Case Study

Reduction of Essential Tremors in a 38 Year Old Male Undergoing Chiropractic Care for the Reduction of Vertebral Subluxation: A Case Report

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Abstract

Objective: The objective of this case report is to detail improvement of a patient with essential tremors while undergoing chiropractic care.

Clinical Features: A 38 year old male who was diagnosed with essential tremors presented with complaints of uncontrollable bilateral arm and head tremors that started in 1997.

Intervention and Outcome: The patient was assessed for vertebral subluxations using instrumentation, radiographs, and video fluoroscopy following the Pierce Results System™ of analysis. An adjustment was made using a toggle set, high-velocity, low-amplitude force on the site of subluxation. The patient reported a decrease in the severity of tremors immediately following the adjustment. After 21 visits during a span of over 5 months the patient reported an improvement of 99% for the head tremors, 75% for his arm tremors and 60% increase in quality of life.

Conclusion: The chiropractic care for a patient diagnosed with essential tremors is presented. Chiropractic care resulted in a dramatic decrease of symptoms and increase in quality of life for the patient. More research on the benefits of chiropractic care on people with essential tremors is needed.

Key Terms: Essential Tremors, vertebral subluxation, Pierce Results System, video fluoroscopy

Introduction

Essential tremor (ET) is the most the most common tremor disorder in the world. Previously known as benign tremors, essential tremors are estimated to occur in 3 to 4 people per 1000 with people over the age of 60 being at a higher risk.1 The disease is as much as 20 times more prevalent than Parkinson’s disease.1 Although there is such a high prevalence, the medical system has limited means of controlling the problem. As of 2009 there was only 1 FDA approved drug for the problem.2

ET is characterized by postural and/or kinetic tremors in the frequency range of 4 to 12 Hz. The amplitude of the tremors usually decrease as time goes on while increasing in frequency. ET is considered to be a heterogeneous genetic condition.2 It is estimated that ET is misdiagnosed up to 50% of the time.3

According to the Movement Disorder Society the following criteria are used for diagnosis of the condition. The inclusion criteria is bilateral postural tremor with or without kinetic tremor, involving hands and forearms, that is visible and persistent and a duration lasting over 5 years.

The exclusion criteria include: other abnormal neurological signs (except Froment’s sign), presence of known causes of increased physiological tremor, concurrent or recent exposure to tremorogenic drugs or the presence of a drug withdrawal state, direct or indirect trauma to the nervous system within 3 months before the onset of tremor, historical or clinical evidence of psychogenic origins, convincing evidence of sudden onset or evidence of stepwise deterioration.4
The verdict is still out on the pathogenesis of ET. There is evidence to suggest the problem being either a neurodegenerative disorder or a non-degenerative disease. The disease may be caused by a central oscillator originating in the Gullain Mollaret triangle in the brainstem while other evidence has found Inferior Olivary nucleus and cerebellar involvement.5

Although there are multiple case studies showing the benefits of chiropractic on patients with tremors related to Parkinson’s disease and seizures, there is very little research on the benefits of chiropractic care on persons suffering from ET. The purpose of this paper is to show the benefits of reducing vertebral subluxations in a patient suffering from ET.

Case Report

Clinical Features

A 38 year old male presented for chiropractic care with a chief complaint of tremors in his upper extremity that started 15 years ago and had no known mechanism related to the onset. He stated that he was diagnosed with Essential (benign) Tremors. The patient stated that he had tremors in both his head and his arms. He stated the tremors averaged a 5/10 and were a 10/10 at their worst. The assessment used to rate symptoms is based on a 0-10 scale, with 0 being no symptoms, and 10 being unbearable symptoms.

He stated that his right arm was worse than his left, and he rated his right arm spasm as a 10/10. At the same time he also complained of 10/10 head tremors. He stated the tremors happen every day and last all day. Relaxing was said to help decrease the frequency of tremors while stress and not eating increased the frequency of tremors. The patient was unable to write with his right hand due to the tremors and stated he was unable to lift a drink to his mouth because he would spill the drink everywhere. He stated that all of his activities of daily living are interrupted by the tremors. He also has a family history of ET with his sister being diagnosed with the problem as well.

The patient also presented with 8/10 low back pain that was a 10/10 at worst. He stated the pain was all day every day and has been going on for three weeks. He stated that any type of movement makes the pain worse while sitting with good posture makes the pain better. He said he has had the low back pain before and that is has been going off and on for the last 10 years.

Chiropractic Examination

The chiropractic examination was performed following the Pierce Results System (PRS) of analysis. The first step in the PRS is to establish a full spine pattern using infrared thermography.6 The Tytron C-5000 instrument was used along with the Platinum System infrared thermography camera. The initial reading showed a severe hypothermic zone of greater than 0.8°C in the cervical region. There was also a severe hyperthermic zone of greater than 0.8°C in the mid thoracic area (Figure 1).

Infrared thermography was used to check for a pattern on the patient. Kent and Gentempo explain pattern analysis as follows:7

“In the ‘pattern system,’ the chiropractor compares consecutive readings acquired prior to the administration of an adjustment. If the readings demonstrate a consistent pattern, nerve interference is suggested. Miller stated, ‘Persons free of neurological interference tend to display skin temperature readings which continually change, but when the vertebral subluxation and interference to normal neurological function appear on the scene, these changing differentials become static. They no longer display normal adaptability, and at this time the patient is said to be 'in pattern.'”

Thermal instrumentation is used to give a reliable objective analysis of the neuropathological component of the vertebral subluxation complex (VSC).8 Owens et al. studied the inter-examiner and intra-examiner reliability of 2 examiners using a Tytron C-3000. They reported an intra-class coefficient between 0.91 and 0.9. They concluded that changes in thermal scans are due to physiological phenomena rather than equipment error.9

Spector also did a study on inter-examiner and intra-examiner reliability and found that reliability ranged from 0.940 to 0.995.3 While McCoy states that the existing literature on reliability of paraspinal thermal scanning shows good to excellent reliability for the technique and issues related to interpreter reliability, and computerized analysis are being addressed.10

The goals of instrumentation in the PRS is: to change any type of pattern or consistent reading, cold areas, and make your readings as straight as possible (within 1 degree F from top to bottom).6 Instrumentation is used to objectify the neuropathology of the VSC.3

Radiographs taken included a lateral a cervical x-ray that showed a slightly kyphotic neck. The measurements were done using an AcuArc ruler. Initial analysis measured the cervical curve as -35 cm (Figure 3). While an A-P lumbopelvic view was taken, no listings were found on the x-ray. The AcuArc ruler measures the radius of an arc that measures a range from 17 cm (representing the smallest arc) to 500 cm (representing the largest arc or a straight line).

When a number is positive it indicates a lordotic measurement, while a negative number indicates a kyphotic measurement. A + 17 cm curve indicates a normal cervical curve, a +/- 500 cm curve indicates a straight or military neck, while a -17 cm curve indicates a perfectly reversed cervical kyphosis.6,11

Along with plain film radiographs video fluoroscopy was used. Fluoroscopy is used to objectively analyze for the kinesiopathological component of the VSC.7 The patient was found to have multiple vertebral locks present. Vertebral locking is used to describe a vertebral segment that does not move in a specific plane of motion.

If the segment does not move into flexion it is called a flexion lock, while an extension lock is described as the vertebra
above not dropping fully into extension. In the thoracic area and the lumbar area if the spinous process does not move to the right it is described as a right lock; if the spinous does not move to the left under fluoroscopy it is called a left lock. The fluoroscopy study found a C6 flexion lock along with C6, C7, T1, and T2 extension locks in the cervical spine (Figure 5). The thoracic spine showed right rotation locks at T1, T2, and T3, while the lumbar spine showed left rotation locks at L5 and L4.

**Intervention**

Using the PRS guidelines - hand, instrument, and pressures, were all used to reduce and correct the vertebral subluxations, The patient was seen 21 times in an approximately five and a half month time period. The patient is still under care at the time that this article is being written.

The first adjustment was performed by hand and was intended to correct the C6 flexion lock. The maneuver which was performed is called a “toggle set.” Unlike the toggle recoil adjustment, the “toggle set” does not have a recoil. For the adjustment the patient was placed prone on Zenith 230 Hilo drop table with the Pierce 3-D head piece in flexion and the cervical and thoracic drop pieces were elevated.

The doctor used the medial aspect of the base of the 5th digit to contact the most posterior inferior aspect of the C6 spinous process. The doctor’s supporting hand was placed over the lateral aspect of the contact hand and a posterior to anterior (P-A) and (I-S) high velocity, low amplitude thrust was performed in the line of the facet joints, allowing the table to drop.

In the 21 visit timeline, the toggle set adjustment was performed on C6 four times. There were only two other uses of the toggle set adjustment used during the care. They were both performed on a C5 flexion lock. The rest of the visits consisted of only low force techniques and instrument adjustments using the Variable Frequency Adjuster™ (VFA), as decided by observing the changes in thermal instrumentation.

Throughout care, pressure adjustments were used on every listing found on video fluoroscopy. Pressure adjusting is based on the Nimmo-Receptor Tonus technique and utilizes ischemic compression to remove myofascial trigger points that may be exacerbating the VSC.\(^1^1\)

The VFA is a low force pulsating tool. It has the ability to set force, frequency, and pre-load, which allows a very precise adjustment to be made at the proper level of VSC. All listings can be adjusted with the instrument while the patient is either sitting or prone on the table.

The general guideline for the tool is to use low force (5-15 lbs) and high frequency (16 Hz) when addressing the upper cervical region, and to increase the force (20-30 lbs) and decrease the frequency (5-12 Hz) while moving to lower areas of the spine.\(^1^1\) Every listing found on fluoroscopy was adjusted using the VFA at least 1 time during the 21 visits.

**Outcome**

Immediately after the patient’s first adjustment there was an improvement in his symptoms. He was able to lift his right hand to his mouth with minimal tremors. The patient came in nine more times in the next 2 weeks, showing consistent improvement of symptoms. One other hand toggle drop adjustment was performed during the course of the two weeks while the pressures and the VFA were used on multiple segments.

After two toggle set adjustments on C6 in nine visits over the course of 15 days, the patient’s improvement prompted the taking of another x-ray and another video fluoroscopy of the cervical area. He noted an improvement from a -35 cm kyphotic curve to a +500 cm curve, also known as a military neck (Figure 4). This is a 49% improvement, moving towards the goal of a +17 cm cervical lordosis.

Though research is limited on curve restoration without the use of traction, Galgano et al. published a retrospective case study of 51 patients and the reduction of kyphosis using the PRS of analysis. They found that over an average of 12 weeks and 10 visits there was an average of a 56% correction towards the normal cervical curve.\(^1^2\)

The fluoroscopy flexion and extension study also showed a dramatic improvement. All of the locked vertebral segments in extension were eliminated (Figure 6) and the only locking left was a C5 flexion lock.

The patient was seen a total of 21 times over a four and a half month period. On his last visit a re-examination was done. The patient reported improvements of 75% for the tremors in both of his arms, 99% for the tremors in his head, 90% for his low back pain, 90% in overall stiffness, and felt that his overall quality of life has improved by 60%.

Thermography on the 21st visit revealed improvements. Although there is still one severe hyperthermic swing in the thoracic area and one hypothermic swing in the cervical area, the swings cover a smaller area (Figure2). Due to the improvements seen in the patient, he was put on a care plan that consisted of two visits per month to maximize his progress.

**Discussion**

**Medical Intervention**

Medical treatment on ET is considered when tremors interfere with activities of daily living. Having a proper diagnosis is essential when using medicine. The medications used to treat ET are used to treat other medical conditions, such as hypertension and seizures. It is estimated that 30% to 50% of patients with ET do not respond to medical therapy, while those who do, experience an improvement of tremor magnitude, estimated to be about 50% reduction.\(^1\)

**Chiropractic Care**

There is very little research that has been done on the effects of subluxation reduction and non-Parkinson’s disease related...
tremors. Alcantara et al published a case showing elimination of tremors in a pediatric patient with a medical diagnosis of conversion disorder. The patient’s spine and cranial bones were adjusted and tremors were completely eliminated after 12 chiropractic visits.\textsuperscript{13} Though there is a lack of research on essential tremors, research is found to demonstrate the benefits of subluxation reduction in patients suffering from Parkinson’s disease and seizures.

When it comes to Parkinson’s disease, there are studies published showing the benefits of vertebral subluxation reduction and symptomatic improvement. Shapiro et al.\textsuperscript{14} published a case study showing that reduction of vertebral subluxations and curve restoration in the cervical spine, along with other postural changes, led to a decrease in Parkinson’s symptoms in a 67 year old male.

Elster\textsuperscript{15} published a case describing the reduction of Parkinsons symptoms in a 60 year old male patient with the use of International Upper Cervical Association upper cervical technique. Bello\textsuperscript{16} documented a reduction in symptoms in a 66 year old female patient using National Upper Cervical Chiropractic Association (NUCCA) technique. Lastly, Malachowski et al\textsuperscript{17} published a case showing a decrease in neurological signs of Parkinson’s in a 77 year old male using Kale Upper Cervical Specific Protocol.

Sweat published two case studies showing improvement of patients with seizures using Atlas Orthogonal technique. The first patient was a 76 year old female suffering from post-concussion seizures that had a complete recovery from seizures while under care for two months.\textsuperscript{18} The second patient was a 75 year old female who was suffering from seizures, ataxia, fatigue, strabismus, and migraines. All of her symptoms were resolved with the correction of her atlas subluxation.\textsuperscript{19}

Although the causes of ET are largely unknown we can theorize how the correction of the VSC along with curve restoration can lead to a decrease in the symptoms of ET. According to Harrison et al.\textsuperscript{14, 20-22} abnormal postural loads on the nervous system can result in progressive neuronal dysfunction and degenerative changes, including abnormal spinal stress on the spinal cord.

Abnormal spinal cord stress has been linked to many conditions such as epidural, and subarachnoid adhesions, amyotrophic lateral sclerosis, cerebral palsy, intermedullary neoplasms, syringomyelia, paraplegia, and urinary incontinence. The research has shown that restoring normal spinal curvature will reduce stress and strain on the central nervous system.\textsuperscript{14, 20-22}

It can be theorized that the patient’s symptoms were caused by abnormal stress on his spinal cord due to the kyphosis in his cervical spine. When the adjustment was given and the subluxations were reduced, the cervical curve improved. This led to a decreased amount of stress being placed on the spinal cord thus allowing for proper nervous system function, leading to a decrease in the patient’s ET symptoms.

Conclusion

We presented a case of a 38 year old male diagnosed with essential tremors. The patient’s symptoms and quality of life were dramatically improved under chiropractic care when his vertebral subluxations were reduced. The medical community has experienced very little success with treating essential tremors, while the chiropractic community has limited research on the subject. This case is an example of the potential of chiropractic care in helping patients suffering from ET, and shows that there is more research needed on the effects of chiropractic and ET.

References

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Figure 1. Pre full spine thermal pattern on the first adjustment.

Figure 2. Pre full spine thermal pattern on the last visit, 5 months later.
Figure 3. Lateral cervical x-ray, taken at start of care, showing a cervical kyphosis measuring -35cm.

Figure 4. Lateral x-ray taken two weeks later showing a 49% improvement to a +500 cm military neck.

Figure 5. A still shot of video fluoroscopy taken at the start of care showing extension locks at C6, C7, T1, and T2.

Figure 6. Video fluoroscopy taken two weeks later showing the elimination of all extension locks.