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Biochemical Salivary Analysis in Patients with Burning Mouth Syndrome

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ABSTRACT

Burning mouth syndrome [BMS] is an enigmatic condition characterized by burning symptoms in the oral cavity. Authors suggested that changes in the salivary flow rate and composition might influence BMS. In 20 patients with BMS [62±12.9yrs] and in 24 controls [24±3.7yrs] we have determined levels of salivary magnesium, calcium, copper, chloride, phosphate, potassium and sodium. Sodium, potasium and chloride were determined by indirect potentiometry, copper was determined by atomic absorption spectrophotometry, whereas magnesium and phosphate were determined by spectrophotometric method. Total proteins were determined by pyrogalol colorimetric method. Amylase levels were determined by continued colorimetric method. Statistical analysis was performed by use of $\chi 2$ test and Spearman´s correlation test. The results of this study indicate that there were no differences between patients with BMS and controls regarding investigated salivary analytes. Therefore, it seems that investigated salivary analytes do not play a role in the BMS.

Key words: burning mouth syndrome, saliva, electrolytes

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INTRODUCTION

Burning mouth syndrome [BMS] is characterised by a painful burning sensation of the oral cavity without any mucosal abnormalities which is poorly understood. BMS is more prevalent in women around the menopause An oral neuropathy and/or neurological transduction interruption induced by salivary compositional alterations is suggested as the possible aetiology for the complaints connected with BMS and taste abberations [1].

Altered salivary composition might affect oral microenvironment and influence depolarization/repolarization processes which could lead to the disturbed nerve conduction and sensory alterations.

Additionally, microscopic atrophy of the oral mucosa is known to enable the leakage of serum-borne factors into saliva [1]. It might be the case in the patients with BMS whose oral mucosas are probably atrophic due to the menopausal changes.

Literature reports regarding salivary analytes and BMS are controversial. Furthermore, some of the authors [2] investigated unstimulated whole saliva, whereas other used stimulated whole saliva [3] which might affect the obtained results. Some authors such as Baricevic et al. [2] have not found any differences between patients with BMS and controls. However, others such as de Moura et al. [3], Pekiner et al. [4], Herskovich and Nagler [1] found significant differences in salivary electrolytes between patients with BMS and controls.

Therefore, the aim of this study was to evaluate salivary analytes in patients with burning mouth syndrome and to compare the results to the controls.

MATERIALS AND METHODS

Prior to this investigation all the participants signed informed consent according to the Helsinki II which was approved by Ethical Committee of the School of Dentistry, University of Zagreb. Patient group consisted of 20 female patients (62±12.9yrs) with true BMS (all the local and systemic known factors were excluded). Control group consisted od 24 participants who were dental students (24 ± 3.7yrs). Every participant underwent clinical examinations which included measurment of salivary flow rate. Unstimulated whole saliva was collected between 9 and 12 AM, while participants were sitting and spitting into test tubes during five minutes and after the saliva specimens were frozen at -20C till analyzed.

Sodium, potasium and chloride were determined by indirect potentiometry on the automatic biochemical analyser Olympus AU2700 (5). Copper was determined by atomic absorption spectrophotometry [6]. Magnesium and phosphate were determined by spectrophotometric method [7]. Total proteins were determined by pyrogalol colorimetric method [8]. Amylase levels were determined by IFCC (continued colorimetric method) [9]. Statistical analysis was performed by use of descriptive statistics i.e. $\chi 2$ test and Spearman's

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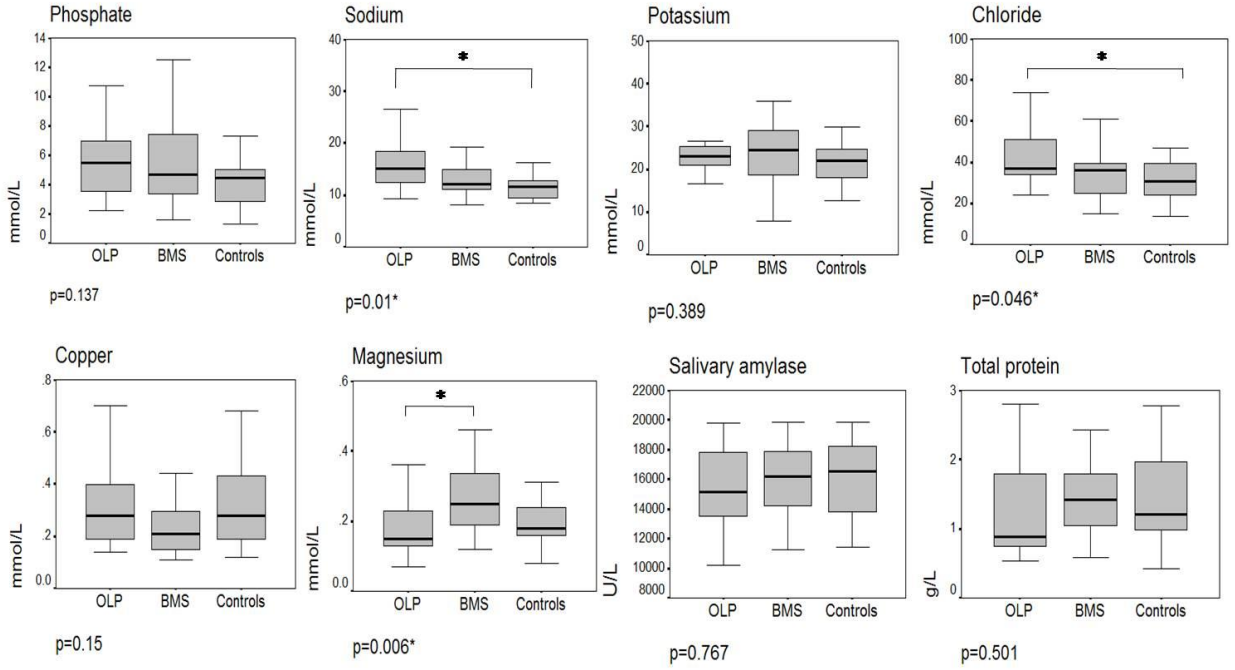
correlation analysis on the SPSS 10.0 (SPSS Inc. Chicago, Illinois, USA). P values lower than 0.05 were considered as significant.

RESULTS

There were no significant differences between patients with burning mouth syndrome and controls regarding salivary magnesium, calcium, copper, chloride, phosphate, potassium, sodium, total proteins and amylase (Figure 1).



*significant difference (p<0.05)

There was a significant difference in salivary flow rate between patients with BMS and controls as well as between their age due to the fact that we estimated salivary analytes for the first time in the Laboratory therefore we needed reference values (Table 1).

Table 1 Demographic characteristic of the participants

	BMS	Controls	p
Age (median ± SE)	62 ± 12.9	24 ± 3.7	*
Sex N (%)			
female	20 (100)	15 (62.5)	
male	0 (0)	9 (37.5)	
Qs (median ± SE)	0.2 ± 0.02	0.5± 0.03	*

*Significant difference (p<0.05)

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DISCUSSION

Salivary quality and quantity play an important role in the health and disease of the oral mucosa especially in the oral diseases which are characterized by loss of epithelium. However, in certain oral complaints without clinical pathology such as burning mouth syndrome or taste disturbances the role of saliva is controversial. Although lack of saliva (i.e xerostomia) certainly adds to aforementioned conditions, salivary quality might have an effect as well. As stated earlier altered salivary composition might alter the oral microenvironment which could in turn affect nerve conductivity and lead to sensory dysfunction. De Moura et al. [3] reported that reduced salivary flow also leeds to the decreased concentrations of ions. Furthermore, de Moura et al. [3] reported that salivary chloride, phosphorus and potassium were elevated in BMS patients when compared to the controls, whereas total proteins were reduced in patients with BMS when compared to the controls. This result is in contrast with the results of our study as we found no differences between the the patients with BMS and controls regarding salivary sodium, potasium, chloride, copper, magnesium, phosphate, total proteins and amylase. However, de Moura et al. [3] investigated salivary analytes in stimulated whole saliva whereas we investigated them in unstimulated whole saliva and therefore different results might have been consequence of the different types of saliva analysed.

Pekiner et al. [4] suggested that salivary magnesium levels might have an impact on BMS, as salivary levels of magnesium were significantly decreased in BMS patients when compared to the controls. This result is contradictory to the result of our study as we found no differences in salivary magnesium levels between patients with BMS and controls. However, the same authors [4] found no significant differences in salivary zinc and copper between patients with BMS and controls which is in concordance with the results of our study as well. Hershkovich and Nagler [1] reported that salivary sodium, total proteins and amylase were significantly increased in BMS patients, a finding which is contradictory to our results as we found no differences between BMS patients and controls regarding aforementioned parameters.

Although Agha-Hosseini et al. [10] found that patients with oral dryness had elevated levels of calcium we couldn't confirm that finding as our patients with BMS also had oral dryness but their calcium levels were not different from the controls. The same authors also concluded that there were no differences between patients with oral dryness and controls in salivary magnesium, chloride, natrium, potassium, inorganic phosphate and chloride.

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