ISSN: 2083-389X,
eISSN: 2084-3127

J Hear Sci, 2021; 11(4): 51–54
DOI: 10.17430/JHS.2021.11.4.6

EFFECT OF SOFT TISSUE MOBILISATION ON QUALITY OF LIFE AND PAIN PRESSURE THRESHOLD IN A PATIENT WITH SOMATIC TINNITUS: CASE REPORT

Contributions:
A Study design/planning
B Data collection/entry
C Data analysis/statistics
D Data interpretation
E Preparation of manuscript
F Literature analysis/search
G Funds collection

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Abstract

Somatic tinnitus is a condition that results from cervical spine or temporomandibular disorders. It commonly affects 36–43% of the Belgian population. We present a single case experimental design of a 38 year old somatic tinnitus patient having neck pain, headache, and ringing sensation in both ears. Six sessions of soft tissue mobilization were performed for 30 minutes on alternate days for two weeks. Postural re-education exercises were instructed as a home regime. Outcome measures were Visual Analogue Scale, Tinnitus Handicap Inventory, and digital calibrated algometer which were evaluated at baseline and after the last treatment session. Following 6 sessions of treatment there was a significant improvement in outcome measures. This study implies positive results of manual therapy on quality of life and pain pressure threshold in somatic tinnitus patients.

Key words: exercise • neck pain • quality of life • tinnitus • visual analog scale

WPŁYW MOBILIZACJI TKANKI MIĘKKIEJ NA JAKOŚĆ ŻYCIA I PRÓG WRAŻLIWOŚCI UCISKOWEJ U PACJENTA Z SOMATYCZNYM SZUMEM USZNYM: OPIS PRZYPADKU

Streszczenie

Somatyczny szum uszny jest dolegliwością powodowaną przez zaburzenia w obrębie kręgosłupa szyjnego lub stawów skroniowo-żuchwowych. Powszechnie dotyka 36–43% populacji Belgii. Przedstawiamy przypadek 38-letniego pacjenta z somatycznym szumem usznym, skarżącego się na bóle karku, głowy i uczucie dzwonienia w obojgu uszach poddanego eksperymentalnej terapii. Przeprowadzono 6 trzydziestominutowych sesji mobilizacji tkanki miękkiej w cyklu co drugi dzień przez 2 tygodnie. Zalecono wykonywanie w domu ćwiczeń z zakresu ogólnej terapii postawy (GPR). Do oceny efektów eksperymentalnej terapii zastosowano wizualną skalę analogową (VAS), Tinnitus Handicap Inventory oraz pomiar cyfrowym kalibrowanym algometrem. Badanie wykonano przed rozpoczęciem terapii i po ostatniej sesji terapeutycznej. Po 6 sesjach terapeutycznych nastąpiła znaczna poprawa wyników. Badanie wskazuje, że terapia manualna może mieć pozytywny wpływ na jakość życia i próg wrażliwości uciskowej u niektórych pacjentów cierpiących na somatyczny szum uszny.

Słowa kluczowe: ćwiczenia • ból karku • jakość życia • szumy uszne • wizualna skala analogowa

Introduction

Tinnitus refers to the perception of sound without the presence of any external auditory stimuli [1]. One type of tinnitus is somatosensory [2] which consists of two domains (associated with the cervical spine or temporomandibular joint) which can alter the severity of tinnitus [3]. The prevalence of cervicogenic somatic tinnitus is 43% [4] and temporomandibular disorders is 64% [2]. The diagnosis was made as per the diagnostic criteria for somatic tinnitus [5]. The characteristics of somatic tinnitus are: tinnitus and neck or jaw pain complaints appear simultaneously; tinnitus is preceded by head or neck trauma; tinnitus increases during bad posture; and tinnitus pitch, loudness, or location vary.

Previous studies [2] have demonstrated a positive role of manual therapy in somatic tinnitus patients. In 2016, a systematic review was carried out and concluded that manual therapy was an efficient treatment for somatic tinnitus [6]. According to our knowledge, there are only limited studies that have verified the efficacy of manual therapy to improve quality of life and pain pressure threshold in somatic tinnitus patients. This report presents evidence for manual therapy in somatic tinnitus patients.

Case report

A 38 year old female having chief complaints of neck pain, headache, and the perception of abnormal sound bilaterally. The patient had taken analgesics without consultation for the previous month but had experienced no relief. She had no previous medical, surgical, or family history and did not undergo any radiological test. Based on somatosensory criteria she was diagnosed with somatic tinnitus [5]. Informed consent was obtained from the patient before the study. The patient's posture was analysed and

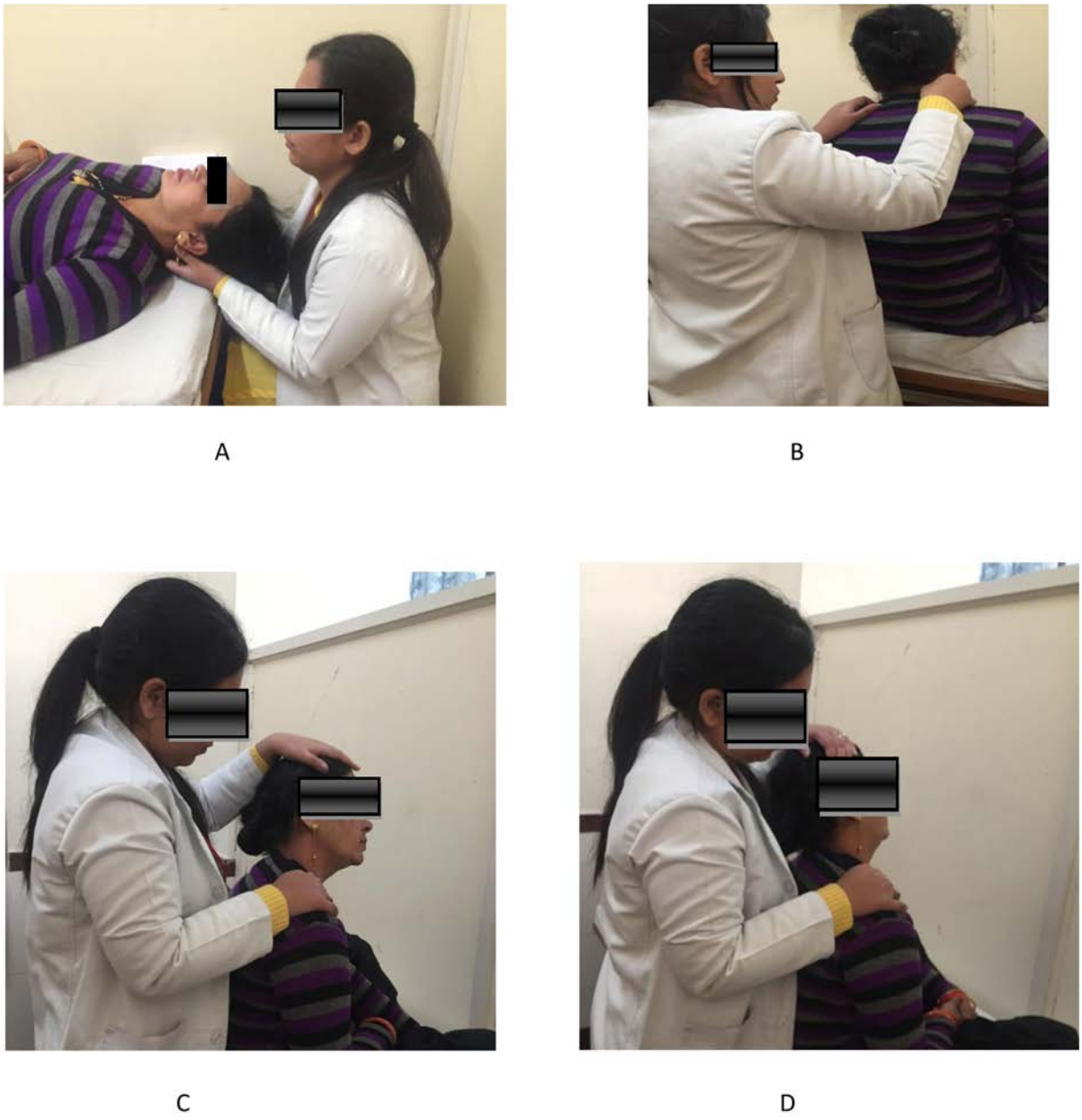

Figure 1. A and B demonstrate myofascial release in sitting and supine position. C and D demonstrate trapezius stretching

Grade 2 tenderness was palpated bilaterally over the upper trapezius, sternocleidomastoid, levator scapulae, splenius capitis, and scalene medius. No swelling was observed.

Outcome measures were tested at baseline and after the sixth session of intervention.

1. Visual Analogue Scale (VAS): The patient was asked to mark a point on a 10 cm horizontal line between "no tinnitus" or "severe tinnitus" [6]. VAS is a consistent and valid tool for measuring the loudness of tinnitus [2].

2. Tinnitus Handicap Inventory (THI): To assess quality of life, 25 questions were answered by yes or no [7]. THI is a suitable and valid tool for measuring the quality of life in a patient with somatic tinnitus [8].

3. Digital calibrated algometer (DCA): An ALGO-DS-01 model was used. To measure pain pressure threshold, the DCA was placed over the trigger point and pressure was subsequently increased. The patient was asked to say whether there was any change from pressure to pain [2].

The intervention protocol consisted of six sessions of soft tissue manual therapy applied for 30 minutes on alternative days for two successive weeks. The therapy involved myofascial trigger point (MTP) release, stretching, craniocervical flexion exercise, and home exercises.

Myofascial trigger point release involved the therapist placing the thumb over the diagnosed MTP and applying pressure while the patient was sitting [9]. Pressure was applied

for 30 seconds followed by a 10 sec rest; the procedure was repeated 5 times.

Prolonged stretching of the sternocleidomastoid and upper trapezius muscle was performed in a sitting or hook lying position five times with a stretch of 5–10 seconds [10].

Craniocervical flexion exercises were performed 10 times in supine lying and sitting positions with a hold for 10 seconds [11].

With, home exercises the patient was instructed to stand against a wall and then slowly draw the head backwards until it came in contact with the wall, maintaining the position for 30 seconds. This was to be done 3–5 times a day. Dosage was varied according to the severity.

Results

Soft tissue manual therapy gave a significant improvement in quality of life and pain pressure threshold in patients with somatic tinnitus. The results are presented in Table 1 and Table 2.

Table1. Pre and post training measurement of VAS and THI

Outcome measure	Baseline	Post treatment
VAS	8	4
THI	42 (Grade3)	24 (Grade2)

VAS: Visual Analogue Scale, THI: Tinnitus Handicap Inventory

Table 2. Pre and post measurement of PPT by DCA

Muscle	Pre pain pressure threshold	Post pain pressure threshold
Sternocleidomastoid	17.8 N	24.3 N
Upper trapezius	14.2 N	18.6 N
Levator scapulae	18 N	24 N
Splenius capitis	15 N	20.2 N
Scalene medius	16 N	18 N

Discussion

This report shows that soft tissue mobilization had a positive role in improving pain pressure threshold and quality of life in somatic tinnitus patients, as all outcome measures were improved significantly.

There is a strong link between the somatosensory system of the cervical spine and the temporomandibular joint (TMJ) to the dorsal cochlear nuclei of the ear [6]. It is therefore considered that the improvement in the patient's quality of life was due to the soft tissue manual therapy, which regained the length of the muscle and desensitized the trigger points responsible for the symptoms of loudness and pain. In this way, it improved the quality of life and pain pressure threshold of the patient [12].

This study also supports the theory that relaxing muscles reduces the severity of tinnitus [12]. Trigger point release can be palpated by stretching the muscles to the end of the tissue's resistance. Trigger points can be released by slowly increasing pressure until the finger comes across an obstruction. Press and stretch techniques can be used to reinstate abnormally contracted sarcomeres [12]. The pain pressure threshold of the patient can be improved due to the localised hypoalgesic effect. Soft tissue manual therapy has proven to be effective in raising the PPT in patients suffering from various musculoskeletal ailments [13].

There are previous studies (e.g. [6]) which have concluded that there is a positive role for multi model cervical physical therapy in improving somatic tinnitus. Cherian et al. [14] also demonstrated the role of mechanical treatment of cervical spine and jaw in tinnitus patients.

A systematic review in 2019 established a positive role for manual therapy in somatic tinnitus [15]. Soft tissue mobilization, in combination with postural re-education exercises, appears to be effective in improving the pain pressure threshold and reducing the negative impact of tinnitus on the daily life of patients. It is advisable to include the soft tissue approach in the successful treatment of symptoms in somatic tinnitus, along with pharmacological and psychological interventions. Future studies with larger sample size should be performed to provide stronger evidence regarding the use of soft tissue mobilization.

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