



CASE REPORT

The effect of cranial osteopathic manual therapy on somatic tinnitus in individuals without otic pathology: Two case reports with one year follow up[☆]



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Abstract The following case reports present the effect of treating proposed cranial bone dysfunctions on chronic somatic tinnitus, following head trauma, with one year follow up. Both cases were suffering from chronic tinnitus on the right side without any otic pathology or temporomandibular dysfunctions. Temporary and limited effects of medications and other treatments on their persistent tinnitus had a negative effect on their social interactions and quality of life. Both patients were considered to demonstrate marked sphenoid, temporal and occipital bone dysfunctions, based on manual cranial treatment. Active tender points were also identified with intra-oral palpation and examination on the lateral pterygoid muscle on the right side.

Manual therapy of the cranial bones for restoration of normal alignment and cranial rhythm and myofascial release technique to deactivate tender points on the lateral pterygoid had a significant effect on reducing the persistent tinnitus in both patients. At one-year follow up, both patients reported significant improvement in their quality of life and social interactions without recurrence of their tinnitus symptoms. The findings of this study suggest that cranial manual therapy and

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myofascial release technique could be a potential treatment for somatic tinnitus in patients with no otic pathology or temporomandibular disorders.
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Introduction

Tinnitus is defined as hearing a sound in the absence of any external auditory stimulus.^{1,2} The duration of tinnitus may vary from being a temporary sensation to being a chronic condition that is resistant to medical treatments.¹ Persistent tinnitus may affect the patient's quality of life and may even lead to severe depression in about 40%–60% of the affected individuals.^{3,4} There are two types of tinnitus described in the literature. Otic tinnitus relates to otologic pathologies such as cochlear disorders, disease of the auditory nerve and damage to middle ear.^{3,5,6} Somatic or cranio-cervical tinnitus, which is present in patients without any detectable ear/nerve disorders,^{7,8} is associated with somatic disorders such as temporomandibular joint (TMJ) disorders,^{7–14} whiplash,¹⁵ myofascial pain syndrome,^{16,17} or cervical and cranial dysfunctions.^{13,18–21}

Somatic tinnitus is mostly reported in patients with craniocervical and craniomandibular disorders.²² According to Salvetti et al.,²³ the prevalence of tinnitus in the general population varies from 10% to 31%, but it increases to 85% in individuals with TMJ dysfunctions. Ramirez et al.²² reviewed the prevalence of somatic tinnitus in patients with TMJ dysfunction in 49 studies published from 1933 to 2006. They indicated that 38.8% of the 12,436 individuals with TMJ disorder, included in those studies, reported having tinnitus symptoms. Ramirez et al.²² attributed somatic tinnitus in patients with TMJ disorder to several factors such as abnormal mandibular position, mechanical joint dysfunction, tight sphenomandibular ligament, hypertonicity or tightness of the temporal, lateral pterygoid and medial pterygoid muscles. This notion is supported by several studies showing that treating the TMJ and cervical spine dysfunction could improve somatic tinnitus.^{16,18,19,24,25}

Cranial bone dysfunctions could also play a role in somatic tinnitus. Anatomically, muscles associated with the temporomandibular joint mechanics i.e. lateral and medial pterygoids and the sphenomandibular ligament, which attach to the mandible, are originated from the pterygoid plates and styloid process of the sphenoid bone respectively. Additionally, there is some embryologic and anatomical evidence for a relationship between the pterygoid muscles and sphenomandibular ligament, which

originate from the sphenoid bone, with the tensor tympani muscle in the middle ear.²⁶ It is speculated that dysfunctions of the cranial bones, such as the sphenoid and temporal bones, could play a role in somatic tinnitus especially in patients without a history of inner ear problems.

It is theorized that manual cranial treatment for correcting cranial bone dysfunctions could improve somatic tinnitus. Manual cranial treatment is defined as a systemic approach for evaluation and treatment of cranial bone dysfunctions. This method has been suggested for treating many somatic conditions such as headache, musculoskeletal disorders, chronic pain, TMJ disorders and ear pain.^{21,27,28} Despite the anatomical relationship between the cranial bones, TMJ and inner ear structures, limited clinical or scientific evidence exists in regard to effectiveness of manual cranial treatment on somatic tinnitus. In this paper, we present the effect of correcting cranial bone dysfunctions, through manual cranial treatment, on somatic tinnitus in two case reports.

Case reports

Case 1

The patient is a 45-year-old male veteran who complains of hearing a constant high-pitched tinnitus in his right ear. His symptoms appeared in 1985 after he experienced a battlefield explosion that left him unconscious for several days. The tinnitus has been constant since that event. There were no other injuries at that time. In addition to the tinnitus, the patient had high sound intolerance which subsided after six months. There has been, however, no change in the intensity of tinnitus in his right ear since being exposed to the burst wave. Because of the constant and chronic tinnitus, he developed intermittent severe psychological complaints and has been hospitalized three times in a psychological clinic since the incident. Currently he has no psychological issues, but reports episodic severe headaches. The patient was suffering from a headache during his initial visit in our clinic.

The patient's otoneurological examination was unremarkable, with a symmetric audiogram with no other hearing, otic or vestibular problems. The patient rated his tinnitus severity, assessed by the

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