

CHRONIC TINNITUS AFTER OSTEOPATHIC CRANIAL
MANIPULATIVE MEDICINE AND ACUPUNCTURE: AN
EXPERIMENTAL STUDYZUMBIDO CRÔNICO APÓS OSTEOPATIA CRANIANA E
ACUPUNTURA: UM ESTUDO EXPERIMENTAL

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ABSTRACT

Objective: tinnitus experienced for more than six months becomes a chronic and often disabling condition. Several treatments have been used to treat tinnitus, including complementary therapies. These therapies are promising for their low cost and low health risk. The aim of this study was to verify the effect of osteopathic manipulation and acupuncture on the symptoms of subjects with chronic tinnitus. **Methods:** this was an experimental clinical study, sample randomized by simple draw, in which one group underwent treatment for cranial osteopathy and the other underwent acupuncture treatment for tinnitus, being a weekly session for six weeks in both treatments, lasting 30 minutes each. Anamnesis with tinnitus handicap inventory, otoscopy, pure-tone threshold audiometry, acuphenometry, and Visual Analogue Scale (VAS) were carried, this last one was the instrument that evaluated the pre and post treatment symptoms. **Results:** a total of 12 subjects were included in the Osteopathic Manipulation Group (OMG) and 12 subjects in the Acupuncture Group (ACG). At least two points on the VAS scale improved in three subjects in OMG ($p = 0.043$) and five in ACG ($p = 0.027$). **Conclusions:** both therapies have been shown to be effective in reducing the symptoms caused by chronic tinnitus.

Keywords: Acupuncture; Manual therapy; Osteopathic Manipulation; Tinnitus; Visual Analog Scale.

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RESUMO

Objetivo: o zumbido percebido por mais de seis meses se torna uma condição crônica e, muitas vezes, incapacitante. Vários tratamentos têm sido utilizados para tratar o zumbido, incluindo terapias complementares. Essas terapias são promissoras por seu baixo custo e baixo risco à saúde. O objetivo deste estudo foi verificar o efeito da manipulação osteopática e da acupuntura nos sintomas de indivíduos com zumbido crônico. **Métodos:** estudo clínico experimental, amostra randomizada por sorteio simples, em que um grupo foi submetido a tratamento para osteopatia craniana, e outro, a tratamento com acupuntura para zumbido, sendo uma sessão semanal por seis semanas em ambos os tratamentos, com duração de 30 minutos cada. Foram realizadas anamnese com questionário de identificação de incômodo do zumbido, otoscopia, audiometria de limiar de tom puro, acufenometria e Escala Visual Analógica (EVA), sendo esta última o instrumento que avaliou os sintomas pré e pós-tratamento. **Resultados:** um total de 12 indivíduos foi incluído no Grupo de Manipulação Osteopática (GMO), e 12 indivíduos, no Grupo de Acupuntura (GAC). No mínimo dois pontos na escala EVA melhoraram em três indivíduos no GMO ($p = 0,043$) e cinco no GAC ($p = 0,027$). **Conclusões:** ambas as terapias demonstraram ser eficazes na redução dos sintomas causados pelo zumbido crônico.

Palavras-chave: Acupuntura; Escala Visual Analógica; Manipulação Osteopática; Terapia manual; Zumbido.

INTRODUCTION

Tinnitus is defined as the perception of sound without the existence of an external acoustic stimulus¹. Although hearing loss is the main cause of tinnitus², there are several emotional, metabolic, structural, and functional causes, and being the association of causal factors also common. For that reason, several treatments are offered in an attempt to minimize tinnitus symptomatology.

Acupuncture (AC) is a treatment widely used in the treatment of tinnitus, but its efficacy has been better described in Asian countries than in the West, perhaps because there is greater acceptance of complementary medicine in those places, and also because it is a therapy that does not require standardization of the protocols used, either regarding the AC points used or the number of adequate sessions, according to the variety of applications found in randomized controlled trials³.

Osteopathic manipulation (OM) is very promising in the treatment of tinnitus⁴, but there are fewer studies on the theme, particularly clinical trials. Moreover, it is a new therapy for AC, since osteopathy has focused its attention for many years on the study of major bone and joint structures such as the spine, pelvis and thoracic region. Studies related to smaller joints such as the skull are still scarce, and especially the symptoms attributed to those, such as tinnitus.

Tinnitus treatment, in general, has more often received a multidisciplinary look⁵ with the inclusion of complementary therapies such as AC⁶, Homeopathy⁷, meditation and relaxation⁸, and others, which are attractive because of the low cost, little or minimal side effect, and which can both prevent the occurrence of the symptom in healthy populations and promote long-term symptom control.

By this way, the aim of the study was to verify the effects of a new therapy for tinnitus – OM – in symptomatology of chronic tinnitus, and compare the results with a recognized treatment of tinnitus, the AC.

METHODS

Subjects

In the Audiology Clinic of the Federal University of Santa Maria, we received subjects who were adults, with unilateral or bilateral tinnitus for more than six months, evaluated by a speech therapist who excluded subjects with middle ear infection, verified by otoscopy, as well as subjects with severe or profound hearing loss, verified by pure-tone threshold audiometry, and only subjects with type A tympanometric curve were included, who should not be participating in other concomitant tinnitus treatments. The sample size was determined concomitantly to the data collection, establishing the cohort point 0.8, through the effect analysis by d of Cohen method⁹, so, the Osteopathic Manipulation Group (OMG) size was calculated in n=12 subjects.

Ethics

This experimental, clinical study, randomized by simple draw and double blinded, was not registered by a randomized trial, because it was a part of another study, approved by the Research Ethics Committee, under number 2958905. All participants was informed by the ethics and signed the Consent Form.

Experimental design

The two experimental groups were composed by OMG (n=12), and Acupuncture Group – ACG (n=12). VAS in the OMG group was 7.5, while in ACG group was 5.8 points. **Table 1.**

Table 1. Sample characterization by groups OMG (n=12) and ACG (n=12) and result of VAS pre and post treatment

Variable	Osteopathic manipulation group (OMG)	Acupuncture group (ACG)
Gender	Female (n=7) Male (n=5)	Female (n=6) Male (n=6)
Age	20 to 39 years (n=3) 40 to 59 years (n=6) >60 years (n=3)	20 to 39 years (n=4) 40 to 59 years (n=3) >60 years (n=5)
Tinnitus	Right Ear (n=2) Left Ear (n=5) Both ears (n=5)	Right Ear (n=4) Left Ear (n=4) Both ears (n=4)
THI	Grau ligeiro (n=2) Grau leve (n=3) Grau moderado (n=3) Grau severo (n=4) Grau catastrófico (n=0)	Grau ligeiro (n=3) Grau leve (n=5) Grau moderado (n=2) Grau severo (n=1) Grau catastrófico (n=1)
VAS	Pre 7,5 (±1,4)	Pre 5,8 (±2,1)

THI: Tinnitus Handicap Inventory; VAS: Visual Analogue Scale.

Treatment with OM was performed by a professional osteopath through the evaluation of osteopathic dysfunction, based on previous studies^{7;10;11} which included assessment of Primary Respiratory Movement, sphenobasilar synchondrosis (SEB), temporomandibular joint and chewing muscles, V-spread for cranial sutures, temporal bone, and fourth ventricle technique (CV4).

Manual monitoring of the Primary Respiratory Mechanism (MRP) was performed with one hand positioned on the occipital bone and the other on the frontal bone, and from then on, the frontal and occipital flexion and extension movements were realized.

The cranial sutures addressed were sagittal, lambdoid, coronal, scaly, and occipitomastoid sutures, in addition to the bregma and lambda meeting points, and the method used was the “V spread”, which is named for the position of the index and middle fingers, one to each side of the suture, making a separation movement of the fingers, associated with a gentle pressure on the structure.

In the temporomandibular joint, Jones techniques were performed on the lateral and medial pterygoid, masseter, temporal, and digastric muscles. Global articulatory maneuvers for the mandible were also performed. Some of these techniques are considered intra-oral and therefore require the use of latex gloves for procedures.

Another maneuver performed was the temporal bones or indirect maneuver of the auditory tube, in which the application of

smooth rotational movements and traction of the temporal bone fasciae, promotes the correction in the internal and / or external rotation dysfunctions of the bones, and indirectly, opening the auditory tube, or equalizing its internal pressures.

In the , which is the joint between the sphenoid and the occipital bone, techniques for lateroflexion, rotation, torsion, lateral and vertical strain and coaptation were performed, the latter being the only intra-oral maneuver for SEB.

At the end, the maneuver of the fourth ventricle or CV4 was performed, with the therapist’s hands positioned on the patient’s occipital region, to improve the circulation of cerebrospinal fluid, a very relaxing technique, in which the average application time is between eight and ten minutes.

A weekly session for six weeks lasting 30 minutes each was carried out, in which the patient was positioned lying down in dorsal decubitus on the procedural stretcher, the therapist sitting closing to the stretcher with his or her hands on the patient’s skull.

Treatment with AC was also performed by a specialist, according to a previous protocol⁶, or is widely used in research for the treatment of chronic tinnitus. For the application of AC, standard size 0.2 mmX25 mm needles, all disposable, were used.

The patient was positioned in dorsal decubitus on a procedural stretcher, the therapist applied the needles and left the patient resting. The protocol was adapted

to the number of sessions from fifteen to six, lasting 30 minutes, once a week for six weeks, divided in three types of session, repeated once, each, to complete six sessions.

Session 1: two points related to the Triple Warmer meridian (TW2 and TW17); two points related to the Gall bladder meridian (GB2 and GB42); a point related to the Governor Vase meridian (GV20)

Session 2: two points related to the Triple Warmer meridian (TW5 and TW21); two points related to the Gall bladder meridian (GB8 and GB43);

Session 3: two points related to the Small Intestine meridian (SI2 and SI8); a point related to the Stomach meridian (S3); a point related to the Gall bladder meridian (GB21); a point related to the Conception Vessel (CV23).

Most points were applied bilaterally; the point CV23 and GB21 and GV20 were applied to the mid-line of the body, and CV23 was applied, stimulated with rotational movements of the needle, and immediately retired.

Evaluation

The main outcome observed was the annoyance generated by tinnitus, through the Visual Analog Scale (VAS), in which the subject assigns a score between zero and ten for the level of annoyance that

the symptom produces at the time of the evaluation. It was answered at the initial assessment and, after, at the last session of treatments. The values obtained in each group were transformed into averages and analyzed by statistics. A reduction at least two points after the procedures in VAS was considered symptomatology improvement.

Data Analysis

In the statistical analysis, associations of variables were performed using the Chi Square test and comparison between two dependent groups using the Wilcoxon test. The significance level used for all tests was 5%

Results

The symptomatology improvement of tinnitus was reported by three OMG subjects (25%) and five ACG subjects (41.6%). The initial assessment of VAS (pretreatment) of tinnitus was higher in OMG ($p = 0.023$), and more subjects of this group ($n=4$) were in severe level of THI, while the major part of subjects were in ACG light grade ($n=5$) in THI. Both treatments were effective in reducing tinnitus symptomatology (Figures 1 and 2) and there was no difference in symptomatology between OMG and ACG in the evaluation of post treatment VAS ($p = 0.02$).

Fig 1. Effect of Osteopathic Manipulation treatment on tinnitus symptomatology through Visual Analog Scale

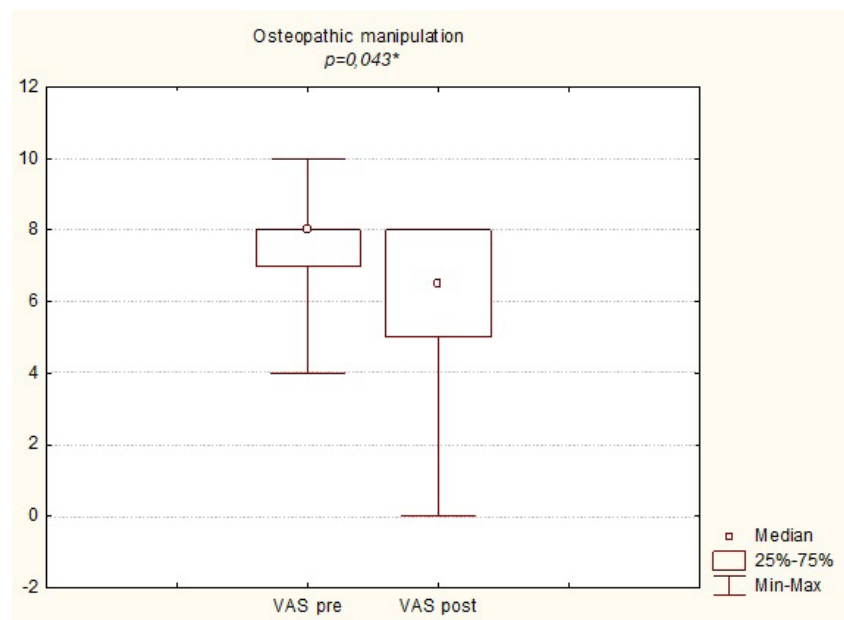
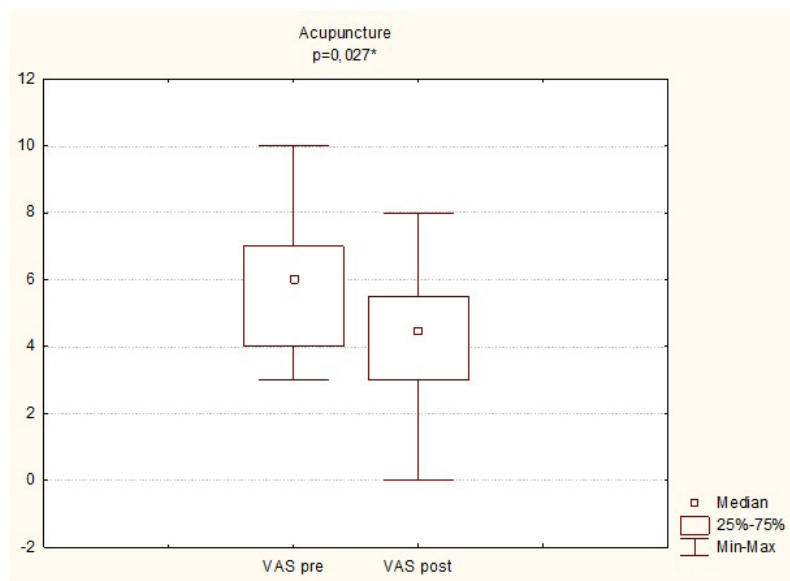


Fig 2. Effect of Acupuncture treatment on tinnitus symptomatology using the Visual Analog Scale



There was difficulty in evaluating other variables, but we consider that the symptomatology of tinnitus is the major objective to decrease with therapies, although it is very difficult to treat this, and therefore, this is a relevant study, especially because OM is a very secure therapy and the access is easy. For further studies, we council to identify more variables or tests.

Discussion

The main hypothesis of this study, that OM could represent a good therapy against tinnitus, was confirmed when 25% of the subjects had symptomatology improvement in at least two points in VAS. This number represents a good answer, considering that this symptom is chronic, difficult to treat, with years of evolution most of the times.

Authors⁴ used a manual therapy similar to OM, with low speed techniques and gentle movements in the treatment of tinnitus, where about 12 sessions were performed to obtain similar results in patients' symptomatic relief, evaluated by VAS. In this study, the subjects' mean age was similar to ours, and most subjects had a symptom evolution time greater than 60 months (5 years).

Furthermore, the result obtained in the VAS at the initial assessment was higher in the OMG, indicating that for some

reason this group had a higher degree of annoyance in relation to tinnitus, what also affects the improvement response in chronic symptoms.

The symptomatology improvement of tinnitus through AC was an expected result, as it is a therapy used for years in the treatment of tinnitus. On the other hand, in this study only 6 AC sessions were performed, while in the reference study⁶ 15 sessions were carried out. Also, a percentage of improvement in these subjects exceeded 41%, while in a previous study it represented only 35% of subjects¹²¹.

Studies with CA have been able to show, in this century, among others, the increase of opioid peptide concentration in the hair cell nerve endings by stimulating some specific points, which would be another effect responsible for the reduction of annoyance and pain and promote well-being¹³.

There has been evidence that OM may be deemed as a reference in the treatment of neuropathic or chronic pain¹⁴. And it indicates the result of this therapy in these patients can improve physical, social, sleep, mood, and relationship aspects.

In this study, we were unable to assess the post-treatment THI, but we encourage this assessment, since the improvement in symptoms generally interfere positively in

the other aspects of the subject's life.

We agree that, despite the promising results, the multifactorial character of tinnitus always requires a multidisciplinary investigation, coordinated by the otorhinolaryngologist, to assess and treat the other causes, metabolic, neurological, cardiovascular, pharmacological, dental, and psychological of the symptom¹⁵.

CONCLUSION

In this sense, both OM and AC may represent a possibility of treatment of chronic pain, and are low cost therapies and practically nonexistent risk. AC is a very recognized therapy in tinnitus, but the studies with OM are a recent discovery, which should have more basement in the future.

In Brazil, the recent inclusion of OM in the public health system may represent a broader population and stimulate more clinical studies that can better elucidate its mechanisms of action, especially in the treatment of tinnitus.

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Author Contributions

CFV contributed in all phases of the study, except for the application of AC. MVG and AFS contributed to the study design, interpretation of results and writing of the paper. SJO, RSB, TDA contributed to the writing of the article, the

interpretation of the results and the evaluations of the subjects. WRB contributed to the application of AC and the writing of the paper.

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