J Oral Med Oral Surg 2019;25:2
https://doi.org/10.1051/mbcb/2018030

https://www.jomos.org

JOMOS
Journal of Oral Medicine and Oral Surgery

## Literature Review

# Psycho-stomatodynia

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(Received: 25 July 2018, accepted: 11 September 2018)

**Keywords:** burning mouth syndrome / stomatodynia / pain / psychogenic

**Abstract – Introduction**: Burning mouth syndrome is an enigmatic condition whose etiopathogenic origin remains largely unknown and whose treatment remains unsatisfactory. It is often considered to be of "psychosomatic" origin, and this etiology is frequently reported in the French medical literature. **Corpus:** This narrative review examines the arguments supporting this point of view, in its historical, clinical, and therapeutic aspects, in order to shed light on the patient's point of view. **Conclusion:** The etiopathogenic uncertainty does not let us give the patient an erroneous conception of the affliction.

## Introduction

Oral pain of unknown etiology has many terminologies: lingual rheumatism, glossalgia, glossopyrosis, lingual neuralgia, imaginary tongue ulceration, stomatopyrosis, psychogenic oral paresthesia, idiopathic orolingual paresthesia, clinically unexplained oral paresthesia, glossodynia, essential or idiopathic stomatodynia, Burning Mouth Syndrome (BMS) and local or general cause. The multiplicity of terms used in the scientific and medical literature reflects the evolution of concepts, specialty of those who are interested, and localization of the infection. Furthermore, it highlights the shortcomings of these semiological descriptions, which may occasionally refer to very different conditions and the absence of an objective cause or biological markers, which could explain the condition.

As opposed to secondary BMS which has a causal factor [1], this oral pain of unknown etiology is most often called primary BMS in English and stomatodynie idiopathique (idiopathic stomatodynia) in French [2]. It has been defined by the International Association for the Study of Pain (IASP) [3] as prolonged, spontaneous pain without any identified organic cause felt in the oral mucosa and by the International Headache Society (IHS) [4] as intraoral burning or dysesthetic sensation, which occurs daily for more than 2 h and persists for more than 3 months, without clinically obvious causal lesions. It has been long regarded as psychogenic pain for multiple reasons; however, this view has been widely questioned by animal and human psychophysical and neurophysiological studies that have objectified sensory alterations in most patients. In particular, various methodological approaches (*e.g.*, electrophysiology, quantitative sensory testing, brain imaging, immunohistochemistry, and molecular biology) have been used to highlight these neuropathic alterations, including the following: (1) peripheral and central functional changes related to sensitivity; thermal, mechanical, and pain tolerance thresholds [5–9]; latency of certain facial trigeminal reflexes [7]; and electroencephalographic changes [10]; (2) decrease in the density of lingual nerve fibers associated with an increase in the expression of thermal/nociceptive receptors TRPV1 and NGF [11,12] and purinergic receptors [13]; and (3) morphological and functional changes in connectivity and architecture of the brain's neural networks [14–16]. These observations suggest that stomatodynia results from neuropathic changes similar to those in fine-fiber neuropathy [17,18], which according to previous studies and clinical definitions, refers to an alteration of descending dopaminergic controls [19,20], taste disinhibition [21,22], thermal disinhibition [23], endocrinological dysfunction, and steroid dysregulation [24].

The characteristics of stomatodynia have been comprehensively reviewed owing to its clinical, physiopathogenic, and therapeutic aspects [1,19,20,23–26] and more recently for its historical aspects [27–30]. However, in France, we have found that in case of this disease, which is mainly considered as a psychosomatic disorder, there are persistently significant differences in terms of its conception and management. This seems interesting to study because, far from being anecdotal, it is symptomatic of a singular conception whose historical origins can be identified.

The purpose of this article was to bring to light various epistemological aspects of BMS to better understand its different conceptions.

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> You may recall that Velpeau once reported that imaginary tumors of the breast described the physical and moral torments experienced by the patients who thought they were affected, as well as the worries and uncertainties of the practitioners consulted in these often-difficult cases.
> …
> What Velpeau did for the breast, I would like to do for the tongue. This also involves a painful symptom with a pseudo anatomical lesion, constituting a painful condition in itself because of the suffering it causes, but also affecting the morale in a very unfortunate way, the patients usually being convinced that they have a serious condition - such as a cancer originating in the tongue.
> ... a condition that is only a variety of neuralgia. Perhaps this tenacity is due to a particular psychic state, as is seen for other imaginary diseases.

**Box 1.** Extracts from Professor A. Verneuil during his lectures on September 27, 1836, at the Academy of Medicine of Paris (Verneuil *et al.,* 1836).

## Historical aspects

BMS pain has long been known in the medical world, but it is the work of Professor Verneuil presented at a symposium on 27 September, 1836, at the Paris Academy of Medicine entitled "imaginary ulcerations of the tongue" that is now considered as a milestone in the study of this condition. In his speech, Verneuil stated that this condition has a psychological origin (Box 1), an idea that was investigated a few months later by his colleague and friend Charcot in his famous Tuesday lectures at Pitié Salpêtrière. With this prestigious patronage, the term "glossodynie de Verneuil" (Verneuil's glossodynia) was coined without, however, including any rigorous semiological descriptions. The idea of Verneuil has prevailed, as evidenced by various journals, treatises, and dictionaries devoted to the condition despite some discordant voices questioning both the etiology and treatment of this condition. These ideas, which will remain as "moral treatment" were intended for neuropathic patients. These European findings were then spread and discussed throughout the medical literature in Europe and the USA where they each evolved differently, giving rise to different scientific and medical approaches [27–30].

## Clinical aspects

This condition whose diagnosis is essentially based on anamnesis is little known to physicians and is therefore often misdiagnosed. This lack of knowledge is mainly due to the absence of any objective pathognomonic clinical sign or laboratory test for the definitive diagnosis. This diagnostic difficulty is illustrated by the disparity of studies using different diagnostic criteria and the lack of specific positive criteria in recent international consensuses [31,32]. However, the diagnostic uncertainty is anxiety provoking, and the practitioner can relate this anxiety to the condition, as evidenced by the first descriptions that emphasized associated carcinophobia as the causal factor.

Symptomatic variability also contributes to the diagnostic challenge; indeed, if burning pain is the most typical clinical presentation, other types of dysesthesia, such as tingling and numbness [33] are also observed in approximately one-third of dysgeusia and xerostomia patients [1], which can make the diagnosis more confusing.

Several arguments have suggested that BMS is not a homogeneous entity but has several types depending on the temporal course [33,34], sensitivity to local anesthesia [35], heterogeneous response to pharmacological treatments [36], and the pattern of histological alterations [37]. For example, Jääskelainen proposed the classification of BMS into peripheral and central types [19].

Comorbidities have also been reported [38], including ENT pain and neurological, ophthalmological, gastrointestinal, cutaneous/glandular, urogenital, or cardiopulmonary symptoms that qualifies BMS as a type of ill-defined idiopathic pain, such as fibromyalgia. However, painful comorbidities are not consistent, and only few studies have addressed this issue [32]. These uncertainties are characteristic of idiopathic diseases, but the fact that BMS is not easily recognized and is therefore simply the opinion of the practitioner does not help the patient to accept it. For example, currently, there is no satisfactory explanation for migraine, which is debilitating and alters the quality of life. However, to assign a name for one's illness helps to better alleviate the symptoms.

In primary stomatodynia, pain, which is the primary symptom, persists most often without notable progression and does not exhibit any visible histophysiological changes. This chronicity without aggravation can lead the practitioner to consider the condition as a minor problem because there are no life-threatening consequences and satisfactory treatment options, although recent advances can occasionally alleviate the symptoms. However, quantitative studies have indicate that the pain is perceived as intense and comparable to dental pain [39], resulting in impaired quality of life [40].

It is also a relatively rare condition because of its low prevalence in the general population ($<1\%$) [41]. Furthermore, it is unevenly distributed [more common in menopausal women (1 in every 7/8)], which suggests an important pathophysiological role of sex hormones; a drastic decrease in their levels at menopause results in many common disorders, but not many are well-documented [31]. This gender specificity may explain the lack of consideration for a pathology that causes only oral pain by the male-centric medical fraternity. Moreover, it was initially considered by the French Academy of Medicine as a form of hysteria.

Finally, there is no etiological treatment, making the condition even more difficult to understand and tolerate [42,43]. These elements contribute to distress among patients who then seek non-medical or unconventional treatments.

## Psychiatric comorbidities

The relationship between psyche and BMS is supported by prevalence studies. Psychological disorders are usually associated with depression and anxiety [44,45,48] in more or less severe forms, as well as other psychiatric disorders, such as personality disorders, phobias, or panic attacks [46–48]. Some studies have also reported more traumatic events in patients with BMS, such as difficult childhood, problematic relationships with children, difficulties with schooling or work, marital or family problems, and financial problems [49–53]. However, this finding varies across studies [54]. Patients with BMS are more prone to catastrophism [55,56] and less interested in novelty [57]. A recent meta-analysis exploring the role of psychological factors in BMS [44] indicated that 11 of 14 controlled studies since 2000 have reported an association between psychological and/or psychiatric disorders and BMS. However, the establishment of a causal association seems challenging. For instance, although the prevalence of anxiodepressive disorders may be higher in patients with BMS, this association is not consistent. Carlson *et al.* [58] did not find any association between BMS and psychic disorders, such as depression, anxiety, and somatization. Rojo *et al.* [59] also did not observe symptoms of anxiety, depression, obsession, somatization, and hostility (DSM-III-R categories) in half of the patients with BMS, indicating that anxiety and depression are common but are not always present. Moreover, the existing association between anxiety and depression and symptomatology is controversial. Schiavone *et al.* [45] observed an association between depression and anxiety scores, whereas Bergdahl & Bergdahl (1999) did not observe any association between the severity of psychological symptoms and intensity of pain, which seemed to be more related to the duration of pain and effectiveness of treatments [60].

Taken together, it is not easy to know what the egg or chicken is in this problem.

Some arguments suggest that anxiety and depression precede BMS. According to the correlation between depression and anxiety scores, Schiavone *et al.* suggested that anxiety determines a form of secondary demoralization in BMS and that depressive symptoms contribute to pain that would be a somatic expression of depression in anxious and hostile subjects, with tendencies to somatization [45]. In addition, studies focusing on the history of psychopathological symptoms [46,61] reported that the onset of major depression, generalized anxiety disorder, and painful conditions other than orofacial disorders preceded the onset of BMS in almost 80% (41) of cases. Galli *et al.* (2016) proposed that BMS is a type of somatoform disorder that occurs in the elderly female population due to specific biological and/or psychological factors. Similarly, Kim & Kho [62] proposed a physiopathological system in which the psychological factors in the broad sense were upstream of the observed peripheral and central neuropathic changes.

Conversely, this classic problem of chronic pain [63] has been integrated into BMS by Grushka [39] who suggested reversal of the classical perspective: patient's psychological state causes pain. Somatic complaints and depression, for at least a part of stomatodynia, may be the consequence of persistent pain. It is interesting to note that the association between psychological factors and BMS is not more pronounced than that for other painful conditions, including orofacial pain [39,64–66].

Moreover, the increase in anxiety and depression scores measured by the HADS[1]-type questionnaires in patients with BMS may reflect general changes, such as menopause, which also result in an increase in the anxiety and depression scores [67]. However, a study that compared premenopausal and menopausal women and men found intergroup differences in clinical features of BMS but not with respect to anxiety and depression [68].

Psychological and emotional factors, personality, and life events cannot be considered as direct causal factors of BMS. However, psychosocial factors may predispose individuals to such pain and/or perpetuate the condition once the symptoms have become established [31]. Several authors suggest a common link between pain and psychic disorders [48], which may be due to alterations in dopaminergic function [20]. Finally, most studies have indicated that there is insufficient scientific evidence to establish definitive conclusions. The pain in BMS could be aggravated in predisposed subjects [56,69].

## Therapeutic aspects

Another source of clinical confusion is the treatment of BMS. In the absence of clear etiopathogenic data, the treatment of stomatodynia remains largely empirical and unsatisfactory. Few studies are available to support rational care [26,42,43,70,71].

Because of its chronic pain status and probably the initial psychological assignment, many drug therapies proposed are based on psychotropic drugs, mainly antidepressants and anxiolytics [72–74]. Gorsky *et al.* [75] observed that the best therapeutic results were obtained with psychotropic drugs and particularly with anxiolytics compared with antidepressants; this lends credence to the psychological (behavioral) origin of the pain theory. However, other studies have concluded that there is no (or little) improvement after the administration of an antidepressant, such as trazodone (atypical sedative antidepressant) [73], paroxetine, sertraline, or amisulpride [76]. It should also be noted that the effects of treatments are studied in the short term and not long term. The anticonvulsant and anxiolytic benzodiazepine, clonazepam, seems to show the best results, but this finding has mostly been obtained through retrospective studies [77]. It is interesting to note that clonazepam was effective even when applied topically in a subgroup of patients [36,78] and that this effect was based on peripheral effects [79]. This local effect questions the etiological role of the anxiodepressive component.

[1] HADS: Hospital Anxiety Depression Scale.

Because clonazepam and occasionally gabapentin [80], which are anticonvulsants, are effective does not make BMS an epileptic disease; the (relative) efficacy of psychotropic drugs is not a proof of causal psychological factors. The modern chronic pain management approach has several objectives: reduce the nociceptive component, reduce the associated anxiodepressive component, and enable the patient to take control of the situation to alleviate the sensory, emotional, and cognitive components of pain. Psychotropic drugs are therefore partly prescribed to reduce the emotional impact of pain. In addition, it is well-known that antidepressants have an analgesic effect independent of their effect on mood [81]. Finally, it must be emphasized that these treatments are not very effective in case of stomatodynia; they partially reduce the pain, without completely eradicating it, and induce side effects, most of which are minor but unpleasant, such as dry mouth, which often result in treatment discontinuation.

The positive effect of psychological interventions may give the impression that the cause of the problem is psychological. A randomized, double-blind study showed that cognitive behavioral therapies are effective in the management of patients with stomatodynia. In fact, 1 h of therapy per week for 4 months significantly reduced the intensity of burns, with a persistent effect after 6 months [82].

However, controlled studies have shown that treatments mostly act as placebo. In addition, pain has sensory, emotional, and cognitive components, and accompanying therapies are an integral part to fight chronic pain and improve the patient's coping ability [83].

## French ideas

Due to the different aspects mentioned above and despite recent physiopathological data showing neuropathic changes leading some authors to classify BMS as a fine-fiber neuropathy [17], stomatodynia is sometimes clearly designated as a disorder of psychological origin, mainly in France and French-speaking countries. A recent study discussed the historical aspects of this epistemological error [29] and noted that different developments have taken place across countries and continents.

Among the recent French-speaking authors who have contributed to this singularity, two authors seem to be particularly important: Kuffer & Demange.

Kuffer 1987 [84] who adopted the term "idiopathic orolingual paresthesia" first proposed by Karshan 1952 [85] suggested to name the condition as psychogenic oral paresthesia or psychogenic oral and pharyngeal paresthesia (POPP) to highlight the supposed etiology[2]. He classified patients into three types according to their psychopathology: (1) POPP resulting from a disorder of somatization of a psychopathological state compared with the patient's mental state (approximately 60% of patients), which corresponds to a depressive state (masked depression, predepressive state); (2) POPP due to decompensation of a long-term psychopathological state (15%–20% of patients) that corresponds to a neurotic mental structure (anxious hypochondriacs, obsession with verification or washing rituals, OCD, hysteria, and phobias); and (3) POPP in 3%–5% of cases as a result of psychotic conditions for which symptoms are an element of a psychiatric disorder (manic-depressive psychosis, schizophrenia). The treatment of groups 1 and 2 is both psychological and medical while that for group 3 is psychiatric. However, this taxonomic classification is not supported by any solid scientific evidence.

This work has been further cited by Masson [86] and supported by Demange *et al.* [87]. Based on the comorbidity of anxiodepressive disorders, therapeutic use of psychotropic drugs, and routine psychobehavioral management, these authors assigned a psychological origin to pain. They used the concept of archaic depression experienced in the initial months of life due to separation of the mother and child and masked depression (Walcher 1969, cited in [87]), also called essential depression by the French psychosomatic school, to explain the occurrence of stomatodynia. Paresthesia may indicate the reappearance of traumatic experience of withdrawal, resulting in the sensations of burning, tearing, tingling, and swelling in the mouth. It is a psychic and non-organic lesion, which affects the subject's mindset. To establish an association with tingling experienced in BMS, the authors used different analogies, such as "discomfort during baby's teething," and "mouth feeling like a black hole with a nasty sting" to associate the condition with the loss of maternal protection. Certain assertions such as "the sensation of oral burn can seriously affect a person's thought process" are difficult to verify and have not been scientifically proven; moreover, this theory is claimed for proven in a subsequent publication [88].

Several subsequent studies are in agreement with this theory [88]: antidepressant, anxiolytic, psychotherapeutic, and behavioral treatments (cognitive behavioral therapy) can result in a significant improvement, if not complete resolution, of the syndrome, thereby suggesting that anxiety and depression are the causes of the problems rather than a consequence. However, none of these articles provide scientific proof for these assertions, and the efficacy of a psychotropic drug does not necessarily indicate psychological cause of the pain. Nevertheless, these quotations are widely used on the Internet intended for the general public [89,90], with a proposal for psychoanalytic therapy to help patients alleviate painful symptoms through psychological exercises that act on the deep strata of their conscience, from where the symptoms originate.

This psychoanalytical approach has also been supported by Gylardi *et al.* [91,92], who suggested that the main problem is the expression of a profound disorder; they reported a case as an example and made the following assertions, which remain unproven: "Naturally, if pain is a sign of life, a sign of enjoyment, it is also a cause for alarm. It is as if an alarm bell is

[2] Note that the term paresthesia, which refers to a disorder of tactile sensitivity, grouping several symptoms, whose main characteristic is to be unpleasant but not painful: tingling, numbness, *etc.* is at odds with the clinical opinion because most patients complain of pain.

continually going off, calling for help and only getting more interventions as a response."

These quotes, which patients can find on the Internet, have no scientific merit because although they seem convincing, there is no evidence to support them.

It should also be noted that the designation of a psychological cause and search for a hidden subconscious cause may lead patients into a vain and anxiety-provoking search for repressed trauma whose salvation depends on its discovery. It may result in some patients feeling guilty because they believe that the pain is their fault; in case of chronic pain, this problem is known as double jeopardy: "It would not hurt any more when you have solved your psychological problems," is perceived as "I have pain and it is my fault" by patients.

Moreover, authors mentioned in this context are largely associated with the French literature and not American or British literature.

## Conclusion

We aimed to clarify the origin of some ideas surrounding BMS to shed light on the current therapeutic approaches and to provide evidence using a factual approach. Numerous studies have shown morphological and functional alterations of peripheral sensory fibers and central changes that reflect the existence of complex alterations and probably different subgroups of patients that could be specifically targeted in the future with adequate diagnostic tests. In view of these uncertainties and the advances already made, it is important to continue research and formulate working concepts that can be clinically tested. Furthermore, it is important not to confine the patient to a misconception of the condition or to a therapeutic approach with uncertain outcomes.

## Conflict of interest

The authors declare that they have no conflicts of interest in relation to this article.

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