

# Psychiatric diagnoses in patients with burning mouth syndrome and atypical odontalgia referred from psychiatric to dental facilities

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**Background:** Burning mouth syndrome (BMS) and atypical odontalgia (AO) are two conditions involving chronic oral pain in the absence of any organic cause. Psychiatrically they can both be considered as “somatoform disorder”. From the dental point of view, however, the two disorders are quite distinct. BMS is a burning or stinging sensation in the mouth in association with a normal mucosa whereas AO is most frequently associated with a continuous pain in the teeth or in a tooth socket after extraction in the absence of any identifiable cause. Because of the absence of organic causes, BMS and AO are often regarded as psychogenic conditions, although the relationship between oral pain and psychologic factors is still unclear. Some studies have analyzed the psychiatric diagnoses of patients with chronic oral pain who have been referred from dental facilities to psychiatric facilities. No study to date has investigated patients referred from psychiatric facilities to dental facilities.

**Objective:** To analyze the psychiatric diagnoses of chronic oral pain patients, diagnosed with BMS and AO, and referred from psychiatric facilities to dental facilities.

**Study design:** Psychiatric diagnoses and disease conditions of BMS or AO were investigated in 162 patients by reviewing patients’ medical records and referral forms. Psychiatric diagnoses were categorized according to the International Statistical Classification of Disease and Related Health Problems, Tenth Revision.

**Results:** The proportion of F4 classification (neurotic, stress-related, and somatoform disorders) in AO patients was significantly higher than in BMS patients. BMS patients were more frequently given a F3 classification (mood/affective disorders). However, 50.8% of BMS patients and 33.3% of AO patients had no specific psychiatric diagnoses.

**Conclusion:** Although BMS and AO are both chronic pain disorders occurring in the absence of any organic cause, the psychiatric diagnoses of patients with BMS and AO differ substantially.

**Keywords:** glossodynia, stomatodynia, ICD-10, somatoform disorder

## Introduction

Burning mouth syndrome (BMS) and atypical odontalgia (AO) are two conditions involving chronic oral pain in the absence of any organic cause. Both BMS and AO could be correctly diagnosed from the psychiatric point of view as “somatoform disorder” because the principal complaint of each condition is prolonged pain without any apparent organic cause. From the dental point of view, however, the etiologies of two diseases are quite different.

The International Association for the Study of Pain defines BMS (also known as stomatodynia, oral dysesthesia, glossodynia, glossopyrosis, and stomatopyrosis) as

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“any form of burning or stinging sensation in the mouth in association with a normal mucosa in the absence of local or systemic disease”.<sup>1,2</sup> AO, as defined by the International Headache Society, is a subgroup of persistent idiopathic facial pain disorders. The term AO is most usually applied to a continuous pain in the teeth or in a tooth socket after extraction in the absence of any identifiable cause”.<sup>3–5</sup>

Because of the absence of organic causes, BMS and AO are often regarded as psychogenic conditions. Although many studies on the relationships between oral pain and psychologic factors have been conducted,<sup>3,6–11</sup> the nature of any relationship is still unclear. The few studies that have investigated psychiatric diagnoses in patients with chronic oral pain have involved patients referred from dental facilities to psychiatric facilities.<sup>12–15</sup> No study has targeted patients referred from psychiatric facilities to dental facilities.

Thus, the objectives of this study were to determine how chronic oral pain patients, diagnosed with BMS and AO and referred from psychiatric facilities to dental facilities, were diagnosed in psychiatry, and to examine similarities and differences between patients suffering from BMS and AO.

## Methods

### Subjects

The study was conducted at the Head and Neck Psychosomatic Dentistry Clinic of Tokyo Medical and Dental University Hospital from April 2007 through to March 2009. Among the 573 new outpatients during this period, all patients with chronic oral pain and diagnosed as BMS or AO and who had official referral forms with psychiatric diagnoses were selected. The 162 selected patients were referred from 160 psychiatry or other clinics.

The inclusion criteria were a principal complaint of pain or burning sensation occurring on an apparently healthy oral mucosa (BMS)<sup>1</sup> and a principal complaint of tooth-related pain or pain localized where a tooth was extracted plus those without clinical and radiographic tooth pathologies or other relevant hard or soft tissue pathologies (AO).<sup>8</sup> All patients had been suffering from chronic pain for at least six months.

Exclusion criteria were any local or systemic causes for symptoms. In addition, any patient who had a diagnosis of both BMS and AO was excluded.

All patients agreed to participate in the study and signed the relevant informed consent forms. This study protocol was approved by the Ethical Committee of Tokyo Medical and Dental University.

## Psychiatric diagnoses

Psychiatric diagnoses were examined by reviewing patients' medical records and referral forms. Since a number of diagnoses were present in the referral forms, they were categorized according to the International Statistical Classification of Disease and Related Health Problems, Tenth Revision (ICD-10) as follows:

- F0 – organic, including symptomatic, mental disorders
- F1 – mental and behavioral disorders due to psychoactive substance use
- F2 – schizophrenia, and schizotypal and delusional disorders
- F3 – mood (affective) disorders
- F4 – neurotic, stress-related, and somatoform disorders
- F5 – behavioral syndromes associated with physiologic disturbances and physical factors
- F6 – disorders of adult personality and behavior
- F7 – mental retardation
- F8 – disorders of psychologic development
- F9 – behavioral and emotional disorders with onset usually occurring in childhood and adolescence
- F99 – unspecified mental disorder.<sup>17</sup>

## Depression rating

The severity of depression was rated using Zung's Self-Rating Depression Scale (SDS) which consists of 20 questions, 10 on the symptoms of depression and 10 on the subject's vitality, equilibrium, and general state of mind. Each question is scored from 0 to 4. Subjects with a total score of 38 and less are considered as normal, 39 to 52 as having a neurotic tendency, and 53 and over as having a depressive tendency.<sup>18,19</sup>

## Pain rating

Pain intensity was rated using the Short-form McGill Pain Questionnaire (SF-MPQ) and the Present Pain Intensity (PPI) scale. SF-MPQ consists of 11 sensory descriptors, ie, throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting, and four affective descriptors, ie, tiring-exhausting, sickening, fearful, and punishing-cruel. Each descriptor is rated on an intensity scale as 0 = none, 1 = mild, 2 = moderate, and 3 = severe. Three pain scores are derived from the sum of the intensity rank values of the words chosen for sensory, affective, and total descriptors.<sup>20</sup>

PPI score measures six degrees of pain intensity using the scale as 0 = no pain, 1 = mild, 2 = discomforting, 3 = distressing, 4 = horrible, and 5 = excruciating.

A pain visual analog scale (VAS) was used to measure subjective pain intensity from 0 (painless) to 100 (worst pain ever had). Subjects circled the scale at the point that expressed their subjective pain most appropriately.

## Life events and duration of complaint

Information on life events possibly precipitating the pain and duration of complaint was collected by a medical interview. Life events were categorized as 1 = after dental treatment, 2 = after other medical treatment, 3 = after stressful or emotional events, and 4 = occurred spontaneously. Duration of complaint was categorized as 1 = less than 12 months, 2 = 12 to 23 months, 3 = 24 to 35 months, and 4 = 36 months and more.

## Pain location

Thirteen areas were recorded according to the patient's pain description, ie, tongue margin, dorsum of tongue, lips, gingiva, hard palate, buccal mucosa, maxillary posterior tooth, maxillary anterior tooth, mandibular posterior tooth, mandibular anterior tooth, dental implant, and whole mouth.

## Statistical analysis

Summary statistics were presented as means ( $\pm$  standard deviation, SD) for continuous variables and as percentages for categoric variables. The *t*-test and Chi-square test were used to compare the differences in psychiatric diagnosis status and patient's characteristics statistically. Binomial logistic regression analysis was used to determine influential factors on the difference between BMS and AO patients (1: BMS, 0: AO), using other factors as independent variables. A *P* value of less than 0.05 was considered statistically significant. The statistical software package, PASW for Windows version 17 (SPSS Inc, Chicago, IL), was used for the analysis.

## Results

### Demographic characteristics of patients

In total, 125 BMS patients and 37 AO patients were recruited (Table 1). The mean age of BMS patients was significantly

higher than that of AO patients in both women ( $P < 0.001$ ) and men ( $P = 0.006$ ).

## Psychiatric diagnoses

The classification of psychiatric diagnoses of BMS and AO patients is shown in Tables 2 and 3. The most frequent diagnoses were F3 and F4. The proportion of F4 in the AO patients was significantly higher than in BMS patients ( $P = 0.03$ ).

## Depression ratings

The mean SDS scores were  $47.6 \pm 10.4$  in BMS patients and  $47.8 \pm 9.5$  in AO patients. There was no significant difference in mean SDS scores between two groups. Among BMS patients, 24 (21.4%) were classified as normal, 52 (46.4%) as having a neurotic tendency, and 36 (32.1%) as having a depressive tendency. Among AO patients, five (15.2%) were classified as normal, 17 (51.5%) as having a neurotic tendency, and 11 (33.3%) as having a depressive tendency. There were no significant distributional differences of SDS classification between the two groups.

## Pain intensity ratings

The mean SF-MPQ and PPI scores are shown in Table 4. On the SF-MPQ, mean scores of "cramping" (1.50) and "heavy" (1.50) in AO patients were significantly higher than in BMS patients (0.60 and 0.84,  $P = 0.007$  and  $P = 0.035$ ). There was no significant difference in mean PPI scores between BMS and AO patients.

The mean VAS scores were  $57.8 \pm 29.6$  in BMS patients and  $64.4 \pm 28.0$  in AO patients. There was no significant difference in mean VAS scores between the two groups.

## Life events and duration of complaint

For BMS, the complaints occurred after dental treatment in 49 (38.9%) patients, after other medical treatment in 13 (10.3%) patients, after stressful or emotional events in 13 (10.3%) patients, and spontaneously in 46 (36.5%) patients. For AO patients, the corresponding figures were 20 (54.1%), two (5.4%), three (8.1%), and nine (24.3%). There were no

**Table 1** Demographic characteristics of patients with burning mouth syndrome and atypical odontalgia

	BMS			AO		
	Women	Men	Total	Women	Men	Total
n	111	14	125	30	7	37
Age (years, mean $\pm$ SD)	62.1 $\pm$ 13.2*	61.8 $\pm$ 17.0 <sup>#</sup>	62.1 $\pm$ 13.6	47.2 $\pm$ 14.7	39.0 $\pm$ 13.4	45.7 $\pm$ 14.7
Duration of complaints (months, mean $\pm$ SD)			49.7 $\pm$ 63.9			31.9 $\pm$ 33.3

**Notes:** \* $P < 0.001$  compared with mean age of women with AO; <sup>#</sup> $P = 0.006$  compared with the mean age of men with AO.

**Abbreviations:** BMS, burning mouth syndrome; AO, atypical odontalgia.

**Table 2** Classification of psychiatric diagnoses in burning mouth syndrome and atypical odontalgia patients (multiple answers included)

Diagnoses	BMS		AO		P
	n	%	n	%	
Dental-related and others	66	52.8	14	37.8	0.13
F0	4	3.2	1	2.7	1.00
F1	0	0	0	0	NA
F2	7	5.6	1	2.7	0.68
F3	40	32	8	21.6	0.31
F4	39	31.2	19	51.4	0.03
F5	9	7.2	3	8.1	1.00
F6	0	0	0	0	NA
F7	0	0	0	0	NA
F8	0	0	0	0	NA
F9	0	0	0	0	NA

**Abbreviations:** BMS, burning mouth syndrome; AO, atypical odontalgia; NA, not applicable.

significant distributional differences of life events between the two groups.

The mean duration of complaints was  $49.7 \pm 63.9$  months in BMS patients and  $31.9 \pm 33.3$  months in AO patients. There was no significant difference in mean duration of complaints between the two groups. In BMS patients, 32 (27.6%) were categorized as one (< 12 months), 14 (12.1%) as two (12–23 months), 16 (13.8%) as three (24–35 months), and 54 (46.6%) as four ( $\geq 36$  months). In the AO patients, 11 (32.4%) were categorized as one month, 8 (23.5%) as two months, three (8.8%) as three months, and 12 (35.3%) as four months. There were no significant distributional differences in duration of complaints between the two groups.

## Pain location

The distribution of pain locations in BMS and AO patients is shown in Table 5. The most common pain location was observed in the tongue margin (85.3%) in BMS patients, while face and maxillary posterior tooth were the most common pain locations (36.1% each) in AO patients.

## Binomial logistic regression

Age and F3 classification were significantly related to disease status. Subjects aged 50 years or older were more likely to be BMS patients compared with those aged 39 years or younger (subjects 50–59 years OR = 10.89,  $P = 0.01$ ; subjects 60–69 years OR = 17.20,  $P = 0.01$ ; subjects  $\geq 70$  years OR = 38.66,  $P < 0.001$ ). Subjects with an F3 classification were more likely to be BMS patients compared with those without an F3 classification (OR = 1.19,  $P = 0.01$ ).

**Table 3** Detailed diagnostic classification in patients with burning mouth syndrome and atypical odontalgia (multiple answers included)

			BMS		AO	
			n	%	n	%
F0	F03	Dementia	3	2.4	1	2.7
		Senile depression	1	0.8	0	0.0
F2	F20	Cenesthopathic schizophrenia	5	4.0	1	2.7
		Schizophrenia	1	0.8	0	0.0
	F22	Delusional disorder	1	0.8	0	0.0
F3	F30	Manic	1	0.8	0	0.0
	F31	Bipolar affective disorder	2	1.6	2	5.4
	F32	Depression	26	20.8	4	10.8
		Reactivity depression	1	0.8	0	0.0
	F33	Recurrent depressive disorder	2	1.6	0	0.0
	F34	Dysthymia	1	0.8	0	0.0
		Depressive reaction	5	4.0	2	5.4
F4	F41	Anxiety disorder	4	3.2	2	5.4
		Panic disorder	3	2.4	2	5.4
		Anxiety	1	0.8	0	0.0
		Anxiety neurosis	3	2.4	0	0.0
		Mixed anxiety and depressive disorder	1	0.8	0	0.0
	F42	Obsessive-compulsive disorder	0	0.0	1	2.7
		Hypochondriasis	1	0.8	0	0.0
		Pain disorder	5	4.0	3	8.1
		Somatoform disorder	14	11.2	3	8.1
		Undifferentiated somatoform disorder	1	0.8	0	0.0
		Hypochondriac disorder	0	0.0	1	2.7
	F45	(Oral) psychosomatic disorder	3	2.4	3	8.1
		Somatization disorder	1	0.8	1	2.7
		Hypochondriac neurosis	0	0.0	1	2.7
		Persistent somatoform disorder	0	0.0	1	2.7
		Persistent somatoform pain disorder	2	1.6	0	0.0
		Somatoform autonomic dysfunction	4	3.2	1	2.7
F5	F50	Eating disorders	0	0.0	1	2.7
	F51	Insomnia	9	7.2	2	5.4

**Abbreviations:** BMS, burning mouth syndrome; AO, atypical odontalgia; NA, not applicable.

## Discussion

### Psychiatric diagnoses

The analysis of psychiatric diagnoses of BMS and AO revealed that BMS patients were often diagnosed with a class F3 disorder while AO patients were diagnosed with a class F4 disorder. Logistic regression analysis also showed that the proportion of F3 classification in BMS was significantly

**Table 4** SF-MPQ and PPI scores in patients with burning mouth syndrome and atypical odontalgia

	BMS		AO		P
	n	mean value	n	mean value	
Throbbing	47	0.91	17	1.35	0.17
Shooting	40	0.33	16	0.81	0.15
Stabbing	43	0.70	17	1.29	0.72
Sharp	42	0.81	15	1.27	0.19
Cramping	42	0.60	16	1.50	0.007
Gnawing	40	0.58	14	1.29	0.11
Hot-burning	46	1.35	16	0.88	0.15
Aching	42	0.90	19	1.63	0.19
Heavy	43	0.84	18	1.50	0.035
Tender	43	0.60	16	1.00	0.16
Splitting	40	0.38	15	0.47	0.74
Tiring-exhausting	50	1.96	19	2.00	0.89
Sickening	43	1.33	18	1.89	0.08
Fearful	42	0.83	16	1.06	0.49
Punishing-cruel	48	1.10	19	1.47	0.24
SUM	57	10.23	22	15.05	0.09
PPI	60	2.90	22	2.73	0.61

**Note:** P = Statistical difference in severity between BMS and AO patients.

**Abbreviations:** BMS, burning mouth syndrome; AO, atypical odontalgia; SF-MPQ, Short-form McGill Pain Questionnaire; PPI, Present Pain Intensity.

higher than that in AO, confirming that psychiatrists tend to diagnose BMS as a F3 disorder. Approximately 60% of reference letters which had an F3 classification described “depression in remission”. There were very few reference letters which mentioned overt psychiatric diseases such as those in the F2 classification.

The possible relationship between BMS and depression is still unclear. SDS scores of BMS patients have been reported to be significantly higher than those of a group of control subjects,<sup>21</sup> while other studies have shown that psychologic factors, such as depression and anxiety, may be related to BMS.<sup>7</sup> Psychologic distress can inhibit pain via a stress-evoked release of opioid peptides in severe cases of major depressive disorder,<sup>22</sup> suggesting a possible connection between the degree of depression and the pain associated with BMS. In contrast, other studies have found no evidence for an association of BMS and any of the Revised Symptom Checklist subscales, including depression, anxiety, and somatization,<sup>10</sup> suggesting, in this case, a lack of any association of BMS with depression.

AO is often considered more as neuropathic pain.<sup>23</sup> Most AO patients have an onset of pain subsequent to invasive dental treatment, such as endodontic procedures or tooth extraction,<sup>8</sup> and several studies have suggested that nerve injury might be associated with the development of persistent

**Table 5** Site of pain in the BMS and AO patients

	BMS		AO	
	n	%	n	%
Tongue margin	106	85.5	3	8.3
Dorsum of tongue	76	61.3	1	2.8
Lips	14	11.3	0	0
Gingival	15	11.2	12	33.3
Hard palate	23	18.5	4	11.1
Buccal mucosa	2	1.6	0	0
Face	4	3.2	13	36.1
Maxillary posterior tooth	5	4	13	36.1
Maxillary anterior tooth	7	5.6	9	25
Mandibular posterior tooth	3	2.4	11	30.6
Mandibular anterior tooth	5	4	4	11.1
Dental implant	1	0.8	1	2.8
In whole mouth	6	4.8	2	5.6

**Abbreviations:** BMS, burning mouth syndrome; AO, atypical odontalgia.

neuropathic orofacial pain in AO.<sup>23</sup> In the present study, however, approximately 50% of the AO patients reported that life events other than dental treatment triggered their symptoms. This suggests that AO is not necessarily neuropathic pain developed by peripheral noxious stimuli, and various additional factors may complicate a patient's condition.<sup>23</sup> Psychologic problems are often present in AO patients. There have been suggestions that AO may be primarily psychogenic, whereas others believe that psychologic problems are secondary to the chronic pain.<sup>3</sup> Acute tooth pain can be reduced by endodontic treatment or tooth extraction. However, if the pain is not relieved, the patient's anxiety about prolonged pain and distrust of dentists may amplify the pain. Llewellyn and Warnakulasuriya<sup>24</sup> reported that most patients with oral disorders have low oral health-related quality of life scores and feel “psychologic discomfort” or “psychologic disability”. Patients suffering from oral disorders are physiopsychologically more unstable than healthy people, and it is possible that dental treatment becomes a trigger for chronic oral pain. Dentists should therefore handle the patients carefully while doing dental treatments, and should not consider chronic oral pain as merely “psychogenic”.

The current study also revealed that 50.8% of BMS patients and 33.3% of AO patients had no specific psychiatric diagnoses. In addition, there was a wide variation in psychiatric diagnosis, and BMS patients and AO patients were sometimes given the same psychiatric diagnosis, such as somatoform disorder, pain disorder, somatization disorder, anxiety disorder, or panic disorder. This indicates that both BMS and AO are difficult to diagnose in psychiatry. F3 and F4 classifications have been the subject of recent debate,<sup>25,26</sup>



especially in relation to the classification of somatoform disorders, and revisions are being considered for the next editions of *Diagnostic and Statistical Manual of Mental Disorders* and International Statistical Classification of Disease and Related Health Problems.<sup>27–31</sup> With these revisions, it is likely that psychiatric interpretation of BMS and AO will also change.

## Clinical differences in patient characteristics

Although BMS and AO have a common characteristic of chronic oral pain, other clinical characteristics seems to be different. In the present study, the mean age of AO patients was significantly lower than that of BMS patients, suggesting some possible differences in biologic background. The proportion of female patients in both BMS and AO was very high, approximately 80%, which is consistent with previous studies.<sup>32,33</sup> Thus, age and gender may be partly involved in the disease mechanism of both disorders.<sup>34</sup> No significant differences were observed in the scores of SDS and pain VAS between BMS and AO.

AO patients were more likely to complaint of “cramping” and “heavy” pains than BMS patients. Both “cramping” and “heavy” pain descriptors are related to “sensory” perception. This suggests that the nature of the pain may be different between two diseases. In contrast, descriptors related to “affect” showed no significant differences between the two diseases, suggesting that both BMS and AO are similar in terms of “unpleasant sensory and emotional experience”.<sup>1</sup> There were no major differences in trigger for disease between BMS and AO. In both groups, psychologic symptoms occurred as a reaction to chronic pain. This may be one of the reasons why both diseases are often given the same diagnoses.

The different diagnoses made in dentistry and psychiatry may reflect, at least partly, differences in diagnostic methods. In psychiatry, pain is considered to be part of the general condition, whereas in dentistry the diagnosis is related to the location of the pain.<sup>12</sup> In the present study, the location of the pain differed in the BMS and AO. Although the two diseases are distinct from this point of view, they are frequently given the same psychiatric diagnosis. The fact that psychiatrists do not fully understand the detailed dental treatment procedures and that patients are generally unwilling to visit a psychiatrist because they consider the causes of their problems are in the mouth, may go some way to explaining the discrepancy of diagnoses between dentistry and psychiatry. Patients tend to visit the medical facilities which they think are relevant to

the location of their pain. Therefore, it is logical for patients with chronic oral pain to visit dental offices initially. It is also easier for patients to understand their disease condition, as well as necessary treatments, in the dental setting. In case of an obvious psychiatric disorder, on the other hand, the procedures that dentists can perform are limited. If a dentist considers that a patient requires medical treatments, the patient should be rapidly referred to the relevant medical specialist.<sup>7</sup> As Turner and Dworkin<sup>9</sup> propose, dentists should give biologic explanations of the symptoms to their patients when referring them to a psychiatrist, even if patients have a definite mental problem.

There are no biologic indicators of either BMS or AO, thus they are still “disputable” diseases in terms of etiology. The results of the current study show that diagnoses of BMS and AO are dependent upon symptomatology both in psychiatry and dentistry. Recently, however, many studies have found antidepressants an effective treatment for chronic pain,<sup>35–37</sup> and research using functional neuroimaging techniques, such as functional magnetic resonance imaging, has made considerable advances.<sup>38,39</sup> A better understanding of the mechanisms explaining the onset of BMS and AO,<sup>40</sup> as well as their responses to different treatment regimens, will enable us to diagnose these conditions more precisely.

## Conclusion

Although BMS and AO are both chronic pain disorders occurring in the absence of any organic cause, the psychiatric diagnoses of patients with BMS and AO can differ substantially. An F3 classification (mood/affective disorder) diagnosis was significantly more frequent in BMS patients than in AO patients who were more frequently diagnosed with a class F4 disorder (neurotic, stress-related, and somatoform).

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## Disclosure

The authors declare no conflicts of interest in this work.

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