

# Clinical knowledge of dentists and physicians on the diagnosis and treatment of the patient complaining of halitosis

## Conhecimento clínico de dentistas e médicos sobre diagnóstico e tratamento do paciente com queixa de halitose

### Abstract

**Purpose:** To evaluate the knowledge of dentists and physicians about the diagnosis and treatment of the patient complaining of halitosis.

**Methods:** Data were collected from a sample of healthcare professionals (81 dentists and 19 physicians) from the city of João Pessoa, Brazil. A structured questionnaire was used to record the professional knowledge about halitosis: frequency, diagnosis, treatment and predisposing factors.

**Results:** Physicians and dentists reported overall different responses based on their clinical knowledge and practice: patient's complaint of halitosis (63% and 38% for physicians and dentists, respectively); halitosis as the main complaint (42% and 23%); perception of halitosis among patients (10% and 67%), professional information to the patient about the halitosis (58% and 89%). Periodontal disease, poor oral hygiene and caries were regarded as the most common causes of halitosis for dentists, but physicians believed that oral cavity changes, sinusitis and reflux disease were the main etiological factors.

**Conclusion:** The results suggest that there is not a high agreement between dentists and physicians regarding halitosis diagnosis and treatment.

**Key words:** Halitosis; dentistry; medicine

### Resumo

**Objetivo:** Avaliar o conhecimento de dentistas e médicos sobre o diagnóstico e tratamento do paciente com queixa de halitose.

**Metodologia:** Os dados foram coletados em uma amostra de profissionais de saúde (81 dentistas e 19 médicos) na cidade de João Pessoa, Brasil. Um questionário estruturado foi utilizado para registrar o conhecimento profissional clínico sobre halitose: frequência, diagnóstico, tratamento e fatores predisponentes.

**Resultados:** Médicos e dentistas relataram em geral diferentes respostas com base em seu conhecimento e prática clínica: queixa de halitose entre os pacientes (63% e 38% para médicos e dentistas, respectivamente); halitose como queixa principal (42% e 23%); percepção da halitose entre os pacientes (10% e 67%); informação profissional ao paciente sobre a halitose (58% e 89%); realização do tratamento da halitose pelo profissional (68% e 65%). Os dentistas apontaram doença periodontal, higiene bucal deficiente e cárie como as causas comuns de halitose, enquanto que os médicos relataram alterações bucais, sinusite e doença por refluxo como os principais fatores etiológicos.

**Conclusão:** Os resultados sugerem que não há alta concordância entre médicos e dentistas sobre fatores relacionados ao diagnóstico e tratamento da halitose.

**Palavras-chave:** Halitose; odontologia; medicina

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Received: April 24, 2011  
Accepted: August 29, 2011

**Conflict of Interest Statement:** The authors state that there are no financial and personal conflicts of interest that could have inappropriately influenced their work.

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## Introduction

Halitosis can be defined as an abnormal breath condition in which there is a unpleasant change in the smell sense, being an obstacle or an incompatibility factor in personal contacts and often leading to a voluntary or discriminatory social withdrawal (1,2). The term halitosis is derived from Latin, where *Halitus* means “breath” and the suffix *osis* “pathological change”. However, it is a mistake to believe that all bad odors are abnormal or indicative of organic amendments (3). The concern with the breath changes has occur since old ages, but only in 1874 the unpleasant change in the mouth odor was considered a clinical entity (4).

Halitosis, also known as bad breath, affects approximately 40% of the Brazilian population, and may be caused by oral or systemic diseases. The majority of cases of bad breath have oral origin, and tongue coating is present in about 90% of them. Halitosis often is reversible, and its treatment consists basically in removing the cause of bad odor and adopting proper oral hygiene. In Brazil, according to the ABPO (Brazilian Association for Research of Oral Odors), 40% of the population is carrier of chronic halitosis, which may be caused by more than 50 possible sources (5).

The dentist often is the first healthcare professional to examine these patients and sometimes refers them to the otolaryngologist for a differential diagnosis of chronic tonsillitis and sinusitis. If the otolaryngologists do not detect changes pertaining to their specialty, the digestive system may be investigated for the diagnosis of gastric pathologies, obstruction or gastrointestinal inflammation, cirrhosis or liver failure. The endocrine system should be screened for the diagnosis of diabetes, and also lung problems such as abscesses, bronchitis and renal insufficiency (2).

The mechanism of bad breath involves the decomposition of organic substances by putrefactive processes on the oral cavity and attached organs, resulting in production of foul-smelling substances (1). Most bad oral odors originate inside the oral cavity (6) mainly as a result of microbial metabolism, in which volatile sulfur compounds (VSC) and other volatile compounds are produced by deglycosylation, proteolysis and putrefaction of glycoproteins and proteins (7,8). The first microorganisms causing halitosis are anaerobic Gram-negative bacteria similar to those that cause periodontitis. These bacteria produce volatile sulfur compounds (VSC) by metabolizing different cells (epithelial cells, leukocytes, etc.) and tissues, which may be found in saliva, dental plaque and gingival fluid (1,9). The increased odor production would be related to the high number of bacteria and basic pH (10). Volatile sulfur compounds (VSC) seem to play a primary role of in the halitosis in comparison with other compounds such as amines and organic acids (11). However, Moreno et al. (12) observed that periodontal treatment did not promote alterations in volatile sulfur compounds (VSC) production in young individuals with periodontitis.

In the past 20 years the dental literature has brought enough evidence that the most important etiological factor for halitosis is the presence of oral microorganisms that

produce volatile sulfur compounds, and that this situation can be controlled by properly cleaning teeth and tongue (13). The main causes of halitosis are of oral origin (14-16): coated tongue, blood retention in the dental interstices, carious processes, plaque, porous prosthetic pieces, gingivitis, stomatitis, ulcers, surgical wounds, alveolitis and pericoronaritis (16). Other causes in the oral cavity include tongue morphological changes, gastrointestinal (1) or orolaringe (15) problems, cancer and myiasis (17).

Many diagnostic methods of halitosis use organoleptic measurement, gas chromatography, and halimeter examination. Organoleptic measurement is based on the subjective sensation of the examiner to the mouth odour. The measurement is recorded on a point scale according to the examiner's perception of the intensity of oral halitosis from the expelled air through a straw at a specific distance. Gas chromatography is a quantitative analysis of the specific gases of interest, and the results are specific and reproducible. For oral halitosis, VSCs including hydrogen sulphide, methyl mercaptan, and dimethyl sulphide are the examination targets. The halimeter is a portable instrument measuring the VSC concentration in the oral cavity. It is sensitive to volatile compounds and has to be calibrated to the background air prior to taking a reading. A straw connected to the halimeter is placed gently over the dorsum of the tongue and the patient is asked to keep the mouth wide open (18).

Halitosis can also be measured by organoleptic test (OLT) and/or gas chromatography; moreover, additional information may be obtained from a questionnaire on the patient history and halitosis symptoms. Recently, based on this information, halitosis has been classified into categories: genuine halitosis, pseudo-halitosis and halitophobia. Genuine halitosis is sub-classified into physiologic and pathologic halitosis (19,20). The subject with genuine halitosis have easily detectable bad oral odor, while the one with pseudo-halitosis fears being bearer of bad oral odor, although this does not reflect reality. In the halitophobia, there is no evidence of physical or social halitosis (21). However, there is still no safe way to assess correctly people's breath odor. In diagnosis and treatment of halitosis, it is important therefore to be considered physiological and psychological factors (22).

After a positive diagnosis for oral halitosis has been made, the treatment plan is implemented, which comprises the elimination of the causative agent and the improvement of the oral health status. The treatment modalities include oral hygiene instruction to reinforce brushing, flossing and denture hygiene; mechanical approach of scaling and root planing of the root pockets, and tongue cleaning; chemical approach using mouthwashes; dietary advice to reinforce mouth cleaning after eating or drinking dairy products, fish, meat, garlic, onion, coffee, and smoking; and regular visit to the dentist (18).

However, common treatments for halitosis, such as cleaning the tongue, mouthwash use, periodontal therapy, are not successful for all patients. Among patients with

psychosomatic halitosis, two subgroups are identified: patients with imaginary halitosis and no detectable bad odor, and patients suffering from bad oral odor accompanied by psychosomatic tendencies (20). In the case of psychic origin of halitosis, the patient may be referred to a psychologist (2,22).

Halitosis is often the consequence of combining two or three causes, which need to be diagnosed correctly (14). It is possible to eliminate bad breath in many cases, using drugs or potent mouthwashes to reduce the bacteria activity that produce odor. Some approaches for prophylactic treatment of halitosis are (4): extracting residual roots, restoring teeth, treating periodontal disease and cases of gingival bleeding; treating necrotic pulps; performing adequate cleaning and polishing of dentures, avoiding food impaction, instructing the patient on how to proceed when using brushes, flosses, toothpastes and antiseptics liquids. As the treatment of halitosis depends essentially of its proper diagnosis, clinical standards should enable simple procedures based on careful observation and scientific knowledge. Therefore, this study aimed to assess the knowledge of dentists and physicians on the diagnosis and treatment of halitosis.

## Methods

The project was submitted to the Ethics Committee of the Center for Health Sciences / Federal University of Paraiba,

Brazil, in accordance with the Brazilian Resolution 196/96 which regulates research involving human beings.

The study population comprised the dentists, gastroenterologists and ENT professionals working in the private and/or public healthcare services in the city of Joao Pessoa, Brazil.

A total of 100 structured questionnaires were used to collect data in a non-random sample using the direct extensive observation method. The instrument consisted of 13 questions on personal and professional data of the interviewees and their knowledge on frequency, diagnosis, treatment and predisposing conditions of halitosis. Data were analyzed by descriptive statistics.

## Results

The sample was composed by 81 dentists and 19 physicians (17 specialists in gastroenterology and in otolaryngology). Table 1 shows the results regarding to the frequency, awareness and diagnosis of halitosis by dentists and physicians. The results for the halitosis treatment are described in Table 2.

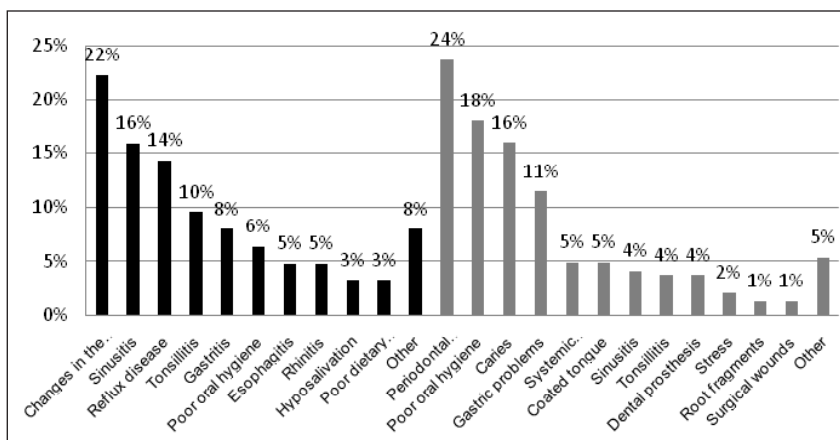
Besides the main possible causes of halitosis depicted in Figure 1, other responses included weight loss diets, dry mouth, smoking and stress. Figure 2 shows the distribution of the types of treatments for halitosis declared physicians and dentists.

**Table 1.** Frequency of responses of healthcare professionals about the diagnosis of halitosis.

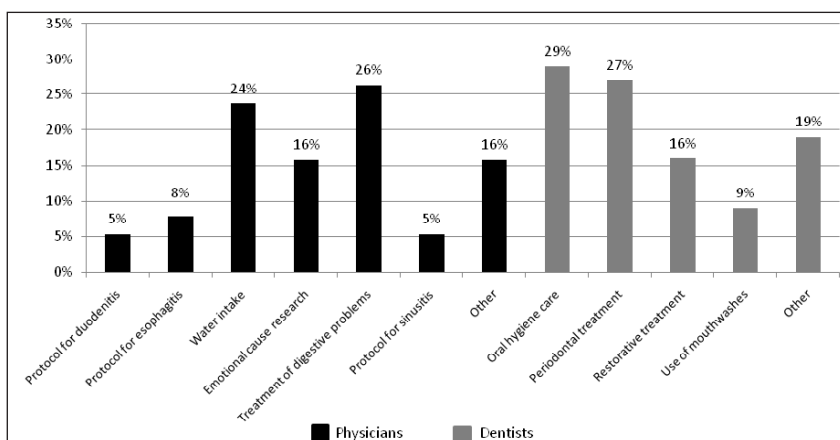
	Physicians	%	Dental Surgeons	%
Presence of patients complaining of halitosis				
Rare	0	0.0%	4	4.9%
uncommon	7	36.8%	46	56.8%
Frequent	12	63.2%	31	38.3%
Total	19	100.0%	81	100.0%
Patient's report about the halitosis perception				
Self-perception	2	10.5%	54	66.7%
Patient was alerted by someone else	15	78.9%	18	22.2%
Both	2	10.5%	9	11.1%
Total	19	100.0%	81	100.0%
Perception of halitosis by professional				
Frequent	7	36.8%	26	32.1%
Uncommon	11	57.9%	53	65.4%
Rare	1	5.3%	2	2.5%
Total	19	100.0%	81	100.0%
Communication of the halitosis diagnosis to patient				
Yes	11	57.9%	72	88.9%
No	8	42.1%	9	11.1%
Total	19	100.0%	81	100.0%
"Imaginary Halitosis" among patients				
Rare	5	26.3%	7	8.6%
Uncommon	6	31.6%	63	77.8%
Frequent	8	42.1%	11	13.6%
Total	19	100.0%	81	100.0%

**Table 2.** Frequency of responses of healthcare professionals about the treatment of halitosis.

	Physicians		Dentists	
	n	%	n	%
<b>Treatment Completion</b>				
Yes, the professional himself perform it	13	68.4%	53	65.4%
No, patient is referred to another professional	6	31.6%	12	14.8%
Both	0	0.0%	16	19.8%
Total	19	100.0%	81	100.0%
<b>Successful treatment</b>				
In most cases	9	47.4%	28	34.6%
In about half the cases	5	26.3%	24	29.6%
Only in some cases	5	26.3%	17	21.0%
Not answered	0	0.0%	12	14.8%
Total	19	100.0%	81	100.0%
<b>Successful treatment occurs when</b>				
Without halitosis, with the use of artifice	0	0.0%	5	6.2%
Without halitosis, without the use of artifice	19	100.0%	72	88.9%
Not answered	0	0.0%	4	4.9%
Total	19	100.0%	81	100.0%
<b>Presence of halitosis indicates</b>				
Local alteration	3	15.8%	3	3.7%
Systemic alteration	0	0.0%	0	0.0%
Both	16	84.2%	75	92.6%
Not answered	0	0.0%	3	3.7%
Total	19	100.0%	81	100.0%



**Fig. 1.** Relative frequency of halitosis etiology according to dentists and physicians.



**Fig. 2.** Relative frequency of types of treatment performed by dentists and physicians.

## Discussion

Halitosis is an embarrassing change and with significant social impact, affecting millions of people around the world. Many resources are invested in products to improve the breath, with minor success. Halitosis causes social restriction, decreases life quality and may be indicative of the presence of more severe diseases (23).

According to Greenman et al. (24), bad breath is one of the most common complaints reported by patients to dentists. Regarding the frequency of the presence of patients complaining of halitosis, most dentists reported that this was uncommon (56.8%), while the physicians reported that halitosis complaint was very frequent (63.2%). These findings may suggest that most patients seek dental treatment for other oral diseases than halitosis.

Regarding the perception of halitosis by the patients, the present study showed that most patients seeking the medical service were alerted by another person (78.9%) and only 10.5% had self-perception about the problem. However, among patients seeking the dentists, 66.7% had noticed the problem and 22.2% were alerted by another person (Table 1). According to Eli et al. (22), the perception of the own bad breath has psychological elements, not only among those concerned about bad breath but also among the general population. In this context, each one of us has a specific image of bad breath that affects the self-breath perception. Results pertaining to bad breath perception in this study suggest that patients who perceive their own bad breath have this condition to a given oral amendment.

The professional's perception regarding their patients' halitosis was considered not so frequent for more than half of the physicians and dentists. However, the procedure adopted while facing a case of halitosis was different between physicians and dentists: 57.9% of physicians would alert the patient about the problem versus 88.9% of dentists. Possibly, the dentists perceived the need to alert patients diagnosed with halitosis as an indicator of possible need for further treatment.

Eli et al. (22) named halitophobia the condition when a person is obsessed with the idea that other people can feel his/her bad breath. This obsession may compromise severely one's behavior, such as poor social interaction and the attempt to cover a problem that does not exist in reality. According to the results of the present study, the "imaginary halitosis" was rare (13.6%-26.3%), uncommon (77.8%-31.6%) and frequent (13.6%-42.1%) among patients seeking the medical and dental services, respectively (Table 1). The fact that the imaginary halitosis was more often reported by physicians may reflect that these professionals have a deeper knowledge on possible psychological and behavioral disorders. On the other hand, dentists usually have a closer contact with the patient during the dental treatment, which may be beneficial to the identification of any changes.

Halitosis is multifactorial and may require an interdisciplinary assessment and treatment involving professionals from dentistry, medicine, psychology and nutrition. In all cases, dental healthcare is needed (21). The present study showed that

most dentists and physicians perform the treatment for halitosis instead of referring to another professional. However, 20% of the dentists declared that they treat the patient and also refer him/her to another professional (Table 2). Fernandes et al. (25) emphasize the dentist's responsibility to treat local factors associated with halitosis, as well as to guide and educate the patient about the importance of oral hygiene. If the dentist suspects that the halitosis is related to systemic changes, it is advisable to refer the patient to other professionals specialized to treat such diseases. Since a multifactorial etiology may be present, the halitosis treatment requires that the healthcare professional examine the patient for local and systemic changes. The present findings show that dentists reported a combination of local and systemic alteration in 92.6% of the cases, while physicians believed that 84.2% corresponded to such condition (Table 2). Therefore, both dentists and physicians should have adequate knowledge about the triggering factors for halitosis.

About 90% of the causes of halitosis are located in the oral cavity such as caries, periodontal diseases, coated tongue, food impaction, prostheses and ill-adapted restorations, ulceration, fistula and neoplastic lesions (23). The causes related to otolaryngologic and respiratory diseases (8%) include pharyngitis, tonsillitis, sinusitis, bronchitis and cancer. Etiological factors also may be related to digestive system diseases (1%) as malabsorption syndrome, gastroesophageal reflux, esophagitis, hiatal hernia, *Helicobacter pylori* infections, and other diseases (1%), such as renal failure, halitophobia and diabetes.

In this study, physicians and dentists declared that the complete success of halitosis treatment is not high (Table 2). Bad breath is one of the most common patients' complaint reported to their dentists, and treatment usually consists of recommendations to improve oral hygiene and advice on the use of proprietary OTC treatments such as mouthwashes, toothpastes, lozenges, oral sprays and films designed to combat halitosis (24). It is difficult to assess the effectiveness of established treatments for halitosis, since there are few studies reporting results from clinical trials.

Methods for controlling bad breath should include masking substances, oral hygiene with antibacterial agents and transformation of volatile sulfur compounds into odorless forms and even the use of sodium bicarbonate (10). When evaluating the professionals' opinion about the success of the halitosis, 100% of physicians considered that they had a successful treatment when the patient is without halitosis and does not use masking substances. Among dentists 89% considered that they had succeeded in similar circumstances, while 6.2% were successful in the treatment when the patient is without halitosis but uses some artifice (Table 2). The treatment of halitosis has a scientific basis and not a cosmetic approach, requiring cooperation for follow-up appointments and adherence to the treatment and preventive program. Guidelines on oral hygiene should be performed for all patients with or without halitosis (21).

It should always be considered that the patient suffering from halitosis may have anxiety due to previous experience of unsuccessful treatment. Besides evaluation of diet and oral

hygiene orientation, which are essential for the treatment of halitosis, psychological counseling may be needed. Halitosis should be treated seriously, and a multifactorial and rationale approach is fundamental for obtaining good results (23). Santana et al. (5) remember that until recently the literature on halitosis often described only individual clinical cases. As a result, dentists and physicians did not have clear evidences to support clinical diagnosis and treatment; many preferred to ignore this great discomfort. This idea persisted for a long time and even today most of the curricula of dental and medical schools do not study this subject.

## Conclusions

Within the limitations of the present study, the results suggest that there is no high agreement between dentists and physicians regarding halitosis diagnosis and treatment. Healthcare professionals have an important role in the diagnosis and treatment of halitosis. However, it is important to emphasize the need of an interdisciplinary approach for the treatment of halitosis to prevent misdiagnosis or unnecessary treatment.

## References

1. Morita M, Wang HL. Association between oral malodor and adult periodontitis. A review. *J Clin Periodontol* 2001;9:831-9.
2. Tomas CI, Limeres PJ, Diz DP. Extraoral etiology of halitosis. *Méd Oral* 2001;1:4-7.
3. Crispim ASS, Sampaio MCC. Halitose – um desafio para o Estomatologista. *Rev. Faculdade de Odontol UFBA* 1999;18:53-9.
4. Silva UH, Figueiredo RLQ. Diagnóstico de causas bucais responsáveis pela halitose. *Informativo CRO-PB* 2001;16:3.
5. Santana NN, Almeida SC, Tomazinho LF. Halitose: abra a boca sem receio. *Arq Ciênc Saúde Unipar* 2006;10:113-5.
6. Delanghe G, Ghyselen J, Bollen C, Van Steenberghe D, Vandekerckhove BN, Feenstra L. An inventory of patients' response to treatment at a multidisciplinary breath odor clinic. *Quintessence Int* 1999;30:307-10.
7. Scully C, El-Maaytah M, Porter SR, Greenman J. Breath odor: etiopathogenesis, assessment and management. *Eur J Oral Sci* 1997;105:287-93.
8. Sterer N, Greentein RB, Rosenberg M. Beta-galactosidase activity in saliva is associated with oral malodor. *J Dent Res* 2002;3:182-5.
9. Young A, Jonsky G, Rolla G, Waler SM. Effects of metal salts on the oral production of volatiler sulfur-containing compounds (VSC). *J Clean Periodontol* 2001;8:776-81.
10. Brunette DM. Effects of baking-soda containing dentfrices on oral malodor. *Compend Conting Educ Dent* 1996;19:22-32.
11. Van Den Velde S, Van Steenberghe D, Van Hee P, Quirynen M. Detection of odorous compounds in breath. *J Dent Res* 2009;88:285-9.
12. Moreno T, Haas NA, Castro GD, Winter R, Oppermann RV, Rösing CK. Tratamento da periodontite agressiva e alterações nos compostos sulfurados voláteis. *Rev odonto ciênc* 2005;20:217-21.
13. Neiders M, Ramos B. Operation of bad breath clinics. *Quintessence Int* 1999;30:295-301.
14. Nadanovsky P. Papel do CD no diagnóstico e tratamento da halitose. *CRO-RJ Notícias*. 2000;1:4-5.
15. Henke J, Schustf F, Nissler K. Successful treatment of gut caused halitosis with a suspension of living non – pathogenic *Escherichia coli* bacteria-a case report. *Eur J Pediatr* 2001;10:592-4.
16. Tommasi AF. Diagnóstico em patologia bucal. 2nd ed. São Paulo: Pancast; 1989.
17. Tarzia O. Halitose. Rio de Janeiro: EPUC; 1991.
18. Lee PPC, Mak WY, Newsome P. The aetiology and treatment of oral halitosis: an update. *Hong Kong Med J* 2004;10:414-8.
19. Miyazaki H, Arao M, Okamura K, Kawaguchi Y, Toyofuku A, Hoshi K, et al. Tentative classification of halitosis and its treatment needs. *Niigata Dent J* 1999;32:7-11.
20. Yaegaki K, Coil JM. Clinical dilemmas posed by patients with psychosomatic halitosis. *Quintessence Int* 1999;30:328-33.
21. Ruiz DR, Cunha FA, Bussadori SK. Halitose. *ConScientiae Saúde* 2007;6:249-54.
22. Eli I, Baht R, Koriat H, Rosenberg M. Self-perception of breath odor. *J Am Dent Assoc* 2001;5:621-6.
23. Dal Rio ACC, Nicola EMD, Teixeira ARF. Halitose: proposta de um protocolo de avaliação. *Rev Bras Otorrinolaringol* 2007;73:835-42.
24. Greenman J, Duffield J, Spencer P, Rosenberg M, Corry D, Saad S, et al. Study on the Organoleptic Intensity Scale for Measuring Oral Malodor. *J Dent Res* 2004;83:81-5.
25. Fernandes LA, Lima DC, Gulinelli JL, Bidóia EM, Garcia VG. Halitose: aspectos de importância clínica para o cirurgião-dentista. *Rev. Fac. Odontol. Lins* 2007;19:57-63.