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# Improved Oral Hygiene as A Result of Successful Toothbrushing Intervention in a Restricted Community Islamic Boarding School

Pindobilowo<sup>1</sup>, Dwi Ariani<sup>2</sup>, Nadia Shabrina Amalia<sup>3</sup>, Taufan Bramantoro<sup>4</sup>

<sup>1</sup>Staff of Department of Dental Public Health, Faculty of Dentistry, Universitas Prof. Dr. Moestopo (Beragama), South Jakarta, Indonesia, <sup>2</sup>Staff of Department of Oral Medicine, Faculty of Dentistry, Universitas Prof. Dr. Moestopo (Beragama), South Jakarta, Indonesia, <sup>3</sup>Undergraduate Student of Faculty of Dentistry, Universitas Prof. Dr. Moestopo (Beragama), South Jakarta, Indonesia, <sup>4</sup>Staff of Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia, \*Corresponding Author: Taufan Bramantoro, Staff of Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

## Abstract

**Introduction:** Brushing teeth is an important thing to do since it is one of the factors that affect oral hygiene, especially to remove plaque on the teeth.<sup>1</sup> The ability to brush teeth properly and correctly is a fairly important factor in maintaining dental and oral health, especially in adolescence.<sup>5</sup> The purpose of study to explain the differences in plaque scores before and after toothbrushing training using Bass technique in adolescents. **Method:** The sample were 100 students aged 12-15 years old in grades 7, 8 and 9. This study design was experimental quasi and using a pre-test and post-test after 7 days to determine the difference in plaque scores before and after the training. The plaque index method that used to examine oral hygiene was Patient Hygiene Performance (PHP). Comparison between plaque scores before and after training evaluated using Wilcoxon test. **Result:** Examination of PHP index before training shows 81 samples (81%) in poor criteria, then most subjects undergoes improvement after training. There were 94 samples (94%) experienced decrease or improvement in plaque score whilst 6 samples (6%) did not show improvement after training. Median of plaque score before training was 4.3 (0.2-5 (SD=0.502)) afterwards improved to 2.2 (0-4.8 (SD=0.496)). Wilcoxon test obtained a value of  $p < 0.05$  which was 0.000. **Conclusion:** There were significant differences in plaque scores before and after toothbrushing training using Bass technique.

**Keywords:** dental plaque, toothbrush, bass technique, oral hygiene

## Introduction

Brushing teeth is an important thing to do since it is one of the factors that affect oral hygiene, especially to remove plaque on the teeth. Dental plaque is a bacterial biofilm with highly variable structural entity consisting of micro-organisms and their products concurrently resides in their environment.<sup>1</sup> The soft layer of plaque consists of 80 percent water, and the remaining of 20 percent are other components, such as proteins, lipids and minerals, calcium and phosphorus.<sup>2</sup> Bacterial deposits on uncalcified plaques accumulate above the surface of the teeth and other objects in the oral cavity, such as restorations, dentures and dental calculus that are firmly attached to this surface. Dental plaque can

only be removed by mechanical cleansing, one of which is by brushing teeth.<sup>3</sup>

The right knowledge about brushing teeth in the community includes the frequency of brushing teeth, the method of brushing teeth, and the shape of a toothbrush. Brushing teeth can be a preventive measure for dental caries and periodontal disease, especially in adolescence.<sup>4</sup>

The ability to brush teeth properly and correctly is a fairly important factor in maintaining dental and oral health, especially in adolescence. The skill of brushing teeth must be taught to children of all ages, especially school children because at that age it is easy to accept

and instill basic values.<sup>5</sup>

<sup>15</sup> Based on the results of national basic health research (riset kesehatan dasar/Riskesdas) in 2007 and 2013, oral health<sup>20</sup> problems increased from 23.2 percent to 25.9 percent. The prevalence of oral health problems based on the 10-14 years age group in 2007 was 20.6 percent, increasing in 2013 to 25.2 percent, and in the 15-24 years age group it increased from 21.5 percent to 24.3 percent. There was also an increase in the proportion of provincial oral health problems in DKI Jakarta province of 6.1 percent, from a value of 23 percent in 2007 to 29.1 percent in 2013. Whereas, the national percentage of toothbrushing every day was 94.2 percent in 15 provinces below national prevalence. There was a decline in correct toothbrushing behavior from 7.3 percent in 2007 and decreased to 2.3 percent in 2013.<sup>6,7</sup>

The purpose of this study was to explain that there were differences in plaque scores before and after toothbrushing training in adolescents aged 12-15 years at An-Nuqthah Islamic Boarding School, Cipete, Tangerang.

### Material and Method

The independent variable was toothbrushing training and dependent variables was the score of plaque. This study was conducted at An-Nuqthah Islamic Boarding School, Cipete, Tangerang, Banten, Indonesia in 2018. The population in this study were adolescents in the An-Nuqthah Islamic Boarding School, Cipete, Tangerang and the sample in this study were 100 students aged 12-15 years old in grades 7, 8 and 9 in An-Nuqthah Islamic Boarding School.

The type and design<sup>3</sup> of the study used was experimental quasi, which is an experimental study that controls the research situation using non-random methods that have a function to determine the impact of interventions. This study used a pre-test and post-test design to determine the difference in plaque scores before and after the training of toothbrushing using Bass technique.

Data collection was done using interviews, questionnaires and examination of plaque scores with disclosing agent solution. The plaque index method used was Patient Hygiene Performance (PHP). Data processing was carried out after the data was collected from school. Furthermore, data processing stage was carried out as follows: editing data, encoding data,

and data entry (computerization). Data that had been collected and processed using the SPSS 17 computer program were then tested for its hypothesis using Wilcoxon test.

### Research Results

#### 1. Plaque Score Before Toothbrushing Training Using Bass technique (Pre-Test Plaque Score)

Distribution of PHP index criteria on 100 samples before toothbrushing training using Bass technique shows very good criteria in 0 sample (0%), good criteria in 1 sample (1 %), moderate criteria in 18 samples (18%), and poor criteria in 81 samples (81%).

**Table 1. Distribution of PHP Index Criteria before Toothbrushing Training using Bass technique (Pre-Test Plaque Score)**

PHP Index Criteria	Plaque Score	Frequency	Percentage
Very good	0	0	0%
Good	0.1-1.7	1	1%
Moderate	1.8-3.4	18	18%
Poor	3.5-5	81	81%
	TOTAL	100	100%

The assessment of plaque score in 100 samples prior to toothbrushing training using Bass technique shows that 47 persons (47%) less than the median value (4.3) while the ones with more than or equal to median value were 53 persons (53%).

**Table 2. Distribution of Median Value of Pre-Test Plaque Score**

Plaque Score before Toothbrushing Training Using Bass Technique	Frequency	Percentage
Less than Median (< 4.3)	47	47%
More than or equal to Median ( $\geq$ 4.3)	53	53%
Total	100	100%

## 2. Plaque Score after Toothbrushing Training Using Bass technique (Post-Test Plaque Score)

Distribution of PHP index criteria on 100 samples after toothbrushing training using Bass technique shows very good PHP index criteria in 1 sample (1%), good criteria in 37 samples (37%), moderate criteria in 48 samples (48%), and poor criteria in 14 samples (14%).

**Table 3. Distribution of PHP Index Criteria after Toothbrushing Training using Bass Technique (Post-Test Plaque Score)**

Plaque Index Criteria	Plaque Score	Frequency	Percentage
Very good	0	1	1%
Good	0.1-1.7	37	37%
Moderate	1.8-3.4	48	48%
Poor	3.5-5	14	14%
	TOTAL	100	100%

The distribution of plaque score in 100 samples after toothbrushing training using Bass technique showed that 42 samples (42%) less than the median value (2.2) while the ones with more than or equal to median value were 53 persons (53%).

**Table 4. Distribution of Median Value of Post-Test Plaque Score Measurement**

Plaque Score after Toothbrushing Training Using Bass Technique	Frequency	Percentage
Less than median (< 2,2)	42	42%
More than or equal to median ( $\geq 2,2$ )	58	58%
Total	100	100%

## 3. Comparison of Plaque Scores before and after Toothbrushing Training using Bass Technique

There was plaque score improvement in 100 sample after toothbrushing training using Bass technique, in which 94 samples (94%) experienced a decrease in plaque score after training. Whereas, 6 samples (6%) did not experience plaque score changes.

**Table 5. The Percentage of Samples that Decreasing Plaque Score after Toothbrushing Training using Bass Technique**

Plaque Score Indicator	Frequency	Percentage
Decrease in plaque score after training	94	94%
No change in plaque score after training	6	6%
TOTAL	100	100%

The median, minimum, maximum, and standard deviation values of the plaque score after toothbrushing training using Bass technique were lower than before training. Wilcoxon test obtained a value of  $p < 0.05$  which was 0.000. It can be concluded that there were differences in plaque scores before and after toothbrushing training using Bass technique in adolescents.



**Table 6. Wilcoxon Test Results of PHP Index before and after Performing Toothbrushing Training in An-Nuqthah Islamic Boarding School, Cipete, Tangerang (n = 100)**

	N	Median (minimum-maximum)	S.D	P
Plaque score before toothbrushing training	100	4.3 (0.2-5)	0.502	0.000
Plaque score after toothbrushing training		2.2 (0-4.8)	0.496	

## Discussion

This study was conducted to determine and explain the differences in plaque scores before and after toothbrushing training using Bass technique of adolescents aged 12-15 years. This study was conducted on 64 female and 36 male students taken randomly of grade 7, 8 and 9 in junior high school students at An-Nuqthah Islamic Boarding School, Cipete, Tangerang who had fulfilled the inclusion and exclusion criteria. The measurement of plaque scores was carried out before and after toothbrushing training using Bass technique.

Bass technique is sulcular (or crevicular) technique that aims to clean the crevicular part or gingival sulcus. If this technique is used correctly, cleaning the gingival sulcus area can be very effective.<sup>3,8,11</sup> The time taken by researchers to measure plaque scores before and after toothbrushing training was 7 days, same as in the study conducted by Choirunnisa *et al* and Sari *et al*.<sup>5,8</sup>

The distribution of samples based on gender can be seen from total sample (n = 100). The number of female samples was more (64) compared to the number of males (36). This was in accordance with previous study conducted by Sari *et al*<sup>2</sup> at At-Taufiq Lakarsantri Islamic School in Surabaya in June 2012, with a sample of 34 people, in which the number of female samples was more(24) compared to the number of males(10).

There was decrease of plaque score in most samples after training. Found 94 samples (94%) experienced improvement or decrease in plaque score and 6 samples (6%) did not show improvement (Table 3.1). The distribution was as follows: 60 samples (63.8%) were female and 34 samples (36.2%) were male who experienced improvement in plaque scores. Whereas, as many as 4 female samples (66.7%) and 2 male samples (33.3%) did not experience changes in plaque

scores. This was in line with a study conducted by Sari *et al*. In 34 samples, 33 samples (97.1%) experienced improvement in plaque scores and 1 sample (2.9%) did not experience changes in plaque scores. The distribution was as follows: 23 samples (95.8%) were female and 10 samples (100%) were male who experienced improvement in plaque scores. Whereas, as many as 1 female sample (4.2%) and 0 male sample (0%) did not experience changes in plaque scores.<sup>5</sup>

The habit of brushing teeth twice or more in one day was quite high, which was equal to 91%. However, the plaque score was still high as evidenced by 81% of total samples having poor criteria (value 3.5-5) before training (Table 1.1). This can be caused by toothbrushing technique being used is not correct. This was stated in a study conducted by Park S, Cho S and Han J in Department of Peridontology, Hanyang Medical Center, Seoul, South Korea in 2018, conducted on 124 samples also used the intervention of toothbrushing method using Bass technique. Park *et al* suggested that the effectiveness of toothbrushing techniques could be a solution for removing plaque on teeth.<sup>9,15,16</sup>

Based on the research that has been done with Wilcoxon test ( $p < 0.05$ ), the value was 0.000. It means there was significant difference before and after toothbrushing training using Bass technique (Table 3.1). This study is in line with a study conducted by Rizkika *et al*<sup>14</sup> which showed that plaque scores decreased after toothbrushing training using Bass technique with mean plaque score was 4.1 before training and 2.2 after training. The difference of mean value before and after toothbrushing training using Bass technique was 1.8.

These results also consistent with a study conducted by Rizkika N, Baehaqi M and Putranto RR in Purwosari Kudus Special Elementary School in 2014 which

examined the effectiveness of toothbrushing with Bass technique on changes in plaque scores in mentally retarded children. In their research, Rizkika *et al* found that brushing teeth with Bass technique could reduce plaque scores, from the mean value of plaque score as much as 3.88 before intervention to 3.03.<sup>5,17,20</sup>

From the results of the study (Table 1.2) it can be seen there was a decrease in plaque scores after toothbrushing training using Bass technique. This proves if this technique is done correctly, cleaning the gingival sulcus area can be very effective.<sup>15,17,22</sup> In addition, toothbrushing is one of the ways to control plaque mechanically which is quite effective in removing plaque attachment on the surface of the tooth. Plaque control is a basic procedure for maintaining oral hygiene.<sup>3,21,23</sup>

Brushing teeth is important to do since it is one of the factors that affect dental and oral hygiene, especially in removing plaque on the teeth. Plaque on the teeth can cause a reduction in the quality of oral and dental health. Plaque is one of the etiological factors in caries and periodontal disease. Plaque will form a smooth, strong surface in the form of a deposit on the surface of the tooth. Therefore, plaque on the tooth surface must be removed by brushing teeth.<sup>5,10,24</sup>

### Conclusion

There were significant differences in plaque scores before and after toothbrushing training using Bass technique. Bass brushing technique is quite effective in removing plaque deposits on the tooth surface, and is quite easy to apply in daily life.

**22** **Conflict of Interest :** There is no conflict of interest.

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**Ethical Clearance :** This research has received ethical approval from Etichal Clearance of health Experiment Committee, Faculty of Dentistry, Universitas Prof. Dr. Moestopo (Beragama), South Jakarta, Indonesia with registered number 065/loloskajietik/FKGUPDM(B)/IV/2018.

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