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ORIGINAL ARTICLE

Burning mouth syndrome and oral health-related quality of life: is there a change over time?

R Ni Riordain[1], E Moloney[2], K O'Sullivan[3], C McCreary[1]

[1]*Oral Medicine Unit, Cork University Dental School and Hospital, Wilton, Cork, Ireland;* [2]*College of Medicine, University College Cork, Cork, Ireland;* [3]*Statistical Consultancy Unit, University College Cork, Cork, Ireland*

BACKGROUND: The symptoms associated with burning mouth syndrome can be quite varied and can interfere with the every day lives of patients. Management of the condition can be challenging for clinicians.

AIMS: To determine the oral health-related quality of life (OHRQOL) implications of BMS on patients over a period of time whilst undergoing treatment and to evaluate whether treatment interventions had a positive effect on OHRQOL.

MATERIALS AND METHODS: Thirty-two individuals (26 females, 6 males, mean age 61 years, range 38–83 years) were enrolled in this study. Individuals were interviewed using Short-Form McGill Pain Questionnaire (SFMPQ), Visual Analogue Scale (VAS), the Hospital Anxiety and Depression Scale (HADS) and the Oral Health Impact Profile (OHIP-14), at weeks 0, 8 and 16.

RESULTS: Scores from all outcome measures used decreased over the 16 weeks of the study. Statistically significant differences were found between time points for VAS pain scores ($P < 0.001$), HADS depression scores ($P = 0.029$), SFMPQ sensory pain scores ($P < 0.01$) and total scores for OHIP-14 ($P < 0.05$).

CONCLUSION: Burning mouth syndrome has a negative impact on OHRQOL; however, individually tailored management of the condition can result in an improvement in patient-reported outcome measures including quality of life.

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Keywords: burning mouth syndrome; quality of life; patient reported outcomes

Correspondence: Richeal Ni Riordain, Oral Medicine Unit, Cork University Dental School and Hospital, Wilton, Cork, Ireland. Tel.: +353 21 4901127, Fax: +353 21 4901179, E-mail: richeal.niriordain@ucc.ie

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Introduction

'A burning sensation for which no dental or medical cause can be found' is how the Headache Classification Subcommittee of the International Headache Society (International Headache Society, 2004) defines burning mouth syndrome (BMS). Also included in the definition is that the burning sensation is not always confined to the tongue and further symptoms could be oral dryness and/or loss of taste. A number of terms used are synonymous with BMS, including oral dysaesthesia, glossodynia, glossopyrosis, stomatodynia, stomatopyrosis, sore tongue and oral dysaesthesia. Zakrzewska *et al* (2005) emphasized the importance of the use of the term syndrome as patients can present with a variety of symptoms including burning sensation, subjective xerostomia, oral paraesthesia, dysguesia, loss of taste and altered smell. This is a chronic pain disorder, typically described by patients as a burning or stinging sensation of the tongue, lips or other oral mucosal surfaces. In a study by Sardella *et al* (2006), the authors concluded that spontaneous complete remission occurs in approximately 3% of patients within 5 years and they suggested that BMS could have a detrimental impact on a patient's quality of life (QOL).

The World Health Organization (1997) defined QOL as 'a state of complete physical, mental and social well-being not merely the absence of disease'. Over the last number of years, the impact of disease on a patient's QOL has become an important element in the management of chronic medical conditions, including diabetes (Rubin and Peyrot, 1999), osteoporosis (D'Amelio *et al*, 2007), ulcerative colitis and irritable bowel syndrome (Ansari *et al*, 2008). Measurement of QOL has been used in dentistry with a focus on its relevance in the field of restorative dentistry (McGrath and Bedi, 2001; Allen and McMillan, 2003); however, Baker *et al* (2006) reported data on QOL measures in patients with xerostomia and Hegarty *et al* (2002) studied the relevance of QOL measures in oral lichen planus. In a recent article by Lopez-Jornet *et al* (2008), the authors concluded that patients with BMS had poorer scores in both

QOL scales used (SF-36 and OHIP-49) when compared with healthy controls at a single point in time.

The aims of this study were to determine the oral health-related QOL (OHRQOL) implications of BMS on patients over a period of time whilst undergoing treatment and to evaluate whether treatment interventions had a positive effect on OHRQOL.

Materials and methods

Study participants

All new patients referred to the Oral Medicine Unit of Cork Dental Hospital with symptoms including burning sensation, subjective xerostomia, oral paraesthesia, dysguesia, loss of taste and altered smell underwent a full history, including a detailed drug history and medical history, a thorough clinical examination and a set of special tests including laboratory evaluations (full blood count, haematinics, blood glucose, urea and electrolytes, thyroid function tests and auto-antibody screen) and swabs for *Candida* before a definitive diagnosis of BMS was made. Urea and electrolytes were tested to check for any evidence of dehydration that could possibly predispose to *Candida*. Thyroid function tests were carried out due to the proposed link between hypothyroidism and BMS (Femiano *et al*, 2008) and an auto-antibody screen was used to detect positive antibodies to Ro and La.

The following were the exclusion criteria used in this study: a positive drug history of previous psychotropic medication, including antidepressants and anticonvulsants as these medications could influence the scores generated from the QOL, anxiety and depression scales used; patients with previous diseases associated with somatic symptoms, such as fibromyalgia and chronic backache, were excluded again due to the influence these conditions on responses to the outcome measures used. Other exclusion criteria included abnormal sialometry, evidence of mucosal disease or biochemical and/or haematological abnormalities. Therefore, only patients with idiopathic or primary BMS, based on the classification outlined by Scala *et al* (2003), were included in this study.

Study protocol

Patients who consented to be enrolled in this study were then interviewed using the following validated scales and questionnaires: Short-Form McGill Pain Questionnaire (SFMPQ), a 10-cm Visual Analogue Scale (VAS), the Hospital Anxiety and Depression Scale (HADS) and the Oral Health Impact Profile (OHIP-14). They were reviewed and re-interviewed at 8 weeks and again at 16 weeks. Some of the recommendations made by Patton *et al* (2007) were incorporated into the study protocol including the assessment of treatment efficacy beyond an 8-week period and the use of a range of outcome measures. Local ethics committee approval was obtained.

Outcome measures

Visual Analogue Scale. The VAS consists of a 10-cm line with verbal anchors labelling each end. It is a straight line with the left end of the line, or 0, representing no pain (none) and the right end of the line, or 10, representing the worst pain imaginable (agonizing). Patients are asked to mark the line to indicate the intensity of their pain. The scale can be administered on paper or electronically with equal success (Jamison *et al*, 2002). It can be presented as a horizontal or vertical line, the most reliable of which is the horizontal line (Ogon *et al*, 1996). The validity and reliability of VAS has been well established (Bijur *et al*, 2001).

Short-Form McGill Pain Questionnaire. The Short-Form McGill Pain Questionnaire, developed by Melzack (1987), consists of 15 descriptors (11 sensory; 4 affective), which are rated on an intensity scale as 0 = none, 1 = mild, 2 = moderate or 3 = severe. The 11 sensory adjectives used as descriptors are throbbing, shooting, stabbing, sharp, cramping, gnawing, hot/burning, aching, heavy, tender and splitting. The four affective adjectives used are tiring/exhausting, sickening, fearful and cruel/punishing. It has successfully been used not only to assess pain experience (Burckhardt *et al*,1993; Dudgeon *et al*, 1993) but also to determine the efficacy of various treatment regimes (Greco *et al*, 1997; Rowbotham *et al*, 1998).

Hospital Anxiety and Depression Scale. The Hospital Anxiety and Depression Scale, developed by Zigmond and Snaith (1983) is a 14-item measure designed to detect anxiety (HADS-A) and depression (HADS-B) in general outpatient populations. All items are coded on a four-point scale from 0 (not at all) to 3 (most of the time). Participants rated each of the items on how they had felt in the last few days on the scale. Sample items include 'I feel tense or wound up' and 'I have lost interest in my appearance'. Responses for the seven anxiety items were summed so that the higher the score, the more anxiety reported by the participants (HADS-A; range 0–21). Similarly, the seven depression items were summed to give a depression score (HADS-D; range 0–21). On the basis of their scores, individuals can be categorized into three score ranges that indicate the severity of the states: 'normal' (0–7), 'borderline abnormal' (8–10) and 'abnormal' (11–21). Moorey *et al* (1991) found that HADS appeared to be the best instrument available for the evaluation of psychological interventions in patients with physical illness in a brief and simple manner. The HADS has been used extensively in patient populations, and has good reliability and validity (Hermann, 1997).

Oral Health Impact Profile –14. The Oral Health Impact Profile is a 14-item questionnaire, derived from a 49-item questionnaire (Slade and Spencer, 1994), designed to measure the frequency of difficulties patients experience associated with the mouth, teeth, or dentures in the recent past on seven domains: functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Patients are asked to rate each question on a five-point Likert-type scale from 0 (never) to 4 (very often). Two measures can be created from the OHIP-14, an unweighted additive

measure (0–56) and a weighted impact measure (0–14). Investigation by Allen and Locker (1997) has demonstrated the limited benefits of weighted over unweighted scores.

Statistical analysis

Statistical Package for the Social Sciences (Version 15.0; SPSS, Inc., Chicago, IL, USA) was used to analyse the data. As all data were highly skewed, median and interquartile range (Q_1–Q_3) were used for summarization, except for age where mean and standard deviation were used. Friedman tests were conducted to compare VAS pain scores, OHIP-14 scores, SFMPQ scores and HADS (anxiety and depression) scores between time points. Where significant differences were found, pairwise comparisons were performed using the Bonferroni–Dunn method. Outliers were identified and analyses were repeated without these outliers. The presence of these outliers did not affect these results. Therefore, the findings of the analyses of the complete data are presented. All tests were two-tailed and statistical significance was determined by $P < 0.05$.

Results

Thirty-two patients were enrolled in this study, 26 of whom were female and 6 male, between the ages of 38 years and 83 years (mean 61 years. s.d. = 10 years). The median duration of symptoms was 8 months (interquartile range: 6.0–22.5 months) in a range of 1–36 months. Table 1 represents the symptoms reported with a burning sensation being the most commonly reported symptom.

Table 2 represents the median and interquartile ranges of VAS, HADS anxiety and depression scores, SFMPQ scores and OHIP-14 scores at each time point.

Table 1 Symptoms reported

	Yes (%)	*No (%)*
Burning sensation	27 (84.375)	5 (15.625)
Dry mouth	3 (9.375)	29 (90.625)
Excess saliva	1 (3.125)	31 (96.875)
Taste disturbance	6 (18.75)	26 (81.25)
Altered sensation	1 (3.125)	31 (96.875)

Table 2 Median (interquartile ranges, Q_1–Q_3) at weeks 0, 8 and 16

	Week 0	*Week 8*	*Week 16*
VAS	7.0 (5.0–9.8)	4.5 (2.0–7.0)	2.0 (1.0–4.0)
HADS (anxiety)	14.0 (5.3–17.8)	13.5 (3.3–18.0)	12.0 (2.0–18.8)
HADS (depression)	4.5 (1.3–16.0)	8.5 (4.0–17.8)	8.0 (2.3–16.0)
SFMPQ (sensory)	1.0 (0.0–2.0)	3.0 (2.0–6.0)	2.0 (0.3–2.8)
OHIP-14	20.0 (10.3–26.5)	12.5 (6.3–19.8)	10.0 (0.0–16.8)

VAS, Visual Analogue Scale; HADS, Hospital Anxiety and Depression Scale; SFMPQ, Short-Form McGill Pain Questionnaire; OHIP-14, Oral Health Impact Profile.

Visual Analogue Scale

Significant differences were found between all time points ($\chi^2_2 = 35.72$, $P < 0.001$). VAS pain scores were significantly lower at week 8 ($P < 0.001$) and week 16 ($P < 0.001$) when compared with week 0. Pain scores were also significantly lower at week 16 compared with week 8 ($P < 0.001$).

Hospital Anxiety and Depression Scale

No significant differences were found between times points for anxiety ($\chi^2_2 = 1.22$, $P = 0.546$). Although depression differed significantly between time points ($\chi^2_2 = 7.07$, $P = 0.029$), when pairwise comparisons were conducted no significant differences emerged.

Short-Form McGill Pain Questionnaire

Significant differences found between time points ($\chi^2_2 = 31.92$, $P < 0.001$). Sensory pain scores were significantly lower at week 8 ($P < 0.01$) and week 16 ($P < 0.001$) compared with week 0. Sensory pain scores did not differ between weeks 8 and 16 ($P > 0.05$).

Oral Health Impact Profile–14

Significant differences were found between all time points ($\chi^2_2 = 26.28$, $P < 0.001$). Total scores were significantly lower at week 16 compared with week 0 ($P < 0.001$) and week 8 ($P < 0.05$). No significant difference was found between weeks 8 and 0 ($P > 0.05$).

Discussion

Burning mouth syndrome can be difficult to manage, is considered to be a multifactorial condition and is poorly understood. The aetiology remains unknown, although evidence of a neuropathic mechanism for the condition has been supported of late (Lauria *et al*, 2005; Yilmaz *et al*, 2007). No specific and effective means of treatment can be given to all patients with this condition and treatment interventions can range from reassurance and cognitive behavioural therapy to the pharmacological interventions such as anti-depressants. In fact Zakrzewska *et al* (2005) recommended the adoption of an individual approach when considering the management of BMS patients. Due to the limited numbers in this study and the individualized approach to the management of these patients, we have not focused on the categorization of patients based upon the treatment intervention but rather have looked at the sample as a whole. Although a recent study carried out has demonstrated the negative impact of BMS on QOL in patients in comparison to a control group (Lopez-Jornet *et al*, 2008), the question remains whether treatment interventions used in this condition have a positive effect on QOL over time.

When using patient-reported outcome measures, such as the measures used in this study, one must also take into consideration the influence of the placebo effect. It is acknowledged that up to one-third of patients feel better in response to placebo-based treatments (McQuay and Moore, 2005) and the role of placebo in BMS has been well documented in the literature (Sardella *et al*,

1999; Femiano *et al*, 2000; Gremeau-Richard *et al*, 2004). In fact in a recent article by Carbone *et al* (2009), the authors recommended that caution should be taken with the interpretation of all intervention-based studies on BMS due to the role of placebo.

Short-Form McGill Pain Questionnaire is widely used in research; however, some studies have questioned the psychometric properties of the instrument (Bonaiuti and Fontanella, 1996; Wright *et al*, 2001). Beattie *et al* (2004) found that even though SFMPQ provides a range of pain descriptors and intensity indications, the version of the questionnaire they derived after factor analysis in patients with chronic lumbar pain had better psychometric properties than the original questionnaire. A dominance of 0 was recorded at each time point in the affective section of SFMPQ in this study, which would indicate an increased use of sensory words to describe pain. This has been discovered in a number of other studies (Fortin *et al*, 1992; Zalon, 1999) and is possibly due to the comparative brevity of the affective component with only four descriptors (McDonald and Weiskopf, 2001) or perhaps many patients may elect to downplay the affective dimension of their pain (Zalon, 1999). Research has suggested that the affective descriptors of pain can reflect emotional distress associated with pain, impacting both intensity and function (Robinson and Riley, 1999). Perhaps the use of factor analysis in a BMS patient cohort could yield a version of SFMPQ with more balanced sensory and affective description of pain, and hence reduce the dominance of 0.

A number of studies have demonstrated that patients with BMS also suffer from a variety of psychological problems (Grushka *et al*, 2002; Soto-Araya *et al*, 2004). Gao *et al* (2009) reported that patients with BMS had significantly higher depression and anxiety scores, using a Self-rating Depression Scale and Self-rating Anxiety Scale, when compared with healthy controls. The question arises whether increased anxiety and depression are primary or secondary events in BMS as chronic pain conditions can produce psychological disturbances. The mean anxiety scores for patients in this study were at the lower level of 'Abnormal' (11.3) and the mean depression scores were 'Borderline Abnormal' (9.2). However, interestingly, neither the anxiety nor the depression scores of the patients involved decreased over time regardless of the treatment intervention, even though all other patient-reported outcomes used in this study demonstrated statistically significant reductions at the various time points.

Oral Health Impact Profile-14 was developed to measure self-reported dysfunction, discomfort and disability attributed to oral conditions, therefore it captures solely the negative impacts on oral health (Slade *et al*, 2005). Although statistically significant differences were found in OHIP-14 scores between time points in this study, the mean unweighted additive severity scores at each time point were generally quite low given the potential range from 0 to 56. As uncovered in another study conducted using OHIP-14 (Slade *et al*, 2005) patients surveyed in this study reported no impact with a number of the questionnaire items, particularly in weeks 8 and 16, leading to a substantial 'floor effect'. This is thought to reflect that items in OHIP-14 consist primarily of quite severe impacts on daily life. Due to these findings, one would have to question the value of this questionnaire in the assessment of OHRQOL in BMS patients.

In conclusion, the data from this study indicate that although BMS has a negative impact on OHRQOL, individually tailored management of the condition can result in an improvement in patient-reported outcome measures including QOL.

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