

---

# **PERIODONTICS**

---

Lec. 19  
Breath malodor (Halitosis)

DR. SURA ALYOSIF  
MSc. Periodontics

**Halitosis:-** is a general term used to define an unpleasant or offensive odour emanating from the breath regardless of whether the odour originates from oral or non-oral sources. Originates from two Latin words – Halitus → breath – Osis → disease

Halitosis should not be confused with the generally temporary oral odour caused by intake of certain foods, tobacco, or medications.

### **Epidemiology**

- In most patients, breath malodor originates from the oral cavity.
  - A large-scale study including **2000** patients with halitosis complaints showed that for those patients whose bad breath could be objectively detected, the cause was mostly found within the oral cavity (90%). Tongue coating (51%), gingivitis or periodontitis (13%), or a combination (22%) accounted for the majority of the cases.
  - The minority of patients , extraoral causes could be identified, including ear, nose, and throat (ENT) disorders, systemic diseases (e.g., diabetes), metabolic or hormonal changes, hepatic or renal insufficiency, bronchial and pulmonary diseases, or gastroenterologic disorders
-

## **Classification**

- Genuine halitosis
  - Physiologic halitosis
  - Pathologic halitosis
- Pseudo halitosis
- Halitophobia.

## **Genuine halitosis**

### **• Physiological halitosis**

– Morning breath odour, tobacco smoking & certain foods & medications.

### **• Pathological halitosis**

– intra oral or extra oral origin

– 90% of patients → oral cavity – Bacteria, volatile sulphur compounds.

### **• Intra oral origin**

– poor oral hygiene, dental caries, periodontal diseases in particular NUG, NUP, periodontitis, pericoronitis, dry socket, other oral infections, tongue coating & oral carcinoma.

- The role of tongue coatings in the etiology of oral malodour has been extensively documented.

### **\* Tongue coating**

Tongue coating is the most important cause of halitosis. The innumerable depressions in the tongue surface are ideal niches for bacterial adhesion and growth; additionally, desquamated cells and food remnants also remain trapped in these retention sites.

The degradation of organic substrates by anaerobic bacteria results in the production of a range of unpleasant-smelling volatile compounds.

---

### **\*Periodontal infection:**

Bacteria associated with gingivitis and periodontitis are indeed able to produce **VSCs**. Several studies have shown that **VSC** levels in the mouth correlate positively with the depth of periodontal pockets (the deeper the pocket, the more bacteria, particularly anaerobic species) and that the amount of VSCs in the breath increases with the number, depth, and bleeding tendency of the periodontal pockets.

The increased production of volatile sulfur compounds in people with bad breath may accelerate the progression of periodontal disease. For example, it is known that methylmercaptan and hydrogen sulfide can adversely affect collagen structure and gingival fibroblasts

### **\*Dental disorder**

- Deep carious lesions with food impaction and putrefaction
- Extraction wounds filled with blood clots.
- Purulent discharge leading to important putrefaction.
- Acrylic dentures, especially when kept continuously in the mouth at night or not regularly cleaned, can lead to infections (e.g. candidiasis), which produce a typical smell

### **\*Dry mouth**

Saliva has an important cleaning function in the oral cavity. Patients with xerostomia often present with large amounts of plaque on teeth and extensive tongue coating. The increased microbial load and the escape of VSCs when salivary flow is reduced explain the strong breath malodor.

§ Other causes of xerostomia are medication, alcohol abuse, Sjögren syndrome (a common autoimmune rheumatic disease), and diabetes

---

### **•Extra oral origin**

- 10-20% – gastro intestinal diseases
- infections or malignancy in respiratory tract
- \_Chronic sinusitis and tonsillitis

-stomach, intestine, liver or kidney affected by systemic diseases

Examples of systemic pathological conditions that cause halitosis Systemic condition • Diabetes mellitus • Renal failure • Liver failure • Tuberculosis/ lung abscess

- Internal hemorrhage/ blood disorders • Fever,

**Pseudo halitosis** – Apparently healthy individuals

- **Halitophobia** – exaggerated fear of having halitosis

– also referred as delusional halitosis

– considered variant of monosymptomatic hypochondrial psychosis.

### **Etiology:**

- Halitosis generally arises as a result of the bacterial decomposition of food particles, cells, blood and some chemical compounds of the saliva.

- Volatile sulphur compounds
  - Non - sulphur containing substances
-

## Role of volatile sulphur compounds in the pathogenesis of halitosis :

- It increases the permeability of oral mucosa and crevicular epithelium. It impairs oxygen utilization by host cells, and reacts with cellular proteins, and interferes with collagen maturation.
  - It also increases the collagen solubility.
  - It decrease the DNA synthesis.
  - It increases the secretion of collagenases, prostaglandins from fibroblasts.
- VSC reduce the intracellular pH; inhibit cell growth, and periodontal cell migration.

## Diagnosis

- Fill history
- Examination

### **Self assessment tests (subjective test)**

- **Whole mouth malodor (Cupped breath)** The subjects are instructed to smell the odor emanating from their entire mouth by cupping their hands over their mouth and breathing through the nose. The presence or absence of malodor can be evaluated by the patient himself/herself.
  - **Wrist lick test** :Subjects are asked to extend their tongue and lick their wrist in a perpendicular fashion. The presence of odor is judged by smelling the wrist after 5 seconds at a distance of about 3 cm.
  - **Spoon test** :Plastic spoon is used to scrape and scoop material from the back region of the tongue. The odor is judged by smelling the spoon after 5 seconds at a distance of about 5 cm organoleptically.
-

- **Dental floss test** Unwaxed floss is passed through interproximal contacts.
- **Saliva odor test** Involves having the subject expectorate approx. 1-2 ml of saliva into a petridish. The dish is covered immediately, incubated at 370 C for five minutes and then presented for odor evaluation at a distance of 4 cm from the examiner's nose.

### **Objective tests**

- Organoleptic measurement
  - Gas chromatography (GC)
  - Sulphide monitoring
  - Electronic nose
  - BANA test
  - Tongue costing index
  - Dark Field or Phase Contrast Microscopy
  - Saliva Incubation
  - Halimeter
-

### **Preventive measures:**

Preventive measures rather than curative aspects are highly recommended.

- Visit dentist regularly
  - Periodical tooth cleaning by dental professional.
  - Brushing of teeth twice daily with appropriate brushing techniques and for a duration of 2-3 mins.
  - Use of a tongue scraper to get rid of the lurking odour causing bacteria in the tongue surface.
  - Flossing after brushing to remove food particles stuck in between the tooth surfaces. – Limit intake of strong odour species.
  - Limit sugar and caffeine intake. –
  - Drink plenty of liquids. –
  - Chew sugar free gum for a minute when mouth feels dry.
  - – Eat fresh fibrous vegetables such as carrots.
-



## **Management:**

- (i) Mechanical reduction of intraoral nutrients and micro- organisms
- ii) Chemical reduction of oral microbial load
- (iii) Rendering malodorous gases nonvolatile
- (iv) Masking the malodor.

### **1. Mechanical reduction of intraoral nutrients and micro-organisms**

- **Tongue cleaning**
- **Tooth brush - Inter-dental cleaning**
- **Professional periodontal therapy**
- **Chewing gum**

### **2. Chemical reduction of oral microbial load**

- **Chlorhexidine** : Chlorhexidine is considered the most effective antiplaque and anti-gingivitis agent. Because of its strong antibacterial effects and superior substantivity in the oral cavity, chlorhexidine rinsing provides significant reductions in VSC levels and organoleptic ratings.

#### **Disadvantage**

Unfortunately, as mentioned in some trials, chlorhexidine at a concentration of 0.2% or greater also has some disadvantages

- 1- increased tooth and tongue staining
  - 2- unpleasant taste
  - 3- some temporary reduction in taste sensation
-

- **Essential oils** : Previous studies evaluated the short-term effect (3 hours) of a Listerine rinse (which contains essential oils) compared with a placebo. Similar VSC reductions were found after rinsing for 4 days. 2- Essential Oils Listerine was found to be only moderately effective against oral malodor ( $\pm 25\%$  reduction vs. 10% for placebo of VSCs after 30 minutes) and caused a sustained reduction in the levels of odorigenic bacteria.

- **Chlorine dioxide** : Chlorine dioxide ( $\text{ClO}_2$ ) is a powerful oxidizing agent that can eliminate bad breath by oxidation of hydrogen sulfide, methyl-mercaptan, and the amino acids methionine and cysteine. Studies demonstrated that a single use of a chlorine dioxide– containing oral rinse slightly reduced mouth odor.

- **Two-phase oil** : Rosenberg and colleagues designed a two-phase oil-water rinse containing Cetylpyridinium Chloride (CPC).

A twice-daily rinse with this product (before bedtime and in the morning) showed reductions in both VSC levels and organoleptic ratings.

These reductions were superior to those seen with Listerine and were significantly superior to placebo.

- **water rinse**

- **Aminefluoride/ Stannous fluoride** : The association of amine fluoride with stannous fluoride resulted in encouraging reductions of morning breath odor, even when oral hygiene was insufficient.

The formulation showed not only short-term but also long term effects on malodor indicators in patients with obvious malodor.

Stannous fluoride has also been shown to be effective in the management of oral malodor as a component of a dentifrice, reducing both organoleptic scores and VSC levels.

---

- **Hydrogen peroxide** : Suarez and colleagues reported that rinsing with 3% hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) produced impressive reductions (±90%) in Sulfur gases that persisted for 8 hours

- **Oxidising lozenges**

- **Triclosan**

### **3. Conversion of volatile sulfide compounds**

- **Metal salt solutions** : Metal ions with an affinity for sulfur are efficient in capturing the sulfur-containing gases.

Zinc is an ion with two positive charges (Zn<sup>++</sup>), which will bind to the twice-negatively loaded sulfur radicals and thus reduce the expression of VSCs.

Zn<sup>++</sup> is relatively nontoxic and noncumulative and gives no visible discoloration.

Thus, Zn<sup>++</sup> has been one of the most-studied ingredients for the control of oral malodor.

- **Toothpastes**

- **Chewing gum**

---

#### **4. Masking the malodor**

**-Rinses**

**-Mouth sprays**

**-Lozenges containing volatiles**

**-Chewing gum**

**Thank**

---

