

Burning Mouth Syndrome

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ABSTRACT

Burning mouth syndrome (BMS) is a chronic pain condition which affects commonly the postmenopausal women, and individuals with psychological problems. In this review, we will study the association between BMS and systemic disorders, as well try to unravel the possible pathogenic mechanisms involving potential nerve damage; which may be responsible for signs and symptoms of BMS.

Keywords: Burning mouth syndrome, Candidiasis, Etiology, Treatment, Xerostomia, Salivary flow.

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INTRODUCTION

Burning mouth syndrome (BMS) is characterized by a chronic, idiopathic, intraoral burning pain, in the tongue or oral mucous membranes. It is usually bilateral and occurs without accompanying clinical and laboratory findings.¹⁻⁴ A burning sensation in the mouth can be a symptom of another disease when local or systemic factors are found to be implicated, and this is not to be considered as BMS.^{1,4} However, this definition has been shown to be too much restrictive, as BMS can coexist with other conditions.⁵ True or primary BMS is a 'diagnosis of exclusion' which means that diagnosis made via the exclusion of all other causes. In the presence of such systemic factors, it is known as either secondary BMS or is dismissed from the diagnosis of BMS completely until the systemic factors are resolved.¹

CLASSIFICATION

Burning mouth syndrome has been classified based on diurnal fluctuations of symptoms or based on systemic

involvement. Various classification systems of BMS have been mentioned in Table 1.

Etiology

Primary BMS

On standard clinical examination of the oral cavity, no abnormalities are identified and there are no clinically useful investigations that would help to support a diagnosis of BMS. However, altered sensory and pain thresholds in these patients indicates that neuronal mechanisms may be involved.⁷ Research suggests that primary BMS is related to problems with taste and sensory nerves of the peripheral or central nervous system.^{8,9} Taste from anterior 2/3rd and posterior 1/3rd of the tongue is transmitted by cranial nerves VII and IX respectively. Fungiform papillae of the tongue is innervated by cranial nerve VII, which, in turn, are surrounded by pain fibers from cranial nerve V. Cranial nerve VII normally inhibits both pain sensation from cranial nerve V and taste sensation from cranial nerve IX. Cranial nerve VII damage releases inhibition of both cranial nerves V and IX. This may be responsible for symptoms of BMS.^{8,9} Thus, damage to nerves that control pain and taste may result in primary BMS.

Secondary BMS

The exact etiology of secondary BMS is not definitely known and is likely to be governed by several factors. The disorder has been associated with several psychiatric diseases.^{7,10-12} The various factors involved in etiology of secondary BMS are discussed below:

- **Nutritional deficiencies:** Nutritional deficiencies of vitamins B1, B2, B6, B12, folic acid, iron and zinc have been reported in individuals with BMS.^{1,13} Recent study has shown patients reporting improved symptoms after zinc replacement therapy.^{1,14}
- **Psychological:** Fifty percent of BMS patients suffer from depression or anxiety with depression as a major component.^{10,11} Eighty-six percent individuals with BMS have shown to have personality disorders when compared to 24% of normal individuals.¹⁵ Patients with BMS have also shown to be associated with significantly higher frequency of past or present psychiatric illness.¹⁶ Such individuals demonstrate benefit from cognitive therapy even in resistant BMS.¹⁷

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Table 1: Classification of BMS^{1,4,6}

<i>A. Based on diurnal fluctuations of symptoms</i>				
Type	Sleep quality	Onset	Systemic disorders	Pathology
1	No interference with sleep	Develops in the late morning, gradually increasing in severity during the day, and reaching its peak intensity by evening	Nutritional deficiency, diabetes mellitus, etc.	Peripheral small diameter fiber neuropathy of intraoral mucosa
2	Disturbed	Continuous symptoms throughout the day	Psychological disorders, Chronic anxiety	Subclinical lingual, mandibular or trigeminal system pathology
3		Intermittent symptoms with pain-free periods during the day	Show allergic reaction	Hypofunction of dopaminergic neurons in the basal ganglia
<i>B. Based on systemic involvement</i>				
Primary BMS		Peripheral and central neuropathological pathways are involved	Local/systemic causes cannot be identified	
Secondary BMS			Caused by local, systemic or psychological factors	

- *Dry mouth:* Higher incidence of BMS in patients with xerostomia has been reported,⁷ with reduction in flow rate.¹⁸ However, Ship et al detected no change in stimulated or unstimulated salivary flow rate.¹³ Various disorders and medications associated with reduced salivary flow rare, like Sjögren's syndrome, diabetes and thyroid problem, have been shown to be associated with BMS.
- *Cancer therapy:* Irradiation and chemotherapy as part of cancer therapy may produce both mucositis and xerostomia, this may result in higher incidence of BMS.
- *Neurological:* Recent evidence suggests that dysfunction in the central nervous system can also cause BMS. It has been shown BMS patients process thermal and pain stimulation in the brain differently than pain-free individuals.¹ The efficacy of some medications in the treatment of BMS suggests that the dopaminergic system may be involved.¹⁹⁻²¹ This is evidenced by the fact that, burning mouth is reported to occur in 24% of Parkinson's disease sufferers which is 5 times greater than that of the general population.²²
- *Smoking status:* A recent study has demonstrated, a potential relationship between smoking and development of BMS, with an estimated odd ratio of 12.6.²³
- *Diabetes:* Diabetics are prone to vascular changes that affect the small blood vessels in the mouth, creating a lower threshold for pain. Thus predisposing to BMS.¹²
- *Hormonal changes:* BMS has been shown to occur with greatest frequency in perimenopause and

postmenopausal women.⁷ Underlying reason for this association may be the fact that dryness of mucosal membranes from age-related reduction in estrogen and progesterone levels and increased frequency of psychological disorders in middle-aged and elderly women.²⁴ Low levels of thyroid hormones can also precipitate as BMS.

- *Oral candidiasis:* A symptom of this oral fungal infection is a burning sensation in the mouth, particularly when consuming acidic or spicy foods, or when the cottage-cheese like lesions are scraped from the inside of the mouth. In contrast a decrease or abolition of the pain is observed while eating in BMS patients.^{1,12}
- *Physical irritation:* Physical irritation from dentures, contact allergy to denture components (contact stomatitis) or oral hygiene products like toothpastes that contain sodium lauryl sulfate, gastroesophageal reflux disease.^{1,12}

DISCUSSION

Burning mouth syndrome is a chronic, idiopathic, intraoral burning pain, in the tongue or oral mucous membranes. BMS usually lasts at least 4 to 6 months and most frequently involves the tongue with or without extension to the lips and oral mucosa.¹⁻³

Burning mouth syndrome affects commonly middle-aged and elderly women and often affects the tongue tip and lateral borders, lips, and hard and soft palate. In addition to a burning sensation, the patients with BMS



may also complain unremitting oral mucosal pain, dysgeusia and xerostomia.¹ For many people, the burning sensation begins in late morning, builds to a peak by evening, and often subsides at night. Some feel constant pain; for others, pain comes and goes. Anxiety and depression are common in people with BMS and may result from their chronic pain. Other symptoms of BMS include: tingling or numbness on the tip of the tongue or in the mouth, bitter or metallic changes in taste, dry or sore mouth.^{2,6}

The diagnosis of BMS remains challenging as diagnostic criteria are not sufficiently defined or universally accepted, several confounding diagnosis exist, and the clinical picture is often variable. Scala et al⁴ have proposed the following fundamental and supportive criteria for diagnosis of BMS, which is mentioned in Table 2.

Diagnosis of primary BMS is a diagnosis of exclusion. However, thorough investigation for local and systemic factors associated with secondary BMS is essential. Various parameters like dietary habits, recent mood disturbances, dental history, use of dental prosthetics, nutritional deficiencies, and changes in medication should be recorded and evaluated for secondary BMS. Laboratory analyses must include hematological investigations, blood glucose, autoimmune markers, estrogen and progesterone concentrations, patch testing for specific allergies should be undertaken.^{1,4}

Various pathological states may present as BMS like stomatitis, atypical facial pain, atypical odontalgia, idiopathic facial arthromyalgia, pemphigoid, pemphigus, neoplastic lesions in the oral cavity, acoustic neuroma, denture design or tooth restoration failures, herpes simplex or herpes zoster, trauma to lingual or mandibular nerves after dental surgery. Detailed history and physical examination is essential to differentiate above medical conditions from BMS.^{1,4,19}

Treatment

Due to the varied and multifactorial etiology, treatment should be tailored to individual's needs. Thus, possible

treatments may include: adjusting or replacing irritating dentures, treating existing disorders, such as diabetes, Sjögren's syndrome, or a thyroid problem recommending supplements for nutritional deficiencies, switching medicine, where possible, if the involved drug is cause of BMS.

Hormone replacement therapy is advised for postmenopausal women. However, hormone replacement therapy has only been effective in relieving burning mouth symptoms in certain patients. A better control of blood sugar levels in diabetic patients may prevent onset or help improve symptoms of burning mouth. When no underlying cause can be found, treatment is aimed at the symptoms to try to reduce the pain associated with BMS.

CONCLUSION

Burning mouth syndrome is characterized by a chronic, idiopathic, intraoral burning pain in the tongue or oral mucous membranes. It usually occurs without accompanying clinical and laboratory findings. Detailed history and physical examination is essential to differentiate BMS from various medical conditions that mimic BMS. BMS remains an important medical condition which often places a significant burden on the patient and healthcare system, and requires diligent recognition and treatment.

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Table 2: Fundamental and supportive criteria for diagnosis of BMS⁴

<i>Essential criteria</i>
1. Daily and deep bilateral burning sensation of the oral mucosa
2. Burning sensation for at least 4 to 6 months
3. Constant intensity or increasing intensity during the day
4. No worsening but possible improvement on eating or drinking
5. No interference with sleep
<i>Supportive criteria</i>
1. Dysgeusia and/or xerostomia
2. Sensory or chemosensory alterations
3. Mood changes or psychopathological alterations

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