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# Bad Breath

## Halitosis

Halitosis, oral malodor (scientific term), breath odor, foul breath, fetor oris, or most commonly bad breath are terms used to describe noticeably unpleasant odors exhaled in breathing – whether the smell is from an oral source or not.

Halitosis has a significant impact - personally and socially – on those who suffer from it or believe they do (halitophobia), and is estimated to be the 3rd frequent reason for seeking dental aid, following tooth decay and periodontal disease.[1]

## Halitosis

### Classification & external resources

ICD-10  
R19.6

ICD-9  
784.9

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## General

In most cases (85-90%), bad breath originates in the mouth itself.[2] The intensity of bad breath differs during the day, as a function of oral dryness, (which may be due to stress or fasting), eating certain foods (such as garlic, onions, meat, fish and cheese), smoking and alcohol consumption.[3]

Because the mouth is dry and inactive during the night, the odor is usually worse upon awakening ("morning breath"). Bad breath may be transient, often disappearing following eating, brushing one's teeth, flossing, and rinsing with specialized mouthwash.

Bad breath may also be persistent (Chronic bad breath), which is a more serious condition, affecting some 25% of the population in varying degrees.[4] It can negatively impact the individual's personal, social and business relationships, leading to poor self-esteem and increased stress. This condition is usually caused by the metabolic activity of certain types of oral bacteria.

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## Origins

## Mouth

Though the causes of breath odor are not entirely understood, most unpleasant odors are known to arise from proteins trapped in the mouth which are processed by oral bacteria. There are over 600 types of bacteria found in the average mouth. Several dozens of these can produce high levels of foul odors when incubated in the laboratory.

The most common location for mouth-related halitosis is the tongue.

Large quantities of naturally-occurring bacteria are often found on the posterior dorsum of the tongue, where they are relatively undisturbed by normal activity. This part of the tongue is relatively dry and poorly cleansed, and bacterial populations can thrive on remnants of food deposits, dead epithelial cells and postnasal drip. The convoluted microbial structure of the tongue dorsum provides an ideal habitat for anaerobic bacteria, which flourish under a continually-forming tongue coating of food debris, dead cells, postnasal drip and overlying bacteria, living and dead. When left on the tongue, the anaerobic respiration of such bacteria can yield either the putrescent smell of indole, skatole, polyamines, or the "rotten egg" smell of volatile sulfur compounds (VSCs) such as hydrogen sulfide, methyl mercaptan and dimethyl sulfide.

The odors are produced mainly due to the anaerobic breakdown of proteins into individual amino acids, followed by the further breakdown of certain amino acids to produce detectable foul gases. For example, the breakdown of cysteine and methionine produce hydrogen sulfide and methyl mercaptan respectively. Volatile sulfur compounds have been shown to be statistically associated with oral malodor levels, and usually decrease following successful treatment.[5]

Other parts of the mouth may also contribute to the overall odor, but are not as common as the back of the tongue. These locations are, in descending prevalence order: inter-dental and sub-gingival niches, faulty dental work, food-impaction areas in-between the teeth, abscesses and unclean dentures.[6]

## Gum Disease

There is some controversy over the role of periodontal diseases in causing bad breath. Whereas bacteria growing below the gumline (subgingival dental plaque) have a foul smell upon removal, several studies reported no statistical correlation between malodor and periodontal parameters.[7][8]

## Nose

The second major source of bad breath is the nose. In this instance, the odor exiting the nostrils has a pungent odor which differs from the oral odor. Nasal odor may be due to sinus infections or foreign bodies.[5][6]

## Tonsils

## Putrefaction from the tonsils

is generally considered a minor cause of bad breath (contributing to some 3-5% of cases). Although some people (approximately 5% of the population) suffer from small bits of calcified matter in tonsillar crypts (called tonsillooliths), which themselves smell extremely foul when released, they do not necessarily cause bad breath.[5][9]

## Systemic diseases

There are a few systemic (non oral) medical conditions which may cause foul breath odor, but these are extremely infrequent in the general population. Such conditions are: [10][11]

- Fetor hepaticus: an example of a rare type of bad breath caused by chronic liver failure.
- Lower respiratory tract infections (Bronchial and lung infections).
- Renal infections and Renal failure.
- Carcinoma.
- Trimethylaminuria ("Fish odor syndrome").
- Diabetes mellitus.
- Metabolic dysfunction.

People suffering from halitosis should not immediately conclude that they suffer from these conditions or diseases just by deducing from the breath odor alone, since these conditions are rare, may not display bad breath at all and will most likely show additional characters, which are more definitive than the breath odor.

Most researchers consider the stomach as a very uncommon source for bad breath (except in belching). The esophagus is a closed and collapsed tube, and continuous flow (in oppose to a simple burp) of gas or putrid substance from the stomach indicates a health problem - such as reflux or a fistula between the stomach and the esophagus - which will demonstrate more serious manifestations than just foul odor.[2]

## Diagnosis

## Self diagnosis and home diagnosis

Scientists have long thought that smelling one's own breath odor is often difficult due to habituation, although many people with bad breath are able to detect it in others. Research has suggested that self-evaluation of halitosis isn't easy because of preconceived notions of how bad we think it should be. Some people assume that they have bad breath because of bad taste (metallic, sour, fecal, etc), however bad taste is considered a poor indicator.[12][13]

For these reasons, the simplest and most effective way to know whether one has bad breath is to ask a trusted adult family member or very close friend ("confidant").

If the confidant confirms that there is a breath problem, he or she can help determine whether it is coming from the mouth or the nose, and whether a particular treatment is effective or not.[14]

One popular home method to determine the presence of bad breath is to lick the back of the wrist, let the saliva dry for a minute or two, and smell the result. This test results in overestimation, as concluded from research,[2] and should be avoided. A better way would be to lightly scrape the posterior back of the tongue with a plastic disposable spoon and to smell the drying residue. A spouse, family member, or close friend may be willing to smell one's breath and provide honest feedback. Home tests are now available which use a chemical reaction to test for the presence of polyamines and sulfur compounds on tongue swabs, but there are few studies showing how well they actually detect the odor. Furthermore, since breath odor changes in intensity throughout the day depending on many factors, multiple testing may be necessary.

## Professional diagnosis

If bad breath is persistent, and all other medical and dental factors have been ruled out, specialized testing and treatment is required. Hundreds of dental offices and commercial breath clinics now claim to diagnose and treat bad breath. They often use some of several laboratorial methods for diagnosis of bad breath:

- Halimeter™: a portable sulfide monitor used to test for levels of sulfur emissions (specifically, hydrogen sulfide) in the mouth air. When used properly this device can be very effective at determining levels of certain VSC-producing bacteria. However, it has drawbacks in clinical applications. For example, other common sulfides (such as mercaptan) are not recorded as easily and can be misrepresented in test results. Certain foods such as garlic and onions produce sulfur in the breath for as long as 48 hours and can result in false readings. The Halimeter is also very sensitive to alcohol, so one should avoid drinking alcohol or using alcohol-containing mouthwashes for at least 12 hours prior to being tested. This analog machine loses sensitivity over time and requires periodic recalibration to remain accurate.[15]

- Gas chromatography:

portable machines, such as the OralChroma™, are currently being introduced. This technology is specifically designed to digitally measure molecular levels of the three major VSCs in a sample of mouth air (hydrogen sulfide, methyl mercaptan, and dimethyl sulfide). It is accurate in measuring the sulfur components of the breath and produces visual results in graph form via computer interface.[16]

- BANA test: this test is directed to find the salivary levels of an enzyme indicating the presence of certain halitosis-related bacteria.[17]

-  $\alpha$ -galactosidase test: salivary levels of this enzyme were found to be correlated with oral malodor.[18]

Although such instrumentation and examinations are widely used in breath clinics, the most important measurement of bad breath (the gold standard) is the actual sniffing and scoring of the level and type of the odor carried out by trained experts ("organoleptic measurements"). The level of odor is usually assessed on a six point intensity scale.[1][5][19]

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## Home care and Treatment

Currently, chronic halitosis is not very well understood by most physicians and dentists, so effective treatment is not always easy to find. Six strategies may be suggested:

- Eating a healthy breakfast with rough foods helps clean the very back of the tongue.[11]

- Gently cleaning the tongue surface twice daily with a tongue brush, tongue scraper or tongue cleaner to wipe off the bacterial biofilm, debris and mucus. An inverted teaspoon is also effective; a toothbrush should be avoided, as the bristles will grip the tongue, causing a gagging reflex. Scraping or otherwise damaging the tongue should be avoided, and scraping of the V-shaped row of taste buds found at the extreme back of the tongue should also be avoided. Brushing a small amount of antibacterial mouth rinse or tongue gel onto the tongue surface will further inhibit bacterial action.[2]

- Chewing gum:

Since dry mouth can increase bacterial buildup and cause or worsen bad breath, chewing sugarless gum can help with the production of saliva, and thereby help to reduce bad breath. Chewing may help particularly when the mouth is dry, or when one cannot perform oral hygiene procedures after meals (especially those meals rich in protein).

This aids in provision of saliva, which washes away oral bacteria, has antibacterial properties and promotes mechanical activity which helps cleanse the mouth. Some chewing gums contain special anti-odor ingredients. Chewing on fennel seeds, cinnamon sticks, mastic gum or fresh parsley are common folk remedies.

- Gargling right before bedtime with an effective mouthwash (see below). Several types of commercial mouthwashes have been shown to reduce malodor for hours in peer-reviewed scientific studies. Mouthwashes may contain active ingredients which are inactivated by the soap present in most toothpastes. Thus it is recommended to refrain from using mouthwash directly after toothbrushing with paste (also see mouthwashes, below).[20]

- Maintaining proper oral hygiene, including brushing, daily flossing, and periodic visits to dentists and hygienists. Flossing is particularly important in removing rotting food debris and bacterial plaque from between the teeth, especially at the gumline. Dentures should be properly cleaned and soaked overnight in antibacterial solution (unless otherwise advised by your dentist).[6]

- Maintain water levels in the body by drinking several glasses of water a day.[2]

## Mouthwashes

Mouthwashes often contain antibacterial agents including cetylpyridinium chloride, chlorhexidine, zinc gluconate, essential oils, and chlorine dioxide. They may also contain alcohol, which is a drying agent and may worsen the problem. Rinses in this category include Scope™ and Listerine™.

Other solutions rely on odor eliminators like oxidizers to eliminate existing bad breath on a short-term basis. Rinses in this category include TheraBreath™, Closys II™ and others.

Bad breath may be temporarily reduced by using a hydrogen peroxide rinse. Hydrogen peroxide at a concentration of 1.5% can be taken as an oral antiseptic by gargling 10 ml, about two teaspoons.

Hydrogen peroxide is commonly available at a concentration of 3% and should be diluted to 1.5% by mixing it with an equal volume of water.

Hydrogen peroxide is a powerful oxidizer which kills most bacteria, including useful aerobic bacteria. Prolonged use of hydrogen peroxide may be harmful. Concentrated hydrogen peroxide (>50%) is corrosive, and even domestic-strength solutions can cause irritation to the eyes, mucous membranes and skin.

Swallowing hydrogen peroxide solutions is particularly dangerous, as decomposition in the stomach releases large quantities of gas (10 times the volume of a 3% solution) leading to internal bleeding. Inhaling over 10% can cause severe pulmonary irritation.

A relatively new approach for home-care of bad breath is by oil-containing mouthwashes. The use of essential oils has been studied,[21] was found effective and is being used in several commercial mouthwashes, as well as the use of two-phase (oil:water) mouthwashes, such as Dentyl-pH™, which have been found to be effective in reducing oral malodor.[22]

## Halitophobia (Delusion Halitosis)

Some one quarter of the patients seeking professional advice on bad breath suffer from a highly exaggerated concern of having bad breath, known as halitophobia, delusional halitosis, or as a manifestation of Olfactory Reference Syndrome.

These patients are sure that they have bad breath, although many have not asked anyone for an objective opinion. Halitophobia may severely affect the lives of some 0.5-1.0% of the adult population.[23]

Only few psychologists and health professionals have tried to come to terms with this debilitating and difficult to treat emotional problem.[24][25]

## Scientific Research

In 1996, an international scientific organization (The International Society for Breath Odor Research, ISBOR) was formed to promote multidisciplinary research on all aspects of breath odors. The seventh international conference on breath odor is scheduled to take place in August, 2007 in Chicago.

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See also

- Periodontitis
- Dental caries
- Tooth abscess
- Postnasal drip
- Oral hygiene
- Toothbrush
- Tongue scraper
- Mouthwash
- Toothpaste

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#### External links

- Bad Breath discussion board - Discussions, experiences and possible cures.
- American Academy of Periodontology.
- Halitosis – fact file – of the British Dental Association.
- Bad Breath – by Mayo Clinic.
- Article on Bad Breath prevention – from CNN.com.
- Bad Breath Fact Sheet – from "Simple Step Dental".
- Article on Bad-Breath Prevention Products – from MSNBC.
- ISBOR – International society for breath odor research.

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More...

Bad breath or “halitosis” is actually a sign or a symptom that there is a presence of a disease inside or near the mouth. It is not a disease itself. A lot of people are very conscious and concerned about bad breath since

the odor may be considered to be unpleasant or even offensive to many. Bad breath may usually indicate a dental problem, but this may not always be the case.

The odor may be caused by some factors in the mouth:

poor oral hygiene

decaying teeth or cavities

Unclean dentures

Decaying food particles stuck on or between teeth

Unclean tongue covered by growing bacteria

Smell of tobacco or cigarettes, coffee

Alcohol

Gingivitis and other Gum diseases with bleeding or pus

Infections    inside the mouth

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Healing    wounds after a surgery or extraction

Or by changes occurring in other parts of the body near the mouth

Colds    and sinusitis

Sinus    infections

Tonsillitis.

Lung    infections

Waste

products broken down from food and drink excreted through the lungs e.g. alcoholic drinks, pungent foods like onion, garlic etc.

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Diabetes which causes a sweet acetone breath.

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