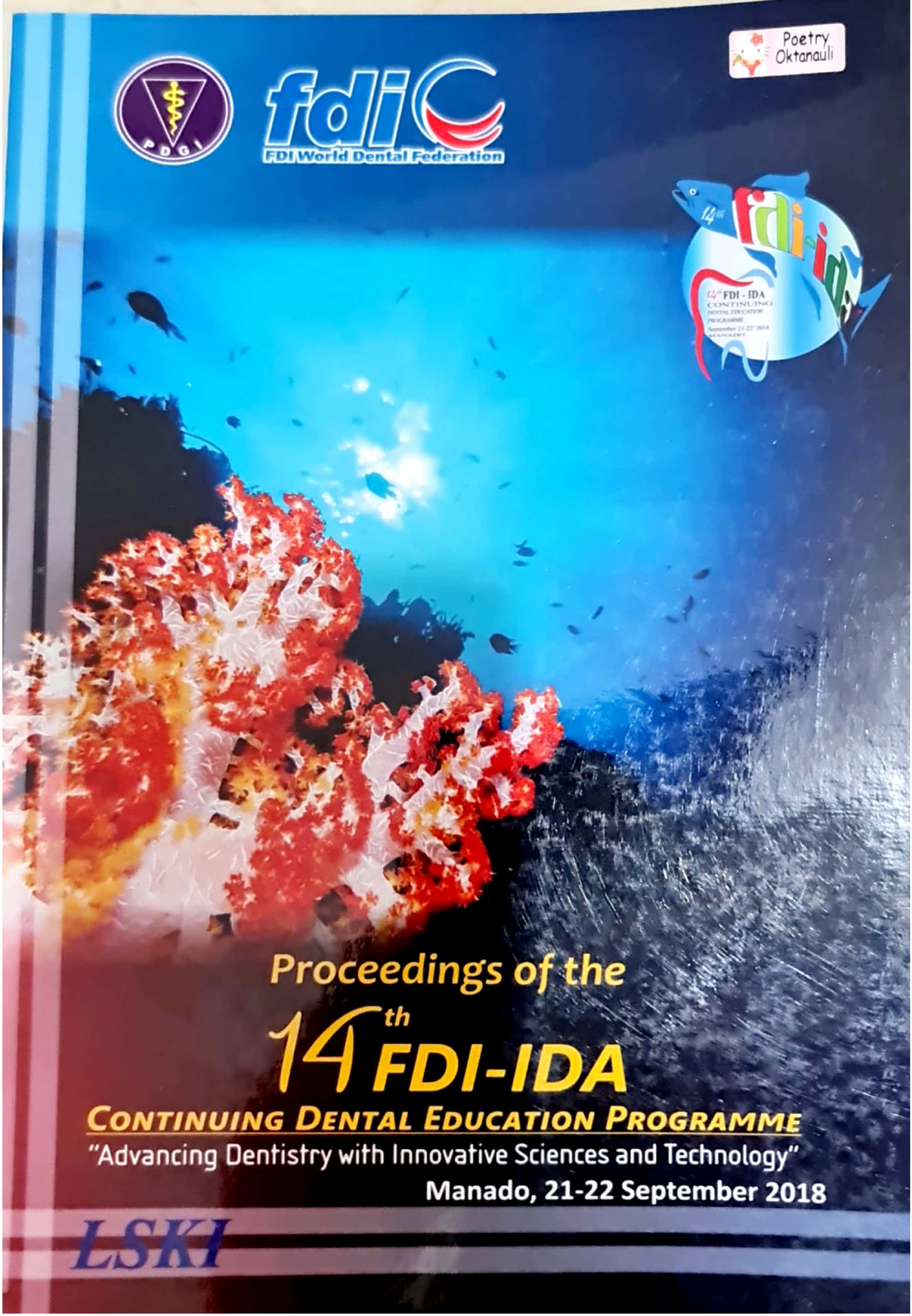
FDI World Dental Federation



Proceedings of the 14th FDI-IDA

Continuing Dental Education Programme

"Advancing Dentistry with Innovative Sciences and Technology"

Manado, 21-22 September 2018

LSKI

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editor :
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First published by Lembaga Studi Kesehatan Indonesia (LSKI) Bandung 2018
for 14th FDI-IDA Continuing Dental Education Programme Committee

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ISBN 978-602-60959-4-7

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FOREWORD

Continuing dental education is a lifelong process for dentists who seek excellence in providing the best and current service to their patients. Scientific and technological advances in dentistry has been progressing rapidly in the last few years. Consequently, patients' needs and expectations to receive the highest standard of dental care has also increase.

World Dental Federation (FDI) in conjunction with Indonesian Dental Association hold international scientific meeting and dental exhibition annually. This year, the event will be organized in Manado. It provides a great opportunity for dentists and dental students, in the eastern part of Indonesia especially, to gain knowledge and update their skills.

The theme of this year's meeting is " Advancing Dentistry with Innovative Sciences and Technology" which will enable an international platform for the discussion of the latest findings and future technologies in dentistry.

Chairman,
Sanil Marentek

RESEARCH

The Effect of Smoking to Enamel and Gingiva (Study at FKG UPDM(B), Jakarta)

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Abstract

Introduction: Cigarettes caused harmful effects on human body, including the oral cavity such as tooth enamel and gingiva. The negative effects of smoking include enamel discoloration, gingival pigmentation and gingivitis. Methods: this research is a descriptive study with cross sectional research design. The objectives from this study is to know more about smoking effect to enamel and gingiva. This study was conducted to 30 subjects in accordance with inclusion criteria, such as active smokers, good general health, no systemic diseases and willing to be research respondents. Results: 30 subjects has been examined and found that 30 subject had tooth enamel discoloration, 27 subjects had gingival pigmentation and 29 subjects had gingivitis. Conclusions: smoking has been shown to cause changes in enamel and gingiva.

Keywords: cigarette, enamel discoloration, gingival pigmentation, gingivitis.

Introduction

Smoking can cause illness and even death.[1] WHO (World Health Organization) states that smoking can cause various diseases, both in active and passive smokers. [2] In 2000, Sitepoe classifies smokers based on the number of cigarettes consumed daily, they are mild, moderate, and heavy smoker category.[3]

Cigarette contains three of the most dangerous chemicals, namely tar, nicotine, and carbon monoxide. Tar is a mixture of some hydrocarbon substances. Nicotine is the largest component of cigarette and an addictive substance, while carbon monoxide is a toxic gas that has a strong affinity for hemoglobin in red blood cells to form carboxyhemoglobin.[4]

Smoking habits can cause pathological conditions in the oral cavity. It is because the oral cavity is where the absorption of substances from the burning of cigarettes, especially soft tissue of the mouth that is more vulnerable to exposure to the effects of cigarettes. The heat and accumulation of cigarette burning products can affect the gingival inflammatory response. In addition, the tar contained in cigarette can settle on the surface of the tooth and cause the tooth surface becomes rough, so the plaque is easily attached. The accumulation of plaque on the edge of gingival margin compounded by poor oral hygiene may lead to gingival inflammation. In addition to gingival inflammation, smoking can also cause color changes in gingiva (gingival pigmentation). [2,5,6]

Cigarettes can also cause enamel discoloration, especially on the cervical. The discoloration of a brownish black stain is caused by tar which is the result of residual burning of tobacco.[7] Smoking is one extrinsic factor that can cause enamel discoloration. [8] The effects of smoking that arise are influenced by the number of cigarettes smoked, duration of smoking, the type of cigarette smoked, and even related to the inhalation. [5]

Methods and Materials

This research is a descriptive research with cross sectional research design. The experiments were observational. The research was conducted in non-dental laboratory Faculty of Dentistry, University of Prof. DR. Moestopo (Beragama) in March 2017. This study was conducted to 30 subjects in accordance with inclusion criteria. The inclusion criteria in this study consisted of FKG UPDM(B) students, with categories active smokers, good general health, no systemic diseases and willing to be research respondents.

This research is done by applying the stain remover to the labial and palatal surfaces of the right upper anterior of the subjects. The labial and palatal surfaces of the upper right anterior teeth, are then cleaned by using a manual scaller (chisel). The enamel color of the upper right anterior teeth, then compared to the left.

The subjects were then examined visually to see if there were gingivitis and gingival pigmentation. The gingival examination is performed with Gingival Index (GI) of Loe and Sillness, by using probe. The examined gingiva is the gingiva that surrounds the teeth (mesial, distal, labial/buccal, lingual/palatal), while the examined teeth are upper right first molar (16), the right upper two incisor (12), the left upper first premolar (24), the left lower first molar (36), the left second incisor (32), and the lower right first premolar (44). The inflammatory rate of each tooth was assessed, and given a score of 0-3.[2] The assessment was performed based on the gingival criteria as in table 1.

Table 1 Gingival Criteria. [9]

Score	Criteria
0	Normal gingiva
1	Mild inflammation, slight change in color, little change in texture, and no bleeding on probing
2	Moderate inflammation, redness and swelling of the gingiva, and bleeding on probing
3	Severe inflammation, significant redness and hypertrophy (swelling), tendency to bleed spontaneously, and ulceration

Scores in each tooth are then added and divided by four to arrive at the tooth score. The total of all teeth values is divided by the number of teeth examined and a Gingival Index score is obtained to determine the condition of the gingiva (table 2).

Table 2 GI Score. [5]

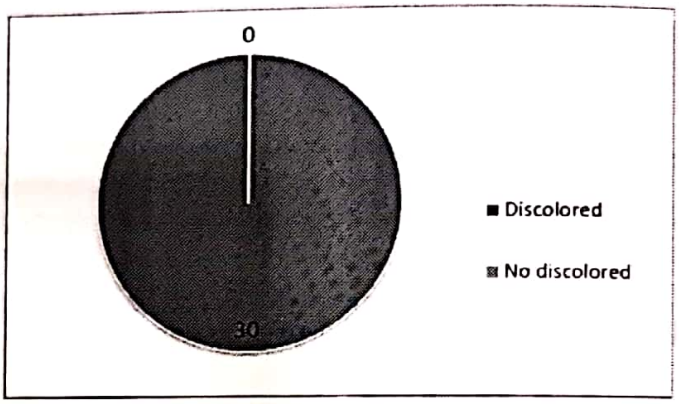
GI score	Condition
0,1 – 1,0	Mild inflammation
1,1 – 2,0	Moderate inflammation
2,1 – 3,0	Severe inflammation

Results

Research about the effects of smoking habits on enamel and gingiva has been done on pre clinic students in FKG UPDM(B). Total of the subjects were 30, consisting of 4 females and 26 males. The results can be seen in the following tables and diagrams:

Table 3 Frequency of Enamel Discoloration in Smokers

Tooth Enamel Color	Frequency	Percentage (%)
Discolored	30	100
No discolored	0	0
Total	30	100

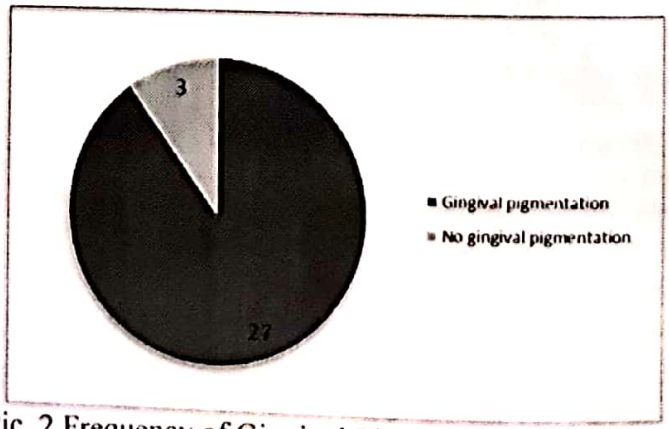


Pic .1 Frequency of Enamel Discoloration in Smokers

Based on table 3 and picture 1, it shows that the frequency of subject who experienced enamel discoloration were 30 subjects.

Table 4 Frequency of Gingival Pigmentation in Smokers

Gingival pigmentation / no gingival pigmentation	Frequency	Percentage (%)
Gingival pigmentation	27	90
No gingival pigmentation	3	10
Total	30	100

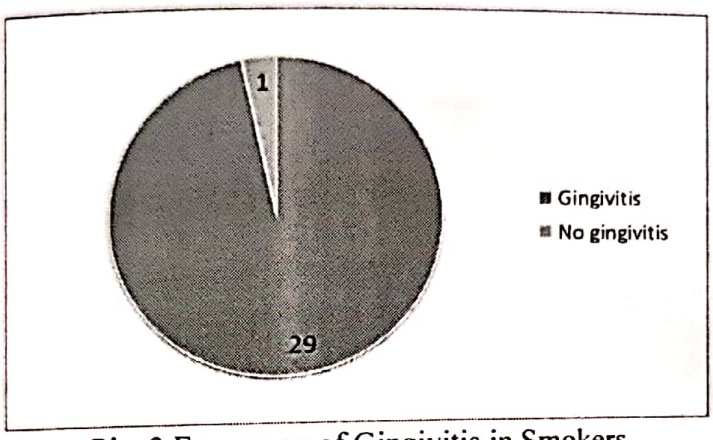


Pic. 2 Frequency of Gingival Pigmentation in Smokers

Based on table 4 and picture 2, it shows that the frequency of subjects who did not experience gingival pigmentation were only 3 subjects, while the most subjects (27 subjects) experienced gingival pigmentation.

Table 5 Frequency of Gingivitis in Smokers

Gingivitis / no gingiviris	Frequency	Percentage (%)
Gingivitis	29	97
No gingivitis	1	3
Total	30	100

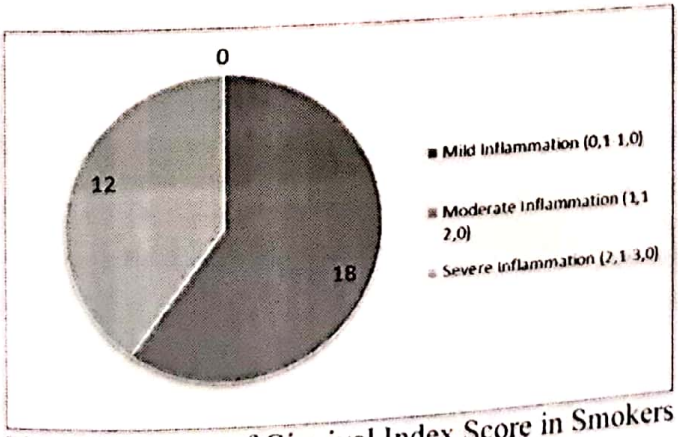


Pic. 3 Frequency of Gingivitis in Smokers

The result of the study in table 5 and picture 3 shows only 1 subject in FKG UPDM(B) who did not experience gingivitis, while 29 other subjects experienced gingivitis.

Table 6 Frequency of Gingival Index Score in Smokers

Gingival Index Score	Frequency	Percentage (%)
Mild Inflammation (0,1-1,0)	18	60
Moderate Inflammation (1,1-2,0)	12	40
Severe Inflammation (2,1-3,0)	0	0
Total	30	100



Pic. 4 Frequency of Gingival Index Score in Smokers

The result of the study in table 6 and picture 4 shows that 18 subjects experienced a mild inflammation, 12 subjects had a moderate inflammation and none of them had severe inflammation.

Discussion

Based on the result, it appears that all subjects of the study experienced the enamel discoloration, which is 30 subjects (100%). The discoloration of tooth enamel that occurs, is included in the type of extrinsic discoloration.

Extrinsic discoloration is found on the outer surface of the tooth and it is generally local.[10] The stain found in smokers is called tobacco stain.[11] Both filter and non filter cigarettes can cause extrinsic enamel discoloration in smokers' teeth. This discoloration occurs because the main content of cigarettes, named tobacco. [11]

Initially, this stain is thought to be caused by nicotine, but it is actually caused by tobacco burning results in the form of tar. Tar or tobacco sap which is the result of residual burning of tobacco can lead to the formation of brownish black stain. Tar is a collection of thousands of chemicals in a solid component of cigarette smoke. By the time a cigarette is smoked, tar enters the oral cavity as solid vapor which after cooling becomes solid and forms a brown precipitate on the tooth surface.[7] Cigarettes can cause enamel discoloration, especially on the cervical. The stains are easily cleaned by scaling because it is only found on the outside of the tooth. In individuals who smoke during their lifetime, the stain can enter the inner enamel layer and it is difficult to remove.[11]

The results of Enny Khalisha, Rosihan Adhani and Syamsul Arifin in 2016 show that stain formation is more prevalent in smokers, both cigarette (filter) and clove (non-filter) users. In the results of their study, the highest plaque buildup also occurred in respondents who smoked <10 and 10-20 cigarettes per day. Bastian and Reade stated that the stain is not related to the amount of tobacco consumed, but it depends on the amount of bacterial dental plaque that absorbs and attach tobacco-burning products (tar) to the tooth surface.[7]

Based on the results of enamel discoloration in smokers, one of the factors that cause discoloration of tooth enamel is smoking. This color change of tooth enamel occurs in all categories of smokers, ranging from mild to severe smokers. The cause of the enamel discoloration is due to the presence of tar content in cigarettes which may cause dark brown or black color deposits on tooth surfaces. Tar can be found on both filter and non filter cigarettes. In this study, the type of cigarette and the number of cigarettes consumed did not affect the results of the study, because all subjects experienced enamel discoloration. [11]

This study was also conducted to see whether there is a relationship between smoking habits with the occurrence of gingival pigmentation. Based on the result, it appears that there were 27 subjects who experienced gingival pigmentation and 3 other subjects did not experience gingival pigmentation. The result of this study is in accordance with the study conducted by Jyothi Tadakamadla et al in 2012. They explained that from 109 subjects who are smokers, there are 108 subjects who experienced gingival pigmentation. They also had a control group which is non-smoker subjects with the same amount. Significantly, the smokers experienced more in gingival pigmentation than non-smokers. This is due to the presence of nicotine and benzopyrene in cigarette smoke which stimulates excessive melanin production derived from melanocytes.[12] Melanin settles on the mucosal basal cell layer, resulting a brown-colored gingival pigmentation.[2]

The next study is to see whether there is a relationship between smoking habits with the occurrence of gingivitis. Gingivitis is a periodontal disease characterized by inflammation that affects the soft tissues around the tooth without experiencing the bone

destruction.[13] The clinical characteristics of healthy gingival include its shape, size, color, consistency, surface texture, and the presence or absence bleeding and / or the presence of pus. The inflammation and the edema of gingivitis may visually result in redness, swollen gingival margin, smooth and glossy surface texture of the gingiva, or loss of spots and loss of flexibility.[14]

Based on the result, it shows that 29 subjects experienced gingivitis. This is due to the presence of tar in cigarettes that settles on the teeth, in addition to causing aesthetic problems, it also causes the tooth surface becomes coarse, so the plaque might easily attached. The accumulation of plaque on the gingival margin, compounded by the poor of oral hygiene, will leads to gingivitis.[2] And one subject who did not experience gingivitis may have a good oral hygiene, so it leads to no visual signs of gingivitis on that subject.

The next research relates to the Gingival Index score in smokers. Based on the result, it appears that 18 subjects had mild inflammation, 12 subjects had moderate inflammation and none of the subjects had severe inflammation. The result of this study is in accordance with the study conducted by Katarina D. Manibuy et al in 2015. The result of their study was there are 70.7% who experienced mild gingivitis (adolescents aged 15-19 years who have a smoking habit in Tuminting District).[6] This is also in accordance with research conducted by Priska M. Poana et al in 2015. From their study, if shows that there were 41 subjects (56,94%) had mild inflammation. They said that this could happened because of the subjects were able to perform oral hygiene well. [5]

Based on all the results from the study in FKG UPDM(B), this can happen because the subjects are from dentistry students, so that the subjects may have more knowledges about the oral and dental health. It is important to note that each person's oral hygiene status varies depending on their knowledge and their awareness of the dental and oral health.

Conclusions and Suggestions

Based on the research, it can be concluded that smoking can lead to enamel discoloration, gingival pigmentation and gingivitis. Given the dangers that can be generated from cigarettes, it is advisable for smokers to stop smoking. This should be done so that the health of teeth, mouth and body, can be maintained more optimally.

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