Case Report

The Resolution of Benign Paroxysmal Positional Vertigo (BPPV) in a 33-Year-Old Female Following Chiropractic Care: A Case Report & Selective Review of Literature

Abstract

Objective: To describe the chiropractic management of a 33-year-old female with Benign Paroxysmal Positional Vertigo (BPPV).

Clinical Features: A 33-year-old female with BPPV presented to her chiropractor following a failed Epley maneuver by the patient's otolaryngologist (ENT). She was prescribed medication, but refused to take it because she was nursing.

Interventions and Outcomes: Care began during the patient's most severe episode of BPPV, rendering her unable to drive herself to appointments. Insight® technology was used to obtain paraspinal thermography as well as surface electromyography scans to assess for vertebral subluxations. Cervical radiographs were also taken prior to beginning care. Diversified adjusting techniques were administered, along with cranial adjustments, manual therapy, and massage. Within three visits, the patient was able to drive herself to her visits and her symptoms had greatly improved. By the 14th visit, the patient presented symptom-free.

Conclusions: This case study shows that chiropractic care was beneficial in the management of BPPV. More research on chiropractic's potential role in vestibular disorders is warranted.

Key Words: Vertebral subluxation, chiropractic, vertigo, Benign Paroxysmal Positional Vertigo, dizziness, Diversified Technique

Introduction

Vertigo, often interchangeably used with the term dizziness, is a common reason many seek medical care. Both vertigo and dizziness, however, are descriptors of symptoms often belonging to a wide variety of disorders among several body systems. Several specialties in medicine treat dizziness/vertigo, for example cardiologists and neurologists, allowing for inconsistencies in diagnosis criteria. Along with patient subjectivity and difficulty describing complaints, this makes differentiating the two challenging, thus making epidemiological research complex. There are also several subcategories of vertigo, all of which require differing diagnostic criteria and treatment.

The following case study features the favorable outcome of a female patient who presented to her chiropractor with Benign Paroxysmal Positional Vertigo (BPPV). Benign Paroxysmal Positional Vertigo is a spinning sensation perceived with changes of head position and movement. Episodes are typically brief and recurrent, but may also be persistent. BPPV may be triggered by a stimulus (e.g. seasickness), or may result from a vestibular-ocular discrepancy (e.g. sickness in a moving vehicle), but most commonly is a product of vestibular system disorder. Movements as simple as looking up or bending down to tie one’s shoes can trigger episodes.

As mentioned before, statistics strictly involving vertigo are muddled and even more challenging as one attempts to single out the various vertigo classifications. In 2003, a large German study attempted to differentiate dizziness from vestibular vertigo subtypes and to obtain statistics on their epidemiological impact. BPPV had a one-year prevalence of 1.6% and a one-year incidence of 0.6%. The lifetime prevalence was 2.4%: 3.2% in females and 1.6% in males,
which led to an estimate that roughly 1.1 million adults in Germany experienced BPPV. The mean age of onset was 49 years old. The study also found BPPV rates two to three times higher in the female population and increased age correlated with increased frequency. Medical consultations, emergency department visits, sick days from work, and interference with daily activities were found to be higher in those suffering from vestibular vertigo, which includes BPPV, than in the other dizziness categories. 

The name may have “benign” in it, but those suffering from BPPV often find the disorder debilitating. The following case study describes a woman who was able to resolve her symptomatology through chiropractic management.

Case Report

History

A 33-year-old female teacher presented with BPPV. She was an existing patient and had been under care for low back pain related to her pregnancy one-year prior. She received 12 adjustments and then discontinued care. The patient had three vertigo episodes in the preceding seven years. According to the patient, her general practitioner “shook her head” and it fixed the vertigo in the past. The patient began re-experiencing BPPV and again sought treatment from her general practitioner and an otolaryngologist (ENT). She was prescribed medication but refused to take it since she was nursing her one-year-old child. The Epley maneuver was also performed and while the severity subsided, the vertigo remained. She then scheduled an appointment with her chiropractor.

She reported the vertigo was constant, aggravated by movement, and she was unable to find relief. She stated that she felt like she was on a cruise ship all day and was often nauseous. She was unable to walk fast or make any quick movements without triggering vertigo symptomatology. The patient was driven to her first few appointments, as she was so dizzy she found herself unable to drive. She also noted neck pain and mid back spasms, with the vertigo comprising her main complaint. She was not taking any medications or supplements aside from prenatal vitamins, which she was taking to supplement her breastfeeding.

Examination

The Insight Subluxation Station® was utilized specifically for detecting areas of nervous and muscular dysfunction. Thermal scanning and surface electromyography (SEM)A were performed to obtain an overall assessment of the patient’s nervous system. With thermal scanning, infrared temperature is read on both sides of the spine and differences have been attributed to many health disorders. The thermal scan showed mild temperature asymmetry at T11, L2 and L4 on the right, moderate asymmetry at L3 on the right, and severe asymmetry on the right at T10. Muscle tension asymmetries in the spinal muscles were measured via SEM. Mild muscle tension increases were found at C7 and T6 on the left and L3 on the right. Moderater tension increase was visualized at T12 and L1 on the right. (See Figures 1-2: Insight® Scans)

Cervical radiographs were also taken. Osteoarthritis was present at the levels of C4, C5 and C6 with evidence of minor osteophytosis in its early stage. She lacked a cervical lordosis, instead displaying a straightened neck with anterior head carriage. (See Figures 3-4: Cervical Radiographs)

Static and motion palpation revealed several spastic, hypo-mobile and tender segments throughout the patient’s spine. The patient’s posture demonstrated right head tilt with left head rotation.

Intervention and Outcomes

The patient was examined for vertebral subluxation and adjusted 13 times in a three-month period. The segments adjusted varied per visit, based on subluxation indicators found each visit. (See Table 1) Indicators were found using prone leg checks, muscle tests, and motion and static palpation findings using the doctor’s fingertips. The doctor utilized mostly Diversified adjusting techniques, including side posture, drop table, prone thoracic adjustments, and supine cervical sets. In Diversified adjusting, if hypo-mobile segments are detected in the spine, a pre-stress is applied to bring the segment to tension at its elastic barrier. From there, a thrust is performed to correct the hypo-mobile and presumably misaligned vertebra. Higher musculature on one side of the spinous process indicates spinous rotation on the y-axis to the opposite side. Sagittal plane rotation is noted if a spinous appears more prominent and if there is edema present. Cranial adjustments were also given on several visits. Cranial adjustments are gentle adjustments given to the bones of the skull by palpating the cranial rhythmic impulse and feeling for restriction or tenderness at any of the cranium’s sutures.

Manual therapy, in the form of myofascial release and mobilization was also performed on the first visit. It was focused on increasing the flexibility and range of motion of the patient’s upper thoracic musculature (rhomboid, trapezius, levator scapula, deltoid, latissimus, infraspinatus, and supraspinatus). The patient also received two one-hour massages and a few 10-minute chair massages over the course of her care. She was advised to drink more water and to avoid aspartame.

By her third visit, the patient was experiencing fewer vertigo episodes. Her neck and mid back pain had also decreased in severity. She was able to drive by her fourth visit, noting she had a few dizzy moments but the vertigo was much better. On her 14th visit, she presented with no complaints.

Discussion

Pathophysiology

Most BPPV is primary, or idiopathic, but secondary BPPV may be due to head trauma, inner ear disease, migraine headaches and much more. Regardless of whether it is primary or secondary, the pathomechanism has partly to do with otolith debris. Debris floating within any of the three semi-circular canals is referred to as canalithiasis, or “canal rocks,” and is the currently accepted theory of pathophysiology. These calcium carbonate crystals, which are embedded in the sacculle and utricle under normal
circumstances, become displaced. The debris often ends up in the posterior canal, since this is the most gravity-dependent area in both supine and standing positions. Once the amount of debris reaches a “critical mass,” endolymph drag is experienced with head movement as the clump of particulate matter attempts to occupy its new gravity-dependent position. This drag may explain the latency of BPPV’s nystagmus.\textsuperscript{10} The ear’s hair cells are stimulated by the clump of floating debris to send messages to the brain; thus creating the illusion of movement known as vertigo.\textsuperscript{10,11}

**Diagnosis**

Diagnosis of BPPV is made clinically by observing the characteristic nystagmus following performance of a positioning maneuver with the patient.\textsuperscript{4} BPPV patients display positional, latent nystagmus that is fatigable and accompanies the subjective description of spinning (whether it be their body they feel is spinning or the room).\textsuperscript{11} The nystagmus generally occurs for 60 seconds or less.\textsuperscript{4} Posterior canal BPPV (PC-BPPV), the most common type, is diagnosed via the Dix-Hallpike maneuver. Horizontal canal BPPV (HC-BPPV) can be detected via the supine roll test. The anterior canal is rarely involved in BPPV.\textsuperscript{4} Patients also lack abnormal neurological findings in their examination. Only when the nystagmus does not display the given characteristics do clinicians consider a Gadolinium-enhanced MRI to rule out CNS lesions.\textsuperscript{11}

**Treatment**

There are essentially two classifications of treatment for BPPV: canalith repositioning maneuvers (CRMs) and medication.\textsuperscript{4} BPPV often remits within six months without intervention, however, its symptoms can greatly interfere with daily living and patients often seek treatment.\textsuperscript{1,5}

Vestibular suppressants are often prescribed to those suffering from BPPV to combat the spinning and/or nausea,\textsuperscript{4} including drugs such as antihistamines and benzodiazepines. Medications, however, come with side effects and may actually worsen the disequilibrium associated with BPPV.\textsuperscript{11} Drugs are known to increase the rate of falls in elderly, so caution should be used in prescribing.\textsuperscript{12} Falls are already a risk with the spinning sensation associated with BPPV, so adding medication that can contribute to the inherent risk may be dangerous.

Surgery may also be considered in cases of intractable BPPV.\textsuperscript{13} Singular neurectomy of the posterior ampullary nerve and occlusion of the posterior semicircular canal have been performed. However, these surgeries are not recommended unless the patient is essentially handicapped by the disorder. Per the usual with surgeries, there are risks involved, which include hearing loss and vestibular disturbances.\textsuperscript{13}

Since the general purpose of medication is to alleviate symptoms, and not necessarily to deal with the root cause of an issue, it has been suggested that those suffering from BPPV try CRMs first.\textsuperscript{11,14} Repositioning maneuvers attempt to guide the debris floating in the endolymph-filled canals back into the utricle.\textsuperscript{2} While patients may become nauseous or uncomfortable during these maneuvers, due to BPPV’s fatigable nature the symptoms are short-lived and there are no true side effects. One study even found these positioning maneuvers to be equally effective as medical intervention.\textsuperscript{14} The Epley and Semont maneuvers are the most commonly utilized CRMs.\textsuperscript{10,15,16} For HC-BPPV, the Gufoni maneuver is used.\textsuperscript{17} There are several variations to the maneuvers, but images are plentiful online to help walk clinicians through the easy steps. There are also videos online that guide both the clinician and patient through the moves.\textsuperscript{18} Due to their simplicity and effectiveness, clinicians truly should look to these maneuvers first. The reoccurrence rate following CRMs, however, has yet to be definitively established.\textsuperscript{4,15,16}

**Chiropractic & BPPV**

The patient in this case presented to her chiropractor after a failed Epley maneuver attempt by her ENT and her decision not to take the prescribed medication. In the literature, several papers showcase chiropractic care and its effectiveness in the management of vertigo.\textsuperscript{19,36} While some of the aforementioned articles feature patients with Meniere’s disease and classifications of vertigo other than BPPV, they are relevant. All patients experienced vertiginous episodes (vestibular disorder) that resolved following chiropractic care focusing on vertebral subluxation. Many of the articles employed upper cervical chiropractic care, which focuses on the top vertebrae of the neck.\textsuperscript{19,22,29,31,33-35} Interestingly, the chiropractor in this case detected and adjusted vertebral subluxations in the upper cervical region at most visits.

The Association of Chiropractic Colleges defines chiropractic and subluxation as follows:

Chiropractic is concerned with the preservation and restoration of health, and focuses particular attention on the subluxation…A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health…A subluxation is evaluated, diagnosed, and managed through the use of chiropractic procedures based on the best available rational and empirical evidence.\textsuperscript{37}

Chiropractic adjustments address vertebral subluxations. One model of subluxation theory, the Subluxation Degeneration Model, suggests there are neurological consequences with degeneration of the spine.\textsuperscript{38} As mentioned in the case report, degeneration was visualized via x-ray from C4-C6 in the patient’s cervical spine. Pioneers in the study of vertigo, Dix and Hallpike found cervical x-ray findings at the fifth and sixth vertebrae to be common among vertigo sufferers.\textsuperscript{39} Autonomic dysfunction may be a manifestation of spinal degeneration and has to be considered in this case.\textsuperscript{38} The connections between the vestibular system and the sympathetic nervous system are well known.\textsuperscript{40} Vertigo and dizziness can be autonomic symptoms, resulting from information carried by the eighth cranial nerve, among others, afferently to the brain.\textsuperscript{1,40}

Another dysfunction resulting from subluxation, described in the Dysafferentation Model, may serve to further the connection between vertebral subluxation and BPPV.
According to Kent:

The intervertebral motion segment is richly endowed by nociceptive and mechanoreceptive structures. As a consequence, biomechanical dysfunction may result in an alteration in normal nociception and/or mechanoreception. Aberrated afferent input to the CNS may lead to dyspseudes. To use the contemporary jargon of the computer industry, “garbage in - garbage out.”

McLain’s work supports Kent’s previous claims. He states, “The presence of mechanoreceptive and nociceptive nerve endings in cervical facet capsules proves that these tissues are monitored by the central nervous system and implies that neural input from the facets is important to proprioception and pain sensation in the cervical spine.” The feedback loop between proprioception within the neck, vestibular system signals and movement is well known. Pathways from the vestibular system to the brain help maintain posture and position sense of the head and body through vestibulospinal reflexes. It has been shown that both neck proprioception and vestibular signals (i.e. those signals resulting from the otolith debris in semicircular canals) can have an effect on space perception. Recall that space perception, or perception of body to environment, is altered in vertiginous attacks following head movement. It would not be unconceivable that aberrant neck proprioception of the case of abnormal cervical posture could lead to altered nervous system responses.

Conclusion

In conclusion, this case features the successful resolution of BPPV through subluxation-based chiropractic management. The various connections between vertebral subluxation, the vestibular system, and altered neurological responses have been explored. It is therefore suggested that those suffering with vertigo seek chiropractic care before resolving to medication or surgery, as chiropractic adjustments address the cause of neurological dysfunction, rather than masking symptoms.

Limitations

Limitations within this study exist. There has yet to be a follow-up examination on the presented patient, therefore pre and post Insight® scans and cervical x-rays cannot be compared. The patient also received massage and manual therapy within her course of care, making it difficult to pinpoint whether adjustments, therapies, or a combination were effective in the resolution of her symptoms. BPPV also has a high rate of self-resolution, so it is hard to know if chiropractic was responsible or not.

Also, case studies lack control groups and are not easily generalized to the entire population. With case studies, it is challenging to know what the patient did outside the office and whether or not that affected the outcome. Regarding published literature on chiropractic and vertigo, it is apparent much more is needed. A few of the articles feature chiropractors that did not employ chiropractic adjusting, but only performed the Epley maneuver with success. While this is within chiropractic’s scope of practice, it does not show a link between chiropractic and BPPV. Further research featuring subluxation-based chiropractic and BPPV is warranted to better understand how to properly assess and manage such patients in a clinical setting.

References


18. Chang C. Epley maneuver to treat BPPV video [Internet]. 2016 [cited 20 February 2016]. Available from: https://www.youtube.com/watch?v=9SLm76jQg3g


### Table 1

<table>
<thead>
<tr>
<th>Visit Number</th>
<th>Spinal Segments Adjusted (Subluxations)</th>
<th>Additional Procedures Performed</th>
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<tr>
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<td>Cranial work, 10-minute chair massage, manual therapy to upper thoracic musculature</td>
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<td>None</td>
</tr>
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<td>3</td>
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</tr>
<tr>
<td>4</td>
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<tr>
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</tr>
<tr>
<td>11</td>
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<td>Left and right scapulae adjusted</td>
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<tr>
<td>12</td>
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<td>1-hour massage</td>
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<tr>
<td>15</td>
<td>C3, C5, T6, L5, Sacrum</td>
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### Table 1: Visit Breakdown

A breakdown of the patient’s visits highlighting subluxations found and adjusted, as well as additional procedures performed (if any) is shown here. The doctor utilized mainly the Diversified adjusting technique, providing high-velocity, low-amplitude adjustments where indicated.
Figure 1: Insight® Thermography Scan
The thermal scan showed mild temperature asymmetry at T11, L2 and L4 on the right, moderate asymmetry at L3 on the right, and severe asymmetry on the right at T10. These asymmetries show nervous system dysfunction.

Figure 2: Insight® Surface Electromyography Scan
Muscle tension asymmetries in the spinal muscles were measured via SEMG. Mild muscle tension increases were found at C7 and T6 on the left and L3 on the right. Moderate tension increase was visualized at T12 and L1 on the right.
Figure 3: Anterior-posterior, open mouth (APOM) combined with anterior-posterior, lower cervical (APLC) cervical radiograph

The doctor utilized this film to determine if there was evidence of osseous or soft tissue pathology and to rule out contraindications to manual adjusting.

Figure 4: Lateral Cervical Radiograph

This film was used to determine if evidence of soft tissue or osseous pathology existed, and also to rule out contraindications to manual adjusting. Osteoarthritis from C4-C6 is visualized, along with a lack of cervical lordosis.