

Content from /en/blog/halitosis/

Halitosis (chronic bad breath): the clinical science and modern consensus



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Abstract

Halitosis is a significant clinical and psychological burden that affects up to **30 % of the global population** [2]. Although often dismissed as cosmetic, true chronic halitosis is a biological manifestation of cellular and bacterial breakdown. The international **Clinical Practice Guidelines on the Diagnosis and Treatment of Halitosis** (*International Dental Journal*, 2026) provide a standardised, evidence-based diagnostic framework [1]. A meaningful subgroup of cases has a **gastroenterological cause** - particularly GERD and hiatal hernia - and should be worked up with oral gastroscopy.

1. Classification

The international consensus divides halitosis into three categories:

I. Genuine halitosis - objectively verifiable malodour above diagnostic threshold.

- **Physiological halitosis:** transient odour, e.g. "morning breath" from reduced salivary flow during sleep, or short-term food-induced odour (garlic, onions, spices).
- **Pathological halitosis:**
 - **Intraoral (85-90 %):** rooted in the oral cavity.
 - **Extraoral (10-15 %):** from the upper airway, upper GI tract or systemic metabolic pathways [1, 3].

II. Pseudohalitosis - the patient is convinced of foul breath but organoleptic and instrumental testing show no detectable malodour. Responds well to education and review of objective data [1].

III. Halitophobia - a persistent, delusional belief in bad breath despite normal measurements and successful treatment. Classified as a somatic delusion and requires psychiatric / cognitive behavioural therapy [1].

2. Aetiology: direct vs indirect causes

Direct causes generate the odour itself - **volatile sulfur compounds (VSCs)**: hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH) and dimethyl sulfide ($(\text{CH}_3)_2\text{S}$).

- **Tongue coating proteolysis:** the posterior third of the tongue dorsum is the major reservoir. Anaerobes (*Prevotella intermedia*, *Treponema denticola*) degrade sulfur-containing amino acids (cysteine, methionine) into VSCs [2].
- **Periodontal disease - the "Red Complex":** *Porphyromonas gingivalis*, *Tannerella forsythia* and *Treponema denticola* digest collagen and feed a self-amplifying VSC cycle [1].
- **Systemic blood-borne exhalation:**
 - **Diabetic ketoacidosis:** acetone (sweet/fruity odour).
 - **End-stage renal failure:** dimethyl-/trimethylamine (uraemic, ammonia-like).

- **Hepatic cirrhosis:** foetor hepaticus (sulfurous) [1].

Indirect causes do not produce VSCs themselves but create the environment in which anaerobes flourish:

- **Hiatal hernia and GERD:** a hiatal hernia compromises the lower oesophageal sphincter. Chronic reflux causes erosive oesophagitis; the inflamed mucosa and micro-bleeding deliver a concentrated protein substrate for bacterial fermentation [3]. See also [GERD](#), [swallowing difficulties](#) and [Barrett's oesophagus](#).
 - **Anatomical traps:** necrotic pulp, open root canals, ill-fitting prostheses and tonsilloliths protect debris and bacteria from salivary clearance.
 - **Hyposalivation (xerostomia):** Sjögren's syndrome, mouth breathing and many medications remove saliva's antimicrobial and mechanical wash, triggering anaerobic overgrowth [1].
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3. Evidence-based diagnostic workflow

Consensus requires that the patient's subjective complaint be confirmed objectively using one or more of three modalities [1, 3]:

1. **Organoleptic measurement (OLS) - clinical gold standard.** A calibrated clinician scores exhaled air at 20 cm on a standardised 0-5 scale. **Pre-test protocol:** patients must avoid garlic, onion, smoking, coffee and scented cosmetics for 24-48 hours.
 2. **Gas chromatography (GC) - most reproducible.** A 10 mL oral air sample is analysed; individual VSCs are quantified in parts per billion. GC can separate intraoral sources (high methyl mercaptan) from extraoral / blood-borne sources (dimethyl-sulfide dominant).
 3. **Electrochemical VSC monitors (e.g. Halimeter).** A portable chairside device measuring total VSC in ppb; ideal for monitoring progress but cannot resolve individual gases and is less sensitive to methyl mercaptan.
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4. Treatment - matched to the verified cause



Step 1 - Mechanical biofilm disruption

- **Twice-daily tongue scraping** of the posterior dorsum significantly lowers VSC levels [1].
- **Professional periodontal therapy** (scaling and root planing) clears the subgingival anaerobic reservoir in patients with gum disease.

Step 2 - Chemical and micro-ecological antimicrobial therapy

- **Synergistic mouth rinses:** combinations of **chlorhexidine (CHX)** or **cetylpyridinium chloride (CPC)** with **zinc ions**. Zinc binds volatile sulfur radicals directly and converts them into non-volatile zinc compounds [1].
- **Oral probiotics:** *Streptococcus salivarius* K12 / M18 lozenges can outcompete malodorous anaerobes and reduce recurrence [1].

Step 3 - Interdisciplinary referral

- Normal intraoral VSC but positive nasal exhalation → ENT (chronic sinusitis, tonsil stones).
- Suspected GI cause → work-up for hiatal hernia, GERD or gastric dysmotility. We offer oral gastroscopy, nasal gastroscopy and Barrett's screening.

- Pseudohalitosis / halitophobia → cognitive behavioural therapy (CBT); further dental or surgical procedures will not resolve the underlying somatic anxiety [1].
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Work-up at Kirurgen.dk

When halitosis has a gastroenterological component we offer [oral gastroscopy](#), [nasal gastroscopy](#) and work-up of [GERD](#) and [swallowing difficulties](#). See also [the gut-brain axis](#) and [gut microbiome and probiotics](#).

References

1. **Clinical Practice Guidelines on the Diagnosis and Treatment of Halitosis.** *International Dental Journal*, February 2026. International consensus framework on diagnostic pathways and aetiological management. PMC12914797.
2. **European Federation of Periodontology (EFP) Consensus Report.** *Gum Health Day Guidelines*, March 2025. Evidence that 80-90 % of chronic cases stem from intraoral proteolytic degradation.
3. **Halitosis management by the general dental practitioner.** *Journal of Breath Research* - International Consensus Workshop Series. Standardisation of organoleptic protocols vs gas chromatography and delineation of extraoral (ENT/GI) causes.