

Oral Malodour – A Review

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Abstract

Oral malodour (OM) has been recognized in the literature since ancient times, but only in the last 15 years it has come to the forefront of public and dental professional awareness.

At least 50% of the population suffers from a chronic OM condition, causing personal discomfort and social embarrassment that often lead to emotional distress. Moreover, the consequences of OM may be more than social in that it may be a symptom of serious local/systemic conditions. Recent research has shown that sulphur-producing bacteria could be the primary source of this condition.

KEYWORDS: Oral malodour, Volatile sulphur compounds ,Halitosis

Introduction

Oral malodour is most common complaint among general population, indiscriminate of age and sex. It gives alarming signals about the periodontal health and other related conditions. Above all this oral malodour is most common neglected condition in our country.

The word "HALITOSIS" is derived from the Latin Word "*halitus*" - meaning 'Bad Breath' and Greek word 'Osis' - meaning 'disease' or 'condition'.

The prevalence of bad breath is quite high and the condition may rank only behind dental caries and periodontal disease as chief complaint of patients.¹

CAUSES OF ORAL MALODOUR:²

Oral malodour has complex etiology, which include intrinsic and extrinsic pathways.

1. Extrinsic Causes:

It includes - Tobacco, Alcohol, certain food such as onions, garlic and certain spices. It can be best controlled by eliminating the intake of such offensive substances.

2. Intrinsic Causes:

It includes both oral and non-oral causes.

a) Oral Causes: About 90% of malodour is of intra oral in origin, these include:

- Periodontal disease
- Retention of odiferous food particles
- Coated tongue
- ANUG
- Smoker's Breath
- Healing surgical/extraction sockets
- Xerostomia or dehydration states
- Artificial dentures
- Caries

b) Non-Oral Causes/Systemic Causes

Around 10% of Malodour is of systemic origin.

It includes Respiratory tract infections such as tonsillitis, sinusitis, postnasal drip (caused by nasal infections, sinusitis or nasal polyp) or various kind of lung infections such as anaerobic lung abscesses, necrotizing pneumonia and carcinomas of respiratory tract.

- Gastrointestinal tract infections
- Liver disorders (sulphur odour)
- Uremia-caused by kidney failure
- (ammonia odour)
- Uncontrolled Diabetes mellitus
- (acetone odour)

According to Grant, causes of halitosis are³-

a) Physiologic

Lack of flow of saliva during sleep
Food
Smoking
Menstruation

b) Pathologic

The pathologic causes are listed in **Table 1**

PATHOPHYSIOLOGY BEHIND MALODOUR

Oral malodour is produced due to putrefaction of microorganisms on the tongue and in the periodontal pocket.

The principal malodourous product of oral bacterial putrefaction found in exhaled air are several volatile sulphur compounds or VSCs including-

- Hydrogen sulphide (H₂S)
- Methyl mercaptan (CH₃SH)
- Dimethyl sulphide [(CH₃)₂S]

These VSCs are all thiols containing SH group, which is formed when oxygen atom in the hydroxyl group is replaced by sulfur.

VSCs are produced primarily by the action of gram negative anaerobic oral bacteria's on sulphur

containing amino acids (cystine, cysteine, methionine) derived from peptides and proteins, gingival crevicular fluids, blood, desquamated epithelial cells, saliva and foods.⁵

Organisms involved in the formation of VSCs are

- Porphyromonas gingivalis
- Prevotella intermedia
- Prevotella melaninogenicus
- Bacteroides forsythus
- Treponema denticola
- Fusobacterium nucleatum

TESTS TO DETERMINE ORAL MALODOUR⁴

There is no ideal test that can objectively assess the extent of oral malodour.

A. There are two types of tests used to determine oral malodour

- 1) Direct tests
- 2) Indirect tests

1) Direct tests

The primary reference standard for the detection of oral malodour is the human nose. Direct test includes sniffing of the breath and determination of odoriferous sulphur containing substances by Halimeter or Gas chromatography

2) Indirect tests

Indirect methods assess the products produced by microorganisms in vitro or identify odour-producing microorganisms.

B. Oral malodour measurement

- (a) Self assessment
- (b) Subjective measurement
- (c) organoleptic assessment
- (d) Objective instrumental analysis
 - Halimeter
 - Diamond probe
 - Gas chromatography
 - Mass spectrometry

(a) Self assessments

Simplest methods of self assessment are:

- Blowing into a cupped hand and smelling one's own breath.
- Licking the dorsum of hand and smelling it.

Studies demonstrate that the individuals are not able to accurately diagnose the malodour by these two methods, but it is the one that most closely resembles daily situations in which malodour is detected.

DISORDERS OF ORAL CAVITY	DISORDERS OF UPPER RESPIRATORY TRACT	DISORDERS OF LOWER RESPIRATORY TRACT	GASTROINTESTINAL CONDITIONS
Poor oral hygiene	Breathing through mouth	Pulmonary abscess	Salivary gland dysfunction
Dental plaque	Chronic sinusitis	Carcinoma of lung	Dehydration Radiotherapy
Gingivitis	Foreign bodies	Bronchiectasis	Sjogren's syndrome
Stomatitis	Atrophic Rhinitis (ozena)	Necrotizing pneumonitis	Peritonsillar abscess
Periodontitis	Wegener granulomatosis (midline granuloma)	Emphysema	Retropharyngeal abscess
Hairy tongue	Tuberculosis		Cryptic tonsillopathy
Oral carcinoma	Syphilis		Vincent's angina
	Rhinoscleroderma		Carcinoma of tonsil or pharynx
	Adenoiditis		Pharyngitis sicca
	Nasopharyngeal abscess		Gangrenous angina
	Carcinoma of larynx		Zenker's diverticulum
	Laryngoscleroderma		Postcricoid carcinoma
			Congenital bronchoesophageal fistula

DISORDERS OF LOWER GASTROINTESTINAL TRACT	NEUROLOGIC DISORDERS	SYSTEMIC DISEASES	DRUGS	FUNCTIONAL
Gastric carcinoma	Dysosmia	Leukemia	Lithium salts	Psychosis
Hiatus hernia	Dysgeusia	Agranulocytosis	Penicillamine	Depression
Pyloric stenosis	Zinc deficiency	Febrile illness of dehydration	Griseofalvin	
Enteric infections		keratoacidosis	Thiocarbamide	
		Hepatic failures	Dimethylsulfoxide	
		Azotemia		

(b) Subjective measurement

In this an individual is screened for oral malodour. In this method another individual judges and scores the offensive level of oral malodour. This method is also known as "**Organoleptic Assessment**"

There are different techniques used for organoleptic assessment, these are :

1. Whole mouth or nose assessment
2. Tongue odour test
3. Dental floss odour test
4. Saliva odour test

MANAGEMENT OF ORAL MALODOUR

Current oral malodour treatment is based on the assumption that the malodour is the result of an overgrowth of oral microorganisms, which produce volatile compounds that are offensive. The aim of the treatment is to reduce these microorganisms in the oral cavity, with concomitant reduction in the formation of volatile compounds. This can be accomplished by following methods

- 1) Mechanical methods
- 2) Chemical methods

Mechanical methods

Mechanical reduction of microorganisms through improved oral hygiene procedures has been associated with reduction in oral malodour. These oral hygiene procedures includes-

- Tongue and tooth cleaning
- Oral prophylaxis by professionals

Particular emphasis has been placed on mechanical cleaning of the tongue. It has been proved that tongue cleaning decreases VSCs by approximately 75%. Tongue cleaning is critical for reducing oral malodour and a number of tongue cleaning brushes and blades are now available commercially.

There are ample evidence in the literature that brushing and flossing of the teeth reduces the number of microorganisms in the oral cavity, thereby reducing oral malodour.

Both professional and personal oral hygiene procedures play a key role in controlling oral malodour.

Chemical methods

Chemical control of oral malodour may be accomplished by a number of oral actives and antimicrobial metabolites (zinc salts and others). Mouthwashes have been advertised for the control of bad breadth and this appears to be the primary reason people use them. The mechanism of action of mouth

rinses is to reduce the number of bacteria responsible for producing oral malodour or mask the odour. Another mechanism of action of mouthrinses is the inactivation of VSCs and their conversion into nonmalodourous compounds by zinc salts.

Various types of Over-the-Counter or OTC mouthwashes are commercially available and by definition are not subjected to same level of regulatory scrutiny before being introduced in the market place. Such OTC products may be genuinely effective as a result of actually reducing the number of bacteria, while other may mask the odours, though their masking effect may only last for a brief period.

1. Chlorhexidine

Chlorhexidine is an antimicrobial agent. It is a cationic chlorophenyl bis-biguanide. Chlorhexidine shows antibacterial and antiplaque effect.

2. Sanguinarine

A benzophenanthridine alkaloid with antibacterial, antiplaque efficacy, used as mouthwash can control bad breadth.

3. Quaternary Ammonium Compounds

Cetylpyridinium chloride acts as antibacterial agent and can be used in management of oral malodour.

4. Iodine Containing Mouthwashes

Iodine containing mouthwashes—Betadine decreases the concentration of micro flora in the oral cavity by its antiseptic action and can contribute to malodour decline.

5. Phenolic Compounds

Listerine contains thymol, menthol, eucalyptol, methyl salicylate, benzoic acid and boric acid. Listerine due to its anti plaque and antiseptic action is effective in controlling malodour.

6. Metallic Compounds

Zinc chloride is effective in controlling oral malodour because of its ability to bind to thiol group of enzymes and VSCs inhibits the conversion of disulphide groups to thiols.

CONCLUSION

Further studies are needed to determine the actual prevalence and clinical variability of oral malodour. Increase in research and interest in oral malodour among dental professionals can result in better understanding of the etiology of oral malodour and the development of more effective diagnostic and treatment methods.

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