



UNIVERSIDADE FEDERAL DE UBERLÂNDIA
FACULDADE DE ODONTOLOGIA



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**THE USE OF ACUPUNCTURE IN TMD
PAINFUL SYMPTOMATOLOGY: AN
EVIDENCE BASED CASE REPORT**

UBERLÂNDIA

2019

THE USE OF ACUPUNCTURE IN TMD PAINFUL SYMPTOMATOLOGY: AN EVIDENCE BASED CASE REPORT

Trabalho de conclusão de curso apresentado a Faculdade de Odontologia da UFU, como requisito parcial para obtenção do título de Graduado em Odontologia

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UBERLÂNDIA

2019



SERVIÇO PÚBLICO FEDERAL
 MINISTÉRIO DA EDUCAÇÃO
 UNIVERSIDADE FEDERAL DE UBERLÂNDIA
 GRADUAÇÃO EM ODONTOLOGIA
 TRABALHO DE CONCLUSÃO DE CURSO

ATA DA COMISSÃO JULGADORA DA DEFESA DE TRABALHO DE CONCLUSÃO DE CURSO DO (A) DISCENTE **Igor Vinicius Santos Rodrigues** DA FACULDADE DE ODONTOLOGIA DA UNIVERSIDADE FEDERAL DE UBERLÂNDIA.

No dia 27 de maio de 2019, reuniu-se a Comissão Julgadora aprovada pelo Colegiado de Graduação da Faculdade de Odontologia da Universidade Federal de Uberlândia, para o julgamento do Trabalho de Conclusão de Curso apresentado pelo(a) aluno(a) **Igor Vinicius Santos Rodrigues**, COM O TÍTULO: **"THE USE OF ACUPUNCTURE IN TMD PAINFUL SYMPTOMATOLY: NA EVIDENCE BASED CASE REPORT"**. O julgamento do trabalho foi realizado em sessão pública compreendendo a exposição, seguida de arguição pelos examinadores. Encerrada a arguição, cada examinador, em sessão secreta, exarou o seu parecer. A Comissão Julgadora, após análise do Trabalho, verificou que o mesmo se encontra em condições de ser incorporado ao banco de Trabalhos de Conclusão de Curso desta Faculdade. O competente diploma será expedido após cumprimento dos demais requisitos, conforme as normas da Graduação, legislação e regulamentação da UFU. Nada mais havendo a tratar foram encerrados os trabalhos e lavrada a presente ata, que após lida e achada conforme, foi assinada pela Banca Examinadora.

Uberlândia, 27 de maio de 2019.

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AGRADECIMENTOS

Primeiramente agradeço à Deus porque sem Ele a vida não faria sentido.

Agradeço minha mãe Nilva, meu pai Paulo, minha tia Doralice e meu tio Alex, por terem me criado com tanto amor e sempre terem investido na minha formação, finalizo essa etapa hoje graças a vocês.

Também agradeço grandemente minha orientadora Prof^a. Dr^a Gisele Rodrigues e co-orientadora Prof^a. Ms^a. Lia Dietrich por toda ajuda na criação deste trabalho.

Aos meus amigos que estão sempre comigo, à turma 80 que me acolheu tão bem e à turma 76, que eu também tive excelentes momentos.

Agradeço aos pacientes, professores e demais funcionários da faculdade que de alguma forma contribuíram na minha caminhada ao longo desses anos.

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CASE REPORT

The use of Acupuncture in TMD painful symptomatology : An evidence - based case report

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Abstract

Temporomandibular Dysfunction (TMD) is complex and multifactorial. Its etiology involves various factors, such as malocclusion, psychological patterns, parafunctional habits and the Temporomandibular Joint (TMJ) anatomy. Symptoms include myofascial pain, joint clicking, mouth opening limitation, headaches, earaches and neck pain, comprising one of the greatest causes of nondental pain. Acupuncture has been used to treat these conditions by acting locally both in muscle relaxation and pain management as well as reaching physical, mental and emotional balance. The aim of this study is to present a brief literature review reporting the efficacy of acupuncture on TMDs and a case report in which the painful symptomatology of TMD was treated with a systemic protocol, based on scientific evidence and concepts of Traditional Chinese Medicine (TCM). Acupuncture may be a complementary treatment for TMD and in this case report it eliminated the patient's painful symptomatology.

Keywords: Acupuncture, Case Report, Temporomandibular Dysfunction, Traditional Chinese Medicine.

INTRODUCTION

Temporomandibular dysfunction (TMD) refers to different kinds of conditions that affect the temporomandibular joints (TMJs), masticatory muscles and associated structures of the head and neck [1]. Signs and symptoms linked to TMD are: debilitating pain in the orofacial region, TMJ pain and/or clicking sounds, mouth opening limitation, restriction in mandibular movements and presence of trigger points (TPs) on palpation [2,3,4]. TMD consists a major cause of nondental pain, more frequent in people from 20 to 40 years and twice as common in females than in males [5].

Its etiology is multifactorial, involving several factors such as parafunctional habits (bruxism, teeth clenching), trauma to the jaw and surrounding areas, degenerative joint diseases, postural changes, TMJ anatomy, hormonal alterations and maxillomandibular relationship instability [1]. Studies show that emotional factors (stress, anxiety, depression) also play an important role in TMDs [1,6].

Due to TMDs complex characteristics, conservative treatment modalities include education, self-care, neuro myorelaxing occlusal splints, pharmacotherapy and behavioral therapy. Relaxation techniques and acupuncture have been used as complementary therapy in patients with TMD painful symptomatology. [1,2,4]

Acupuncture originated in China over 3000 years ago consisting one of the building blocks of Traditional Chinese Medicine (TCM) and it has been used to treat plenty clinical conditions, especially in pain management [2,3,7]. Since pain is often observed in patients with TMD, Acupuncture has been widely chosen as adjunctive therapy, with a considerable number of studies corroborating to its effectiveness [2,4,8,9].

The aim of this manuscript is to present a case report of a patient diagnosed with TMD, submitted to an acupuncture protocol treatment based on scientific evidences and TCM concepts, offering a more individualized approach.

CASE REPORT

A female patient, 22 years old complaining of severe pain in the middle third of the face radiating to the head searched for treatment at Patos de Minas School of Dentistry, Brazil. Patient had no systemic alterations and reported that pain begun 2 months prior to the first appointment and was managing it by taking analgesic (dipyrone 500mg) and anti-inflammatory (ibuprofen 400mg) on her own. However, pain became worse and medication was not being effective anymore.

At clinical examination, patient reported pain score 10 in the 10 cm Visual Analog Scale (VAS), which 0 represents "no pain" and 10 the "worst pain possible". Occlusion evaluation and muscle palpation was performed in accordance with the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) (Axis I) [10]. The patient had premature contacts on the anterior teeth and occlusal interference on right lateral movement. Intense pain was reported in the masseter, temporalis, trapezius and sternocleidomastoid muscles bilaterally during palpation exam as well as mouth opening limitation, pain on mastication, especially food of harder consistency. Patient also reported being under stress because of daily routine of studies and a night shift job. The RDC/TMD (Axis II) [10] questionnaire was applied to confirm TMD diagnosis.

Five acupuncture sessions (one session a week) were proposed to the patient to minimize painful symptomatology. To make muscle activity assessment before and after treatment, the patient underwent electromyography (EMG) test [11]. The handler used the EMG030204/06U (EMG System do Brasil Ltda) equipment with 4 channels, 14 bits resolution in signal acquisition and 5000-volt electrical isolation. The software (EMG System do Brasil - www.emgsystem.com.br) was used for assessment (Figure 1, A - C).

The skin was cleaned with cotton wool and 70% alcohol before signal acquisition. Disposable bipolar Ag/AgCl electrodes of 1 cm, which were circular in shape, were

connected to the preamplifier and placed at a distance of 2 cm from each other according to Surface ElectroMyoGraphy for Non-invasive Assessment of Muscles (SENIAM) Project [12] on the following muscles: first the masseter and then the temporalis (anterior portion), bilaterally (Figure 1, D - E).

The electrical activity of these muscles was recorded at rest (R), maximum voluntary contraction (MVC), maximum protrusion (P), right lateral movement (LR), left lateral movement (LL), clenching wax (CW), habitual mastication (HM), chewing peanut (CP) and chewing raisin (CR). EMG test was performed right before the first acupuncture session (T0), right after it (T1) and after the fifth (T2) session (table 1). During the test, patient remained sitting in a comfortable position, and was oriented to keep the back straight, arms relaxed, feet on the floor and eyes fixed on the horizon. Patient was advised to interrupt self-medication one week prior to the first session. At week 1 VAS score was 8 before EMG test and 10 after it (T0). VAS score was 0 after the first acupuncture session and 3 after EMG test (T1). As the patient reported greater discomfort on the left side of the face at this day, only acupoints on the left side of the body were punctured. On the following sessions acupoints of the both sides were selected for puncturing. After the last session, the patient reported no more painful symptoms

The acupoints selected for this case were those recommended by the literature for orofacial pain [2,3] as well as trigger points (Ashe) [13] and points for anxiety (table 2). Stainless steel acupuncture needles (DongBang; DBC 108 Medical Co Ltd, South Korea) were chosen in sizes 0.22 mm x 13 mm (for points of the face) and 0,25 mm x 30 mm (for distal points). The skin was previously cleaned on the points location with cotton wool and 70% alcohol. During therapy, the patient stayed lying on a stretcher in supine position.

The patient underwent occlusal adjustment after the first acupuncture session and will receive a myorelaxing occlusal splint to protect the teeth and neuromuscular system from parafunctional activities such as teeth clenching and bruxism [1].

DISCUSSION

Chronic pain is a great burden to society, responsible for personal suffering, drug abuse and a considerable financial problem due to treatment spending and lost productivity [7]. A study from 2012 found that the annual cost of pain in the United States ranged from \$560 to \$635 billion dollars, being superior than the costs of heart disease (\$309 billion), cancer (\$243 billion) and diabetes (188 billion) [14]. In this context, acupuncture can play an important role considering its efficacy in reducing pain, few occurrence of adverse effects and relatively low cost [7].

Acupuncture has been often used as a complementary treatment in pain management in TMD [3]. A study comparing dry needling (DN) with methocarbamol (380 mg) and paracetamol (300 mg) combination drug therapy in TMD patients with pain on the lateral pterygoid muscle showed better results in the DN group [15]. In a clinical trial involving occlusal splints, a group treated only with splint and another only with acupuncture had significant and similar results on pain reduction [2]. In another study, the group treated with a combination of occlusal splint and laser acupuncture had faster and greater pain reduction than the group treated with occlusal splint and laser placebo [4].

According to Western Medicine, Acupuncture is responsible for activating peripheral sensory nerves and the afferent nerve pathway in the spinal cord, liberating cortisol, enkephalins, endorphins, dynorphins and endomorphins blocking the painful stimulus [7,13]. In the reported case, the patient was in great pain before treatment (score 10 on VAS) and pain medications were not being sufficiently effective, reducing pain to a score 6 on VAS according to the patient. Acupunture treatment could eliminate patient's pain without the intake of any substance and the patient had no side effects and as was observed on the EMG test, muscular activity reduced both in T1 and T2 for most of the evaluated positions (table 1)

Myofascial pain is one of the main symptoms of TMD and treatments must act on pain control. In this case report acupuncture was chosen before occlusal splint therapy because of its effectiveness on acting quickly on TMD painful symptoms as was observed by the absence of pain after acupuncture treatment since the first session, directly impacting the patient's well-being considering that pain was present for 2 months and medications were not working effectively anymore. However, acupuncture alone does not cure TMD, due to its multifactorial etiology which often requires multidisciplinary approaches that not only treat painful symptomatology, but also work to eliminate the causes.

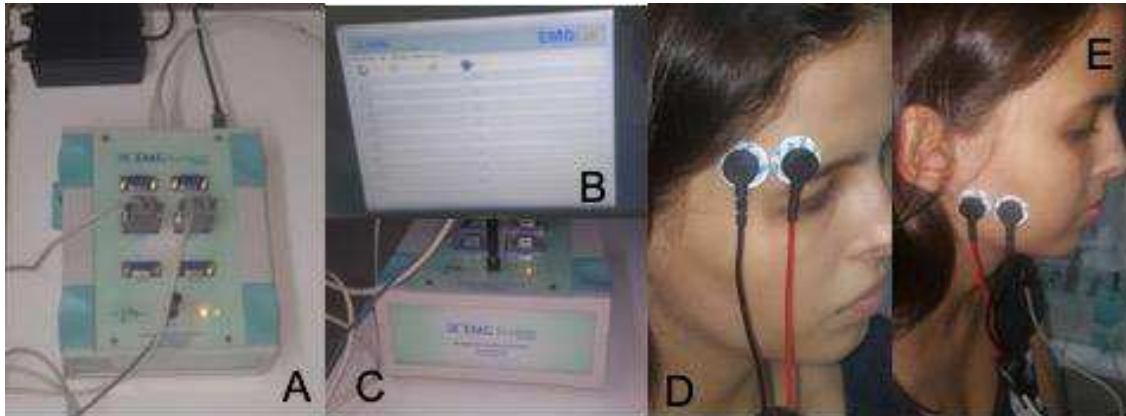
Table 1 – EMG test											
Muscle	Data	Channel	Muscular electrical activity								
			R	MVC	P	LR	LL	CW	HM	CP	CR
MASSETER	RMS	C3 – T0	56,6	66,51	61,92	54,48	58,36	77,41	66,63	63,48	64,55
		C3 – T1	48,44	50,48	42,77	45,94	48,43	68,14	52,6	64,8	64,89
		C3 – T2	40,94	35,15	41,98	45,05	44,09	66,06	51,33	63,47	55,54
		C4 – T0	52,03	53,37	52,92	50,1	36,67	66,77	69,12	59,84	59,84
		C4 – T1	19,48	27,53	32,95	24,83	20,85	49,42	39,18	45,38	39,57
		C4 – T2	16,15	26,41	30,42	28,23	25,30	48,00	38,89	37,02	38,37
	Area	C3 – T0	44,53	23,45	47,19	46,23	46,81	48,87	48,85	48,96	48,96
		C3 – T1	51,01	51,01	48,77	50,22	50,24	51,68	50,17	51,15	51,25
		C3 – T2	44,96	22,67	45,32	44,87	44,46	46,78	44,17	44,58	44,10
		C4 – T0	18,8	10,11	20,37	20,15	19,19	22,84	22,56	22,56	22,65
		C4 – T1	22,37	22,37	22,15	21,39	22,36	23,69	22,59	22,81	22,03
		C4 – T2	14,82	10,14	20,38	19,87	19,09	22,55	20,02	20,57	20,76
TEMPORALIS	RMS	C3 – T0	27,37	104,88	17,24	18,09	16,14	138,95	89,04	76,48	71,62
		C3 – T1	19,02	109,08	16,67	17,69	17,6	168,72	75,57	99,75	88,2
		C3 – T2	18,15	92,98	15,62	17,39	16,49	136,91	60,32	80,09	69,05
		C4 – T0	29,86	65,34	31,3	28,25	40,13	156,05	112,09	113,64	91,75
		C4 – T1	39,58	71,71	26,23	26,37	26,85	147,55	67,21	102,59	86,61
		C4 – T2	36,72	70,95	22,48	26,55	24,52	144,56	50,99	101,18	86,68
	Area	C3 – T0	43,94	25,53	42,99	43,02	43,11	52,3	46,78	45,89	46,69
		C3 – T1	43,57	25,71	44,09	44,01	44,15	54,18	46,15	46,8	46,29
		C3 – T2	41,86	24,18	41,99	42,62	42,77	50,38	46,03	43,92	43,14
		C4 – T0	22,44	11,76	22,13	21,65	22,71	28,14	26,29	25,5	24,77
		C4 – T1	21,72	12,96	21,48	21,24	21,4	28,42	22,23	24,1	23,31
		C4 – T2	20,36	11,47	17,96	17,19	18,08	25,56	18,00	21,26	19,62

Table 2 – Selected acupoints description.

Body place	Point	Anatomical position	Indication
FACIAL	Jiache	On the cheek, 1 cun superior to the anterior angle and above the mandible, on masseter muscle prominence.	Relax facial muscles, facilitate mandible opening. Improves TMJ Qi.
	Xianguan	On the face, distally to the zygomatic bone, in the center of the depression between the mandible incisure and the inferior edge of the zygomatic arch, anterior to the mandibular condylar process, on the posterior margin of masseter muscle.	Improve ear and TMJ functions. Alleviate spasms and pain.
	Tinggong	On the face, anatomical depression formed when mouth opens, localized anterior to the ear tragus, between the TMJ and the tragus.	Relax the Shen, benefits the mind, removes Qi and blood obstructions of the vessels, alleviates pain, muscular spasms, trismus, TMJ motor impairment and toothaches.
	Ermen	Superior part of the cavity before the tragus and above the mandibular condyle as mouth opens.	Toothaches and pains, TMJ arthritis, headaches.
	Yintang	Anterior middle line of the face, middle point between the eyebrows.	Extra point that eases the mind.
	Trigger points	A palpable taut band anywhere on the body	Relaxation of the region and pain reduction
SYSTEMIC	Bai Hui	Middle of the skull, at the top of the head, on the intersection of the body middle line with the line from the vertical axis of both ears.	Stimulates the memory and the mind.

	Hegu	Radial face of the hand, between metacarpal bones I and II, closer to the second one, approximately on its center, on the muscular projection when adduction of the thumb is performed.	Eases the mind, decreases pain and inflammation, improves gastrointestinal function and headaches.
	Houxi	On the ulnar margin on the hand, in the depression proximal to the metacarpal bone head V,	Alleviates pain and releases articular movements.
	Yanglingquan	Superior third of the leg lateral face, on the muscular depression anterior and inferior to the fibular head.	Alleviates pain, decreases anger and relaxes the TMJ.
	Fengchi	Lateral and posterior to the neck, on the bone depression between external occipital tuberosity and mastoid process, at Fengfu level, on the depression between the sternocleidomastoid muscle and the superior margin of the trapezius.	Relax the muscles and tendons, improves articular functions.
	Zusanli	Anterolateral face of the leg, 3 cun directly below the Dubi and 1 cun lateral to the anterior margin of the tibia between the muscles tibialis anterior and the extensor digitorum.	Stomach tonification, alleviate pain and inflammation, improves , improves gastrointestinal function and headaches.

Figure 1 (A-D) : A – Channels, B – computer software, C – Frontal view of the EMG equipment, D – Electrodes placed on the anterior portion of the temporalis, E – electrodes placed on the masseter.



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