



Effect Of Smoking On Lip And Gingival Pigmentation Among Adult Population Of Moradabad City

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Abstract

Background & Aim: Smoking appears to have numerous negative consequences on the body. Cigarette smoking is clearly a significant risk factor for periodontal disease. In addition to periodontal damage, smoking may cause pigmentation of the oral mucosa. Pigmentation is primarily induced by five primary pigments: melanin, melanoid, oxyhemoglobin, haemoglobin, and carotene, the most prevalent of which is melanin and the area most affected by this condition is the keratinized gingiva. Thus, the study's goal is to examine the relationship of smoking with lip and gingival pigmentation in the adult population of Moradabad, India.

Methodology: A cross-sectional study was conducted in the Department of Public Health Dentistry at Kothiwal Dental College and Research Centre, Moradabad. The study involved 250 individuals aged over 20 years who were smokers, free from nutritional deficiencies, and without systemic disorders that cause pigmentation. Gingival pigmentation was measured using the Hedin scale and Lip pigmentation was recorded as diffuse brown or blackish discoloration in the vermillion border.

Result & Conclusion: Results of the present study showed that significant association existed between status of smoking and lip pigmentation with p value being 0.01 but no such association was found with gingival pigmentation with p value being 0.3. highly significant association existed between duration of smoking with both lip and gingival pigmentation with p values being 0.04 and 0.007 respectively.

Keywords: Gingival Pigmentation, Hedin Scale, Vermillion Border

Introduction

The gingival tissue and the location, colour, and form of the teeth work together to create a harmonious smile. An appealing smile depends on the health and look of the gingiva, and a confident and pleasant grin requires the elimination of unattractive pigmented gingiva. "Coral pink" is how gingival colour is typically described. Diffuse deep purplish staining or asymmetrically formed patches, striae, or strands of black, brown, or light brown are the two common manifestations of gingival pigmentation¹. Pigmentation can be endogenous and secondary to a number of conditions like Addison's

disease and HIV infection, or hereditary in the form of a pigmented mole or physiological pigmentation. Exogenous causes of pigmentation include amalgam tattoos, lead toxicity, anti-malaria drugs, and cigarette smoke^{2,3}. The gingiva, palate, labial mucosa, ventral side of the tongue, and infrequently the floor of the mouth are among the oral cavity regions where pigmentation can occur; still, attached gingiva is the place most frequently affected². The main pigments that contribute to the normal colour of the gingiva are melanin, which has the highest incidence rate among them, carotene, decreased haemoglobin, and oxy-

haemoglobin. Gingival hyperpigmentation is the consequence of excessive melanin deposition in the basal and supra-basal cell layers of the epithelium¹. One major local factor influencing the melanin pigmentation of the oral mucosa is smoking. Hedin originally identified the link between smoking and oral melanosis in 1977 after conducting a thorough study in the Swedish population. He also initially used the term "smokers melanosis" to refer to the melanin pigmentation that develops in smokers' gingiva^{3, 4}. Smoker's melanosis, a melanin pigmentation usually present in the attached gingiva among tobacco smokers, is a benign focal pigmentation of the oral mucosa⁵. Melanin is synthesized from tyrosine and dihydroxyphenylalanine (DOPA) via dopaquinone by oxidation of tyrosinase⁶.

Gingival pigmentation has been examined in terms of its association with smoking in various countries, including Israel (Steigmann, 1965), Sweden (Axell and Hedin, 1982), Japan (Araki et al, 1983; Hanioka et al, 1993), Thailand and Malaysia (Hedin and Axell, 1991), Turkey (U'nsal et al, 2001) and India (Sarswathi et al, 2003). Excessive melanin pigmentation is correlated with smoking; thus, smoking may stimulate melanin production in gingival tissue⁷. Melanocytes have been shown to be able to produce more melanin when stimulated by smoking, even in individuals where hereditary variables are present. It has been discovered that polycyclic amines, such as nicotine and benzpyrenes, which are known to permeate into the oral mucosa and bind firmly to melanin, stimulate melanocytes to create melanin⁵.

Thus, the present study is planned to determine the effect of smoking on lip and gingival pigmentation among adult population of Moradabad city, India.

Objectives:

To determine lip pigmentation among smokers.

To determine gingival pigmentation among smokers.

Materials and Method:

The present study was an observational study conducted on 250 smokers attending the outpatient department of Kothiwal Dental College and Research Centre, Moradabad, Uttar Pradesh, India. All the subjects were randomly selected from the outpatient department during the period from June 2023 to August 2023. Individuals suffering from nutritional

deficiencies and systemic disorders that would cause oral pigmentation were excluded from the study and individuals those were permanent residents of Moradabad aged 20-35 years and those willing to participate were included in the study. The study protocol was approved by the ethics committee of the mentioned institute. Written informed consent was obtained from all participants. All the measurements were carried out by a single examiner and the method of examination and scoring was standardized in the department of public health dentistry of Kothiwal Dental College and Research Centre.

Clinical examination was conducted by a single examiner who assessed the existence of lip and gingival pigmentation. The absence and presence of blackish or brownish lip pigmentation were scored as zero and one, respectively. Degree of gingival pigmentation in each jaw was scored based on the classification of melanin index proposed by Hedin (1977)

Score 0 - No pigmentation

Score 1 - one or two solitary unit(s) of pigmentation in papillary gingiva without formation of a continuous ribbon between solitary units.

Score 2 - more than three units of pigmentation in papillary gingiva without formation of continuous ribbon.

Score 3 - one or more short continuous ribbons of pigmentation.

Score 4 - one continuous ribbon including the entire area between canines, respectively. Total score of upper and lower arches were taken and the final score was calculated by summing the scores.

Examination of upper and lower gingiva was done with the help of a plane mouth mirror.

Data regarding the smoking behaviour (i.e. status of smoking and duration of smoking) was obtained through individual interviews with the participants. Then, the subjects were classified as current smokers, occasional smokers. The smokers were further categorized based on the duration of tobacco use (less than five years and more than 5 years). Current smokers constituted individuals who smoked at least once a day at the time of study and occasional smokers were the ones who smoked at least three consecutive

days a week and former smokers had not used tobacco products for at least one year.

Statistical Analysis:

Data description, analysis and presentation were performed using Statistical Package for Social Science (SPSS) version 19. Chi-square test was used to find out the association of status of smoking and duration of smoking with lip and gingival pigmentation. A $p \leq 0.05$ was considered to be statistically significant.

Results:

The present study was conducted among 250 subjects aged 20-35 years to find out the association of status of smoking and duration of smoking with lip and gingival pigmentation among the population of Moradabad, Uttar Pradesh.

Table 1 shows the distribution of subjects with or without melanin pigmentation in lip and gingiva by smoking status. It was observed that 97.8% of regular smokers and 90.7% of occasional smokers had lip pigmentation and 94% of regular smokers and 96.9% of occasional smokers had gingival pigmentation. The table also shows the association of status of smoking with lip and gingival pigmentation. It was observed that significant association existed between status of smoking and lip pigmentation with p value being 0.01 but no such association was found with gingival pigmentation with p value being 0.3.

Table 2 shows the distribution and association of subjects with or without melanin pigmentation in lip and gingiva by duration of smoking. It was observed that 91.1% of smokers smoking up to 5 years and 97.07% of smokers smoking for more than 5 years had lip pigmentation and 86.6% of smokers smoking up to 5 years and 96.5% of smokers smoking for more than 5 years had gingival pigmentation. The table also shows the association of duration of smoking with lip and gingival pigmentation. It was observed that highly significant association existed between duration of smoking with both lip and gingival pigmentation with p values being 0.04 and 0.007 respectively.

Discussion:

The present study was to determine the effect of smoking on lip and gingival pigmentation among adult population of Moradabad city. In this study it was found that among smokers, 96% had lip pigmentation and 94.8% had gingival pigmentation which is in

accordance with the studies done by Hedin et al⁶ and Basol et al⁵. This could be attributed to nicotine and benzpyrene content of tobacco smoke which stimulates melanin production from the melanocytes.

Generally, stimulants present in cigarette smoke have two main routes to reach gingival melanocytes:

1. Dissolution in the saliva and penetration through the mucous membranes
2. Inhalation of cigarette smoke through the nose, its entry into the blood circulation and exerting indirect effects on melanocytes.⁸

In this study the effect of duration of smoking on lip and gingival pigmentation was evaluated and it was found that number of individuals with both lip and gingival pigmentation was significantly high who smoked for more than five years than individuals who smoke upto 5 years which is in accordance with the studies done by Multani S. et al¹

This study also determined the status of smoking with lip and gingival pigmentation and it was found that lip pigmentation was significantly high among regular smokers when compared to occasional smokers which is in accordance to study done by Multani S et al¹ but contradictory results were found in the study regarding the status of smoking with gingival pigmentation as we found more number of occasional smokers had pigmentation when compared to regular smokers.

Hedin in 1977(Sweden), reported the occurrence of smokers' melanosis.⁷ He believed that nicotine shows affinity to cells containing melanin, causes the development of melanosomes, and causes them to migrate.⁷ In another study, Araki et al¹⁶ reported the occurrence of melanin pigmentation in the attached gingivae of 195 Japanese workers, reporting it to be significantly higher in workers who smoked more than 10 cigarettes daily.⁷ Sreeja et al. 2015, observed that gingival pigmentation in children has been linked to passive smoking from parents and other adults who smoke¹⁵.

Visible symptoms due to smoking in different parts of the body could afford smokers an indicator potentially via which to recognize health consequences of smoking. Furthermore, oral health professionals could elevate the awareness of smokers in dental practice. However, clinicians should be reminded that lip and gingival pigmentation is not a flawless indicator of

current smoking. Indeed, differentiation between ethnic pigmentation and smoker's melanosis' is generally impossible³. For instance, certain neoplasms like melanomas are characterized by abnormal production of melanin and some medications may also stimulate melanin production. If such lesions are thought to be irrelevant to smoking then they require clinical and pathologic correlations for definitive diagnosis, which will be expected to reflect the underlying cause². On the contrary, visible symptoms of lip and gingiva may lead to unnecessary anxiety among nonsmokers and former smokers.

Limitations:

The study solely focused on the smokers only without taking into consideration the nonsmokers secondly those present at the day of examination was only considered thirdly lip may be more susceptible to sources of melanin stimulation other than smoking thus there might be chances of misinterpreting melanin pigmentation with other pigmentation.

Conclusion:

Deposition of melanin in the gums and lip due to chronic exposure to the chemicals in tobacco is a known effect of smoking. Melanin pigmentation was influenced by duration, frequency, and unit years of cigarette smoking. Therefore, it (COSMETIC CHANGES) can be used in dental offices to raise awareness about the harms of smoking, motivate individuals to quit, and educate the public, particularly young individuals, about consequences of tobacco use for both oral health and overall, well-being.

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Table1: Distribution of subjects with or without melanin pigmentation in lip and gingiva by smoking status

Status of smoking	Study population	Lip Pigmentation		P value	Study population	Gingival pigmentation		p value
		Absent	Present			Absent	Present	
Regular	185	4(2.1%)	181(97.8%)	0.01	185	11(5.9%)	174(94%)	0.3
Occasional	65	6(9.2%)	59(90.7%)		65	2(3%)	63(96.9%)	
Total	250	10	240(96%)		250	13	237(94.8%)	

P-value ≤ 0.05 (statistically significant); Chi-square test

Table2: Distribution of subjects with or without melanin pigmentation in lip and gingiva by duration of smoking

Status of smoking	Study population	Lip Pigmentation		P value	Study population	Gingival pigmentation		p value
		Absent	Present			Absent	Present	
0-5years	45	4(8.8%)	41(91.1%)	0.045	45	6(15.38%)	39(86.66%)	0.007
>5 years	205	6(2.9%)	199(97.07%)		205	7(3.41%)	198(96.5%)	
total	250	10	240(96%)		250	13	237(94.8%)	

P-value ≤ 0.05 (statistically significant); Chi-square test