



Debris Index Before and After Apple Consumption

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ABSTRACT

Dental caries is a form of tooth decay that begins in the enamel and progresses to the dentin. This is usually caused by poor oral hygiene, which causes a buildup of debris that harbors various types of bacteria. Efforts to prevent debris accumulation can be in the form of mechanical control, chemical control and control of fibrous foods such as apples Purpose: The purpose of this study was to analyze the effectiveness of the debris index before and after consuming apples. Methods: The type of research used in this study was a quasy experiment with a pretest and posttest design with one group design. This research was conducted with a sample of 84 students, using a total sampling technique, the research data used primary data. The research instrument uses a debris index check sheet. Data analysis was tested using paired sample t test. Results: Before entering the apples, 14 students (16.7%) had good debris criteria, 66 students (78.6%) had moderate debris criteria and 4 students (4,8%). And after consuming apples, 77 students (91.7%) had good debris criteria index, 7 students (8.3%) had moderate debris criteria index and no students had bad debris criteria index. Conclusion: The Debris Index before consuming apples was highest in the Moderate mixture of 66 students (78.6%). The Debris index after consuming apples was the highest in a good assessment of 77 students (91.7% and there were no bad criteria of 0.0%, the number of students who consumed apples was 86.9%, the highest with a good assessment of (91.7%), with the results of paired sample t-test $p < 0.001$. Conclusion: Consuming apples is effective in reducing the debris index.

INTRODUCTION

Dental and oral health is still a problem in Indonesia. This problem is reflected in the high incidence of dental and oral cavity diseases in Indonesia (Fadjeri et al., 2021). Based on the results of the 2018 Basic Health Survey, it was revealed that dental and oral health problems increased from 25% in 2013 to 56% in 2018 and 73% in 2018 have tooth decay. The results showed that 54% of children aged 5 to 9 years experienced cavities or diseased teeth, 55.6% of young people aged 10 to 14 years, and 51.9% of young people aged 15 to 24 years suffered from dental and oral health problems. . Actions or attitudes in maintaining oral hygiene are known to be poor. DKI Jakarta is one of the provinces where the incidence of dental and oral diseases such as cavities increased from 2007 to 2013, from 23% to 29.1%. DKI Jakarta is ranked 15th highest out of 34 provinces in Indonesia in terms of dental and oral problems. Several previous studies have revealed that individual awareness of dental health is an important role in initiating dental care. In order to achieve optimal health, unhealthy behaviors must be changed (Riskesdas, 2018; Tamami et al., 2023).

A healthy society involves every individual having rights to live healthily, avoid risks that could potentially harm their health, and gain access to high-quality, affordable, and equitable health services (Organization, 2018). Health is a form of investment for society because it creates a healthy and productive environment (Stroud et al., 2015). Everyone, including children, needs to practice healthy oral hygiene. Eating becomes uncomfortable and can interfere with other body functions if the teeth and gums are damaged and neglected (Kasihani & Purnama, 2021; Purnama, 2022). Children are the nation's treasure for the future, and if they have dental and oral problems, it will interfere with their quality of life and they will not be able to maximize their activities (Kantohe et al., 2016).

In elementary school students aged 6 to 12 years, the prevalence of cavities is 90.2%, with an average cavity score of 3.00 (0-18.00) and a cavity score of 1,000 (0-12.00). Therefore, children aged 6 to

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12 years on average have relatively low levels of cavities. This shows how tooth decay is caused by the respondent's level of dental and oral hygiene. The risk factors for poor oral hygiene associated with cavities reinforce this (RE et al., 2021; Supriatna & Angki, 2018).

Tooth decay is a process of tooth decay that starts at the enamel layer and then attacks the dentin layer. The most common cause of tooth decay is usually caused by poor oral hygiene, which is why there is a buildup of food debris containing various types of bacteria. Periodontal disease and dental caries are mostly caused by food debris (Ling & Tao, 2016; Valm, 2019). According to (Wiradona et al., 2013) Debris is a small organism that forms a soft layer. It grows in a matrix and firmly adheres to the surface of calculus, piles, and unclean teeth. Apart from tooth decay or cavities, dirt can also irritate the gums or cause gum inflammation.

Efforts to prevent the buildup of waste can take the form of mechanical regulation, chemical regulation, and regulation of foods containing fiber. Eating fruit that has fiber such as apples, watermelon, water guava, guava and papaya is one method of getting fiber in food, and this fruit can also help clean teeth (Cahyati, 2013). In addition, this fruit has the capacity to clean teeth. to purify himself (Hidayati & Suyatmi, 2016). Self-maintenance is a process in which teeth are cleaned naturally in the oral cavity (Mandalika et al., 2014). When foods containing fiber and water are consumed in the mouth, the natural process of cleaning teeth will occur (Prasetiowati et al., 2017). From a physiological perspective, foods containing fiber will stimulate the production of saliva, so that food particles stuck to the teeth can be removed (Hidayati & Suyatmi, 2016).

Create a bolus of food through proper eating, the oral cavity carries out a chewing process by using the teeth to crush coarse food particles into fine ones 33 times. The mechanical characteristics of consuming fibrous fruit produce a brush-like action that helps remove food debris (Haida & Cholil, 2014). Apart from cleaning teeth from stuck food particles, foods containing fiber also help remove sugar components from food particles left in the crevices and cracks of the teeth, which can affect a person's OHIS index (Prasetiowati et al., 2017).

According to (Cahyati, 2013) apples (*Malus Sylvestris*) are a fruit rich in fiber. People generally only know about the positive benefits of this fruit on overall health, they are not aware of the positive benefits of this fruit on oral health (Haida & Cholil, 2014). A natural substitute that can be used to stop the growth of debris is apples (*Malus sylvestris*). Eating apples will cause friction between the fruit fibers on the teeth and the sour taste of apples will increase the secretion of saliva in the mouth which can function as a natural oral cleanser.

The reason scientists chose apples as research subjects was because these fruits were easy to find and most people, especially children, enjoyed the taste of these apples. This apple has an attractive color, so children like this fruit

METHOD

The research design used in this study was a quasi-experimental design with a pretest and posttest with one group design.. The research sample to be taken in this study consisted of fifth grade students at SDN 03 Cilandak Timur, South Jakarta with a total sampling technique, namely taking samples from the entire population with a total sample of 94 students.

This research was conducted from February to June 2023, data collection in this study was carried out on May 5, 2023. The research was conducted at State Elementary School 03 Cilandak Timur. The instrument used in data collection was a debris index check sheet. Analysis of the data used in this study using SPSS with paired sample t test. This data collection is carried out as follows:

1. Giving informed consent
2. For those who are approved, students are smeared with disclosing solution on the entire surface of the index tooth, then instructed to rinse their mouth once.
3. Before consuming apples, a debris index test is carried out using a mouth mirror and sonde. The results are then recorded in the examination format.
4. Before the apples are distributed to students, instructions are given on how to chew the apples so that all students receive the same treatment.

5. Eating apples is done by chewing on two sides, namely the right and left for 5 minutes. The number of apples consumed is 50 grams for each respondent.
6. Students were instructed to eat an apple, after which the researchers and research friends checked whether the fruit they had eaten had run out or had not run out. The results are then recorded in an examination format.
7. After eating apples, 15 minutes later the pupils are measured for the index debris, by smearing the index tooth with disclosing solution on the entire surface of the index tooth, then instructed to rinse once
8. After consuming apples, check the debris index again using a mouth mirror and sonde.
9. After that, the results are recorded in the inspection sheet, sheet checks are collected and calculated and adjusted according to the results of checks carried out by researchers to avoid a lack of information and facilitate the management of research data.
10. The completeness of the data collected is verified. If the information is incomplete, it must be filled in first.
11. Next, calculate the debris index value for each student examination format.

RESULT

The results of the study were conducted on fifth grade students at SDN 03 Cilandak Timur, South Jakarta in 2023. Data collection was carried out before and after eating apples by direct examination of the oral cavity of the students who were the samples. From the research conducted, the sample frequency distribution data is obtained as follows:

Table 1. Frequency Distribution of Debris Index Criteria Before and After Consumpting Apples

Criteria	Before		After	
	F	%	F	%
Good	14	16.7	77	91.7
Moderate	66	78.6	7	8.3
Bad	4	4.8	0	0
Total	84	100	84	100

Based on table above, it shows that of the 84 samples studied before consuming apples, 14 students (16.7%) had good debris index criteria, 66 students (78.6%) had moderate debris index criteria and 66 students (78.6%) had moderate index criteria. bad debris as many as 4 students (4.8%). Based on table above, it shows that of the 84 samples studied after consuming apples, 77 students (91.7%) had students with good debris index criteria, 7 students (8.3%) had moderate debris index criteria and there were no students with bad debris index criteria.

Table 2. Different test of Debris Index Criteria Before and After Consumpting Apples

Knowledge	Mean	Difference	p-value
Pre-test	1.12	0.74	0.001
Pos-test	0.38		

Table 2 shows that the results of the paired sample test analysis obtained a p-value of 0.001, meaning that consuming apples is effective in reducing the debris index.

DISCUSSION

Oral hygiene cannot be separated from assessing the buildup of food in the mouth which can be removed by the flow of saliva and movement of the oral muscles by brushing the teeth (Purnama et al., 2020), except for buildup that is pushed between the teeth or in the mouth. Periodontal pockets are dirt that can form plaque in the oral cavity without being cleaned. Dental plaque is a complex group of microorganisms that forms on all parts of the tooth surface that are exposed to bacterial products in the mouth. A complex group of microorganisms can consist of live bacteria, dead bacteria, and artificial

products of bacteria and saliva. Plaque formation can be prevented by maintaining good oral hygiene (Peterson et al., 2013; Wiegand & Schlueter, 2014).

While the research conducted by (Seajima & Gunawan, 2015), there was a difference in the decrease in the index of food scraps before and after consuming apples in 2 students in the good category, 11 in the medium category and 10 in the bad category, while the index of food scraps after treatment became 13 good students, 10 students in the moderate category. Then the research conducted by (Natamiharja & Sitorus, 2013) found a significant difference between the index of food scraps before and after chewing apples and guava fruit.

Apple (*Malus sylvestris* Mill) is a fruit that contains vitamin A, thiamin, riboflavin, niacin, pantothenic acid, and pyridoxine. Minerals including potassium, magnesium, calcium, iron, and zinc are also present. Natural compounds, polyphenols, fiber, boron, and tartaric acid are some other substances that are very good for treating hypertension. Apples are known as an extraordinary source of flavonoid compounds, which are substances that are beneficial to the circulatory system and the heart in particular. If the heart is in good condition, blood pressure will also be optimal. Potassium is a prominent component in apples, and red apples in particular are rated as having quite high levels of potassium. Potassium decreases renin production, arteriolar vasodilatation, and response to endogenous vasoconstrictors while increasing sodium excretion and increasing Na excretion (Dalimartha & Adrian, 2013).

People generally only know about the positive effects of this fruit on general health, they are not aware of its positive effects on dental and oral health (Haida & Cholil, 2014). Apples (*Malus sylvestris*) are a natural option that can be used as a measure to prevent the buildup of food waste. Biting an apple will cause friction between the teeth and the fruit fibers. Apart from that, the sour taste of the apple will encourage saliva in the mouth to come out and can be used as a natural mouth cleanser.

The results of research on eating apples in terms of the amount of fruit eaten showed that from 84 samples, 73 students had consumed apples (86.9%) with good criteria being 67 students (79.8%), while 6 students were (7.1%), there were no students with bad criteria and 11 people did not finish eating apples (13.1%) with good criteria as many as 10 students (11.9%), while there were 1 student (1.2%) %, there are no students with bad criteria. Judging from the amount of apples eaten, it was concluded that those who ate the finished fruit had better results than those who did not, as proven by the most criteria, namely good. Because apples contain fiber and water, they can cause tooth cleaning because when chewing, the fiber will move and release food particles that stick to the surface of the teeth. Apples can reduce bad breath because the water they contain also moisturizes the mouth to eliminate bacteria (Branson, 2017).

The benefits of apples for dental and oral health are because they contain high levels of fiber and water. Apples contain large parts that must be crushed again before being absorbed. Eating them quite hard is sometimes referred to as a natural toothbrush, because it can cause saliva secretion. Therefore, apples can naturally clean teeth from food remaining in the teeth and food stuck to them, which can affect a person's debris index number (Rini & Hutagalung, 2021; Touyz, 2016). This fibrous and juicy fruit can help clean teeth because when consumed, the fibers move and release food particles that stick to the surface of the teeth. The water content of apples also provides moisture to the mouth, which helps cleanse germs and reduce bad breath.

Apples contain ingredients that are good for dental and oral health, apart from fiber and water, namely tannin. Tannins have antibacterial, spasmolytic and astringent properties. This tannin ingredient functions to refresh and clean the mouth, protecting teeth from decay and gum disease due to accumulated plaque. Apart from that, apples contain maleic acid which can brighten yellowing teeth (Nurasiki & Amiruddin, 2017).

CONCLUSION

Based on the results of the research that has been done, it can be concluded that there is the consuming apples is effective in reducing the debris index.

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