

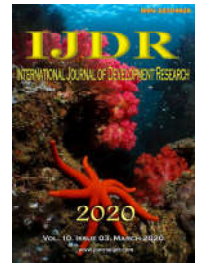


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RESEARCH ARTICLE

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EVALUATION OF AURICULOTHERAPY IN PAIN REDUCTION IN PATIENTS WITH TEMPOROMANDIBULAR DYSFUNCTION

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ABSTRACT

Temporomandibular Dysfunction (TMD), characterized by pain in the masticatory muscles and temporomandibular joint (TMJ). Auriculotherapy, according to Chinese medicine, represents a microsystem of the body where there are specific points for pain treatment. This study aimed to evaluate the effectiveness of auriculotherapy in reducing pain in TMD patients. We evaluated patients who sought the dental clinic of the University of West Santa Catarina complaining of orofacial pain. Thirty-three patients with TMD were selected by the American Orofacial Pain Association (AAPO) questionnaire. For clinical evaluation and muscle palpation, the Diagnostic Criteria for Temporomandibular Disorders Research questionnaire was used. Using the visual analog scale (VAS), the patient pointed out his perception of pain at the time, so that auriculotherapy was performed at the Shen Men, Subcortex, TMJ, mandible and maxilla points. VAS was reapplied 1 hour, 24 hours and 7 days after auriculotherapy. Reduction in pain level was observed at all times of treatment. Pain reduction was maintained after 24 hours and after 7 days, being statistically significant ($p=0.000$), demonstrating the effectiveness of auriculotherapy in pain control in the evaluated cases.

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INTRODUCTION

Pain is the main reason for seeking medical care, and orofacial pain is a major cause of dental demand. The symptom that has a great impact on the lives of patients due to suffering and the changes that cause problems in daily life and in social and individual problems, harming the productive process and quality of life (Lacerda et al. 2008). Analyzing this way it is possible to determine that pain is an unpleasant sensory and emotional experience, with real or potential technical damage, in which chemical and chemical components are involved, also considering the subjective and psychological aspects (Da Silva et al., 2011; Leeuw, 2010). Temporomandibular disorder (TMD) is the main cause of orofacial pain, characterized by muscle disorders involving a temporomandibular joint (TMJ)

and as structures that are related to it, where chronic pain is present and, on average, 50 to 60% of the population has any TMD signs or symptoms (Okeson, 2013). This dysfunction is characterized by a pathological and disharmonious condition in the function and structures involved in the TMJ, it is a disease of multifactorial etiology and can be triggered by psychosocial, inflammatory, infectious factors or by autoimmune processes. The main signs and symptoms are noise in the joint, pain in the muscles involved mainly in the masticatory muscles (masseter and temporal), tired jaws that show symptoms of being stuck or stuck or even changing the way that the upper teeth fit into the lower ones, therefore, you must have an interdisciplinary diagnosis and treatment, as the therapeutic approach for each individual will be different (Melo e Barbosa 2009; Leeuw, 2010). Traditional Chinese Medicine (TCM) is one of the oldest forms of oriental

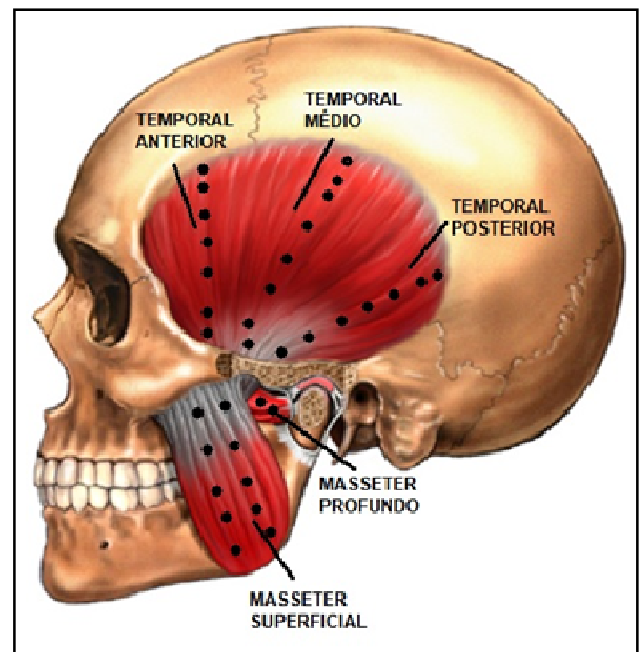
medicine, based on the observation of nature, the interaction between its phenomena and the harmony that exists between them. Concluding that the human being and the universe are closely connected, subjected to the same influences, thus being able to compare them with the physiology of the human body, and in this way, it was possible to apply this understanding to the treatment of diseases, prevention and maintenance of health through several ways (Moura, 2016). One of the techniques of TCM is auriculotherapy, which consists of stimulation of the ear to affect the treatment of various diseases. It works only with points located in the ear, which comprise a microsystem of the human organism, with the representation of the whole body contained in the ear, corresponding to a “map” in which all the organs and structures of the body are present, allowing it to act in the organism in a wide and distant way from the pain point (Souza, 2007; Tolentino, 2016). Auriculotherapy indications are wide-ranging, from inflammatory, painful, endocrine-metabolic, urogenital, infectious and contagious diseases to chronic diseases. The contraindications vary according to common sense, considering that it is a complementary treatment for the patient's well-being. It is not indicated for life-threatening cases and should be used with caution in pregnant women, especially in urogenital and endocrine points (Garcia, 1999).

Auriculotherapy treatment stimulates nerve endings in the ear (V and VII cranial nerves) that are transmitted to the central nervous system. These stimuli are associated with the release of several neurotransmitters, the modulation (activation and/or inhibition) of endogenous mechanisms (endorphins) to control nociception, inflammation and the activity of the limbic system in the central nervous system (Moré *et al.*, 2018). Being the vagus nerve (VII by cranial) or main nerve without control of the viscera function and inflammatory processes, its nerve endings can signal to the central nervous system the presence of inflammation, which immediately leaves the signals to release the neurotransmitter acetylcholine that inhibits the release of inflammatory substances produced by cells of the immune system. Since the ear is one of the few areas of the body where the nerve can be directly stimulated in a non-invasive way, auriculotherapy can be used as an activator of natural anti-inflammatory responses, that is, a form of physiological (non-pharmacological) activity to control inflammatory processes (He *et al.*, 2012; Moré *et al.*, 2018). Because of this, and due to the magnitude of the orofacial pain problem, the dentist must know the alternative treatments, as they are used, safe and economical methods. Favor health promotion and consequently improve the quality of life of their patients (Bérzin, 2007). With this, the need to analyze alternative alternatives and their objectives is justified. Thus, the present study used in patients diagnosed with TMD according to the American Orofacial Pain Association (AAPO) and Diagnostic Criteria for Researching Temporomandibular Disorders RDC / TMD on the efficacy and effects of auriculotherapy in reducing and/or painful symptoms.

MATERIALS AND METHODS

The research was submitted to and approved by the Ethics and Research Committee of the University of the West of Santa Catarina (Unoesc) under opinion number 3,042,849/2018, being the type of observational clinical research. Initially, 43 patients, of both sexes, aged between 18 and 65 years, who visited the Dentistry clinic of the Unoesc campus Joaçaba,

complaining of facial pain or difficulty in opening their jaws, were examined. Those who agreed with the free and informed consent form (ICF), those who had some type of TMD according to the questionnaire of the American Orofacial Pain Association (AAPO), and those who presented pain symptoms were considered as included. Exclusion criteria were those who had comorbidities and degenerative diseases, who used medications analgesics and/or anti-inflammatory drugs or who used occlusal plaque. After this exclusion, the sample was made up of 33 patients, aged 20 to 50 years. For physical examination, part of the questionnaire Diagnostic Criteria for Research on Temporomandibular Disorders (RDC/TMD) related to palpation of the masseter and temporal muscles (Figure 1), after which the Visual Analogue Scale (VAS) was applied.



Fonte: NETTER, Frank H. Atlas de Anatomia Humana. 2ed. Porto Alegre: Artmed, 2000.

Figure 1. Points of palpation of the Masseter and Temporal muscles



Figure 2. Ear points used in research

Table 1. Relationship between degree of TMD and perception of pain intensity, using the visual analog scale (VAS)

Degree of TDM	N	%	Pain intensity (average)			
			Before	1 hour after	24hour after	7 days after
Grade I	1	3%	0	0	0	0
Grade II	29	87,9%	8	4	2	3
Grade III	3	9,1%	9	6	4	2
Grade IV	0	0%	0	0	0	0

Legend: n – number.

Table 2. Average pain intensity in muscle groups

Pain intensity	Anterior Temporal	Middle Temporal	Posterior Temporal	Superficial Masseter	Deep Masseter
Painless	18,18%	21,21%	30,30%	12,12%	18,18%
Mild pain	24,24%	21,21%	24,24%	9,09%	9,09%
Moderate pain	33,33%	30,30%	27,27%	15,15%	24,24%
Severe pain	24,24%	27,27%	18,18%	63,64%	48,48%

Table 3. Comparison between pain intensity before and after auriculotherapy

Pain Intensity	Average	Standard deviation	Value of t*	Value of p
Before	7,58	1,985	9,442	0,000
1 hour after	3,85	2,063		
Before	7,58	1,985	9,152	0,000
24 hour after	2,48	2,526		
Before	7,58	1,985	9,842	0,000
7 days after	2,67	2,341		

Legend: *T test paired sample.

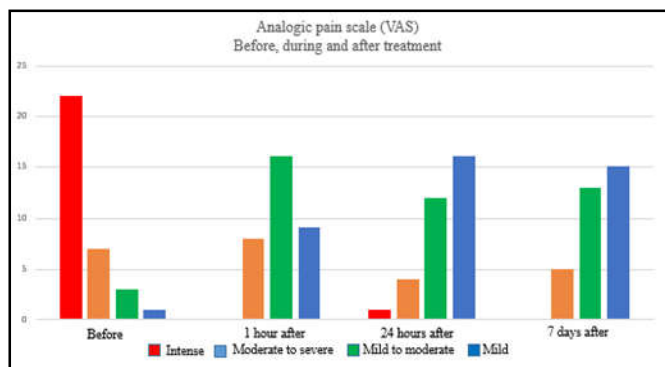
To start the auriculotherapy treatment, the area (ear) was cleaned with cotton and 70% alcohol, to remove the oil from the skin, the desired points for treatment proceeded (Sub cortex, Shen Men, ATM, Maxilla and Mandible) (Figure 2) where the crystal balls of the Dux® brand were applied following the protocol of Da Silva (2012). The application has always been carried out by a single operator, with the same point locator. Patients were instructed to stimulate the spheres by pressing them 3 times, at least 4 times a day. The spheres should remain in the points for at least 4 days, and the guidelines given to patients followed the protocol of Araujo and Silverio-Lopes (2013) and Zumstein (2012). The VAS has applied again 1 hour, 24 hours and 7 days after the auriculotherapy, checking the level of pain that the patient was feeling at those moments. The data were tabulated on a Microsoft Excel® spreadsheet and later submitted to statistical analysis. To compare the means of the groups, students' t-test for paired samples was performed. The tests were performed using the SPSS® program (Statistical Package for the Social Sciences) version 21, the p-value was considered statistically significant when $p \leq 0.05$, with a 95% confidence level.

RESULTS AND DISCUSSION

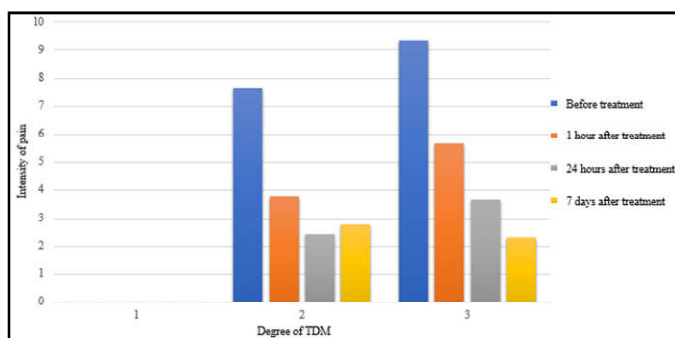
In the painful processes that occur in patients with TMD, multidisciplinary and integrative treatment is necessary, the literature shows that 74% of patients seek alternative therapies such as auriculotherapy to reduce painful symptoms (Porporatti *et al.*, 2015). Symptoms of chronic pain are difficult to characterize and quantify since they are subject to individual patient perceptions where the degree to which a person reacts to pain is highly variable. Through mechanical stimulation caused by digital pressure, the fibers that lead to pain in the central nervous system (CNS), located in the myofascial and muscular structures, are stimulated, and in this study, we opted for the most significant for palpation the masseter muscles and temporal, where the diagnosis of muscle-type TMD is characterized by pain in these muscles

(Figure 1) (Castro, 2007; Pinto *et al.*, 2015; Santos-Silva *et al.*, 2010). Classified using the RDC/TMD algorithm, most patients had a grade II TMD (87.9%) (Table 1), assessed through VAS the patients' perception level was high, where 8 to 10 means pain severe (mean intensity level 8) (Table 1) and on muscle palpation they presented mild to moderate pain in all muscle groups, (Table 2) (Graph 2). Only 3 patients (9.1%) had a TMD classified as grade III (Table 1), with a perception level of 9 on the EVA scale. (Table 1); on muscle palpation, they presented moderate to severe pain in all muscle groups (Table 2). Only one patient had TMD classified as grade I, but he had no perception of pain at the time of the examination, and no cases with TMD grade IV were observed (Table 1). According to the TCM, pain is interpreted by stagnation of Qi and/or Xue in the meridians, and auriculotherapy stimulates specific points of the ear, so any change in a certain organ or part of the body can be detected and treated by him. Therefore, the choices of points were the Shen Men, subcortex, ATM, maxilla and mandible. The Shen Men stitch has an analgesic, anti-inflammatory and anti-anxiety function. The subcortex point for the treatment of pain, anxiety and depression, these points being when the effects of the application points were enhanced, which was an ATM, is an area for converting Qi and/or Xue, or which may appear as a clinical condition called syndrome Bi. According to another study (Maciocia, 2010), if it is not fought it can go on to the organs developing diseases. The mandible and maxilla points are points for the treatment of sinusitis, odontalgia and temporomandibular disorder. The points chosen to treat TMD in evaluated patients were decisive for the results presented when we compared the perception of pain level according to the VAS scale before treatment, one hour after, 24 hours and 7 days, where the pain decreased significantly in intensity in all periods, agreeing with other studies (Graph 1) (Da Silva *et al.*, 2012; Farias, 2018). When compared to the intensity of pain before and after auriculotherapy, there was a reduction in the level of pain at all times (Graphs 1 and 2). In patients with grade II TMD, which according to axis II of the RDC/TMD evaluates the patient

with a low disability and high intensity of chronic pain, there was a 50% reduction in the first hour (Table 1).



Graph 1. Pain scale (VAS) during treatment



Graph 2. Relationship between the intensity of pain and the degree of TMD

The pain reduction was maintained after 24 hours and 7 days (Table 1), this reduction was statistically significant ($p = 0.000$) (Table 3), demonstrating the effectiveness of auriculotherapy in pain control in TMD cases. In agreement with another study (Da Silva *et al.*, 2011), in which it was found that patients who had TMD and used auriculotherapy had pain reduction. In this study, women diagnosed with TMD represented 84.84% of the total number of individuals (Table 4) corroborating the study by Piccin *et al.* (2016) where it was found that women are more likely to be diagnosed with TMD than men. It occurs predominantly during the productive years, between 20 and 50 years of age. Pain reduction occurred in both sexes. The stimulus performed in the auricular region are associated with the release of endogenous opioids (endorphins) in the central nervous system, which can decrease the activity of nociceptive neurons, which can generate a decrease in pain perception, corresponding in the present study to subcortex point, combined with the Shen Men point (Figure 2) (Moréet *et al.*, 2018; Neves, 2009). Regarding the treatment time, auriculotherapy is recommended for at least three to four days, and after decreasing, however, its effect lasts up to seven days after the application (Zumstein, 2012). After this period, the stitch is already saturated and has no more results, as observed in the present study, after 7 days the patient's perception of pain increased, but it remained lower than the pain the patient felt when he arrived for the first consultation. In the study by Santoro *et al.* (2015) found an increase in the pain threshold after 24 hours of treatment. They have shown that stimulation of acupoints causes the release of anti-inflammatory cytokines induced by neuropeptides in long-term effects. Comparing the effects of auriculotherapy with myorelaxant plaque, they prove that the technique is positive when indicated for pain relief, which corroborates the results of this study, as both conclude

that there was a statistically significant difference in favor of the use of auriculotherapy, and that reduced symptoms of muscle pain faster and more significantly than isolated occlusal therapy (Da Silva *et al.*, 2012; Ferreira *et al.*, 2015). Other studies that used auriculotherapy to relieve other pains, such as headache and chronic low back pain, proved that auriculotherapy was effective in reducing pain, in agreement with the present study, in which auriculotherapy was shown to be statistically significant for chronic pain relief caused by TMD (Tolentino, 2016; Bevilacqua *et al.*, 2008). Still, in the longitudinal study conducted by Araújo and Silverio-Lopes (2013), which applied auriculotherapy for the treatment of musculoskeletal disorders, and after undergoing treatment, they were reassessed after three years, it was concluded that there was a reduction in pain and / or beneficial modification of painful symptoms in 100% of the volunteers, the results remaining even after the three-year period.

Conclusion

From the results obtained, it was observed that auriculotherapy is effective in reducing painful symptoms, in cases of TMD, up to 7 days after treatment. Bearing in mind that TMD pain is one of the most common complaints in the search for a dental surgeon, auriculotherapy, in addition to being a quick, relatively simple treatment method, with practically no side effects, is a very useful and effective tool for the treatment of pain in temporomandibular disorders.

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