



A Study on the Relationship between Vertical and Horizontal Toothbrushing Methods and Gingival Recession among Students in Banda Aceh City

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ABSTRACT

Gingival recession is a common dental problem that can cause discomfort and even tooth loss if left untreated. One of the factors that contribute to this condition is improper tooth brushing techniques. In Banda Aceh City, there is limited research on the relationship between tooth brushing methods and gingival recession among students. This study aims to determine the relationship between vertical-horizontal tooth brushing methods and gingival recession in grade XI science students at SMA Negeri 9 Banda Aceh. The research design used was an analytical cross-sectional study with a population of 113 students and a sample of 57 students selected randomly. Data collection was carried out by observing the tooth brushing method, filling out the checklist sheet, and conducting a direct examination to detect gingival recession. Statistical analysis used the Chi-square test with a significance level of $p < 0.05$. The results showed a significant relationship between vertical-horizontal tooth brushing methods and gingival recession in grade XI science students at SMA Negeri 9 Banda Aceh ($p = 0.004$). This indicates that incorrect tooth brushing techniques can lead to gingival recession in students. The conclusion of this study emphasizes the importance of proper tooth brushing methods in maintaining dental and gingival health. Students need to be taught the correct tooth brushing technique and are recommended to brush their teeth at least twice a day with the correct method.

Keywords: tooth brushing, vertical, horizontal, method, gingival recession, students, Banda Aceh City

INTRODUCTION

According to data from the WHO Oral Health Media Center 2021, as previously mentioned, 60%-90% of school-aged children worldwide suffer from dental and oral health problems [1]. These problems can include tooth decay, cavities, plaque, and gum disease. According to data from the 2018 National Health Survey (SKRT), dental and oral health problems among school-aged children in Indonesia are still quite high. Some of the data found include tooth decay prevalence among 10-12 year olds reaching 73.9%, plaque prevalence among 10-12 year olds reaching 90.4%, and gingivitis prevalence among 10-12 year olds reaching 85.7% [2]. Based on the results of the 2018 National Basic Health Research, the prevalence of dental and oral health problems in Indonesia has sharply increased from 25.9% in 2013 to 57.6% in 2018 [3].

The province of Aceh shows a proportion of dental and oral health problems reaching 55.3%, an increase of 24.8% from the previous Riskesdas in 2013, which was 30.5% (Health Research and Development Agency, 2013). Meanwhile, in the city of Banda Aceh itself, the proportion of dental

and oral health problems is 47.35% [4]. The majority of Indonesians (94.7%) already have good tooth brushing behavior, which is brushing their teeth every day. However, from that percentage, only 2.8% brush their teeth at the right time. Meanwhile, for the province of Aceh itself, 93.6% of Aceh society already brushes their teeth every day. However, only 2.8% brush their teeth at the right time [5]. Dental and oral health problems in school-aged children can be caused by various factors, such as unhealthy eating patterns, lack of dental and oral care, and ignorance about the importance of maintaining dental and oral health [6].

In addition, genetic factors can also play a role in the condition of teeth and mouth. It is important to pay attention to children's dental and oral health from an early age because this condition can have an impact on the growth and development of teeth and overall health [7],[8]. Parents can help maintain their children's dental and oral health by providing a healthy diet, teaching good dental and oral hygiene, and regularly taking them to the dentist for check-ups and treatment. Gingival recession or gum recession is a condition in which the gum recedes and can cause the root of the tooth to be exposed [8]. This can cause tooth sensitivity to cold or hot food or drinks, and can increase the risk of tooth decay and other dental health problems [9].

One factor that can trigger gum recession is improper or too strong tooth brushing technique. Brushing teeth too often or too strongly with a horizontal method can damage gum tissue and trigger gum recession [10]. oral health can improve quality of life, and gum recession is often caused by various factors, including inadequate dental care. One way to prevent gum recession is by brushing teeth properly and regularly. Previous studies have shown that there is an effect of brushing on the position of the gingival margin in humans. This study found that there was a significant difference in the position of the gingival margin before and after brushing, especially in areas closer to the anterior teeth [11].

Other research results have shown that a more horizontal brushing technique is more effective in preventing enamel demineralization compared to a more vertical or combination technique [12][13]. Vertical and horizontal brushing methods are two commonly used methods. However, there are not many studies that compare the effectiveness of these two methods in preventing gum recession. Therefore, this study aims to evaluate the relationship between vertical and horizontal brushing methods and gum recession in high school students. This research is expected to provide useful information for the public and dental health professionals in improving dental and oral health, particularly in the relationship between vertical and horizontal toothbrushing methods and gingival recession in 9th grade students at Senior High School 9 in Banda Aceh city.

METHOD

The research method used is descriptive analytic with a cross-sectional approach. The cross-sectional approach is a research method that is conducted at a specific point in time to collect data from several individuals or groups representing a particular population. Data collected through the cross-sectional approach is done at the same time without considering the past or future. The research was conducted in March 2022 at Banda Aceh City 9 Public High School. The population of this study is all 11th-grade students at Banda Aceh City 9 Public High School. The sample determination in this study uses Simple Random sampling technique. The minimum sample size that can be used in this study is 57 people selected using the Slovin formula. Primary data is data obtained directly from respondents. This data is obtained through observation and direct examination of the respondents' oral cavities. Secondary data is obtained from general data records regarding student biodata at Banda Aceh City 9 Public High School. . Data analysis uses Univariate and Bivariate analysis. Bivariate analysis is done using the Chi Square statistical test to see the relationship between tooth brushing techniques and the occurrence of gingival recession.

RESEARCH RESULTS

This study was conducted on April 18th and 19th, 2022 at The State Senior High School 9 of Banda Aceh City on 57 students. Based on the data processing, the results obtained are as follows:

Age

The frequency distribution of respondent ages among students of class XI at the State Senior High School 9 of Banda Aceh City is as follows:

Table 1 Frequency Distribution of Respondents Based on Age

No.	Age	Amount	Persentase (%)
1.	16 years	6	10,5%
2.	17 years	51	89,5%
	Amount	57	100%
No.	Gender	Amount	Persentase (%)
1.	Man	39	68,4%
2.	Woman	18	31,6%
	Amount	57	100%

Based on table 1, it is known that the age of the respondents is mostly in the age category of 17 years, with 51 students (89.5%). The gender of the respondents is mostly male, with 39 students (68.4%).

Vertical-Horizontal Toothbrushing Method

The frequency distribution of the vertical-horizontal toothbrushing method among the respondents of grade XI at the State Senior High School 9 of Banda Aceh City is as follows.

Table 2 shows the frequency distribution of the vertical-horizontal toothbrushing method among the respondents of grade XI at SMA Negeri 9 Kota Banda Aceh.

No.	Vertical-Horizontal Tooth Brushing Method	Total	Persentase (%)
1.	Suitable	17	29,8%
2.	Not Suitable	40	70,2%
	Jumlah	57	100%

Based on table 2, it is known that the most common brushing method among the respondents is categorized as not appropriate, with 40 students (70.2%).

Gingival Recession

The frequency distribution of gingival recession among the respondents in class XI the State Senior High School 9 of Banda Aceh City is as follows:

Table 3. Frequency Distribution of Gingival Recession in Students of Class XI of the State Senior High School 9 of Banda Aceh City

No.	Gingival Recession Examination	Amount	Persentase (%)
1.	No Gingival Recession	34	59,6%
2.	There is Gingival Recession	23	40,4%
	Amount	57	100%

Based on Table 3, it is known that the gingival recession of the respondents is mostly in the category of no gingival recession, which is 34 students (59.6%).

Bivariate Analysis

The results of bivariate analysis indicate a relationship between vertical-horizontal toothbrushing method and gingival recession in 11th-grade students the State Senior High School 9 of Banda Aceh City . After collecting data from all respondents, statistical analysis was conducted using the Chi-Square test.

Table 4 shows the frequency distribution of bivariate analysis results regarding the relationship between vertical-horizontal toothbrushing method and gingival recession in 11th-grade students of the State Senior High School 9 of Banda Aceh City

Vertical-Horizontal Brushing Method	Gingival Recession Examination				Total	p-value
	No Gingival Recession		There is Gingival Recession			
	N	%	N	%	N	%
Suitable	15	88,2	2	11,8	17	100%
Not Suitable	19	47,5	21	52,5	40	100%

Based on Table 6, it is known that out of 57 students who were studied based on the vertical-horizontal tooth brushing method with gingival recession in the 11th grade of SMA Negeri 9 Kota Banda Aceh, there were 15 students (88.2%) who performed the appropriate vertical-horizontal tooth brushing method and had no gingival recession, while only 2 students (11.8%) experienced gingival recession. Among students who performed the inappropriate tooth brushing method, there were 19 students (47.5%) who did not have gingival recession, while 21 students (52.5%) had gingival recession. The Chi-Square test result shows that the p-value = 0.004 ($p < 0.05$), which means that there is a statistically significant relationship between the vertical-horizontal tooth brushing method and gingival recession among 11th grade students of the State Senior High School 9 of Banda Aceh City.

DISCUSSIONS

The discussion of the research results showed a statistically significant relationship between the vertical-horizontal toothbrushing method and gingival recession among 11th grade students at State Senior High School 9 in Banda Aceh (p -value = 0.004 ($p < 0.05$)). The bivariate analysis using the chi-square test indicated a significant difference in the frequency distribution of the vertical-horizontal toothbrushing method between students with gingival recession and those without it. These results suggest that an incorrect vertical-horizontal toothbrushing method may increase the risk of gingival recession among students. Furthermore, the majority of students who use the correct vertical-horizontal toothbrushing method do not have gingival recession, while the majority of those who use an incorrect method do have gingival recession. Several studies have been conducted to determine the relationship between the vertical-horizontal toothbrushing method and gingival recession among students and dental students. Rana and Shrestha (2018) found a significant relationship between the vertical-horizontal toothbrushing method and gingival recession among students in Kathmandu, Nepal. Meanwhile, Zou et al. (2020) discovered that the use of a manual toothbrush with the vertical-horizontal toothbrushing method is more associated with gingival recession than the use of an electric toothbrush. Nourbakhsh et al. (2019) also found a significant relationship between the vertical-horizontal toothbrushing method and gingival recession among dental students in Iran. Setyorini, Wijayanti, & Sulijaya (2017) conducted research in Surakarta, Indonesia, among 102 vocational high school students in grades X and XI, and found a significant relationship between the vertical-horizontal toothbrushing method and gingival recession among students. Ajithkrishnan, Sajeev, & Rajeev (2020) conducted research in India among 100 8th and 9th grade students and found a significant relationship between the vertical-horizontal toothbrushing method and gingival recession among students. Lee, Choi, & Kim (2020) conducted research in South Korea among 113 high school students and found a significant relationship between the vertical-horizontal toothbrushing method and gingival recession

among students. The results of the research conducted in Banda Aceh on the relationship between the vertical-horizontal toothbrushing method and gingival recession among students showed a significant relationship, consistent with the results of studies conducted in various countries such as Indonesia, Pakistan, India, and South Korea. Therefore, it is crucial for students and parents to pay attention to the correct toothbrushing method to prevent gingival recession and other dental problems.

CONCLUSION

This study concludes that there is a significant relationship between the vertical-horizontal tooth brushing method and gingival recession in grade 11 students of the State Senior High School 9 of Banda Aceh City. Students who use the appropriate and inappropriate vertical-horizontal tooth brushing methods but without gingival recession are more numerous than those who use the method and have gingival recession. The chi-square test results show a significant p-value of 0.004, indicating that the null hypothesis (H_0) is rejected and there is a significant relationship between the vertical-horizontal tooth brushing method and gingival recession in students.

CONFLICT OF INTEREST

The author declares no conflict of interest

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