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Proceeding Paper

Intra-Oral Halitosis in Periodontitis: The Role of Tongue Coating—A Cross-Sectional Study †

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Abstract: Halitosis is an unpleasant breath odor that interferes with self-confidence and with people's professional and social lives. The aim of this cross-sectional study was to evaluate the impact of tongue coating on intra-oral halitosis in patients with periodontitis. The Winkel Tongue Coating Index (WTCI) score was found to be positively and significantly correlated with VSC values (rho = 0.473, $p < 0.001$). WTCI may be associated with levels of volatile sulfur compounds (VSCs) when other causes of extra-oral halitosis are excluded.

Keywords: halitosis; tongue coating; periodontitis

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1. Introduction

Halitosis or oral malodor is a unpleasant breath odor that impacts the quality of life [1,2]. As one of the primary symptoms of periodontitis, halitosis frequently prompts patients to seek treatment [3]. Intra-oral halitosis is caused by pathological conditions (periodontitis and gingivitis) and physiological traits, particularly tongue coating (TC), a grayish-white deposit on the tongue. Several studies have addressed the tongue coating with halitosis, but the number of studies on the tongue coating impact on intra-oral halitosis in periodontitis patients is still scarce. The aim of this cross-sectional study was to evaluate the impact of tongue coating on intra-oral halitosis in patients with periodontitis.

2. Materials and Methods

This research received approval from the Egas Moniz Ethics Committee, following the guidelines of the Helsinki Declaration from 1975, with the 2013 revisions. The study participants were consecutively selected from the Periodontology Department at Egas Moniz Dental Clinic for the purpose of periodontal assessment, spanning from October 2019 to March 2021. To be included in the study, participants needed to have periodontitis and be aged between 18 and 65. They were required to adhere to the recommended methods for halitosis evaluation and provide informed consent. Exclusion criteria encompassed a history of previous periodontal treatment, recent antibiotic usage within the last 4 weeks, a medical history of radiotherapy or chemotherapy, external sources for halitosis, and pregnancy.

A single trained examiner conducted a comprehensive examination of the entire mouth using a manual periodontal CP-12 probe (Hu-Friedy®, Chicago, IL, USA). The definition of periodontitis followed the AAP/EFP 2018 consensus [4]. To diagnose halitosis,

a two-step approach was employed: Step (1) A self-reported questionnaire was used to rule out potential causes of extra-oral halitosis; Step (2) Volatile sulfur compounds (VSC) were measured using a device (Halimeter®, Interscan Corp, Chatsworth, CA, USA). A VSC concentration below 80 ppb indicated no detectable odor, while a concentration above 80 ppb indicated the presence of halitosis [5].

The evaluation of tongue coating was performed using the Winkel Tongue Coating Index (WTCI) [6]. In summary, the dorsum (upper surface) of the tongue was divided into six areas: three posterior and three anterior. Tongue coating in each of these sextants was assessed and categorized as follows: 0 = no coating, 1 = light coating, 2 = severe coating. The overall WTCI score was obtained by summing up the scores from all six areas, resulting in a possible range of 0 to 12.

Data were analyzed by descriptive and inferential methodologies. Bivariate correlation was assessed by the Spearman correlation coefficient (rho). A significance level of 5% was established for the inferential analysis.

3. Results

The present study explored the correlation between the intra-oral halitosis (VCS counting) and clinical parameters of periodontitis and tongue coating.

From a total of 71 participants, 51 were evaluated, regarding halitosis status, by VSC counting. From those, 37.3% were diagnosed as exhibiting halitosis (VSC > 80 ppb). The WTCI score ranged from 0 to 9, with a median value of 3 ($\pm$2). WTCI score was found to be positively and significantly correlated with VSC values (rho = 0.473, $p < 0.001$). No significant correlation was identified between WTCI and periodontal clinical parameters Plaque Index (rho = 0.112, $p = 0.437$) and Gingival Index (rho = 0.083, $p = 0.568$).

4. Discussion

Although this study has its limitations, our current discoveries offer supplementary evidence to clarify the impact of tongue coating on intra-oral halitosis in patients with periodontitis. However, it's important to note that these results are derived from a cross-sectional study, and as such, prospective longitudinal studies are required to assess the temporal relationship of these events.

5. Conclusions

Considering the constraints of this observational study, there appears to be a correlation between the Winkel Tongue Coating Index and volatile sulfur compound (VSC) levels in patients with periodontitis, after excluding other causes of extra-oral halitosis. To establish a potential causal relationship, additional intervention studies are necessary. Therefore, it is crucial to incorporate tongue scraping into oral hygiene instructions.

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Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by Ethics Committee of EGAS MONIZ (No. 781, 26 June 2019).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data may be available upon reasonable request.

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Conflicts of Interest: The authors declare no conflict of interest.

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