



ORIGINAL ARTICLE

Patients with burning mouth sensations. A clinical investigation of causative factors in a group of “complete denture wearers” Jordanian population



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KEYWORDS

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Abstract *Aim:* To find out the prevalence of “true” burning mouth syndrome and study the association between patients’ spontaneous complaints of burning mouth and systemic conditions in a group of middle age and elderly “denture wearers” patients in Jordan.

Methods: A group of 129 patients (112 female and 17 male) of “complete denture wearers” subjects aged 40 years and over attended prosthetic clinic at King Hussein Medical Hospital complaining from oral burning, with no oral lesion possibly responsible for the burning sensations were selected. Assessment of oral and general status was done based on questioners, detailed history taking, medical records and extra and intraoral examination. The existed complete dentures retention, stability, jaw relationship and the free way space were evaluated. The current blood test and instrumental protocol for examination of patients with burning mouth complains were performed for each patient. Then those studied patients with burning mouth sensations including “true” burning mouth syndrome have been compared to the controls with regard to the presence of local problem, undermined local, systemic or psychological disease.

Results: The diagnosis of “true” burning mouth syndrome was established in (2.3%) of the studied population two females and one male. In most patients (58%) more than one site was affected. Significant positive associations were found between local factors (i.e., wearing complete dentures with unsatisfactory retention or jaw relationship, dry mouth or candidasis) and patients suffering from burning mouth sensation. The results also show that some systemic or psychological disorders

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were significantly more present among patients with burning mouth symptoms when compared to the control group ($p < 0.05$).

Conclusion: Spontaneous symptoms of burning mouth without mucosal signs should be considered as a manifestation of undermined pathology and/or distress, and the multi-factorial causes of burning mouth syndrome and sensation need to be referred to the suitable specialist for better treatment results.

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1. Introduction

One of the most difficult problems in oral medicine is the patient who consistently complains of pain or burning sensations, but the dentist or physician can find no convincing physical explanation (Brightman, 1984). Such conditions can occur in several local, systemic diseases or psychiatric conditions that must be ruled out prior to making a diagnosis of burning mouth syndrome, since this term is used exclusively to refer to idiopathic forms and is included within different sensory disorders (Brufau-Redondo et al., 2008).

Burning mouth sensation is probably of multi-factorial origin and can be a symptom of another disease when local or systemic factors are found to be implicated; however the exact underlying etiology remains uncertain (Javali, 2013; Kohorst et al., 2014). Clinical studies showed that the burning sensation can affect the tongue, the palate, the denture bearing areas, the buccal mucosa and the throat. From a clinico-pathologic stand – point two forms of burning mouth syndrome (BMS) has discussed: “true” or primary BMS, the idiopathic form of the disorder, and secondary BMS, which results from local or systemic disorders that may respond to appropriately directed therapy (Scala et al., 2003). In most cases, patients suffering from burning mouth syndrome frequently continue their looking for proper treatment through a long series of oral and medical attendance to solve their problems and relieve the pain. Therefore, special attention must be given to local factors like dentures and any systemic and psychological problem. Undiagnosed diabetes mellitus, hematological deficiencies, decreased salivary gland flow, candidal infection, allergy and parafunctional habits might also play an important role in the undermined causes of the symptoms of spontaneous burning sensations and should be considered during considering the treatment protocol (Lamey and Lamb, 1988; Svensson and Kaaber, 1995; Silvestre and Serrano, 1997; Soares et al., 2005).

This study was conducted to find out the prevalence of “true” BMS between groups of patients with burning sensation and study the association between burning mouth sensation and undermined local, systemic diseases or psychiatric conditions since this can be primarily diagnosed by dentist and then referred to the specialist to receive the best and quick-est possible treatment results.

2. Methods

A total 129 “denture wearers” patient aged 40 years and over who attended the prosthetic clinics at King Hussein Medical Military Hospital in Jordan complaining of oral unremitting burning, with no oral lesions possibly responsible for the burning, in 2014 were sampled for this study. All participants were

edentulous and wearing upper and lower complete dentures aged for 6 months or more. The study was conducted following the guidelines of the ethical review committee of the Royal Medical services-King Hussein Hospital in Jordan and a consent form each participant was obtained.

After detailed medical history was taken from each participant, thorough clinical examination of the oral cavity was performed. Patients with any extra or intra oral localize traumatic or pathologic lesion suspected to induce patient’ distress, pain or burning sensation was excluded from the study. The location of burning sensation and its relation to the existed denture retention, stability, jaw relationship and the free way space, denture base extension, tongue position as well as parafunctional habits such as clenching and tongue thrusting, was established. Smear for the detection of *Candida Albicans* was taken from each participant with a cotton stick. The smear was placed on the Sabouraud’s agar into an incubator at the temperature of 37 °C for 48 h and then according to the number of colonies diagnosis of candidiasis was made according to Budtz-Jørgensen (1974). Salivary gland investigations-Stimulated parotid salivary gland flow rates were performed with a Carlsson-Crittenden cup, stimulation being with 1 ml of 10% citric acid. The volume of saliva produced in 1 min was then measured. A value below 0.5 ml/min was considered abnormal according to the studies of Femiano et al. (2008).

Patch testing was done to investigate allergy to the acrylic monomer. The current blood test and instrumental protocol for examination of patients with burning mouth complains were performed for each patient (Table 1) in addition to Free T3 and T4, Thyroid-stimulating hormone (TSH) was done to detect hypothyroidism. Patients were asked directly about

Table 1 Current blood and instrumental protocol for BMS patients.

Complete blood count (CBC)
Random level of blood glucose
Ferritin serum
Liver function for Alanine transaminase and aspartate transaminase
Level vitamin B12
Serum total IgE
Autoantibodies by using antinuclear antibody test
The gastrointestinal tract by using serum antibodies to helicobacter
Salivary flow rates by using Saxon’s test
Scintigraphy for magor salivary glands
Free triiodothyronine (FT3) and free thyroxine (FT4)
Thyroid-stimulating hormone (TSH)
Estradiol levels for females

depression, and anxiety. Careful questioning in an unhurried atmosphere was necessary to elucidate causes of anxiety such as financial, housing, and domestic problems. After all known local and systemic factors known to contribute to burning symptoms in clinically healthy oral mucosa were excluded, the diagnosis of “true” burning mouth syndrome was established in the remaining number of patients. Then they were compared to the same number and sex and age distribution matched controls recruited from the Department of Prosthodontics and free of any oral disease and burning symptoms, regarding presence of any undermined pathology. The statistical analysis was performed by use of Chi-Square test and *p* values (*p* < 0.05) were considered as significant.

3. Results

The population of this study composed of 112 (~87%) female with the mean age of 58.5 years and 17 (~13%) male with the mean age of 60 years (Table 2).

Table 3 and Fig. 1 shows the site of the oral mucosa affected by the burning sensation. In most patients (58%) more than one site was affected.

Clinical and laboratory results of the local factors and denture quality measures detected between subjects with burning symptoms and clinically healthy mucosa and the control group are shown in Table 3. Local and denture factors were detected as follows: unacceptable retention and /or stability in 20 (~16%) patients, unacceptable horizontal or vertical jaw relationship in 24 (~13%), inadequate base extension leading to overloading of the denture bearing tissues 20 (~16%) patients, limited tongue space due to improper position of the teeth and reduce of freeway space in 18 (~14%) patients. When such features were present new dentures were fabricated to a new and proper design; this reduces the burning symptoms in 35 of the 64 patients. Dry mouth was detected in 46 (~35%) patients, oral candidiasis in 47 (~36%) patients, parafunctional habits in 4 (~3%) patients. Significant differences were found between patients with burning mouth symptoms and controls regarding a presence of a predisposing local factor (*p* < 0.05) (Table 4).

Systemic factors which might contribute to burning symptoms in clinically healthy oral mucosa were: gastrointestinal problem which was found in 26 (~20%) patients, diabetes which was found in 37 (~29%) patients, nutritional deficiencies like anemia which was found in 30 (~23%) patients, hypothyroidism was found in 23 (17.8%) patients, 56 women (~50%) with low estradiol level (the estradiol levels were below 15 pg/ml in 56 (49.8%) women in the studied sample), psychological problems was found in 14 (10.9%) and other diseases such as Parkinson’s disease and cerebrovascular insult which were found in 12 (9.3%) patients. Significant differences were found between patients with burning mouth and controls regarding the presence of undermined systemic disease (*p* < 0.05) (Table 5).

4. Discussion

In agree with the other studies (Lamey and Lamb, 1988; Suresh et al., 2014; Kohorst et al., 2014), this study confirms

Table 2 Distribution of patients with burning sensation by gender and age group.

Age group	Male	Female	Total
40–50	5 (3.9%)	22 (17.1%)	27 (20.9%)
51–60	5 (3.9%)	37 (28.7%)	42 (32.6%)
> 60	7 (5.4%)	53 (41.1%)	60 (46.5%)
Total	17 (13.2%)	112 (86.8%)	129

Table 3 Location of burning sensation in the oral cavity in the studied group.

Location	N (%)
Tongue	21 (17%)
Palate	20 (15%)
Lower ridge	4 (3.1%)
Lip	4 (3.1%)
Cheeks	5 (4%)
Tongue, palate and upper ridge	27 (21%)
Tongue and lips	18 (14%)
Tongue, palate, upper ridge, lower ridge and cheeks	9 (7%)
Palate, upper ridge, lower ridge and lips	1 (1%)
Palate, upper ridge, lower ridge, cheeks and lips	1 (1%)
All mouth	19 (14%)

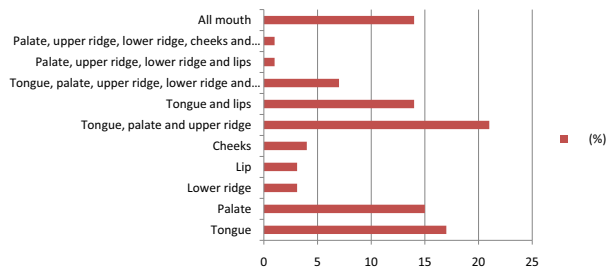


Fig. 1 Location of burning sensation in the oral cavity in the studied group.

Table 4 Local factors associated with burning symptoms found in the studied group (total of 129 patients with burning symptoms and healthy oral mucosa) and the control group.

	Number (%) of patients with burning sensation	Control group N (%)	<i>P</i> -value
Not acceptable retention and/or stability	20 (15.5%)	10 (7.8%)	0.01
Not acceptable vertical and/or horizontal relation	24 (12.6%)	5 (3.9%)	0.01
Inadequate denture extension	20 (15.5%)	12 (9.3%)	0.01
Inadequate tongue space	18 (14%)	3 (2.3%)	0.02
Presence of parafunctional habit	4 (3%)	5 (0.4%)	0.00
Dry mouth	46 (35.4%)	9 (0.7%)	0.00
Presence of candidal infection	47 (36.4%)	3 (0.2%)	0.01
Allergy to denture material	1 (0.1%)	–	0.00

P < 0.05.

the unknown specific cause and the multi-factorial origin of spontaneous burning mouth symptoms. Factors related to dentures, systemic diseases, and to psychological abnormalities were found to be important. Low salivary gland flow, candidal

Table 5 Type and frequency of general conditions between subjects with burning symptoms and the control group.

Medical condition	Number (%) of patients with burning mouth sensations	Control	P-value
Medically and psychologically free (“true” BMS)	3 (2.3%)	–	0.00
Systemic problem			
Diabetes	37 (28.7%)	29 (22.5%)	0.01
Nutritional deficiencies	30 (23.3%)	21 (16.3%)	0.02
Gastrointestinal problems	26 (20.2%)	12 (9.3%)	0.00
Hypothyroidism	23 (17.8%)	10 (7.8%)	0.00
Low estradiol level in women	56 (49.8%)	27 (20.9%)	0.00
Psychological factors (i.e., Depression/anxiety)	14 (10.9%)	2 (1.5%)	0.00
Others (e.g., Parkinsons, Cutaneous, MI, ...)	12 (9.3%)	12 (9.3%)	0.01

$P < 0.05$.

infection, parafunctional habits, and allergy might also play a part (Femiano et al., 2008).

In this study, 3 patients out of 129 (2.3%), the diagnosis of “true” burning mouth syndrome was established based on the symptoms of burning sensation in the oral cavity in clinically healthy oral mucosa, however, this is not representative of the general population because the surveyed subjects were part of the stratified sampling. The results also suggest that the majority of patients with burning symptoms are women (86.8%) (~40%) of them were older than 60 years which is in harmony with previous findings of other authors (BOY METÍN et al., 2008; Maresky et al., 2001; Brailo et al., 2006). Around 1–3% of the adult British populations are affected (Brailo et al., 2006; Rhodus et al., 2003). Similarly, Larsson et al. (2014) reported the prevalence of BMS as 4.6% among a representative population of Swedish middle-aged and elderly women (Larsson et al., 2014).

Problems with dentures are important factors in the burning symptoms. Inadequate denture retention and stability can induce abnormal tongue activity and become a habit to retain the denture (Lamey and Lamb, 1990). Denture extensions and in adequate free way space increase load on the denture bearing areas which results of burning mouth sensation (Svensson and Kaaber, 1995). It is clinically helpful if patients find that removal of the denture reliefs their symptoms.

Dryness from low saliva flow can lead to fungal infections (Nasri et al., 2002, 2007; Blasberg et al., 2008). Additionally, poor lubrication causes sticking of the tongue, cheeks and palate, also sometimes leading to a burning sensation (Scully, 2009). Some denture wearers may have an allergic reaction to the denture materials, resulting in oral burning (Van Ulsen and Van Loon, 1988).

In this study 56 (49.8%) women with burning mouth symptoms and low estradiol levels were all at pre and post-menopausal stage of life. AL-Kotany (2011) reported low estradiol levels in 67 (51.9%) women with burning mouth sensation which confirm the relationship between estradiol level and burning mouth sensation. Basker et al. (1978) found that 19.3% of women presenting to a menopause clinic in England ($n = 114$) had experienced BMS at some time. Ferguson et al. (1981) reported a significant association between oral symptoms (burning, oral dryness, and strange taste) and increased scores on a psychological self-rating test of symptoms such as anxiety.

In agree with the other studies, many intra-oral regions other than the denture bearing areas and the surrounding

mucosa can be affected by burning sensation which confirm the role of the systemic and psychological condition in these symptoms (Scala et al., 2003; Suresh et al., 2014).

Ali et al. (1986), Browning et al. (1987), Lamey and Lamb (1990) found that less than half of BMS patients, whose symptoms could not be accounted for by either local or systemic factors, have significant psychological morbidity. For these reasons, clinicians may want to avoid the assumption of psychological etiology.

Therefore although, burning mouth syndrome is a rare syndrome of medically unexplained symptoms in the oral cavity, it is still a challenge for the dentist because this condition can be primarily seen by him. This study highlighted the need to take all local and systemic factors into consideration in order to achieve proper diagnosis before starting treatment of patients with burning mouth symptoms and this can be achieved by consultation the other physician each according to his specialty.

Further studies are needed on this disease in order to study different management protocols taking the different possible causes and predisposing factors in consideration.

5. Conclusion

Within the limitation of this study the followings can be concluded:

- “True” BMS was reported in 2.3% of the studied group and one male and two females.
- The exact cause of BMS was often difficult to pinpoint and need team work study protocol.
- There is no specific site for burning mouth sensation and many sites can be affected.
- Although various local, systemic, and psychological factors are considered to be predisposing factors for burning mouth sensations, it is still a challenge in the field of oral medicine and should be followed for diagnosis and treatment of the patients complaining of spontaneous burning sensation.

Conflict of interest

Some elderly ‘complete denture wearers’ may keep complaining from burning mouth without any local lesions. The cause

can be considered multi-factorial, therefore cooperation between dentist and physician is mandatory for proper diagnosis and effective treated.

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