

# Examination, Classification, and Treatment of Halitosis; Clinical Perspectives

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## A b s t r a c t

*Patients with halitosis may seek treatment from dental clinicians for their perceived oral malodour. In this article, an examination protocol, classification system and treatment needs for such patients are outlined. Physiologic halitosis, oral pathologic halitosis and pseudo-halitosis would be in the treatment realm of dental practitioners. Management may include periodontal or restorative treatment or both, as well as simple treatment measures such as instruction in oral hygiene, tongue cleaning and mouth rinsing. Psychosomatic halitosis is more difficult to diagnose and manage, and patients with this condition are often mismanaged in that they receive only treatments for genuine halitosis, even though they do not have oral malodour. A classification system can be used to identify patients with halitophobia. Additionally, a questionnaire can be used to assess the psychological condition of patients claiming to have halitosis, which enables the clinician to identify patients with psychosomatic halitosis. In understanding the different types of halitosis and the corresponding treatment needs, the dental clinician can better manage patients with this condition.*

**MeSH Key Words:** halitosis/diagnosis; halitosis/therapy; psychophysiologic disorders

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The prevalence of halitosis has been reported to be as high as 50%.<sup>1</sup> However, only a few patients visit dental clinicians to seek help for halitosis. This fact suggests that the patients who do visit clinicians may have different psychological characteristics or values concerning their own breath than other individuals. Since the biochemical pathogenesis of oral malodour was elucidated by Tonzetich,<sup>2</sup> Kaizu,<sup>3,4</sup> and Yaegaki and others,<sup>5-12</sup> simple treatment measures have proven very effective in controlling halitosis. Nevertheless, halitosis treatments are generally unsuccessful in halitophobic patients because clinicians are unable to find any signs of bad breath. Patients with psychosomatic halitosis frequently receive only treatment for genuine halitosis and do not receive care from a psychological specialist.<sup>13,14</sup> Occasionally, patients with no oral malodour have been given metronidazole and/or chlorhexidine mouthwash, which might involve side effects,<sup>15</sup> rather than referral to a psychological specialist. Patients' persistent complaints about malodour are often ignored by dental clinicians. Consequently, these patients may start "doctor shopping." Many patients with psychosomatic halitosis are not able to obtain proper treatment for their condition because of a clinician's mismanage-

ment. Since a few of these patients go so far as to commit suicide,<sup>5</sup> they need appropriate management by a psychological specialist. Therefore, it is important for the general practitioner to distinguish between patients with real halitosis and those with psychological halitosis.

A successful protocol for distinguishing or diagnosing psychosomatic halitosis has not yet been established. Although more than 100 papers about psychosomatic halitosis have been published during the past quarter century,<sup>16-21</sup> classification of and criteria for genuine halitosis and the psychosomatic condition remain unclear. To clarify the appropriate management of a patient with psychosomatic halitosis, a simple classification of the types of halitosis must be established.

On the basis of numerous case studies of halitosis, Miyazaki and others<sup>22</sup> established the recommended examination for halitosis and a classification of halitosis with corresponding treatment needs. We have been modifying these standards to reflect North American society. This work was reported and recognized at the International Workshop for Halitosis Treatment on March 13, 1999, in Vancouver, B.C., as well as the Fourth International Conference on Breath Odor, August 19 to 21, 1999, in Los Angeles, Calif.<sup>23</sup> The purpose of this

paper is to present an examination protocol, classification system and treatment procedures for halitosis patients. Additionally, assessment of the psychological condition and management of patients with pseudo-halitosis and halitophobia are described.

### 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.<sup>2-12</sup> 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.<sup>24-26</sup> 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.<sup>26</sup>

### 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 1).<sup>22</sup> However, to prevent the patient from seeing the examiner sniffing from the tube, a privacy screen is often used. The tube is inserted through a privacy screen (50 cm – 70 cm) that separates the

**Table 1 Organoleptic scoring scale<sup>22</sup>**

Category	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 is deemed to exceed 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 (examiner instinctively averts the nose)

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 pseudo-halitosis or halitophobia is suspected.

### Conditions for Organoleptic Measurement

The recommended examination procedures are described below.<sup>22</sup> 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.

### Classification of Halitosis Patients

A simple classification with corresponding treatment needs was reported by Miyazaki and others<sup>22</sup> (Table 2). The classification of halitosis includes categories of genuine halitosis, pseudo-halitosis and halitophobia. Genuine halitosis is subclassified as physiologic halitosis or pathologic halitosis. If oral malodour does not exist but the patient believes that he or she has oral malodour, the diagnosis would be pseudo-halitosis. If, after treatment for either genuine halitosis or pseudo-halitosis, the patient still believes that he or she has halitosis, the diagnosis would be halitophobia. This classification allows the clinician to diagnose a psychological condition.

Most halitophobic patients interpret other people's behaviour, such as covering the nose, averting the face or stepping back, as an indication of their own bad breath, and such behaviours convince the patients that they have offensive oral malodour.<sup>24,27-29</sup> This interpretation is the most common complaint of patients with psychosomatic halitosis. However, it has been shown that gestures such as covering the nose are usually not a reaction toward another person's malodour.<sup>17,28,29</sup> These gestures are performed incidentally, often without any specific reason, but they are misunderstood by halitosis patients. Because these psychological conditions are caused by psychosomatic factors, such as socialphobia,<sup>16-21,24,27-30</sup> clinicians should focus on the symptoms of socialphobia (i.e., patients' anxiety about other individuals' behaviours toward them) rather than the patient's own delusion (so-called imaginary halitosis).

Not only patients with pseudo-halitosis but also those with genuine halitosis may have an accompanying psychological condition.<sup>5</sup> A questionnaire can be used to evaluate the psychological condition of a halitosis patient.<sup>13</sup> Although psychological specialists frequently use established questionnaires to diagnose psychogenic halitosis,<sup>16-21</sup> the psychological

**Table 2 Classification of halitosis with corresponding treatment needs (TN)<sup>22</sup>**

Classification	Treatment Needs <sup>a</sup>	Description
I. Genuine halitosis		1. Obvious malodour, with intensity beyond socially acceptable level, is perceived.
A. Physiologic halitosis	TN-1	1. Malodour arises through putrefactive process within the oral cavity. Neither specific disease nor pathologic condition that could cause halitosis is found. 2. Origin is mainly the dorsoposterior region of the tongue. 3. Temporary halitosis due to dietary factors (e.g., garlic) should be excluded.
B. Pathologic halitosis		
(i) Oral	TN-1 and TN-2	1. Halitosis caused by disease, pathologic condition or malfunction of oral tissues. 2. Halitosis derived from tongue coating, modified by pathologic condition (e.g., periodontal disease, xerostomia), is included in this subdivision.
(ii) Extraoral	TN-1 and TN-3	1. Malodour originates from nasal, paranasal and/or laryngeal regions. 2. Malodour originates from pulmonary tract or upper digestive tract. 3. Malodour originates from disorders anywhere in the body whereby the odour is bloodborne and emitted via the lungs (e.g., diabetes mellitus, hepatic cirrhosis, uremia, internal bleeding).
II. Pseudo-halitosis	TN-1 and TN-4	1. Obvious malodour is not perceived by others, although the patient stubbornly complains of its existence. 2. Condition is improved by counselling (using literature support, education and explanation of examination results) and simple oral hygiene measures.
III. Halitophobia	TN-1 and TN-5	1. After treatment for genuine halitosis or pseudo-halitosis, the patient persists in believing that he/she has halitosis. 2. No physical or social evidence exists to suggest that halitosis is present.

<sup>a</sup> See **Table 3** for description of treatment needs.

questionnaires cannot be recommended for use at the initial visit, because their use may cause a patient to believe that the clinician suspects a psychosomatic condition. Hence, a questionnaire that appears to be a regular inquiry used in the dental clinic rather than a psychological questionnaire was created to survey the causes of halitosis and psychosomatic tendencies.<sup>13</sup> The questionnaire has the following features: questions related to a possible psychosomatic condition are scattered throughout the questionnaire and are disguised, there is opportunity for verbal inquiry to assist in establishing rapport, only 10 to 15 minutes is required to complete the questionnaire, and there is opportunity for more detailed inquiry when the clinician is confirming the answers. The questionnaire includes 10 questions to investigate psychological conditions (questions 18, 19, 24b-g, 29a and 29b). An affirmative answer to any of these questions counts for one point toward the psychological score (maximum 10 points). Patients with genuine halitosis but no psychological conditions would score no points. Patients with a psychological condition might score 4 or higher. Scores from 1 to 3 are borderline, but some patients may still be diagnosed as having a psychological condition because of contradictions in their answers on the questionnaire.<sup>31</sup>

### Treatment of Halitosis

Treatment needs (TN) for halitosis in dental practice have been categorized into five classes (**Table 3**)<sup>22</sup> to provide guidelines for clinicians in treating halitosis patients. Treatment of physiologic halitosis (TN-1), oral pathologic halitosis (TN-1

**Table 3 Treatment needs (TN) for breath malodour<sup>22</sup>**

Category	Description
TN-1	Explanation of halitosis and instructions for oral hygiene (support and reinforcement of a patient's own self-care for further improvement of their oral hygiene).
TN-2	Oral prophylaxis, professional cleaning and treatment for oral diseases, especially periodontal diseases.
TN-3	Referral to a physician or medical specialist.
TN-4	Explanation of examination data, further professional instruction, education and reassurance.
TN-5	Referral to a clinical psychologist, psychiatrist or other psychological specialist.

*Note: TN-1 is applicable to all cases requiring TN-2 through TN-5*

and TN-2) and pseudo-halitosis (TN-1 and TN-4) would be the responsibility of dental practitioners. Treatment of extraoral pathologic halitosis (TN-3) would be managed by a physician or medical specialist. Treatment of halitophobia (TN-5) would be managed by a physician, psychiatrist or psychological specialist.

The origin of physiological halitosis is mainly the dorsoposterior region of the tongue, and the malodour is derived from the tongue coating. Therefore, in TN-1, cleaning the tongue is more important than rinsing the mouth. The tongue coating comprises desquamated epithelial cells, blood cells and

bacteria. More than 100 bacteria may be attached to a single epithelial cell on the tongue dorsum, whereas only about<sup>25</sup> bacteria are attached to each cell in other areas of the oral cavity.<sup>32</sup> Hence, cleaning the tongue is a very effective measure for improving physiologic halitosis. However, we do not recommend that patients use a tongue scraper or adult toothbrush for cleaning the tongue because of possible damage to the tongue surface. An infant toothbrush or a small tongue brush (Tonguemate, DentCare Co., Neyagawa, Japan) is recommended. It has been reported that mechanical stimulation enhances carcinogenesis of the tongue in experimental animals.<sup>33,34</sup> Patients with psychological conditions may overzealously scrape or brush the tongue till bleeding starts; therefore, the patient should receive detailed, comprehensive instruction about tongue cleaning. On the other hand, patients sometimes inappropriately brush or scrape the tongue tonsil because they have been instructed to clean the posterior tongue as far back as possible. It is important to demonstrate to patients the position of the terminal sulcus of the tongue and the anatomical limits for cleaning.

The remaining treatments in TN-1 include routine oral hygiene procedures and mouth rinsing. As Loesche<sup>35</sup> described, very few clinical trials have evaluated the efficacy of antimicrobial mouthwashes in the treatment of oral malodour. Neiders and Ramos<sup>36</sup> recommended that dentists refer to articles published in peer-reviewed dental journals to determine whether a product is safe and effective. However, most products have only the manufacturer's claims of effectiveness. Research articles on North American mouthwashes containing zinc,<sup>8</sup> chlorhexidine<sup>37</sup> and hydrogen peroxide<sup>38</sup> indicate the efficacy of these agents in reducing malodour. The side effects of chlorhexidine mouthwash include tooth stains and allergic reaction, and the oxidative activity of hydrogen peroxide might be harmful to the oral soft tissues. Therefore, we recommend that patients use a mouthwash containing zinc.

Oral pathologic halitosis is caused mainly by periodontal disease,<sup>4,5,8,11,12</sup> a condition managed by periodontal treatment. Additionally, dental treatment may be necessary to correct faulty restorations that might contribute to poor oral health (TN-2).

Patients exhibiting oral malodour but showing no oral cause of halitosis are classified as having extraoral pathologic halitosis, and they should be referred to medical specialists (TN-3).

Patients with pseudo-halitosis mistakenly believe that other individuals' avoidance behaviours are caused by their own oral malodour. Hence, these patients need to be counselled, with literature support,<sup>29</sup> education and explanation of examination results (TN-4), that the intensity of their malodour is not beyond a socially acceptable level. This step in patient management is most important in differentiating pseudo-halitosis from halitophobia. Pseudo-halitosis patients generally respond favourably to TN-4 because they can accept the counselling. Patients who cannot accept their perception of malodour as a mistaken belief are classified as halitophobic and need assistance from a psychological specialist (TN-5). Furthermore,

patients with genuine halitosis who undergo successful reduction of halitosis by TN-2 or TN-3 yet still believe that they have the condition should also be referred to a psychological specialist (TN-5).

Halitophobic patients usually refuse to visit a psychological specialist, because they cannot recognize their condition as psychosomatic. They never doubt that they have offensive oral malodour. Hence, they are unhappy with the dental clinician who tells them they do not have the condition. Some clinicians may hesitate to refer such patients to a specialist, and the patients may then start "doctor shopping." It is important, therefore, to provide TN-4 counselling to these patients.

Some patients may resist visiting a psychological specialist even though they understand that their problem is not within the dental field. Further investigations are ongoing as to how to persuade patients who have halitophobia and who object to a psychological referral to eventually see a specialist.

## Conclusion

In this paper we have outlined the recommended examination and classification of halitosis patients to avoid mismanagement of psychosomatic halitosis. The classification and management of halitosis patients is very useful for general practitioners, especially with regard to patients with pseudo-halitosis, 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. A questionnaire can be useful for identifying patients with a psychological condition. ♦

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C E N T R E

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The CDA Resource Centre has an information package on halitosis. To order this package or to find out about fees, CDA members can contact us at **1-800-267-6354** or **(613) 523-1770**, ext. 2223; fax: **(613) 523-6574**; e-mail: **info@cda-adc.ca**.