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Overview of Burning Mouth Syndrome for Prosthodontics Practitioners.

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ABSTRACT

Burning mouth syndrome (BMS) is multifactorial in origin which is typically characterized by burning and painful sensation in an oral cavity demonstrating clinically normal mucosa. Although the cause of BMS is not known, a complex association of biological and psychological factors has been identified, suggesting the existence of a multifactorial etiology. As the symptom of oral burning is seen in various pathological conditions, it is essential for a clinician to be aware of how to differentiate between symptom of oral burning and BMS. An interdisciplinary and systematic approach is required for better patient management. The difficulty in diagnosing BMS lies in excluding of known causes of oral burning. The purpose of this study was to provide the practitioner with an understanding of the local, systemic, and psychosocial factors which may be responsible for oral burning associated with BMS, and review of treatment modalities, therefore providing a foundation for diagnosis and treatment of BMS.

Keywords: Burning mouth syndrome, classification, diagnosis, treatment modalities

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INTRODUCTION

Burning mouth syndrome (BMS) is defined by the International Association for the Study of Pain1 as burning pain in the tongue or other oral mucous membrane associated with normal signs and laboratory findings lasting at least four to six months. The International Headache Society in The International Classification of Headache Disorders II4 describes BMS as an intra-oral burning sensation for which no medical or dental cause can be found. It is further commented that the pain may be confined to the tongue (glossodynia) with associated symptoms including subjective dryness of the mouth, paraesthesia and altered taste.

The purpose of this article is to provide the practitioner with an understanding of the local, systemic and psychosocial factors which may be responsible for oral burning associated with secondary BMS, therefore providing a foundation for diagnosing primary BMS.

Classification

Lamey and Lewis (1989) classified BMS into three types depending on the intensity of pain [1].

- Type 1 (35%) is characterized by patients having burning every day. The burning is absent on waking but presents as the day goes on, being maximal in the evening. This type may be linked to systemic disorders, such as nutritional deficiencies and endocrine disorders
- Type 2 (55%) is characterized by burning that occurs every day, is present on awakening and often makes falling asleep at night difficult. This subgroup of patients often report mood changes, alterations in eating habits, and decreased desire to socialize, which seem to be attributable to an altered sleep pattern
- Type 3 (10%) is characterized by intermittent burning, present only on some days, with burning affecting unusual sites such as the floor of the mouth, buccal mucosa, and throat. These patients frequently display anxiety and allergic reactions, particularly to food additives.

Scala et al. classified BMS into:

- Primary (essential/idiopathic) BMS: For which no organic local/systemic causes are identified
- Secondary BMS: Resulting from local/systemic pathological conditions, and thus this form responds well to the etiology-directed therapy [2].

Epidemiology

As it is aware that there is a lack of appropriate and ideal classification system, diagnostic criteria, and knowledge among oral health-care professionals regarding BMS, it is hard to validate and authenticate the exact prevalence of the disease.

International estimates of prevalence vary from 0.7% to 0.15% [3]. BMS basically affects middle- and elderly-aged individuals with an average age range of 38-78 years [4].

This syndrome is stated to primarily affect women in the age group 50-60 years, especially prone toward women in their post-menopausal stage where the prevalence increases to about 13%, usually BMS first occurs 3-12 years after the menopause and rarely before the age of 30 [5].

For better determination and investigation of BMS this article provides to the practitioners an easier understanding of the local systematic and psycho-social factors which may be responsible for the syndrome.

Etiopathogenesis

Local factors

There are a number of local factors that can cause oral burning which must be excluded prior to making a diagnosis of primary BMS. One of the more common causes of oral burning is dry mouth. Dry mouth may either be an objective finding due to hyposalivation or a subjective sensation termed xerostomia. 25% of BMS patients report dry mouth which may either be idiopathic or secondary to medication use such as tricyclic antidepressants and benzodiazepines [6]. A list of medications associated with dry mouth may be found in other sources [7,8]. Objective reduction of salivary flow (hyposalivation) as measured by sialometry is also reported [9]. Patients with normal oral mucosa may present with salivary gland dysfunction upon assessment (hyposalivation) or may not voluntarily admit to oral dryness (xerostomia) unless actively questioned [9]. A lack of lubrication with saliva predisposes the oral mucosa to friction and pain often of burning quality [10].

Nagler and Hershkovich [11] found similarities with respect to low salivary flow, as well as salivary and taste analysis among subjects with BMS, taste aberrations or xerostomia compared to controls. This suggests that oral sensorial complaints may have a salivary-related neuropathic mechanism. Specifically, BMS subjects had higher concentrations of sodium, total protein, albumin, IgA, IgG, IgM, lysozyme, amylase and secretory IgA. Of interest, Nagler and Hershkovich [11] studied the elderly and found an age-related reduction in salivary flow rate and components when compared to younger subjects.

Taste disturbances, such as an alteration in taste perception (dysgeusia) and ⁄ or a persistently altered taste are often reported by BMS patients. Grushka [12] reported disturbances of taste in 69 % of BMS subjects (n = 49), whereby 88 % and 59 % reported persistent taste and alteration in taste perception, respectively.

Infections involving the oral cavity have been reported as a cause of oral burning [9]. Oral candidiasis is a common fungal infection implicated in BMS and must be ruled out. Of concern, is the high prevalence of candida species in BMS patients, therefore making it difficult to discern its specific role in causing oral mucosal burning [13]. Typically, the presence of fungal infection is often associated with the findings of atrophy, erythema and ulceration of the oral mucosa which may be the cause of burning pain [14].

Patients often report an increased pain upon eating suggestive of candida-induced burning and likely due to irritation of the mucosa [15,16]. On the contrary, a decrease or abortion of the pain while eating is commonly found in BMS patients [12]. This finding would therefore cast doubt on a fungal infection being the source of the burning pain. Bacterial infections involving spirochetes, fusiform, enterobacter and klebsiella species and helicobacter pylori have been suggested as causative of BMS [17-19].

Oral mucosal diseases such as lichen planus, benign migratory glossitis, hairy tongue and fissured tongue have been proposed as causative of BMS [10,20]. Atrophic and ulcerative forms of lichen planus are known to have a burning pain particularly during periods of exacerbation [21]. Benign migratory glossitis is usually painless but burning may occur in areas of depapillation which may be exacerbated by spicy foods, alcohol or stress [20]. Fissured tongue is also usually painless unless grooves and fissures become inflamed or infected due to accumulation of debris resulting in a burning sensation [22]. These oral mucosal diseases are all associated with visual clinical findings, yet in BMS patients, the oral mucosa appears normal.

Parafunctional oral habits such as clenching, bruxing, tongue posturing, lip trapping, sucking, licking or mouth breathing have been proposed as causative in BMS [9,22].

The role of oral galvanism due to electrochemical potential differences between dissimilar metals (restorations and metal prosthesis) as a cause of BMS is rare, but has been reported in the literature [23].

Poorly designed dentures have been implicated as causative for BMS. Correction of tongue space deficiency because of a lingually positioned occlusal table or incorrect vertical dimension may benefit some patients [9,24]. A study by Nater et al. [25] found no difference in the denture characteristics such as occlusion, articulation and stability among BMS patients compared to controls suggesting that mechanical factors were unlikely causes of BMS.

Allergic reactions to polymethylmethacrylate, epoxy curing agent, chromium, cobalt, nickel, cadmium, amalgam (mercury), gold, potassium, palladium and related materials in dental products and food-related products such as sorbic acid, propylene glycol, fragrance mix (eugenol, cinnamic aldehyde), benzoic acid, mint and cinnamon may cause allergic contact stomatitis (type IV hypersensitivity reaction) but are rarely implicated in BMS [9,26].

Systemic factors

As well as local environmental factors, a number of systemic factors are considered to be involved in causing oral burning sensations. Blood disorders associated with anaemias, including vitamin B group, iron and folate deficiencies are associated with a variety of oral manifestations including oral dryness, tongue papillary changes and burning pain. Zinc deficiency has also been associated with burning oral mucosa [27].

Blood studies could be utilized to rule out these factors as the cause of the oral burning symptoms.

Autoimmune type connective tissue disorders such as Sjogren's syndrome, sicca and systemic lupus erythematosis are associated with oral dryness and increased risk of candida infections that may cause oral burning [28]. Even though more than 58 % of persons with BMS display abnormal immunological features such as elevated rheumatoid factor and antinuclear antibody, no consistent relationship has been found between BMS and a connective tissue disorder [29], thereby questioning connective tissue disorders as an aetiological factor.

Gastroesophageal reflux disease must be considered in any patient complaining of oral burning. Careful history taking and examination is required for diagnosis and the symptoms should rapidly respond to appropriate management.

Endocrine-related disorders, especially uncontrolled diabetes and thyroid disorders, along with hormonal deficiencies and alterations at menopause have also been associated with oral burning [30].

Medications that may cause hyposalivation such as tricyclic antidepressants have been implicated, but the angiotensin converting enzyme (ACE) inhibitors, namely captopril, enalapril and lisinopril have been particularly associated with oral burning pain [31].

Central nervous system changes associated with conditions such as multiple sclerosis, Parkinson's disease and trigeminal neuralgia may be associated with oral neuropathic pain that may assume a burning nature. The prevalence of BMS has been suggested to be greater in patients with Parkinson's disease than in the general population, suggesting a role of dopaminergic pathways [32].

Psychosocial factors

Various disorders, such as depression, anxiety and somatization have been discussed as having a major association with BMS [33]. It has been reported that at least one-third of BMS patients may have an underlying psychological diagnosis [10]. Furthermore, a phobic concern regarding cancer has been reported in 20 % of patients [9] and is often manifested as repeated self-examination by the patient [34]. In a study [33] comparing 25 BMS subjects to an equivalent number of an age and gender matched group with organically based intraoral pain disorders, it was found that 44 % of the BMS subjects displayed a positive psychological diagnosis as compared to only 16 % of the non-BMS group.

In a more recent study [35] investigating personality profiles, 32 BMS subjects were compared to 32 matched control subjects using a comprehensive, reliable and validated inventory. The results indicated there were many personality characteristics within the domains of neurotisicism, extraversion, openness and conscientiousness differentiating BMS subjects from the control group. Maina et al. [36] found a high degree of personality disorders among the BMS subjects compared to both a non-psychiatric population sample and a population with other somatoform disorders. However, they stated their results could not determine whether or not the development of BMS precedes or follows the development of personality disorders.

Bergdahl et al. [37] reported that when compared to a control group, the BMS subjects had a significantly lower score on the socialization scale and significantly higher scores on the somatic anxiety, muscular tension and psychoasthenia scales.

The findings of high levels of psychological disturbances involving depression, anxiety, somatization and personality disorders are not unusual or unique to BMS patients. These are common findings in the chronic pain population and may contribute to the cause, intensity or urgency of complaint or may be the result of the constant pain [38].

In a study by Grushka et al. [39], BMS subjects did show elevations in the following personality characteristics: being more concerned with bodily function, depressed, emotionally repressed, angry, distrustful, anxious and socially isolated as compared to age and gender matched control subjects. However, these characteristics were similar to those seen in other chronic pain patients, and these personality disturbances tended to increase with increased pain. It appears personality characteristics among chronic pain patients, be it BMS or other pain conditions, share a certain commonality. Furthermore, many of the medications used to treat these psychological conditions and personality disorders can cause side effects such as dry mouth and taste alterations that may induce orexacerbate oral burning symptoms.

Therefore, the question remains whether psychological disturbances and personality disorders are aetiologically related to BMS or if chronic oral burning sensations initiate or exacerbate psychosocial disorders.

Diagnostic Criteria

Diagnosis of BMS may be complex for three main reasons:

- BMS is positively defined only by symptom(s) without regard to signs or etiologies
- The symptomatic triad rarely occurs simultaneously in same patient [40]
- 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 diagnostic criteria developed by Scala et al., for the diagnosis of BMS are as follows [5].

Fundamental criteria

- Daily deep burning sensation of the bilateral oral mucosa
- Burning sensation for at least 4–6 months
- Constant intensity or increasing intensity during the day
- No worsening on eating or drinking. Instead, the burning sensation may reduce
- No interference with sleep.

Additional criteria

- Dysgeusia and/or xerostomia
- Sensory or chemosensory alterations
- Mood changes or psychopathological alterations.

Pain that gets worse over the day decreased pain on eating and with sleep absence of clinical finding, presence of abnormal or dysgeusia tastes, usually metallic, bitter or sour, and complaint of dry mouth in presence of normal flows are other findings which help in diagnosis of BMS [23].

Treatment Modalities

Before starting the treatment, it is important to inform the patient about nature of disease and give reassurance. Patient management involves a differential diagnosis for BMS and the discrimination between

"primary BMS" and "secondary BMS" based on the identification of possible etiologic factors for the syndrome. The most used medications to treat this syndrome are antidepressants, antipsychotics, sedatives, antiepileptics, analgesics and oral mucosa protectors, sialagogues, and vitamin-mineral replacements [40-42]. Various alternative treatment modalities have also been implicated, which includes lasers, acupuncture, behavioral therapies, yoga, relaxation therapy, meditation, group psychotherapy, and electroconvulsive therapy; the purpose of these medications is to reduce the suffering of the patients and to bring their condition under better control and improve the quality of life. Control of parafunctional activity prosthesis adjustment in case of patient wearing prosthesis [43].

Grushka et al. suggested that the best treatment for the syndrome consists of a combination of drugs, such as clonazepam, gabapentin, and baclofen [44]. Gremeau-Richard et al., in 2004, reported significant reduction in pain with topical application of clonazepam in patients with BMS [45]. Heckmann et al. conducted a double-blind study on clonazepam in patients with BMS. They found that patients on clonazepam (0.5 mg/day) were significantly improved in pain rating as compared to placebo (lactose) [46]. Local application of desensitizing agents such as topical capsaicin: The use of hot pepper sauce (a good source of capsaicin) in water in the ratio of 1:2 is also found to be effective in reducing oral pain in BMS. Capsaicin acts by depletion of substance p, so results in decreased peripheral burning [47].

Volpe et al., in his study on postmenopausal women, found that 12 out of 22 patients experienced improvement in oral symptoms after estradiol-based treatment [48]. Femiano et al., in 2002, have shown the use of alpha lipoic acid in management of BMS, 96% of patients had shown significant improvement in their symptoms. It is a potent antioxidant and neuroprotective agent [49]. However, Cavalcanti et al., in their randomized, double-blind, placebo-controlled trial of 38 patients, did not find effectiveness of alpha lipoic acid, in comparison with the control group given placebo, in the management of BMS [50].

Bergdahl et al. suggested the use of cognitive behavioral therapy for BMS patients. He found reduction in pain intensity following cognitive behavioral therapy (CBT) immediately, following therapy [51]. Mock and Chugh [52], and Reamy et al. [53], found the combination of CBT, alpha lipoic acid, and/or clonazepam as the most promising.

CONCLUSION

BMS is a difficult and challenging problem for the dental practitioner. It is a clinical diagnosis made via the exclusion of all other causes. No universally accepted diagnostic criteria, laboratory tests, imaging studies or other modalities definitively diagnose or exclude BMS. The key to successful management is a good diagnostic work-up and coordination between the dental practitioners and appropriate physicians and psychologists. All this together will help prosthodontics practitioners to better diagnose and treat the BMS.

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