

Halitosis

– raising a stink

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ABSTRACT

Bad breath or halitosis is a common problem that is either real or putative in nature. There are many factors which can lead to bad breath including those in the oral cavity, the upper respiratory tract or from systemic reasons. Commercially available products such as breath mints or mouthwashes have little significant therapeutic value but nonetheless have a large market due to popular advertising. A systematic approach to halitosis is presented.

Key words

Halitosis, bad breath

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Introduction

Bad breath or halitosis is defined as an offensive or unpleasant odour emanating from the mouth that is objectionable to others. At least 50% of the population believes that they, or their partners suffer from chronic bad breath, aided undoubtedly by the commercial interests of the media.

Bad breath is a major concern and embarrassment for many individuals as well as the people around them and forms the basis of a multi-million dollar industry – in 1996 alone, almost a billion dollars was spent in the United States of America supporting the mouthwash/toothpaste/ breath freshener industry – despite scientific reports that most commercially available products have little, if any, significant beneficial effect in the long term.

This article reviews the aetiologies and discusses the manage-

ment of patients with chronic bad breath, real or putative.

Local factors in the mouth

In up to 90% of cases, halitosis can be directly linked to causes in the mouth, fuelled by the breakdown of food debris, epithelial cells and salivary compounds.

Sulphur-containing amino acids, such as cysteine, undergo anaerobic bacterial degradation to form volatile sulphur compounds (VSC), such as hydrogen sulphide (H_2S), methylmercaptan (CH_3SH) and dimethyl sulphide (CH_3SCH_3). Other non-sulphur containing compounds that may also contribute to bad breath includes cadaverine and putrescine (diamines), acetone and acetaldehyde.

Numerous bacterial species have been shown to produce VSCs. The microflora of the mouth is predominantly gram-positive in nature but becomes more gram-negative in situations such as reduced salivary flow, periodontal disease and poor oral hygiene. Gram-negative anaerobic bacteria produce higher levels of sulphides and are therefore more likely to produce bad breath.

The dorsum of the tongue has a large papillary surface area, which traps dead epithelial cells, leucocytes and food debris, all of which provide a substrate for bacterial degradation. Brushing the tongue with a toothbrush is only slightly beneficial, as the majority of people cannot tolerate the tactile insult of a toothbrush further than halfway posterior on the tongue. Tongue scrapers have been used since antiquity and have seen some popu-

larity from time to time, although now they have become somewhat of a curiosity when introduced to patients. Consisting of a thin, flat blade made of metal or plastic, the surface of the tongue is cleaned by literally scraping off debris as the blade is drawn across the tongue. Figures 1 and 2 show an example of a tongue scraper currently available. Problems with dexterity and the gag-reflex however, overcome most people.

Tobacco can be a direct or indirect factor in bad breath. Tobacco residues found in saliva as well as stale smoke from the respiratory tract contribute to bad breath and smokers in general have a higher incidence of periodontal disease, which compounds the issue.

Various commercial products such as chewing gum, drops, pastilles, films and mouth rinses are merely cosmetic and only mask the odour temporarily. Chewing gum does perhaps have an advantage in that after 15 minutes of continuous chewing, salivary flow is increased and the local cleansing action of saliva may be helpful. Figure 3 shows examples of breath fresheners, which have no therapeutic value but may temporarily mask malodour in the mouth.

Oral pathology

Periodontal disease is a major cause of bad breath due to an environment that is conducive to trapping food and epithelial debris as well as allowing anaerobic bacteria to thrive. In the healthy individual the gingival tissues are well adapted to the surface of the tooth root and underlying bone. How-

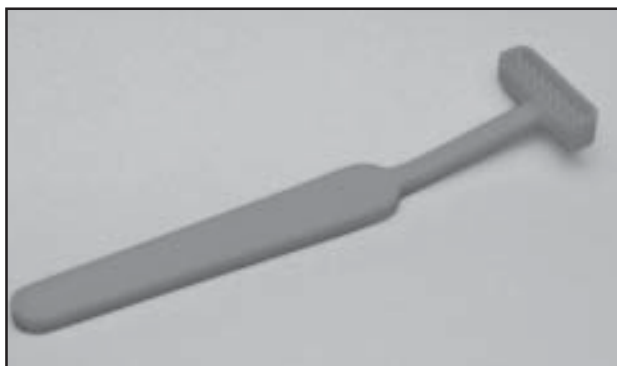


Figure 1. Commercially available plastic tongue scraper shaped like a safety razor.



Figure 2. Close up view of the serrated head used to clean the dorsum of the tongue.

ever, with progressive periodontal disease, the gingival tissue forms pockets, in which food can become trapped and anaerobic bacteria thrive. Figures 4 and 5 illustrate these differences.

An extreme example of periodontal destruction is acute necrotising (ulcerative) gingivitis which, due to its particularly foul odour and the high prevalence among soldiers during the First World War, is also colloquially known as 'trench mouth'.

Patients with active periodontal disease should see a dentist in the first instance to manage the disease and then be placed on a maintenance programme. Oral hygiene instruction such as proper tooth brushing and flossing technique may be supplemented by regular use of antibacterial mouth rinses such as chlorhexidine 0.2%. Specialised toothbrushes to clean in between teeth are also available but require specific indica-

tions and instructions for their use. In acute cases of periodontal infection, metronidazole 400mg three times daily for five days can be prescribed.

Although *Candida* itself does not cause malodour, the oral conditions predisposing to candidosis such as reduced salivary flow and poor oral hygiene do contribute directly to bad breath. Included in this category is poor denture hygiene, especially common in rest homes. In most cases, brushing of the denture with toothpaste after meals is adequate and it is recommended that people leave their dentures out during the night, usually in some water and a commercial denture cleaner.

In some instances not only is a topical antifungal indicated but also the provision of a new set of dentures may be necessary due to infiltration of the acrylic by the fungus.

As mentioned earlier, reduced saliva is a factor in the production of malodour. A disturbance in salivary flow may arise in a number of circumstances but are commonly due to medication side-effects, radiation therapy and certain autoimmune disorders namely Sjögren's syndrome. Medications with anticholinergic effects, for example the tricyclic antidepressants, can cause xerostomia.

Interestingly, patients with xerostomia but immaculate oral hygiene do not appear to experience the same degree of bad breath, illustrating perhaps the importance of primarily reducing periodontal pathogens.

The use of sugar-free chewing gums may help stimulate salivary flow and aid in the cleansing and remineralisation of early dental decay. For more severe cases of dry mouth or xerostomia, specialist consultation may be necessary before embarking upon other medications.

A recent development has been the use of films or strips in breath freshening. These films are placed on the tongue and dissolve, releasing flavourings and any active ingredient that may be present.

Nasal and paranasal pathology

Chronic infection of the nasal cavity and paranasal sinuses lead to changes in the cleansing action of the respiratory epithelium, allowing bacterial overgrowth and stasis of secretions to occur. Chronic nasal discharge including post-nasal drip may also give rise to unpleasant odours. Nasal obstruction due to inflammation or anatomical variance, may lead to nocturnal mouth breathing with subsequent drying out of the oral mucosa, contributing to 'morning breath'.

Occasionally dental treatment such as root canal therapy and dental extractions may violate the maxillary sinus and cause infection necessitating further dental intervention.

Systemic pathology

Systemic disease is an uncommon cause of bad breath but certain smells are almost pathognomonic, such as the sweet 'fruity' smell of diabetic keto-



Figure 3. Examples of breath fresheners available from most grocery stores. They have no therapeutic value except cosmetic masking of oral malodour.

acidosis due to the accumulation of ketones (acetoacetate, β -hydroxybutyrate and acetone) in blood subsequently excreted through the respiratory system. The musty or 'mousey' odour of foetor hepaticus, said to be characteristic of hepatic cirrhosis.

Gastro-intestinal sources of malodour do not occur in healthy individuals, as gases from the upper gastrointestinal tract do not mix with expired air. Vomiting, eructation and especially gastro-oesophageal reflux allows the escape of gastrointestinal odours not normally smelt.

Retention, stagnation and putrefaction of undigested or partially digested food will lead to the production of foul gases and may occur in cases of gastric ulcer and hypopharyngeal diverticula. Putrefaction of proteins is a known source of cadaverine production as well as sulphides.

Bad breath may be a presenting complaint of infection, inflammation or malignancy of the upper gastrointestinal or respiratory tracts, including the tonsillar beds. Debris in the tonsillar crypts may stagnate and occasionally even calcify. Pharyngeal ulceration, tonsillitis, post-tonsillectomy eschar, bronchitis, pneumonia, bronchiectasis and tuberculosis have all been reported to cause malodour.

Anti-neoplastic medications may indirectly contribute to halitosis due to mucositis, ulceration and increased gingival inflammation. Debilitated patients often cannot manage routine oral hygiene, which compounds the problem.

Halitosis may be imaginary or exaggerated in some individuals with mental illness. Depression, somatisation, organic brain syndrome, temporal lobe epilepsy and schizophrenia have been associated with psychogenic halitosis. There have also been references to 'halitophobia' in the literature and although this is not found in DSM-IV classification, this may be categorised under a specific phobia or perhaps under obsessive-compulsive disorder.

Even in the absence of mental illness, halitosis may be imaginary and often these individuals seek a dental opinion only to be disappointed to find that no objective malodour can be found. It has been suggested that the imaginary halitosis is based on the other people's perception and attitudes towards bad breath rather than actually having a problem with halitosis as such. This being said, however, there is literature that suggests that negative behaviour from others may reinforce imaginary halitosis or obsessional behaviour and that these people may have an underlying psychological vulnerability, which sometimes predisposes them to mental illness. It is important that these patients are well informed; not only about their own behaviour but also that the behaviour of others, in particular avoidance behaviour, may not be due to their bad breath – real or imaginary.

In cases of psychosomatic halitosis, instruction should be given for tongue brushing and other adjuncts in oral hygiene as these patients will seek some form of treatment, as they believe themselves to have bad breath. This has the drawback however of possibly reinforcing inappropriate behaviour.

It has also been recommended that clinicians do not argue with patients over whether their bad breath exists or not but rather try to determine if a patient is aware of behaviours or attitudes from others towards them.

Occasionally, complaints of bad breath may be a social invention of a partner for similar psychological reasons but affecting the partner rather than the individual accused of having bad breath.

Non-pathological causes

Many people experience 'morning breath' upon waking, which can be somewhat unpleasant for partners as well as the individual concerned. Salivary flow decreases to approximately 10% of normal daytime production during sleep and with the relative inactivity of tongue and cheek muscles,

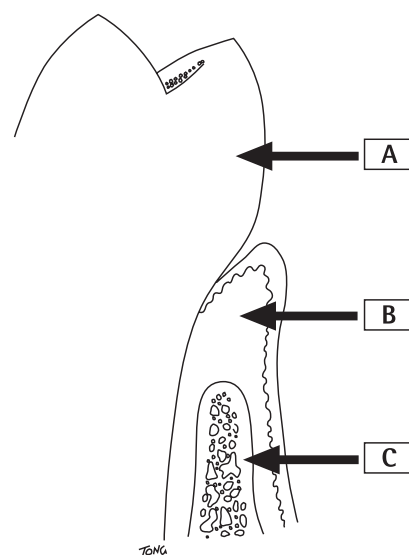


Figure 4. Illustration showing the relation between the tooth (A), healthy periodontal tissues (B) and alveolar bone (C). Note that the gingival soft tissues form a cuff or barrier to food debris.

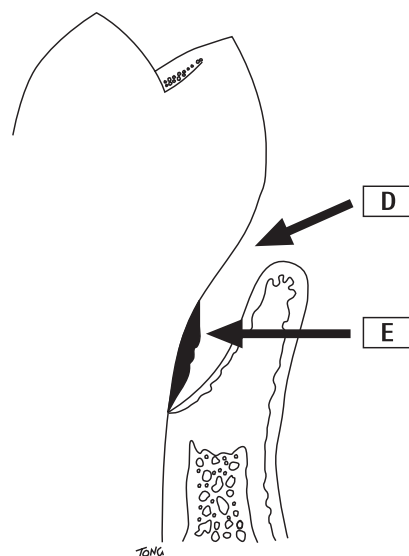


Figure 5. Illustration showing periodontal pocketing with associated bone destruction. The periodontal soft tissues no longer form an effective cuff around the tooth (D). The presence of a periodontal pocket makes cleaning around the tooth more difficult and allows the build up of calculus, bacteria and food debris (E).

saliva is allowed to pool and stagnate for long periods of time. Habitual nocturnal mouth breathing in the absence of nasal pathology may also lead to morning breath. Morning breath usually improves after eating, tooth brushing, rinsing the mouth or chewing gum – all of which stimulate salivary flow and reduce the collection of oral debris.

Certain types of food are strongly associated with particular mouth odours; these include onions, garlic, animal fats, curries and alcohol. Although a dietary analysis is often recommended in identifying which foods are the culprits, in practicality, this is rarely done.

Management

First try to establish whether there is a physical problem or not, then proceed with a pertinent history and examination.

A history of dental problems, periodontal disease, recent oral or ENT procedures, sinusitis or pharyngitis may all be very useful in identifying the cause of the malodour. However, serious systemic illness must be ruled out when aetiology is not so obvious.

Unfortunately, patient self-assessment is inherently unreliable due to the subjectivity of such factors as intensity, character and offensiveness. Adaptation or an inability to smell one's own bad breath also adds to the unreliability of this analysis, not to mention embarrassment and social misfortune.

Crude as it may seem, direct sniffing of expelled air remains the most reliable method of assessing malodour, although again, a degree of subjectivity is still present on the part of the person assessing the smell. Some preparation is required beforehand and a separate visit may be necessary as the patient must refrain from eat-

ing, drinking or smoking for at least two hours prior to the assessment and avoid the use of scents and fragrances.

To determine the origin of the malodour, the patient is asked to occlude the nostrils and expel air from the mouth. Any malodour that results is likely to arise from the oral cavity, oropharynx or upper gastrointestinal sources.

Conversely, if a malodour is present when air is blown out from the nose after the lips are sealed, then the likely aetiology is of nasal, paranasal sinus or nasopharyngeal in origin.

If both oral and nasal expired air is equally offensive then one must rule out a systemic cause. This may be overly simplistic but it is a useful method of obtaining a 'ball park' picture of where to start.

Direct measurements of sulphides and other volatile compounds are possible using modified gas chromatography equipment but are impractical for general use in clinical evaluation due to cost of the equipment and the specialised nature of the analysis.

Similarly, microbiological analysis is also somewhat impractical.

Determining the origin of the malodour is perhaps the most pertinent part of management. If halitosis is suspected due to local causes in the oral cavity a referral to a dentist is appropriate. Good oral hygiene instruction including tooth brushing technique, flossing and tongue cleaning are useful measures in reducing halitosis. Treatable causes of halitosis such as periodontal disease, oral infections and dental caries should be addressed by the dentist.

The use of commercially available mouthwashes effectively mask malodours but do nothing to address the underlying cause. Chlorhexidine-containing mouth rinses, however, reduce bacterial counts and have been shown to be effective against periodontal pathogens. Similarly, toothpastes containing triclosan, an antibacterial agent, are being trialed with results from early research showing some promise. Until more research is done, however, its availability is not yet widespread.

Lifestyle modifications such as a healthy diet, smoking cessation and drinking more water should be encouraged, the benefits being more than reducing bad breath.

Patients suffering from xerostomia may be encouraged to chew sugar-free gum or have a drink bottle for regular usage. Should referral be the option taken, a specialist in oral medicine would be most appropriate.

Although most causes of halitosis are simple and can be determined quickly, there is no 'quick fix' solution or single therapy that is absolutely effective. There are enormous commercial interests at stake in keeping the public intolerant of bad breath, sometimes to the point of paranoia. The management of bad breath involves not only eliminating organic causes but also must take into account various psychosocial aspects as well.

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Further reading

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