

## Bacterial attachment on the tongue after using tongue scraper (Perlekatan bakteri pada lidah sesudah menggunakan tongue scraper)

Asmawati

Department of Oral Biology  
Faculty of Dentistry Hasanuddin University  
Makassar, Indonesia

### ABSTRAK

Infeksi rongga mulut dapat terjadi akibat berbagai macam jenis mikroorganisme yang menempati hampir seluruh bagian rongga mulut. Lidah adalah salah satu bagian di dalam rongga mulut yang sangat rentan ditempati oleh mikroorganisme dan apabila dibiarkan terus-menerus dapat terjadi kolonisasi bakteri sehingga menimbulkan penyakit. Pembersihan lidah secara mekanis menggunakan tongue scraper dapat mengurangi sebagian bakteri anaerob pada dorsal lidah. Tujuan penelitian adalah untuk mengetahui perbedaan jumlah bakteri anaerob yang terdapat pada dorsal lidah sebelum dan sesudah pembersihan lidah secara mekanis dengan menggunakan tongue scraper. Penelitian dilakukan secara eksperimental laboratoris dengan sampel 25 orang yang diperoleh secara random sampling. Hasil penelitian menunjukkan bahwa setelah membersihkan lidah dengan menggunakan tongue scraper, jumlah bakteri anaerob pada lidah menurun sekitar 28%. Berdasarkan analisis statistik menggunakan uji t dengan  $\alpha=0,05$ , ada perbedaan jumlah bakteri anaerob lidah sebelum dan sesudah pembersihan lidah secara mekanis menggunakan tongue scraper.

**Kata kunci:** pembersihan lidah, tongue scraper, bakteri anaerob pada lidah

### ABSTRACT

Oral infections can be caused by the many microorganisms that occupy the oral cavity. Tongue is one of the vulnerable areas of the oral cavity occupied by microorganisms, in which colonized bacteria may cause disease. Mechanical tongue cleansing using tongue scraper can reduce anaerobic bacteria on dorsal of the tongue. The objective of this study was to observe the difference of anaerobic bacteria amount on dorsal of the tongue before and after mechanical tongue cleansing using tongue scraper. This was laboratory experimental study with sample consists of 25 students selected by random sampling method. The results showed that the amount of bacteria is decreased approximately 28% after tongue cleansing using tongue scraper. Based on the statistical analysis with t-test on  $\alpha=0.05$ , there is a difference on the amount of anaerobic bacteria on dorsal of the tongue before and after mechanical tongue cleansing using tongue scraper.

**Key words:** tongue cleansing, tongue scraper, anaerobic bacteria of the tongue

**Correspondence:** Asmawati, Department of Oral Biology, Faculty of Dentistry, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, Indonesia. E-mail: asmaamin68@yahoo.com

### INTRODUCTION

Tongue has function to taste in the mouth, and the benefit is to make it possible for someone to choose food based on their taste and their nutritional need. Physiologically, tongue have at least four primary taste function: sour, salty, sweet, and bitter.<sup>1</sup>

Anatomical form of tongue with papilla and fissure in the middle of it, and the anatomical place cause many anaerob bacteria hidden on the dorsal of the tongue. More than 100 bacteria found stick on each epithelia on the dorsal of the tongue, and only 25 bacteria that stick on the mucose of another area in the mouth.<sup>2</sup>

Anaerob bacteria is a normal flora and mostly found in gingival sulcus. It is also found in saliva and plaque. Normal flora could cause disease if it is located on the with various predisposition factors.<sup>3,4</sup>

Anaerob bacteria is normally found in oral cavity could caused infection on another place in certain condition, such as *Streptococcus viridans*. If these organisms enter the blood circulation in a big amount, after tooth extraction or tonsillectomy, they could cause endocarditis infection.<sup>4,5</sup>

Mouth infection commonly consists of anaerob bacteria. Periodontal infection, perioral abcess, sinusitis, and mastoiditis primarily involve *Prevotella melaninogenica*, *fusobacterium*, and *peptostreptococci*. Anaerob bacteria especially *Streptococci* found on the tongue surface. In a bigger population, number and various predisposition factors, it could cause infection.<sup>4</sup>

Anaerob bacteria found on the tongue could produce volatile sulfur compound (VSC) that could cause halitosis and has a pathology role in periodontitis development and gingivitis.<sup>3</sup> To

prevent halitosis, American Dental Association (ADA) recommend to brush teeth and tongue using tooth paste with fluoride twice a day, and use dental floss once a day.<sup>6</sup>

Over the centuries, there was a theory about tongue cleansing. The finding of artefact that lead to tongue cleansing is found in the various places include Africa, South America, India, and Arabia. The importance of mechanical tongue cleansing is to protect the oral health and because bacteria on the tongue could produce VSC, the primer component of halitosis. The VSC also could cause periodontitis and gingivitis.<sup>7,8</sup> More over tongue cleansing using tongue scraper could decrease *Streptococci* and *Lactobacilli* population, where the higher amount of this bacteria could cause caries, and infection.<sup>4,9-11</sup> Statistically, mechanical tongue cleanser using tongue scraper or tongue cleanser has a real difference in higher decrease of VSC level compared to effective use of toothbrush to reduce halitosis on adults.<sup>12</sup>

Tongue scraper is one of the tongue cleansers specially designed to clean tongue. Tongue cleaner or tongue scraper is designed to fit tongue anatomy, and optimized to remove plaque, and more effective to clean tongue surface. Besides using tongue scraper, tongue surface could be cleaned by using toothbrush. However, toothbrush is less effective because it is only designed to brush teeth. There are various kinds of tongue scrapers, made of plastic, metal, etc. The effectiveness is varied depending on the form, dimention, configuration, and the quality of the material.<sup>13</sup>

This article is aimed to discuss the amount difference of anaerob bacterial before and after mechanical dorsal tongue cleansing using tongue scraper.

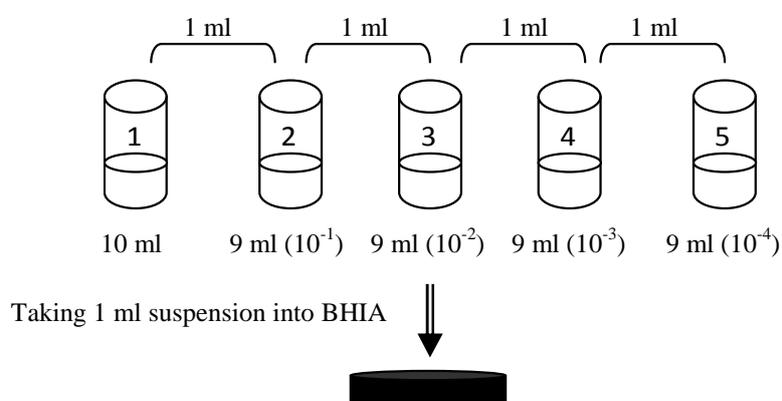
## METHOD

This study was a experimental laboratory study of anaerob bacterial population of the tongue. Samples were 25 students of Faculty of Dentistry Hasanuddin University selected by random sampling. Age ranged 17-19 years old, 14 females and 11 males, with various habit of tongue cleansing. The materials used were tubes, straws, spiritus lamp, sterile wooden spoon, magnifying glass, tongue scraper, aquadest, transport medium, and Brilliant Hearth Infussion (BHIA).

The collection of sample was carried out at the Laboratorium Oral Biology Faculty of Dentistry Hasanuddin University. The subjects were instructed not to brush their teeth, eat and drink first. Then they were instructed to rinse their mouth with sterile aquadest. Before using tongue scraper on the subject, dorsal of the tongue was scraped using wooden spoon sterile, and put in tubes filled with transport medium.

The next collection after sample using tongue scraper. There are 10 times light scrape from circumvallata papilla to the tip of the tongue. These two techniques of tongue cleansing is performed without toothpaste. After each tongue cleansing, dorsal of the tongues was scraped using wooden spoon, and put in another tube filled with transport medium, and incubated for 24 hours.

Four tubes with 9 ml aquadest were prepared. Each tube was labelled with No.1-5. Tube No.1 was filled with bacteria suspension and dorsal tongue was scraped, tube No.2-5 was filled with 9 ml aquadest. Tube No.1 was homogenated, then 1 ml was taken and put in tube No.2 and shaken till homogen. From tube No.2, 1 ml was taken with sterile straws and put in tube No.3, and shaken carefully until homogen.



**Fig.1.** Procedure of serial dilutions and investments in BHIA

The 1 ml sample of tongue scraper with concentration  $10^{-4}$  was taken with sterile straws and put on BHIA medium. Then, it was put under the anaerob condition and incubated at 37 °C for 1x24 hours. After incubated, the anaerob bacterial colony was calculated manually using magnifying glass. White spot on the dish showed the bacterial colony. To ease the calculation of the bacteria colony, a line was drawn to help the calculation, besides avoiding miscalculation the amount of

bacterial colony.

## RESULT

Table 1 shows the average population of anaerob bacteria based on tongue cleansing habit, age, dan sex of the samples. While table 2 shows no microorganism growth on seeding medium.

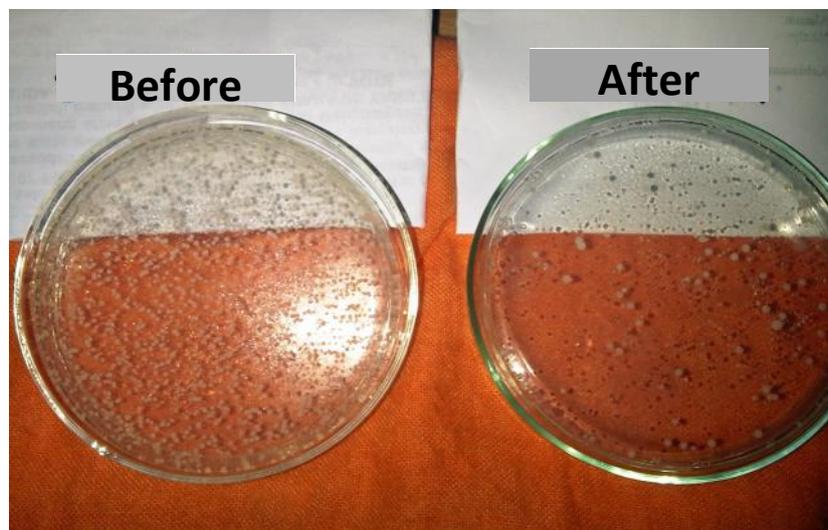
Anaerob bacterial population that is taken by using tongue scraper before and after tongue cleansing is showed on Fig.2.

**Table 1.** Total average population of anaerobic bacteria based on tongue cleaning depended on habits, age, and gender.

Tongue Cleaning Habits		Never	Sometimes	Once-twice a day
Age	17 years	842	695	537
	18 years	735	674	481
	19 years	785	668	448
Gender	Male	845	711	497
	Female	747	621	457

**Table 2.** Observations on the control.

Sample	Total population of anaerobic bacteria	
	Incubation 1 x 24 hours (medium tranport)	Incubation 2 x 24 hours (medium BHIA)
Control	-	-



**Fig 2.** Differences in the number of anaerobic bacterial populations before and after cleaning the tongue using a tongue scraper.

**Table 3.** Descriptive analysis of the average percentage reduction in the number of colonies of anaerobic bacteria on dorsal tongue at  $10^{-4}$  dilution, before and after cleaning the tongue using a tongue scraper.

Number of sampel	Total Average of colonies		Difference	
	Before cleaning	After cleaning	Total	%
25	630	465	165	28

## DISCUSSION

Table 1 shows the average population of anaerob bacteria based on age and sex with no significant difference. This is caused by sample that is taken with random sampling method, with no quota for each sample based on age level and sex. Based on the cleansing tongue habit, there is a significant difference for the population that never clean their tongues have more anaerob bacteria population, followed by the population that sometimes clean their tongues, and the population that clean their tongues 1-2 a day with the least anaerob bacterial population.

Table 2 is the observation of control group, in incubation for 1x24 hours in transport medium and incubation for 2x24 hours in BHIA medium. This observation shows no anaerob bacterial growth in seeding medium.

The result of this study showed on table 3 that the average amount of anaerob bacterial population before tongue cleansing using tongue scraper are 630 colonies and after tongue cleansing using tongue scraper are 465 colonies. There are 28% difference of the anaerob bacteria colony amount.

On Fig.2 shows that anaerob bacteria population that has been taken before tongue cleansing is more compact and more various than anaerob bacterial population after tongue cleansing.

Statistical analysis before and after tongue cleansing using tongue scraper with t-pair test, shows a significant value where  $P < 0.05$  with interval confidence 95%. Hypothesis is accepted, which means there a significant difference between the amount of anaerob bacterial population before and after tongue cleansing using tongue scraper.

The previous data calculated that before and after tongue cleansing using tongue scraper the amount of anaerob bacterial of tongue is decrease approximately 28%. This result showed that tongue cleansing using tongue scraper could reduce anaerob bacteria population on tongue, which mean the using of tongue scraper is reduce halitosis and periodontal disease significantly.<sup>7</sup> The previous study of Prijono, showed that five people as the sample found there is an effect of tongue cleansing to the amount of anaerob bacteria population of tongue.<sup>14</sup>

Based on the study of Seemann et al, said that mechanical tongue cleansing could reduce VSC level in mouth that is most produced from dorsal of the tongue. VSC is a sulphur, that is produced

from the bacteria in the mouth, especially anaerob bacteria, which could cause halitosis and play a role in the etiology of periodontal disease.<sup>8</sup> According to Jawetz et al, anaerob bacteria often cause infection in mouth. So, with the regular tongue cleansing it could avoid the anaerob infection in mouth.<sup>4</sup>

Recent data based on Casemiro et al, tongue cleansing using tongue scraper is an important procedure to reduce microba and VSC in mouth. Tongue scraper is one of the tongue cleansers specially designed to clean the tongue. Tongue scraper is designed to fit the tongue anatomy, and optimized to clean the plaque and more effective to clean the tongue surface, especially to remove debris and bacteria around filiformis and fungiformis papilla from the base to the dorsal of the tongue. That is why the use of tongue scraper is more effective to clean tongue from debris and bacteria that could cause halitosis and periodontal disease.<sup>13,14</sup>

## CONCLUSION

The result of this study showed that average amount of anaerob bacteria population on the tongue attachment decreased significantly after using the tongue scraper.

## SUGGESTION

Recommended conduct further research using more specific tongue scraper for research and to obtain accurate results in further research is recommended to use the PCR ( Polymerase chain reaction) method.

## ACKNOWLEDGMENT

I would like to thank patients for participated in this study. I acknowledgment the contribution of Fenny for the cooperation in recruiting patients for this study.

## REFERENCES

1. Guyton AC. Fisiologi manusia dan mekanisme penyakit. 3<sup>rd</sup> Ed. Jakarta: EGC; 1990.hlm.108-19.
2. Mustaqimah DN. Bakteri yang berkaitan dengan halitosis. *Dentofasial* 2003; 1; 81-7.
3. Furne J, Majerus G, Lenton P, Springfield J, Levitt DG, Levitt MD. Comparison of volatile sulfur compound concentrations measured with a silfide detector vs gas chromatography. *J Dent Res* 2002; 81: 140.
4. Jawetz E, Melnick JL, Adelberg EA. *Medical microbiology*. 22<sup>nd</sup> Ed. New York: McGraw Hill Companies; 2002.

5. Finegold SM, Sutter VL. Anaerobic infections. 5<sup>th</sup> Ed. Michigan: The Upjohn Company; 1983.
6. Ferri R. How to cure bad breath. Available at [http://www.ehow.com/how\\_5546856\\_naturally-cure-bad-breath.html](http://www.ehow.com/how_5546856_naturally-cure-bad-breath.html). Accessed at 7 January 2010.
7. Christensen GJ. Why clean your tongue. J Am Dent Assoc 1998; 129: 1605-7.
8. Seeman R, Kison A, Bizhang M, Zimmer S. Effectiveness of mechanical tongue cleaning on oral levels of volatile sulfur compounds. J Am Dent 2001; 132(9); 1263-7.
9. Peters D. Tongue cleaning. Available at <http://www.dentalgentlecare.com>. Accessed at 15 Feb 2010.
10. Khalid A, Al-Sanawi E, Al-Shahrani B. The effect of tongue scraper on mutans streptococci and lactobacilli in patients with caries and periodontal disease. Odonto-Stomatologie Tropicale 2005; 109: 1-6.
11. Menon MV, Coykendall AL. Effect of tongue scraping. J Dent Res 1994; 73: 1492.
12. Outhouse TL, Al-Alawi R, Fedorowicz Z, Keenan JV. Tongue scraping for treating halitosis. Evid Based Dent 2006; 7(3); 78.
13. Verma V. Aryurveda a way of life. 2002. Available at <http://www.tonguescraper.com>. Accessed at 15 Feb 2010.
14. Prijono E. Efektivitas pembersihan lidah secara mekanis menggunakan *tongue scraper* terhadap jumlah populasi bakteri anaerob lidah. Jurnal PDGI 2005; Edisi khusus; 95-100.