REVIEW ARTICLE

Oral Malodor in Children

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Abstract

Bad breath can be an embarrassing problem for children, as well as parents. Though 80-90% of the oral malodor originates from mouth, there are extraoral sources also contributing. This article briefs on the etiologies of malodor, distinguishing each and managing it, with added emphasis on oral hygiene measures for children.

Key words: Halitosis, Volatile Sulfur Compounds (VSC’s), Halitaphobia, Oral Hygiene.

INTRODUCTION

Bad breath, or halitosis, is any unpleasant odor emerging from the mouth, either caused by intra- and/or extraoral factors. Although halitosis has a multifactorial etiology, 80-90% originates from oral cavity. Volatile sulfur compounds (VSC’s) especially hydrogen sulphide (H$_2$S), methyl mercaptan (CH$_3$SH) and dimethyl sulphide ((CH$_3$)$_2$S), have been cited as the predominant source of foul odor. Therefore halitosis is defined as exhaled air containing more than 75 parts per billion of odor-producing VSCs.

Oral Sources of Malodor:

- The coating on the dorsum of the tongue consists of desquamated epithelial cells, blood cells and bacteria. When these get trapped in the plaque and crevices on the dorsum of the tongue along with specific gram-negative anaerobes, degrade Sulfur-containing amino acids cystine, cysteine, and methionine to foul smelling VSCs, producing “rotten egg” smell. Proteolysis activity by gram positive Stomatococcus mucilaginous also contribute for subsequent malodor.

- Xerostomia (dry mouth) due to mouth breathing, decrease in salivary flow, sleeping, dehydration, salivary gland disease, chemotherapy, diabetes, and certain medications, produce bad breath. Tonzetich et al argued that bad breath derives exclusively from VSC’s, while Kleinberg and Codipilly have shown that when the skin/mucosa dries out non-sulfur containing gases like cadaverine, putrescine, indole, butyric acid, skatole are released, attributing to increased halitosis.

- An abscessed tooth, dental caries, faulty dental restorations or ill-fitting crowns allow food and bacteria to accumulate – producing a foul odor.

- Children on long term antibiotics, chemotherapy, or immunosuppressive are prone to develop oral fungal (Candida) infections, producing characteristic sweet odor.

- Gram-negative bacteria (Veillonella, Fusobacterium nucleatum, Treponema

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denticola, and Porphyromonas gingivalis hide in diseased periodontal/gingival tissues, produce inflammatory diseases and distinctive foul gases.

- Oral cancer and its treatment cause tissue destruction, bleeding, and necrosis. The resulting oral debris is an ideal substrate for the anaerobic bacteria to produce the offensive gases.
- Also increase in the relative amount of protein and reduction in the relative amount of carbohydrate in the diet and rise in oral pH to more alkaline environment can predispose to oral malodor.

Non-Oral Sources of oral malodor:

- Systemic (medical) problems attributes to a very small percentage of malodor experience.
  - Liver failure and cirrhosis are associated with sulfur or “rotten egg” smells from the mouth. Timethylaminuria, a rare metabolic disorder of the liver, causes the buildup of trimethylamine in exhaled air, with a foul fishy odor.
  - Odor causing bacteria thrive on post nasal secretions and produce VSCs. Also problems affecting air flow and mucous secretions (polyps, enlarged adenoids), craniofacial anomalies (cleft palate) may lead to halitosis, with a typical cheesy smell.
  - If a child’s tonsils are infected, it emits foul smelling exudates when pressed. Tonsils have deep crypts, food and debris will accumulate in them, producing some halitosis. Sometimes tonsilloliths form in the crypts. These tonsilloliths are small, soft, whitish-yellow secretions which produce a foul odor as they break up.
  - Kidney failure causes uremia, which produces an ammonia smell in the breath.
  - Helibacter pylori (gastric) infection can cause inflammatory changes in the stomach. Achalasia of the esophagus also can result in halitosis. But bad breath originating in the gastrointestinal tract is extremely rare, as esophagus is normally collapsed and closed. Although occasional belch may carry odor up from the stomach, the possibility of air escape continuously is remote.
  - Uncontrolled diabetes mellitus eventually results in ketoacidosis, causing acetone (rotten apple) breath.
  - Medications: Antihistamines, antipsychotics, bronchodilators, antidepressants, and antispasmodics cause dry mouth (Xerostomia), and halitosis of bacterial origin. This is transient, and usually disappears when antibiotic therapy has ceased.
  - Bad breath during menstruation may be caused by transient gingivitis.

Psychological causes of oral malodor:

Pseudo-halitosis occur when bad breath does not actually exist, but the child or parent believes it does. Sometimes, child may recall someone in the immediate family (usually parents) suffering from bad breath and would be concerned of inherited this trait. This is diagnosed as halitaphobia. Parents and patients can be convinced using a portable sulfide monitor (Halimeter). If the child or parent still believes that bad breath exists after successful treatment of genuine halitosis or pseudo-halitosis; they should be referred to a psychiatrist / psychologist. Halitaphobia can drive the child for social isolation; many may have their teeth extracted and occasionally even commit suicide.

Diagnosis:

Establishing a diagnosis of halitosis involves:

1. Complete medical history, medication history, review of systems is performed.
2. Through physical examination, with special attention to the structures of the head and neck, along with complete oral and dental examination is done.
3. Measurement and evaluation of the breath is done using the following methods:
   a) The sensory (organoleptic) technique: This is based on the examiner’s perception of patient’s breath. The examiner smells the patient’s breath while positioned 4 to 6 inches away from the mouth. The odor level is scored on a five-point scale. The tongue odor is measured by gently scraping the back of the tongue with a
plastic spoon and evaluating the odor on the spoon. The patient is asked to refrain from ingesting food or drink, and any oral hygiene procedures two hours before the procedure. No garlic or spicy food should be ingested within 48 hours before the evaluation procedure.

b) Halimeter: This is an instrumental device specific for hydrogen sulfide gas only. A flexible straw is inserted into the partially opened mouth, or into the nostrils, while the patient holds their breath. The peak VSC level is measured in parts per billion. Any measurement over 75 ppb is diagnostic for halitosis.

Management

- Gentle daily cleaning of the back (dorsum) of the tongue with a small, soft-bristled brush or tongue scraper is very important.

- Routine oral hygiene procedures i.e., brushing and flossing reduce the number of bacteria and fermentable substrates in the mouth. Children should brush their teeth thrice a day with a soft-bristled toothbrush. Children younger than 8 years of age will need to have their parents help them floss. Mouth rinses (Chlorhexidine, Zinc) can also be advised in children who can expectorate. Avoid alcohol-containing mouth rinses, as they dry the oral tissues and may cause oral tissue sloughing.

- When bad breath is due to dry mouth, treatment involves having the child drink lots of sugar-free fluids. Sugarless gum may stimulate salivary flow. Children are recommended to eat fibrous foods, as this will stimulate the flow of saliva and reduce oral microbial levels. In very severe cases, an artificial salivary substitute such as Carboxymethylcellulose may be needed.

- If bad breath is due to periodontal disease, dentist may need to intervene with surgical or pharmacologic treatment.

- Dental caries abscess and defective dental restorations may need endodontic or surgical treatment.

- If halitosis is because of the medical conditions, underlying disorder is to be managed along with oral hygiene programs.

References: