CASE STUDY

Resolution of Glossopharyngeal Neuralgia & Spastic Dystonia Following Chiropractic Care to Reduce Upper Cervical Vertebral Subluxation: A Case Study

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ABSTRACT

Objective: This case study reports the improvement in quality of life experienced by a patient with Glossopharyngeal neuralgia undergoing upper cervical specific care as an alternative to medication or surgery.

Clinical Features: An 82 year old female presented with right-sided Glossopharyngeal neuralgia of ten years duration. Pain was helped by medication and exacerbated by talking, swallowing, coughing, quick head movements and air conditioning. Daily prescriptions included Gabapentin, 5700 mg.

Patient had a case history of falling on her head in a snow skiing trauma at age sixteen followed by possible whiplash injuries when falling on ice that same year and a vehicular accident in 1984. Patient had constant stabbing pain with tremor in right temple, face, tongue and throat. She could only manage to whisper a few words at a time. Posture analysis, leg length equality, modified Prill tests, thermography, and cervical x-rays supported evidence of vertebral subluxation at atlas, axis, C4, C5 and C6.

Intervention and Outcomes: Immediately after specific adjustments to C5, C2 and C1, pain diminished from 10 to 1. Tremor was eliminated. Head tilt, eye clarity and facial color returned to normal. She could talk normally. Two days later pain was zero. Under her neurologist's supervision, she started reducing her Gabapentin. Six weeks later, patient presented with straight thermograph, balanced legs, and was pain-free without medication.

Conclusion: This case demonstrates the effectiveness of upper cervical specific care as an alternative to medication or surgery for the control of pain associated with Glossopharyngeal neuralgia.

Key Words: *Glossopharyngeal neuralgia, upper cervical subluxation complex, specific chiropractic adjustments, whiplash, Gabapentin (Neurontin)*

Introduction

Amongst the lower six cranial nerves, the glossopharyngeal nerve (CN IX) is the smallest in terms of nerve diameter, importance and clinical significance.[1] Additionally, when compared with the facial, vestibulococchlear (CN VIII), vagus (CN X), accessory (CN XI), and hypoglossal (CN XII) nerves,

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the glossopharyngeal nerve appears dwarfed in comparison. Otolaryngologists and other clinicians are consciously aware of the presence of the facial, vagus, accessory and hypoglossal nerves, for these nerves are commonly encountered in neck surgery. Inadvertent surgical injury to these nerves result in clinically obvious problems like facial palsy, vocal cord palsy, shoulder dysfunction from denervation of the trapezius muscle, and speech problems arising from tongue deviation. The glossopharyngeal nerve lies deep within the neck, and surgeons often do not encounter the nerve even with deep dissections. The nerve is not commonly identified or visualized even when performing a major neck operation, for example, a radical neck dissection.[1]

Cranial nerves (CN) IX through XI all leave the skull together through the jugular foramen.[2,3] Cranial nerves IX and X are closely related, and often difficult to separate in clinical situations. For example, testing this nerve would include the gag reflex, but this would be testing both CN IX and X. The glossopharyngeal nerve has sensory, parasympathetic and motor components. The sensory division receives general sensory fibers from the tonsils, pharynx, middle ear and posterior one third of the tongue.

The sensory division of the nerve projects to the solitary nucleus, which perceives information about taste. Parasympathetic visceral fibers to the glossopharyngeal nerve arise in the carotid bodies of the neck. It contributes to the carotid sinus nerve (of Hering) which supplies the carotid body and sinus. The glossopharyngeal nerve also supplies parasympathetic innervation to the parotid gland via the otic ganglion.[2,3] The parotid gland is the largest salivary gland in the body. The motor supply of the glossopharyngeal nerve innervates the stylopharyngeus muscle. This muscle controls the larynx and pulls it forward to swallow.[2]

The reported incidence of glossopharyngeal neuralgia is .2 to.8 cases per 100,000 people a year.[3,4] The frequency of glossopharyngeal neuralgia is underestimated due to difficulties in clinical diagnosis, unawareness of the disease, and differentiation from trigeminal neuralgia.[4]

The glossopharyngeal nerve supplies important structures in the head and neck region in the company of the vagus nerve.[1] Being that the glossopharyngeal and vagus nerves are somewhat intertwined, it is no surprise that there is a grouped disorder called vagoglossopharyngeal neuralgia. It is described as paroxysmal electric shock like pain that is located in the areas that are innervated by the glossopharyngeal nerve and the pharyngeal branch of the vagus nerve.[5] Additionally, this article states that Microvascular Decompression and Rhizotomies have become the standard surgical treatment for cranial nerve syndromes, in spite of the lack of knowledge on the etiology.

Glossopharyngeal neuralgia can be extremely disabling and life-threatening. Patients that experience dysphagia can suffer from weight loss and malnutrition due to fear of pain while swallowing.[1] In addition, depression from debilitating pain may become so severe that there have been cases of neuralgic patients who have attempted suicide. In 1921, Harris reported that glossopharyngeal neuralgia can be associated with cardiac dysrhythmia and instability. This relationship is well accepted, having been documented by many authors. Intense irritability and hyper-stimulation of the glossopharyngeal nerve stimulates feedback onto the vasomotor center in the brainstem, giving rise to a heightened vagal response.[1]

Furthermore, a heightened vagal response can result in cardiac dysrhythmia, bradycardia, hypotension, and even asystole and subsequent syncope. This effect is similar to that seen in carotid sinus massage for the treatment of supraventricular tachycardias. Massaging the carotid sinus causes a hyper-stimulation of the glossopharyngeal afferent pathway, resulting in an exaggerated parasympathetic vagal efferent response. In the case of glossopharyngeal neuralgia, the hyper-stimulation is induced by either an intrinsic irritability of the nerve or compression of the nerve by blood vessels or styloid process.[1]

Diagnosis is clinical. Treatment is the same as that for trigeminal neuralgia. The first line of treatment is normally anticonvulsive drugs such as carbamazepine or gabapentin. If oral drugs are ineffective, topical cocaine applied to the pharynx may provide temporary relief, and surgery to decompress the nerve from a pulsating artery may be necessary. If pain is restricted to the pharynx, surgery can be restricted to the extracranial part of the nerve; if the pain is widespread, surgery must include the intracranial part of the nerve.[6]

Case Report

An 82 year old female presented with right sided Glossopharyngeal neuralgia of ten years duration. Pain was helped by medication and exacerbated by talking, swallowing, coughing, quick head movements and air conditioning. Secondary complaints included unsteady gait, dizziness, spastic dysphonia, chronic cervicalgia, tremor, ankle edema, hiatal hernia, high blood pressure, sleep apnea, ulcerative colitis, reflux, migraine, hoarseness, hypothyroidism, mitral valve prolapse, arthritis and possible transient ischemic attack.

Daily prescriptions include Gabapentin 5700 mg (3600 mg maximum prescribed by manufacturer, less for geriatric patients), Lipitor 20 mg, Hydrochlorothiazide 25 mg, Inderal 60 mg, Aleve, 220 mg, aspirin 81 mg, Omeprazole 20 mg, Diazepam 15 mg, Advil 800 mg, Hydrocodone 20 mg, Benadryl/Lidocaine 40 ml and multiple herbal and vitamin supplements. Prior surgeries included hip replacement, tonsillectomy, hysterectomy and bilateral stapectomies, seven months apart at ages 30 and 31. She is widowed with six children. She does not drink or smoke and has significant family history of cancer.

Past History

A past history of traumas revealed that the patient sustained two falls involving significant head impacts at age sixteen, one snow skiing followed by another while ice-skating. Fifteen years later, she woke up deaf in one ear. Seven months later, she woke up deaf in the other ear. Hearing in both ears was successfully corrected by stapedectomy surgery.

The patient suffered a minor vehicular whiplash injury in

1984. Patient stated she did have a past history of migraines. She reported throat problems since 2001 and had been coughing chronically since 2003. In 2005, the patient saw an otolaryngologist with the sensation of a foreign body being caught in her throat. In 2009, an upper GI study showed previous Barrett's esophagus. In 2010, she awoke with intense throbbing pain on the right side of her neck. The subject stated she was diagnosed with cysts on her vocal cords in 2008 or 2009.

Cervical x-rays showed marked degenerative spondylosis of the spine. In June of 2010, cervical CT examination showed possible unilateral Warthin's tumor, a benign tumor located in the salivary glands. She was experiencing chronic right neck pain, spastic dystonia involving the right true vocal cord and tingling in right arm and her fourth and fifth fingers at this time.

In December of 2010, she experienced a transient ischemic attack, producing jumbled speech. In 2011, she was having significant difficulty speaking, cervicalgia and painful swallowing. Physical therapy did not help the cervicalgia. This suggested that the problem might be neurological in nature.

The patient was evaluated multiple times by multiple specialists, none of which had found a cause of right-sided throat pain. She had multiple procedures in multiple states. The medical doctors concluded it may be from a pinched nerve in her neck and recommended MRI, but she was not able to have one.

In May 2011, she had "dreadful" pain in her anterior aspect of the right sternocleidomastoid muscle when asked to extend her neck. She could not speak. The patient took a double dose of Neurontin and, although it made her sleepy and gave her a bit of unsteady gait, she felt better, so the dosage was increased.

Given the patient's age and the fact that she was taking twice the maximum dose of Neurotonin, she became too dizzy to live on her own. Her family decided that they would try upper cervical chiropractic and if it did not help, they would take her to the Mayo Clinic. The patient got under cervical specific chiropractic care on June 8, 2011, brought in by her daughter.

Exam

The patient's daughter explained that the subject had given up speaking two years prior because whispering two or three words would send electrical shock pains through her right throat, tongue, cheek and temple. The patient was sleeping most of the day. Most of her time awake was spent trying to swallow one cup of water. On the first visit, her pain scale was 10 out of 10.

The patient had severe right head tilt. The thermographic Delta T line graph (Figure 1) broke to the right 0.81 degrees Celsius with left line breaking left, indicating a cold area over the upper cervical spine. Her right leg presented with a one inch short relative to left, with one-inch bilateral cervical syndrome. A positive modified Prill tests for atlas (C1), axis (C2) and C5 was found. X-ray analysis listed atlas posterior and inferior on left, axis total segment right and C5 posterior and inferior with spinous left. These three segments were adjusted and patient rested for fifteen minutes.

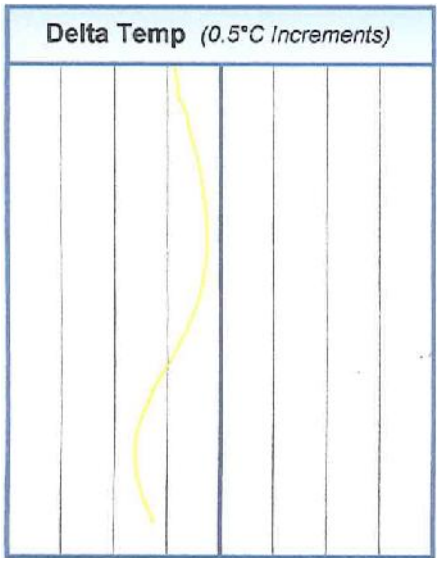

Figure 1. Thermographic Scan

Intervention

The technique utilized is based on the work of BJ Palmer DC, as developed at his Research Clinic at Palmer Chiropractic College in Davenport, IA, from the early 1930s until his death in 1961.[7] Techniques also include the vertebral subluxation pattern work of his clinic director, Lyle Sherman DC, for whom Sherman College of Straight Chiropractic, Spartanburg, SC is named.[8] A detailed case history was taken on the first visit, followed by a spinal examination. A report of findings was given, recommending a minimum set of three cervical x-rays because evidence of an upper cervical subluxation was discovered. X-rays and analysis of the upper cervical vertebrae based on the work of William G Blair DC was used to determine chiropractic listings of subluxation.

Lateral cervical, A-P open mouth and Nasium x-rays were taken. (Figures 2-4) Blair began to develop his distinctive method for the analysis and correction of subluxations of the cervical spine soon after graduating from the Palmer School of Chiropractic. Trained in the classical upper cervical specific "Hole In One" (HIO) method, he soon became concerned with the potential effects of osseous asymmetry or malformation on the accuracy of the traditional spinographic analysis in producing a valid adjustive listing. His observations of skeletal specimens also led him to conclude that the prevailing view of misalignment of atlas in relation to the occiput was inaccurate.[9]

Detailed leg checks were performed on each visit, utilizing the work of J Clay Thompson DC and Clarence Prill DC.[10] Thompson, with the help of Romer Derifield DC, popularized the cervical syndrome check for the upper cervical subluxation complex in the 1940's. Since then, no one has come up with a reason relative leg length would change when a patient gently turns their head from side to side, while either prone or supine, thus not under the effects of gravity, except upper cervical subluxation.[11]

It is unknown definitively what causes one leg to appear shorter than the other; or why the relative lengths change when the head is turned while the patient is lying down. One hypothesis proposes that the mechanism of subluxation involves impingement of the atlanto-occipital intra-articular fat pad causing reflexive guarding contraction of the suboccipital muscles. Stimulation of the spindles in these muscles are thought to be involved in the initiation of tonic neck reflexes that alter global extensor muscle tone to achieve proper body balance in response to head movement.[12]

A conservative approach in determining evidence of subluxation was used. That is, when in doubt, no adjustment was given. The leg checks were the main criterion used to decide when to adjust or not. Many upper cervical chiropractors rely heavily on bilateral leg length comparisons for analysis and post-adjustment assessments. Derifield and upper cervical leg length checks are performed prone and supine, respectively.[13]

To determine whether the major subluxation was at the level of atlas or axis, Prill modified leg length tests were utilized. With the patient prone, she was instructed to gently and steadily raise their feet toward the ceiling, while the doctor resisted such movement with his hands. The peripheral nerves were being tested, those that innervate the postural muscles holding one upright in gravity, so it was imperative that the patient only lift their legs slightly and maintain this pressure for at least two seconds.

This test was for atlas, the top cervical vertebra. Instructing patients to rotate their feet while the doctor provided resistance and checking relative leg length was used to test axis. Some clinicians prefer to have the toes rotate outward. This doctor had the patient pull their feet together. This corresponds to the rotation of the head on the neck, 50% of which occurs at the level of C2.

Although many chiropractors that utilize the Blair technique do not adjust the lower cervicals, the doctor did on this patient. Blair died before getting below C4 in his analysis and adjusting technique protocol. The author agrees with Dr. Blair in that until the upper cervical spine is cleared of subluxation, adjusting the lower cervicals will not hold. Although research may not support this, in the doctor's experience, he found that when there is a significant "kink" in the lower cervicals caused by a whiplash injury, a specific lower cervical adjustment can help the upper cervical adjustments hold significantly longer.

This is why he developed Prill type tests for the lower cervicals; C5, C6 and C7.[14] This chiropractor uses the technique Pierce Results to analyze and adjust lower cervical segments. The Pierce "Results System" is a result of combining a few techniques such as: 5th Cervical Key, Logan Basic, HIO, Thompson, Nimmo and Pierce's personal way of adjusting. The main focus of Pierce centered chiropractors is subluxation correction by way of focusing on restoring proper structure and motion of the spine.[15]

Thermographs of the cervical spine were utilized using a Tytron C-300 instrument. The instrument was used to develop a pattern of subluxation in order to determine when to adjust.

The thermal differential of skin temperature is a demonstration of both symmetry and pattern. A graph reading that is static and persistent over time is considered to be the patient's pattern. A break is defined as a heat deflection to the left or right of the graph centerline. Advocates of the "break" analysis or system, often consider this to be an indicator for vertebral subluxation.[16] Vertebral subluxations often cause thermal asymmetries and/or pattern. A patient with a vertebral subluxation that appears "in pattern" no longer displays the normal adaptability of the autonomic nervous system to display a continuously adapting temperature reading.[17]

When it was determined that the patient was in a pattern of subluxation, some combination of Blair toggle recoil and Pierce Results adjustments were performed. A Thuli chiropractic table, using the cervical drop piece was utilized. For Blair side posture adjustments, the headpiece was set to drop straight down. In prone adjustments, it was set to drop down and forward. The patient was then rested for fifteen minutes and rechecked, to make sure that the pattern had been broken.

Outcomes

The patient got up and started talking normally with a pain level of one and went home with her daughter. Two days later, the pain was entirely gone. The doctor checked her for nervous system interference and found subluxation using leg checks. This visit he chose to use an instrument to adjust. The patient is still pain-free to this day and receiving maintenance care.

She began reducing, and eventually, eliminating Neurontin regimen under the supervision of her neurologist. The neurologist encouraged the patient to stay under chiropractic care. The doctor checked the patient a final time and she showed balanced legs and her thermograph was not in pattern. She was seen twelve times over six weeks, at which time she was free of pain and medication and holding her adjustment.

Discussion

This case is an example of rare nervous system issues being resolved outside the current medical model of surgery and medications. The patient had experienced a variety of symptoms for 10 years and was evaluated by several physicians, none of whom could find the cause of the glossopharyngeal neuralgia. This was this author's first case of glossopharyngeal neuralgia.

He has been treating and tracking the results of cervical specific chiropractic with three hundred Meniere's disease (MD) patients for a minimum of three years, up to eleven years. The doctor used the same protocol in this case.[18] All 300 consecutive MD cases had suffered a whiplash type of cervical trauma an average of fifteen years prior to the onset of symptoms. Ninety percent of these patients had an atlas subluxation, with a listing posterior and inferior on the opposite side of the involved ear.

The doctor relates his success to his analysis of finding subluxations. There are many terms and definitions used for subluxation. D. D. Palmer and B. J.Palmer defined

subluxation as: "A (sub)luxation of a joint, to a Chiropractor, means pressure on nerves, abnormal functions creating a lesion in some portion of the body, either in its action, or makeup." Since then, many models have been produced trying to explain subluxation. The vertebral subluxation complex model has been expanded to include all essential components of a subluxation, which currently has nine components. These components include detailed anatomic, physiologic, and biochemical alterations inherent in subluxation. In any definition of subluxation, most chiropractors agree that when you correct a subluxation through an adjustment, the functional integrity of the nervous system, general health, and quality of life are indicators of improvement.[19]

Much of the research related to this topic has been done on trigeminal (CN V) neuralgia because as discussed previously, the incidence of glossopharyngeal neuralgia is rare. As shown by this case, most people with these conditions see chiropractic care as a "last resort" effort.

Glossopharyngeal neuralgia shares several characteristics with trigeminal neuralgia. Trigeminal neuralgia (TN) is much more common, yet still rare, ranging at incidences between 4.17-7.1/100,000 for both sexes. Similar characteristics between CN V and IX neuralgias include: spastic attacks of electric shock-like stabbing pain, trigger mechanisms (such as speaking, swallowing, eating, breathing, cold air and slight touch of the mouth and pharyngeal region), initial good response to anticonvulsant drugs and association with neurovascular compression.[4]

Chiropractors encounter these neuralgias very infrequently, but may play a role in the management through recognition, diagnosis, referral if necessary and symptom management.[20] Patients with these neuralgias often live with these symptoms for long periods of time before seeking chiropractic care. This author has adjusted a patient with trigeminal neuralgia using the same protocol as he did in this case to remove vertebral subluxations. Much like this case study, the patient is able to be pain free again and completely eliminate Gabapentin from their life.[21]

Other cases with trigeminal neuralgia reported on in the chiropractic literature show similar results. One patient had been experiencing TN pain for 7.5 years that was gradually worsening after a surgical resection of a brain tumor. She sought care from a chiropractor as a last resort effort because she could no longer stand the pain. She could not find long term relief from the pain through acupuncture, physiotherapy or medications. The chiropractor's treatment consisted of ultrasound, massage, and mobilization through adjustments and traction. The patient received relief after the first adjustment and is still receiving chiropractic treatments as needed without medication.[20]

A case reported on in the chiropractic literature on trigeminal neuralgia combined various modalities, diversified and cranial adjustments to relieve TN symptoms. This patient had experienced pain on and off for six years, when it seemed to be caused by a tooth. After chiropractic care was initiated the patient's pain was reduced and she began to reduce her intake of Carbamazepine. When followed up with three months later she had no further trigeminal symptoms, but at her eighteen month follow-up she had experienced the pain again. The author was retired by this time and she visited a medical practitioner for laser therapy instead, which was successful in reducing her pain again.[22] Furthermore, there is another TN patient that had pain along the mandibular distribution of the TN for five years. The patient was taking Carbamazepine daily to manage the pain associated with his TN. After receiving three Atlas Orthogonal upper cervical adjustments over one month, the patient was pain free and no longer taking Carbamazepine.[23]

In order to propose a mechanism by which these improvements occurred, it is important to study the pain generators in the cervical spine. Sources of upper cervical pain include the occipital-atlanto-axial joint, zygapophyseal joints through C3-C4, the vertebral artery, C2-C3 intervertebral disc, dura mater, pre- and post-vertebral skeletal muscle.[23]

In the medical literature, when viewing cranial nerves under advanced imaging, neurovascular compression is a common finding. Many of the idiopathic cranial neuralgias are attributed to a neurovascular nerve compression at the root entry zone of the respective cranial nerve.[4] When viewing the brainstem, accompanied by the vessels and cranial nerves under MRI and 3D, it was found that two arteries were the main source of compression on the glossopharyngeal nerve (CN IX).

The vertebral artery and posterior inferior cerebellar artery tend to compress the CN IX on the ipsilateral side of pain. Additionally, other neurovascular compressions including both the trigeminal nerve and the vagus nerve were found as well.[4] Leading research indicates the superior cerebellar artery may be the main source of compression on the trigeminal nerve.[21] Furthermore, such a compression can cause injury to the nerves' protective myelin sheath and cause irregular and hyperactive function of the nerves.

The Dentate Ligament-Cord Distortion hypothesis may be able to provide explanation as to why the correction of upper cervical subluxations relieves trigeminal neuralgia, and possibly other cranial nerve neuralgias.[24] Additionally, the paroxysmal nature of pain suggests that it arises as a sudden discharge of neurons, as a result of irritation of the nerve or it's corresponding ganglion. Anatomical abnormalities of the cervical spine have been the leading finding in patients with Meniere's syndrome, trigeminal neuralgia, Bell's palsy, multiple sclerosis and Parkinson's disease.[18,20-23,25] By changing the structure of the cervical spine through specific adjustments, it is removing the irritation to the nerve, thereby reducing symptoms.

Conclusion

Although a case study is limited to provide conclusions, it does offer insight that chiropractic offers a noninvasive method to improve these patients' quality of life. This author continues to use the same protocol for Meniere's syndrome, trigeminal neuralgia, Bell's palsy, multiple sclerosis and Parkinson's disease.[18, 21, 25] This patient's quality of life rapidly changed after one adjustment. This patient suffered ten years without knowledge of chiropractic care results. She

had been ingesting large amounts of medication without any improvement. Medical doctors should consider referring patients to cervical specific chiropractic care when they suspect a upper cervical vertebral subluxation.

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Figures

Figure 1. Lateral cervical radiograph taken pre-care. Post-care radiographs were not taken.

Figure 2. Nasium view radiograph taken pre-care. Post-care views were not taken.

Figure 3. APOM view taken pre-care. Post-care view was not taken.