**Materials and Methods**

**Methods:** Studies assessing salivary biomarkers in BMS were identified through the PubMed Central database. BMS was identified using the following keywords “burning mouth syndrome” and “glossodynia,” and “oral neuropathic pain.” Keywords for salivary biomarkers included “salivary biomarkers,” “inflammatory cytokines,” “cytokines,” and “inflammation.” Only studies published between 2000 and 2023 were reviewed.

**Results**

A summary of papers examining salivary biomarkers in patients experiencing BMS is presented in Table 1. The only two biomarkers which were studied in at least four papers which were alpha-amylase and cortisol. Three studies concluded that there is a significant increase in alpha amylase levels between BMS patients and the control group. Furthermore, four studies determined BMS patients will have higher cortisol levels compared to the control group. However, one study reported finding no differences between its study groups. Moreover, many studies also conflicted in their findings with regards to the specific biomarkers tested with one paper reporting a statistical significance while another declaring no difference. These contrasting findings can be seen with IL-2, IL-6, and estradiol.

**Discussion**

The papers reviewed in this study measuring salivary biomarkers in patients with BMS demonstrated inconsistent results. These results can be the result of small samples sizes or varying biomarkers being tested. Out of the seventeen studies collected, only two biomarkers were tested at least four times. As a result, a reliable conclusion of the biomarkers tested cannot be derived from the studies. Furthermore, a majority of the BMS patients studied were females which may skew the results. Lastly, many studies utilized different methods to analyze the saliva samples and used different units of measurements making detailed analysis difficult.

**Conclusions**

Literature regarding salivary biomarkers in BMS patients report varying results on the differences between study groups. In addition, there was a large range of biomarkers tested in patients. Large-scale studies are required as there will be a calibration of salivary biomarkers of inflammation analyzed. Doing so may clarify the contradicting literature found concerning salivary biomarkers and BMS. Current literature do not clearly determine which salivary biomarkers accurately diagnose patients with BMS and its prognosis.

**Future Research**

Center for Clinical and Translational Research of Penn Dental Medicine is conducting an observational study in BMS patients to track pain symptoms in real-time and collect saliva samples to analyze biomarkers. Patients 18 years and older with access to a smart phone will complete a questionnaire three times daily over a 12-week period. The study will potentially supply additional data on salivary biomarkers in context of pain symptoms to help characterize BMS.

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