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Knowledge of different medical and dental professional groups in Switzerland about halitosis

KEYWORDS

Halitosis,
intraoral causes,
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SUMMARY

Although halitosis is a widespread condition, it is still seen as too personal or embarrassing to talk about. The cause of real halitosis can be intraoral or extraoral.

In order to determine the level of knowledge of health care providers in Switzerland, a survey was conducted over a period of three years in which 150 family physicians, 150 ear, nose and throat specialists, 154 dentists and 151 dental hygienists were personally interviewed.

The survey shows that only 46.7% of the dentists and only 47.0% of the dental hygienists are consulted by patients for their halitosis, whereas 58.0% of the family physicians and 50.7% of the ENT specialists reported treating 1–10 patients for halitosis per year, while 46.7% of the ENT doctors

even reported treating 11–100 patients for halitosis per year. 81.5% of all interviewed doctors and dental hygienists were of the opinion that halitosis mainly originates intraorally.

76.0% of the dentists and 72.8% of the dental hygienists as well as 33.3% of the family physicians recommend periodontitis therapy as halitosis treatment.

This proves that a large percentage of medical professionals thinks that marginal periodontitis is the most common cause of halitosis.

This study also shows that patients seek first consultations with dentists and dental hygienists less often than with family physicians and ENT specialists, despite the fact that the cause of halitosis is primarily intraoral.

Introduction

Due to the increasing presence of the topic of halitosis in the media, both patients and various professional groups are becoming more aware of it. The widespread opinion is that the main cause of halitosis is an illness in the gastrointestinal tract, which is why many patients first consult a family physician or internist (FILIPPI & MÜLLER 2006).

85% to 90% of all cases of halitosis develop in the oral cavity, resulting from bacterial decomposition of organic materials from saliva, food residue, or sloughed-off epithelial cells (TONZETICH 1978, DELANGHE ET AL. 1997, ROSENBERG & LEIB 1997,

AMIR ET AL. 1999, DELANGHE ET AL. 1999A, SEEMANN ET AL. 2004, FILIPPI & MÜLLER 2006, MEYER 2006, FILIPPI 2011).

As 60% of all oral microorganisms are located on the tongue (GILMORE & BASHKAR 1972, GILMORE ET AL. 1973, YAEGAKI & SANADA 1992A, DE BOEVER & LOESCHE 1995), the coating of the tongue is chief among all oral factors resulting in halitosis.

Next to periodontal pockets, bacterial plaque – especially the uppermost layer (materia alba) – is a source of volatile sulfur compounds (VSC) because saliva proteins, epithelial cells and blood cell components accumulate here (TONZETICH & KESTENBAUM 1969). Bacteria produce VSC, which play an important

role in the development of halitosis (TONZETICH & RICHTER 1964, TONZETICH 1971, TONZETICH 1977, SCHMIDT ET AL. 1978, PERSSON ET AL. 1990, PRETI ET AL. 1992, ROSENBERG & MCCULLOCH 1992, YAEGAKI & SANADA 1992A, VAN STEENBERGHE ET AL. 2001, FILIPPI & MEYER 2004).

In professional halitosis consultation sessions, the coating of the tongue is diagnosed as one of the causes in 60% of the patients and as the only cause in 40% of the patients (QUIRYNEN ET AL. 2009). Further frequent oral causes are periodontitis and gingivitis (DELANGHE ET AL. 1999B). Candidiasis, caries, open root canals, neglected prostheses or insufficient oral hygiene lead to halitosis less frequently (TONZETICH 1978, YAEGAKI & SANADA 1992A, SÖDER ET AL. 2000, LANG & FILIPPI 2004, FILIPPI 2011).

The most common extraoral causes of halitosis are found in the ear, nose, and throat (ENT) area and amount to 5 to 8% of all cases (DELANGHE ET AL. 1997, DELANGHE ET AL. 1999A, DELANGHE ET AL. 1999B). The main ENT reasons leading to halitosis are tonsillitis (71%) and sinusitis (19%) (ROSENBERG & LEIB 1997). The gastrointestinal tract is rarely the reason for the development of halitosis (LAMBRECHT 2011, QUIRYNEN ET AL. 2009). Possible gastrointestinal causes are cardia insufficiency, gastroesophageal reflux or diverticulitis (STEPHENSON & REES 1990). Characteristic bad breath can also come from certain food products, such as coffee, onions or country-specific cuisine (JECKE 2002).

This paper aims to compare the results of a survey on the state of knowledge about halitosis between different medical professional groups and dental hygienists.

Materials and Methods

In this survey, 150 family physicians, 150 ENT specialists, 154 dentists and 151 dental hygienists were interviewed per-

sonally via telephone or during specialist conferences. As the number of family physicians and ENT specialists interviewed at conferences was not sufficient, the rest (54 family physicians and 70 ENT specialists) were interviewed by telephone. People who were interviewed by phone were chosen randomly from the register of medical specialists. We decided to use this survey method rather than sending questionnaires because we expected a higher response rate this way. Furthermore, during personal interviews based on questionnaires, questions can be explained and thus random answers are avoided.

The interview was comprised of ten questions (Tab.I) which examined the level of knowledge about halitosis of different medical professional groups and dental hygienists. Points of interest were whether patients had consulted them for bad breath, which medical field the halitosis patient should first contact and what they estimated the percentage of Europeans with halitosis to be. They were also asked what the main cause of halitosis was, in which field halitosis occurred most frequently and where, in general, halitosis patients are best cared for. In addition, questions focused on what their most common method of treatment was and if they used tongue cleaners during treatment. Lastly, it was determined whether special training courses or seminars concerning halitosis were offered in their field and if they had taken part in them.

Some of the questions were open-ended; others could be answered with yes or no. At the same time as this study, another survey was conducted to examine the halitosis-related knowledge of dentists and dental hygienists in Germany and Switzerland and dentists in France (OPPLIGER ET AL. 2013). The questions were identical. Part of this data (dentists and dental hygienists in Switzerland) was used and analyzed in this paper.

Tab.I The ten questions of the interview

Questions	Answers
Have you had/ Do you have patients who consult you for bad breath/halitosis?	<input type="checkbox"/> yes <input type="checkbox"/> no If yes, how many per year?
Where (which field) do you think the halitosis patient goes to first?
Are you aware of halitosis consultation hours?	<input type="checkbox"/> yes <input type="checkbox"/> no If yes, where?
What percentage of all Europeans have socially incompatible bad breath day and night?
What do you believe to be the most common cause for halitosis?
Where do you think a halitosis patient is best taken care of?	<input type="checkbox"/> Psychologists <input type="checkbox"/> Family physicians <input type="checkbox"/> Internists <input type="checkbox"/> Ear, nose and throat specialists <input type="checkbox"/> Dentists
In your field, what is the most common form of treatment for halitosis?
Do you use tongue cleaners during your treatment?	<input type="checkbox"/> yes <input type="checkbox"/> no If yes, which one?
Are continuing education courses offered in your field on this topic?	<input type="checkbox"/> yes <input type="checkbox"/> no
Have you taken part in such a continuing education course on this topic?	<input type="checkbox"/> yes <input type="checkbox"/> no

The descriptive statistics include cross tables with the number and percentage of cases as categorical parameters. The corresponding p-values were calculated with Fisher's Exact Test (p-values given in the tables). The level of significance was set at 0.05 error probability (two-sided) for all tests. The p-value is valid for all groups. Where $p < 0.05$, there was a significant difference in at least one group.

Results

Number of patients

The question "How many patients with halitosis do you see per year?" was answered by 599 of the respondents (n=605). 53.0% (n=79) of the dental hygienists and 53.3% (n=80) of the dentists treated no halitosis patients. Of 150 family physicians, 58.0% (n=87) reported having been consulted by 1–10 patients and 50.7% (n=76) of the ENT specialists were consulted by 1–10 patients ($p < 0.001$). 56.7% of the ENT specialists, 8.1% of the dental hygienists, 7.3% of the dentists, and 6.7% of the family physicians treated between 11 and 100 patients for halitosis per year ($p < 0.001$) (Tab. II).

Europeans with halitosis

The question "What percentage of Europeans have chronic bad breath?" was answered by 571 respondents (n=605). 76.2% of the ENT specialists, 62.2% of the family physicians, 29.4% of the dentists, and 22.7% of the dental hygienists believed that 0% to 10% of all Europeans suffer from chronic halitosis ($p < 0.001$). 25.9% of the surveyed family physicians, 24.2% of the dentists, 20.3% of the dental hygienists, and 19.0% of the ENT specialists were of the opinion that 11%–20% of all Europeans have chronic halitosis ($p < 0.001$). In analyzing this question, respondents who did not answer were not considered.

Most common cause

81.5% of all those surveyed (n=492) claimed that intraoral factors were the most common cause of halitosis. Among them were 69.3% of all family physicians (n=104), 72.7% of all ENT specialists (n=109), 86.4% of all dentists (n=133), and 97.3% of all dental hygienists (n=146) ($p < 0.001$). The second highest percentage, 6.8% (n=41), named gastroenterological problems as the most common cause (12.7% of the family physicians, 7.8%

of the dentists, 6.0% of the ENT specialists and only 0.7% of the dental hygienists [$p < 0.001$]). The third highest percentage, 5.8% (n=35), cited tonsillitis (15.3% of the ENT specialists, 6.0% of the family physicians, 1.3% of the dentists and 0.7% of the dental hygienists [$p < 0.001$]). 1% or less named illnesses in the upper respiratory tract, nutrition, mouth breathing, psychological problems, smoking, reflux, and xerostomia as the most common cause.

Where are the patients best cared for?

Of the surveyed family physicians, 45.3% (n=68) thought that halitosis patients are best looked after by a family physician/ internist. 97.3% (n=146) of the dental hygienists, 93.5% (n=144) of the dentists, and 42.0% (n=63) of the ENT specialists would send patients with halitosis to a dentist first ($p < 0.001$). Not one of the dentists thought the patient would be best cared for by an ENT specialist. 6% (n=9) of the family physicians and 4.7% (n=7) of the ENT specialists suggested that halitosis patients should be treated by an interdisciplinary team of doctors. None of the dentists or dental hygienists agreed with this ($p < 0.001$). One ENT specialist would refer his halitosis patients to a psychologist (Tab. III).

Most common therapy

Analyzing the question of the most common form of treatment, 577 of 605 possible answers were considered (4 dental hygienists and 24 family physicians did not respond to this question). Treating periodontitis was the most common form of therapy for 72.8% of the dental hygienists and 76.0% of the dentists. 33.3% of the family physicians and 9.3% of the ENT specialists claimed that patients with halitosis should be primarily treated for periodontitis ($p < 0.001$).

Of the ENT specialists, 45.3% answered that treating tonsillitis is their primary therapy. The second most common therapy for halitosis mentioned by 24.6% of the family physicians and 22.7% of the ENT specialists was using a mouthrinse. This form of therapy was recommended by only 1.9% of the dentists and none of the dental hygienists ($p < 0.001$). Only 24.5% (n=36) of the dental hygienists, 17.5% (n=27) of the dentists, 9.5% (n=12) of the family physicians and 1.3% (n=2) of the ENT specialists recommended using tongue cleaners first ($p < 0.001$). Contrary

Tab. II Estimated number of patients treated for halitosis per year within the individual professional groups

	Dental Hygienists	Family Physicians	ENT Specialists	Dentists
None	79 (53.0%)	53 (35.3%)	4 (2.7%)	80 (53.3%)
1–10	58 (38.9%)	87 (58.0%)	76 (50.7%)	59 (39.3%)
11–100	12 (8.1%)	10 (6.7%)	70 (46.7%)	11 (7.3%)

Tab. III Assessment of where the halitosis patients are best cared for according to the individual professional groups

	Dental Hygienist	Family Physician	ENT Specialist	Dentist
Family Physician	0.7% (n=1)	45.3% (n=68)	22.7% (n=34)	6.5% (n=10)
ENT Specialist	2.0% (n=3)	5.3% (n=8)	30.0% (n=45)	0.0% (n=0)
Dentist	97.3% (n=146)	43.3% (n=65)	42.0% (n=63)	93.5% (n=144)
Interdisciplinary	0.0% (n=0)	6.0% (n=9)	4.7% (n=7)	0.0% (n=0)

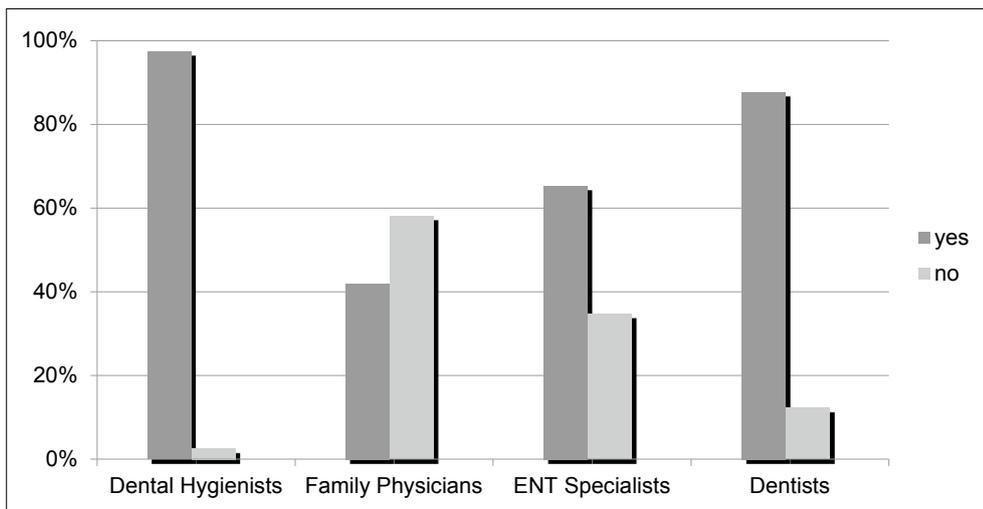


Fig.1 Frequency of recommendation of tongue cleaners as part of the halitosis treatment within the individual professional groups

to the dental hygienists and the dentists, 3.2% of the family physicians and 2.0% of the ENT specialists treated halitosis primarily with antibiotics ($p=0$).

Use of tongue cleaners

All 605 participants answered the question about whether tongue cleaners were used for the treatment of halitosis. 97.4% ($n=147$) of the dental hygienists, 87.7% ($n=135$) of the dentists, but only 65% ($n=98$) of the ENT specialists recommended this form of treatment. Only 42% ($n=63$) of the family physicians recommended tongue cleaners as part of the treatment ($p<0.001$) (Fig.1).

Continuing education

The question of whether or not continuing education concerning halitosis was offered in their field was answered by all 605 participants. 82.0% ($n=123$) of the ENT specialists, 67.5% ($n=102$) of the dental hygienists, 64.9% ($n=100$) of the dentists answered the question with “yes” and 68.0% ($n=102$) of the family physicians with “no” ($p<0.001$). All 605 participants also answered the question of whether or not they had attended a form of continuing education about halitosis. 68.0% ($n=102$) of the ENT specialists and 64.9% ($n=98$) of the dental hygienists had attended such an event. 82.0% ($n=123$) of the family physicians and 70.8% ($n=109$) of the dentists had never taken part in such training ($p<0.001$).

Discussion

Both doctors and patients in Switzerland generally view halitosis as a result of pathological changes in the gastrointestinal tract (SEEMANN 2000, SEEMANN ET AL. 2004). This was also affirmed in the present survey. 46.7% of the ENT specialists stated that they treated 11–100 patients for halitosis per year. On the other hand, 53.0% of the dental hygienists and 53.3% of the dentists did not treat any halitosis patients and 38.9% of the dental hygienists and 39.3% of the dentists only 1–10 patients per year. This leads to the conclusion that most patients do not see halitosis primarily as an oral problem and thus first consult a family physician or ENT specialist. Another reason for this could be that talking about and diagnosing halitosis is still a taboo at a dental appointment.

A study from Japan shows that 14.5% of those surveyed have problems with bad breath (SAITO & KAWAGUCHI 2002). Other in-

vestigations revealed that about 6 out of 100 people suffer from socially incompatible bad breath at certain times during the day (FILIPPI 2009). The majority of the surveyed medical professional groups believed that 0–10% of all Europeans have chronic halitosis. Interestingly, just as many dentists and dental hygienists (24.2% and 20.3%) were of the opinion that 11%–20% of all Europeans suffered from chronic halitosis.

Quite a large number of respondents stated that the most common cause is found intraorally. Furthermore, 90% of the dentists and dental hygienists and 42% of the ENT specialists thought that halitosis patients were best looked after by the dentist. Only 45.3% of all family physicians recommended that halitosis patients first consult a family physician or a specialist for internal medicine. This shows that promoting education concerning halitosis for different medical professional groups and dental hygienists was successful. Comparing various first-contact points with the number of patients per year, it becomes evident that the recommendation to first go to the dentist must be more consistently communicated to the patient, especially by the family physicians. One single ENT specialist would refer his halitosis patients to a psychologist. This is not surprising, as many participants of this survey did not know or were not able to explain the characteristics of pseudo-halitosis and halitophobia.

72.8% of the dental hygienists, 76.0% of dentists, and 33.3% of the family physicians most frequently recommended treatment for periodontitis. A number of studies have shown that periodontitis therapy by means of both curettage and periodontal surgery and also improvement of oral hygiene leads to a reduction of VSC (TONZETICH & SPOUGE 1979, SEEMANN 1999, SEEMANN ET AL. 2001). However, this also shows that many members of these medical professional groups still believe periodontitis to be the most common cause of halitosis.

Although about 60% of all oral microorganisms are on the surface of the tongue (YAEGAKI & SANADA 1992A, B, DE BOEVER & LOESCHE 1995), only 24.5% of the dental hygienists, 17.5% of the dentists, 9.5% of the family physicians and 1.3% of the ENT specialists named cleaning the tongue as primary form of treatment. 58.0% of the family physicians did not recommend the use of tongue cleaners, although several surveys have shown that cleaning the tongue leads to a reduction of VSC and thus to a reduction of halitosis (GILMORE & BHASKAR 1972, GILMORE ET AL. 1973, TONZETICH & NG 1976, KAIZU ET AL. 1978, TONZETICH 1978,

VASILAKIS & PREIS 1981, RALPH 1988, YAEGAKI & SANADA 1992B, BOSY ET AL. 1994, DE BOEVER & LOESCHE 1995, MIYAZAKI ET AL. 1996, CLARK ET AL. 1997, VOLLMER 1997, CARLSON-MANN 1998, QUIRYNEN ET AL. 1998).

The most common form of therapy applied by 45.3% of all ENT specialists is treating tonsillitis. This corresponds with another study that showed chronic tonsillitis to be named as the most common cause of halitosis by 71% of ENT professionals (ROSENBERG & LEIB 1997).

The second most common form of treatment was using a mouthrinse for 24.6% of the family physicians and 22.7% of the ENT specialists. Other studies have shown, however, that mouthrinses as well as chewing gum and lozenges merely mask the effects and do not have any influence on treating the causes of halitosis (QUIRYNEN ET AL. 2002).

68.0% of the family physicians stated that halitosis had never been a topic during advanced training courses. This shows the great need for increasing and deepening knowledge, especially that of family physicians, concerning this issue.

82.0% of the family physicians and 70.8% of the dentists have never taken part in a continuing education course focused on halitosis. This is remarkable because 64.9% of the dentists said that these courses were offered in their field, but they evidently only met with little interest. Astonishingly, although about 68.0% of the ENT specialists stated to have participated in a continuing education course, 45.3% of them still chose tonsillitis treatment as the primary form of therapy. The question arises whether or not tonsillitis treatment is still recommended as the best therapy during these courses. This should be investigated in further surveys. During the present survey, many family physicians mentioned that regarding continuing education courses in their field, there are issues more important and relevant for their patients than halitosis.

Given the fact that all dentists and dental hygienists, about half of the ENT specialists and a third of the family physicians were interviewed exclusively during the mentioned events, it can be assumed that they were all willing to take part in them.

Consequently, it can be expected that the level of knowledge about halitosis is indeed lower in the different fields than portrayed in this paper.

This survey shows that different medical professional groups and dental hygienists have acknowledged halitosis to be primarily an intraoral problem. Many are convinced that periodontitis is the main cause. Therefore, it is important to more heavily emphasize the influence of the tongue coating on the development of halitosis and the effectiveness of tongue cleaning as a form of treatment.

Résumé

L'halitose est très répandue dans la population, mais demeure malgré tout un thème tabou. Une vraie halitose peut trouver son origine soit intrabuccale soit extrabuccale.

Afin de recenser les connaissances à ce sujet auprès du personnel spécialisé, des enquêtes personnalisées ont été réalisées auprès de 150 médecins généralistes, 150 oto-rhino-laryngologistes, 154 dentistes et 151 hygiénistes dentaires sur une période de trois ans.

Cette étude met en évidence que seuls 46,7% de dentistes et 47% d'hygiénistes dentaires ont été consultés dans leur cabinet par des patients atteints d'halitose, alors que 58% de médecins généralistes et 50,7% de médecins ORL soignent de un à dix patients par an, et que même 46,7% des médecins ORL soignent 11 à 100 patients par an.

81,5% de l'ensemble des médecins et des hygiénistes dentaires consultés sont d'avis que l'halitose est d'origine intrabuccale.

76% des dentistes, 72,8% des hygiénistes dentaires et 33,3% des médecins généralistes préconisent un traitement parodontal. Cela confirme que la majorité du personnel spécialisé estime que la parodontite est la cause la plus fréquente de l'halitose.

Cette enquête met en évidence que le dentiste et l'hygiéniste dentaire sont plus rarement consultés en premier que les médecins généralistes et les médecins ORL, alors que les causes intrabuccales sont le plus souvent responsables de l'halitose.

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