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Burning Mouth Syndrome In Complete Denture

**A Project Submitted to
The College of Dentistry, University of Baghdad,
Department of prosthodontics in Partial Fulfillment for
the Bachelor of Dental prosthetics**

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Certification of the Supervisor

I certify that this project entitled “Burning Mouth Syndrome In Complete Denture “was prepared by the fifth-year student Lubab Hassan Hadi under my supervision at the College of Dentistry/University of Baghdad in partial fulfilment of the graduation requirements for the Bachelor Degree in Dentistry.

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Dedication

First , I would thank god for the power he gave me to reach this place , So I dedicate my project to my light in this life, my queen ,my pure soul (My Mom) which is started my journey , to my father and his support, to my sister that witnessed my breakdowns , to my spiritual friend whom make me believe in my self , in my abilities and whose always there for me . To all our professors at Baghdad College Of Dentistry and their efforts .

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INTRODUCTION

Burning mouth syndrome is a debilitating medical condition affecting nearly 1.3 million of Americans. Its common features include a burning painful sensation in the mouth, often associated with dysgeusia and xerostomia, despite normal salivation. Classically, symptoms are better in the morning, worsen during the day and typically subside at night. Its etiology is largely multifactorial, and associated medical conditions may include gastrointestinal, urogenital, psychiatric, neurologic and metabolic disorders, as well as drug reactions **(WJG *et al*., 2013)**

The burning sensation often occurs in more than one oral site, with the anterior two thirds of the tongue, the anterior hard palate and the mucosa of the lower lip most frequently involved. Facial skin is not usually affected. No correlation has been noted between the oral sites that are affected and the course of the disorder or the response to treatment ***WJG 19 et al., 2013***

Alterations in taste occur in as many as two thirds of patients and often include complaints of persistent tastes (bitter, metallic, or both) or changes in the intensity of taste perception. In spite of the normal clinical appearance of the oral mucosa, BMS subjects do have demonstrated changes in sensory perception and salivary factors in addition to alterations in psychologic features. Although some of these changes may be suggestive of a peripheral or central dysfunction of small afferent nerve fibres, the extent of this alteration and its cause both remain unclear. The existence of changes other than psychologic, however, do weaken the proposition that BMS has a

primarily psychogenic origin and suggests instead that future research should address the question of other organic changes in BMS(**M Beljan*, et al* 2016).**

Recent studies (2022)have pointed to dysfunction of several cranial nerves associated with taste sensation as a possible cause of burning mouth syndrome

Aims of the review

The aim of this review is to determine the prevalence of burning mouth syndrome and the association between BMS and the complete denture- wearer

Chapter one: Review of literature

Oral health reflects a history of person's behavioral attitudes and expectations for their oral health. **(M Beljan, *et al* 2016)**. It is well known that symptoms of BMS in oral tissues are concomitant to certain oral diseases. Burning symptoms might occur when oral mucosa has clinically healthy appearance: candidate infection, Xerostomia oral galvanism, parafunctional habit such as tongue , psychological and neurological disorders, diabetes mellitus and menopause , side effect of drug therapy lead to BMS. **(Silvestre *et al*.1997).**

1.1 Definition

Burning mouth syndrome (BMS) is a chronic pain condition. It has been described by the International Headache Society as “an intra-oral burning or dysesthetic sensation, recurring daily for more than 2 h/day for more than 3 months, without clinically evident causative lesions.” BMS is frequently seen in women in the peri-menopausal and menopausal age group in an average female/male ratio of 7: 1. The site most commonly affected is the anterior two-thirds of the tongue. The patient may also report taste alterations and oral dryness along with the burning. **(Stomatologiia ., 2014)**

1.2 Classification Of Burning Mouth Syndrome

Two classification schemes have been proposed based on either etiology or clinical symptoms. When classifying by etiology, **primary BMS** is the idiopathic form for which organic causes cannot be identified while **secondary BMS** results from local or systemic pathological conditions.

The other scheme divides BMS cases into three types :-

- **Patients with type 1 BMS (35%) :-**are symptom-free upon awakening with worsening symptoms throughout the day and variable symptoms at night.
- **Type 2 BMS (55%) :-** is defined by continuous symptoms in the day but none at night.
- **Patients with type 3 BMS (10%) :-** have intermittent symptoms interspersed with symptom-free days.

Type 1 BMS is linked to nutritional deficiencies and diabetes, type 2 to chronic anxiety, and type 3 to dietary .***WJG 19 et al., 2013.***

hypersensitive reactions to denture-base/dental-filling materials and food allergens in BMS subjects are more frequent than expected (Type 3 BMS) **(Lamey *et al.*, 1994)**, but do not seem to have any influence on the outcome of the syndrome **(Virgili *et al.*, 1996)**. In fact, the replacement of dental-filling materials **(Bergdahl *et al.*, 1994)** may relieve the burning symptom in very few cases, whereas the removal of the denture **(Purello-D'Ambrosio *et al.*, 2000)** or diet modification (avoiding food allergens) **(Whitley et al., 1991)** often led to the clearing up of oral symptoms in a few days.

Table -1- Classifications of BMS

Types	BMS symptomology[6]	Factors associated with BMS in each type[7]
1	Symptoms are not present when the patient wakes up, but they will appear and increase during the day	Moderate anxiety disorders
2	Symptoms are present all day and night and strongly associated with anxiety.	Severe psychiatric disorders.
3	Symptoms are not present during some days and are associated with emotional instability or a Hypersensitivity reaction to some foods.	Emotional instability or allergic reactions.

The utility of this classification would be determined primarily by the ability to correlate the diagnosis with patient prognosis. Patients with type 2 diabetes appeared to be the most resistant to treatment **(Grushka *et al*.,2006)**

The main symptoms were present in patients with BMS whereas the detection of either "oligosymptomatic" or "monosymptomatic" variants is more complex.

These details include daily bilateral oral burning (or pain-like sensation) and pain that:

- is experienced deep within the oral mucosa,
- is unremitting for at least 4–6 months,
- is continuous throughout all or almost all the day,
- seldom interferes with sleep.
- never worsens, but may be relieved, by eating and drinking

Further support may come from the identification of the other common complaints in BMS, which may be considered additional “inclusion symptomatic criteria”, such as:

- the occurrence of other oral symptoms, such as dysgeusia and/or xerostomia ,
- pain and tenderness in TMJ , headache , pain in masticatory and neck , shoulder and supra-hyoid muscles.
- the presence of sensory/chemo-sensory anomalies, and
- the presence of mood changes and/or specific disruption(s) in patient personality traits.

To establish the frequency of glossodynia and BMS 2355 patient records were analyzed admitting consultation for oral diseases for the last 10 years. Clinically we examined 408 patients aged 40 to 70. The research results showed that 17% of patients complained of" burning mouth": 10.2% of them had these symptoms due to oral mucosa diseases; 58.0% had glossodynia, 27.4% had discomfort because of intolerance to metal prosthodontic materials and 4.4% had combined pathology **(Stomatologiia *et al*., 2014).**

1.3 Characters of BMS

BMS is a chronic condition characterized by burning sensation in normal oral mucosa and occur particularly in postmenopausal. Women **(Bergdahl ., 1999)**, the patient complain dry mouth, fry lips and dysgensia , Xenostomia (**Formaker *et al.*,2000).**

It primarily affect menopausal or postmenopausal women, Idiopathic or primary BMS can occur spontaneously and without any identifiable precipitating

factors, when it is associated with systemic factors, it is defined as secondary BMS. The mechanism of BMS in postmenopausal women seems to be the result of decrease in estrogen levels with corresponding increase of follicular hormone led to burning in the oral mucosa as it contains estrogen receptors **(Klasser *et al*., 2018).**

Another mechanism could be a higher number of no receptive neurons in the nerves **VII** lead to pain burning symptoms (**Klasser *et al.*, 2018**).

In individuals with BMS, the most prevalent site with burning sensations was the tongue (67.9%)

1.4 Etiology

A number of hypotheses have been proposed to explain the etiopathogenic mechanism of BMS. The first studies attributed great importance to endocrine alterations and tissue degenerative phenomena inherent to aging. **BMS** is multitude of causes which may be placed in to three groups according to **ship AJ (Lamey, Lamb *et al.*,2000):-**

1.4.2 Local factors/oral disorders

1.4.2.1 Denture acrylic allergies:-

High residual monomer levels have been suggested as a causative factor. (**Ali,Bates *et al*.,1986)** However it was found that it was not possible to correlate any signs that implicated dentures as a local etiologic agent(**Nater, Groenman *et al*.,1994)**

1.4.2.2 Poorly fitting dentures :-

it is more likely that mechanical irritation due to errors in denture design and parafunctional habits that may cause denture related burning. (**Grushka.,1995)**.

1.4.2.3 Para functional activities:

Para functional activities resulting in excessive occlusal and denture wear has been shown in 61% of patients with BMS. (**Paterson,Lamb *et al*., 1995)** parafunction (especially night bruxism) is probably the result of an interaction between the limbic system and the motor system, but the dopaminergic system might also be involved .Also Parafunctional activity of lip sucking, lip licking, lip pressure and mouth breathing were noted with BMS. **(Lamey, Lamb *et al.*,1994).**

1.4.2.4 Salivary gland dysfunction:

Many patients with BMS complained of a dry mouth (xerostomia) which is decreased salivary gland secretion in patients with BMS (**Lamey,*Lamb et al.,1998*).**

Irregularities in saliva metabolites like protein, potassium and phosphate concentration have been documented in patients with BMS, where there was significant increase in unstimulated salivary metabolites particularly potassium, phosphate and protein(**Glick,Gutman *et al*., 2002))** ,Complains of dry mouth may not necessarily be predictive of salivary gland hypo function. It may be due to multiple medical problems and medication rather than BMS(**WuAJ,*Ship et al.,1999***).

1.4.2.5 Taste dysfunction:

Many BMS subjects have reported with persistent dysguesia (usually bitter or metallic) and altered taste perception. The abnormalities in salt and sweet taste are consistent with anterior tongue involvement which is a common site for BMS. Also altered taste in BMS may be due to effects of salivary hypofunction and alterations in salivary composition. The basis of these is unclear however one possibility is that increased spontaneous firing rate of certain afferent taste fibers (e g. bitter) or afferent inhibitions of others

(**Ship.,Grushka *et al.*,1995).**

1.4.2.6 Infectious agents

Candidiasis has been the most frequently identified infectious agent (**Gorsky,Chinn *et al.*,1991)** Prevalence of Candida has been found in patients with BMS than those without symptoms (**Samaranayake., Lamb *et al*.,1989)** Fusospirochetal infection and mucosal diseases such as geographic tongue or benign migratory mucositis have been found in patients with BMS.

1.4.2.7 Periodontal diseases:

Although a periodontal disease as etiological factor has been suggested for BMS There is no scientific evidence of a direct causal relationship of periodontal disease to BMS. (**Ship.,Grushka *et al*.,1995)**.

1.4.2.8 Peripheral nerve damage:

BMS may be associated with neuropathic conditions possibly involving central or peripheral nervous system or both. This can occur in inflammatory conditions or nerve injuries (neuroma) if there is a history of trauma to the region where burning is experienced.(**Grushka., Sessle *et al.*,1991)** In a study conducted

by Connecticut Chemosensory Clinical Research Centre (CCCRC),(**Ship.,Grushka *et al*. 2000)** to evaluate the effect of topical anesthetic (dyclonine HCI) on patients" intensity ratings for oral burning and taste dysgeusia. The subjects were divided into 3 groups as burning-only, dysguesia-only and lastly both burning and dysguesia group. Burning sensations increased after application of topical anesthesia in the burning-only group and in the burning and the dysguesia group, but dysguesia symptoms never increased in the dysguesia-only group and in the burning and the dysguesia group. Alternatively dysguesia symptoms were more likely to decrease or become abolished, compared with burning sensation. These findings imply that in dysguesia excitatory afferent input could evoke burning sensation suggestive of peripheral abnormalities; alternatively topical anesthesia may be releasing peripheral inhibition of central sensory pathways in some patients who have oral burning, since approximately one third of subjects with burning sensations experienced increased sensation. This could suggest a centrally based neuropathic condition and provide a rationale for the use of centrally acting medication (**Ship.,Grushka *et al*. 1999).**

1.4.2 Systemic conditions

1.4.2.1 Nutritional deficiency/anemia:

Nutritional deficiency including iron, B1, B2, B6, B12 and zinc have been associated with **BMS(Lamey Lewis *et al.*,1998)** .Folic acid deficiency is also a causative factor for BMS. However recent studies have little support for nutritional deficiencies as a causative factor . An example of BMS caused by a deficiency is shown in **Fig.1 (Main,*Baskeret al.,1983*)** One explanation for the discrepancy in results of iron deficiency causing BMS is that earlier studies did not always measure serum ferritin levels, as normal level of serum ferritin precludes a diagnosis of iron deficiency even in the presence of decreased serum iron.

Replacement therapy of vitamin B1, B2 and B6 produced resolution of symptoms in only 30 percent of patients with such **deficiency (Lamey.,*Lamb et al.,1988*)** . Most recently, zinc deficiency was shown to be a possible cause of BMS, with patients reporting improved symptoms after zinc replacement therapy.

A potential relationship between smoking and development of BMS has been described, with an estimated odd ratio of **12.6** in a recent study **(WJG 19., 2013).**

(Fig.1). Burning tongue in anemia patient : note the smooth and shiny **(Main ,Basker *et al.,1998)*.**

1.4.2.2 Central nervous system disorders:

In the trigeminal and spinal somatosensory systems interactions between various sensory inputs occur such that transmission via one pathway (related to pain) can be modulated by other sensory pathways (related to touch) this alteration in one of these pathways might unmask or enhance nociceptive afferent inputs leading to pain such as that of BMS **(Ship.,Grushka *et al.* 1995).**

1.4.2.3 Psychiatric and Psychological disorders (depression, anxiety):

A complex spectrum of social and psychological disturbance was found in patients with BMS. Patients with BMS tended to be more depressed, angry, doubting, apprehensive, and introverted as a direct result of pain experience. Pain of BMS has been attributed to the manifestation of exogenous or reactive depression caused by the external stress of desolation or anxiety. Psychologic factors in BMS have been reported by several authors **(Schoenberg., 1990) .**BMS may be regarded as a variant of atypical facial pain in which an association with depression is found When psychiatric disorder is present it usually takes the form of mixed anxiety and depressive symptoms. **(Browing.,Hislop *et al.*,1987**)A study confirmed that two aspects of neurosis seen in hospital practice anxiety and depression are involved in BMS and there is response to antidepressant medication.

1.4.2.4 Diabetes mellitus/Hormonal imbalance

Lamey has shown an incidence of oral burning in only 2 to 10 percent of diabetics which indicates that diabetes may not be main cause for
BMS **(Lamey.,Lamb *et al.*,1988).** However it may predispose to candidiasis, responsible for burning.

Hormonal changes are still considered to be important factors in BMS. The greatest frequency of onset of burning mouth syndrome among post menopausal women was reported from 3 years before to 12 years after menopause(**Grushka. 1987).**

1.4.2.5 Xerostomia:

Xerostomia occurring with age has been suggested as a causative agent in the pathogenesis of BMS. However the evidence of decreased salivary flow with age is still **controversial (Baum. 1981).**

(Fig. 2) : Burning mouth due to xerostomia ,note the redness and fissures. (**Veronica roller *et al*.,2015**)

1.4.2.6 Sjogren's syndrome:

BMS had evidence of an immunologic abnormality which may be linked to a more generalized connective tissue disorder like Sjogren's syndrome **(Grushka.,Shupak *et al.*,1986).**

1.4.3 MISCELLANEOUS

1.4.4.1 Menopause

Studies have shown that the oral symptoms compromising BMS are the result of decreased estrogen during menopause. However other studies have not demonstrated a dramatic improvement in oral symptoms with estrogen replacement therapy .Therefore it appears that the pathogenesis of BMS may be linked in some as yet unclear manner to the physiologic changes that occur at menopause **(Paterson *et al.*,1995**).

1.4.4.2 Food/allergy

Oral allergies to food results in symptoms similar to BMS which includes ingested allergens like sorbic acid (a preservative found in foods, ointments, creams Cinnamic aldehyde (a flavoring agent in foods and dentifrices) nicotinic acid (used as rubefacient in tooth paste) and propylene glycol (food additive) **(Grushka.,Shupak *et al.*,1986).**

1.5 Diagnosis

The first step in an initial diagnosis of BMS consists of a careful analysis of the symptom pattern experienced by each patient. Diagnosis of BMS may be complex for three main reasons: **(1)** BMS is positively defined only by symptom(s) without regard to signs or etiologies; **(2)** the symptomatic triad rarely occurs simultaneously in one patient; and **(3)** overlapping or overwhelming stomatitis may confuse the clinical presentation. As a result, clinicians can arrive at a diagnosis of BMS by matching specific details of the main complaint with clinical oral findings that exclude oral mucosal changes, the only exception being the presence of stomatitis, which requires proper and prompt management. The search for

identifiable causative factors represents a next stage in BMS patient management, and it is essential for choice of the most appropriate therapy. Consensus included deletion of 2 diagnostic criteria:-

(1) emotional distress or functional disability

(2) the number of hours symptoms occur per day

Small neurotomy in the mucoperiosteum may cause pain under the denture when it exerts pressure on large nerves, such as the mental nerve. Even though digital imaging is proposed to evaluate the resilience of surrounding tissues of the crest, with the help of a rounded plastic tip of a blunt instrument, such as an explorer, it can be understood whether any trigger (paininitiator) point on the mucosal crest is available**(Nagler *et al*., 2004).**

These trigger points are usually about 2mm in diameter and can be located on both jaws; however, they are more often located in the anterior region and the lower jaw. It is thought that these are derived from the disproportionate distribution of nerve endings following tooth extraction **(Grushka *et al*. 1999).**

A biopsy taken from the trigger point indicates that local nutrition is rich in this area. Generally, wide and irregular nerve stacks are observed around sharp bone protrusions near the crest area. This pressure over the tissues causes a very painful reaction and makes the use of denture almost impossible**(Forsell *et al*.,2012).**

During this examination, if the dentist notices any trigger point and does not treat it surgically or prosthetically, the patient will not be able to use his/ her denture comfortably. Some patients who typically examine their mouth and are worried about the emergence of normal anatomic details and neoplastic changes will sooner or later show psychogenic symptoms. After a careful examination,

concerns should be eliminated with regular controls. Asymptomatic "burning mouth" may occur in patients with depression **(Lopez-Jornet *et al.*,2015).**

(Fig. 3) In adaptable denture of the patient (**Yasemin *et al.*, 2018)**

1.6 clinical features

Accordingly, two specific clinical features define this syndrome:

(1) a “symptomatic triad”, which includes unremitting oral mucosal pain, dysgeusia, and xerostomia,

(2) “no signs” of lesion(s) or other detectable change(s) in the oral mucosa, even in the painful area(s).

Common aggravating factors include personal stressors, fatigue, and specific foods (acidic, hot, or spicy), More than two-thirds of the patients complain of altered taste sensation (dysgeusia) accompanying the burning sensation, in many cases described as a spontaneous metallic taste(**Grushka *et al*. 1987;Ship *et al*., 1995)**.

Abnormal sensations, such as feeling of dry mouth, are common but true hypo salivation is less common and should be considered under secondary or symptomatic BMS (**Forsell *et al*.,2012;Lopez-Jornet *et al.*,2015)**.

BMS patients may perceive the dry mouth effect due to the reduction of UWS that plays an essential role in lubricating and protecting the oral mucosa (**De Pedro *et al*., 2020; Nagler *et al*., 2004**).

1.7 Treatment

The multiple etiologic factors for treatment of BMS present a challenging scenario for the dental clinician. In the absence of any identifiable cause of BMS pharmacologic therapy has been suggested. Medications used for BMS include antifungal, antibacterial, corticosteroids, analgesics, sialagogues, vitamin mineral replacements. Estrogen replacement no therapies [ERT] have reported reduced oral symptoms in post-menopausal women.Control of parafunctional activity, prosthesis adjustment in case of patient wearing prosthesis (**Forsell *et al*.,2012).**

The first step in the treatment of BMS was to distinguish between the primary and secondary forms, because in the presence of the latter, therapy was aimed at treating the underlying disease) .This etiologically directed therapy usually yields a positive result. Thus, in the presence of allergic contact reactions, simply removing the suspected allergen (e.g., the material/dental alloy) resulted in the remission of BMS symptoms. In the case of idiopathic BMS, the therapeutic principles covered a triple purpose: improvement of symptoms, correction of biological **(Gurvits and Tan *et al*.,2013).**

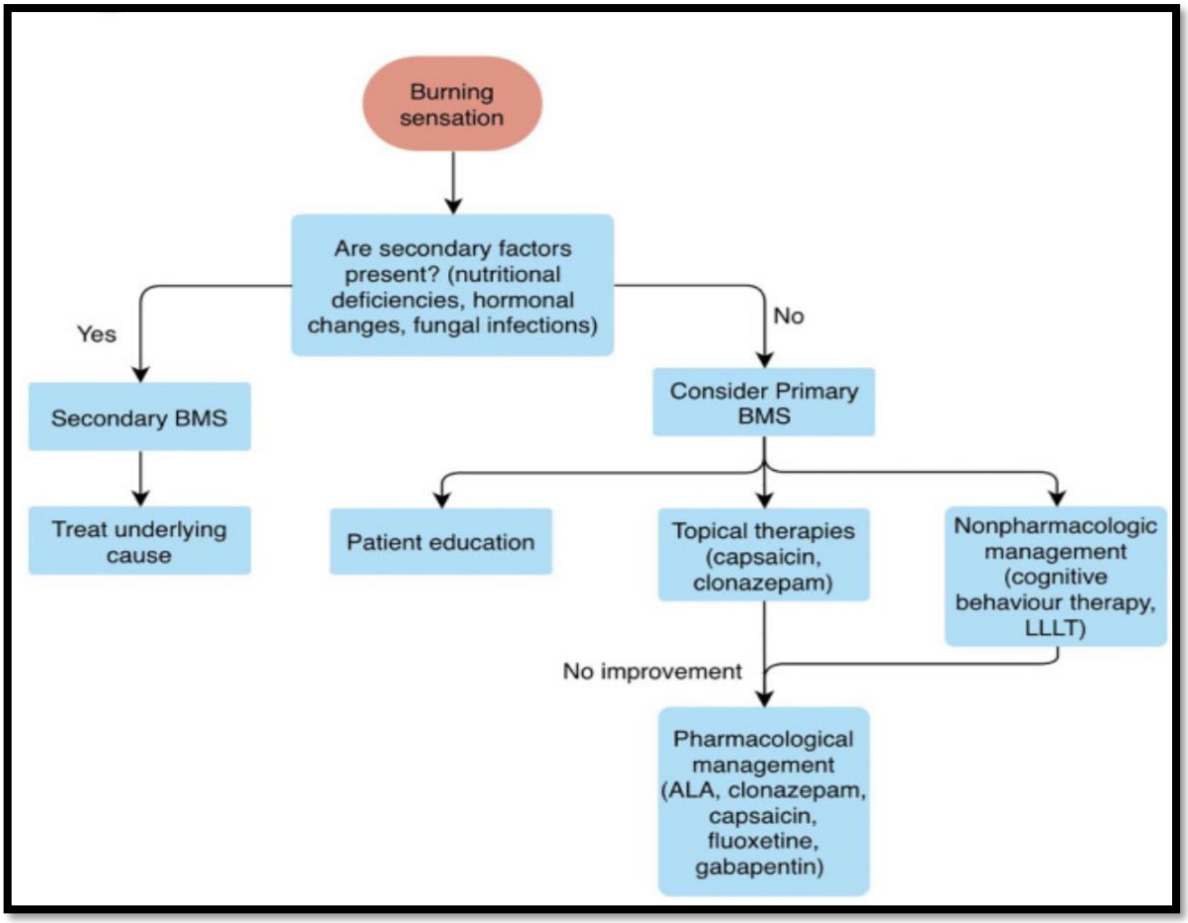

Fig4.(Management of BMS) **(Mcmillan *et al*.,2016)**

Treatment options may include (JM Kramer *et al*.,2018)

- Saliva replacement products.
- Specific oral rinses or lidocaine, which causes numbness to help relieve pain.
- Capsaicin, a pain reliever that comes from chili peppers.
- Alpha-lipoic acid, an antioxidant that may help relieve nerve pain.
- A medicine used to control seizures called clonazepam (Klonopin).
- Certain antidepressants.
- Medications that block nerve pain.

• Cognitive behavioral therapy to develop practical skills to address anxiety and depression, deal with stress, and cope with ongoing pain.

Table -2- Types of Therapy for BMS (López-Jornet *et al*., 2010)

Systemic Pharmacological therapy • Tricyclic antidepressants: Amitriptyline 10 mg • Benzodiazepine: Clonazepam 0.25 2 mg • Anticonvulsants: Gabapentin 100 mg • selective serotonin re-uptake inhibitors: Sertraline 50 mg • Hormonal replacements • Dietary supplements: Folate
Topical Pharmacological therapy • Lidocain • Clonazepam/ Capcetin/ Benzydamine hydrochlorate
Non-pharmacological treatment • Laser therapy • Laser acupuncture • Cognitive behavioral therapy • Psychotherapy

Table-3- Shows Prescribed Medications for the Treatment of BMS(Lopez-Jornet *et al*., 2010)

Medication (Dosage)	**Prescription**
Tricycle Antidepressants	10 mg.at bedtime and may be increased every 4-7 days until BMS is relieved
Benzodiazepines/Clonazepam (Klonopin) Chlordiazepoxide (Librium)	0.25 mg at bed time and may be increased every 4-7 days until BMS is relieved. Side effects may increase as dose increases.
Anti-Convulsant	100 mg at bed time, Doseage may be increased every 4-7 days until symptoms are relieved.

1.8 Problems with Denture in patients with BMS :

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 *et al.*,1990).** Denture extensions and in adequate freeway space increase load on the denture bearing areas which results of burning mouth sensation **(Svensson and Kaaber *et al.*,1995)**. It is clinically helpful if patients find that removal of the denture relies their symptoms.

Dryness from low saliva flow can lead to fungal infections (**Nasri *et al.*, 2002, Nasri *et al.*, 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 *et al.*, 1988).**

Chapter Two : Discussion

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 extensions and in adequate freeway space increase load on the denture bearing areas which results of burning mouth sensation 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 additionally, poor lubrication causes sticking of the tongue, cheeks and palate, also sometimes leading to a burning sensation Some denture wearers may have an allergic reaction to the denture materials, resulting in oral burning.

Chapter Three: CONCLUSION

Although different etiological theories have been proposed to explain primary burning mouth syndrome, none have received universal acceptance to date. While the origin of BMS remains unclear, a range of factors are believed to be implicated. It seems clear that psychological factors and alterations of the central nervous system are involved, though we do not know whether they are a cause or a consequence of BMS. In addition, the influence and connections of such factors in relation to alterations at peripheral nervous system level have not been established.

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