Case Study

Resolution of Trigeminal Neuralgia Following Chiropractic Care Utilizing Chiropractic Biophysics and Diversified Techniques: A Case Study

Abstract

Objective: The purpose of this case study is to report the resolution of trigeminal neuralgia (TN) paroxysms and improvement in quality of life experienced by a patient undergoing Chiropractic Biophysics (CBP) and Diversified chiropractic care.

Clinical Features: A 77-year-old female presented with severe right-sided TN of seven years duration. TN pain was only initially helped by medication and exacerbated by chewing, talking, and smiling. When symptoms were their worst, the patient was unable to eat or talk well for 4 days. At the time of presenting into office, the patient rated the pain 10 out of 10 on the visual analog scale; describing it as a constant hot, throbbing, burning sensation that progressively get worse.

Intervention and Outcomes: CBP and Diversified techniques were utilized to adjust and correct subluxations at C1 and other segments. Nutritional supplementation including Omega-3’s and Vitamin D was also implemented. After six visits the patient saw significant reduction in pain. After four months she went off her medication and at 6 months was pain free.

Conclusions: This case demonstrates the effectiveness of subluxation-based chiropractic care in managing the debilitating symptoms of TN. Further research is advised.

Key Words: Trigeminal neuralgia, chiropractic, subluxation, CBP, Diversified technique, adjustment, neuropathic pain, anticonvulsant drugs

Introduction

In 1910 Founder of Chiropractic DD Palmer noted that the different forms of neuralgia were named according to their anatomic position relative to the spinal cord. One instance observed by Palmer was trigeminal neuralgia (TN), which has confounded physicians for over 2,000 years. Also known as tic dououreux, TN is a form of chronic neuropathic pain, which indicates that there is presence of a nerve injury or nerve lesion.

Nerve lesions of this kind cause extreme, sporadic, sudden burning or shock-like facial pain that comes and goes and can last anywhere from a few seconds to as long as two minutes per episode. Additionally, these lesions can cause a lower intensity, albeit consistent aching, burning, and stabbing pain.

The pain associated with TN are oftentimes triggered by common activities of daily living (ADLs) including, shaving, washing the face, or applying makeup, brushing teeth, chewing food, drinking, talking, or being exposed to different elements of weather, in particular wind. Subsequently, the constant threat of an attack and sheer intensity of the pain can be physically and mentally weakening; hence, the pseudonym “The Suicide Disease.” Unfortunately, according to Burcon, roughly half of those people who live with TN for more than three years commit suicide. Not knowing when the next bout of painful paroxysms will occur, people commonly live in a
perpetual state of fear and anxiety and avoid these triggering mechanisms because of the possibility of setting off a spasm.

When addressing a patient with TN, it is important to remember that everyone does not have the same interest in having his or her issue resolved. Paradoxically, Penman wrote in 1954 that, “Some patients are not glad to be cured of any pain, however severe. The explanation in most cases is that their lives are devoid of activity and interest, they were so to speak married to their pain, and they find the sudden divorce distressing.” Interestingly, these people tend to have lived a relatively unsatisfied life without hobbies and interest in people and actually appear to revel over the attention they receive when others wait on them and do the majority of chores in the home.

Epidemiology

Most likely due to a more thorough understanding of the condition and a greater diligence of upholding consistent diagnostic criteria, we are seeing more people affected by TN than ever before. Not surprisingly, while the National Institute of Health still refers to TN as a “rare disease,” incidence has risen almost exponentially since 1993.

- In 1968, U.S. prevalence of trigeminal neuralgia was roughly 107 men and 200 women per 1 million people.
- Remarkably, Mauskop noted that in 1993 approximately 40,000 patients are affected the condition at any particular time, which equates to an incidence rate of 4-5 cases per 100,000.
- Currently, the Institute of Neurological Disorders and Stroke suggest that new cases are approximately 12 per 100,000 people per year.
- Overseas, Zakrewska notes that the UK and Holland propose a much greater incidence of 28 per 100,000.

Concerning demographics, TN affects females twice as often as males and is also first observed in patients age 40 years or greater 90% of the time. At this point, there doesn’t appear to be a connection to race or ethnicity.

Etiology

It is well known that females are at greater risk for many acute and chronic pain conditions such as TN, but it is not understood why. Because of the understanding that hormones plays a role in pain conditions, current research is exploring how estrogens may affect nerves that send pain signals to the central nervous system. For instance, a recent study out of the University of Kansas Medical Center determined that as estrogen levels rises, a decrease in the molecule bone morphogenetic protein 4 (BMP4) will lead to fewer pain-sensing nerves. It was, thus, determined that additional research is required to fully delineate the correlation among innervation, estrogen and pain sensitivity.

In addition to possible hormonal factors, it is generally accepted that the pathophysiology of TN centers on compression of the trigeminal nerve at the root or near the nerve root by a blood vessel. It is suspected that the extreme, sporadic, sudden burning or shock-like facial pain is produced by ectopic action potentials (EAP) generation in the sensory root of the nerve. According to Keros and Hablitz, “EAP’s, are thought to be action potentials initiated in distal axon terminals which subsequently travel antidromically toward the soma.” As a result of nerve root injury, central and peripheral demyelination can lead to ephaptic transmission, where action potentials jump from one fiber to another.

A lack of inhibitory input from large myelinated nerve fibers have been observed to initiate a reentry-mechanism that causes an amplification of sensory input and excruciating pain when triggered (i.e. “hyperexcitability”). The most commonly accepted theory explaining this pathophysiology is Devor et al.’s ignition hypothesis. They argue that:

The ignition hypothesis of trigeminal neuralgia is based on recent advances in the understanding of abnormal electrical behavior in injured sensory neurons, and new histopathologic observations of biopsy specimens from patients with trigeminal neuralgia who are undergoing microvascular decompression surgery. According to the hypothesis, trigeminal neuralgia results from specific abnormalities of trigeminal afferent neurons in the trigeminal root or ganglion. Injury renders axons and axotomized somata hyperexcitable. The hyperexcitable afferents, in turn, give rise to pain paroxysms as a result of synchronized after discharge activity. The ignition hypothesis accounts for the major positive and negative signs and symptoms of trigeminal neuralgia, for its pathogenesis, and for the efficacy of treatment modalities. Proof, however, awaits the availability of key experimental data that can only be obtained from patients with trigeminal neuralgia.

Sens and Higer contend that tortuous arteries in the preoptic space are the most common cause of this phenomenon. It is believed that the trigeminal nerve is most commonly compressed by the superior cerebellar or basilar arteries, especially if the pain is located in the mandibular or maxillary branch. This mechanism is thought to be as high as 80-90% of all TN cases.

Another interesting observation has been seen within the multiple sclerosis (MS) population as several sources claim that TN occurs in people with MS because both caused are by demyelination mechanisms. Accordingly to the NIH National Institute of Neurological Disorders and Stroke,

Patients who present with the disease when aged 20-40 years are more likely to suffer from a demyelinating lesion in the pons secondary to multiple sclerosis; younger patients also tend to have symptomatic or secondary trigeminal neuralgia. There have also been occasional reports of pediatric cases of trigeminal neuralgia.
It should be noted that, when TN is diagnosed in persons under the age of 40, it is necessary to rule out MS. It has been reported that as high as 5% of patients with MS have also been diagnosed with trigeminal neuralgia and this comorbidity can muddy the diagnostic waters.

Ultimately, TN is still considered idiopathic as the most recent data provided by the NIH insists that no known cause has been found.

Case Report

Patient History

A 77-year-old female presented with severe right-sided trigeminal neuralgia of seven years duration. TN pain was helped by medication and exacerbated by chewing, talking, and smiling. When symptoms were their worst, the patient was unable to eat or talk well for 4 days. She came into the office crying in agony. Patient rated the pain 10 out of 10 on the visual analog scale describing the pain as a constant hot, throbbing, burning sensations that was progressively getting worse. The patient reports that she “can’t do much,” because of the pain, thus highlighting the extent that her ADLs were affected. The patient attempted to relieve her TN via craniosacral massage, but to no effect.

The patient’s medical history included a fall on the ice at 17-years old and a fall down a ramp when she hit her head over the right eye on a door jam at 68-years. Three years after the fall, electric shock like sensations commenced and the patient was prescribed 50mg of Lyrica for the TN symptoms. As the symptoms progressed over the course of seven years, the dosage of Lyrica increased incrementally from 50mg to a maximum amount of 400mg. Ultimately, the medication “no longer worked,” which led the patient to “try” chiropractic management.

Additionally, it was also discovered that the patient had secondary health complaints of high blood pressure and constipation. Subsequently, she was taking 10mg of Altace and 2.5mg of Indapamide to manage these issues.

Examination

Chiropractic examination revealed through palpatory findings right laterality of C1 and a right lateral flexion restriction of C2. Posture examination demonstrated severe anterior skull translation (AST), right cervical rotation, right cervical translation, and left pelvic rotation. Active range of motion of the cervical region showed 30 degrees of left lateral flexion, 20 degrees of right lateral flexion, 45 degrees of left rotation, and 55 degrees of right rotation.

Radiograph views taken were anterior to posterior cervical, lateral cervical, anterior to posterior lumbar, and lateral lumbar, which illustrated AST of 38 millimeters (mm), cervical lordosis of 20 degrees, degenerative joint disease (DJD) of C3/C4, C4/C5, and C5/C6. Radiographs of lumbopelvic region exemplified a moderate right lateral translation of 8 mm and increased lordotic curve of 63 degrees. Hypertrophic arthritic changes were also apparent at the levels L4, L5, and S1 with decreased interosseous spacing at the L5-S1 vertebral level. Finally, a left iliac crest deficiency of 9mm and a left femoral deficiency of 11 mm were observed.

Thermography was utilized using c, version 3.0. Before care began a pre-thermography scan detailed a “high” or severe reading at C1 of 0.98 degrees Celsius, a “medium-high” reading at C2 of 0.59 degrees Celsius, and a “low” reading at C3 of 0.12 degrees Celsius.

Intervention

Chiropractic Biophysics (CBP) and Diversified adjusting techniques were utilized with the following care plan: 3 visits per week for first 12 weeks and after that 1 visit per week. To address the patient’s right lateral cervical translation, mirror-imaging adjusting was performed while correcting C1. She was placed in left lateral cervical translation and C1 was adjusted in a left side-lying position utilizing a cervical drop piece while contacting the transverse process on the right side of C1. To assist in the upper cervical area mobilization the doctor utilized an occiput/C1 stretch of the occipital muscles. With the patient supine, the doctor passively moved the cervical spine in slight flexion and, with the thumb and index finger placed on the occiput brim, applied cephalic pressure toward the ceiling. Generally, CBP utilizes traction and extension exercise, but in this case the patient pain tolerance could not handle this type of therapy and it was not implemented.

Diversified Technique encompassing a variety of high-velocity, low-amplitude (HVLA) adjustments was utilized for the remaining vertebral segments as determined by palpatory findings each visit.

The patient also received nutritional counseling and was provided with omega-3 and vitamin D supplements. The patient took 1 capsule daily of Omega SufficiencyTM produced by Innate ChoiceTM, which contains 1000mg of fish oil and 180mg of Eicosapentaenoic Acid (EPA), 120 mg of Docosahexaenoic Acid (DHA), and 50 mg of other omega-3s. The patient also took D SufficiencyTM distributed by Innate ChoiceTM, which consisted of 500 IU of cholecalciferol daily. According to Innate Choice’sTM website, these products have not been evaluated by the Food and Drug Administration and are not intended to diagnose, treat, cure, or prevent any disease.

Outcomes

After just three visits, the patient reported that the twitches related to TN ceased and that she started to recover quicker from an attack. By six visits, she started to experience a breakthrough as indicated by reporting 3/10 on the visual analog scale (down from the 10/10 she presented with just two weeks prior). As her condition continually progressed into remission, she stopped taking Lyrica (four months after beginning care) and reported being 100% pain free (after 6 months or 31 visits).

Objective findings correlating with the resolution of TN were observed during her three-month reassessment in which the patient’s thermography scan revealed considerable...
improvement: “medium-low” reading at C1 of 0.42 degrees Celsius, a “low” reading at C2 of 0.29 degrees Celsius, and a “medium-high” reading at C3 of 0.69 degrees Celsius.

Subjective reports indicate that, after subluxation-based chiropractic management, the patient has a greater range of motion in the cervical spine and notices this most while driving her car. She also reports increased energy and improved immune function, as she does not get sick as often.

**Discussion**

**Chiropractic Biophysics**

Chiropractic Biophysics (CBP) is a structural-based technique emphasizing the importance of postural correction and appropriate spinal alignment. In an opinioned review of technique conducted by Harrison, the distinguishing technical feature of “mirror image” alignment procedures are described as follows:

For these new Mirror Image patient positions, Dr. Don Harrison [the originator of CBP technique] placed the patient in their opposite posture. These Harrison Mirror Image positions can be described as ‘reflecting’ the patient’s head, ribcage and/or pelvis across the median-sagittal plane in the AP view; and positioning the head, ribcage and/or pelvis across the mid-frontal plane in the lateral view. Prior to performing CBP Mirror Image postural set-ups, the patient’s initial presenting abnormal posture(s) must be exactly determined.²⁸

To verify postural abnormalities and spinal curve aberrancies, radiographs are taken via CBP protocol. Generally, traction and extension exercise therapies are applied to help support subluxation-based chiropractic management in CBP’s approach to address distortions in global posture. Several studies have indicated the effectiveness of CBP on corrected structure by improving abnormal posture and spinal alignment, with the end result of restoring function with the reduction of pain symptoms.²⁹–³²

**Diversified Technique**

Diversified technique is a widely used chiropractic approach covering a variety of HVLA manual thrust approaches to restore motion, proper alignment, and appropriate joint function of the spine. Generally, this technique utilizes radiography and may be combined with other modalities such as traction to achieve clinical goals in structure with a philosophically implied improvement in patient function. According to Gitleman, the key to diversified has always been the importance of accurate, specific diagnosis of the active lesion and the structural environment of that lesion within the patient.³³

**Thermography**

Thermography was used as an objective measure to determine the presence of vertebral subluxation and subsequent correction after a course of adjustments.

Traditionally utilized in order to measure function of the autonomic nervous system, thermography has been an integral component of the chiropractic profession dating back to the 1920’s when BJ Palmer started using thermal readings to compare temperature differentials from one side of the spine to the other.³⁴,³⁵ Palmer’s technique followed the age-old practice started by Hippocrates, who reportedly spread mud along the spine to see which areas dried faster, indicating an increase in blood flow.³⁶ Needless to say, various thermographic practices have held a critical position in healthcare for centuries.

In this case, MyoVision thermography readings were determined by rolling a handheld device with two infrared probes up the spine while a computer recorded the skin surface temperature on the left and right side of the spine. The handheld device records dermal blood flow as temperature; specifically as a measurement of sympathetic nervous system activity, which controls microcirculation. Thermography can, thus, help differentiate between visceral and somatic complaints, sympathetic defense mechanisms (Reflex Sympathetic Dystrophy Syndrome), direct neurological conditions, and local skin phenomena. Henceforth, thermography currently remains the single most objective measurement and recording of autonomic nervous system function related to skin vasomotor control.³⁷

According to the American Medical Association (AMA) Council on Scientific Affairs:

"Central control of skin temperature affects both sides of the body uniformly and simultaneously, resulting in symmetry of thermal patterns...The presence of a significant temperature difference between corresponding areas of opposite sides of the body is suggestive of nerve impairment, since defective vasomotor mechanisms result in thermal asymmetry."³⁸

This relationship between symmetrical thermography and "normal" physiology has been well established for well over 30 years. For instance, in the mid-1980s, Uematsu tackled the difficult questions that are raised upon sensory examination in light of patient's subjective assessment of symptoms; such as determining if the chief complaint was precipitated by malingering, organic nerve damage, or psychogenic factors. Using a prototype computerized tele thermograph, Uematsu discovered that for people with peripheral nerve damage, "The temperature of the skin innervated by the damaged nerve deviated an average of 1.55°C (p < 0.001)." However, "In normal persons, the skin temperature difference between sides of the body was only 0.24° ± 0.073°C." Thus, clearly showing that side-to-side symmetry is a statistically significant sign of pathology.³⁹

Therefore, physicians can utilize thermographic readings with confidence, knowing that science has not only confirmed the deleterious effects causing asymmetry, but also the accuracy of this ancient technique. For instance, McCoy et al., in the largest study evaluating thermal scanning reliability conducted
documented excellent intra-examiner and inter-examiner reproducibility in regards to the thermal functions of this infrared scanner.\textsuperscript{39,40} In this study, “Two practicing chiropractors conducted the measures on 100 subjects and found intra class correlation coefficients (ICCs) for agreement and consistency ranging from 0.959 to 0.976. Concordance correlation coefficients (CCC) ranged from 0.783 to 0.859 with tight confidence intervals indicating robust estimates of these quantities.\textsuperscript{41,42}

**Patient Experience**

The patient reported that over the past seven years the pain would wax and wane, keeping her in constant fear of the next paroxysm. She even avoided going to her dentist for one year because she feared her annual check-up could trigger an attack. In her own words, she “could be out shopping and could go to the ground” in agony from the excruciating electric shock sensation.

It is critical to note that after nearly 6 months of chiropractic care, she remains pain free. The patient reports that there is “no pain while chewing food and that “it is a wonderful feeling being pain free” again. Eventually, she went to the dentist and afterward had only minor twitches in her face.

**Efficacy in Chiropractic Management**

In 1895, the first chiropractic adjustment was witnessed by BJ Palmer, when his father, DD Palmer, delivered an adjustment to the upper cervical region of the spine which restored hearing in Harvey Lillard.\textsuperscript{33} According to Elster, an upper cervical subluxation usually results from head or neck trauma.\textsuperscript{42} Lillard alleged that due to “a cramped, stooping position” while exerting himself he felt his back give out and after that he became deaf.\textsuperscript{43} This case study is similar to Lillard’s case in that the patient’s medical history included a fall producing trauma to her head, which likely lead to vertebral subluxation in the upper cervical region.

The explanation behind this may be – because the trigeminal nucleus covers the length of the brainstem and continues inferiorly to the level of C3 – \textsuperscript{44} a vertebral subluxation located in the upper cervical region has the potential to affect the nuclei of cranial nerves V, VI, VII, and VIII, which all lie within the pons. Ultimately, all sensory sensations from the face travel to the trigeminal nucleus, which is comprised of three different sections that receive different sensory modalities. From rostral to caudal, the three nuclei make up the mesencephalic nucleus, the chief trigeminal sensory nucleus, and the spinal trigeminal nucleus.\textsuperscript{45}

The chief trigeminal sensory nucleus is responsible for a sensory system for the face and head, which integrate fine touch and dental pressure in the posterior columns. Subsequently, the spinal trigeminal nucleus is going to assimilate pain, temperature, and crude touch into the anterolateral systems.\textsuperscript{45} These two nuclei extending down the cervical portion of the spinal cord could be the reason why correction of the upper cervical spine had an effect on the patient in this case study, as well as restoring Lillard’s hearing because the cranial nerves affecting these conditions are all within the pons.

Grostic described this in his dentate ligament-cord distortion hypothesis. Due to the fact that TN spasms could be due to exasperation of the trigeminal nerve, trigeminal ganglion or the spinal nucleus, Grostic proposed

By combining anterior rotation of the atlas on the side to which the atlas has laterally deviated with the lateral traction it may be possible to put traction directly on the sensory nucleus of the trigeminal nerve at the level of the first and second cervical vertebra….Direct mechanical-vascular irritation of the spinal nucleus might also explain those cases in which surgical destruction of the ganglion or sectioning of the nerve fails to provide relief.\textsuperscript{46}

This explanation can help further our understanding of how patient with upper cervical subluxations are so commonly helped by chiropractic adjustments. It is no surprise that this connection between the Dentate Ligament Theory and TN has been described in more recent papers and, thus, suggests that Grostic’s work needs further substantiation.\textsuperscript{3,5,47}

**Subluxation’s Role**

The dysafferentation model, described by Kent, provides a valid theory of how the vertebral subluxation is related in these cases. Within each segment of vertebral spinal motion, an organization of an abundant amount of nociceptive and mechanoreceptive structures exists. Subsequently, when there is biomechanical dysfunction within the related segments, the nociceptive and mechanoreceptive structures are modified. When this kinetic dysfunction in the spine and alteration of the nociceptive and mechanoreceptive structures exists, an abnormal afferent input to the central nervous system manifest, which can lead to dyspontics.\textsuperscript{48} In the words of Kent, “Garbage in, garbage out.”\textsuperscript{48}

To illustrate, we suggest that, because the patient in our case experienced biomechanical dysfunction due to degeneration and related trauma in the neck, dysaffective signals were initiated from the upper cervical area to the brain via the trigeminal nucleus that extends down to C3. Traversing cephalically, we theorize that these distorted signals entered the pons (which contains the nuclei of cranial nerves V, VI, VII, and VIII) and distorted the trigeminal nerve’s sensory input. This neurological insult, therefore, caused dysaffective trigeminal output manifesting in TN symptoms. Because the upper cervical subluxations were corrected, we believe that the dysaffective signals were reduced, which led to proper efferent messaging throughout the nerves whose nuclei are included in the pons; namely, cranial nerve V.

We support and encourage further research to substantiate this theory.

**Limitations**

There are two limitations to this study. First, it is a case study and not a blinded random control trial. Secondly, because multiple interventions were employed (i.e. subluxation-based chiropractic adjustments as well as nutritional
supplementation), we cannot confidently conclude that remission of TN symptoms were due to either one.

Conclusion

The patient continues to be pain free at the time this paper was published. She reports that her quality of life continues to improve and admittedly, chiropractic drastically improved her health.

As more TN cases surface describing how chiropractic may possibly help people with this debilitating disease, more reliable research is needed. As a suggestion to clinical researchers, the next research study that can be used to test the theories presented in this paper would be to have a pilot study comparing and contrasting 4 groups: TN patients who receive chiropractic care, TN patients who receive nutritional changes, TN patients who receive both chiropractic care and nutritional alterations, and a control group with no interventions at all. With the emerging chiropractic and TN case studies within the profession, now is the time to act.

References

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