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MANAGEMENT OF GINGIVAL MELANIN HYPERPIGMENTATION USING TWO SURGICAL TECHNIQUES (CLINICAL AND HISTOLOGIC STUDY)

Sarah Elkot* *and* Al-Hassan Diab **

ABSTRACT

Main purpose: To determine the best surgical technique for gingival melanin depigmentation.

Subjects and methods: Sixteen subjects were included; eight of them will be treated by bur abrasion technique (group1) and the other eight will be treated by blade technique (group2). Parameters as melanin area fraction (MAF) and Dummet-gupta oral pigmentation index (DOPI) were recorded before and 3 months after treatment.

Results: Both groups showed decrease of MAF and DOPI values. Bur abrasion technique (Group 1) showed higher statistical significant decrease of MAF than blade scrapping technique(Group 2).

Conclusion: Bur abrasion technique is good alternative technique to blade scrapping technique.

Clinical relevance: Both bur abrasion and blade scrapping techniques are nearly equal effective techniques in managing of gingival melanin hyperpigmentation and the choice of either techniques only depends on clinical expertise and preference of the patient.

Keywords: MAF, DOPI , Bur, Blade

INTRODUCTION

There is a wide variety of gingival colorations between different individuals and it also can be related to skin tone. Gingival color with pigmentation can range from light to medium to dark brown or black. Level of keratinization, degree of vascularization and embedded epithelium pigments like hemoglobin and melanin are important determinants of gingival color ***(Prabhuji et al., 2011; Kumar et al., 2013; Nagati et al., 2017).***

* Lecturer of Oral Medicine, Periodontology and Diagnosis, Faculty of Oral and Dental Medicine, Future University in Egypt, Cairo, Egypt.
** Lecturer of Periodontology, Faculty of Dentistry, British University in Egypt, Cairo, Egypt.

Melanin is a brown pigment that can be found in epithelial basal and suprabasal cell sheets. It is synthesized by dendritic cells called melanosomes that use the dendrites to distribute melanin to the adjacent cells (epidermal-melanin unit). Oral pigmentation can be present alone or combined with cutaneous pigmentation and may appear very early (three hours after child delivery).Regarding distribution of oral melanin pigmentation, the most commonly affected area is the attached gingiva ***(Javali et al., 2011; Sanjeevini et al., 2012).***

As the esthetic demands increase every day, many individuals are concerned with removing the unusual brown color of gingiva and getting the pink color so, in **2005,** ***Roshni and Nandakumar*** grouped the different gingival depigmentation methods under two main categories ***(Prasad et al., 2010; Javali et al., 2011)***

1-Blade scrapping technique, bur abrasion technique, electro-surgery, cryosurgery, lasers and radiosurgery were classified as surgical methods to remove the gingival pigmentation. Also, the pigmentation can be removed by use of certain peeling chemicals

2- Free gingival graft and cellular dermal matrix allograft were among the methods that can veneer the pigmentation.

So, in the current study, we are comparing bur abrasion and blade scrapping techniques.

SUBJECTS AND METHODS

Sample size calculation

Dummett-Gupta oral Pigmentation Index (DOPI) is the central outcome of the current study. In order to investigate reduction of pigmentation; sixteen patients were sufficient with a standard deviation (SD) of 0.1 with 80% power and a 5% level of significance. With 10% waste range, the necessary sample size was 20 (10 per treatment group).

Sixteen individuals suffering from oral melanin hyperpigmentation were included in this research. They were grouped into 2 groups. They were randomly distributed using a coin toss.

Group 1: Included 8 individuals treated using bur abrasion technique.

Group 2*:* Included 8 individuals treated by blade scrapping technique.

The patients of the two groups were followed up for 3 months. Preoperative biopsy was taken before any treatment method using biopsy punch and the patient was followed up clinically after 1 month, 2 months and 3 months and at the end of the third month, a postoperative biopsy was taken.

Parameters:

Melanin area fraction (MAF):

For each biopsy section, photomicrographs were taken using digital camera fixed on a light microscope. For analysis of mean area fraction of melanin forming cells , Digital images at magnification of 40X were taken.

Dummett-Gupta Oral Pigmentation Index (DOPI)

Grade 0, pink tissue [no clinical pigmentation];

Grade 1, mild light brown tissue [mild clinical pigmentation];

Grade 2, medium brown or mixed brown and pink tissue [moderate clinical pigmentation];

Grade 3, deep brown/blue–black tissue [heavy clinical pigmentation].

Statistical methods:

Using the Social Sciences (SPSS) version 28 (IBM Corp., Armonk, NY, USA), Data were summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons

between groups were done using unpaired-t test in normally distributed quantitative variables while non parametric Mann Whitney test was used for non-normally distributed quantitative variables. For comparison of serial measurements (baseline to 3 months after intervention) within each patient the non-parametric Wilcoxon signed rank test was used. For comparing categorical data, Chi-square (c2) test was performed. Exact test was used instead when the expected frequency is less than 5. P values less than 0.05 were considered as statistically significant.

RESULTS

1- Comparison between groups regarding demographics:

Regarding gender and age, the difference between the two groups was not statistically significant (Table 1 and 2).

2- Comparison between groups regarding (MAF):

After 3 months, there was no statistical significant difference between the two groups. Both groups showed decrease in MAF values after treatment. The decrease was only significant in group 1. *(Table 3, Figure 1)*.

3- Comparison between groups regarding DOPI:

There was no statistical significant difference between groups regarding DOPI at baseline as well as after 3 months. Both groups showed decrease of DOPI values after treatment (Table 4, Figure 2).

4- Comparison between groups regarding change in MAF and DOPI:

Group 1 showed higher statistically significant decrease of MAF while group 2 showed non statistical significant decrease of MAF. Both groups showed non statistical significant decrease of DOPI *(Table 5, Figure 3)*.

TABLE (1) Gender distribution between the groups:

		Group 1 (Bur Abrasion)		Group 2 (Blade)		
		Count	%	Count	%	P value
Gender	Male	3	37.5%	3	37.5%	1
	Female	5	62.5%	5	62.5%	

TABLE (2) Age differences between the groups:

	Group 1 (Bur Abrasion)					Group 2 (Blade)					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	P value
Age (years)	28.00	5.86	28.50	20.00	35.00	26.50	5.98	25.50	20.00	37.00	0.620

TABLE (3) Comparison between MAF in the two groups before and 3 m. after treatment

	Group 1 (Bur Abrasion)					Group 2 (Blade)					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	P value
MAF of melanosomes before Treatment	2.40	1.46	2.49	0.80	4.50	1.00	0.95	0.62	0.23	2.90	0.038
MAF of melanosomes after 3m	0.095	0.107	0.067	0.014	0.326	0.045	0.047	0.027	0.004	0.109	0.279

TABLE (4) Comparison between groups regarding DOPI:

	Group 1 (Bur Abrasion)					Group 2 (Blade)					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	P value
DOPI Baseline	2.38	0.52	2.00	2.00	3.00	2.13	0.83	2.00	1.00	3.00	0.645
DOPI after 3M	1.00	0.53	1.00	0.00	2.00	0.63	0.74	0.50	0.00	2.00	0.279

TABLE (5) Comparison of groups regarding MAF and DOPI:

	Group 1 (Bur Abrasion)					Group 2 (Blade)					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	P value
MAF change (decrease)	2.31	1.46	2.24	0.75	4.42	0.96	0.93	0.61	0.12	2.81	0.049
DOPI change (decrease)	1.38	0.74	1.00	1.00	3.00	1.50	0.53	1.50	1.00	2.00	0.574

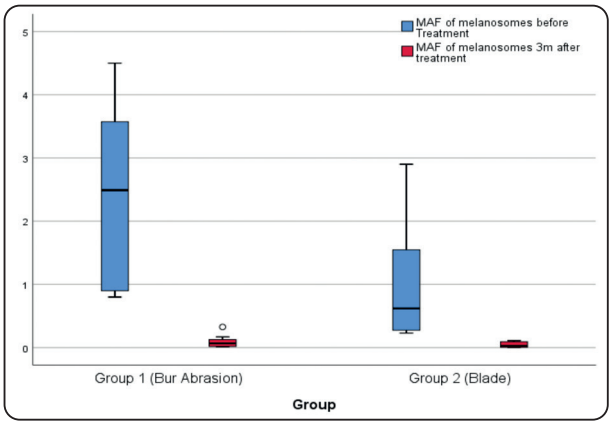

Fig. (1) Showing no significant difference between groups after treatment regarding MAF.

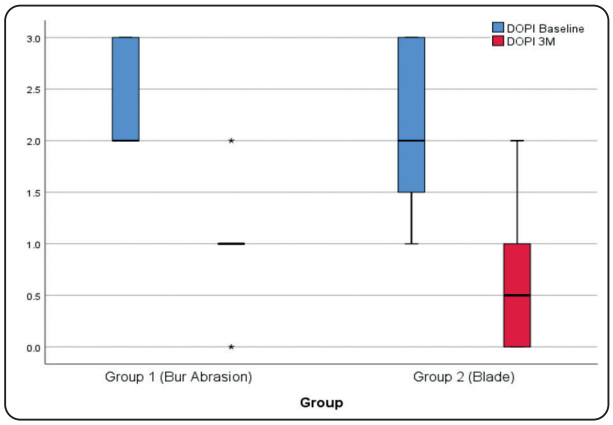

Fig. (2) showing no significant difference between groups after treatment regarding DOPI.

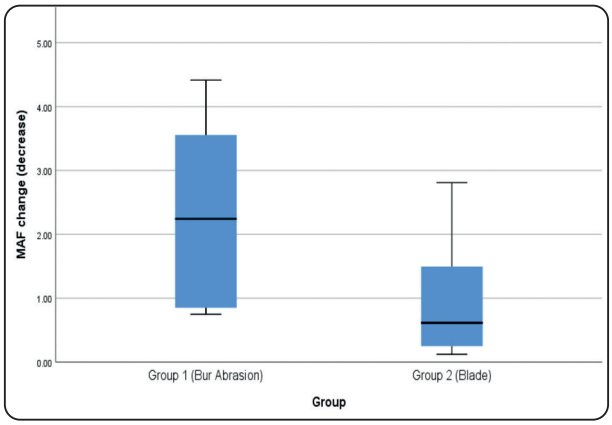

Fig. (3) showing higher statistical decrease of MAF in group 1

DISCUSSION

As the esthetic demands are increasing every day, there was a necessity for optimizing shape and form of teeth and gingiva and that led us to the term of cosmetic dentistry. Melanin is one the most common pigments present in tissues of oral cavity as well as skin. Since the increased melanin pigmentation of gingiva presents esthetic issues to a lot of people, Depigmentation techniques were developed to overcome this problem.so, the current study compared two of the most affordable surgical depigmentation techniques; bur abrasion and blade scrapping techniques.

As the number of studies comparing bur abrasion and scalpel depigmentation techniques, the current study is a new piece of knowledge to compare these affordable surgical gingival depigmentation techniques.

The scalpel scrapping depigmentation technique was included in the current study as it is still the gold standard depigmentation technique with high affordability and less technique sensitivity. Both bur abrasion and blade scrapping techniques are relatively easy and require minimum time and effort plus that no sophisticated and expensive armamentarium is needed. Both of techniques share same postoperative complications as increased pain and bleeding. The main problem that we encounter with bur abrasion depigmentation technique is the difficulty of controlling the depth of de-epithelization in addition to noise resulting from rotary bur abrasion technique ***(Verma et al., 2013, Chandra et al., 2020).***

A study by ***Verma et al., 2022*** confirmed that gingival pigmentation increases with age so, in the current study, individuals with same age range were included. The former study also confirmed that female subjects showed less pigmentation than males so, the present study included equal numbers of males and females.

Regarding removal of the pigmentation and decrease of DOPI values, outcomes of the present study were similar to results of studies conducted by ***Prasad et al., 2010*** **and** ***Murthy et al., 2012*** that showed good clinical results when using bur abrasion and blade scrapping gingival depigmentation techniques.

CONCLUSION

The outcomes of the present study suggest that both bur abrasion and blade scrapping techniques were nearly equal in efficacy of gingival depigmentation and the choice of any of them depends mainly on expertise of operator and preference of the patient.

REFERENCES

- Chandra GB, VinayKumar MB, Walavalkar NN, Vandana KL, Vardhan PK. Evaluation of surgical scalpel versus semiconductor diode laser techniques in the management of gingival melanin hyperpigmentation: A split-mouth randomized clinical comparative study. J Indian Soc Periodontol. 2020;24(1):47-53.
- Javali M, Tapashetti R, Deshmukh J. Esthetic management of gingival hyperpigmentation: report of two cases. Int J Dent Clin 2011;3:115-6.
- Kumar S, Bhat S, Bhat M. Comparative evaluation of gingival depigmentation using tetrafluoroethane cryosurgery and gingival abrasion technique: two years follow up. J Clin Diagnostic Res 2013; 7:389-94.
- Murthy MB, Kaur J, Das R. Treatment of gingival hyperpigmentation with rotary abrasive, scalpel, and laser techniques: A case series. J Indian Soc Periodontol 2012; 16:614-9.
- Nagati R, Ragul M, Al-Qahtani N, Ravi K, Tikare S, Pasupuleti M. Clinical effectiveness of gingival depigmentation using conventional surgical scrapping and diode laser technique: a quasi experimental study. Glob J Health Sci 2017; 9:296-303.
- Prabhuji M, Madhupreetha S, Archana V. Treatment of gingival hyperpigmentation for aesthetic purposes using the diode laser. Laser 2011;2:18-19.
- Prasad S, Agrawal N, Reddy N. Gingival depigmentation: a case report. People's J Sci Res 2010; 3(1):27-9.
- Roshni T, Nandakumar K. Anterior esthetic gingival depigmentation and crown lengthening: report of a case. J Contemp Dent Pract 2005; 3:139-47.
- Sanjeevini H, Pudakalkatti P, Soumya B, Aarati N. Gingival depigmentation: 2 case reports. World J Med Pharm Biol Sci 2012; 2:1-4.
- Verma S, Gohil M, Rathwa V. Gingival depigmentation. Indian J Clin Pract 2013;12:801-3.
- Verma J, Ahuja A, Ahuja V, Thosar NR. Reconnoitering the Association of Gingival Melanin Pigmentation With Skin Color, Age, and Sex in Pre-School Children of Hazaribag: A Cross-Sectional Study. Cureus. 2022;14(10):e30699.