

# Gingival Pigmentation Reduction: A Novel Therapeutic Modality

**Aim:** The objective of the present clinical study was to compare the effectiveness of radiofrequency de-epithelialization and conventional (slicing) method in reducing gingival pigmentation on long term basis by split mouth design. **Materials and Methods:** A total of 28 maxillary gingival units from 4 subjects aged between 15-30 years were considered for this clinical study and the selected gingival units were made plaque free and clinically healthy before subjecting these sites to one of the procedures. The selected sites were abraded by either the conventional (slicing) method (14 gingival units of 21, 22, 23, 24) or by radiofrequency (14 gingival units of 11, 12, 13, 14). After the procedure periodontal dressing was applied to protect the operated area. After 1 week periodontal dressing was removed and the area was irrigated with saline. Follow up examination was done on 30<sup>th</sup>, 60<sup>th</sup> and 90<sup>th</sup> days to evaluate the recurrence of pigmentation, if any. **Results:** It was observed that, sites operated with conventional (slicing) method, showed higher mean pigmentation than the sites treated with the radioablation during the follow up period of 90 days. **Conclusion:** When used judiciously, radiofrequency can be clinically valuable, safe and effective method to reduce pigmentation of gingiva.

**KEYWORDS:** Conventional slicing method, pigmentation, radiofrequency

## INTRODUCTION

Brown or dark pigmentation of gingival tissue, whether physiological or pathological can be caused by a variety of local and systemic factors.<sup>[1]</sup> The patients with black/brown discoloration of gingival tissue combined with excess gingival display (gummy smile) often demand for cosmetic therapy. Till date several attempts have been made for removal of gingival pigmentation by different techniques such as chemicals,<sup>[2]</sup> abrasion with diamond bur,<sup>[3,4]</sup> gingivectomy,<sup>[5,6]</sup> soft tissue autograft,<sup>[7]</sup> partial-thickness flap,<sup>[8]</sup> cryosurgery<sup>[9]</sup> and lasers.<sup>[10,11]</sup>

One of the earlier and still popular techniques is the surgical removal of the undesirable pigmentation by slicing technique using scalpel or Kirkland's gingivectomy knife.<sup>[12]</sup> Each technique had its own supremacy in efficiency and also draw back. Hence in

the present study, an attempt was made by comparing radiofrequency and Conventional (slicing) technique for gingival de-pigmentation clinically.

## MATERIALS AND METHODS

A total of 4 subjects with gingival pigmentation who are willing for the procedure were selected. Patient aged between 15-30 years were included. The facial gingival units of #11,#12,#13,#14 and #21,#22,#23,#24 were selected for surgical procedure. Patient suffering from long term systemic illness, genetic pigmentary disorders and smokers were excluded. A complete medical history and investigations for blood and urine were carried out to rule out any systemic contraindications for the surgery.

Distribution of melanin pigmentation in gingiva was recorded in relation to each gingival unit comprising of interdental papilla with half marginal gingival on either side of it and associated attached gingiva in every patient before procedure.

Gingival melanin pigment was scored according to Pal T.K. and Co-Workers (1984)<sup>[13]</sup> as follows:

- 0 - No Pigmentation
- 1 - Spotted Pigmentation (brown/black/any pigmented colour)

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	<b>DOI:</b> 10.4103/0974-2077.99458

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- 2 - Diffuse Discrete Pigmentation (brown/black/any pigmented colour)
- 3 - Diffuse Continuous Pigmentation (brown/black/any pigmented colour).

The score added and divided by the number of gingival unit examined to get the mean pigmentation score of surgical site and subjected to comparison.

### Surgical procedure

A total of 28 gingival units from 4 cases selected and the gingival units were made plaque free and clinically healthy before attempting for surgical procedure. Under perfectly aseptic conditions and infiltration anesthesia, the gingiva of the facial surface of the selected sites were de-epithelialized by conventional (slicing) method (14 gingival units of 21,22,23,24) using No 15 surgical blade [Figure 1] and by radiofrequency (14 gingival units of 11,12,13,14) [Figure 2] respectively. The entire visible pigmentation was removed, exposing the underlying connective tissue [Figure 3].



Figure 1: De-epithelialization by conventional (slicing) method using scalpel blade

After thorough depigmentation, the surgical site was dressed with periodontal pack [Figure 4]. Patients were discharged with proper post-operative instructions, and adequate antibiotic and analgesic coverage. The patients were recalled after one week for pack removal and observed on 30<sup>th</sup>, 60<sup>th</sup> and 90<sup>th</sup> days [Figure 5] for recurrence of melanin pigment in the depigmented site and scored accordingly, to evaluate the efficacy between the two methods used.

### RESULTS

Out of 28 gingival units of four cases, 14 were treated with radiofrequency and another 14 units by conventional slicing method. The total pre-operative gingival score was 33 [Table 1] and mean gingival pigmentation score of gingival units that were operated by with radiofrequency and conventional (slicing) method was 2.34 and 2.39 respectively [Table 1].

On re-evaluation of cases for the recurrence of pigment in the depigmented sites operated by radiofrequency



Figure 2: Ablation by radiofrequency

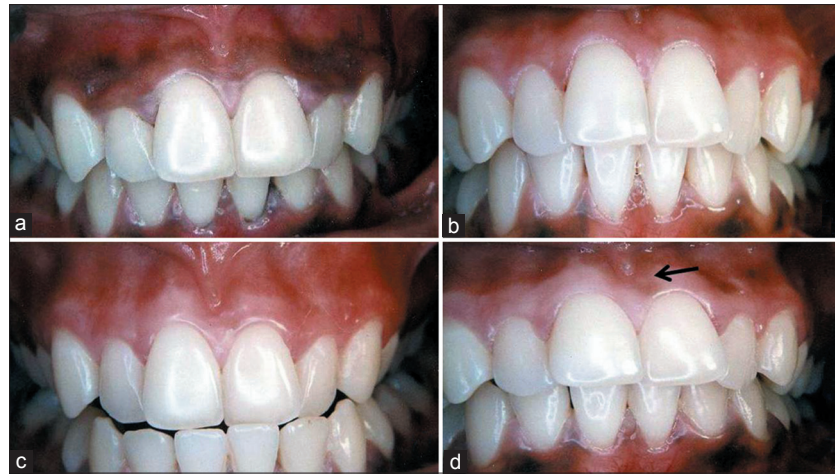


Figure 3: Intra-operative- after radiofrequency ablation



Figure 4: Dressing with periodontal pack





**Figure 5: Follow-up. (a) pre-operative. Radiofrequency ablation of right maxillary quadrant (I.R.T - 11,12,13,14) and conventional slicing of left maxillary quadrant (I.R.T - 21,22,23,24). (b) After 30 days, complete healing without any pigmentation on both upper quadrant. (c) After 60 days, Better healing over the right upper maxillary quadrant treated with radiofrequency. (d) After 90 days. Recurrence of pigmentation on left upper quadrant treated with conventional slicing method**

**Table 1: Total pigment score**

Method	GU (gingival unit)	Pre-op	30 <sup>th</sup> day	60 <sup>th</sup> day	90 <sup>th</sup> day
Radiofrequency	14	33	2	5	6
Conventional slicing technique	14	33	7	14	19

**Table 2: Mean pigment score per gingival unit**

Method	GU (gingival unit)	Pre-op	30 <sup>th</sup> day	60 <sup>th</sup> day	90 <sup>th</sup> day
Radiofrequency	1	2.34	0.14	0.36	0.42
Conventional slicing technique	1	2.39	0.5	1	1.3

[Table 2] on 30<sup>th</sup>, 60<sup>th</sup> and 90<sup>th</sup> days, revealed the mean pigment recurrence score per gingival unit was 0.14 on 30<sup>th</sup> day, 0.36 on 60<sup>th</sup> day and 0.42 on 90<sup>th</sup> day respectively. whereas, sites operated with conventional (slicing) method [Table 2] showed higher mean pigment recurrence score which is of 0.5 on 30<sup>th</sup> day, 1.0 on 60<sup>th</sup> day and 1.3 on 90<sup>th</sup> day respectively.

**DISCUSSION**

Disharmony between the skin color and gingival tissue color always motivates people to seek cosmetic treatment. Different treatment modalities have been employed by different clinicians for gingival depigmentation with complete restoration of esthetics but recurrence of pigmentation is well documented following the surgical depigmentation procedure within 24 days to 7 years long period.<sup>[5,14,15]</sup>

In the present study, 28 gingival units of maxillary component from 4 cases were selected. Out of 28 gingival units 14 gingival units were operated with radiofrequency and another 14 gingival units with conventional slicing method. Following surgical procedure, patients were recalled after 30<sup>th</sup>, 60<sup>th</sup> and 90<sup>th</sup> days respectively to observe the recurrence of pigments. On observation, the mean recurrence pigment score in sites operated by radiofrequency was 0.14 on 30<sup>th</sup> day, 0.36 on 60<sup>th</sup> day and 0.42 on 90<sup>th</sup> day. In contrary, the mean recurrence pigment score in the sites operated with conventional

slicing method was 0.5 on 30<sup>th</sup> day, 1.0 on 60<sup>th</sup> day and 1.3 on 90<sup>th</sup> day respectively.

Comparison of the obtained data indicated that rate of recurrence in the sites operated with conventional slicing method was higher, than the sites treated with radiofrequency. A reasonable explanation can be given, regarding the superior efficiency of radio ablation when compared to conventional slicing method in the present study, based on Oringer (1975)<sup>[16]</sup> exploding cell theory.

According to this theory, we can hypothesize that the electrically generated thermal energy influenced the molecular disintegration of melanin cells that are present on the basal and supra basal cell layer of operated gingival sites. And the latent heat of radiosurgery had some influence on retarding the development and migration of melanocytes, which makes use of radiofrequency more efficient in surgical depigmentation procedure compared to conventional procedures.

**CONCLUSION**

If radiofrequency is used judiciously, it can be valuable clinically as a safe and effective method for depigmentation, in conjunction with esthetic dentistry.

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**How to cite this article:** Mahesh HV, Harish MR, Shashikumar BM, Ramya KS. Gingival pigmentation reduction: A novel therapeutic modality. *J Cutan Aesthet Surg* 2012;5:137-40.

**Source of Support:** Nil. **Conflict of Interest:** None declared.

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