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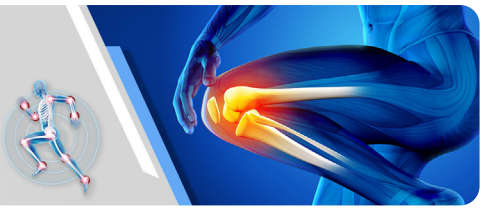

Spinal Manipulative Therapy for Atypical Cervicogenic Symptoms: A Review

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Abstract

There is considerable evidence to support the importance of cervicogenic spinal dysfunction in musculoskeletal complaints, and the development of atypical symptoms including dizziness, dysphagia, angina, and visual disturbances. However, there are other possible causes for these symptoms, and secondary adaptive changes should also be considered in differential diagnosis. Understanding the pathophysiology of these symptoms and differential diagnosis of their potential origin is important for therapy. In addition to symptoms, the evaluation of potential impairments (altered cervical joint position and movement sense, static and dynamic balance, and ocular mobility and coordination) should become an essential part of the routine assessment of those with traumatic neck pain, including those with concomitant injuries such as concussion and vestibular or visual pathology or deficits. Once adequately assessed, appropriate tailored management should be implemented. Research to further assist differential diagnosis and to understand the most important contributing factors associated with abnormal cervical afferent input and a subsequent disturbance to the sensorimotor control system, as well as the most efficacious management of such symptoms and impairments, is important for the future.

Keywords: Atypical symptoms; Cervical Spondylosis; Vertigo; Headache; Cervicogenic Dysphagia

Introduction

Atypical symptoms of cervical origin can include headaches, blurred vision, dizziness, vertigo, tinnitus (ringing in the ears), chest pain, and difficulty swallowing [1]. Many of these symptoms can be mistaken for other conditions, making it difficult to diagnose cervical origin. Understanding these symptoms and signs and their possible causes is crucial for proper evaluation and therapy. Possible causes include impaired sympathetic system, sensorimotor control, vertebral artery dissection or insufficiency, psychosocial variables such as worry and fear avoidance, and the use of medications [2]. These atypical symptoms of cervical spondylosis can make diagnosis and treatment difficult. It is important to visit a doctor if you are experiencing any of these symptoms in order to be properly diagnosed and treated [1].

After a direct trauma of the neck, a series of mechanical reactions may cause sensorimotor control problems, predominantly via changed cervical input [2]. Aside from the injury, reactions from the injury such as pain perception, muscle imbalance, mechanical dysfunction, chemical inflammation, morphological alterations to the muscles, and psychological factors, can modify cervicogenic input and affect the central nervous system. This can impact the nervous system between the sympathetic and parasympathetic balance, cervical nerve

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and the vestibular, visual, gastrointestinal anatomy, leading to secondary dysfunctions. Immediate sustained change in cervical input to the sensorimotor control system following neck trauma may be a more common cause of dizziness, visual disturbances, and unsteadiness, as well as changes in cervical proprioception, head and eye movement control, and postural stability, although other causes of sensorimotor control disturbances should also be considered [2].

Our research offers a narrative summary of cervicogenic dysfunction linked with cervical spondylosis. We have reviewed the literature about the efficacy of spinal manipulative therapy on the atypical cervicogenic symptoms. In a later section of the review, we discussed the potential pathways generating cervicogenic dysfunction.

Cervicogenic Symptoms

The sensorimotor control system is an integral part of the central nervous system that helps in controlling and coordinating movements. It is composed of the brain, cerebral cortex, and peripheral nervous system [3]. The brain, in particular, plays a vital role in the integration of the sensorimotor control system as it is responsible for the processing of sensory information and the generation of motor commands [3]. The brain receives information from the environment through the peripheral nervous system and this information is then processed in the cerebral cortex [3]. In the cortex, sensory information is analyzed and motor commands are generated in response. After this, the motor commands are sent to the corresponding muscles and this results in the desired movement [3]. The brain is also responsible for initiating new motor responses and making sure that the movement is precise and accurate [4]. Additionally, the brain also needs to process sensory information in order to adjust the motor commands accordingly. In order to make sure that these processes are done effectively, the brain needs to integrate information from multiple sensory modalities and generate a precise motor response [4]. Therefore, impairment of cervical spine (components of the sensorimotor control system) leads to many atypical symptoms.

Cervicogenic Dizziness

This Cervicogenic dizziness is a type of dizziness caused by a neck injury or disorder. It is characterized by a feeling of instability or imbalance, as if the world around the person is spinning [3]. The main pathophysiology of cervicogenic dizziness is related to abnormal proprioceptive input from the neck joint receptors [5]. This impairs the ability of the brain to accurately detect body position and movement and to interpret the position of the body relative to the environment [5]. This can lead to disorientation and vertigo, which can cause nausea, vomiting and even anxiety [6]. Treatment for cervicogenic dizziness is focused on strengthening the neck muscles and reducing pain, as well as improving coordination. Spinal manipulative therapies are all treatments that have been found to be effective [7-9].

Cervicogenic Headache

Cervicogenic headache is a condition that results from dysfunction of structures in the cervical spine. It is characterized by a unilateral headache that is usually located over the occiput or behind one eye, and may also have an associated neck pain [10]. The underlying mechanism is believed to be related to an altered nociceptive input from the cervical spine, leading to sensitization of the trigeminal nucleus caudalis and subsequent activation of associated pain pathways in the brain [10]. Pathophysiologically, the type of nociceptive input is thought to vary between individuals, so the symptomatology may also vary. It can be triggered by a variety of physical activities, such as head posture, neck movement, or sustained contraction of muscles in the neck or shoulders [11]. In addition, psychological and environmental factors may play a role in the development of cervicogenic headache. Diagnosis is typically based on a thorough medical history and clinical findings. Spinal manipulative therapy is effective in treatment of cervicogenic headache [12-17].

Cervicogenic Fibromyalgia

The pathophysiology of cervical spine and Fibromyalgia is not fully understood. However, it is likely that there is an overlap between the two conditions, as both involve pain and disruption of muscle function. It has been suggested that physical and psychological stress, along with traumatic events, can trigger an episode of Fibromyalgia [18]. The treatment of cervical spine and Fibromyalgia is multidisciplinary, and often includes both medical and non-medical interventions. Medications such as muscle relaxants, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), and antidepressants may be prescribed when necessary. In addition, spinal manipulative therapy can play a role in providing relief from symptoms [19].

Cervicogenic Blurred-Vision

A large number of studies conducted in the 1990s reported visual improvement as a result of spinal manipulation, despite the fact that no proof of visual improvement following spinal manipulation could be found [20]. Presumptive optic nerve ischemia, microvascular spasm of the optic nerve, bilateral simultaneous optic nerve dysfunction after periorbital trauma, constricted fields of vision, monocular visual loss after closed head trauma, and severe glaucomatous visual field deficit have all been reported to recover successfully after spinal manipulation. Significant restoration of both eyes' normal visual sensitivity following spinal manipulation [21]. A spontaneous remission of myopic retinoschisis following a comparable treatment of the spine. Moreover, a single cohort prospective assessment assessing the immediate effects of

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spine manipulation revealed that chiropractic treatments led to considerable increases in visual acuity. On the other hand, clinical investigations including various procedures for spinal manipulation also revealed variable relationships. In a feasibility randomized sham-controlled trial, chiropractic treatment, i.e. instrument-assisted manipulation, for the treatment of nonspecific dizziness and neck discomfort in community-dwelling seniors was deemed effective. However, another study described the reverse effect, in which higher spinal manipulation resulted in unknown frequency ophthalmological unfavorable consequences [22].

Cervicogenic Angina

Cervicogenic Angina (CA) is defined as paroxysmal angina-like pain that originates from the disorders of the cervical spine or other neck structures [23]. Because CA mimics typical cardiac angina, symptoms in the elderly with cervical spondylosis are more frequently misdiagnosed. Patients with CA may have suffered symptoms for longer periods of time and seen several clinicians due to conflicting cardiac exams. Clinicians and patients are unaware that CA symptoms are stemming from cervical spine disorders. However, the mechanism of pain occurrence in patients with CA remains unclear. Cervical spondylosis is a very common natural wear condition that worsens with age [23]. The masquerading of CA as typical cardiac angina can result in wasteful repeated cardiac workups and a disregard to recognizing the link between cervical pathologies and CA symptoms. In this case, the patient complained of non-traumatic chest pain and neck pain accompanied by numbness in his right third and fourth fingers, and CA was disregarded throughout a 2-year evaluation. This study contributes to a better understanding of the role of pain processing in the development of CA. Compression of the C4-C8 (prefixed brachial plexus) nerve roots, which carry innervation to the pectoralis muscles, can cause pain in the anterior chest wall [24]. This example demonstrates that awareness of other sources of pain will reduce unnecessary cardiac investigations and treatment regimens. Radiculopathy-associated CA symptoms can be eased by relieving the noxious input stemming from the pinched cervical nerve roots, as seen by an increase in the spacing of the restricted neuroforamina.

Cervicogenic Dysphagia and Gastrointestinal Dysfunctions

The most frequent causes of dysphagia (difficulty swallowing) are structural problems, neurological disorders, brain or spinal cord traumas, and neuromuscular abnormalities. Dysphagia may have a detrimental effect on nutritional intake as well as lung health [25]. The determined cause determines the proper course of action. A difficulty of swallowing brought on by the cervical area is called cervicogenic dysphagia. In certain patients with cervicogenic dysphagia symptoms, correction of spinal deformity may lead to great therapeutic success. Upper Cross Syndrome (UCS), a disorder characterized by thoracic hyperkyphosis and forward head and shoulder postures, is brought on by ongoing bad posture [26]. It has been connected to a number of secondary illnesses that hurt and distressed those who were impacted. The most frequent causes of dysphagia are structural problems, neurological disorders, brain or spinal cord traumas, and neuromuscular abnormalities. Dysphagia may have a detrimental effect on nutritional intake as well as lung health. The determined cause determines the proper course of action. A cervical cause of swallowing issues is cervicogenic dysphagia. When a spinal deformity is corrected, some patients with symptoms of cervicogenic dysphagia may see better treatment outcomes. Upper cross syndrome (UCS), a disorder characterized by thoracic hyperkyphosis and forward head and shoulder postures, is brought on by ongoing bad posture. It has been connected to a number of secondary illnesses that hurt and distressed those who were impacted [27]. To prevent further problems, manipulative and preventative therapy aimed at treating and preventing UCS should be used more regularly. Manipulative and preventative therapy aimed at treating and preventing UCS should be more widely accepted to prevent subsequent illnesses.

Cervicogenic Headache

Cervicogenic Headache is a type of headache that is caused by problems with the neck or cervical vertebrae. It is often described as a dull, aching pain that is localized to the neck and base of the skull, but can also spread to the forehead, temples, and ears [26]. It is estimated that up to 10% of all headaches are related to cervicogenic causes and that this type of headache can significantly affect quality of life [27]. The exact cause of cervicogenic headache is not yet known, but it is believed to be caused by a combination of physical and psychological factors, such as muscle tension, injury, posture, stress, and fatigue [28]. It is also associated with other neck conditions, such as whiplash, arthritis, and degenerative disc disease. Spinal manipulative therapy can help improve neck posture and flexibility, as well as reduce muscle tension [29]. Cognitive-behavioral therapy can help reduce stress and anxiety, which can help reduce the severity and frequency of headaches [30-32].

Conclusion

Chiropractors use spinal manipulative therapy as their primary treatment [33]. The adverse events occur with spinal manipulative therapy are very rare [34]. As spinal manipulative therapy is an effective treatment for symptoms related to cervical spondylosis, chiropractors sometimes encounter severe pathology such as osteoporosis [35], circulatory pathology [36-42], radiological abnormality

[43], neurological dysfunction [44-48], tumor [49-55], musculoskeletal diseases [56-75] and atypical symptoms. Although the chances of chiropractic encountering severe pathology is rare, chiropractors should be aware of the atypical symptoms and find the best solutions for patients.

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