Relationship between Tongue Coating and Halitosis in Periodontally Healthy Subjects

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Abstract: Periodontally healthy subjects as well as patients with periodontitis complain of halitosis. We focused on physiologically confirmed halitosis patients to examine the relationship between volatile sulfur compounds (VSC) in mouth air and the tongue coating. We assessed 6 subjects who were in good general health. After improving their periodontal status, VSC in their morning breath were measured via gas chromatography. Subsequently, professional tooth cleaning of all teeth was performed, and VSC were measured. Immediately following the latter procedures, tongue cleaning was performed, and VSC were measured again. Subsequently, the bacteria in the tongue coating, which were removed by tongue cleaning, were anaerobically cultured on blood agar and identified using Gram’s stain. There was a significant reduction in VSC after tongue cleaning (P<0.05). There was no positive correlation between the number of bacteria removed in the tongue coating and the decrease in VSC. However, there was a positive correlation between the distribution of Gram-positive rods and the decrease in VSC (p<0.10). It was suggested that the main source of oral malodor in periodontally healthy subjects might be the tongue coating. It was also concluded that bacterial distribution in the tongue coating might affect the concentration of VSC in the mouth air of periodontally healthy subjects.

Key words: Halitosis, Tongue coating, Periodontally healthy subjects

Introduction

We often encounter oral malodor patients who are periodontally and systemically in good health. This type of halitosis is classified as physiologic halitosis. The major substances causing bad breath are volatile sulfur compounds (VSC) such as hydrogen sulfide, methyl mercaptan, and dimethyl sulfide that are produced by oral bacteria. The tongue coating on the tongue’s dorsal surface is considered to be a major cause of halitosis. It is composed of blood components and other nutrients, large amounts of desquamated epithelial cells, and bacteria, suggesting that it has a putrefactive capacity to produce large amounts of VSC and other malodorous molecules. In addition, the pathological periodontal pocket is also considered to be a source of VSC. In fact, patients with severe periodontitis have a strong oral malodor. However, periodontally healthy subjects also experience oral malodor.

Studies using bacterial strains, i.e., periodontitis-related bacteria, have been carried out to determine which bacterial species produce VSC in vitro. Many oral bacteria, especially Gram-negative anaerobic species found in subgingival plaque, produce a diverse array of malodorous compounds as by-products of their metabolism, including VSC and short-chain organic acids such as valeric acid, butyric acid, putrescine, and skatole.

It is assumed that the oral microflora of periodontally healthy subjects is distinct from that of patients with pe-