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THE COMPARISON OF REDUCING PLAQUE INDEX BEFORE AND AFTER USING CHEWING GUM AND TOOTH BRUSHING IN PERTIWI JUNIOR HIGH SCHOOL STUDENTS

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Abstract

Up to present, plaque control is the most effective method to maintain oral hygiene. Using chewing gum after eating food and snacks can stimulate saliva, promote remineralization and reduce potential dental plaque. To know whether using chewing gum can reduce plaque index as good as toothbrushing, thus an experimental study was performed. Sample was the first grade of junior high school students. After selection according to the requirements, the sample size was 35 students. Each sample got two different treatments. In the first day, they used chewing gum and the next day they were instructed to brush their teeth. Before and after using chewing gum and toothbrushing their dental plaque was scored. The mean of plaque score before using chewing gum was 2.24 and after using chewing gum was 1.28, statistically there was a significant difference ($t = 33$; $df = 34$; $p<0.001$). The mean of plaque score before toothbrushing was 2.26 and after toothbrushing 1.10, statistically there was a significant difference. Using chewing gum and toothbrushing can reduce plaque score, though the reduction of plaque score by toothbrushing was greater compared with using chewing gum.

Key words : Dental plaque; chewing gum; toothbrushing.

Introduction

Up to present plaque control is the most effective method to maintain good oral hygiene, that is to clean tooth mechanically using toothbrush and other aid cleaning tools i.e dental floss, tooth pick, even by chewing coarse food that contains fibers.[1] Toothbrushing aims at keeping at cleaness and oral health, especially tooth and the surrounding tissues, and appeared oral freshness.[1]

William F from Ohio, the first man who got chewing gum patent right, said that chewing gum was not only a nice type but also had potential effect as toothpaste. Besides giving mechanical effect, using chewing gum after eating food and snacks can stimulate saliva, and promote reminalisation and reduce potential dental plaque.[2, 3, 4] According to Peterson DE and Razanamihaja N, using Polyol chewing gum contained 55.5% sorbitol, 4.3% xylitol and 2% carbamide three times daily can reduce occlusal caries incidence.[5]

Proskin HM performed a clinical study to compare the group who used free sugar chewing gum for 15-20 minutes after meals three times daily with control group who did not use chewing gum. After two years, excluding white spot, the chewing gum group exhibited a 38.7% caries increment reduction compared to the control group. Including white spots. a corresponding 33.1% reduction was indicated.[6]

Edgar WM said using chewing gum contained xylitol 100% is the most effective in reducing caries, that showed caries reduction 70% compared to without chewing gum. and caries reduction approximately 50% compared to chewing gum contained sorbitol.[7] Wisnu Adi Yudianto also said that the sweet and cold nice taste of chewing gum can create the increment of saliva flow ten folds.[8] According to Soparker and New MB using chewing gum contained baking soda will reduce extrinsic stain significantly 29.7% for 4 weeks.[9] One of the chewing gum products that is marketed is "Happydent" brand, where it was introduced as a chewing gum that could be used as a substitute for toothbrushing if there is no chance for toothbrushing.

Natamiharja I. and Dewi O's research compared reduction plaque index before and after toothbrushing between the straight filaments tooth brush group and zig-zag group in three elementary schools, found that reduction plaque score in the straight filaments tooth brush group was about 1.02-1.23. Commonly, children like to chew gum and fortunately chewing gum has a potential effect in reducing caries and dental plaque. The problem is whether using chewing gum can reduce plaque score as good as toothbrushing. The aim of this study was to know how much using chewing gum can reduce plaque score. The hypothesis was no significant difference in reducing plaque score between using chewing gum and tooth brushing.

Materials and Methods

The design of this research is an experimental study. The same sample got two different treatments. In the first morning the sample used chewing gum and in the next morning they brushed their teeth. Before and after using chewing gum and toothbrushing their dental plaque was scored.

Population was Pertiwi junior high school students, sample was the first grade of junior high school. One class was chosen randomizely from the four first grade classes and after selecting according to the sample requirements the total amount of sample was 35 students.

Sample requirements : (1) no using removable and fixed orthodontic appliances, (2) no using denture, (3) having minimally plaque score 2, and (4) aged 12-14 years old.

The plaque score of students was scored by adding rose pink colour food used Turesky-Gilmore-Glickman Modification of the Quiqley-Hein Plaque Index with the criteria as follows :

0 No plaque
1 Separate flecks of plaque at the cervical margin of the tooth.
2 A thin continous band of plaque (up to 1mm) at the cervical margin of the tooth.
3 A band of plaque wider than 1 mm but covering less than one third of the crown of the tooth.
4 Plaque covering at least one third but less than two third of the crown of the tooth.
5 Plaque covering two third or more of the crown of the tooth.

The sides of each tooth that were examined as follows :

-Mesial buccal/labial side
-Mid buccal/labial side
-Distal buccal/labial side
-Mesial lingual/palatinal side
-Mid lingual/palatinal side
-Distal lingual/palatinal side

The criteria of the tooth that was not examined :

-third molar
-tooth radix
-not and has been erupting tooth
-having filled at the servical tooth.

A plaque score per person was obtained by totaling all of plaque scores and devided by the number of sides.

The students who have plaque score less than 2 were not included in the samples, then each student was given one pack of chewing gum that contains 2 gums. They were instructed to chew the two chewing gums for 5 minutes either in the anterior or posterior tooth. After the chewing gum was thrown, plaque index was scored again with the same method.

The next morning the same students were scored their plaque indexes, subsequently they were given straight filament tooth brushes and having been given Pepsodent tooth paste. Instructed in toothbrushing for 5 minutes, without giving guidance how to brush their teeth (based on their daily habits) because the aim of this study was not to evaluate the effect of dental education. After rinsing, their dental plaque were scored again.

Counted different plaque score before and after using chewing gum and toothbrushing. To know the reduction of plaque score significantly difference between the chewing gum group and toothbrushing group non paired student T test was performed.

Results

The mean of plaque score before using chewing gum was 2.24 and after using chewing gum was 1.28, statistically there was a significant difference ($t = 33$; $df = 34$; $p<0.001$). The mean of plaque score before toothbrushing was 2.26 and after toothbrushing was 1.10; statistically there was a significant difference ($t = 41.42$; $df = 34$; $p<0.001$).

The different mean of plaque score before and after using chewing gum was 0.96, whereas the different mean of plaque score before and after toothbrushing was 1.16, statistically there was a significant difference ($t = 5$; $df = 68$; $p<0.001$).

Table 1. The mean of plaque score before and after using chewing gum and toothbrushing.

Treatment	Plaque Score				Statistical Analysis Results			Sample Size
	Before		After					
	$\bar{X}$	SD	$\bar{X}$	SD	t	df	p	
I..Usingchewing gum	2.24	0.19	1.28	0.15	32	34	<0.001	35
II. Toothbrushing	2.20	0.15	1.10	0.15	41.42	34	<0.001	35

Table 2. The different mean of plaque score before and after using chewing gum and toothbrushing.

Treatment	Different Plaque Score		Statistical Analysis Results			Sample Size
	$\bar{X}$	SD	t	df	p	
I. Using chewing gum	0.96	0.22	5	68	<0.001	35
II. Toothbrushing	1.16	0.17				35

Discussion

In the first morning before using chewing gum, the mean of plaque score was 2.24 and the next morning before toothbrushing the plaque score was 2.26. It was "Hallo effect" of plaque index examination in the first morning did not influence the students in their toothbrushing habit, and statistically there was no significant difference ($t = 0.66$; $df = 68$; $p>0.5$)

The different mean of plaque score before and after toothbrushing was 1.16, this result was nearly similar to Natamiharja L and Dewi O's research that compared reducing plaque score before and after toothbrushing at three elementary school children that were 1.02-1.23.

The different reducing plaque score after using chewing gum was 0.96, indeed, using chewing gum can reduce plaque score. However the reduction was not as many as if the students brushed their teeth. Besides, it can reduce plaque score, using chewing gum that contained xylitol can reduce dental caries incidence too.

Conclusion

Using chewing gum and toothbrushing can reduce plaque score significantly, though the reduction plaque score by toothbrushing was greater compared with using chewing gum and statistically significant difference.

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