

**CLINICAL CHARACTERISTICS OF HYPERPIGMENTATION
GINGIVAL PATIENTS AT CAN THO UNIVERSITY OF MEDICINE
AND PHARMACY 2019-2020**

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ABSTRACT

Background: Excessive melanin deposition (ethnic/physiologic) in the basal and supra-basal epithelial layers causes gingival hyperpigmentation, which is a benign condition. Although clinical pigmentation is not a medical problem, it can be a cosmetic issue for patients. Another common cosmetic concern is a gummy smile, which refers to an excessive gingival display. The confidence of patients may be affected by the presence of a gummy smile and/or hyperpigmentation of the gingiva and result in psychological stress. **Objectives:** To determine the class of hyperpigmentation, the appearance of midfacial gingival tissue while smiling. **Materials and methods:** A case series report was conducted with a convenient sampling method. The study was performed on 45 patients with moderate and heavy gingival hyperpigmentation from January 2019 to December 2020. A clinical assessment of the grade of gingival pigmentation was done in accordance with the Dummett-Gupta oral pigmentation (DOPI) index. Smile line classification by Liebart and Deulle (2004) was used to analyze. **Results:** Mean age of the patients was 22.87 ± 3.1 . The class of gingival hyperpigmentation had a 20% moderate hyperpigmentation and 80% heavy pigmentation. There was no statistically significant difference between males and females. A very high smile line was frequently observed among the subjects, followed by a high smile line. No statistically significant difference in gender and class of gingival hyperpigmentation was observed for smile line. **Conclusions:** Hyperpigmentation gingival and high smile line are the common cosmetic concern that patients want to remove.

Keywords: gingival hyperpigmentation; smiling

I. INTRODUCTION

The dimension of blood vessels, the thickness and degree of epithelial keratinization, and pigments are all influences on the color of the gingiva. Melanin stands out among the pigments because it is a natural dye formed by melanocytes and contained in the gingival epithelium's basal and suprabasal layers. The darkening of gingiva is caused by a variety of causes, including (1) drugs, (2) ingestion of heavy metals, (3) genetics, (4) endocrine disorders, (5) ultraviolet rays, (6) inflammation, (7) smoking and (8) other factors [10].

Excessive melanin deposition (ethnic/physiologic) in the basal and supra-basal epithelial layers causes gingival hyperpigmentation, which is a benign condition. Although clinical pigmentation is not a medical problem, it can be a cosmetic issue for patients [9]. The majority of the young thought that pink gingiva is normal, and that dark gingiva is unattractive [12]. Smile guideline standards were established for the first time in the profession in the mid-1980s, and accordingly smiles were divided into three basic categories: high, average and low, based on the visibility of the midfacial cervical margin of the clinical crown relative to the vermilion border of the maxillary lip [1].

Another common cosmetic concern is the gummy smile, which refers to an excessive gingival display. The confidence of patients may be affected by the presence of a gummy smile and/or hyperpigmentation of the gingival and result in psychological stress [9].

The aim of this study was to determine the class of hyperpigmentation, the appearance of midfacial gingival tissue while smiling and the possible correlation with gingival smile lines in the patients who had gingival depigmentation by diode laser at Can Tho University of Medicine and Pharmacy.

II. MATERIALS AND METHODS

2.1. Study population

This study was conducted on 45 periodontally healthy and dentate adult patients who came to the Can Tho University of Medicine and Pharmacy Hospital for treatment of hyperpigmentation gingival between January 2019 and September 2020. The study protocol was approved by the Institutional Ethics Committee and adhered to the provisions of the Helsinki Declaration. The patients were informed about the purpose of the study and consent was obtained from each of them.

Inclusion criteria:

- Males and females aged 18 years or over.
- Exhibiting healthy gingival as assessed by Plaque Index and Gingival Index scores of 0 to 1.

Exclusion criteria:

- Patients had undergone gingival surgery previously.
- Patients had treatment of high smile line.

2.2. Gingival hyperpigmentation

A clinical assessment of the grade of gingival pigmentation was done in accordance with the Dummett-Gupta oral pigmentation (DOPI) index [2]. The DOPI scoring criteria:

0: pink tissue, no clinical pigmentation.

1: mild light brown tissue, mild clinical pigmentation.

2: medium brown or mixed brown and pink tissue, moderate clinical pigmentation.

3: deep brown/blue-black tissue, heavy clinical pigmentation.

2.3. Gingival smile line

Smile line classification by Liebart and Deulle (2004) was used to analyze, as follows: [4]

Class 1: very high smile line – more than 2mm of the marginal gingival visible during smile

Class 2: high smile line – 0 to 2mm of marginal gingiva visible during smile

Class 3: average smile line – gingival embrasures visible only during smile

Class 4: low smile line – gingival embrasures and cemento-enamel junction not visible during smile

2.4. Statistical analysis

Categorical variables were presented as frequency and percentages. Correlation between gingival pigmentation with gender was performed by Pearson chi-square test. For a small number, Fisher's exact test was applied wherever applicable. Pearson chi-square test was used to correlate the gingival smile line with gender. Gingival pigmentation and gingival smile line were correlated by using Pearson chi-square test. All the tests were two-sided; $p < 0.05$ was considered statistically significant. SPSS software program (Statistical Program for Social Science) was used.

III. RESULTS

The present study was conducted on 45 patients: 23 males (51.1%) and 22 females (48.9%). The mean \pm standard deviation (SD) values of age were 22.87 ± 3.1 years with a minimum of 19.0 years and a maximum of 37.0 years old. Nine cases (20%) had moderate pigmentation while thirty-six cases (80%) had severe pigmentation. There was no statistically significant difference between males and females (**Table 1**) (**Figure 1 and 2**).



Figure 1. Moderate clinical pigmentation gingival in maxillary arch in accordance with Dummet-Gupta index



Figure 2. Heavy clinical pigmentation gingival in maxillary arch in accordance with Dummet-Gupta index

Table 1. Prevalence of gingival pigmentation, in accordance with Dummet-Gupta index

	Moderate pigmentation		Heavy pigmentation		Total	
	n	%	n	%	n	%
Males	5	21.7%	18	78.3%	23	100%
Females	4	18.2%	18	81.8%	22	100%
Total	9	20%	36	80%	45	100%

Fisher's exact: $p > 0.05$

Table 2. Prevalence of gingival smile line, in accordance with Liebart and Deulle classification

	Very high		High		Average		Low		Total	
	n	%	n	%	n	%	n	%	n	%
Males	10	43.5%	5	21.7%	8	34.8%	0	0	23	100
Females	13	59.1%	6	27.3%	2	9.1%	1	4.6%	22	100
Total	23	21.1%	11	24.4%	10	22.2%	1	2.2%	45	100

Fisher's exact: p>0.05

Table 3. Comparison of gingival pigmentation among the gingival smile line classes

	Moderate pigmentation		Heavy pigmentation		Total	
	n	%	n	%	n	%
Very high	5	21.7%	18	78.3%	23	100%
High	1	9.1%	10	90.9%	11	100%
Average	3	30%	7	70%	10	100%
Low	0	0	1	100%	1	100%
Total	9	20%	36	80%	45	100%

Fisher's exact: p>0.05

A very high smile line was frequently observed among the subjects, followed by a high smile line. No statistically significant difference in gender and class gingival hyperpigmentation was observed for the smile lines (**Table 2** and **Table 3**).

IV. DISCUSSION

Gingival melanin pigmentation can be seen in people of all races, at any age and without gender predilection. While it is not a medical problem, black gum complaints and demands for depigmentation are common. Many techniques have been tried for depigmentation. Removal of pigmentation is included in a recent modification of definition of mucogingival surgery to periodontal plastic surgery and there is voluminous research and studies which refer to alteration or elimination of gingival pigmentation for cosmetic purposes. Understanding the evolution and distribution of gingival pigmentation is needed to provide a reasonable basis for clinical circumstances.

Dummet-Gupta Oral Pigmentation index [2] was used to evaluate the pigmentation of the gingiva. The Dummet-Gupta Oral Pigmentation Index has the benefit of having a composite numerical value for total gingival melanin pigmentation. It is used as a clinical tool to estimate the quantitative incidence of gingival pigmentation and as an epidemiologic tool to estimate the degree of gingival pigmentation and to compare the quantities of pigmentation found in different oral tissues, including gingival.

In the present study, the subject demanded the treatment for gingival hyperpigmentation, so the prevalence of heavy hyperpigmentation was higher (80%). The severity of gingival pigmentation between males and females was statistically not significant and denotes any lack of association between gender and gingival pigmentation. This lack of association is in following with the findings of Manaswini [5].

We noted that 75.5% had a high or very high smile line, different from Nabeeh's [8] and Nguyen Ny's studies [11] which showed that in a natural smile, average smile-line is the most common. According to the study of Vidya [12], there are 45.3% of students with hyperpigmentation with no need for treatment, similar to Matundura's study [6], with a

recorded 72.7% of study subjects that are unmindful to the problem of hyperpigmentation. That shows people's understanding of this situation is still limited. The subjects of our study are those who have hyperpigmentation gingival and effect on aesthetics, so the combination with a gummy smile is one of the important reasons for patients to decide on treatment. The gender ratio is not significantly different, which is consistent with Mantudura's research [6]. They showed the difference in perception between males and females that is not statistically significant. According to Mehwish Khan [7], the average smile lines were observed to be the most frequent among participants. Furthermore, the aforementioned studies showed statistically significant differences between male and female participants for the position of the smile line. However, no such difference has been observed in this study.

Since the smile line has a therapeutic application in patient treatments, for patients with a high smile line, careful procedures should be taken to prevent the excessive display of gingival when patients made the restoration of anterior teeth. Clinically, it is known that low smile lines are more tolerant to inadequacies in the anterior restorations and hence it is easier for the dentist to satisfy these patients with restorative dentistry work.

Chemical agents (phenol 90 percent plus alcohol 95 percent), free grafts, abrasion with rotating or manual instruments, cryosurgery with liquid nitrogen, gingivectomies, electrosurgery, and laser have all been suggested to remove melanocytic pigmentation. A combined technique has also been proposed, which includes using a No15 scalpel to de-epithelize the basal layer of the attached gingival and fine-grain diamond burs to abrade the stains in the interdental papilla [3].

V. CONCLUSIONS

Heavy pigmentation gingival is a cosmetic concern that patients want to remove. A high smile line is a decisive factor in patient with hyperpigmentation gingival.

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