

## Oral Malodor (Halitosis)

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### Abstract

The public is greatly concerned about the impact of breath on personal and professional aspects of life. It is an issue that affects one's quality of life and social relationships leading to feelings of self-esteem, sadness and other mood disorders. Professionals such as dentists, doctors, dietitians and psychologists should collaborate to assess and provide treatment for this problem. Therefore, it is crucial to study the causes and explore treatment options for halitosis. With society's increasing emphasis on cleanliness interest in odor has also grown. Bad breath can cause distress and impede social interactions because it is challenging to detect oral malodor on our own. Even individuals who do not have bad breath might experience anxiety or distress when they notice others reacting by pinching their noses or making grimaces during conversations. Given its origins, addressing breath requires a comprehensive evaluation and intervention from experts, in dentistry, medicine, nutrition and psychology.

**Key words:** *Malodor, Halitosis, Bad breath, Volatile sulfur compounds.*

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### Introduction

Human breath comprises a vast array of intricate chemicals, each of which has a particular aroma that can cause unpleasant conditions like halitosis. The Latin term halitosis comprises halitus, meaning "breathed air," and osis, meaning "pathologic alteration."<sup>1</sup>

Oral malodor, also called halitosis, is the unpleasant breath odor that comes from the mouth.<sup>2</sup> The phrase "oral malodor" refers to any offensive odor in expired air, regardless of whether the odorous components are

derived from oral or nonoral sources. Other names for it include halitosis, breath malodor, and fetor ex ore or fetor oris. Approximately 80%–90% of instances of halitosis are brought on by anaerobic bacteria in the oral cavity, which produce volatile sulfur compounds (VSCs).<sup>3</sup>

Volatile sulfur compounds (VSCs), which include hydrogen sulfide, methyl mercaptan, and dimethyl sulfide and are primarily responsible for oral malodor, have been implicated in the pathogenesis of

periodontal disease due to their toxicity to oral tissues at extremely low concentrations, negative impact on collagen metabolism and protein synthesis of human gingival fibroblasts, induction of oxidative stress, and other factors.

This implies that many patients who initially complain of oral malodor will also have some degree of periodontal and gingival pathology. According to reports, those with periodontitis who have poor breath have more advanced disease than those who do not.<sup>4</sup> In 10-20% of instances, halitosis is suspected to have non-oral sources.<sup>5</sup>

Attitudes and ideas regarding oral health have a big impact on oral health behavior.<sup>1</sup> A healthy oral profile requires collaboration between the dentist and the patient. One of the most crucial factors that affect a population's oral health is the way they feel about their dentition.<sup>6</sup> As society grows more hygienic, interest in odor has grown. Foul breath has a substantial negative effect because it is challenging to notice mouth odor on one's self. Even if they do not have oral malodor, many people worry or are distressed about it. People could infer someone has bad breath if they squeeze their nose or grimace during a discussion.<sup>7</sup>

### Classification of Halitosis (Types of Halitosis)

#### According to origin

- **Physiologic malodor:** Occurs due to decreased saliva production.  
e.g.: Tobacco smoking and certain food items like garlic and onion also cause bad breath due to aromatic compounds
- **Pathologic malodor:** The existence of a preoccupation with unpleasant mouth odor.  
e.g.: Periodontal disease, poor oral hygiene, tongue coat, food impaction,

unclean dentures, faulty restorations, oral carcinomas, and throat infections.

- **Pseudo malodor:** Halitosis is not perceived by others and condition improves with counselling and simple measures.
- **Halitophobia:** No obvious signs of halitosis but patient persists in having halitosis.

#### According to cause

- **Oral:** Periodontal infections, smoking, stress, insufficient oral hygiene practice, xerostomia, tongue coating, dry socket, exposed necrotic pulp, and food impaction.
- **Non-oral:** Infection from the ear, nose, throat, tonsils, maxillary sinuses, or pulmonary system

**Malodor:** People of all ages are susceptible to oral malodor, which is prevalent. It might lessen social interactions and self-confidence when it is severe or persistent.<sup>8</sup>

#### Box 1: Common causes of the manifestation of oral halitosis

- Oral disease**
- Food impaction
  - Acute necrotising ulcerative gingivitis
  - Acute gingivitis
  - Adult and aggressive periodontitis
  - Pericoronitis
  - Dry socket
  - Dry mouth
  - Oral ulceration
  - Oral malignancy
- Respiratory disorder**
- Foreign body
  - Sinusitis
  - Tonsillitis
  - Malignancy
  - Bronchiectasis
- Volatile foodstuffs**
- Garlic
  - Onions
  - Spiced foods

**Problems faced by patients:** Due to its negative effects on personal and professional life, oral malodor is a serious concern for the general public.<sup>4</sup> It represents a serious issue that degrades social relationships and quality of life, directly contributing to low self-esteem, sadness, and other mood disorders.<sup>9</sup> The

terrible impact on daily social life and interpersonal contact is due to the barrier that the affected people's bad mouth air puts in the way of their relationships with their friends, family, and co-workers. Therefore, it is well recognized that oral malodor, whether actual or imagined, when seen, prompts behavioral action aimed at restoring fresh breath and, as a result, facilitates social and psychological well-being among those who are affected.<sup>10</sup> Therefore, it may be necessary for one to understand their oral hygiene practices, the negative impacts of smoking, and their own perception of oral odor.<sup>3</sup>

**Sources of malodor:** At awakening, oral odor is common and not thought to be halitosis. Long-lasting bad breath is typically caused by oral or in rare cases, nasopharyngeal disease. The most frequent reason for bad breath is the accumulation of food particles and dental bacterial plaque on the teeth and tongue as a result of poor oral hygiene, which leads to gingival and periodontal inflammation. Most types of gingivitis and periodontitis can induce halitosis, but acute necrotizing ulcerative gingivitis (Vincent's disease, trench mouth) causes the most obvious halitosis. Aggressive periodontitis, which is characterized by a quick loss of periodontal bone and subsequent tooth movement, can cause unpleasant oral odors. Lack of oral hygiene due to xerostomia (dry mouth) has the potential to also induce or exacerbate bad breath, & some research suggests that wearing dentures can occasionally worsen bad breath due to increased tongue coat deposits.<sup>8</sup>

**Other sources of malodor:** Morning halitosis is the name for a mild, temporary mouth odor that frequently appears after sleeping. This might be more prevalent in those who have nasal blockage, such as those who have upper respiratory

infections, or in those who sleep in warm, dry environments. After consuming volatile foods like garlic, onions, or spices (durian is rumored to be the worst), a person may have temporary oral malodor. This odor may linger for several hours. Like how betel nut products can have an almost constant stench if a person has a chronic habit, cigarettes and alcohol can provide distinct mouth scents that can last a few hours.<sup>8</sup>

As a result of nasal or sinus secretions entering the oropharynx or in those who breathe primarily via their mouth, respiratory tract illnesses can result in oral malodor. Halitosis can also be caused by tonsillitis. Additionally, foreign objects in the nose might cause a strong odor to emanate from the breath.<sup>11</sup> Halitosis can also result from lung infections such as bronchiectasis and cancer-related lung infections.

Rarely, a variety of systemic illnesses can lead to bad breath. As with undetected type 1 diabetes mellitus, the halitosis associated with these illnesses is most usually an incidental finding during a clinical examination rather than an early sign of the disease. It's interesting to note that a subjective change in oral odor has been linked to *Helicobacter pylori* infection.<sup>12</sup> Rarely, a variety of medications may result in bad breath. For instance, amphetamines, phenothiazines, dimethyl sulfoxide, nitrates, and nitrites.

The rare illness known as "fish odor syndrome" or trimethylaminuria is characterized by body odor and persistent poor breath. An excess of trimethylamine causes a strong ammoniacal odor that is comparable to that of rotting fish. This illness is caused by either flavin monooxygenase activity that is faulty (typically genetically determined) or an

excess of flavin monooxygenase precursors, such as those produced when choline is administered to treat Huntington's chorea or Alzheimer's disease.<sup>13</sup> Other uncommon metabolic disease that can cause bad breath is hypermethioninemia.<sup>14</sup>

With time, these individuals may start to engage in several activities (such as covering one's lips when speaking, avoiding other people, or keeping a safe distance from them, or avoiding social engagements) to reduce their perceived problem. The acts of others are usually misinterpreted by such people as an indication that their breath is objectionable.<sup>8</sup> To lessen their discomfort, halitophobic individuals typically become preoccupied on cleaning their teeth and tongue while also abusing chewing gum, mints, mouthwash, and sprays.<sup>8</sup>

**Box 2: Clinical assessment of oral halitosis**

**Subjective**

- Intensity—the organoleptic procedure
  - Smelling expelled air of mouth and nose separately
  - Easy to do, requires no clinical training
- Quality—the hedonic procedure
  - Rarely clinically applicable
  - Requires well trained clinical judges

**Objective**

- Detection of sulphides with appropriate monitor—simple, but may fail to detect oral halitosis caused by non-sulphides components
- Gas chromatography—not applicable for routine clinical practice
- Bacterial detection (such as benzoyl-arginine-naphthylamide test, polymerase chain reaction, dark field microscopy)—not applicable for routine clinical application

**Diagnosis:** By smelling and comparing the exhaled air from the mouth and nose, the clinical examination of oral malodor is typically subjective (organoleptic evaluation). Malodor that can be detected in the mouth but not the nose is probably coming from the mouth or pharynx. Odor

coming solely from the nose is probably coming from the sinuses or nose.<sup>15</sup> Rarely, if the mouth and nose odors are of comparable strength, a systemic origin of the malodor may be likely (box 2). The hedonic approach, which evaluates odor quality, makes use of qualified clinical judges.<sup>16,17</sup>

As it is costly and time-consuming, objective assessment of the breath components is rarely employed in everyday clinical practice. Using a portable sulfide monitor to measure volatile sulfur compounds is possible, but because oral malodor can be caused by substances other than volatile sulfur compounds, the source and severity of oral malodor may not be accurately determined. Although gas chromatography of oral breath is a possible technique for identifying the components of oral malodor, it is not currently used in clinical settings. In a similar vein, the identification of bacteria that exhibit trypsin-like activities (as determined by the benzoylarginine-naphthylamide test, dark field microscopy, and real-time quantitative polymerase chain reaction) does not fall under the purview of normal clinical evaluation of oral malodor.<sup>8</sup>

**Treatment of halitosis:** The method for treating halitosis is described in Box 3. The main goals of treatment are to reduce the buildup of oral bacteria and educate the patient about the condition's causes and prevention. Effective tooth cleaning, such as brushing and flossing in between teeth, can dramatically lessen bad breath, especially in those who have bad oral hygiene and associated gingival and periodontal disorder.<sup>18,19</sup>

**Box 3: Treatment of oral halitosis**

- Examine and manage possible systemic (non-oral) source if organoleptic procedure detects halitosis from both mouth and nose
- More oral hygiene by professional and patient administered tooth cleaning
- Routine atraumatic tongue cleaning
- Routine use of antimicrobial toothpastes and mouthwashes, such as Chlorhexidine gluconate, Methylpyridinium, Oil-water rinse, Triclosan/co-polymer/sodium fluoride toothpaste
- Routine clinical review to ensure maintenance of effective oral hygiene
- Halitophobia warrants referred to clinical psychologist

If dental cleanness is already good or gets better but bad breath still exists, the tongue may be cause of the odor, so cleaning the tongue is advised. According to a recent methodical analysis, tongue scraping may only have a minimal long-term benefit in eliminating mouth odor.<sup>20</sup> However, if tongue cleaning is done gently and frequently, no harm is expected to occur, and patients may experience benefits—at least in the short term. Gum chewing appears to only temporarily reduce bad breath.<sup>21</sup>

The variety of mouthwashes recommended for the treatment of oral malodor work by lowering the bacterial load or the odoriferous substances that go along with it.<sup>22</sup> Mouthwash or spray containing chlorhexidine gluconate can be more successful at decreasing oral odor for a period of hours than oral hygiene alone because it reduces the amount of bacteria that create volatile sulfur compounds.<sup>23</sup> Oral odor can also be reduced by using a mouthwash containing zinc lactate, chlorhexidine, and cetylpyridinium chloride. However, patients might be hesitant to use chlorhexidine for an extended period because to its unpleasant taste, potential for burning the oral mucosa with excessive use, and potential for

(reversible) tooth discoloration. Without causing any negative side effects, a two-phase oil and water mouthwash can eliminate dental odor for hours.<sup>24,25</sup> Other mouthwashes that can reduce oral halitosis for hours include cetylpyridinium chloride, chlorine dioxide<sup>26</sup> and zinc chloride.<sup>27</sup>

When used in mouthwashes and toothpaste, triclosan may lessen oral halitosis because it has an antimicrobial impact in addition to its direct action on volatile sulfur compounds. However, it appears that the solubilizing agent with which triclosan is given has the greatest influence on the drug's ability to combat volatile sulfur compounds. It appears that a triclosan/co-polymer/sodium fluoride combination is especially successful at lowering oral bacteria, malodor, and volatile sulfur compounds.<sup>28,29</sup>

The use of glycosylation inhibitors, such as d-galactosamine, the probiotic placement of bacteria, such as *Streptococcus salivarius*, that change the bacteria causing oral halitosis, light uncovering that directly hampering bacteria that produce explosive sulphur compounds, or lethal photosensitization are all examples of experimental methods to reduce oral halitosis.

Patients with halitophobia need to be referred for evaluation and treatment by a professional psychologist. Sadly, not many of these patients are ready to continue this course of action.

## Conclusion

Interest in odor has increased as society becomes more hygienic. Since poor breath cannot be accurately detected by oneself, it causes significant psychological pain and may hinder social relationships. Even if they don't have oral malodor, many people experience anxiety or anguish over it. When

people notice someone pinching their nose or grimacing during a conversation, they might assume they have oral malodor. Due to its multifaceted nature, it needed an interdisciplinary evaluation and course of therapy from experts including dentists, doctors, dietitians, and psychologists.

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