

Halitosis Recent Updates-A Review

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ABSTRACT

Halitosis is an unpleasant offensive odor .Which leading to causes anxiety and psychosocial embarrassmentof the people. It is the most common social problem among one in four people and is reported as third most common reason thatpeople seeks dental care. The causes can be intra-oral or extra-oral.which is caused by the microbial degradation of organic substrates in the food debris. Volatile sulphur containing compounds is the major constituent for oral malodour.

KEY WORDS : *Fetor oris, Volatile Sulphur compounds,bad breath, Unpleasent odor*

INTRODUCTION

Halitosis is an general term which describes bad or unpleasant smells from the oral cavity or outside the oral cavity.The word Halitosis which means “halitus” breath in Latin and “osis” pathological process in Greek [1]. Fetor ex-ore, fetor oris, oral malodor and bad breath refer to unpleasant odors in the air of the expiration[2].Halitosis is the widespread problemabout 50% of world population suffers from the oral malodor. It can be of intra-oral or the extra-oralorigin. In 90% of cases malodor causes from oral cavity and the main sources are tongue coating, periodontal disease, extensive carious lesions with exposed tooth pulps, pericoronitis, mucosal ulcerations and diseases, impacted food and debris, unclean dentures, and a decreased salivary flow rate [3, 4]Though oral cavity is the main source of halitosis, the following conditions can also contribute to malodor such asthe chronic sinusitis with postnasal drip, bronchitis, pneumonia, esophageal reflux, pyloric stenosis, hiatal hernia, diabetic ketoacidosis, hepaticfailure, kidney dialysis, and leukemia [5]

CLASSIFICATION OF HALITOSIS

The International Society for Breath Odor Research established the method of classifying halitosis through the scientific analyses. The classification system allows the dental team to identify the causative factors and also establish the potential treatment protocols (TableI and TableII).[6,7]

Table I: Classification of halitosis with the corresponding treatment needs (TN)

Classification	Treatment Needs	Description
1. Genuine halitosis		Obvious malodor, with intensity beyond socially acceptable level is perceived.
a. Physiologic halitosis	TN-1	Malodor arises through the putrefactive processes within the oral cavity. Neither a specific disease nor a pathologic condition that could be cause halitosis is found. Origin is mainly dorsoposterior region of tongue. Temporary halitosis due to the dietary factors should be excluded
b. Pathologic halitosis		
• Oral	TN-2	Halitosis caused by disease, pathologic

		condition or malfunction of oral tissues. Halitosis derived from tongue coating, modified by pathologic condition (e.g., periodontal disease, xerostomia), is included in this subdivision.
• Extra oral	TN-3	Malodor originates from nasal, paranasal and/or laryngeal regions. Malodor originates from pulmonary tract or upper digestive tract. Malodor originates from disorders anywhere in the body whereby the odor is blood-borne and emitted via the lungs (e.g. diabetes mellitus, hepatic cirrhosis, uremia, internal bleeding).
2. Pseudo-halitosis	TN-4	Obvious malodor is not perceived by others, although the patient stubbornly complains of its existence. Condition is improved by counseling (using literature support, education and explanation of examination results) and simple oral hygiene measures.
3. Halitophobia	TN-5	After the treatment for genuine halitosis or the pseudo-halitosis, the patient persists in believing that he/she has halitosis. No physical or social evidence exists to suggest that halitosis is present.

Table II: Treatment needs (TN) for the breath malodor

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 a medical specialist
TN-4	Explanation of examination data, further professional instruction, education and reassurance
TN-5	Referral to a clinical psychologist, a psychiatrist or other psychology specialist

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

Different Diagnostic Methods

There are different diagnostic methods to detect and measure halitosis which are given in the table

Direct measurement Techniques

Organoleptic measurement is the simple and widely used method. In this technique a plastic tube is placed on the mouth of the patient and ask the patient to slowly breathe into the tube. by this time, the examiner evaluates the smell arises from other side of the tube. This method increases reliability when used in conjunction with the other measurement methods. This method is most commonly used scoring system, the malodor is classified between 0 - 5[1].

INTENSITY OF MALODOR	SCORE
Odor cannot be detected	0
Questionable malodor, barely detectable	1

Slight malodor exceeds the threshold of malodorrecognition	2
Malodor is definitely detected	3
Strong malodor	4
Very strong malodor	5

Gas Chromatography

The quantitative analysis of VSCs causing the odor they are dimethyl sulfide, methyl mercaptan, and hydrogen sulfide gases are performed by this method [8]. With this method, even low concentration of the gases can be measured separately and their quantities can be determined [9]. In this method, samples are analyzed by the detector and mass spectra of existing compounds they are compared and determined by the computer-based database. An automated aspiration system in gas chromatography has developed to remove the differences caused by the sampling or exhaling techniques [10]

Portable Sulfide Monitor

The sulfide monitor is a portable device that allows the easy measurement of VSCs found in the expiration air outside the laboratory environment. This device was developed over time and presented to the market under the name as Halimeter' Interscan Corp., Chatsworth, CA, USA. Under this method, the measurement is made as follows: The patient keeps his mouth closed for 5 minutes. Then the patient inserts a single-use tube connected to sulfide monitor into his mouth while breathing from the nose. The electrochemical reaction that takes place in the compounds containing sulfur in breath brings the electric current in proportion to the levels of the compounds [9,11].

Indirect Measurement Techniques[8]

Diagnostic Method	Description
Halimeter	Chair side equipment to assess oral malodor. Measures H ₂ S Cannot discriminate sulphide components. False results in presence of ethanol & essential oils.
BANA Test (Benzoyl-DL-arginine-anaphthylamide)	Detects short chain fatty acids & proteolytic obligate gram negative anaerobes. Detects T. denticola, P. gingivalis & T. forsythensis Can be used for periodontal risk assessment
Quantifying β galactosidase activity	Enzyme responsible for removing O- and N- linked carbohydrate chains. Detected by using chromogenic substances absorbed on to chromatography paper.
Saliva Incubation Test	Saliva is collected in glass tube, sealed and incubated at 37 °C in anaerobic condition. Measure halitosis indirectly Less influenced by external parameters
Ammonia Monitoring	Detects ammonia quantity which is producing by the oral bacteria.
Ninhydrin Method	Used for examination of amino acids and low-molecular-weight amines. Simple, rapid and inexpensive.
Electronic Nose	Chemical sensors are used to assess the oral malodor. Instrument consists of sensor array, pattern reorganization modules, and headspace sampling, to Generating the signaling pattern that are used for characterizing smells.
Biomimetic Olfactory Sensors	The most fundamental elements are ORs in cilia of olfactory sensory neurons (OSNs).

MANAGEMENT OF HALITOSIS

Methods to Reduce Halitosis

The following treatment modalities can be adopted to reduce halitosis they are:

Mechanical Reduction

Several studies have been implicated the dorsum of the tongue as primary source of VSC both in periodontally diseased and the healthy individuals [12]. The development of the predominant anaerobic microbiota associated with the tongue coating has considered an ideal microenvironment to produce malodorous compounds and therefore different authors have tried to assess the relationship between the morphology of the tongue and severity of oral halitosis [13, 14]

1. Tongue Cleaning & Tooth Brushing:

The tongue brushing and mouth rinsing both are the basic treatment measures for halitosis. Kuo YW et al. compared the effectiveness of two types of oral care, tooth brushing alone and tooth brushing plus tongue cleaning, on halitosis and tongue coating (TC). The use of tooth brushing plus tongue cleaning compared with tooth brushing alone significantly reduces the indicators of halitosis and Tongue coating. [15]

2. Non Surgical Periodontal Therapy:

Sao-ShenLiu et al evaluated the impact of the nonsurgical periodontal therapy alone on the oral malodor in chronic periodontitis patients by comparing the intraoral concentrations of the volatile sulfur compounds (VSCs) before and after nonsurgical therapy. All patients received oral hygiene instructions and full mouth scaling and root planning with specific instructions not to use tongue scraping or chlorhexidine mouth rinse. On the basis of findings, they suggest that nonsurgical periodontal therapy has a mild impact on oral malodor [16] Significant reductions for Organoleptic score, total sum of volatile sulphur compounds (T- VSC) and methyl mercaptan (MM) values were found after non surgical periodontal treatment in studies conducted by Seida Erovic Ademovski et al. [17]

3. Photodynamic Therapy:

PDT involves the use of a non-toxic light-sensitive photosensitizer combined with visible light at the appropriate wavelength to coincide with the absorption spectrum of the photosensitizer, which reaches a state of excitation after absorbing the photons, reacting with the oxygen in the medium to form reactive oxygen species (ROS). This phototoxic reaction induces the destruction of bacterial cells, but the antimicrobial effect is confined to areas covered by the light-activated photosensitizer, quickly acting on the target organisms when the appropriate energy dose and output power are used. After treatment, a statistically significant reduction in halitosis was found in a study conducted by Rubia Garcia Lopes et al to evaluate the effect of photodynamic therapy for the treatment of halitosis [18].

4. Laser Therapy:

Finkelstein Y et al evaluated the tonsils as a source of halitosis and to assess the efficacy of laser CO₂ cryptolysis for the treatment of oral bad breath caused by chronic fetid tonsillitis [19]. The laser treatment resulted insignificant reduction of halitosis. The study conducted by Kellesarian SV et al assessed the efficacy of laser therapy (LT) and antimicrobial photodynamic therapy (aPDT) as adjunct to mechanical debridement (MD) on the management of halitosis study reported a significant reduction in bacterial colony forming units on the dorsum of the tongue among patients with coated tongue receiving MD with aPDT compared with MD alone [20].

Chemical Reduction

Mouthrinses with antimicrobial properties can reduce oral malodor by reducing the number of microorganisms chemically. Often used active ingredients in these products are chlorhexidine (CHX), essential oils (EOs) triclosan and cetylpyridinium chloride (CPC). It can also reduce halitosis by chemically neutralizing odor compounds, including VSCs. Often used active ingredients of these products are metal ions and oxidizing agents [24].

1. Combination of Chemical Agents:

Zinc ions, chlorhexidine (CHX) and cetylpyridinium chloride (CPC) are all known to inhibit production of volatile sulfur compounds (VSCs). Young et al. conducted a study to examine the anti- VSC dose-response effects of each of the above agents. Zinc had a marked dose- and time- dependent anti- VSC effect. Chlorhexidine maintained a moderate anti- VSC effect over time. Cetylpyridinium at a concentration of 0.2% was only marginally more effective than 0.025% CHX over the 3 h, while 0.025% CPC had no better anti- VSC effect than water at both 2 h and 3 h. It was concluded that the three test agents demonstrated different anti- VSC kinetics.[21].

2. Herbal Remedies:

Green Tea, Tulsi, Clove, Ela triphala has antimicrobial and anti halitosis activity which helps to reduce oral malodor to an extent. Several studies have been conducted to analyse the effect of these herbs on reduction of VSC which is major component of Halitosis. The study conducted by Nir Sterer et al tested the effect of a palatal mucoadhesive tablet containing an herbal formulation on oral malodor production and volatile sulfide compound (VSC) levels, and to evaluate its antimicrobial activity. The active ingredient was an herbal formulation composed of equal shares of four herbal medicinals: Echinacea (*Echinacea augustifolia*), Mastic gum (*Pestacia lentiscus*) Lavender (*Lavandula augustifoli* and Sage (*Salvia officinalis*), supplied as dried powders. Sage, Lavender and Mastic gum showed antimicrobial activity against all three oral pathogens. [22].

Masking the Odor

Treatments with rinses, mouth sprays and lozenges containing volatiles with a pleasant odor have only a short-term effect. Another pathway is to increase the solubility of malodorous compounds in the saliva by lowering the pH of saliva or simply increase the secretion of saliva; a larger volume allows retention of larger volumes of soluble VSCs. In order to lower the pH, an orange juice may be sufficient. The latter can also be achieved by ensuring a proper liquid intake or by using a chewing gum [23].

Probiotics

Probiotics can be defined as living microbes, or as food ingredients containing living microbes, that beneficially influence the health of the host when used in adequate numbers. The general mechanisms of probiotics can be divided into three main categories: normalization of the intestinal microbiota, modulation of the immune response, and metabolic effects [24].

Conclusion

Dentists should analyze and treat oral problems that may be responsible of the patient's malodor, and should inform the patient about halitosis causes and oral hygiene procedures (tooth flossing, tongue cleaning, appropriate mouthwash and toothpaste selection and use) and if the problem persists, they should consult to a medical specialist.

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