

Effectiveness of acupuncture for temporomandibular disorders and associated symptoms

Eficiência da acupuntura no tratamento das disfunções temporomandibulares e sintomas associados

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ABSTRACT

BACKGROUND AND OBJECTIVES: Temporomandibular disorder is defined as a set of clinical problems involving masticatory muscles, temporomandibular joint and associated structures. For having multifactorial etiology, several treatments are proposed and successfully used. However, most recommended therapies are those reversible and noninvasive, which should be the first choice to treat temporomandibular disorders. This study aimed at discussing acupuncture to treat temporomandibular disorders and associated symptoms.

CONTENTS: This is a review of 34 articles published between 1983 and 2015. Since acupuncture aims at returning balance to body and harmony between physical and psychical parts by stimulating specific points, it may be considered therapy of choice to treat temporomandibular disorders. In TMD patients, evidences have shown efficacy in increasing temporomandibular joint movement amplitude, accelerating serotonin, enkephalin and endorphin release, thus favoring masticatory muscles relaxation and pain relief. According to recent articles, most commonly used points for this purpose are: ST6, ST7, SJ21, SJ17, SI18, Taiyang and Yintang (face and head) and LI4 (extrafacial).

CONCLUSION: Acupuncture is as effective to control facial pain as conventional Western therapies. It is considered useful, of low cost and provides better quality of life to patients treated with this technique.

Keywords: Acupuncture analgesia, Facial pain, Temporomandibular joint disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A disfunção temporomandibular é definida como um conjunto de problemas clínicos que envolvem os músculos mastigatórios, a articulação temporomandibular e estruturas associadas. Por serem de causa multifatorial, diversas modalidades de tratamento são propostas e utilizadas com êxito. Contudo, as terapias mais recomendadas são as reversíveis e não invasivas, as quais devem ser a primeira opção de escolha no tratamento das disfunções temporomandibulares. O objetivo deste estudo foi discutir sobre o uso da acupuntura no tratamento da disfunção temporomandibular e sintomas associados.

CONTEÚDO: Compuseram essa revisão 34 artigos, publicados entre os anos de 1983 e 2015. Uma vez que a acupuntura busca devolver o equilíbrio do organismo e harmonia entre as partes física e psíquica por meio de estímulos em pontos específicos, pode ser considerada uma terapia de eleição para o tratamento da disfunção temporomandibular. Em pacientes com disfunção temporomandibular evidências demonstraram eficácia no aumento da amplitude de movimento da articulação temporomandibular, acelerando a liberação de serotonina, encefalina e endorfina, e favorecendo assim o relaxamento dos músculos mastigatórios e a redução da dor. Segundo os artigos recentes, os pontos mais comumente empregados para esse fim são: E6, E7, TA21, TA17, ID18, Taiyang e Yintang (face e cabeça) e IG4 (extrafacial).

CONCLUSÃO: A acupuntura tem se mostrado tão eficiente no controle de dores faciais quanto as terapias ocidentais convencionais. É uma terapia considerada útil, de baixo custo e que proporciona uma melhor qualidade de vida aos pacientes tratados com essa técnica.

Descritores: Analgesia por acupuntura, Dor facial, Transtornos da articulação temporomandibular.

INTRODUCTION

According to the American Academy of Orofacial Pain (AAOP)¹, temporomandibular disorder (TMD) is a set of clinical signs and symptoms involving masticatory muscles, temporomandibular joint (TMJ) and associated structures. Currently, TMD are basically divided in two major groups, which are joint disorders and masticatory muscles disorders². Most frequently reported symptoms by patients are muscle fatigue, pain on face, TMJ and/or masticatory muscles, headache and earache and jaw movements limitation and/

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or shifts². It has multifactorial etiology basically summarized as high psychological stress and pain amplification states, together with a wide range of specific risk factors³.

Literature data have shown high incidence of TMD in general population, varying from 21.5 to 51.8%. It affects all age groups, although its highest incidence is between 20 and 45 years of age. From 15 to 30 years of age, most frequent causes are of muscle origin and, as from 40 years of age of joint origin. Females are more affected than males, in a proportion of five females for each male⁴⁻⁹. Approximately 3.6 to 7% of the population have sufficiently severe TMD to look for medical assistance¹.

Reversible and noninvasive therapies are the most recommended to treat TMD and should be the first choice¹⁰. Among these techniques, one should stress acupuncture¹⁰⁻¹⁷. Due to its recent use in dentistry, its noninvasive character and effective results, it has been successfully used for this purpose^{14,16,18-24}.

Acupuncture is a millenary technique of Traditional Chinese Medicine (TCM) which has been justified and structured on philosophical, rather than scientific basis²⁵. The word has Latin etymology (acus = needle and puncture = prick) and means needles insertion on specific skin points, called acupoints or acupuncture points, aiming at healing and preventing diseases²⁶⁻²⁸. Acupuncture aims at developing body balance by intervening in the physical body to help reestablishing lost harmony between physical and psychic parts²⁵.

Literature suggests that, in TMD patients, acupuncture speeds serotonin, enkephalin and endorphin release, being effective to increase jaw movement amplitude and oral function, decreasing muscle hyperactivity, favoring masticatory muscles relaxation, thus decreasing pain²⁴. Acupuncture is no longer considered an alternative method, but rather it started to be a treatment alternative without major adverse effects for using own body substances to control pain¹⁴.

In face of the topicality of the subject, we propose a literature review on acupuncture indications, action mechanism and possible side-effects, when used to treat TMD and associated symptoms.

CONTENTS

An exploratory search was carried out in Pubmed, Scielo and LILACS databases. Several books and articles were selected, published between 1983 and 2015, on the efficacy of acupuncture for TMD. Descriptors were “acupuncture analgesia”, “temporomandibular joint dysfunction syndrome” and “facial pain”, in addition to their equivalent in Portuguese, “*analgesia por acupuntura*”, “*transtornos da articulação temporomandibular*” and “*dor facial*”. In total, 34 articles were selected for matching the objectives of our study, being these narrative reviews and systematic reviews, case reports and clinical trials.

Acupuncture uses individuals' bioenergetic balance, promoting sensation of wellbeing (endogenous opioids release) and dramatically decreasing muscle tension points and/or

trigger-points, frequent in TMD patients²⁹. So, it is important tool to manage patients with joint¹⁶ and muscle²⁴ disorders, with good clinical results^{24,30,31}.

According to the principles of the technique, needle entrance in skin causes micro-inflammation which moves natural serotonin, enkephalin and endorphin production. The release of these neurotransmitters blocks painful stimuli propagation, impairing its perception by the brain. So, body response is faster, decreasing symptoms intensity, often making them disappear. Acupuncture stimulates blood circulation dynamics due to regional microdilation and relaxation; it releases hormones, such as cortisol and endorphins; increases host resistance by means of stimulating hypothalamus, hypophysis and other important glands for systemic recovery; it normalizes body functions and stimulates metabolism of different organs^{24,28}.

So, it is characterized as potent analgesic, sedative and relaxant, which is the basis for its application in dental treatments³². It may be indicated as first treatment option when patients are allergic or suffer severe adverse effects induced by drugs, in cases of liver or kidney function failure, history of gastric bleeding when using anti-inflammatory drugs, or for the elderly needing many drugs^{29,32}. For having few adverse effects, it provides further safety for hypertensive, diabetic, cardiac and hemophilic patients, children, pregnant women and those affected by human immunodeficiency virus (HIV)²⁹. It is an effective and economic method, causes few clinically relevant adverse effects and may promote decreased salivation, nausea and postoperative pain, by regulating homeostasis and immunodefensive and anti-inflammatory responses³². Acupuncture adverse effects are minimal, being in general associated to dizziness, nausea and, in some cases, transient erythema or increased pain in the first hours²⁶.

In dentistry, acupuncture is effective to treat orofacial pains, such as idiopathic trigeminal neuralgias, herpes-zoster, maxillary sinusitis, toothache, TMJ arthritis, as well as in patients with dry mouth, bruxism and TMD²⁹. It may be indicated for pre-treatment of anxious, stressed or hypertensive patients or with systemic diseases, and to improve assistance quality since it is able to induce analgesia in Endodontics, Periodontics and Surgical procedures³³. Acupuncture has been indicated to treat chronic facial pain resistant to conventional treatments (occlusal splint or physical jaw exercises), especially in cases of muscle pain. Some selected studies have compared the efficacy of occlusal splint and acupuncture.

Both therapies resulted in significant improvement of subjective symptoms and clinical signs in the stomatognathic system, with significant pain decrease in all evaluation variables, during 12 months of study^{11,13,33}. Another study has shown that, for patients under anti-inflammatory drugs to control orofacial pain, TCM was effective to decrease drug use³⁴.

Most studies involving acupuncture as therapeutic method were carried out with female samples, due to the high prevalence of TMD in this gender^{16,33,35,36}. With samples in mean

age group between 20 and 40 years, results have shown that treatment efficacy is not influenced by age, but rather by pain intensity and number of sessions to be performed¹⁷. However, it is important to stress that different studies based on TCM principles, have not evaluated TMD alone, but rather the body as a whole, posture and general health among other aspects, before determining the adequate therapy.

Different protocols regarding acupuncture points used for TMD, type of stimulation, number of sessions and intervals between them are described in the literature. Since application sites and number of sessions change from individual to individual and depend on the origin of the problem, it is difficult to compare protocols and results of different studies. However, some authors^{14,15} mention average of 6-8 sessions lasting 30 minutes each to obtain effective results of TMD treatment by acupuncture and, although there are reports of improvement in the first session, pain relief is seen in the medium term with consequent jaw function improvement^{16,17}.

Treatment duration may vary in a case-by-case basis and for the same disease, because one has to take into account

whether it is acute or chronic disease and even different individual responses to treatment with acupuncture. In chronic conditions, during acupuncture treatment, symptoms are expected to improve as from the fourth session although each individual responds differently. In acute processes, results are fast with few applications, but in chronic processes they may require months of treatment. In cases of extreme pain, improvement might be immediate, being that as from the second session treatment may be once a week in a total of six sessions and may continue for three months until symptoms remission¹⁷. Some more recent studies evaluating the effects of acupuncture in TMD^{16,22-24,31,34,35,38}, and published in the last five years, are described in table 1.

There is no standard clinical protocol to select points used in each treatment. Differently from Western therapies, acupuncture is applied based on biopsychosocial data collected by TCM during patients' anamnesis, that is, all protocols should be tailored according to each patient's needs. However, this is not possible in most clinical trials, as shown by the literature²⁴. As shown in table 1, some studies use special protocols and others use fixed protocols. According to

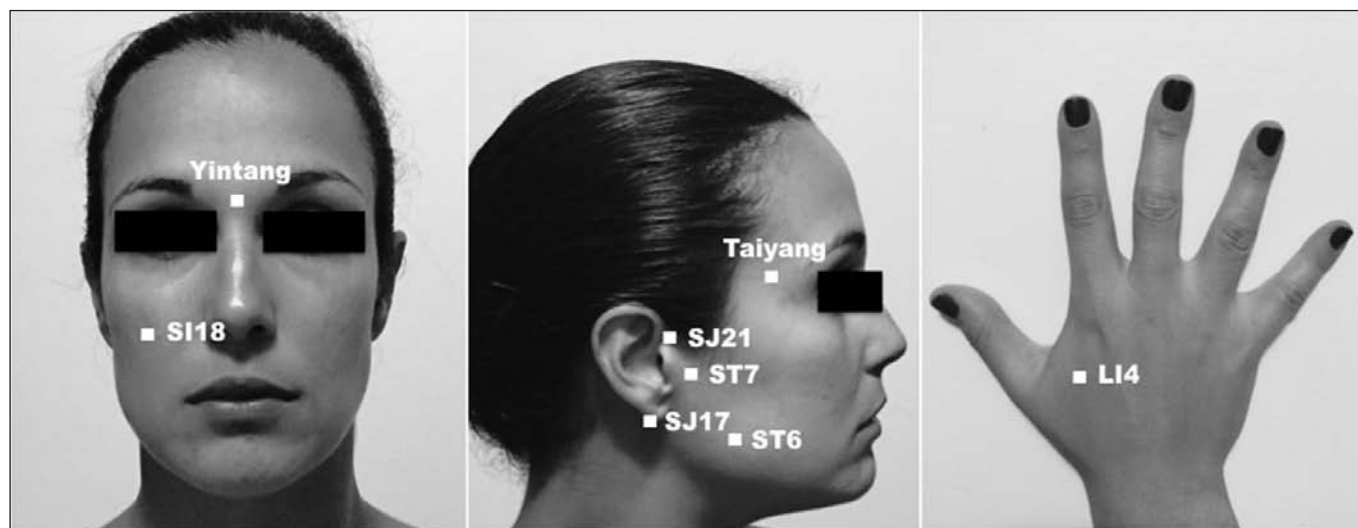
Table 1. Summary of more recent studies (last five years) on temporomandibular disorder treatment with acupuncture

Authors	Type of study	Sample	Recommended points	Number of sessions and treatment duration	Primary results
Borin et al. ¹⁶	Clinical trial	40 females, 20 received acupuncture and 20 have not received	Fixed protocol: ST7, ST5, SJ17, GB3, taiyang and yintang (face) and GB43 (extrafacial)	Twice a week for 5 weeks	Improved TMD severity and decreased pain level
Borin et al. ³⁵	Clinical trial	40 females, 20 received acupuncture and 20 have not received	Fixed protocol: ST7, ST5, TE17, GB3, taiyang and yintang (face) and GB43 (extrafacial)	Twice a week for 5 weeks	Decreased temporal muscle electric activity, promoting better balance between masseter and temporal muscles
Elder et al. ³⁴	Clinical trial	111 patients, received acupuncture and orientations about TMD	Fixed protocol ST6, ST7, SI18, (face), VG20, GB20, SP10 (head) and LI4 (extrafacial) in addition to specific points by diagnosis, not exceeding 20 points.	Mean of 20 sessions during one year	TMD pain was linearly decreased after mean period of 16 sessions and decreased use of anti-inflammatory drugs among frequent users
Camargo et al. ²³	Clinical trial	31 patients	Points determined by diagnosis, most commonly: CS7, CS6, SI3, GB20, SJ23; VC3, KI3, KI7, VG4, VG14, SJ17, SJ21; GB34, GB39, LV2, VC12, SJ3, LI4, SP4, VG15.	3 sessions, once a week	TMD pain control in most patients
Vicente-Barrero et al. ³¹	Clinical trial	20 patients, 10 treated with acupuncture and 10 with occlusal splint	Fixed protocol: Extra Taiyang, SJ21, GB2, SJ17, ST6 (face and head), LI4, ST36, SJ5 and GB34.	15 sessions, 3 consecutive and others 3x a week.	Acupuncture group had significant improvement in all evaluated parameters
Sousa et al. ²²	Clinical trial	20 patients	Specific points by diagnosis	8 sessions, once a week	Pain decrease, maintained for one year
Jung et al. ³⁸	Systematic review	7 controlled and randomized studies	LI4, ST6, SI18, SI2, SI3 and ST7	1 to 3 weeks	Limited evidence of acupuncture to treat TMD
Porporatti et al. ²⁴	Critical review	21 articles	LI4, ST6, ST7 LV3, SI19, SJ17, taiyang e yintang	-	Superiority and efficiency in pain and function improvement in muscle TMD patients

Table 2. Location and function of most commonly used acupoints to treat temporomandibular disorder³⁷

Point	Location	Function
ST6	Prominence of masseter muscle	Relaxes facial muscles and improves temporomandibular joint Qi
ST7	In the Center of depression between jaw notch and zygomatic arch inferior border	Improves TMJ functions and relieves spasms and pain
SJ17	Point where ear lobe touches the neck	Relaxes tendons and muscles
SJ 21	Interosseous cavity before tragus and above condyle	Treats temporomandibular pain and arthritis and jaw pain
SI18	Inferior zygomatic arch border, anterior masseter muscle border	Relieves pain, calms the mind, treats facial pain and facial nerve spasm.
Taiyang	Between lateral eyebrow edge and lateral eyes epicanthus	Calms pain, treats facial muscle spasm
Yintang	Face midline between eyebrows	Interrupts pain, calms the mind, treats headache
LI4	Between metacarpi I and II in muscle bulge	Treats headaches, facial pains, trismus, head and neck anesthesia

TMJ = temporomandibular joint.

**Figure 1.** Location of commonly used acupoints to treat temporomandibular disorders³⁷

recent studies, most commonly used points in protocols to treat TMD-induced facial pain and associated symptoms are ST6, ST7, SJ21, SJ17, SI18, Taiyang and Yintang (face and head) and LI4 (extrafacial) (Table 2, Figure 1)^{16,22-24,31,34,35,38}. Notwithstanding promising acupuncture results, a systematic review has shown that there are still controversies and limitations to the effectiveness of acupuncture to treat TMD³⁸, which suggests that studies in the area shall continue for the definition of better treatment protocols and to measure the real efficacy of the technique as compared to most traditional modalities to treat TMD.

CONCLUSION

Acupuncture has been shown to be effective to control facial pain, especially pain of muscular origin. For having low incidence of side effects, its use may be continuous, being an excellent option to control or treat pain and TMD.

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