

Review Article

Clinical Perspectives of Halitosis- A Review

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ABSTRACT:

Halitosis is offensive breath to others, caused by a variety of reasons including but not limited to periodontal disease, bacterial coating of tongue, systemic disorders and different types of food. Gram-positive bacteria produce little or no malodor; most Gram-negative bacteria are potent producers of odoriferous compounds. Treatments corresponding to the causes of oral malodor include mechanical or chemical tongue cleaning, periodontal disease treatment, oral hygiene instruction and mouth rinses or mouthwashes.

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INTRODUCTION

Halitosis is defined as breath that is offensive to others, caused by a variety of reasons including but not limited to periodontal disease, bacterial coating of tongue, systemic disorders and different types of food.¹ It is one of the most frequent claims from patients to the dentist.² Halitosis is not a disease but rather a symptom of underlying oral, systemic or psychological conditions. The primary cause of halitosis is due to release of odoriferous volatile sulphur compounds (VSC) in the exhaled air. VSC are released following putrefactive activity of anaerobic bacteria present in the oral or nasal cavity. The VSC may also be absorbed by the blood stream from a remote part of the body, such as from cirrhotic liver, and transferred

to the pulmonary alveoli to be exhaled through the nostrils or mouth as malodorous breath. If VSC are present in an objectionable concentration in the breath, it is perceived as halitosis.³

AETIOLOGY OF HALITOSIS

Periodontal Inflammation

The presence of microorganisms and the inflammatory products present in gingivitis/periodontitis are capable of producing odoriferous substances. Cross-sectional studies associated halitosis to the presence of either gingivitis or periodontitis.^{4,5} In vitro and in vivo studies demonstrated the ability of putative periodontal pathogens and products of inflammation to produce volatile odoriferous compounds.^{6,7,8}

Tongue Coating

Tongue coating, including bacteria, desquamated cells, and saliva, among others, is one of the important etiological factors of halitosis.⁹

Non-Oral Causes of Halitosis

Ear-nose-throat problems such as tonsillitis, sinusitis, the presence of out-of-body material and rhinitis were frequently associated with non-oral halitosis in breath clinics.^{9,10}

Table 1: Systemic diseases and their associated Halitosis³

Systemic Diseases	Characteristic odour
Poorly controlled diabetes mellitus or hyperglycemic coma	Acetone, sweet fruity
Renal failure or uraemia	Urine or ammonia
Liver failure or hepatic coma	Fresh cadaver
Liver cirrhosis	Fetor hepaticus
Tuberculosis/ lung abscess	Foul, putrefactive
Gastrointestinal disorder	Rotten egg
Internal haemorrhage	Decayed blood
Blood disorders	Decomposed blood
Fever, dehydration	Odour due to xerostomia and poor oral hygiene

EXAMINATION FOR HALITOSIS

The three main methods of analyzing oral malodour are organoleptic measurement, gas chromatography (GC) and sulphide monitoring. Organoleptic measurement is a sensory test scored on the basis of the examiner's perception of a subject's oral malodour. GC, performed with apparatus equipped with a flame photometric detector, is specific for detecting sulphur in mouth air. GC is considered the gold standard for measuring oral malodour because it is specific for volatile sulphur compounds

(VSC), the main cause of oral malodour.^{11,12,13} However, the GC equipment is not compact, and the procedure requires a skillful operator; therefore, it is impractical for practitioners to equip their offices for GC. Sulphide monitors analyze for total sulphur content of the subject's mouth air. Although compact sulphide monitors are portable and easy to use, most are not specific for VSC.¹⁴⁻¹⁶ For example, the Halimeter (Interscan Co., Chatsworth, CA) has high sensitivity for hydrogen sulphide, but low sensitivity for methyl mercaptan, which is a significant contributor to halitosis caused by periodontal disease. Thus, the most reliable and practical procedure for evaluating a patient's level of oral malodour is organoleptic measurement.¹⁶

ORGANOLEPTIC MEASUREMENT

Organoleptic measurement can be carried out simply by sniffing the patient's breath and scoring the level of oral malodour. By inserting a translucent tube (2.5 cm diameter, 10 cm length) into the patient's mouth and having the person exhale slowly, the breath, undiluted by room air, can be evaluated and assigned an organoleptic score (Table 2). The tube is inserted through a privacy screen (50 cm – 70 cm) that separates the examiner and the patient. The use of a privacy screen allows the patient to believe that they have undergone a specific malodour examination rather than the direct-sniffing procedure. For reliable diagnosis, the oral malodour assessment should preferably be carried out on two or three different days, if possible. This is especially important when either pseudohalitosis or halitophobia is suspected. Patients are instructed to abstain from taking antibiotics for three weeks before the assessment, to abstain from eating garlic, onion and spicy foods for 48 hours before the assessment and to avoid using scented cosmetics for 24 hours before the assessment. Patients are instructed to abstain from ingesting any food or drink, to omit their usual oral hygiene practices, to abstain from

using oral rinse and breath fresheners, and to abstain from smoking for 12 hours before the assessment. The oral malodour examiner, who should have a normal sense of smell, is required to refrain from drinking coffee, tea or juice, and to refrain from smoking and using scented cosmetics before the assessment.^{17,18}

Table 2: Organoleptic Scoring Scale^{3,18}

Odour Scale	Description
0: Absence of odour	Odour cannot be detected
1: Questionable odour	Odour is detectable, although the examiner could not recognize it as malodour
2: Slight malodour	Odour exceeds the threshold of malodour recognition
3: Moderate malodour	Malodour is definitely detected
4: Strong malodour	Strong malodour is detected, but can be tolerated by examiner
5: Severe malodour	Overwhelming malodour is detected and cannot be tolerated by examiner

MICROBIOLOGICAL TESTS

The VSC monitors detect from 18% to 67% of the odors represented by the organoleptic score. This is because the nose is detecting odors due to many other compounds that are in the intra-oral air as a result of microbial metabolism. Most of these compounds cannot be easily measured, and some such as volatile fatty acids (butyrate, propionate, etc.), diamines (cadaverine, putrescine) and other foulsmelling products can only be measured by laboratory based assays.

An alternative strategy would be to detect in plaque, or in the tongue coating, taken from individuals with halitosis, those bacteria or

their enzyme(s) that can produce these compounds. Three species with periodontal disease, *Treponema denticola*, *Porphyromonas gingivalis* and *Tannerella forsythia*, produce both VSC and volatile fatty acids. The detection of these bacteria might provide additional information concerning factors contributing to the individual's malodor. These organisms can be detected by the presence of an enzyme(s) that degrades benzoyl-DL-arginine-naphthylamide (BANA), a synthetic trypsin substrate, forming a colored compound.¹⁹ The BANA test provides additional information on compounds other than the VSC that contribute to halitosis. Kozlovsky et al. concluded that the "BANA test is a simple, adjunct assay together with volatile sulphide determination in order to provide additional quantitative data which contribute to the overall association with odor-judge estimation."²⁰

TREATMENT

Periodontal Therapy

Periodontal treatment decreases halitosis. A study by Silveira et al.²¹ demonstrated that a strict supragingival plaque control is able to reduce VSC and organoleptic scores in periodontitis patients.

Tongue Cleaning and Mouth Rinsing

Cleaning the dorso-posterior surface of the tongue has a significant beneficial effect on all forms of genuine halitosis. As approximately 60% of total VSC in the mouth is from tongue coating, it is important to encourage patients with halitosis to prescribe to regular tongue cleaning.³ Cleaning the tongue either with a brush or a scraper often effectively reduces malodour to below recognition threshold.^{22,23} Mouthrinses, especially chlorhexidine and cetylpyridinium chloride have been effective in reducing halitosis.^{24, 25} In addition, the use of dentifrices has also been studied. Triclosan containing dentifrices, for example, have

demonstrated an interesting potential in reducing VSC.^{26,19}

Medical Approaches

If oral approaches are not successful in reducing/ eliminating halitosis, patients should be referred to a physician. If the medical causes cannot be suspected, the first professional to be referred is the otorhinolaryngologist, followed by the gastroenterologist. If halitophobia is considered, a psychologist or psychiatrist should be included.^{27,28,29}

Masking Agents

When it is not possible to direct the treatment approach to the cause, masking agents have been developed to decrease the odor. The use of chewing gum may decrease halitosis, especially through increasing salivary secretion.³⁰ Mouthrinses containing chlorine dioxide and zinc salts have a substantial effect in masking halitosis, not allowing the volatilization of the unpleasant odor.^{19,24,30} These approaches should be only used temporarily in order to improve satisfaction of the patient.

CONCLUSION

The dental professional is in an excellent position to recognize halitosis and make recommendations regarding its source and treatment. In this paper we have outlined the recommended examination and management of halitosis patients which is very useful for general practitioners, especially with regard to patients with pseudohalitosis, who may seek treatment from general practitioners. Because halitosis treatments are successful in cases of physiologic or pathologic halitosis but unsuccessful in cases of halitophobia, evaluation of the psychological condition of halitosis patients is important. Since the majority of halitosis is related to the mouth, the dental team should lead the treatment, performing dental/periodontal treatment and personalized oral hygiene instructions.

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