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**CORRELATION BETWEEN MALOCCLUSION LEVELS AND ORAL
 HYGIENE STATUS IN SMAN 10 BANJARMASIN STUDENTS**

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ABSTRACT

Background: A malocclusion is a form of deviation in the location of the teeth or malrelation of the jaw. Malocclusion can cause many problems, one of which is oral hygiene problems. Crowded teeth conditions cause difficulties in cleaning teeth, accumulated food debris can lead to plaque and calculus retention which is a predisposing factor for caries and gingivitis formation which affects the oral hygiene and health. **Objective:** To determine the relationship between the severity of malocclusion and oral hygiene status in students of SMAN 10 Banjarmasin. **Method:** This study was an observational study with a cross-sectional approach. The study population was students of SMAN 10 (Senior High School) Banjarmasin with age range of 15-18 years. The research sample was 97 respondents and the sampling technique used simple random sampling technique which was determined based on inclusion and exclusion criteria. **Results:** The highest malocclusion severity level of SMAN 10 Banjarmasin students was in the medium category with 34 people (43%). The oral hygiene status was the highest in the medium category with a total of 42 people (53.2%). The results of the data analysis found that there was a significant relationship of 0,000 ($p < 0.05$) between the severity of malocclusion and the oral hygiene status on the moderate category in students of SMAN 10 Banjarmasin. **Conclusion:** There is a relationship between the severity of malocclusion and oral hygiene status in SMAN 10 Banjarmasin students.

Keywords: Adolescents, OFI, Oral Hygiene Status, Severity of Malocclusion.

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INTRODUCTION

Malocclusion is an abnormal occlusion state. Occlusion is being an abnormal if the arrangement of teeth in the arch is not a harmonious relationship both the upper and lower teeth, and the arrangement of teeth is unwell organized.¹ It occurs for several reasons, one of which is abnormalities in the number of teeth, abnormalities in teeth and jaw size, abnormalities of teeth shape, late tooth eruption, and also the disruption in tooth eruption.² Banjarmasin is the Capital City of South Kalimantan with the most populous population and has a fairly high prevalence of dental and mouth problems which initially about 23.8% in 2013 to increase to 52.67% in 2018.^{3,4} One of the oral and dental abnormalities found in the community is malocclusion. The results of the *Riskesdas* in

2013 showed that malocclusion cases occurred in South Kalimantan is 12%.⁵

Malocclusion is possible to cause many problems, one of the problems is oral hygiene problems. Crowded teeth conditions cause difficulties in cleaning teeth, leftover food that has accumulated on the surface of the teeth can lead to plaque and calculus retention which is a predisposing factor for caries and gingivitis that affects hygiene and health of the oral cavity. Factors that influence oral hygiene to be poor are the way to brush teeth, uninterrupted eating patterns, bad habits, and lack of education about oral hygiene. This is also possible to cause the condition of malocclusion in order to affect oral hygiene status.⁶

Adolescents' level of knowledge about oral and dental hygiene is already considered to be

good, but there are still those who lack of oral hygiene due to several reasons. One of the reasons is the condition of malocclusion that cause oral hygiene problem.⁷

Index of malocclusion has been developed to categorize malocclusions into several groups according to their severity. One of the index that is easy to use is the Occlusal Feature Index (OFI). The measurement in the OFI includes the location of lower front crowding teeth, interdигitation abnormalities in the posterior tooth cusps which can be seen in the premolar and right molar regions from the buccal direction in occlusion, overjet and overbite. This method is used because it is simple, objective, does not require complicated diagnostic tools and only requires a fairly short assessment time. Assessment can be done directly in the mouth or on the dental model. The time needed to assess the severity of malocclusion is only about 1-1½ minutes for each individual.⁷

The preliminary study in SMAN 10 Banjarmasin got 7 out of 10 students who were examined experiencing malocclusions in the mild to severe of OHI-S category. The school has never been counseled about malocclusion and facilities in the *Unit Kesehatan Sekolah (UKS)* are incomplete, and also there are none of malocclusion data.

Based on the description above, researcher is interested in conducting research that aims to determine the relationship between the severity of malocclusion and the status of oral hygiene in students of SMAN 10 Banjarmasin.

MATERIALS AND METHOD

This research was carried out after obtaining a certificate of ethical worthiness by the *Komisi Etik Penelitian Kesehatan Fakultas Kedokteran Gigi Universitas Lambung Mangkurat No.028 / KEPKG-FKGULM / EC / I / 2020* and a letter of research permitted with the relevant agencies. The method used in this study was observational with a cross-sectional approach, that the measurements and observations were made at one particular time. The population in this study were students of SMAN 10 Banjarmasin with ages of 15-18 years with total of 584 people. The sample in this study about 97 respondents and the sampling was determined by simple random sampling technique.

The inclusion criteria were students who attend SMA 10 Banjarmasin at the age of 15-18 years, experience malocclusion, have filled out informed consent and were willing to become respondents for this research. The exclusion criteria were students who are in orthodontic treatment. The tools used in this study were

mouth glass, probes, small rulers, informed consent forms, OFI assessment forms and OHI-S forms. The materials used in this research were masks, handschoens, wipes, sterilization pouches and sterilization materials.

Researcher came to SMAN 10 Banjarmasin in order to conduct the research, then respondents were given an explanation of the research and procedures to be carried out. The first procedure to be carried out was screening to determine the sample or respondent that will join the inclusion and/or exclusion criteria. Researcher used masks and handschoens to examine respondents with sterilized mouth glass and sonde. Then after obtaining respondents that in accordance with the criteria, the procedure was continued by giving informed consent, as a sign that the respondent has agreed in the procedure of this study. After the informed consent has been filled and approved, it was continued by recording the complete identity of the respondent in the status form. Then the researcher assessed and measured the severity of malocclusion with OFI, the results of the examination were recorded in a form, collected and made an indicator value comparison between the very mild, mild, moderate and severe malocclusion categories. It was then continued by the Oral Hygiene assessment with OHI-S. OHI-S assessment was done by add up both DI-S and CI-S scores. Then the data will be analyzed and made conclusions.

The data used in this study were primary data obtained directly from subjects' research in the form of direct assessment in the oral cavity. The assessment results were written on the Malocclusion and OHI-S examination sheets. The data obtained was processed and analyzed. The results of the data were presented in the table form.

RESULT

Based on the research, the results were obtained below

Tabel 1. Characteristics of respondents based on age in SMAN 10 Banjarmasin students

Age	Frequency	Percentage
15 years	12	15,2%
16 years	34	43%
17 years	17	21,4%
18 years	16	20,3%
Total	79	100%

Table 1. shows the highest number of respondents in this study was the age of 16 years as many as 34 people (43%), while the number of respondents at the age of 15 years are the lowest, that is 12 people (15.2%). The following is the

characteristics data of students of SMAN 10 Banjarmasin based on gender.

Tabel.2 Characteristics of respondents base on gender in students of SMAN 10 Banjarmasin

Gender	Frequency	Percentage
Male	36	45,6%
Female	43	54,4%
Total	79	100%

Table 2. shows that the number of female respondents was greater than the male respondents. The number of female respondents were 43 people (54.4%), while the male respondents were 35 people (45.6%). The frequency distribution of severity assessment of malocclusion by gender can be seen in table 3.

Tabel 3. The frequency distribution of malocclusions based on gender in students of SMAN 10 Banjarmasin

Malocclusion Levels	Gender		Total
	Male	Female	
Very Slight	3 (3,8%)	1 (1,3%)	4 (100%)
Slight	16 (20,3%)	17 (21,5)	33 (100%)
Moderate	15 (19%)	19 (24,1%)	34 (100%)
Severe	2 (2,5%)	6 (7,6%)	8 (100%)

Table 3 shows that the most respondents were women with moderate categories, that were 19 people (24.1%) in a total of 43 female respondents (43%). The most male respondents were in the mild category, that were 16 people (20.3%). The frequency distribution of malocclusion severity assessment based on the OFI method can be seen in table 4.

Tabel 4. The frequency distribution of malocclusion data is based on the OFI method for students of SMAN 10 Banjarmasin

Malocclusion Levels	Frequency	Percentage
Very Slight	4	5.1%
Slight	33	41.8%
Moderate	34	43%
Severe	8	10.1%
Total	79	100%

Table 4 shows that the results of the respondents who have the highest malocclusion severity was in the category of moderate

malocclusion, that were 34 people (43%), while the least number of respondents was in the good category with 4 people (5.1%). The frequency distribution of oral hygiene status based on the OHI-S method can be seen in table 5 below.

Tabel 5. The frequency distribution of oral hygiene status based on the OHI-S method for students of SMAN 10 Banjarmasin

Oral Hygiene Status	Frequency	Percentage
Good	36	45.6%
Moderate	42	53.2%
Poor	1	1.3%
Total	79	100%

The highest number of respondents in the Oral Hygiene status was in moderate category with 42 people (53.2%). The frequency distribution of oral hygiene status based on gender in the students of SMAN 10 Banjarmasin can be seen in table 6 below.

Tabel 6. Frequency distribution of oral hygiene status based on gender.

Oral Hygiene Status	Gender		Total
	Male	Female	
Good	14 (17,7%)	22 (27,8%)	36 (100%)
Moderate	22 (27,8%)	20 (25,3%)	42 (100%)
Poor	0 (0%)	1 (1,3%)	1 (100%)

The highest number of male respondents was in the moderate category with the number of 22 people (27.8%), while the highest number of female respondents was in the good category with the number of 22 people (27.8%). The lowest number of male respondents was in the good category with the number of 14 people (17.7%), while the female respondents was in the bad category with the number of 1 person (1.3%).

Data analysis was performed to see the relationship or correlation between variables. Data were analyzed using the Spearman correlation test. The result of Spearman analysis test and the frequency distribution of the severity of malocclusion to oral hygiene status can be seen in table 7 in the following.

Tabel 7. Spearman Test Analysis Results and frequency distribution of the severity of malocclusion to oral hygiene status

Malocclusion Levels	Oral Hygiene Status			Total	Sig.	r
	Good	Moderate	Poor			
Very Slight	3 (3,8%)	1(1,3%)	0(0%)	4 (100%)	0,000	0,533
Slight	25(31,6%)	8(10,1%)	0(0%)	33 (100%)		
Moderate	6 (7,6%)	28(35,4%)	0(0%)	34 (100%)		
Severe	2(2,5%)	5(6,3%)	1(1,3%)	8 (100%)		

Table 7 shows that the highest number of respondents were respondents who had moderate malocclusion severity and moderate category of oral hygiene status, which were 28 people (35.4%). The result of Spearman test can show that the significance value was 0,000 (<0.05), which means that there is a relationship between the severity of malocclusion and oral hygiene

status. Correlation Coefficient value (0.533) means that the strength of correlation is strong and the direction is directly proportional or positive. The higher the severity of the malocclusion, the worse the oral hygiene status will be.

DISCUSSION

Malocclusion is a form of deviation in the location of the teeth or malrelation of the arch. Malocclusion is not a disease, but it is considered as a variant of normal.⁸ Table 3 shows that most students experienced malocclusion in the medium category, in amount of 34 people (43%). The cause of the high number of malocclusion with the medium category is due to the lack of awareness of the importance of dental care and a low economy, thus they do not do the orthodontic treatment. The knowledge about orthodontic treatment will influence the level of awareness of orthodontic treatment. Knowledge is the most basic factor in shaping one's actions. Good knowledge of oral health is needed to foster good behavior towards permanent dental care.⁹ Other causes of differences in the severity of malocclusion of each respondent can be caused by the differences of respondents' backgrounds, including developmental factors, oral habits such as thumb sucking and breathing through the mouth, heredity, genetic factors, and ethnicity or culture.¹⁰

Table 4 shows that cases of moderate category malocclusion were more experienced by women than men with number of 43 women (54.4%) and 36 men (45.6%). This result is in accordance with research conducted by Riyanti which obtained from 96 students, there were 59 female students who experienced malocclusion, and 27 male students.¹¹ The cause of the high prevalence of malocclusion in women is also caused by the habit of consuming and chewing soft foods that affect the growth of jaw size. The chewing can provide stimuli to the growth of the

jaw. According to Anzar Kusuma et al, women tend to prefer snacks than men, the lack of stimulus to jaw growth is due to consumption of snacks and soft foods that can inhibit jaw growth and trigger to malocclusion, especially in girls who consume snacks more often.¹² The high incidence of malocclusion in women can also be caused by environmental factors, such as premature loss of primary teeth. According to Beldiman's research, the prevalence of early deciduous loss is higher in girls, that was 55.1%. Therefore, the prevalence of crowding in girls can be related to the prevalence of premature decay of teeth.¹³

The malocclusion conditions can cause brushing teeth problems due to the difficulty of reaching food scraps in the interdental area which can produce the accumulation of plaque and calculus.¹⁴ Table 5 shows that the Oral Hygiene Status of SMAN 10 Banjarmasin students was mostly in the medium category. This result is reinforced by the research conducted by Rattu et al (2013) at SMAN 1 Manado, the results of the study showed that 51 students (61.4%) had moderate oral hygiene status. These results indicate that most students have awareness in maintaining oral hygiene, but it still needs to be improved so that good oral hygiene and oral health can be achieved.¹⁵ This behavior is caused by lack of knowledge about maintaining oral health and also other factors. The results of this research are also in line with research conducted by Cantekin in Turkey that there were respondents about 76.47% with oral hygiene status in the moderate category.¹³

The condition of dental malocclusion can affect the cleanliness of the oral cavity. In people with malocclusion, it is considered to be more difficult in cleaning teeth than in the normal occlusion conditions. There are factors that influence oral hygiene to be poor, including how to brush teeth, uninterrupted eating patterns, bad habits and lack of education about oral hygiene which can also cause malocclusion conditions to affect oral hygiene status.¹⁶ In addition to malocclusion conditions, a person's level of knowledge and education can also affect oral cleansing which in line to research conducted by Basuni et al in Banjar District that showed a low level of education has an influence on oral hygiene.¹⁷

The results of the analysis test found that there is a significant relationship between the severity of malocclusion and the status of oral hygiene in students of SMAN 10 Banjarmasin with the age of 15-18 years. From this research, it can be seen that in adolescence, malocclusion is still one of the things that influence and as the cause of poor oral hygiene status and oral health.

In a state of malocclusion, crowded teeth will be difficult to clean. Food scraps located in the interdental area will be difficult to reach and cause difficulties in cleaning teeth, if not cleaned these food scraps will continue to stick at the tooth surface until decay occurs. This continues until the food is accumulated by bacteria then transformed into plaques that are harder to be cleaned.^{14,16} Difficulties in maintaining oral hygiene can produce greater accumulation of dental plaque, which is considered as a primary etiological agent in caries and gingivitis. Based on the exposure, it was found that the condition of malocclusion can affect oral hygiene. This statement is also reinforced by research conducted by Arora Geetika and Sumit Bhateja in Mathura City. They found a decrease in the oral hygiene status of adolescents who have malocclusion which means that there is a significant relationship between those experiencing malocclusion and oral hygiene status.¹⁸

A suggestion for further research is the need to do research about the relationship between gender and the severity of malocclusion and also oral hygiene status. It is also recommended to use other methods to measure the severity of malocclusion. This research is expected to increase awareness for students of SMAN 10 Banjarmasin in order to maintain the cleanliness

of the oral cavity, both those who are experiencing malocclusion and not.

Suggestions for SMAN 10 Banjarmasin are need to do regular counseling on dental and oral health and hygiene, especially providing education about malocclusion, collaborating with relevant agencies, and also enhancing the role of UKGS and motivating students of SMAN 10 Banjarmasin in maintaining oral health.

Based on this research, it can be concluded that there is a relationship between the severity of malocclusion and the status of oral hygiene in students of SMAN 10 Banjarmasin.

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