Effectiveness of acupuncture for temporomandibular disorders and associated symptoms

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, encephalin 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, Taiyaing 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 discorrer 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, Taiyaing 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), 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 disorders. 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/
or shifts. It has multifactorial etiology basically summarized as high psychological stress and pain amplification states, together with a wide range of specific risk factors. 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 male. Approximately 3.6 to 7% of the population have sufficiently severe TMD to look for medical assistance. Reversible and noninvasive therapies are the most recommended to treat TMD and should be the first choice. Among these techniques, one should stress acupuncture. Due to its recent use in dentistry, its noninvasive character and effective results, it has been successfully used for this purpose.

Acupuncture is a millenary technique of Traditional Chinese Medicine (TCM) which has been justified and structured on philosophical, rather than scientific basis. 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 diseases. Acupuncture aims at developing body balance by intervening in the physical body to help reestablishing lost harmony between physical and psychic parts. Literature suggests that, in TMD patients, acupuncture speeds serotonin, encephalin and endorphin release, being effective to increase jaw movement amplitude and oral function, decreasing muscle hyperactivity, favoring masticatory muscles relaxation, thus decreasing pain. 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 pain. Acupuncture adverse effects are minimal, being in general associated to dizziness, nausea and, in some cases, transient erythema or increased pain in the first hours.

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 TMD. 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 procedures. 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 stomatognatic system, with significant pain decrease in all evaluation variables, during 12 months of study. Another study has shown that, for patients under anti-inflammatory drugs to control orofacial pain, TCM was effective to decrease drug use.

Most studies involving acupuncture as therapeutic method were carried out with female samples, due to the high prevalence of TMD in this gender. 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 performed\textsuperscript{17}. 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\textsuperscript{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\textsuperscript{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 remission\textsuperscript{17}. Some more recent studies evaluating the effects of acupuncture in TMD\textsuperscript{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 established in the last five years, are described in table 1.

As shown in table 1, some studies use special points and others use fixed protocols. According to

<table>
<thead>
<tr>
<th>Authors</th>
<th>Type of study</th>
<th>Sample</th>
<th>Recommended points</th>
<th>Number of sessions and treatment duration</th>
<th>Primary results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borin et al.\textsuperscript{26}</td>
<td>Clinical trial</td>
<td>40 females, 20 received acupuncture and 20 have not received</td>
<td>Fixed protocol: ST7, ST5, SJ17, GB3, taiyang and yintang (face) and GB43 (extrafacial)</td>
<td>Twice a week for 5 weeks</td>
<td>Improved TMD severity and decreased pain level</td>
</tr>
<tr>
<td>Borin et al.\textsuperscript{25}</td>
<td>Clinical trial</td>
<td>40 females, 20 received acupuncture and 20 have not received</td>
<td>Fixed protocol: ST7, ST5, TE17, GB3, taiyang and yintang (face) and GB43 (extrafacial)</td>
<td>Twice a week for 5 weeks</td>
<td>Decreased temporal muscle electric activity, promoting better balance between masseter and temporal muscles</td>
</tr>
<tr>
<td>Elder et al.\textsuperscript{34}</td>
<td>Clinical trial</td>
<td>111 patients, received acupuncture and orientations about TMD</td>
<td>Fixed protocol ST6, ST7, SI18, (face), VG20, GB20, SP10 (head) and Li4 (extrafacial) in addition to specific points by diagnosis, not exceeding 20 points.</td>
<td>Mean of 20 sessions during one year</td>
<td>TMD pain was linearly decreased after mean period of 16 sessions and decreased use of anti-inflammatory drugs among frequent users</td>
</tr>
<tr>
<td>Camargo et al.\textsuperscript{23}</td>
<td>Clinical trial</td>
<td>31 patients</td>
<td>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.</td>
<td>3 sessions, once a week</td>
<td>TMD pain control in most patients</td>
</tr>
<tr>
<td>Vicente-Barrero et al.\textsuperscript{21}</td>
<td>Clinical trial</td>
<td>20 patients, 10 treated with acupuncture and 10 with occlusal splint</td>
<td>Fixed protocol: Extra Taiyang, SJ21, GB2, SJ17, ST6 (face and head), Li4, ST36, SJ5 and GB34.</td>
<td>15 sessions, 3 consecutive and others 3x a week</td>
<td>Acupuncture group had significant improvement in all evaluated parameters</td>
</tr>
<tr>
<td>Sousa et al.\textsuperscript{22}</td>
<td>Clinical trial</td>
<td>20 patients</td>
<td>Specific points by diagnosis</td>
<td>8 sessions, once a week</td>
<td>Pain decrease, maintained for one year</td>
</tr>
<tr>
<td>Jung et al.\textsuperscript{26}</td>
<td>Systematic review</td>
<td>7 controlled and randomized studies</td>
<td>Li4, ST6, SI18, SI2, SI3 and ST7</td>
<td>1 to 3 weeks</td>
<td>Limited evidence of acupuncture to treat TMD</td>
</tr>
<tr>
<td>Porporatti et al.\textsuperscript{24}</td>
<td>Critical review</td>
<td>21 articles</td>
<td>Li4, ST6, ST7 LV3, SI19, SJ17, taiyang yintang</td>
<td>Superiority and efficiency in pain and function improvement in muscle TMD patients</td>
<td></td>
</tr>
</tbody>
</table>
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 TMD\(^{38}\), 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.

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

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

**REFERENCES**

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