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Chiropractic spinal manipulative treatment of cervicogenic dizziness using Gonstead method: a case study

Aleksander Chaibi MChiro, BPT[a,*], Peter J. Tuchin GradDipChiro, DipOHS, PhD, FACC[b]

[a] *Chiropractor & Physiotherapist, Atlasklinikken, Fridtjof Nansens plass 8, 0160 Oslo, Norway*
[b] *Senior Lecturer, Department of Chiropractic, Macquarie University, NSW 2109, Australia*

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Abstract

Objective: The purpose of this case report is to present the response of a patient with chronic nonresponsive cervicogenic dizziness to chiropractic care.

Case report: A 29-year-old man had a 10-year history of progressive cervicogenic dizziness with symptoms including a sensation of excessive motion, imbalance, and spinning associated with neck pain and stiffness. After treatment, he reported a reduction in pain and dizziness and an improved quality of life following Gonstead method of chiropractic spinal manipulative therapy.

Conclusion: This case study suggests that a patient with nonresponsive cervicogenic dizziness might respond to chiropractic spinal manipulative therapy approach using Gonstead method.

Introduction

Dizziness is a relatively common and disabling disorder seen in clinics for manual therapy.[1] It affects all ages and appears to affect women more than men.[2] The prevalence has been reported to vary from 20.5% to 32.5%.[2] Dizziness and vertigo are sometimes used interchangeably to describe the same disorder. *Dizziness* has been defined as a sense of disequilibrium in the vestibular system, whereas *vertigo* is considered a subgroup of dizziness that is characterized by sensations of movement when no causative movement is present.[3,4] After headaches, dizziness is the most commonly occurring chief symptom in neurological practices.[5] Research has identified a significant reduction in quality of life, both at work and at home, for patients with dizziness.[6,7]

Cervicogenic dizziness was first described in 1955 by Ryan and Cope.[8] The diagnosis of cervicogenic dizziness is characterized by dizziness and disequilibrium that are associated with neck pain in patients with abnormal afferent activity from the neck.[9,10] The 3 most common pathophysiological causes for cervicogenic dizziness are believed to be related to vascular compression, altered proprioceptive input, and vasomotor changes caused by irritation of the cervical

* Corresponding author. Atlasklinikken, Fridtjof Nansens plass 8, 0160 Oslo, Norway. Tel.: +47 22331050.
E-mail address: aleks@atlasklinikken.no (A. Chaibi).

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sympathetic chain.[11] Cervicogenic dizziness may be a result of whiplash injury, other forms of cervical spine dysfunction, or spasms in the cervical muscles. Cervicogenic dizziness from whiplash injury is thought to account for around 50% of the causes.[11-13] As there are limited specific objective valid tests for cervicogenic dizziness, the diagnosis is first by excluding life-threatening and pathological causes as well as trial and errors and clinical reasoning. Because of difficulties defining cervicogenic dizziness, it can be hard to diagnose and treat.[14]

Diversified technique is reportedly used by 91% of chiropractors and includes a diversity of manipulative procedures, hence the name *diversified*.[15] The Gonstead method is used by 59% of chiropractors and is also based on high-velocity, low-amplitude adjustment. Evaluation procedures for chiropractors generally includes history taking, visual inspection, physical examination, and static and motion palpation. In addition, Gonstead evaluation procedure also routinely includes static and dynamic (stress) radiography and instrumentation (primarily thermography). Gonstead practitioners apply short lever forces in an attempt to correct the vertebra posterior to anterior, as they believe the posterior component of the spinal misalignment to be the most important.[16] The correction is directed through the parallel of the disk plane. Gonstead method, as with other spinal manipulative therapies (SMTs), has few adverse reactions and is therefore considered as a safe intervention.[17] The Gonstead method has not previously been researched for cervicogenic dizziness, and there are few if any pragmatic studies supporting Gonstead for patients experiencing cervicogenic dizziness.

Several case series studies have previously successfully investigated the effect of SMT for patients who experience cervicogenic dizziness,[8,11-13,18-20] and 2 systematic reviews have been conducted.[1,21] However, no studies or randomized controlled trials investigating the effect from Gonstead SMT have previously been researched. The aim of this study is to present a successful case of cervical spinal manipulative therapy (CSMT) using the Gonstead method for a patient who experienced chronic nonresponsive cervicogenic dizziness.

Case presentation

A 29-year-old man presented to the clinic with progressive dizziness that began 10 years prior. Symptoms included a sensation of excessive motion, imbalance, and spinning associated with neck pain and stiffness. The patient remembered being run over on a push bike by a motor vehicle 23 years ago. He recalls his smile being asymmetrical and experiencing neck and back pain as well as suboccipital headaches after this event. The patient did not seek any treatment after this accident except for visiting his general medical practitioner. In his early 20s, the neck and back pain that had been present from the accident increased in severity; minimal dizziness was however noted. The patient sought various treatments including medications, physiotherapy, acupuncture, massage therapy, and chiropractic, with minimal relief. Seven years before presenting to the clinic, the patient had severe psychological distress with his parents getting separated and his brother suddenly dying after years of heavy drug abuse. This episode worsened his neck and back pain, with the dizziness increasing in severity. The patient continued to see several different therapists in the period after the psychological trauma including a psychiatrist and a psychologist, without sufficient relief; and he experienced a further worsening of his pain and dizziness. He was thoroughly examined by several hospitals in Norway for peripheral vestibular diseases, infections, cardiovascular conditions, drugs- and alcohol-related dizziness, metabolic and endocrine conditions, and other neurological conditions. The examinations did not lead to a definitive diagnosis. The patient reported that his dizziness increased significantly 2 years ago, which now also was provoked by head movements and caused him severe discomfort when lying down, also giving him problems when sleeping. When the patient presented to our clinic, he had a back and neck pain and a score of 7 out of 10 in the numeric pain scale, with 0 being no pain and 10 being extreme pain.[22] He had severe dizziness (85/100) as measured by the Dizziness Handicap Inventory (DHI). The DHI measures from 0 to 100, with 0 point being no experience of dizziness.[23] He had severely reduced quality of life (20/100) using the General Well-being Questionnaire Short Form (SF)–36, with a score of 100 indicating the highest level of functioning possible.[24]

Chiropractic examination revealed a global reduced cervical range of motion (ROM) in right lateral flexion and rotation with reduced segmental joint play at right atlanto-occipital joint and cervical vertebra C7. Results of cervical compression test (Spurling) and slump tests for neural tension were both negative for pain.[25] Results of motor function testing and deep tendon reflex testing were both normal and symmetrical (C2-T1). Dermatome testing (C2-T1) showed normal and symmetrical sensibility. Result of cranial nerve

testing of III, IV, and VI was also normal and symmetrical bilaterally. Romberg test result revealed slight body movement to the left, although it was not indicative of any pathological cause.[26] Spinal palpation revealed segmental joint dysfunctions with decreased segmental joint play at multiple levels in the cervical vertebrae (atlanto-occipital and C7), thoracic vertebrae (T6, T11), and sacrum with minimal tenderness on the cervical vertebra C7 and sacral process S1. On examination, his neck muscles were tender and tight (hypertonic), especially the levator scapula, trapezius, suboccipitals muscles bilaterally, and lower rhomboids bilaterally. His blood pressure was measured at 118/80 mm Hg, but no other vital signs (such as respiration rate or body temperature) were assessed.

Radiographic examination was performed to evaluate his posture, joint and disk integrity, and vertebral misalignments and to rule out any pathology. These full-spine radiographs (anterior-posterior and lateral film) were taken in the standing, weight-bearing position to substantiate the examination findings. The radiograph showed minimal reduction in the cervical lordosis, (minimal-moderate-marked classification). There was a mild right convex S-scoliosis with apex at T12-T7-C7. A minor stable compression fracture was detected at the level of T12. No other abnormalities were detected.

Based on his extensive previous hospital examinations and his current history and physical examination, the patient fulfilled the criteria of cervicogenic dizziness related to sensation of excessive motion, imbalance, and spinning associated with neck pain and stiffness.[9]

Treatment outcomes

Chiropractic SMT was performed using the Gonstead method. A total of 17 visits over 2 months were scheduled, with additional 5 visits over the next 4 months. Outcome measures included the patient recording pain (numeric pain scale), DHI scaling, and the General Well-being Questionnaire SF-36 at baseline, after 6 weeks, and at 6 months posttreatment. Adverse reactions were also being noted throughout the study. A specific contact using the Gonstead listing system, high velocity, low amplitude, short lever, with no recoil postadjustment directed to spinal biomechanical dysfunction diagnosed by standard chiropractic tests, was performed. The initial 4 treatments concentrated itself on the thoracic vertebra subluxations (T6 and T11) to increase ROM and decrease tenderness along the rhomboids and trapezius muscles bilaterally. The initial effect of CSMT was immediate, with reduced pain and dizziness and increased ROM. The next 3 treatments focused on improving the joint dysfunctions in the atlanto-occipital joint on the right side, with a further reduction in pain and dizziness and an increased ROM being noted. The patient experienced a marked change in his proprioception, commenting that he felt that we had made a huge change to his whole balance and orientation in space. He also got very nauseous after the first occipital adjustment. Further improvement in cervical ROM and reduced tenderness along the suboccipital muscles, levator scapula, and trapezius were also noted. The next 6 treatments focused on improving spinal joint dysfunctions at thoracic vertebra T11 and sacrum. The patient reported a further reduction in pain and dizziness following the sacrum adjustments, noticing an overall improved functioning in his total spine. Sleep also improved at this stage of the treatment. No adverse reactions were noted post these adjustments except for minor local tenderness and the feeling of tiredness at night. The next 4 treatments were directed to improve cervicothoracic motion by adjusting cervical vertebra C7 and thoracic vertebra T6; and further reduction in muscle soreness and improved ROM were noted. Further minimal reduction was noted in pain and dizziness. The next 5 treatments were given over 4 months, focusing on maintaining stability in the spine and on further improving the spinal function. Some minor relapses of increased pain and dizziness were noted during this stage, which improved posttreatment. The patient reported a substantial reduction in neck and back pain and in dizziness and an improved quality of life. The patient provided consent for this information to be published in this case report.

Discussion

The pathophysiology behind the effect of SMT on cervicogenic dizziness is not well understood; however, mechanoreceptors and proprioceptors in the upper cervical spine have been shown to contribute to postural balance within the dorsal root of spinal nerves C2 and C3 synapsing with the vestibular nuclei.[27,28] Some theories suggest that SMT has a beneficial effect on the dorsal horn by stimulating mechanoreceptors and inhibiting nociceptors through the ascending spinothalamic tract.[29,30] As theories suggest the upper cervical joint complex to be involved primarily in patients experiencing cervicogenic dizziness, SMT is

Table 1 Summary of key changes in this case

Patient Features	Major Findings	Baseline	Midway 6 wk	Posttreatment 6 mo
29-y-old man; mason by occupation	Chronic cervicogenic dizziness	P: 7/10 DHI: 85/100 QOL: 20/100	P: 4/10 DHI: 45/100 QOL: 50/100	P: 1/10 DHI: 0.5/100 QOL: 90/100

P, Pain; *QOL*: quality of life using the General Well-being Questionnaire SF-36.

believed to have the best effect in the upper cervical complex. However, there is no conclusive evidence that this approach will have an effect compared with another SMT approach directed at other levels of the spine. This case supports that we know little about the pathophysiology behind the effect of SMT on cervicogenic dizziness. Research should therefore focus on the mechanisms behind the improvement in patients who experience cervicogenic dizziness.

This case study showed a reduction in pain (86%) and dizziness (99%) and an improved quality of life (78%) posttreatment (Table 1). The proposed pathogenesis of cervicogenic dizziness is not well understood, and further research should focus its investigation of the neurological mechanisms that will help us improve our understanding and develop strategies to best care. Although the patient had minor adverse effects in terms of local tenderness, nausea, and feeling of tiredness, chiropractic care was considered a safe intervention with few adverse reactions for this particular patient.[17]

Limitations

This case study had several limitations including no outcome measures conducted before intervention, leading to the possibility of self-reported biases. A follow-up period was documented, as the patient continued to seek treatment of his cervicogenic dizziness when needed. It is possible that this patient may have improved for other reasons external to chiropractic care. It is not possible to generalize the positive findings and treatment response to other patients. Although previous case studies have shown a positive result, the methodological quality of studies on cervicogenic dizziness has shown poor quality overall, usually because of a lack of a control group. Research should be directed to assess the mechanisms of improvement in patients who experience cervicogenic dizziness. A trial of CSMT is highly warranted for chronic, nonresponsive cervicogenic dizziness, as current research shows many methodological shortcomings.

Conclusion

This case study shows that one patient with cervicogenic dizziness might respond to chiropractic SMT using the Gonstead method.

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No funding sources or conflicts of interest were reported for this study.

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