REVIEW ARTICLE

Acupuncture therapeutic protocols for the management of temporomandibular disorders *

Protocolos de acupuntura para o tratamento da disfunção temporomandibular

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ABSTRACT

BACKGROUND AND OBJECTIVES: For most cases, temporomandibular disorders should be treated by a non-invasive, interdisciplinary and integrative process. In traditional Chinese medicine, acupuncture is an excellent tool aiming at treating and healing this disease. This study was a critical literature review to observe the efficacy of traditional Chinese acupuncture to treat muscular temporomandibular disorders and to identify primary acupoints.

CONTENTS: Pubmed, LILACS, Scielo and Cochrane databases were queried to identify scientific articles relevant for the study. Articles were selected from January 2000 to May 2013. A total of 125 articles were found and 21 were included. Acupuncture treatment alone or as additional therapy, or even compared to other techniques, was superior and effective to improve pain and function of patients with temporomandibular disorders and most commonly used acupoints were IG4, E6, E7 and F3.

CONCLUSION: This study has shown that acupuncture is a technique recommended by national and international literature to treat muscular temporomandibular disorders, promoting pain relief and/or total intensity, improvement of joint movements and oral function and decrease of masticatory muscles hyperactivity.

Keywords: Acupuncture analgesia, Acupuncture points, Facial pain, Temporomandibular disorder syndrome, Temporomandibular joint disorder.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Na grande maioria dos casos, o tratamento das disfunções temporomandibulares deve ser um processo não invasivo, interdisciplinar e integrativo. Dentro da medicina tradicional chinesa, a acupuntura é uma ótima ferramenta que visa a terapia e cura dessas doenças. O objetivo deste estudo foi conduzir uma revisão crítica da literatura para verificar a eficácia da acupuntura tradicional chinesa no tratamento da disfunção temporomandibular do tipo muscular, bem como identificar os principais acupontos.

CONTEÚDO: Foi realizada uma pesquisa nas bases de dados Pubmed, LILACS, Scielo e Cochrane para identificar artigos científicos relevantes para o estudo. Os artigos foram selecionados no período de janeiro de 2000 a maio de 2013. Encontrou-se um total de 125 artigos, sendo que 21 foram incluídos. O tratamento de acupuntura isolado ou como terapia complementar, ou ainda comparado com outras técnicas, se mostrou superior e eficiente na melhora da dor e da função de pacientes com disfunção temporomandibular, e os pontos de acupuntura mais citados foram IG4, E6, E7 e F3.

CONCLUSÃO: Este estudo demonstrou que a acupuntura é uma técnica recomendada pela literatura nacional e internacional para o tratamento de disfunções temporomandibulares de origem muscular, promovendo alivio e/ou redução total da intensidade dolorosa, melhora nos movimentos mandibulares e na função oral e diminuição da hiperatividade muscular dos músculos da mastigação.

Descritores: Analgesia por acupuntura, Dor facial, Pontos de acupuntura, Síndrome da disfunção da articulação temporomandibular, Transtornos da articulação temporomandibular.

INTRODUCTION

Orofacial pain is associated to head, face and neck soft tissues and may be defined as dysfunction and pain affecting sensory and motor transmission in the trigeminal nervous system[1].

Among pains affecting this region there are temporomandibular disorders (TMD) which represent a collective term related to a group of musculoskeletal and joint problems which affect the temporomandibular joint (TMJ) and associated structures[1,2]. TMD may present as facial pain, stiffness sensation, joint sounds (clicks), deviation of mandibular midline, restricted movements and pain during function[3]. Among such

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disorders, one should stress myofascial pain, which has been documented as the most prevalent disorder in this region[1,2] and may affect individuals' routine to a greater or lesser extent[4-6].

Current interventions to manage TMDs involve therapies with muscle relaxant plates, drugs, physiotherapy, self-care guidance and education and surgeries[7,8]. Noninvasive or even nonsurgical therapies are the most widely used and prescribed therapies and according to the literature they have been very successful to date[9].

Studies have shown that 74% of patients with TMD look for conservative, more alternative and complementary therapies, especially looking for manual therapies, massage therapy and acupuncture[10,11]. Acupuncture is indicated and effective to manage TMD, based on pain decrease mechanisms, anti-inflammatory properties and with endocrine neuro-hormonal effects[9,11].

The Traditional Chinese Medicine (TCM) is an energetic medicine, that is, it is based on the existence of an energetic structure beyond the physical body, and states that in our body the energy circulates by channels or meridians which, when punctured, reorganize the energetic circulation throughout the body. Disease, in turn, is always a disorganization of the functional energy which controls and dynamizes organs. Chinese philosophical conception about the universe is based on three basic pillars: Yang/Yin theory, five movements and Zang Fu (organs and viscerae)[12,13].

Acupuncture aims at managing and healing diseases by the application of skin stimuli with the insertion of needles on specific points called acupoints[14,15]. This is also a reflex therapy where the stimulation of one area acts on other(s). For such, it primarily uses nociceptive stimuli[14,15].

This study aimed at carrying out a critical literature review, in Portuguese and English, to check the efficacy of traditional Chinese acupuncture to treat muscle-type TMD, as well as at identifying major acupoints which will help guiding clinical approaches of acupuncture professionals.

CONTENTS

PubMed, LILACS, Scielo and Cochrane (including Central Cochrane) databases were searched to identify scientific articles relevant to the study. Articles were selected from January 2000 to May 2013 using the following keywords (DeCS Descriptors in Health Science): Temporomandibular Disorder AND Acupuncture OR Chinese Acupuncture OR Acupuncture Techniques, in Portuguese and English languages.

After the search, a previous screening of articles was carried out, based on articles title and abstract, excluding possible publications unrelated to the subject. Then, criteria for the final selection of articles were applied. Table 1 shows the results of the search.

Table 1. Result of the search carried out in different literature databases.

Databases	Results	Initial selection by title	After applying inclusion and exclusion criteria
PubMed	116	67	20
LILACS	07	03	02
Scielo	01	01	00
Cochrane (including Central Cochrane)	01	00	00
Subtotal	125	71	21
Repeated articles	01	01	01
Total	124	70	21

Studies selection criteria

Controlled randomized studies, cohort clinical trials, clinical studies, case-control studies, cross-sectional studies and case series reports having in their methodology the application of different acupuncture techniques, types of used points and meridians, were included. Case reports, systematic literature reviews and literature reviews were excluded.

Inclusion criteria were limited to studies where participants were:

- Humans of both genders, aged between 18 and 80 years;
- Individuals diagnosed with muscle-type TMD, meeting the following criteria:

Criteria for muscle TMD[1,6]

Myofascial pain in masseter and/or temporal masticatory muscles:

- Pain on mandible, temple or ear region in the last month;
- Pain modified with movement, function or parafunction;
- Report of family pain at masseter or temporal muscle palpation;
- Individuals with our without mouth opening limitation;
- Individual with muscle pain caused by systemic diseases, patients with toothache, individuals with psychological disorders previously identified and individuals with recent history of face and neck trauma were excluded.

Relevant data were part of studies where acupuncture protocols were applied to patients with muscle-type TMD and whose results were mentioned in the study.

Data collection

A reviewer has selected articles as from abstract data and in cases when abstracts were unavailable, through title information. Relevant data for this stage were type of study and sample profiles. Selected articles should also meet all selection criteria in their complete publication.

Articles review

The next step was to evaluate selected articles to determine their internal and external validity. If there was inadequate information not allowing criteria evaluation, the author would be contacted by e-mail to explain study design and characteristics.

We have found 125 potential scientific articles. After analyzing the abstract, 21 articles were selected to be fully evaluated. One hundred and four articles were excluded from the study for not meeting inclusion criteria. Among them, 25 articles were dated before 2000, five were excluded for being a single

clinical case report, two articles had no relevant results and just clinical observations and five articles were not written in the defined standard language (two in Spanish, one in German and two in Chinese). A total of 54 articles were excluded for not matching the theme proposed by this review.

The 21 selected articles are shown in table 2. Most articles are in English being just two in Portuguese.

Tables 2 and 3 show major features of included studies, such as studied disease, primary treatment (treatment recommended and treatment of choice for the case), additional treat-

Table 2. Summarized information of articles about treatment, number of sessions and number of evaluated patients

Authors	Studied disease	Primary treatment	Additional treatment	Number of patients	Acupuncture sessions
Ferreira, de Oliveira, Guimaraes, et al.[16]	Chronic TMD	Muscle relaxant plates	To compare real laserthe-rapy to placebo laser in acupuncture points	14 (7 for each group)	12
Ritenbaugh, Hammerschlag Dworkin, et al.[17]	Chronic TMD	Muscle relaxant plates	Compare Traditional Chinese Medicine (acu-puncture, phytotherapy, massage) to guidance	168 (84 for each group)	20
Vicente-Barrero, Yu-Lu, Zhang, et al.[18]	TMD	Compare acupuncture with Muscle rela-xant plates	None	20 (10 for each group)	15
Itoh, Asai, Ohyabu, et al.[19]	Chronic TMD	Compare real trigger points needling to placebo (sham)	None	16 (8 for each group)	5
Borin, Corrêa, Silva, et al.[20]	TMD	Compare acupuncture with control (no treatment)	None	40 (20 for each group)	10
Borin, Corrêa, Silva, et al.[21]	TMD	Compare acupuncture with control (no treatment)	None	40 (20 for each group)	10
Bu, Chen, Chen, et al.[22]	Acute TMD	Compare electroacupuncture to electro-acupuncture + massage therapy	None	96 (48 for each group)	1
Noiman, Garty, Maimon, et al.[23]	TMD and trigeminal neuralgia	Acupuncture (local and distant techni-que)	None	35 with TMD and 4 with neuralgia	08 to 10
Hotta, Hotta, Bataglion, et al.[24]	TMD	Lasertherapy in acupuncture points	None	10	10
Simma, Gleditsch, Simma, et al.[25]	TMD	Compare acupuncture with control (sham)	None	23 (11 real and 12 placebo)	1
Rancan, Bataglion, Bataglion, et al. [26]	TMD	Traditional acupuncture	None	17	10
Shen, Younger, Goddard, et al.[27]	TMD	Compare acupuncture with placebo acupuncture (sham)	None	28 (16 real and 12 placebo)	1
Wang eZhang[28]	TMD	Compare acupuncture + electromagne-tictherapy to electromagnetictherapy	None	82 (52 acupunctu-re + magnetic and 30 magnetic only)	1
Shen e Goddard[29]	TMD	Compare acupuncture with placebo acupuncture (sham)	None	15 (09 real and 06 placebo)	1
Smith, Mosscrop, Davies, et al.[30]	TMD	Compare acupuncture with placebo acupuncture (sham)	None	27	6
Shin, Ha, Song, et al.[31]	TMD	Treatment with acupuncture and massa-ge therapy	None	49	08 to10
Schmid-Schwap, Simma-Kletschka, Stockner, et al.[32]	TMD	Compare acupuncture with placebo acu-puncture (Laser in randomized points)	None	23	1
Goddard[33]	TMD	Traditional acupuncture	None	29	1
Wong e Cheng[34]	TMD	Traditional acupuncture + muscle rela-xant plate + trigger points injection	None	85	6
DeBar, Vuckovic, Schneider, et al.[10]	TMD	Application of questionnaires about Tra-ditional Chinese Medicine	None	192	Not specified
Goddard, Karibe, McNeill, et al.[35]	TMD	Compare acupuncture in recognized acupoints to placebo acupuncture in non recognized points or away from me-ridians location	None	18 (10 real acu-puncture, 8 place-bo acupuncture)	1

Table 3. Summarized information of articles about acupuncture points used and results obtained

Authors	Acupoints	Results
Ferreira, de Oliveira, Guimaraes,et al.[16]	E6, ID19, VB20, VB43, IG4, F3, TA3 and Yintang	Real laser has shown significantly faster improvement with greater pain decrease
Ritenbaugh, Hammerschlag, Dworkin, et al.[17]	E7 and/or E6, VB20 and/or VB21, F3, F4 and Taiyang	Faster pain and quality of life improvement of patients receiving Chinese Eastern treatment as compared to those who just received guidance
Vicente-Barrero, Yu-Lu, Zhang, et al.[18]	Local points: TA21, VB21, TA17, E6 and Taiyang. Distant points: F4, E36, TA5 and VB34	Results for both groups were similar, showing pain decrease and less pain at pressure in temporal and masseter muscles
Itoh, Asai, Ohyabu, et al.[19]	Ashi points (painful points at pressure or trigger points)	Much higher pain intensity decrease in the group receiving real needling on trigger points, however there has been no difference between groups with regard to movement and oral function improvement
Borin, Corrêa, Silva, et al.[20]	E7, E5, TA17, VB43, IG4, Taiyang and Yintang	Acupuncture has decreased temporal muscles activity in the position of mandibular rest, providing better muscle balance between these and masseter muscles
Borin, Corrêa, Silva, et al.[21]	E7, E5, TA17, VB43, IG4, Taiyang and Yintang	There has been significant decrease in pain and severity of temporomandibular disorder after treatment with acupuncture. Control group had no improvement
Bu, Chen, Chen, et al.[22]	VB3, E7, E6, ID19 and IG4	Effective improvement for the group with acupuncture + massage therapy as compared to acupuncture alone
Noiman, Garty A, Maimon Y, et al.[23]	Local: Ashi or trigger points, Distant: varied in the region of hand or foot. In general IG4 and F3	Patients with temporomandibular disorder had 88.6% pain improvement, while just 25% of patients with neuralgia had improvement
Hotta, Hotta, Bataglion, et al.[24]	IG4, C3, E6 and E7	Significant improvement in painful symptoms and masseter muscle function
Simma, Gleditsch, Simma, et al.[25]	Ashi points or trigger points	Pain decrease was significantly better after acupuncture as compared to placebo treatment
Rancan, Bataglion, Bataglion, et al. [26]	IG4, E6, E7, B2, VB14, VB20, ID18, ID19, F3, E36, VB34, E44 and R3	Decreased muscle activity during jaw movements and teeth clenching and decreased pain after acupuncture
Shen, Younger, Goddard, et al.[27]	IG4	Decreased pain and sensitivity of masticatory/face and neck muscles only for the group receiving real acupuncture
Wang & Zhang[28]	E7, E6, IG4	Significant pain improvement in 90.4% of the acupuncture + magnetic group, while improvement for the control group was only 66.7%.
Shen & Goddard[29]	IG4	Significant improvement of facial pain, neck pain and headache for real acupuncture
Smith, Mosscrop, Davies, et al.[30]	E7	Better influence of real acupuncture on clinical results as compared to placebo
Shin, Ha, Song, et al.[31]	ID18, ID19, E6, E7, TA17 and IG4	Proposed treatment has significantly improved pain and mouth opening
Schmid-Schwap, Simma-Kletschka, Stockner, et al.[32]	Maxilla and mandible retromolar region, mandible and maxilla vestibular region. Extraoral points: IG4, ID2 and ID3	Decreased pain, better mouth opening and improved muscle sensitivity to palpation for the group receiving real acupuncture
Goddard[33]	Varied on a patient-by-patient basis, however IG4 was always used	Significant pain intensity decrease from 5.28 to 2.26
Wong & Cheng[34]	Local: E7, E6, ID17 and extra point QianZheng, distant: IG4, TA5, F3 and E36	85% of patients with temporomandibular disorder had relieved symtoms
DeBar, Vuckovic, Schneider, et al.[10]	Not specified	63% of patients reported using Traditional Chinese Medicine to treat temporomandibular disorder pain, being acupuncture, massage therapy and chyropraxis the most satisfactory and helpful for patients
Goddard, Karibe, McNeill, et al.[35]	IG4 and E6 (real acupuncture) and points close to IG4 and E6 for placebo	Both groups had significant pain intensity decrease, without difference between groups

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ment, number of evaluated and treated patients, number of acupuncture sessions, as well as the list of all major acupuncture points used and results found with a certain technique or comparison among techniques.

Most described and applied meridians were stomach, with 26 cases, followed by large intestine with 15 cases and gall bladder with 12 cases. Figures 1 and 2 describe all points mentioned by the 21 included articles.

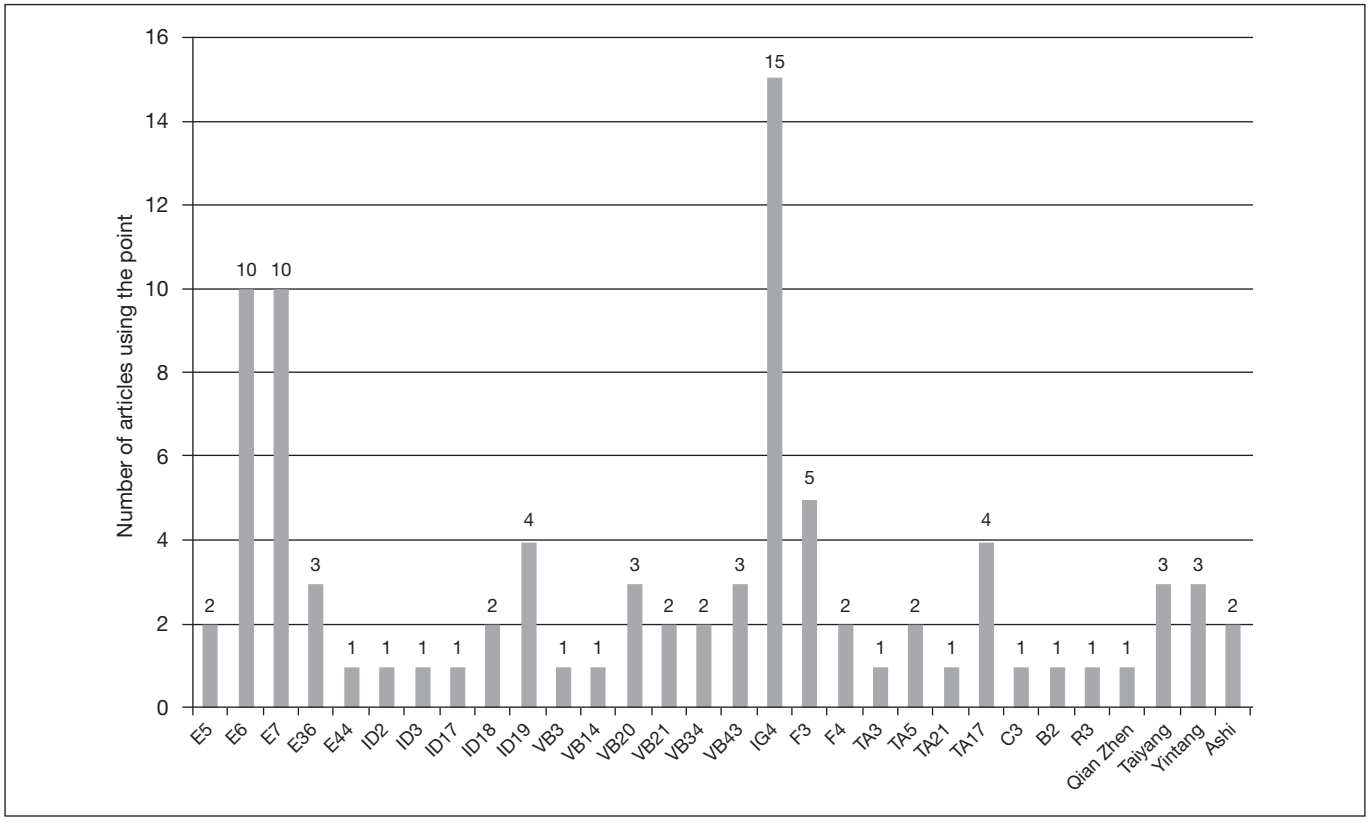

Figure 1. Most common acupuncture meridians used in the articles

E = stomach; ID = small intestine; VB = gallbladder; IG = large intestine; F = liver; TA = triple heater; C = heart; B = bladder; R = kidney.

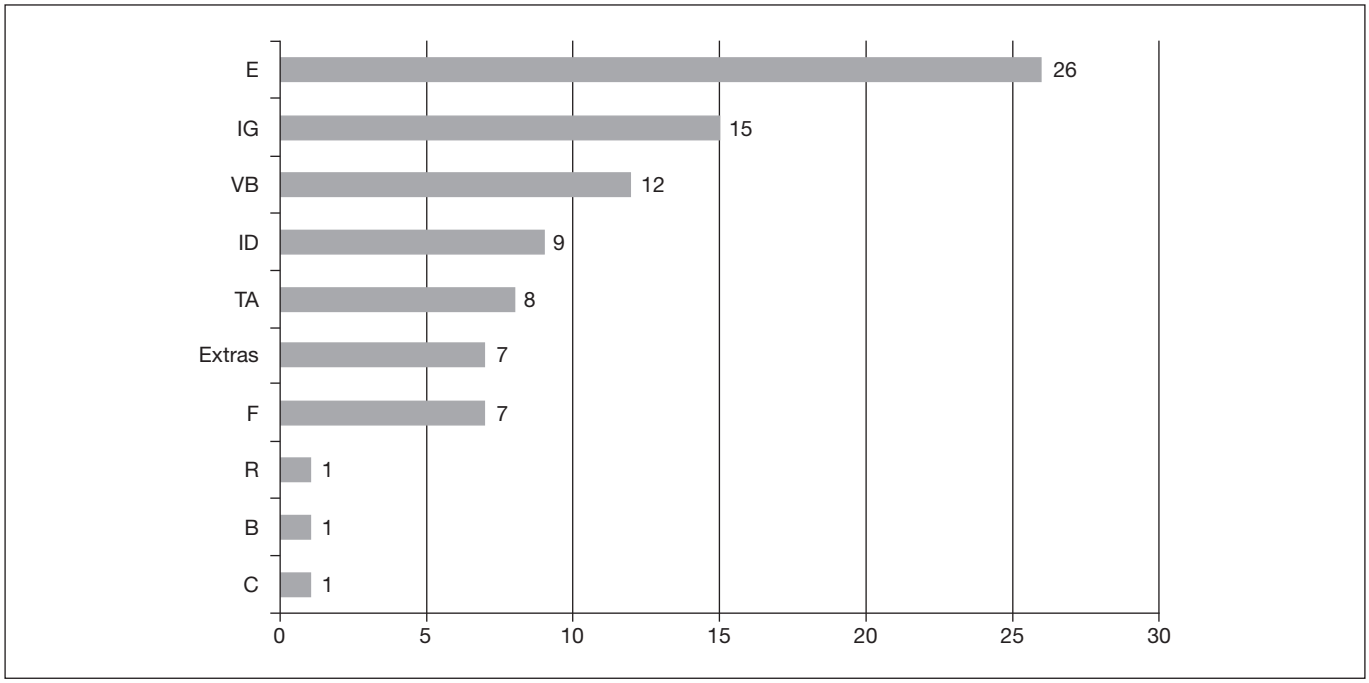

Figure 2. Acupuncture meridians used in more articles

E = stomach; ID = small intestine; VB = gallbladder; IG = large intestine; F = liver; TA = triple heater; C = heart; B = bladder; R = kidney.

DISCUSSION

This study has provided data showing that acupuncture is a TCM technique indicated and recommended by national and international literature to treat TMD. In most of the 21 articles selected and described in this review, acupuncture alone or as complementary therapy or even as compared to other techniques was superior and efficient to improve pain and function of patients with muscle-type TMD.

Acupuncture directly impacts mental stress, decreases anxiety and improves sleep quality. Acupuncture holistic approach allows dealing with other comorbidities, as well as with integrative problems, such as headache and body pain, aiming at reaching physical and mental balance[27].

Studies have shown that acupuncture to treat musculoskeletal pain is a promising technique. In a study with 92 patients, 69% had good or excellent response to treatment, with at least 30% pain decrease[36].

In our study, all articles show a predilection for IG4 as a distant point with very strong energetic action. IG4 has excellent function as potent anti-inflammatory and analgesic[13,36]. Even so, many meridians and points had more indications and utilization. In 17% of all cases, IG4 was used as the point of choice to treat muscle TMD, followed by 11% of points E6 and E7 and 6% of point F3. Also, in 4% of cases, points ID19 and TA17 were indicated.

It is also interesting to note that some extra points were more frequently used, indicating that their prescription should be always recommended. Points Taiyang and Yintang are extra points of easy access and greatly improve painful symptoms of TMD patients[27].

Currently, and following the Western vision, channels or meridians through which the whole energy of our body circulates are considered integrative or functional areas where there is the participation of several local and systemic systems, such as nervous, circulatory, lymphatic, endocrine and immune systems, among others[17,26,36].

Acupuncture action mechanisms may be explained by three principles. The first is based on the placebo effect of the technique, which is somehow controversial, because acupuncture is effectively used also in non-suggestible beings such as animals and plants[37]. The second principle is based on Mendell's control gate theory[38] and the third principle involves the descending release by the central nervous system of hormones and neurochemical substances such as steroids, endorphin, serotonin and other natural analgesics[39].

The biggest problem of current scientific studies using acupuncture as treatment is primarily based on the Western theory of creating therapeutic protocols for each case. For example, to treat patients with muscle TMD, one should use specific acupuncture points. However, acupuncture is a TCM technique which presents an energetic diagnosis and tailors the treatment for each patient, inter-relating consequences for the environment, emotional, psychosocial and biological factors.

Scientific articles, in addition to creating therapeutic protocols, have always a Western diagnosis and the treatment is the same, with the same acupoints for the whole sample. So, when analyzing articles using acupuncture as therapy, one should observe that acupuncture is an Eastern technique looking for tailoring patients' treatment and always in search of a more holistic vision. Obviously, each scientific article has to standardize its methodology, and treatment tailoring is very often unfeasible.

CONCLUSION

Muscle TMD treatment with acupuncture promotes pain relief and/or total intensity decrease, improves jaw movements and decreases muscle hyperactivity of masticatory muscles. Acupuncture professionals should have in mind that some points were effective to treat muscle TMD, such as stomach, large intestine and gall bladder acupoints.

TMD patients may, in most cases, resort to acupuncture as alternative, complementary or even primary treatment to decrease painful symptoms and to improve oral function.

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