

Original

Characteristics of middle-aged and older patients with temporomandibular disorders and burning mouth syndrome

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Abstract: The aim of this study was to evaluate the relationship between pain intensities and psychosocial characteristics in middle-aged and older patients with temporomandibular disorders (TMDs) and burning mouth syndrome (BMS). Subjects were selected according to the Research Diagnostic Criteria for TMD ($n = 705$) and International Association for the Study of Pain criteria for BMS ($n = 175$). Patients were then divided into two age groups: 45-64 years (middle-aged, Group A) and 65-84 years (older, Group B). Pain intensity and depression and somatization scores were evaluated in both groups. In BMS patients, present and worst pain intensities were significantly higher in Group B than in Group A {4.6 [95% confidence interval (CI) = 4.0-5.2] vs. 3.5 [95% CI = 3.1-3.9] and 5.9 [95% CI = 5.2-6.4] vs. 5.0 [95% CI = 4.5-5.6], respectively; $P < 0.05$ }, with no difference observed in TMD patients. The depression and somatization scores were significantly higher in Group A than in Group B among BMS patients [0.57 (95% CI = 0.45-0.69) vs. 0.46 (95% CI = 0.34-0.59) and 0.537 (95% CI = 0.45-0.63) vs. 0.45 (95% CI = 0.34-0.55); $P < 0.05$], with no difference observed in TMD patients. The results of the present study indicate that

pain intensities and psychosocial characteristics in BMS appear to differ between middle-aged and older patients. (J Oral Sci 57, 355-360, 2015)

Keywords: geriatric; temporomandibular disorders; burning mouth syndrome; depression; somatization.

Introduction

The signs and symptoms of temporomandibular disorders (TMDs) have been demonstrated in all examined populations, with low TMD prevalence in children, higher during adolescence and young adulthood, and highest among middle-aged subjects (1,2). In older adults, the prevalence of reported TMD symptoms decreases with age, although reports regarding the development of clinically recorded signs have been inconclusive (3,4). A study of the association between psychological factors and TMD treatment outcomes reported that unless somatization issues are addressed in TMD patients, successful treatment outcomes may not be possible (5).

Burning mouth syndrome (BMS) is a chronic, intractable pain condition characterized by a burning sensation or other dysesthesias affecting the oral mucosa, without abnormal clinical or laboratory findings (6). The International Association for the Study of Pain (IASP) defines BMS as a “distinctive nosological entity” characterized by “unremitting oral burning or similar pain in the absence of detectable oral mucosa changes” (7). Gurvits et al. examined predisposing factors to BMS such as age

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Table 1 Inclusion and exclusion criteria for patients with burning mouth syndrome

Inclusion criteria	
1)	Complaint of superficial pain in the tongue
2)	No organic lesion that corresponds to patients' complaint
3)	No sign of anemia on laboratory testing
4)	No pain in the tongue while eating
5)	No complaint of pain on palpation of the tongue
Exclusion criteria	
Systemic conditions	
1)	Nutritional deficiency
2)	Uncontrolled diabetes mellitus
3)	Certain pathologies involving the central nervous system, i.e., multiple sclerosis or Parkinson's disease
4)	Autoimmune diseases including Sjögren's Syndrome
5)	Congenital and acquired immune deficiency
Local conditions	
1)	Allergy to metals or dental materials
2)	Oral candidiasis
3)	Lichen planus
4)	Occult viral infection, e.g., herpes simplex, zoster sine herpette
5)	Post-herpetic neuralgia
All patients underwent laboratory testing to exclude the conditions listed in the abovementioned exclusion criteria. Patients who satisfied the inclusion and exclusion criteria were diagnosed as having BMS and were included in this study.	
Modified from Koike et al., 2014 (12)	

and demonstrated that although BMS can affect any age group, patients are typically aged between 27 and 87 years, with an average age of 61 years (8). However, the relationship between BMS pathogenesis and aging has yet to be fully elucidated. A recent review highlighted the frequent interaction between chronic pain and psychological disorders in BMS (9). Psychological disorders such as anxiety and depression or personality disorders are reported to be more frequent in BMS patients than in control subjects (10). Although psychiatric disease was initially considered a primary cause of BMS, the relationship between BMS pathogenesis and psychological characteristics remains unclear.

To further investigate potential factors underlying BMS pathogenesis, we performed a cross-sectional study examining age, pain intensity, and psychological characteristics such as depression and somatization in university hospital-based patients with TMD and BMS. Because patients in different age groups may experience varying pain intensities and psychosocial characteristics, the specific aim of the present study was to evaluate the relationship between pain intensities and psychosocial characteristics in middle-aged and older patients with TMD and BMS.

Materials and Methods

Subjects

The present study included 3,645 patients who sought treatment for orofacial pain at the Orofacial and Head

Pain Clinic, Nihon University School of Dentistry at Matsudo between 2007 and 2010. Study subjects were selected according to the Research Diagnostic Criteria for TMD (RDC-TMD) (11) ($n = 705$), including myofascial pain (Ia or Ib), arthralgia (IIIa), or osteoarthritis of the temporomandibular joint (TMJ) (IIIb); the IASP; and additional criteria for BMS, as shown in Table 1 (12) ($n = 175$). All subjects aged 45 years or older provided complete answers to the study questionnaire. Furthermore, any subject with metabolic disease (e.g., diabetes, hyperthyroidism), vascular disease (e.g., migraine, hypertension), neoplasia, history of drug abuse, recent facial or cervical trauma (e.g., whiplash), and patients currently receiving medications or other treatments were excluded from the present study.

Patients ranged in age from 45 to 84 years (Table 2). Subjects meeting the inclusion criteria were then divided into two groups based on age according to the methods of a previous study (13), with Group A ranging from 45 to 64 years old and Group B from 65 to 84 years old.

All subjects were informed of the study protocol in a standardized manner. The present study, which followed the guidelines established by the Helsinki Declaration, was approved by the Ethics Committee of Nihon University School of Dentistry at Matsudo (EC07-003).

Self-reported measures

The age and sex of participants were recorded, and patients reported durations of illness according to the

Table 2 Descriptive data of the subjects' characteristics

Group	TMD		BMS	
	A	B	A	B
Number of subjects	466	239	96	79
Age (mean \pm SD)	55.5 \pm 5.6	71.9 \pm 5.0	56.6 \pm 4.6	71.8 \pm 4.9
Sex (number of subjects)				
Women	353 (75.8%)	167 (70.0%)	85 (88.5%)	68 (86.1%)
Men	123	72	11	11
Duration of illness (number of subjects)				
<3 months	261 (56.0%)	176 (73.6%)	30 (31.3%)	25 (31.6%)
3-6 months	60 (12.9%)	31 (13.0%)	21 (21.9%)	20 (25.3%)
>6 months	145 (31.1%)	32 (13.4%)	45 (46.9%)	34 (43.0%)
Present pain intensity	4.2 (3.9-4.4)	4.0 (3.7-4.3)	3.5 (3.1-3.9)*†	4.6 (4.0-5.2)
Worst pain intensity	6.2 (5.9-6.4)	5.8 (5.4-6.1)	5.0 (4.5-5.6)*†	5.9 (5.2-6.4)
Depression score	0.44 (0.38-0.49)	0.45 (0.36-0.53)	0.57 (0.45-0.69)*†	0.46 (0.34-0.59)
Somatization score	0.51 (0.46-0.56)	0.57 (0.48-0.66)	0.54 (0.45-0.63)*	0.35 (0.20-0.51)

TMD, temporomandibular disorders; BMS, burning mouth syndrome. Subjects in Group A ranged from 45 to 64 years old, while subjects in Group B ranged from 65 to 84 years old.

*Significant difference between age groups for each disease ($P < 0.05$)

†Significant difference between diseases for each age group ($P < 0.05$)

following categories: less than 3 months; 3-6 months; or more than 6 months. A numeric rating scale from 0-10 was used to report the present pain intensity and worst pain intensity during the past 6 months (14). The psychosocial characteristics and depression and somatization scores were evaluated using the RDC-TMD Axis II questionnaire.

Statistical analyses

Descriptive statistics were used to summarize the basic characteristics of the subjects and all measurements. The χ^2 test was used to compare the female/male ratio and duration of illness between groups for each disease. Because the data were not normally distributed, the Wilcoxon signed-ranks test was used to compare the differences between age groups for each disease. The Kruskal-Wallis test with Bonferroni correction was applied for comparisons between the two diseases. P -values < 0.05 were considered statistically significant. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) for Windows, version 12.0 (SPSS, Chicago, IL, USA).

Results

Descriptive data for each disease are shown in Table 2. All BMS subjects complained of symptoms affecting

the tongue. No significant differences in the female/male ratio were observed between age groups for either BMS or TMD. Analysis of the ratios of illness duration revealed a significant difference between age groups among patients with TMD ($P < 0.001$), but not for patients with BMS.

Pain intensity

Present pain intensity

Comparisons within Group A demonstrated a significantly higher pain intensity in patients with TMD than in patients with BMS ($P = 0.013$).

No significant difference in the present pain intensity was observed between age groups for TMD patients. In BMS patients, age comparisons indicated a significantly higher present pain intensity in Group B than in Group A {4.6 [95% confidence interval (CI) = 4.0-5.2] vs. 3.5 [95% CI = 3.1-3.9]; $P = 0.007$ }.

Worst pain intensity during the past 6 months

Comparisons within Group A showed that patients with TMD had a significantly higher pain intensity than patients with BMS ($P = 0.001$).

No significant difference in the worst pain intensity was observed between age groups for TMD patients. In BMS patients, Group B reported a significantly higher

worst pain intensity during the previous 6 months than Group A [5.9 (95% CI = 5.2-6.4) vs. 5.0 (95% CI = 4.5-5.6); $P = 0.032$].

Psychosocial variables

Depression score

No significant differences in the depression score were observed between age groups for TMD patients. Group A patients with BMS had significantly higher depression scores than patients with TMD ($P = 0.003$). In BMS patients, Group A had significantly higher depression scores than group B [0.57 (95% CI = 0.45-0.69) vs. 0.46 (95% CI = 0.34-0.59); $P = 0.044$].

Somatization score

No significant differences in the somatization score were observed between age groups for TMD patients. In BMS patients, Group A had significantly higher somatization scores than Group B [0.537 (95% CI = 0.45-0.63) vs. 0.45 (95% CI = 0.34-0.55); $P = 0.030$].

Discussion

In this study, we compared pain intensities and psychosocial characteristics in middle-aged (45-64 years old) and older (65-84 years old) patients with TMD and BMS. In corroboration with previous studies (2,8), we observed a significantly higher ratio of females among TMD and BMS patients. A significantly higher ratio of subjects had a greater than 6-month duration of illness in the middle-aged group, whereas the older group had a significantly higher ratio of illness lasting less than 3 months among TMD patients, confirming the results of our previous study (14). In BMS patients, no difference in illness duration was observed between age groups; however, the ratio of subjects with a greater than 6-month duration of illness was higher than patients with TMD. These findings indicate that BMS may be associated with chronic and persistent pain across all ages.

Comparisons of the type of disease in the middle-aged group demonstrated that BMS patients had a significantly lower present pain intensity and worst pain intensity than TMD patients. BMS patients in the middle-aged group also had significantly higher depression scores than TMD patients. These results are similar to those reported in our previous studies (14). Generally, pain intensity and depressive tendencies increase with the duration of illness in orofacial pain syndromes (such as TMD) (15), and TMD patients generally exhibit higher depression and somatization score values (11). Therefore, psychosocial factors can be considered as one of the etiologic factors for BMS (16). However, as discussed below, we

observed differences in pain intensities and psychosocial factors between middle-aged and older patients. Thus, psychosocial issues may not be an etiological factor in all BMS patients.

Although Riley et al. (17) reported that older-aged adults have a higher pain threshold than middle-aged adults, a significantly higher present pain intensity and worst pain intensity along with significantly lower depression and somatization scores were reported in older BMS patients than in middle-aged BMS patients. A previous study has reported depression scores under 0.535 as normal, between 0.535 and 1.105 as moderate, and over 1.105 as severe depression and somatization scores under 0.500 as normal, between 0.500 and 1.000 as moderate, and over 1.000 as severe somatization. This study also demonstrated that age and gender adjusted the normal value of depression and somatization scores for 45-64-year-old males to 0.2898 and 0.3898 and for females to 0.4078 and 0.4493, respectively. For 65-74 year olds, the normal depression and somatization scores for males were adjusted to 0.1572 and 0.4120 and for females to 0.2273 and 0.3729, respectively (11). In the present study, TMD patients in both age groups had a tendency toward moderate depression and somatization scores. For BMS, patients in the middle aged group had a trend toward moderate depression and somatization scores; however, the older group was closer to the normal value. These findings indicate that psychosocial factors may decrease the pain intensity in older BMS patients.

Despite the large number of clinical and epidemiological studies of BMD, the pathogenesis and etiology of BMS remain unclear. A number of researchers have posited trigeminal small-fiber neuropathy as a cause of BMS (18,19). Because older individuals often complain of dysgeusia followed by BMS, dysfunction of the chorda tympani nerve may represent a cause of BMS (20,21). In the present study, the central nervous system disorders were associated with psychosocial disturbances and may strongly contribute to BMS in middle-aged patients. In contrast, BMS pain in older subjects may be more predominantly due to a neuropathic pain component than neuropathic pain (10). Because the results of the present study were unable to clarify the contribution of neuropathic pain to nerve or psychosocial issues, quantitative somatosensory testing (QST) after the allocation of patients into groups according to psychosocial index may be required to fully elucidate the pathophysiologic factors shared by potential neuropathic and psychosomatic components of BMS.

A genetic cause for higher pain intensity in a proportion of chronic pain patients was suggested by the results

of the OPPERA (Orofacial Pain: Prospective Evaluation and Risk Assessment) study. Genetic factors play a role in the etiology of persistent pain conditions, putatively by modulating underlying processes such as nociceptive sensitivity, psychological well-being, inflammation, and autonomic response (22). Several genetic risk factors for clinical, psychological, and sensory phenotypes associated with TMD onset have been reported (23). Measures of somatic symptoms are reportedly most strongly associated with TMD onset, but perceived stress, previous life events, and negative affect have also been shown to predict TMD incidence (24). These findings may explain a genetic predisposition towards chronic pain and depression in a proportion of patients and may indicate a contribution of epigenetic factors to the chronic orofacial pain reported in the present study.

The present study had a number of limitations. Because data collection for chronic pain did not adequately define the types and levels of chronic pain, we were unable to clarify the functional disturbance in these patients. A comprehensive evaluation of chronic pain utilizing not only a simple subjective questionnaire but also an objective evaluation that includes QST, a functional examination, and genetic risk factors is required in future studies.

In the present study, investigated disorders exhibited different pain intensities, with incremental changes in age also found to be associated with differences between TMD and BMS, thereby potentially resulting in different psychosocial factors. The results of the present study indicate that BMS may have a different pathophysiological etiology depending upon patient age.

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Conflict of interest

All authors declare that there are no conflicts of interests.

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