BURNING MOUTH SYNDROME AND ITS RELATION TO DISORDERS OF OROFACIAL PAIN

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Abstract
An Individual is termed to have “burning mouth syndrome” if they have burning sensations in the tongue or other oral mucous membranes, but they do not exhibit any other symptoms or abnormalities in the laboratory findings (BMS). This strategy is now being called into question since it is seen to be very restricted; it has been reported that BMS may develop in conjunction with other oral conditions. BMS might be related to disorders of orofacial pain like temporomandibular disorder (TMD), atypical odontalgia (AO) and sensory dysesthesia.
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**Introduction**

An Individual is termed to have “burning mouth syndrome” if they have burning sensations in the tongue or other oral mucous membranes, but they do not exhibit any other symptoms or abnormalities in the laboratory findings (BMS) (Klein et al., 2020). This strategy is now being called into question since it is seen to be very restricted; it has been reported that BMS may develop in conjunction with other oral conditions. Although gingivitis, periodontitis, scalloped and erythematous tongue, ulcerative/erosive tongue lesions and erythematous tongue are directly related to BMS, the increased association of this condition with prevalent mucosal diseases render it to become more a serious conversation which was previously not taken into account. Other orofacial pain syndromes, like temporomandibular joint dysfunction TMD, atypical odontalgia (AO) and other sensory dysesthesias have been associated with BMS Bender., (2018). This suggests that simple oral changes may lead to the emergence of diverse neuropathic-like pain conditions comprising BMS, initiated just by a common mechanism.

**Burning Mouth Syndrome (Clinical Features)**

**Demographics**

Clinical findings imply that postmenopausal women are more likely to have oral burning, the data from epidemiological studies specify the incidence of the condition is comparable across the sexes. In addition, men and younger women are at a higher risk. Patients indicate that the symptoms began after a dental procedure, an illness (especially an upper respiratory infection), or a course of medication in around 30–40 per cent of all cases (Ritchie and Kramer., 2018). The burning sensation might continue like this for years.

The sensation of burning as reported was not only restricted to the tongue but to other parts of the oral mucous membrane as well, including the lower lip and the hard palate. These three
areas were subjected to the condition more making them the site of BMS. The majority of patients do not have any damage done to their facial skin. The discomfort usually goes away at night but it often returns in the morning, and accelerates throughout the day, reaching to highest in the late afternoon or early evening. It is quite unusual for someone to awaken due to pain, even though it may interfere with falling asleep (Teruel and Patel., 2019). In most situations, eating will be helpful. The personality disorders of an individual are directly connected to an increase in the level of pain. Almost little is known about how BMS emerges in its natural environment. Both of the studies that have been conducted to investigate the phenomenon of spontaneous remission have shown that between fifty per cent and sixty-three per cent of participants have at least a partial recovery within a few years after the study's beginning.

**Associated Conditions**

Patients with BMS may experience pain in other parts of the body, as well as a change in their perception of taste, as well as an increase in the usage of drugs, headaches and other facial pains. Personality and mood alteration, most notably depression and anxiety, are widespread in people who have BMS, even though a relationship between psychogenic factors and BMS has not been demonstrated. Rheumatoid factor RF and antinuclear factor ANA levels have been observed to be mildly elevated, as well as a decrease in complement levels, in individuals with rheumatoid arthritis; however, the significance of these findings is unclear (Currie et al., 2021). In addition, the research that relates BMS in women to anaemia, poor nutrition, chronic infection, and hormone therapies is of uncertain significance. Hematologic testing for nutritional deficits, such as deficiencies in numerous B vitamins and zinc, as well as other systemic illnesses, like diabetes, have failed to exhibit a clear connection.
Other studies have shown that mechanical irritation and/or parafunctional activities due to reaction in denture materials and design may be a probable source of the pain. However, research has not been able to substantiate either chemical or allergic reactions to dental materials as a prominent cause of BMS (de Souza et al., 2018). Even though galvanic currents have been associated with BMS, the majority of research has demonstrated no difference in galvanic currents between BMS patients and control individuals.

Those individuals who have dentures, those who are using antibiotics, those who are taking steroids (both topical and systemic), and patients who do not have a healthy immune system are all at risk for getting a candidiasis. On the other hand, there is no evidence to support the hypothesis that people who have been diagnosed with BMS have a greater frequency of candidiasis. If an individual use an ACE inhibitor like captopril or enalapril, can have increased burning sensations in the mouth, but this will not affect the oral mucosa in any way (Orliaguet and Misery., 2021). The burning sensation usually subsides within a few weeks once the dosage of these medications is reduced, changed, or stopped altogether. A reduction in the sensation of taste has also been associated with the use of ACE inhibitor medications.

**Triads of Symptoms**

According to the findings of the research, two of the most common symptoms of BMS are a change in taste as well as the complaints—dry mouth. More than two-thirds of patients that were polled said that they had experienced a change in their sense of taste, as well as chronic dysgeusia, also known as phantom taste, which has a flavour that is often bitter or metallic. When an individual is in agony of the severe discomfort that comes while eating. There is some evidence to support the idea that burning oral pain and dysgeusic taste may be linked (Jääskeläinen., 2018). A recent study indicated that low-dose clonazepam helped 50-70 per cent of BMS patients decrease
the oral burning and taste disturbances and also proposes the same pathways for taste and oral pain.

Those who suffer from BMS report far more severe cases of dry mouth than healthy individuals do. The statements that BMS patients had reduced unstimulated and stimulated salivary flow rates. Even though the levels of immunoglobin, pH, electrical resistance, phosphates, mucin, and salivary protein have all been dramatically altered (Zhang et al., 2021). Alterations in sympathetic output or secondary damage to taste along with loss of inhibition in the trigeminal system, which also transmits autonomic fibres to the salivary glands, might result in changes in salivary composition that are connected to BMS.

The chord tympani is the nerve that is responsible for taste at the anterior part of the tongue. According to (Kim et al., 2021), individuals with BMS have a distinct impairment in taste, particularly bitterness, at the tip of the tongue. Changes in the glossopharyngeal nerve have been identified, even though their impact is not as significant as first thought. BMS is caused when a person's sense of taste is impaired as a consequence of a viral infection, medicine, or the loss of oestrogen around the time of menopause this makes it more difficult for the central nervous system to control pain phantoms known as BMS.

Even though hormonal imbalance after menopause has long been regarded significant determinant of BMS, there is no actual evidence of hormone replacement therapy HRT in postmenopausal individuals in which BMS has been identified. However, a woman's capacity to taste bitterness is affected by hormones, and this tends to become less pronounced after menopause. Those who have been diagnosed with BMS have a reduced taste bud capacity at chord tympani.
Additional research has shown that the level of oral pain in patients with BMS is directly correlated with the density of fungiform papillae that are located on the tip of the tongue. According to the studies, the majority of people diagnosed with BMS are what are known as “supertasters” this refers to people who have a dense innervation of nociceptors in the fungiform papillae on the tip of the tongue, which are connected with these taste buds. According to (Sikora et al., 2018) examination of the relevant literature, some women may be more prone to experience pain in their oral cavity after menopause as a consequence of the loss of the ability to sense bitterness. It is generally believed that pain in the oral cavity results from a lack of pain inhibition in the central region of the brain in response to changes in taste, particularly a bitter taste that is caused by hormones. There is evidence to suggest that the application of a topical anaesthetic rinse makes the burning sensation caused by BMS worse (Nakamura et al., 2022). This research also explains why supertasters, who are disproportionately female are at the greatest risk of experiencing phantom oral sensations after taste impairment. These feelings may include discomfort, and it explains why postmenopausal women are at the greatest risk.

**BMS and Atypical Odontalgia**

The results are impressive on their own, even without taking into account the fact that supertasters have a higher risk of developing a disorder known as atypical odontalgia. This disorder is often described as a toothache-like sensation that does not originate from a dental cause. According to (Tu et al., 2018), this issue might impact as much as five per cent of all teeth that have had endodontic treatment.

Patients with atypical odontalgia have recently been shown to have symptoms of intraoral burning pain and evidence of taste abnormalities of both the glossopharyngeal and the chord tympani nerve, which are alterations that mimic the symptoms of BMS. The glossopharyngeal
nerve is responsible for taste at the back of the tongue (Honda et al., 2019). Because tooth pain is the most prevalent symptom of atypical odontalgia, various intraoral pain disorders in addition to BMS probably share this trait. Both atypical odontogenic pain and BMS are characterised by improper taste sensation and the inability to control pain, these two characteristics suggest a possible link between the two seemingly unrelated diseases. The phantom experience of mouth burning may be linked back to a damaged sense of taste, according to studies of nerve injuries that involve following dental procedures that used inferior alveolar nerve block methods and lingual nerve block techniques.

**Other Associations**

Individuals diagnosed with atypical odontalgia almost always suffer from temporomandibular disorder TMD. This finding adds to the growing body of data suggesting that “clinically different intraoral sensory abnormalities may be related. To put this another way, this suggests that a loss of taste or a change in taste in the chorda tympani or glossopharyngeal nerves may result in a lack of inhibition and subsequent hyperactivity of the motor part of the trigeminal nerve. This, in turn, results in an increase in muscular activity during mastication. It is possible that atypical odontalgia, which in some cases can involve the sympathetic nervous system, can alter the parasympathetic/sympathetic output of the salivary gland which can lead to mouth dryness and/or other qualitative changes in saliva, both of which have been documented in BMS but have not been examined in atypical odontalgia” (Orliaguet and Misery., 2021). However, it is important to note that atypical odontalgia can sometimes involve the sympathetic nervous system.

BMS and other oral sensory diseases might benefit from treatment protocols that are quite similar to one another. Clonazepam, carbamazepine, and gabapentin are a few examples of anticonvulsant medications that fall into this category. These medications are used to treat
trigeminal neuralgia, a condition that, in some respects, may be analogous to atypical odontalgia. Even though it has not been well researched, the possibility that atypical odontalgia has a role in modifying taste should be investigated. This is because many patients who have atypical odontalgia report symptoms of shooting pain comparable to those of trigeminal neuralgia. The fact that several kinds of pain may overlap with one another presents the fascinating concept that none of them is genuinely distinct from one another, but rather that they may all have similar pathophysiology that lies underneath them.

**Diagnosis And Management**

When it comes to making a diagnosis of BMS, the clinical history may be highly helpful. This includes pain that builds up throughout the day and reduction while eating, a dry mouth that wanes and waxes with the burning, and taste disturbances in the mouth that is bitter or metallic. However, the majority of biological peripheral organic alterations are linked to a stronger searing sensation after consuming meals that are either hot or spicy also there is no regular pattern of increasing pain throughout the day. Any organic lesions discovered during a clinical examination of the patient need to be treated, even if the patient's medical history suggests that BMS is the likely diagnosis. Topical steroids may be used in the treatment of disorders like erosive lichen planus, geographic tongue and other vesiculobullous diseases (Adamo et al., 2018). Antiviral medications may be utilised in the treatment of herpes simplex infections. If nutritional deficiencies are found, these may be addressed. Because some people who use ACE inhibitors have burning of the tongue as a side effect, their existing antihypertensives may need to be changed for them.

Additional examination for dryness of mouth must include studies of salivary flow, both unstimulated and stimulated, “to rule out a connective tissue disorder such as Sjogren's syndrome
as the cause of the problem. Saliva production may be assessed by collecting salivary flow from a patient while the patient is chewing a stimulant like chewing gum. This is done after the patient has been instructed to spit for five minutes without stimulation. Flow rates of less than 1.5 ml/5 minutes unstimulated and 4.5 ml/5 minutes stimulated justify additional examination using serology and salivary uptake scans. This is necessary so that Sjogren’s syndrome or other causes of xerostomia may be ruled out. Other causes of xerostomia include dry mouth” (Madariaga et al., 2020). It is possible that a perceptual change, analogous to the burning feeling in the mouth, is the root cause of mouth dryness, and if normal flow rates are present, the condition should be treated as such.

When the burning sensation does not go away after receiving therapy for either systemic or local oral medicaments, a patient should be provided treatment for symptomatic care or sensory neuropathy. It is possible to employ spatial taste testing to record nerve injury by using sour, bitter, sweet, and salty flavours to test for injury to cranial nerves VII and IX (chords tympani and glossopharyngeal), as well as the loss of bitter at the chorda tympani in BMS.

**Treatment**

Once a diagnosis of BMS has been established, “the treatment that follows is often symptomatic and is similar to that of other neuropathic pain diseases. There have been very few controlled pharmacological trials done in BMS, which is surprising given that this treatment plan might include any of the tricyclic antidepressants as well as additional medications. Existing research provides evidence for the use of modest dosages of clonazepam (0.25–1.0 mg) and amitriptyline (10–40 mg) in split doses or as a rinse, these dosages range from (10–40 mg)” (Acharya et al., 2018). The strongest effects of clonazepam have been documented at low doses or when the medication was administered as a troche which leads one to believe that a sedative or
hypnotic effect is not the major mechanism by which this class of medications reduces oral discomfort (Lee et al., 2022). In addition, there is empirical evidence for the use of gabapentin in BMS, however, no studies have established the effectiveness of SSRIs. Low doses of gabapentin are effective. Capsaicin used topically for use as a desensitising agent, on the other hand, has only gained limited support. It is very uncommon for patients who suffer from chronic pain to need the use of many drugs, some of which may include a combination of gabapentin, tricyclics and clonazepam. In the future, research has to be done to determine the effectiveness of alternative anticonvulsants in BMS patients.

**Conclusion**

The symptom of a burning mouth is most often seen when the oral tissues have not undergone any changes. BMS is most certainly caused by a combination of factors that interact to cause damage to one or more of the cranial nerves that are responsible for taste (VII, IX, and x). If there are many causes of damage to the peripheral taste pathway that result in the same symptoms, it may be challenging to establish the root cause of BMS and the confusing array of symptoms that it causes. After ruling out local and systemic factors, one possible explanation for many sensory complaints is that they are the result of “phantom” sensations brought on by a selective taste impairment and a lack of inhibition in the central nervous system. It would seem that postmenopausal women, and especially those who are supertasters, are the most susceptible to the development of these diseases. As soon as a diagnosis has been made, the therapy should be on finding ways to alleviate the associated symptoms.
Reference


