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The Efficiency and Acceptance of a Suction Tongue–Cleaning Device in Adults

KEYWORDS

TS1 suction tongue cleaner
Tongue cleaning
Tongue sanitizer

SUMMARY

Halitosis is often caused by a change in the oral biofilm, primarily located on the surface of the tongue. A suction tongue cleaner enables professional cleaning of the tongue. The aim of this study was to investigate the acceptance and efficiency of a suction tongue–cleaning device in adults in comparison to a conventional manual tongue cleaner in an office (professional) setting. Both were tested simultaneously on 100 individuals with a split–mouth (i. e. half–tongue) design, between the ages of 19 to 31, at the University Center for Dental Medicine Basel UZB. To evaluate the efficiency of the cleaning, photos were taken before and after the cleaning and later assessed by using a modified coating tongue index by Winkel (WTCl). Both cleaning devices significantly reduced the coating on the tongue ($p < 0.001$). In 58 cases, the side cleaned with the suction tongue cleaner resulted to be cleaner in compari-

son to the side which was cleaned manually. There were no significant differences in acceptance on a visual analogue scale (VAS, 0–10 cm) between the devices ($p = 0.259$). However, 53 subjects favored the manual method in comparison to 36 who favored the suction device. The remaining 11 did not convey any preference for either. Both devices triggered an equally frequent gag stimulus. With 95%, the majority of the patients who had this treatment would undergo it a second time. In conclusion, both cleaning devices resulted in a significant reduction of tongue coating, and the usage in general can be highly recommended. While it does not matter which one is used, the suction tongue–cleaning device offers a good alternative to manual tongue–cleaning devices in dental clinics and can be considered a viable adjunct for in–office use.

Introduction

Changes in the oral biofilm are often responsible for the development of halitosis. Between 60 and 80% of the bacteria present in the oral cavity may be found coating the dorsum of the tongue (DE BOEVER & LOESCHE 1995; FILIPPI 2011A, 2011B). This agglomeration plays an important role in halitosis. In 40–50% of diagnosed cases, this dorsal coating has been found to be the sole cause of the patient's bad breath (DELANGE ET AL. 1999; QUIRYNEN ET AL. 2009; FILIPPI 2011A). The odor active components of some bacteria found on the tongue's surface, when metabolically activated, result in the formation of volatile sulfur compounds, which have a noxious smell (TONZETICH & RICHTER 1964; TONZETICH 1971; McNAMARA ET AL. 1972; TONZETICH 1977; SCHMIDT ET AL. 1978; DELANGE ET AL. 1997; VAN STEENBERGHE ET AL. 2001; FILIPPI & MEYER 2004; QUIRYNEN ET AL. 2004; LANG & FILIPPI 2004A; KRESPI ET AL. 2006; FILIPPI 2011B). Biofilm can be reduced through mechanical cleaning of the tongue's surface (DELANGE ET AL. 1997; QUIRYNEN ET AL. 2004; LANG & FILIPPI 2004B; KRESPI ET AL. 2006; MATSUI ET AL. 2014; SEEMANN ET AL. 2014), leading to a reduction or elimination of the odorous components and decreasing/eliminating bad breath (TONZETICH & NG 1976). Tongue-cleaning should therefore be carried out during professional halitosis consultations.

The topic of bad breath is of increasing importance in today's world consequently increasing the spectrum of various devices ranging from brushes to scrapers that the patient is able to choose from. Nevertheless, tongue-cleaning treatments have not been incorporated into dental treatment in most dental offices (ZÜRCHER & FILIPPI 2016B). This leads primarily to the fact that tongue-cleaning takes place at home.

The University Center for Dental Medicine Basel UZB has been offering halitosis consultations since 2003. In addition to the general and special halitosis medical history, further findings and saliva diagnostics permit the development of an individual therapy plan for each patient (ZÜRCHER ET AL. 2012; ZÜRCHER & FILIPPI 2016A; SCHUMACHER ET AL. 2017). Once a coating of the tongue is diagnosed, its cleaning will follow (ZÜRCHER & FILIPPI 2016A). For home usage, tongue-cleaning should be embedded into our daily routine, performed two to three times per day (FILIPPI 2011B; SEEMANN ET AL. 2014; SCHUMACHER ET AL. 2017).

In 2015, a novel tongue-cleaning device (TS1, TSpro GmbH, Karlsruhe, Germany) appeared on the market. This disposable appliance is connected to the suction device of a dental unit and may be used to perform professional tongue-cleaning (ZÜRCHER & FILIPPI 2016A, 2016B).

In a previous clinical study (RICKENBACHER ET AL. 2019), the acceptance of the TS1 suction tongue cleaner was tested on children. 162 children between the ages of 5 and 18 were asked to evaluate the treatment on a visual analogue scale, ranging from 0 (not acceptable) to 10 (highly acceptable), comparing the TS1 with a conventional toothbrush to clean their tongue. The second part of the study comprised an evaluation of the motivation of the children who then independently cleaned their tongues with a manual toothbrush over a period of a month. In this case the efficiency of the bacterial reduction of the tongue was not evaluated.

The aim of the present study was to investigate professional (in-office) usage between a manual tongue cleaner and the TS1 suction device if used on adults. Differences are divided into a primary outcome (efficiency) and a secondary outcome (acceptance).

Materials and methods

The TS1 was used on 100 participants. The minimum sample size was calculated by the Clinical Trial Unit at the University of Basel (CTU) to be 29 participants. It was raised up to 100 participants to further increase confidence in the analysis. The subjects were recruited at the University Center for Dental Medicine Basel UZB by showing up voluntarily on various preset time schedules. The time schedules were announced at the University Center for Dental Medicine Basel UZB prior to the cleaning. In order to participate, volunteers had to be between the ages of 19 and 31 and systemically healthy. Currently suffering from halitosis was not necessary to join the study. Further criteria that excluded the participation were the intake of antibiotics, acute sinusitis, currently suffering from asthma or hay fever and a pronounced gag reflex. The volunteers were informed verbally and in written form about the course of the study and confirmed their participation with their signature.

The study was approved by the Ethics Commission in Northwest and Central Switzerland EKNZ (No. 2015/218).

The devices used for tongue-cleaning were a novel tongue-cleaning device (TS1, TSpro GmbH, Karlsruhe, Germany) and manual tongue cleaner. The manual tongue cleaner is equipped with four rubber blades with a flat and a scraping side and nubs on the flat side, which would allow easier application of tongue gel.

Prior to cleaning, the participants had to answer a questionnaire composed of general and specific questions relevant to the topic. On a visual analogue scale ranging from 0 cm (no stimuli) to 10 cm (strong stimuli), they were asked to evaluate their gag reflex as well as their personal experience with tongue-cleaning devices, addressing the frequency and the product used (Fig. 1).

In order to obtain a non-subjective assessment of the cleaning, volunteers were asked to close their eyes during the procedure. A special device was attached to the manual tongue cleaner, not to allow the subject to identify either of the two methods through sound (Fig. 2). Both cleaners were moistened with water before usage, to improve the gliding capacity. A photo (Nikon D7100: focal length 105, f-number 29, exposure time 1/125, ISO 200) was taken to evaluate the clinical situation before cleaning.

The cleaning was carried out by an expert (standing in front of the subject, while the subject was sitting straight in a dental chair) during a single appointment with a split-mouth (i.e. half-tongue) design, hence each side of the tongue was cleaned consecutively with a different device, for 40 seconds. The sequence (which device would start) was randomized (Research Randomizer, www.randomizer.org) and then noted on the result sheets.

During the first 20 seconds, serpentine-like movements were performed with the knobbed side of the suction tongue cleaner, while with the manual tongue cleaner, circular movements were done on the flat side. This was executed, while the practitioner held the tip of the tongue with a damp compress. This step was followed by removing (20 seconds) the previously loosened biofilm with the back of the device. This meant that the TS1's lamella side was used and the manual version was used with its scraping edge facing the tongue. The cleaning was performed from the posterior to the tip of the tongue on the respective dorsal half. Another post-cleaning picture was taken for evaluation purposes.

After each side was cleaned, the participant was able to judge the procedure via using a visual analogue scale, assessing

Questionnaire Part 1: General Questions

General Questions

Age _____

Gender f m

Health Questions

Do you currently have a cold / flu? Yes No

Are you currently suffering from asthma / hay fever? Yes No

Are you taking antibiotics at the moment? Yes No

Do you currently have an acute sinus infection (sinusitis)? Yes No

Gag reflex Question

Please assess your gag reflex (mark with a cross on the line)

no stimuli _____ strong stimuli

Experience with tongue cleaning products

Product _____

Frequency _____

Fig.1 Questionnaire Part 1: General Questions

how pleasant the treatment was, ranging from 0 cm (very unpleasant) to 10 cm (very pleasant), and if they would undergo treatment again. In the case of varying results between both methods, the subject was asked to give a reason in key words, which treatment she or he stipulated was preferred (Fig. 3). In the meantime, the examiner noted whether one of the two devices had resulted in stimulating a gag reflex during cleaning. The strength of this stimulus was scrutinized by using the Gag-



Fig.2 A modified manual tongue cleaner with a disposable suction device

ging Severity Index (GSI) (DICKINSON & FISKE 2005). With a wooden spatula, the back of the tongue and its sides were lightly touched in order to receive a better idea of the person's gag reflex (1 normal to 5 pronounced) as compared to undergoing the procedure with one of the devices. The photos taken before and after the tongue-cleaning were used to evaluate the efficiency of the procedure. This was assessed by the two people in charge of the halitosis consultation in a lecture hall, where the images were projected and enlarged, while not knowing which tongue-cleaning devices had been used on which side.

An evaluation of the coating of the tongue was performed using a modified coating tongue index by Winkel (WTCI, Winkel Tongue Coating Index) (WINKEL ET AL. 2003). The tongue was divided into two anterior and two posterior fields. The evaluation per field ranged from 0 = no tongue coating (pink), 1 = light coating (pink tongue color is still visible under the coating) and 2 = strong coating (no more pink tongue color visible). The summary of all values of the four fields resulted in a WTCI value between 0 and 8. Eventually, the side that was visually cleaner was written down in order to compare the similarity between the visual cleanliness of the tongue-cleaning and the WTCI (Fig. 4).

All data was calculated with the statistics program R Version 3.5.1. Non-parametric analyses were undergone so as not to create a disparity of the score values regarding its distribution when performing a group comparison (Wilcoxon Rank-Sum

Fig. 3 Questionnaire Part 2: Clinical Examination

Questionnaire Part 2: Clinical Examination

Please assess the tongue cleaning

How pleasant was the cleaning on... (mark with a cross on the line)

...the right side

very unpleasant _____ very pleasant

...the left side

very unpleasant _____ very pleasant

If so, why was one side more pleasant than the other (please comment with key words)

Would you undergo tongue cleaning again on...

...the right side Yes No

...the left side Yes No

Test of Wilcoxon Sign Rank Test for paired data). Additionally, a general linear model was calculated in order to enable a comparison between purified vs. unpurified. All tests were performed with a statistical discrepancy of 5% error probability ($\alpha \leq 0.05$). Due to the purely explorative nature of the study, the significant variance for multiple comparisons was not adjusted. The result is a ratio including 95% CI and p-value. For 2x2 contingency tables a Fisher's exact test was performed and the esti-

mated odds ratios including 95% CI and p-value were presented. The significance level was $\alpha \leq 0.05$.

Results

In total there were 100 participants, 60 females and 40 males, between the ages of 19 and 31 (\bar{x} 23.97; SD 2.56). Since the recruitment took place at the University Center for Dental Medicine Basel UZB, the majority of the participants were dental

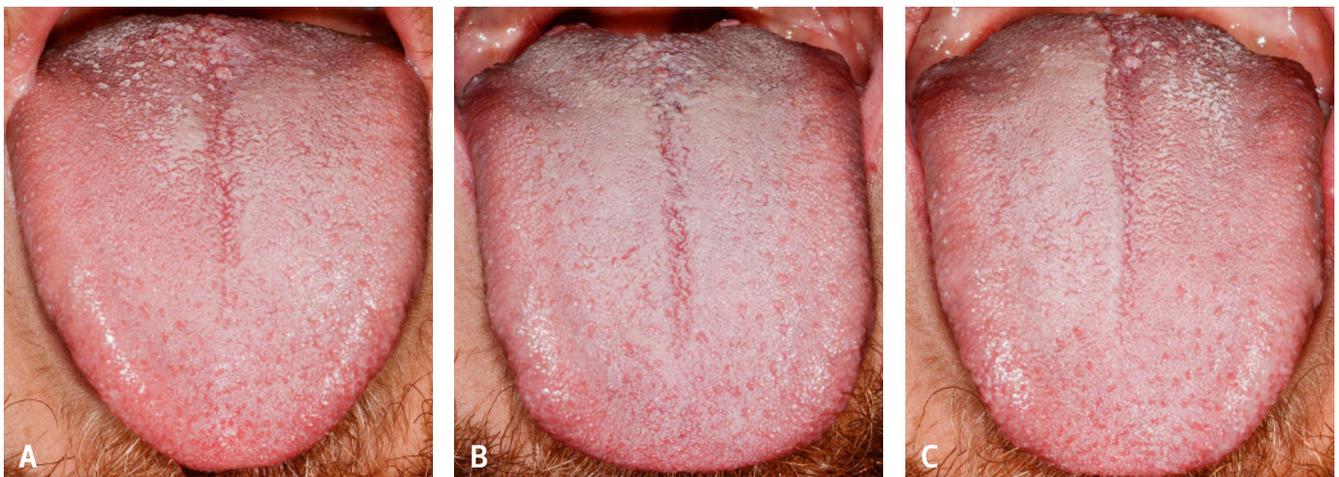


Fig. 4 An excerpt from the result sheet to evaluate the pictures taken of the tongue: a) right side cleaned, b) uncleaned, c) left side cleaned

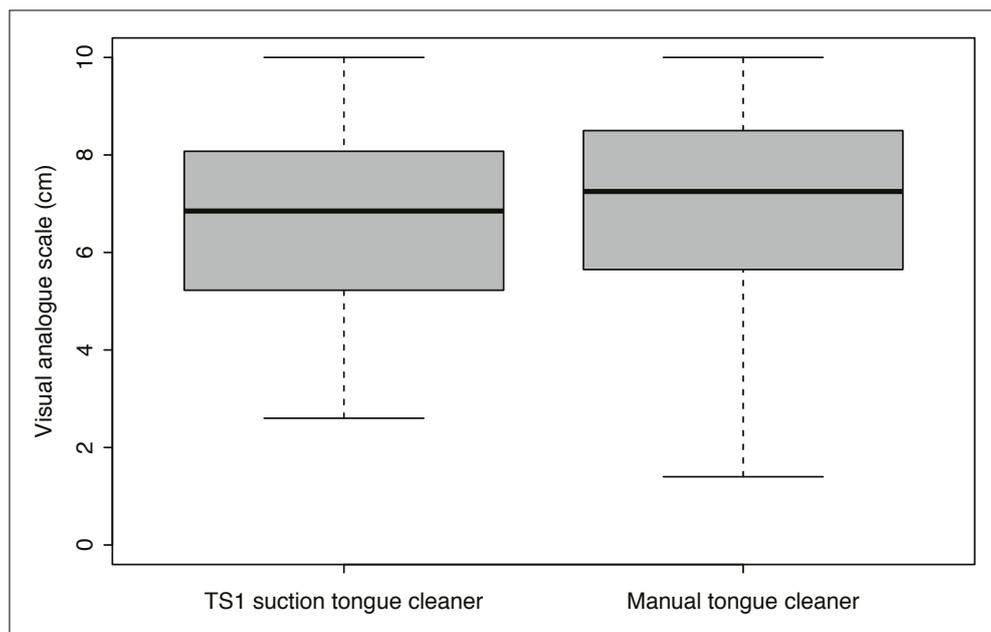


Fig.5 A box plot graph comparing both devices via a VAS (scale range 10 cm = very pleasant, 0 cm = very unpleasant)

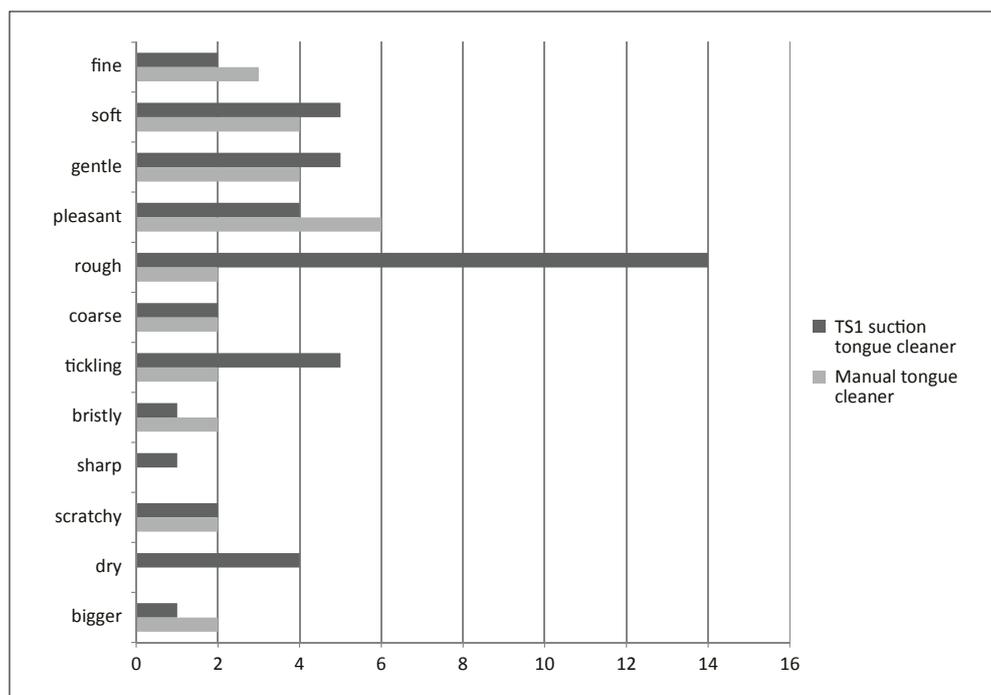


Fig.6 Frequency of adjectives used to describe the sensation during tongue-cleaning

students (90%). The remaining 10% were students from other departments. When assessing the subjective perception of the treatment with a manual device (\bar{x} 6.9 cm; SD 2.0 cm) in comparison to the TS1 suction tongue cleaner (\bar{x} 6.8 cm; SD 1.8 cm), no significant statistical data was noted (median difference 0.3, 95%CI -0.25/0.85, $p = 0.259$), as displayed in Figure 5. Whereas 53% of the participants favored the manual tongue cleaner, 36% of the subjects preferred the TS1 suction tongue-cleaning device. The remaining 11% considered either one as being equally pleasant.

The most frequently used word to describe a negative sensation was “rough”, followed by “tickling”, “dry” and “scratchy”. Other words, such as “pleasant”, “gentle” and “soft”, were applied when reflecting a positive connotation and experience of the cleaning procedure (Fig. 6).

There was no statistical difference in the acceptance between the TS1 suction tongue cleaner and a manual tongue cleaner (OR 1, 95%CI 0.2/4.5, $p = 1$). Five volunteers could not imagine undergoing treatment again with either of the tongue cleaners.

The number of stimulated gag reflexes did not vary statistically between the devices used (manual tongue cleaner, $n = 8$, and suction tongue cleaner, $n = 9$) (OR 1.14, 95%CI 0.37/3.55, $p = 1$).

The nine participants who had to choke with either of the tongue cleaners had estimated beforehand a high likeliness of choking on the visual analogue scale. This estimate was in fact higher in their case than with the rest of the participants ($n = 91$) who did not have to choke during the cleaning procedure (median difference 4.2, 95%CI 2.4/6.0, $p < 0.001$). In the GSI score eight out of nine subjects showed a gag reflex with a value of 2

Tab.1 Table displaying the subjective Gag Severity Indices

Part. Number	Self-evaluation on a visual analogue scale (cm)	Exhibited gag reflex		GSI-Score
		TS1 suction tongue cleaner	Manual tongue cleaner	
17	8.62	yes	yes	2
19	10	yes	yes	2
20	6.71	yes	yes	2
35	8.6	yes	yes	2
37	8	yes	no	2
38	4.12	yes	yes	2
42	6.3	yes	yes	2
75	5.1	yes	yes	1
94	9.6	yes	yes	2

(light gagging – the patient could control the gag reflex themselves with the support of the treatment team). A value above 2 was not measured (Tab. 1).

The evaluation of the WTCl showed that the tongue coating decreased by a factor of 0.63 (95%CI 0.58/0.7, $p < 0.001$) after applying the TS1 suction tongue cleaner and by a factor of 0.68 (95%CI 0.62/0.75, $p < 0.001$) after using the manual tongue cleaner. Although in 58 of 100 cases the side cleaned by the TS1 tongue cleaner was evaluated as being visually cleaner, statistically there was no difference between the suction tongue cleaner and the manual tongue cleaner (median difference 0.5, $p = 0.493$). It is important to note, that a total of 23 out of 100 volunteers had a thick coating on the tongue before cleaning (WTCl ≥ 3 per half of the tongue).

70 participants already had experience with a manual tongue cleaner; more frequently females ($n = 48$) than males ($n = 22$). Women who participated in this study had more experience with tongue cleaners than men (OR 3.2, 95%CI 1.2/8.8, $p = 0.013$). 31 subjects used a tongue cleaner daily, 13 weekly, 6 every month and 20 subjects used a manual tongue cleaner very rarely or had tried it only once.

Discussion

The results of the present study reflect that the TS1 suction tongue cleaner removes the tongue coating as well as a manual tongue cleaner. The subjective assessment of tongue-cleaning showed no difference on the visual analogue scale between the TS1 and the manual tongue cleaner. In 95% of the cases the participants would agree to repeat the treatment with a TS1 suction tongue cleaner and a manual tongue cleaner. The results showed that the volunteers were motivated to use the TS1 suction tongue cleaner and that there was no difference between the acceptance of the suction tongue-cleaning device and the manual tongue cleaner on a visual analogue scale, even though the manual cleaner was slightly preferred subjectively as shown in Figure 6. However, it should be noted that only a few subjects (23 out of 100) had a thick tongue coating with a WTCl of 3 or more measured per half of the tongue. Further,

water was used instead of a tongue paste in this study to increase the gliding capacity, so that the taste did not distract the volunteers.

One problem with tongue-cleaning is the long-term effectiveness. A study reported that tongue coating returned to its baseline (i.e. prior to cleaning) after only two days of not cleaning the tongue anymore (CHÉREL ET AL. 2008). Another study did not show either any significant difference when comparing the WTCl after three and ten days prior to cleaning when compared to subjects who did not clean their tongue at the beginning (MATSUI ET AL. 2014).

Therefore, tongue-cleaning should be performed on a daily basis (as stated earlier). This means that periodic professional de-plaquing cannot substitute daily home tongue-cleaning. The idea of professional tongue-cleaning in a dental office can rather be seen as a tool to inform patients about tongue-cleaning, to teach and help patients to perform correct tongue-cleaning (with providing information about the many devices available for home usage), or to just remind patients to clean their tongue regularly. Nevertheless, there still is a scientific need to study novel professional tongue-cleaning products to better understand their efficiency in improving and guaranteeing successful, professional treatment (professional tongue-cleaning) in dental appointments, such as in professional halitosis consultations.

Another benefit of professional tongue-cleaning is the obvious inspection of the tongue coating and possible help with further treatment where needed. While tongue coating caused by bacterial overgrowth has already been mentioned earlier in this study, it is important to distinguish between fungal overgrowth and bacterial overgrowth. Fungal overgrowth on the tongue is an infection, known as candidiasis or thrush, caused by any of the *Candida* species (SING ET AL. 2014). The difference is that candidiasis presents itself on the tongue as a whitish-yellow creamy confluent plaque (PATIL ET AL. 2015), which can be removed but will leave an underlying erythematous and occasionally bleeding surface (ASHMAN & FARAH 2005; FARAH ET AL. 2010), whereas tongue coating caused by bacterial overgrowth will not leave such a mark. Using a tongue cleaner will not result in a successful treatment of fungal overgrowth, it is therefore recommended to get help from a doctor for further treatment such as antifungal medicine.

There were differences between adults in the current study and children in an earlier study regarding the acceptance of the TS1 tongue cleaner. For adults the acceptance on the visual analogue scale in the present study was 6.8 cm out of 10 cm. Children rated the TS1 slightly higher at 8.9 cm (RICKENBACHER ET AL. 2019). However, the initial and maximum values of the visual analogue scales were not considered identical in both studies. In this study, it was presented as a range displayed by the values 0 = very unpleasant and 10 = very pleasant, whereas the visual analogue scale in children ranged from 0 = not accepted to 10 = accepted. Furthermore, in children the acceptance of the TS1 was better in comparison to the manual toothbrush (RICKENBACHER ET AL. 2019). However, adults in this study did not demonstrate any difference in the acceptance between the two. In 93% of the cases, children would agree to repeat this procedure with the TS1 suction tongue cleaner (RICKENBACHER ET AL. 2019).

The gag reflex has a major influence on the acceptance of the treatment. The posterior region of the dorsal surface of the tongue is a typical trigger zone for gag stimulation (MEEKER &

MAGALEE 1986). This part has to be included when undergoing a cleaning of the tongue and hence increases the likelihood of triggering a gag reflex.

In the present study, no difference was noticed in the number of gag stimuli between the suction tongue-cleaning device and the manual tongue cleaner. Treatment with the TS1 suction tongue cleaner did not lead to a higher gag reflex than when using the manual cleaner and could therefore be used on all patients. In children, the TS1 never caused a gag reflex (RICKEN-BACHER ET AL. 2019). In this study, 70% of the subjects had already had experiences with tongue cleaners. The regular use of a tongue cleaner can also lead to a reduced gag reflex (CHRISTENSEN 1988; FILIPPI 2011B).

Only a few studies compared various manual tongue cleaners (BEEKMANS ET AL. 2017). Amongst other things, it was investigated how pleasant and effective the product was for the participants and how strong their gag reflex was. The manual tongue cleaner also used in this study was one of the best, with a very pleasant and comfortable feeling for the subjects and triggering a subjectively low gag reflex (BEEKMANS ET AL. 2017). These results are consistent with the results of this study.

Consequently, it can be said that the TS1 suction tongue cleaner offers a good alternative to a manual tongue cleaner within the professional sector, especially since there are no other products available at the moment (for example novel air polishers), which are proven to be effective against tongue coating. Therefore, tongue-cleaning with a suction tongue-cleaning device can be effectively implemented in a professional dental environment.

The present study shows that both the suction tongue cleaner and the manual tongue cleaner reduce the tongue's coating and only rarely trigger a gag reflex. With 95%, the majority of the subjects would have both treatments carried out again. The S1 suction tongue-cleaning device can be recommended a viable adjunct for in-office use.

Zusammenfassung

Einleitung

Veränderungen des oralen Biofilms sind oft für die Entstehung von Halitosis verantwortlich. Da sich rund zwei Drittel der in der Mundhöhle vorkommenden Bakterien auf der Zungenoberfläche befinden, spielt der Zungenbelag eine wichtige Rolle bei Halitosis. Daher werden im Rahmen professioneller Halitosis-Sprechstunden Zungenreinigungen durchgeführt. Im Jahre 2015 erschien der TS1-Zungensauger, der eine professionelle Zungenreinigung in der Praxis ermöglicht. Ziel der vorliegenden Arbeit war es, Effizienz und Akzeptanz des professionellen Zungensaugers im Vergleich zu einem konventionellen manuellen Zungenreiniger bei Erwachsenen zu untersuchen.

Material und Methoden

Am Universitären Zentrum für Zahnmedizin Basel UZB wurde an 100 Probanden der TS1-Zungensauger und ein manueller Zungenreiniger auf jeweils einer Zungenseite intraindividuell getestet. Teilnehmen durften Erwachsene im Alter von 19 bis 31 Jahren ohne allgemeinmedizinische Erkrankungen oder extremen Würgereiz. Mithilfe von visuellen Analogskalen (VAS) schätzten die Probanden ihren Würgereiz ein (0 = kein Würgereiz, 10 = sehr starker Würgereiz) und bewerteten die durchgeführte Zungenreinigung (0 = sehr unangenehm, 10 = sehr angenehm). Für die Auswertung der Zungenreinigung wurden während den Untersuchungen Vorher-nachher-Fotos der Zun-

genreinigung angefertigt und mit einem modifizierten Zungenbelagindex nach Winkel (WTCl) ausgewertet.

Resultate

Die subjektive Beurteilung der Akzeptanz zeigte auf der VAS keinen Unterschied zwischen manuellem Zungenreiniger (\bar{x} 6,9 cm; SD 2,0 cm) und Zungensauger (\bar{x} 6,8 cm; SD 1,8 cm) (Mediandifferenz 0,3, 95%CI -0,25/0,85, $p=0,259$). Es zeigte sich kein statistischer Unterschied zur Akzeptanz einer erneuten Behandlung (OR 1, 95%CI 0,2/4,5, $p=1$) sowie an der Anzahl an aufgetretenem Würgereiz zwischen Zungensauger und manuellem Zungenreiniger (OR 1,14, 95%CI 0,37/3,55, $p=1$).

Die Auswertung des WTCl zeigte einerseits, dass der Zungenbelag nach Anwendung des Zungensaugers um das 0,63-Fache (95%CI 0,58/0,7, $p<0,001$) und des manuellen Zungenreinigers um das 0,68-Fache (95%CI 0,62/0,75, $p<0,001$) abnahm, andererseits, dass es zwischen Zungensauger und manuellem Zungenreiniger keinen statistischen Unterschied gibt (Mediandifferenz 0,5, $p=0,493$). Frauen hatten in der vorliegenden Arbeit mehr Erfahrungen mit Zungenreinigern als Männer (OR 3,2, 95%CI 1,2/8,8, $p=0,013$).

Diskussion

Die Ergebnisse der vorliegenden Studie zeigen, dass der TS1-Zungensauger den Zungenbelag ebenso gut entfernt wie ein manueller Zungenreiniger. Es konnte kein Unterschied zur Akzeptanz zwischen Zungensauger und Zungenreiniger festgestellt werden, und der Würgereiz wurde nur selten ausgelöst. Bei beiden Reinigern würden in 95% der Fälle die Probanden einer erneuten Zungenreinigung zustimmen. Zusammengefasst kann festgehalten werden, dass der TS1-Zungensauger im professionellen Bereich eine gute Alternative zu manuellen Zungenreinigern bietet und in der zahnärztlichen Praxis für eine professionelle Zungenreinigung empfohlen werden kann.

Résumé

Introduction

Les changements du biofilm oral sont bien souvent à l'origine de l'halitose. Comme près de deux tiers des bactéries présentes dans la cavité buccale se trouvent sur la surface rugueuse de la langue, le dépôt lingual joue un rôle d'autant plus important dans l'halitose. C'est la raison pour laquelle des nettoyages de langue sont effectués dans le cadre de consultation professionnelle de l'halitose. En 2015, l'aspirateur lingual TS1 fut mis sur le marché. Celui-ci permet un nettoyage professionnel de la langue en cabinet. Le but de la présente étude est donc d'examiner l'efficacité et l'acceptation d'un aspirateur lingual professionnel par rapport à un nettoie-langue conventionnel chez les adultes.

Matériel et méthodes

L'aspirateur lingual TS1 et le nettoie-langue furent testés individuellement chacun sur un côté de la langue de 100 participants au centre universitaire pour la médecine dentaire à Bâle (UZB). Afin d'être éligibles pour cette étude, les participants devaient être adultes, âgés entre 19 et 31 ans, ne pas souffrir de maladie ou encore d'un réflexe nauséux extrême. À l'aide d'une échelle analogique visuelle, les participants ont évalué leur réflexe nauséux (0 = pas de réflexe nauséux, 10 = réflexe nauséux très fort) ainsi que le nettoyage de la langue (0 = très désagréable, 10 = très agréable). Pour l'évaluation du nettoyage de la langue, des photos avant/après ont été prises durant l'exa-

men, puis évaluées à l'aide de l'index de dépôt lingual de Winkel (WCTI) modifié.

Résultats

L'évaluation subjective de l'acceptation montre qu'il n'existe aucune différence sur l'échelle analogique visuelle entre le nettoie-langue (\bar{x} 6,9 cm; SD 2,0 cm) et l'aspirateur lingual (\bar{x} 6,8 cm; SD 1,8 cm) (différence de médiane 0,3, 95 %CI -0,25/0,85, $p = 0,259$). De plus, il n'existe aucune différence statistique entre l'acceptation d'un nouveau traitement (OR 1, 95 %CI 0,2/4,5, $p = 1$) ainsi que le nombre de réflexes nauséux survenus avec un aspirateur lingual ou avec un nettoie-langue (OR 1,14, 95 %CI 0,37/3,55, $p = 1$). De plus, l'évaluation du WCTI montre d'une part que le dépôt lingual diminue de 0,63 fois après l'utilisation de l'aspirateur lingual (95 %CI 0,58/0,7, $p < 0,001$) et de 0,68 fois après l'utilisation du nettoie-langue

(95 %CI 0,62/0,75, $p < 0,001$). D'autre part, il n'existe aucune différence statistique entre l'aspirateur lingual et le nettoie-langue (différence de médiane 0,5, $p = 0,493$). Dans la présente étude, les femmes ont plus d'expérience avec le nettoyage de langue que les hommes (OR 3,2, 95 %CI 1,2/8,8, $p = 0,013$).

Discussion

Les résultats de cette étude ont montré que l'aspirateur lingual TS1 nettoie le dépôt lingual aussi bien qu'un nettoie-langue. Aucune différence n'a été constatée entre l'acceptation de l'aspirateur lingual et le nettoie-langue, et le réflexe nauséux ne fut déclenché que rarement. Pour les deux types de nettoyage, 95 % des participants accepteraient un nouveau nettoyage de langue. On peut donc conclure que l'aspirateur lingual TS1 constitue une bonne alternative au nettoie-langue et peut donc être conseillé pour un nettoyage professionnel en cabinet.

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