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Relationship between tonsil odor and oral malodor: a clinical study on 48 Iranian patients

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Abstract

The objective of this study is to evaluate tonsil odor as a contributor to halitosis and to study the reduction of oral malodor by mouth rinsing, without tonsil treatment. In 48 halitosis patients, tonsil odor and oral malodor were assessed through the 0–5 scale. In tonsil odor assessment, a dental burnisher was inserted into the tonsilar crypts and was sniffed by an odor judge. Oral malodor was analyzed through a plastic straw using the same scale by the same judge. The concentrations of H_2S, CH_3SH and $(CH_3)_2S$ were measured by a portable gas chromatograph (GC) (OralChroma) in ppb. After the baseline evaluations the subjects were instructed to scrape the surface of the tongue daily and rinse with a zinc-containing mouthwash twice daily for 1 month. After this period the same evaluations were repeated. Data were analyzed by SPSS software, paired *t*-test and Pearson correlation. Before mouthwash test: mean values of oral malodor scores and tonsil odor scores were 4.2 and 3.7, respectively. Pearson correlation analysis showed that oral malodor scores and tonsil odor scores had a significant correlation ($p = 0.025$). Oral malodor scores were correlated with the concentrations of H_2S ($p = 0.0001$), CH_3SH ($p = 0.041$) but not with $(CH_3)_2S$ concentration. After mouthwash test: mean values of oral malodor scores and tonsil odor scores were 2.2 and 3.0, respectively. Tonsil odor scores and oral malodor scores were not correlated. Also the paired *t*-test results showed that the effect of the mouthwash on the reduction of oral malodor and tonsil odor was not the same. Since oral malodor was successfully reduced while tonsil odor remained with a little reduction, it is concluded that tonsilar treatment such as tonsillectomy and laser cryptolysis might be considered only after the failure of mechanochemical therapy.

M A Persian translation of this abstract is available online

Introduction

The bacteria adhered to the surface of the oropharynx, especially the dorsum of the tongue, are the major cause of halitosis [1]. Since the surface area of the oral cavity is much more than the pharyngeal surface, it is estimated that small portion of halitosis comes from pharyngeal structures. Tonsillar cryptic area (with or without tonsillolith) has been reported as a halitosis-inducing factor [2–4], therefore ENT specialists use tonsillectomy and laser cryptolysis as a treatment for halitosis [5–7]. In some cases, tonsillectomy has been used prior to simpler treatment such as mouth rinsing. Tonsils of 9.9% of the patients who were admitted in our breath odor clinic in Isfahan (Iran) had been surgically removed due to halitosis or medical indications [8]. The patients whose tonsils had been surgically removed due to halitosis stated

that because of treatment failure they sought the remedy and visited the clinic. Actually, tonsilar treatment as the first step for halitosis treatment is not logical because the problem may be reduced satisfactorily by a simple mechanochemical treatment.

Aim

To evaluate the tonsil odor as a contributor to halitosis and to study the reduction of oral malodor by mouth rinsing, without tonsil treatment.

Methods

This study utilized data recorded in a breath odor clinic in Isfahan, Iran. In the clinic, all the patients who received halitosis therapy were recorded in a database. The criteria for the patient selection were as follows. First, the patients who suffered from one class of halitosis. In order to narrow the scope of the study and to reach to a better conclusion, the patients were selected from one class of halitosis. Since all the patients had been classified according to current classification [9, 10], only the data files of the patients with physiologic halitosis were searched. Second, the patients who completed two sessions of clinical evaluations. Third, the patients with tonsils. As the number of the patients without tonsils in the physiologic halitosis group was low, no control group was considered and therefore their data were omitted. Finally, the data from 48 patients (27 men, mean 32.11 (SD 11.43) years; 21 women, mean 27.86 (SD 8.56) years; range 22–65 years) were retrieved.

The patients visited the clinic from December 2005 until August 2006. Informed consent was not deemed necessary because of the retrospective nature of this study. The patients were asked to refrain from oral care including brushing and from eating on the appointment day. Also they were instructed to avoid any spicy foods, garlic and onion for 48 h before their appointments and avoid antibiotics for 2 weeks before appointment day. Most of the patients attended the clinic from 8 to 9 am and some attended from 9 to 10 am.

Organoleptic assessment. Tonsil odor (T) was assessed by an odor judge utilizing a large sterile dental burnisher according to the 0–5 scale [9, 10]. In order to avoid any contamination of burnisher, the tongue was pressed downwardly by a dental mirror then the burnisher was inserted into the crypts of left and right tonsils. Oral malodor (O) was analyzed by the same judge and scale using an odorless plastic straw. A privacy screen (50 cm × 70 cm) was placed between the patient and the judge in all assessments.

Chromatographic analysis. A sample of mouth air (5 ml) was taken by a special plastic syringe and injected into a portable gas chromatograph, OralChroma (Abilit Co., Japan). The concentrations of three volatile sulfur compounds (hydrogen sulphide, methyl mercaptan and dimethyl sulphide) were determined in 8 min. The device was connected to a laptop running DataManager software (version 3.02). It drew a chromatogram for each measurement and showed the concentrations of three gases in parts per billion (ppb).

Table 1. Statistical analysis results: before scraper and mouthwash test.

		T_1	H_1	M_1	D_1
O_1	Pearson correlation	0.324[a]	0.489[b]	0.295[a]	0.168
	Sig. (two-tailed)	0.025	0.000	0.041	0.253

[a] Correlation is significant at the 0.05 level (two-tailed).
[b] Correlation is significant at the 0.01 level (two-tailed).

Table 2. Statistical analysis results: after scraper and mouthwash test.

		T_2	H_2	M_2	D_2
O_2	Pearson correlation	0.200	0.067	0.249	0.097
	Sig. (two-tailed)	0.172	0.650	0.088	0.510

No correlation was found.

Scraper and mouthwash test. The patients were instructed to clean their tongues gently (30 strokes) with a commercial tongue scraper[4] daily and then rinse (with gargling) with 10 ml of a commercial zinc-containing mouthwash[4] twice daily as instructed by the manufacturer. They were instructed not to eat or drink up to 1 h afterwards. After one month, the patients attended the clinic and the previous evaluations were repeated while they observed the first session instructions.

Statistical evaluation. Data were analyzed by SPSS software, paired *t*-test and Pearson correlation.

Results and discussion

Before scraper and mouthwash test. Mean values of oral malodor scores (O_1) and tonsil odor scores (T_1) were 4.2 and 3.7, respectively. Pearson correlation analysis showed that oral malodor scores (O_1) and tonsil odor scores (T_1) had a significant correlation ($r = 0.324$, $p = 0.025$). Oral malodor scores (O_1) were correlated with the concentrations of H_2S (H_1) ($r = 0.489$, $p = 0.0001$), CH_3SH (M_1) ($r = 0.295$, $p = 0.041$) but not with $(CH_3)_2S$ (D_1) concentration (table 1).

After scraper and mouthwash test. Mean values of oral malodor (O_2) and tonsil odor scores (T_2) were 2.2 and 3.0, respectively. Pearson correlation analysis revealed that oral malodor scores (O_2) and tonsil odor scores (T_2) were not correlated (table 2). Since oral malodor was successfully reduced while tonsil odor remained with a little reduction, it is concluded that the mouthwash could not affect tonsil area efficiently. In spite of before mouthwash test, oral malodor scores (O_2) were not correlated with the concentrations of the gases (H_2, M_2, D_2).

The paired *t*-test for each individual parameter (table 3) revealed that the mouthwash effect on all parameters except for *D* (concentration of dimethyl sulphide) was significant. This finding proved that the mouthwash was effective enough to be used as an anti-halitosis agent.

[4] BreathRX, Discus Dental, Inc., CA, USA.

Table 3. Statistical analysis results: paired *t*-test results.

		Mean	Standard deviation	Sig. (two-tailed)
Pair 1	$O_1 - O_2$	2.02	0.821	0.000
Pair 2	$T_1 - T_2$	0.79	0.967	0.000
Pair 3	$H_1 - H_2$	342.60	350.003	0.000
Pair 4	$M_1 - M_2$	144.69	261.571	0.000
Pair 5	$D_1 - D_2$	10.00	41.507	0.102
Pair 6	$O_3 - T_3$	1.23	1.13	0.000

In order to compare the effect of mouthwash in reducing oral malodor and tonsil odor the parameters O_3 and T_3 were defined as follows: $O_3 = O_1 - O_2$ and $T_3 = T_1 - T_2$. These paired *t*-test results showed that the effect of the mouthwash on the reduction of oral malodor and tonsil odor was not the same (table 3). The result of this analysis was in agreement with clinical finding that the oral malodor reduction was more significant than tonsil odor reduction.

The clinical conclusion was that the mouthwash could not reduce both odors identically. This is reasonable because while rinsing and gargling a barrier is shaped by pressing the tongue over the pharyngeal septum to keep the solution in the oral cavity.

The tonsilar surface is not usually smooth and in most cases has crypts. They increase the tonsilar surface area and cause more bacteria to adhere to the surface. This area has a potential for malodor production. Although tonsil odor is statistically correlated with oral malodor it is not obvious how much oral malodor comes from the tonsil area. In this study, mechanochemical therapy (tongue scraping + mouthwash) proved that much of oral malodor was produced by the oral cavity and that a minor portion of oral malodor is produced by the tonsil area. Clinical importance of this finding is that oral malodor can be satisfactorily reduced by a simple treatment. Therefore, tonsillectomy or laser cryptolysis for halitosis treatment should only be considered after the failure of mechanochemical therapy.

Conclusions

It is concluded that tonsil odor is a probable contributor to oral malodor but oral malodor can be reduced to a socially acceptable level without tonsilar treatment.

References

[1] Tonzetich J 1971 Direct gas chromatographic analysis of sulphur compounds in mouth air in man *Arch. Oral Biol.* **16** 587–97
[2] Finkelstein Y 1995 The otolaryngologist and the patient with halitosis *Bad Breath: Research Perspectives* 2nd edn ed M Rosenberg (Tel Aviv, Israel: Ramot Publishing) pp 175–88
[3] Caldas M P *et al* 2007 Tonsillolith—report of unusual case *Br. Dent. J.* **202** 265–7
[4] Ansai T and Takehara T 2004 Tonsillolith as a halitosis-inducing factor *Br. Dent. J.* **198** 263–4
[5] Finkelstein Y, Talmi Y P, Ophir D and Berger G 2004 Laser cryptolysis for the treatment of halitosis *Otolaryngol. Head Neck Surg.* **131** 372–7
[6] Krespi Y P and Ling E H 1994 Laser-assisted serial tonsillectomy *J. Otolaryngol.* **23** 325–7
[7] Dal Rio A C, Passos C A, Nicola J H and Nicola E M 2006 CO_2 laser cryptolysis by coagulation for the treatment of halitosis *Photomed. Laser Surg.* **24** 630–6
[8] Talebian A, Tazhibi M, Semyari H, Iranpoor R, Talebian H, Oreizy S M and Khansari M 2008 Clinical evaluation of 222 Iranian patients with halitosis *J. Breath Res.* **2** 017015
[9] Miyazaki H *et al* 1999 Tentative classification for halitosis patients and its treatment needs *Niigata Dent. J.* **29** 11–5
[10] Yaegaki K and Coil J M 2000 Examination, classification, and treatment of halitosis: clinical perspectives *J. Can. Dent. Assoc.* **66** 257–61