs had her hard palate measuring at 8° from horizontal.

The outcome measures used to monitor the health progression of our patient showed improvement over 4 months of care. At the beginning, the tremor assessment¹³ (0-4 scale) was rated as 3 for resting right arm tremor and 2 to 3 for the areas of writing, fine

Fig 1. Lateral cervical radiograph taken at the beginning of care. The hard palate measured 8°. The cervical curve measured from the posterior bodies of C2 and T1 equals 17°.

Fig 2. Lateral cervical radiograph taken after 4 months of care. The hard palate is measured at 8°. The cervical curve measured from the posterior bodies of C2 and T1 equals 30°.

movements, embarrassment, depression, and anxiety due to tremor. At 4 months of care, the same indicators were rated at 0 to 1 for all categories. The headache disability index¹⁴ at the onset of treatment was rated at 68/100, E = 28/52, F = 32/48; and after 4 months of care, her scores were 14/100, E = 4/52, F = 10/48. The headache disability index rates patient's answers to 25 questions regarding emotional (E) and functional (F) effects of headache.¹⁴ After 4 months, physical examination showed normal cervical spine paraspinal muscle tone and normal range of motion.

Discussion

Recent guidelines suggest that there is evidence that chiropractic care may be beneficial for patients with migraine.¹⁵ However, the mechanisms for how chiropractic spinal manipulation therapy (SMT) alters headache are unclear. One theory that may explain how SMT may have influenced the patient's signs and symptoms includes upper cervical misalignment and/or dysfunction. The trigeminocervical nucleus, which is innervated by nerves of the upper 3 cervical vertebrae, is thought to play a role in migraine headaches.¹⁶ Many intracranial and extracranial blood vessels are innervated by the trigeminal nucleus. Nerve roots from the C1-C3 vertebra also innervate the dura mater and

suboccipital muscles.¹⁶ A decrease in occipital blood flow has been found in patients who have migraine with and without aura.¹⁷ It has been suggested that spinal dysfunction may lead to altered afferent input to the central nervous system, which causes plastic changes in response to any subsequent input.¹⁸ The high-velocity, low-amplitude thrust of the SMT may stimulate or silence nonnociceptive, mechanosensitive receptive nerve endings in paraspinal tissues.¹⁹ It is hypothesized that SMT may influence pain-producing mechanisms and physiological systems controlled or influenced by the nervous system.

Compared with drug therapy, SMT may have an effect comparable to commonly used first-line prophylactic prescription medications for tension-type headache and migraine headache.²⁰ The first-line pharmaceutical treatment of ET is the β -blocker propranolol 60 to 800 mg/d or primidone 50 to 1000 mg/d; however, it can be associated with adverse effects such as sedation, fatigue, nausea, vomiting, and ataxia. Additional therapies used are alprazolam 0.125 to 3 mg/d and gabapentin 1200 to 1800 mg/d. All pharmaceutical treatments had inconsistent results in small trials.⁵ Interestingly, propranolol and gabapentin, as well as many other medications prescribed for tremor, are also commonly prescribed for migraine.⁵

Bryans et al¹⁵ suggest that chiropractic care, including spinal manipulation, improves migraine and cervicogenic headaches. In addition, the most common alternative treatment of headaches is chiropractic.²¹ In previous randomized control trials, subjects who received cervical spinal manipulation showed a reduction in the migraine frequency, duration, disability, and use of medication.¹⁵ Reduction in neck pain was also reported.

The patient in this study showed an immediate reduction in her migraine symptoms after SMT. We cannot state that the 2 events are related; however, it does contradict Astin and Ernst²² and Biondi,²³ who report that SMT is not supported in the literature to be effective in the treatment of migraine headaches over other options. According to Astin and Ernst,²² the data available do not support a definite conclusion of the effectiveness of SMT when treating headache. Both reviews, however, state that further studies are warranted to evaluate the effectiveness of SMT for migraine.

Recent literature indicates that there is no relationship between ET and migraine headaches.^{24,25} Postural and kinetic tremor does however occur in 4% to 55% of patients with cervical dystonia (CD).²⁶

Shaikh et al²⁶ tested limb tremor on ET and CD patients by attaching a 3-axis accelerometer to the top of the middle phalanx of the index finger. The patients were asked to rest their hands on a table in front of them and performed slow back-and-forth finger-nose-finger movements. The frequencies of limb tremors were found to be similar in CD and ET patients; however, the tremor amplitude in ET patients was significantly larger than that in CD. This difference in amplitude was not clinically obvious. Spinal manipulation therapy has been reported in the successful management of CD patients.²⁷ It is possible that our patient did not have ET, but a subclinical torticollis presenting as paraspinal muscle spasm and associated cervicgia with arm tremor.

The Blair radiographs do not use line analysis for the diagnosis of the upper cervical spinal misalignment. The radiographic series is taken to view the cervical articulations, giving the doctor an opportunity to visualize the state of potential juxtaposition of each cervical articulation.^{10,28} This method of radiographic analysis is thought to eliminate the inherent error that

Fig 3. Right protractoview (oblique nasium) radiograph with the patient rotated to the degree of occipital condyle convergence as seen on the base posterior radiograph. The arrow shows the right occipitoatlantal articulation in an anterior-superior-right misalignment, where the lateral edge of the occipital condyle is medial to the lateral edge of the atlantal lateral mass.

Fig 4. The left lateral stereo radiograph, where the patient is rotated 5° to the left, so that the articular facets do not overlap on the film. The white arrow points to the right facets, where the inferior articulating surface of the second cervical is misaligned anterior to the superior articulating surface of the third cervical. The black arrow shows the left facets, where the inferior articulating surface of the second cervical is misaligned posterior to the superior articulating surface of the third cervical. The Blair protocol for interpreting the radiograph is to use the anterior part of the articulating surfaces as the reference points.

may occur with line analysis techniques due to spinal asymmetry (Figs 3 and 4).

Limitations

The outcomes reported in this case cannot be generalized to other patients with ETs and/or migraine headaches. Although the patient showed a reduction in symptoms after spinal manipulation treatment, it is possible that the patient would have improved on her own because of the normal course of the disorder; therefore, it cannot be implied that the SMT was directly related to patient improvement.

The patient in this case is a coauthor of this case report. Upon resolution of her symptoms under care and as part of her chiropractic education, she agreed to coauthor this article. We cannot discount the possibility of the SMT having a placebo effect, in that she believed that this treatment would have a positive effect in light of her chiropractic education.

Excessive caffeine intake is a known cause of tremor symptoms. The patient did not have a history of refraining from caffeine. There is a possibility that caffeine did play a role in the exacerbation of her ET

disorder and may have attributed to the lack of total resolution of the tremors; however, this was not tracked during our treatment.

Conclusion

This case report describes the reduction of tremor and migraine symptoms in a patient who received Blair Upper Cervical chiropractic treatment. The reduction of her symptoms immediately following treatment may indicate a link between the upper cervical spine and tremors and migraine headaches.

Funding sources and potential conflicts of interest

No funding sources were reported for this study. Todd Hubbard is a member of the Blair Chiropractic Society, a board member, and a Blair instructor. He is also given a stipend by Palmer College per publication in a peer-review journal. Janice Kane is a member of the Blair Chiropractic Society and was the patient in this case.

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