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Acupuncture as an Alternative Therapy in the Management of Burning Mouth Syndrome (BMS)

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ABSTRACT

In the routine of dental care, complaints of burning sensation, burning tongue and dry mouth are frequent. Due to the complexity of etiology and diagnosis, treating patients with these sensations is a challenge for clinicians. This study aimed to assess acupuncture as an alternative therapy for patients with burning mouth syndrome (BMS). Clinical data were collected from visits of patients to the School of Dentistry of Piracicaba, State University of Campinas, with the application of a protocol of acupuncture points: LI-4 (Hegu), HT-7 (Shenmen), SP-6 (Sanyinjiao), ST-36 (Zusanli), REN-23 (Lianquan), REN-6 (Qihai), LI-11 (Quchi), ExHn3 (Yintang), LV-3 (Taichong), ExHn12 (Jinjin), and ExHn13 (Yuye) to treat the symptoms of BMS, from August 2017 to March 2020. The sample consisted of 6 volunteers – 5 female and 1 male patients – aged 40 to 79 years. The intensity of BMS was assessed before and after each session with self-reported verbal numerical rating scale (VNRS) during the treatment. On average, each patient had 8.16 sessions using 9.92 acupuncture points per session. Variation of VNRS during the treatment showed a decline in burning mouth in most patients, and 83.34% of the sample showed partial or total improvement of symptoms. This study showed that acupuncture was effective in relieving burning mouth, reducing it by 43%, representing an alternative therapy in the management of symptoms of burning mouth syndrome.

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1. Introduction

The International Association for the Study of Pain (IASP) defines burning mouth syndrome (BMS) as “a burning pain in the tongue or other mucous membranes associated with normal signs and laboratory findings lasting at least 4 to 6 months^[1].”

Although no consistent data are available about the prevalence of BMS in Brazil, estimates indicate that around 4.5% of the population has BMS^[2].

The prevalent mean age of patients with BMS is higher among individuals from 55 to 65 years, but it can also affect adults between 30 and 40 years, rarely affecting younger people^[2,3,4,5], and more women are affected when compared to men.

BMS has complex multi-factor etiopathogenesis, involving systemic, local, psychogenic factors, and possibly an interaction among them. Therefore, its diagnosis and specific therapy for each case represent challenges for dental surgeons^[6].

Different types of treatments are found in the literature, such as topical treatments based on clonazepam; systemic treatments with alpha-lipoic acid, selective serotonin reuptake inhibitor and amisulpride inhibitor; and cognitive behavioral therapy. Other possibilities based on the opinion of specialists and clinical practice, but not yet assessed, include topical treatments based on capsaicin, doxepin and lidocaine, in addition to systemic treatments^[7]. Low-level laser therapy has been an alternative treatment for BMS, since it helps reduce the symptoms of BMS^[8].

Few studies have analyzed acupuncture as a therapy for BMS, with evidence of its effective impact on relieving and treating burning sensation by stimulating microcirculation of the oral cavity^[9]. It is a non-invasive method that influences the control of peripheral sympathetic nervous system activity, and stimulation promoted by acupuncture associated with minimal local and systemic adverse effects makes it an alternative treatment for BMS^[10]. From a pilot study patients reported a reduction of pain and better able cope with their oral symptoms^[11]. Then, this study aimed to evaluate acupuncture as an alternative therapy for the symptoms of burning mouth syndrome (BMS).

2. Method

2.1 Participants

After analyzing the medical records of patients treated with acupuncture at the Acupuncture Clinic of the School of Dentistry of Piracicaba from August 2017 to March 2020, whose main complaint was burning mouth, a sample was obtained of 6 patients: 5 female and 1 male

individuals, aged between 40 and 79 years, mean age 62 years. The inclusion criterion was data collection from at least 8 points (75%) of the protocol of acupuncture points for BMS during the treatment sessions; medical records were excluded from this analysis which used acupuncture points other than those of the protocol.

The treatments used traditional acupuncture performed by experienced dentists-acupuncturists.

2.2 BMS Treatment Protocol

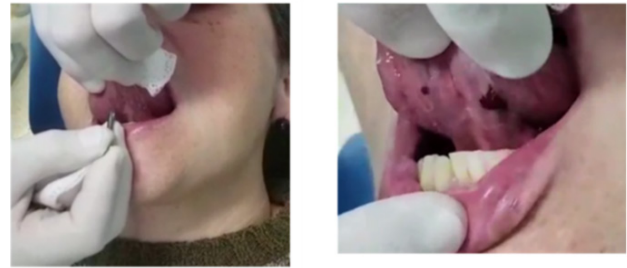


Figure 1. Bleeding at acupuncture points

Acupuncture points from the BMS treatment protocol are: LI4 (Hegu), HT7 (Shenmen), SP6 (Sanyinjiao), ST36 (Zusanli), REN23 (Lianquan), REN6 (Qihai), LI11 (Quchi), ExHn3 (Yintang), LV3 (Taichong), ExHn12 (Jinjin), and ExHn13 (Yuye); with bleeding performed at the two last points.

Dong Bang® disposable stainless steel needles 0.25mm x 30mm were used. Perpendicular insertion was used in most acupuncture points, with Yintang acupuncture point needled more superficially and parallel to the skin, towards the base of the nose. The application was unilateral and the needle retention time was 20 minutes in each session.

For bleeding of extra points ExHn12 (Jinjin) and ExHn13 (Yuye), the acupuncturist wore disposable rubber gloves, stabilized the tongue with gauze, and bled the points with perforation using disposable stainless steel lancets (Sterilance Advantive®, Wuxi Xinda Medical Device Co, Ltd, Jiangsu Province, People's Republic of China); ending with tamponing of perforations by gentle compression of gauze over the acupuncture points (Figure 1).

Medications taken by patients and the clinical characteristics of tongues were recorded.

2.3 Burning Mouth Assessment

Verbal numerical rating scale (VNRS) was used to measure the effects of acupuncture, with 0 (zero) meaning absence of burning mouth, and 10 (ten), high level of burning, as verbally reported by patients in the beginning and at the end of each session.

In order to analyze the evolution of symptoms during the treatment, each individual was evaluated separately, given the significant variation in the number of sessions, enabling to assess the progress of symptom remission, session by session, during the treatment.

2.4 Statistical Analysis

The statistical analysis was performed using Excel 2010 spreadsheet and data were analyzed by the reduction of Verbal Numerical Rating Scale (VNRS).

2.5 Ethical Aspects

All patients signed an informed consent approved by the Research Ethics Committee of the School of Dentistry of Piracicaba, State University of Campinas.

3. Results

Most participants reported taking medication to control chronic diseases, including arterial hypertension, anticoagulants, anxiolytics and antidepressants, drugs for cholesterol control, among others, as indicated in Table 1.

Table 1. Medications taken by patients comprising the study sample

Medications taken by patients										
PATIENT	Anxiolytics/ Antidepressants	Anti-hypertensive agents	Cholesterol	Anticoagulant	Supplements	Vertigo and nausea	Hormone	Others		
1	Diazepam	Losartan						Omeprazole		
	Amitriptyline hydrochloride									
2										
3	Bromazepam				Barbit		Puran T4			
4	Sertraline	Losartan						Omeprazole		
	Clonazepam									
5	Sertraline	Naprox	Rosuvastatin	Aspirin			Mecliz			
	Donaren									
6			Atenolol	Rosuvastatin	Aspirin					

Most patients (80%) reported burning sensation in the tongue, and at the time of diagnosis, some characteristics of the tongue were common to patients, such as white coating (100% of patients), teeth marks (83.33%), deviation downwards (83.33%), swelling (83.33%), moisture (83.33%) and weakness (83.33%) (Figure 2).



Figure 2. Tongue of one patient from the sample showing the characteristics that were common to most patients: white coating, teeth marks, edema, moisture and weakness

The sites affected by burning were tongue, gingiva, palate and buccal mucosa; with an average duration of 2.5 years. (Table 2).

Table 2. Sites affected and duration

PATIENT	SITE AFFECTED	DURATION
1	Gingiva	
	Palate	
2	Buccal mucosa	60
	Tongue	
3	Tongue	15
4		7
5	Palate	
	Tongue	
	Buccal mucosa	
6	Tongue	36
Average duration		29.5 months

In total, 49 acupuncture sessions were provided to the sample, using on average 8.16 sessions per patient and 9.92 acupuncture points per session.

In the total sample, 87% of the points selected for treatment were from the BMS treatment protocol and 13% were additional points, due to sporadic secondary changes presented by patients during the therapy. Among these additional points not from the BMS protocol, the most frequently used were PC6 (Neiguan) for anxiety and restlessness, LU7 (Lieque) to tonify defensive Qi and release

emotional tension, HT5 (Tongli) to relieve stress and clear the heat of the heart, and REN12 (Zongwang) to tonify stomach Qi and disperse heat and moisture.

All treatments used at least 75% of the acupuncture points from the BMS protocol, as illustrated in Figure 3.

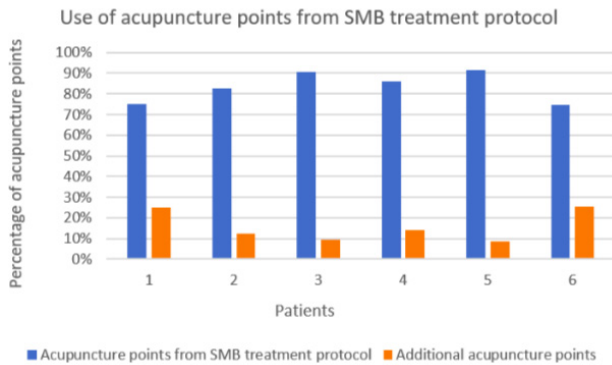


Figure 3. Use of acupuncture points (in %) from BMS treatment protocol per patient

The illustration below shows the individual results of initial and final VNRS from the first sessions of each patient (Figure4).

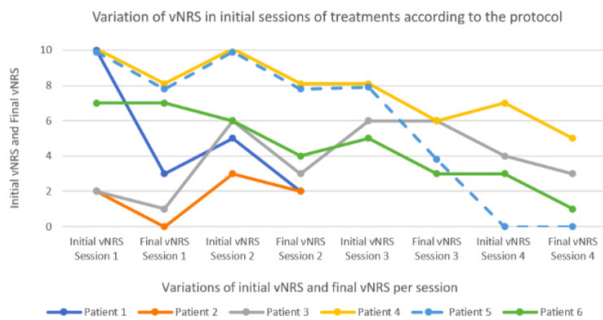


Figure 4. Variation of VNRS in initial sessions of treatments according to the protocol

Variations in initial VNRS during the treatment show a decline in burning sensation in most patients, with 5 out of 6 patients (83.34% of the sample) showing partial or total improvement in burning mouth sensation. Patient 2 interrupted the treatment in the third session and did not complete it.

4. Discussion

BMS affects five out of 100,000 individuals, affecting around 1.3 million American adults; it is more frequent in post-menopausal and elderly or middle-aged women, regardless of ethnicity or socioeconomic condition [12]. Prevalence of BMS in the world population varies between 3.7% and 5.4% [13], which justifies further studies like this

one to analyze potential therapies.

Discomfort starts suddenly, with low intensity [14], which may be accompanied by other symptoms, whose intensity may vary between individuals, which was also observed in the sample of this study, where initial VNRS varied from 2 to 10 among participants.

Studies have reported a relationship between burning mouth and emotional factors such as depression and anxiety, although it is not known whether these psychological conditions have an etiological contribution to the syndrome [15,16], in agreement with the findings of this study, in which 66.66% of all patients were taking an anti-anxiety or antidepressant drug.

It is a consensus in the literature that BMS proportionally affects more women than men, more frequently reported among elderly people, mean age 65 years, but it may also occur among younger people [2,4,17,18], which is consistent with the results of our study, whose sample consisted of 83.33% female patients, mean age 62 years.

In BMS, tongue is the site presenting most symptoms, bilaterally and symmetrically in most cases, more commonly found in the anterior two thirds (71% to 78%); symptoms may also affect the dorsum and lateral borders, hard palate, alveolar ridge and lips, and may affect more than one site of the same patient [19], consistent with data of our study, where tongue was frequently affected in the sample; however, the clinical findings of tongues presented surprising characteristics, since the reported burning symptoms would lead to a hypothesis of heat and dryness in the perspective of Traditional Chinese Medicine (TCM), contradicting the recurrent aspects of white coating and moisture in most individuals of the sample. Also, absence of clinical signs was observed in both perspectives of Western medicine and TCM, which makes the reporting of symptoms by the patient essential for the differential diagnosis of BMS.

The common tongue characteristics of the patients in this study show Qi running counterflow, stagnant Qi in the stomach, with deficiency of Qi and Yin. Then, acupuncture points were used to regulate the affected functions: LI-4 (Hegu) promotes analgesia for disorders of the head and face region; HT-7 (Shenmen) eliminates heat from the heart's energy channel by calming the Shen; SP-6 (Sanyinjiao) nourishes blood and Yin and reassures the Shen; ST-36 (Zusanli) strengthens and tonifies Qi, nourishes blood and reassures the Shen; REN-23 (Lianquan) regulates and redirects the flow of inverted Qi, eliminates fire and perverse heat; REN-6 (Qihai) strengthens Qi and harmonizes blood, LI-11 (Quchi) filters heat and cools blood; ExHn3 (Yintang) eliminates wind and reassures the Shen; LV-3 (Taichong) nourishes blood, eliminates internal wind

and mobilizes Qi; ExHn12 (Jinjin) and EXHn13 (Yuye) expel heat and wind.

Sardella et al. (2006) studied the spontaneous remission of BMS symptoms, analyzing 48 women and 5 men, mean age 67.7 years, who presented BMS for an average of 5.5 years, and concluded that due to the therapies adopted, 26 patients (49%) showed no improvement in symptoms, 15 (28.3%) showed a small improvement and 10 (18.9%) reported worsened symptoms, with only 2 patients (3.7%) presenting full spontaneous remission of symptoms. Then, studies analyzing therapeutic practices that can relieve symptoms, even partially, are important as an alternative to improve the quality of life of patients with BMS. The protocol adopted in this study showed reduced symptoms in 83.34% of the sample.

Changes in microcirculation caused by acupuncture happened not only at the skin level, but also in deeper areas^[20].

Acupuncture is a non-invasive method that can influence the control of peripheral vascular sympathetic activity^[21]. Stimulation promoted by acupuncture associated with minimal local and systemic adverse effects make it an alternative treatment for diseases caused by poor systemic circulation^[22], despite the challenge of standardizing this methodology as it is a TCM technique, requiring many sessions, which can lead BMS patients to dependence on therapy due to the psychogenic components that involve the etiopathogenesis of BMS^[10]. Our study also observed difficult standardization of this methodology, considering that several sessions required additional acupuncture points, not from the BMS treatment protocol, for tonification or due to secondary complaints that emerged during the treatment. These additional acupuncture points included PC-6 (Neiguan) for anxiety and restlessness, LU-7 (Lieque) to tonify defensive Qi and release emotional tension, HT-5 (Tongli) to relieve stress and clear heart heat, and REN-12 (Zhongwan) to harmonize, tonify and strengthen spleen Qi and stomach Qi and promote stomach Qi and the middle Jiao.

Scardina (2010) conducted a study that analyzed a sample of 30 individuals with BMS, mean age 65.4 years, 10 male and 20 female individuals; and a control group of 30 healthy individuals, mean age 62.06 years, 10 male and 20 female individuals. All participants were treated with acupuncture using the following acupuncture points: SI1 (Shaoze), SJ1 (Guanchong), LI4 (Hegu), SJ21 (Ermen), ST5 (Daying), ST6 (Jiache), and REN24 (Chengjiang), with LI4 (Hegu) in common with the protocol adopted in our study. Scardina found a significant change in the oral microcirculation, promoting relief of burning mouth symptoms after a three-week treatment. Such relief lasted

18 months after acupuncture therapy, leading the author to conclude that acupuncture may be a valid option for the treatment of BMS. This finding is consistent with the results of our study, where reduced VNRS was observed throughout the sessions. In future studies we intend to add acupuncture points that help further tonify Qihua, remove obstruction, improve flow, descend Yang that has ascended, and harmonize the three San Jiaos such as ST40 (Fenglong), REN12 (Zhongwan), ST21 (Liangmen), and SP15 (Daheng).

5. Conclusions

This study demonstrated that acupuncture was effective in relieving burning mouth, reducing it by 43%, representing an alternative therapy in the management of symptoms of burning mouth syndrome.

Declaration of Competing Interest

The authors declare no conflict of interests in this study.

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