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RESEARCH ARTICLE

Acupuncture Effect on Pain, Mouth Opening Limitation and on the Energy Meridians in Patients with Temporomandibular Dysfunction: A Randomized Controlled Trial

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Abstract

Temporomandibular disorders (TMD), recognized as the most common conditions of chronic orofacial pain, have a multifactorial etiology. Acupuncture can help to relieve the pain and discomfort associated with these conditions, because it can rebalance the energy (Qi) circulating in the meridians. The aim of the study was to verify the effectiveness of acupuncture in treating the pain; mouth opening limitation, and energy circulating in the meridians of patients with TMD of muscular or mixed origin. This was a controlled, randomized, double-blind clinical trial conducted at the Piracicaba Dental School (FOP/Unicamp), in Piracicaba SP, Brazil. The Treatment Group received acupuncture with real penetration of the needle, and the Placebo Group received a sham treatment without needle penetration. The acupoints used were: ST6, ST7, SI18, GV20, GB20, BL10, and LI4, during treatment performed for four weekly sessions. The TMD and mouth opening were evaluated according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC). The measurements of the energy at the meridians were performed by the Ryodoraku method, before and after acupuncture in all of the sessions in both groups. The results showed no decrease in pain in the Treatment Group when compared with the Placebo Group ($p = 0.2261$). There was no increase in the oral opening limit in the Treatment Group compared with the Placebo Group ($p > 0.05$). Regarding the energy levels, after acupuncture, there was a decrease in Yang energy in all sessions

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($p < 0.05$), in both groups, however, only real acupuncture was effective in maintaining the Yin energy average throughout the four sessions, with significant difference between groups ($p = 0.0198$). In conclusion, volunteers with TMD presented a pattern of energy deficiency and the most prevalent imbalance patterns identified were in the meridians coupled to the kidney and bladder, and in the Shao Yin (heart/kidney) and Shao Yang (triple energizer/gall bladder) energetic planes. The acupuncture points used were equally effective in reducing pain in both groups; increasing the unassisted mouth opening limitation without pain in the Treatment Group, and were also effective in preserving the Yin energy in the Treatment Group. The Yang energy decreased equally in both groups.

1. Introduction

The temporomandibular dysfunctions (TMD) are recognized as the most common conditions of chronic orofacial pain [1]. The pain reported by patients with TMD, is typically felt in the chewing muscles, preauricular area, or in the temporomandibular joint [2]. It has been suggested that between 40% and 75% of the population presents at least one sign of TMD, such as the presence of joint sounds in TMJ; and 33% have at least one symptom such as, facial or TMJ pain [3]. TMD may be muscular and/or articular, but the literature has shown that the types of muscular origin are more prevalent [4]. Although TMD occurs in both sexes, recent studies have found a higher prevalence in women [5,6].

The etiology of TMD is multifactorial, originated by association between psychological, structural, and postural factors that unbalance the occlusion, masticatory muscles, and temporomandibular joint. Parafunctional habits, emotional tension, and stress also act as etiological factors related to alterations in the head and neck [7].

Acupuncture may not be helpful in eliminating the cause of TMD resulting from structural abnormalities, such as degenerative changes and disc displacement, however, it can mainly help relieve the pain and discomfort associated with these conditions [8]. Studies have indicated that acupuncture has analgesic effects in the short term, and therefore has an effect comparable with that of the splint for treatment of TMD of muscular origin [9]. In a review of the literature, Rosted in 2001, [10] compared data from several clinical studies and found that the most recommended acupuncture points for TMD treatment were: ST6, ST7, SI18, GV20, GB20, and BL10 as the local points in the face and neck, and LI4 as a distant point.

Traditional Chinese Medicine (TCM) is an energy medicine, that is, based on the existence of an energy structure beyond the physical body, and states that in our body energy circulates through channels or meridians that have specific points called acupoints which, when punctured, reorganize the energy circulation of the entire body. Diseases arise from disorganization of the functional energy that controls and dynamizes the organs [11]. An objective way of measuring this energy is based on the Ryodoraku method developed by Dr. Nakatani in Japan in 1947 [12]. Dr. Nakatani noted that the activity of the sympathetic nervous system could be correlated with most of the symptoms explained by the Qi of the traditional acupuncture theory [13].

Recent controlled studies have demonstrated the effectiveness of acupuncture in TMD. Borin et al [14] compared 20

women treated with acupuncture twice weekly for 5 weeks with 20 untreated women as controls and showed that acupuncture promoted a significant reduction in pain levels compared with the control group. Ferreira et al [2] evaluated 40 female volunteers in a randomized experimental group ($n = 20$) who received splint plus laser acupuncture, compared with the control group ($n = 20$) who received splint plus placebo laser and demonstrated that laser acupuncture was more effective and faster in achieving complete remission of pain symptoms after 3 months of treatment compared with the placebo laser. Ferreira et al [15] compared 10 women treated exclusively with splints, and 10 women treated with splints associated with auriculotherapy, and demonstrated that the association of treatments reduced pain more significantly and faster than the splint alone. Grillo et al [16] compared two groups of women treated with acupuncture ($n = 20$) and splint ($n = 20$) and concluded that there was reduction of pain and increase in the opening mouth limitation in both groups.

There is no study on the application of the meridian electric conductance theory for the diagnosis and treatment of TMD. Therefore, the aim of this study was to demonstrate the effect of acupuncture by means of objective measurements based on the Ryodoraku Method.

2. Materials and methods

This was a double-blind, randomized, controlled clinical study conducted from July 2015 to June 2016, at the Specialization Clinic of the Piracicaba Dental School (FOP/UNICAMP), in Piracicaba SP, Brazil. The study was approved by the Research Ethics Committee of FOP-UNICAMP, under protocol No. 109/2014 and registered on the Platform of Brazilian Clinical Trials under RBR-77y2sp.

2.1. Inclusion criteria

Adult patients of both sexes, aged from 20 years to 50 years, with pain due to temporomandibular disorders (TMD) of muscular or mixed origin, with or without opening mouth limitation, according to the RDC (Research Diagnostic Criteria for Temporomandibular Disorders), [17].

2.2. Exclusion criteria

Patients with severe trauma or infections in TMJ, on analgesic and/or antiinflammatory medications, pregnant women,

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