Republic of Iraq
Ministry of Higher Education &
Scientific Research
University of Baghdad
College of Dentistry

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 Surgery

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2021-2022

بسم الله الرحمن الرحيم

{الله نور السموات والأرض مثل نوره كمشكاة فيها مصباح المصباح في زجاجة الزجاجة كأنها كوكب دري يوقد من شجرة مباركة زيتونة لا شرقية **ولا** غربية يكاد زيتها يضيء ولو لم تمسسه نار **نور** على **نور** يهدي **الله** لنوره من يشاء ويضرب **الله** الأمثال للناس والله بكل شيء عليما}

النور (٣٥)

{صدق الله العظيم}

Dedication

I dedicate this graduation paper to all my professors and endeared colleagues. To all my closest friends and friends of friends. To my mother who always believed in me and her unlimited support throughout the years, my brother for his support.

To the department of dentistry. To the college of dentistry medicine and to my beloved University. To Dr.Yagthan Mohammed And finally, to my family Mom and Dad for their wonderful support

Researcher. . . .

Certification of the Supervisor

I certify that this project entitled **"BURNING MOUTH SYNDROME IN COMPLETE DENTURE"** was prepared by the fifth-year student **AYAT MOHAMMED MUEEN** under my supervision at the College of Dentistry/University of Baghdad in partial fulfilment of the graduation requirements for the Bachelor Degree in Dentistry.

Supervisor's name **Dr.Yagthan Mohammed Haider**

Acknowledgment

First of all, I thank God for helping us to complete this research. Thanks to the dean of college of dentistry, university of Baghdad for his continuous support for the students. Deep appreciation and respectful regards to **professor Dr. ABDULBASIT AHMAD** ,head of Prosthodontics department, College of dentistry, University of Baghdad, for facilitating the commencement of this project and providing all the support at his disposal. I cannot express enough thanks to my supervisor, **Dr. Yagthan Mohammed Haider** for his continued support and encouragement. I offer my sincere appreciation for the learning opportunities provided by my supervisor. I could never forget to thank my colleagues for being truly helpful and cooperative with me.

Table of Contents

List of Tables

List of Figures

ABSTRACT

Burning mouth syndrome (BMS) is a chronic pain condition characterized by a burning sensation in clinically healthy oral mucosa. BMS is hard to diagnose because there is a discrepancy between the severity of a patient's extensive objective pain and the absence of any clinical changes of the mucosal surface. This article presents some aspects of BMS, including such clinical diagnosis, classification, differential diagnosis, general treatment, evolution, and prognosis.

Introduction

The burning mouth syndrome (BMS) can be very troublesome to the sufferer, presents problems of diagnosis and often involves prolonged treatment (Basker et al. 1978; Maresky et al. 1993). The symptoms occur in 5–7% of the adult population. Of those who seek treatment, there is a predominance of women, with a mean age of approximately 60 years. The most common sites of the complaint are the tongue and the upper denture-bearing tissues. Rather less common are the lips and lower denture-bearing tissues The oral mucosa typically appears normal. However, those cases due to a high level of residual monomer are the exception as the mucosa is inflamed (Fig. 1).

Figure 1. Severe blistering of the mucosa re- sulting from a residual monomer content of 3.2%.(Basker et al. 1978;Maresky et al. 1993)

Many BMS patients have consulted numerous health care professionals before seeking help from the clinician or dental specialist. They rarely know of others with the complaint and can therefore feel quite isolated. If several professionals have stated that the mouth looks normal the patient may feel that ‘it is all in the mind’. The level of anxiety is commonly raised and cancerophobia may develop.

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- wearers

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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, FJ. et al 1997).

1.1 Classification of Burning Mouth Syndrome

The severity and duration of symptoms can vary from patient to patient, prompting some authors to propose categorizing BMS into three clinical subtypes (Table 1) shows the types of BMS according to [Demarosi F. et al. 2013].

Table -1- Types of BMS [Demarosi F. et al. 2013].

Clinical Findings	Association
Type I Daily Pain , Not at the awakening ,Progresses throughout the day	Not-Psychiatric
Type II Constant Pain	Psychiatric -Chronic
Type III Intermittent Pain/Floor of Mouth	Allergic Contact Stomatitis due to preserving agents and additives.

Type 1 BMS was linked to systemic diseases such as nutritional deficiencies, diabetes mellitus, and so on, while type 2 BMS was linked to psychological

disorders and type 3 BMS was linked to allergic reactions or local factors [Scala A. et al.2003].

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 M. et al.2006].

The main symptoms were present in patients with BMS [Scala A et al.2003]:

a) The presence of the triad consisted of:

1. Pain in the oral mucosa: burning, scalding, tingling, numb feeling, swelling, stinging;

2. Altered taste (dysgeusia): persistence of a certain taste/ altered taste perception;

3. Xerostomia, with dry mouth.

b) Other associated symptoms: thirst, headache, pain in the temporomandibular joint (TMJ) tenderness/ pain in the masticatory and neck, shoulder, and supra-hyoid muscles.

[Scala et al. 2003] proposed a set of positive diagnostic criteria for the identification of BMS difference between the fundamental criteria and additional criteria as it shown in (Table 2).

Table 2 Criteria developed by Scala for the diagnosis of BMS[Scala et al. 2003]

Fundamental criteria	1. Daily deep burning sensation of oral mucosa (bilateral)

	2. Pain of at least 4-6 months
	3. Constant intensity or increasing intensity during the day
	4. Characteristic symptoms are not getting worse/ sometimes there may be an improvement over the ingestion of food and liquid
	5. No interference with sleep
Additional criteria	6. The occurrence of other oral symptoms (dysgeusia +/- xerostomia)
	7. Sensory changes/ chemosensory alterations
	8. Psychopathological alterations/ mood changes that translate the patient's personality disorder

(Eliasson et al., 2003) The disease occurs predominantly in women in postmenopausal period depression and anxiety and cancer phobia constitute important aspects of patient's profile. BMS is neurosensory disorder where in patients present with a complain of stinging or burning sensation that affect oral mucosa –BMS also known as stomatodynia, glassogia , glossodynia , glossopyrosis , stomatopyrosis ,sore , tongue , sok mouth , scalded mouth syndrome.

The inter-rational habit society define BMS as pain condition characterized by internal burning or dysesthesia sensation, depression and sleep disturbances. BMS diagnosis was primarily based on exclusion [Epstein JB.2012]. It was founded on an in-depth history and clinical examination. Often, a local clinical examination reveals no changes. Physical examination can sometimes detect minor changes or natural variations such as cracked tongue, exfoliative glossitis of various origins, geographic tongue, or white/coated tongue [Milkov M et al.2013] ,[Dermarosi F et al 2013].If no clinically visible lesions in the oral mucosa were found during the physical examination, it was reasonable to suspect that intra oral burning was a possible indicator of systemic disorders

(such as diabetes mellitus or anemia presence of blood with different etiologies: iron, folic acid, or vitamin B12 - cobalamin - etc.)

1.2 Characters of BMS

BMS is a chronic condition characterized by burning sensation in normal oral mucosa and occur particularly in postmenopausal. Women (Bergdahl M.1999). The patient complain dry mouth, fry lips and dysgensia , Xenostomia (Formaker BK. 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 , G.D . 2018).

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

1.3 Etiology

BMS has been attributed to a multitude of causes which may be placed conveniently into three groups according to ship AJ:

1. Oral disorders/local factors

2. Systemic factors

3. Miscellaneous – menopause, food allergy and drug allergies

1. Oral disorders/local factors include

a. Denture acrylic allergies/poorly fitting dentures

b. Para functional habits

c. Salivary gland dysfunction

d. Taste dysfunction

e. Infectious agents

f. Periodontal diseases

g. Peripheral nerve damage

2. Systemic conditions

a. Nutritional deficiency/anemia

b. Central nervous system disorders

c. Psychiatric and psychological disorder (depressions,

anxiety)

d. Diabetes mellitus/Hormonal imbalance

e. Xerostomia,

f. Sjogrens syndrome

3.Psychogenic causes

1. Local factors/oral disorders

a. Denture acrylic allergies and poorly fitting dentures:

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.1978) But it is more likely that mechanical irritation due to errors in denture design and parafunctional habits that may cause denture related burning.(Grushka.1995).

b. 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) Also Parafunctional activity of lip sucking, lip licking, lip pressure and mouth breathing were noted with BMS.(Lamey,Lamb.1994)

c. 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. 1994) 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.1976) 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.1993)

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

e. 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.

f. 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).

g. 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. 1991) In a study conducted by Connecticut Chemosensory Clinical Research Centre (CCCRC), to evaluate the effect of topical anesthetic (dyclonine HCl) 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.1995)

2. Systemic conditions

a. Nutritional deficiency/anemia:

Nutritional deficiency including iron, B1, B2, B6, B12 and zinc have been associated with BMS.(Lamey.,Lewis.1989)Folic acid deficiency is also a causative factor for BMS.[32] 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.2** .(Main.,Basker. 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.1988)

Figure 2. A burning tongue: note the smooth surface of the dorsum.(Main.,Basker.1983)

b. 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)

c. 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.1967)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.

d. 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.1988)However it may predispose to candidiasis, responsible for burning.

Hormonal changes are still considered to be important factors in BMS.[2] 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).

e. 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)

f. 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)

Psychogenic causes

The more common psychiatric disorders associated with BMS are anxiety, depression, cancero phobia and hypochondriasis. The associated parafunctional activities such as bruxism and abnormal and excessive tongue movements are

capable of inducing mucosal irritation. One study showed that parafunctional habits were present in 61% of patients with BMS (Paterson et al. 1995).

1.4 Diagnosis

In the absence of any specific diagnostic tests or oral mucosal lesions, BMS is predominantly a diagnosis of exclusion of all other probable causes. Disorders that can present with symptoms similar to BMS are Sjogren's syndrome, lichen planus, diabetes mellitus, candidal infection, deficiencies of minerals such as iron/folate/zinc or vitamin B-complex24.Laboratory studies that must be conducted include (Patton.,et al. 2007)Serum glucose levels or Hb A1C levels to evaluate glycemic control (Merskey,Bogduk.1994)Serum iron/ferritin, vitamin B12 and folate levels to evaluate anemias (International Headache Society.2013)Antinuclear antibodies such as antiRo/SS A, antiRo/SS B and rheumatoid factor, to rule out connective tissue disorders like Sjögren's syndrome (Coculescu,Tovaru,2014) Complete blood count (Klasser.,Grushka.2016) Cytological smears when candidal infection is suspected (Gremeau-Richard, et al.2010) Saxon's test to measure salivary flow rates (Jaaskelainen,S.K)Skin patch tests to rule out any allergic reaction (Scala.,Checchi et al.2003)MRI imaging when any central nervous system pathology is suspected (usually when BMS symptoms are accompanied by numbness/ dysaesthesia) (Cerchiari et al.2006) Taste evaluation to check whole mouth threshold and any altered burning sensation on ethanol application57 (Soares,Chimenos-Kustner et al.2005)Thyroid profile.

Recently, Tan et al26 conducted a functional MRI study wherein BMS patients exhibited decreased amount of gray matter in the bilateral ventro-medial prefrontal cortex (VMPFC) and an increase in connectivity between this region and the bilateral amygdale. The functional connectivity also indicated the duration of BMS symptoms in patients. This could be utilized as a potential

neuromarker in future. Ji et al27 identified three potential protein biomarkers, alpha-enolase, IL-18, and KLK13 through quantitative salivary proteomic analysis which could serve as a non invasive diagnostic tool in BMS patients.

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. 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. 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. 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. (Yasemin et al., 2018) (Fig. 3)

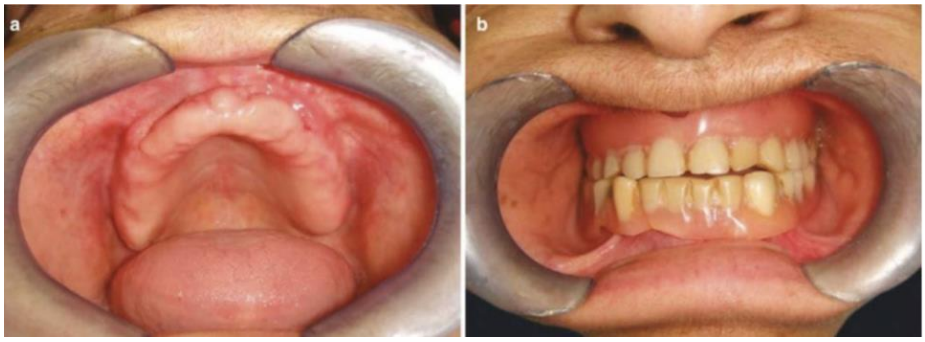

Fig. 3 a) Fibrous hyperplasia in the maxilla and b) in adaptable denture of the patient

1.5 Clinical features

Systems vary from slight to severe although they will generally be described as burning feeling (Basker et al 1997) Categorized BMS into mild, moderate and severe grades. Moderate BMS was most frequently seen followed by severe intermittent symptoms were more common.The pain is usually at its lowest in the morning upon awake, and once aggravated, it continuously reaching the maximum intensity by late evening (Forsell et al., 2012; Lopez-Jornet et al., 2015).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. The aging process may contribute and enhances the perceived oral dryness, as a majority of BMS patients are aged 60 and above(Affoo et al., 2015; Percival et al., 1994) Menopausal and post-menopausal females have reduced UWS flow rate too (Eliasson et al., 2003). 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).

Oral and perioral burning sensation as a result of local or systemic factors or diseases is classified as SBMS (Galli et al., 2017; Renton at al., 2011; Thoppay et al., 2013).

1- Local factors associated with BMS include bacterial invasion, fungal infection, allergies, temporomandibular joint dysfunctions and salivary glands abnormalities.

2-Systemic disorders that induce SBMS include hormonal changes, deficiencies of vitamin B12, folic acid or iron, diabetes mellitus, side effects of medications, and autoimmune diseases.

It was believed that psychological or psychopathological factors play a role in triggering or exacerbating the BMS symptoms. A meta-analysis reported BMS patients to have a high predisposition towards anxiety (odds ratio 2.64) and depression (odds ratio 3.18) (Galli et al., 2017). BMS patients may have other psychological profiles, such as social phobia, cancerphobia, hypochondria,and neuroticism (Galli et al., 2017; De Souza et al.,2012). The ongoing high- level oral burning pain will likely have a significant psychological burden on patients affected and the relationship being causative and or resultant of the condition requires clarification.

Duration of symptoms range from 3 months to 12 years. Resolution of symptoms is variable and poorly predictable spontaneous remission occur in some patients (Ghruska, et al 1991).

Speaking and hot foods decrease burning mouth while sleeping, eating meals or cold foods and working distraction. (Grushka.et al 1987).

1.6 Treatment of BMS:

Because the treatment is generally unsatisfactory and BMS is a chronic pain syndrome, patients must be properly informed about realistic and appropriate expectations(Coculescu, et al.,2014).

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.,2013)

Table -3- Types of Therapy for BMS (López-Jornet et al., 2010)

Type of therapy
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

Fig4. (Management of BMS)

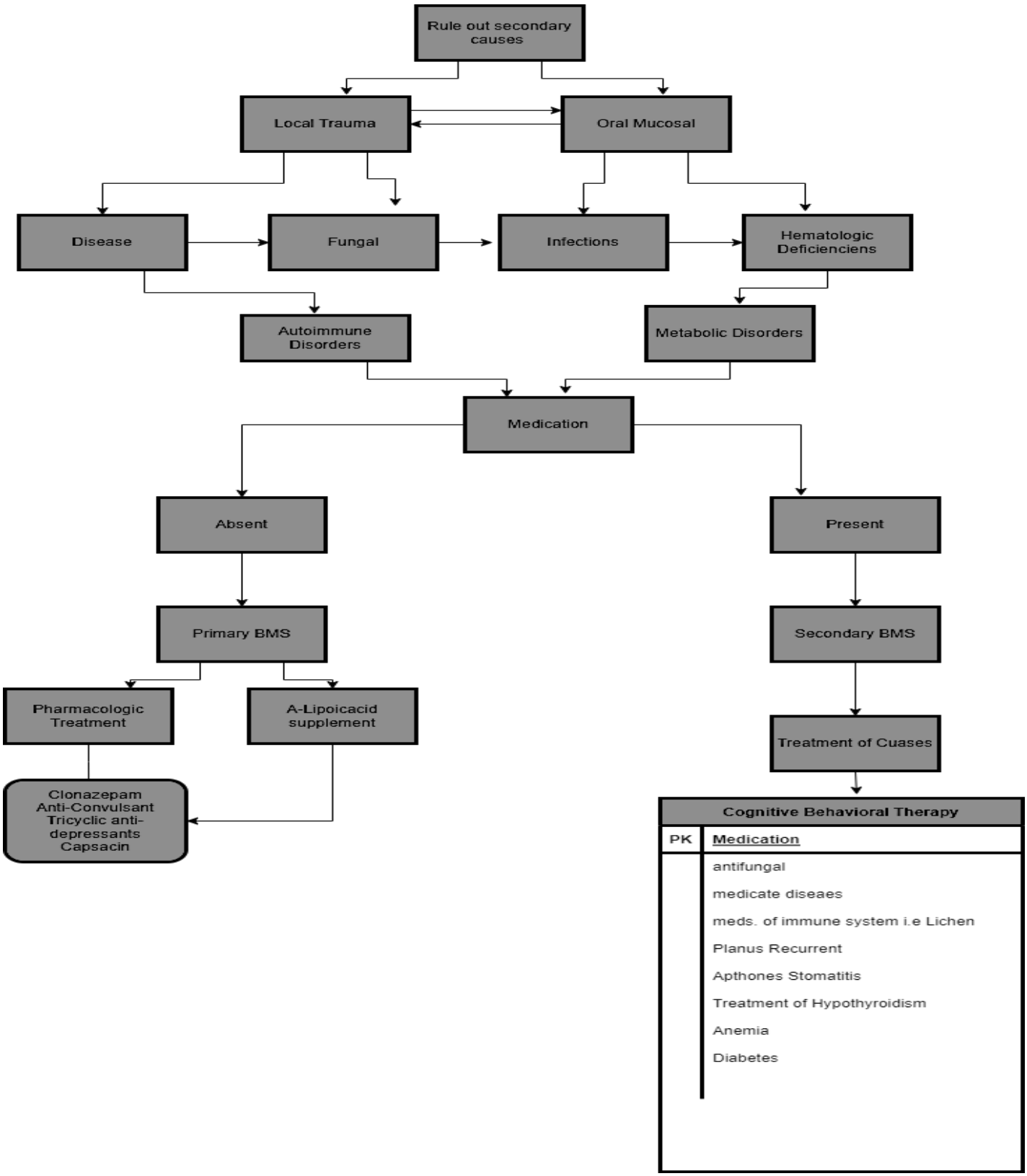

Table-4- Shows Prescribed Medications for the Treatment of BMS(López-Jornet et al., 2010)

Medication (Dosage)	Prescription
Tricyclic 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.

1.7 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, 1990). Denture extensions and in adequate freeway 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, 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, 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 D 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

BMS remains a poorly understood chronic facial pain that is difficult both to diagnose and treat. Multiple etiologic factors for diagnosis of BMS present a challenging scenario for dental clinician. Lack of success in explaining and treating BMS is because the features of BMS have not been rigidly characterized. Identification of the etiologic group, local, systemic or psychogenic is the first step towards diagnosis and treatment of BMS. Unfortunately no therapy for BMS has been proven to be completely effective but can provide symptomatic relief if etiology for BMS is recognized.

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