Halitosis - a review

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Introduction

Halitosis (bad breath) is an oral condition characterized by unpleasant odours from the oral cavity. It is estimated to be the third most frequent reason for people seeking dental care, following tooth decay and periodontal disease [1]. In 90% of cases the causes of halitosis arise in the mouth and caused by deep carious lesions, periodontal diseases, oral infections, peri-implant diseases, pericoronitis, mucosal ulcerations, impacted food or debris, factors causing decreased salivary flow rate and tongue coating [2]. The tongue is a major site of oral malodour [3].

Aetiology

The unpleasant smell originates mainly from volatile sulphide compounds (VSC). Tonzetich identified hydrogen sulphide, methyl mercaptan, methyl sulphide as the main factors These compounds result from the proteolytic degradation by predominantly anaerobic gram negative oral microorganisms of various sulphur-containing substrates in food debris, saliva, blood and epithelial cells [4]. Several microorganisms recovered from periodontal lesions of gingivitis and periodontitis produce large amounts of these volatile sulphur compounds. VSC levels in the mouth correlate positively with the depth and number of periodontal pockets and bleeding. Oral malodour can also arise from the posterior dorsal tongue

The tongue, with its large and papillary surface area, can retain large amounts of desquamated cells, leucocytes and microorganisms. Studies of the microflora on the tongue dorsum of subjects with and without halitosis, show that the predominant species in test and control groups were Veillonella Prevotella species. Greater species diversity was found in the halitosis samples compared with controls. The increased species diversity found in halitosis samples suggests that halitosis may be the result of complex interactions between several bacterial species [5].

Prevalence

There are no universally accepted standard criteria, objective or subjective, that define a patient with halitosis [6]. There are few studies that have assessed the prevalence of oral malodour in the general population, with rates ranging from 22% to over 50%. In addition, approximately 50% of adults and elderly individuals emit socially unacceptable breath, related to physiological causes, upon arising in the morning [7]. Studies suggest that oral malodour might be caused mainly by tongue coating in the younger generation and by periodontal diseases together with tongue coating in older groups [8]. Studies have shown that use of the toothbrush less than once daily was the factor most strongly associated with self-perceived halitosis [9].

Management

Miyazaki established the recommended examination for halitosis and a classification of halitosis with corresponding treatment needs [10]. Accordingly, different treatment needs (TN) have been described for the various diagnostic categories. The responsibility for the treatment of physiologic halitosis (TN-1), oral pathologic halitosis (TN-1 and TN-2) and pseudo-halitosis (TN-1 and TN-4) rests on dental practitioners. However, extra-oral pathologic halitosis (TN-3) and halitophobia (TN-5) should be managed by a medical specialist with psychiatric / psychological help. Table 1 describes the five different categories of treatment needs according to diagnosis [10].

The management of halitosis starts by taking a detailed history of the condition including an enquiry into the duration, severity and impact on the patient's everyday life. Examination involves clinical, radiographic, and special tests. The contributing medical conditions, once identified, are referred for treatment accordingly. Special tests are performed to detect the foul-smelling VSCs along with the associated bacteria.

Interdental cleaning and toothbrushing are essential mechanical means of dental plaque control. Both remove residual food particles and organisms that cause putrefaction. A combination of tooth and tongue brushing or toothbrushing alone has a beneficial effect on bad breath for up to 1 hour (73% and 30% reduction in VSCs, respectively [11]). Two weeks of regular tongue brushing or scraping by a group of patients free of periodontitis resulted in negligible reductions in bacteria on the tongue, whereas the amount of tongue coating decreased significantly. Therefore, tongue cleaning seems to reduce the substrates for putrefaction, rather than the bacterial load [12].

Table 1: Treatment categories and treatments needed

Treatment Category	Action Required
TN-1	Explanation of halitosis and instructions for oral hygiene (support and reinforcement of a patient's own self-care).
TN-2	Oral prophylaxis, professional cleaning and treatment of oral diseases, especially periodontal diseases.
TN-3	Referral to a medical specialist.
TN-4	Explanation of examination data, further professional instruction, education and reassurance.
TN-5	Referral to a clinical psychologist or psychiatrist.

Chemical reduction of microbial overload

Chlorhexidine is a cationic bis-biguanide, with a very broad antimicrobial spectrum. Its antibacterial action can be explained by disruption of bacterial cell membrane and increasing bacterial cell permeability resulting in cell lysis and death. Because of its strong antibacterial effects chlorhexidine rinsing provides significant reduction in VSC levels organoleptic ratings. 0.2% chlorhexidine mouth rinse produceds significant reductions in volatile sulphur-containing compound levels and in organoleptic scores [13].

Triclosan is a broad-spectrum antibacterial agent and has been found to be effective against most oral bacteria. It has a good compatibility with other compounds used for oral home care. The anti-VSC effect of triclosan seems strongly dependent on the solubilizing agents. Clinical studies have shown that mouth-rinsing with triclosan solubilized in sodium lauryl sulphate, propylene glycol and water gave a marked and long-lasting anti-VSC effect. It cannot be excluded that sodium lauryl sulphate contributed to the observed anti-VSC effect [14].

Essential oils - Essential oils, including hydro-alcohol solutions of thymol, menthol, eucalyptol, and methyl salicylate, have been used in mouthwashes to prevent periodontal disease. Anti-plaque and anti-gingivitis activity has been demonstrated in several studies [15].

Cetylpyridinium chloride - Quaternary ammonium compounds, such as benzalkonium and cetylpyridinium chloride, inhibit bacterial growth, but reviews concluded that the results were modest for plaque and equivocal for gingivitis. A cetylpyridinium chloride rinse used in a 6-week pre-brushing study failed to confer any additional benefit to oral hygiene and gingival health compared to a control rinse [16].

Conversion of Volatile Sulfide Compounds

Elements such as zinc, sodium, tin and magnesium are thought to interact with sulphur. The mechanism proposed is the ions oxidize the thiol groups in the precursors of volatile sulphur-containing compounds [17]. Morning breath odour can be reduced successfully by the sole use of an amine fluoride - stannous fluoride-containing mouth rinse twice daily. This reduces the bacterial load in the saliva and retards plaque formation [18]. Unfortunately, both cupric and stannous ions have the potential to discolour teeth, either as a result of sulphide formation on the teeth after extended periods of use or the precipitation of dietary chromogen.

Chlorine dioxide -The use of chlorine dioxide associated with chlorite anion has been shown to result in oxidative consumption of amino acids such as cysteine and methionine, which are precursors of VSCs [19]. Thus, clinical use of this mouth rinse can be expected to reduce oral malodour by reducing concentrations of VSCs. Chlorine dioxide, a strong oxidizing agent, consumes oral substrates containing cysteine and methionine, thus preventing the production of VSCs.

Masking the malodour

Mint toothpaste, mouth rinses, sprays and chewing gum controls halitosis with pleasant flavour and fragrances, they increase salivation thus reducing the pH of saliva [20].

Effective combination of agents

Chlorhexidine and zinc mouth rinses have a strong effect on volatile sulphur-containing compounds and is effective for at least nine hours. Control rinses with chlorhexidine or zinc alone had a moderate and strong effect for one hour, but this effect diminished with time, respectively, fast and slightly [21].

Cetylpyridinium and zinc ions mouth rinses have a good synergistic effect on the levels of volatile sulphur-containing compounds after one hour but minimally above the effect of zinc alone [21].

Conclusion

An oral source is the main cause of breath malodour. Dental clinicians have the responsibility for diagnosis and treatment. Treatment should be centred on reducing the bacterial load by effective mechanical oral hygiene procedures. A multidisciplinary team may be required for some patients.

References

1. Loesche, WJ; Kazor. Microbiology and treatment of halitosis. *Periodontology* 2000; 28: 256–79.
2. Van den Broek AM, Feenstra L, de Baat C. A review of the current literature on management of halitosis. *Oral Dis.* 2008; 14(1):30-9.
3. Rosenberg M. Bad breath and periodontal disease: how related are they? *J Clin Periodontol.* 2006; 33(1):29-30.
4. Tonzetich J. Production and origin of oral malodor: a review of mechanisms and methods of analysis. *J Periodontol.* 1977; 48(1):13-20.
5. Donaldson A, McKenzie D et al. Microbiological culture analysis of the tongue anaerobic microflora in subjects with and without halitosis. *Oral Dis.* 2005; 11 Suppl 1:61-3
6. Newman MG. The role of periodontitis in oral malodour: clinical perspectives. In: van Steenberghe D, Rosenberg M, eds. Bad Breath: *A multidisciplinary approach.* Leuven: Leuven University Press; 1996. p. 3-14.
7. Rosenberg M. Bad breath: research perspectives. Ramat Aviv: Ramot Publishing-Tel Aviv University Press; 1997.
8. Miyazaki H, Sakao S, Katoh Y, Takehara T. Correlation between volatile sulphur compounds and certain oral health measurements in the general population. J Periodontol. 1995; 66(8):679-84.
9. Al-Ansari JM, Boodai H, et.al. Factors associated with self-reported halitosis in Kuwaiti patients. *J Dent.* 2006; 34(7):444-9.
10. Miyazaki H, Arao M, et al. [Tentative classification of halitosis and its treatment needs] [Article in Japanese]. *Niigata Dent J.* 1999; 32:7-11.
11. Quirynen M, Zhao H, et.al Review of the treatment strategies for oral malodour. *Clin Oral Investig.* 2002 Mar; 6(1):1-10
12. Quirynen M, Avontroodt P, et.al Impact of tongue cleansers on microbial load and taste. *J Clin Periodontol.* 2004; 31(7):506-10.
13. Carvalho MD, Tabchoury CM, et.al. Impact of mouthrinses on morning bad breath in healthy subjects. *J Clin Peridontol.* 2004; 31:85-90.
14. Young A, Jonski G, Rölla G. A study of triclosan and its solubilizers as inhibitors of oral malodour. *J Clin Periodontol.* 2002; 29:1078-81.
15. Gunsolley JC. A meta-analysis of six-month studies of antiplaque and antigingivitis agents. *J Am Dent Assoc.* 2006;137(12):1649-57.
16. Moran J, Addy M. The effects of a cetylpyridinium chloride prebrushing rinse as an adjunct to oral hygiene and gingival health. *J Periodontol.* 1991; 62:562-4.
17. Tonzetich J. Effect of hydrogen sulphide and methyl mercaptan on the permeability of oral mucosa. *J Dent Res.* 1984; 63:994-7.
18. Quirynen M, Avontroodt P, et al. The efficacy of amine fluoride/stannous fluoride in the suppression of morning breath odour. *J Clin Periodontol.* 2002; 29:944-54.
19. Frascella J, Gilbert R, Fernandez P. Odour reduction potential of a chlorine dioxide mouth rinse. *J Clin Dent.* 1998; 9(2):39-42.
20. Itthagarun A, Wei SH. Chewing gum and saliva in oral health. *J Clin Dent.* 1997; 8(6):159-62.
21. Young A, Jonski G, Rölla G. Inhibition of orally produced volatile sulfur compounds by zinc, chlorhexidine or cetylpyridinium chloride – effect of concentration. *Eur J Oral Sci.* 2003; 111:400-4.

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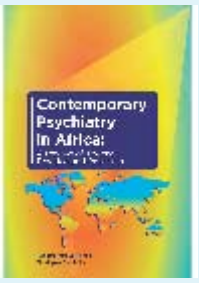

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