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Original Research Article

Comparative Evaluation between Electrosurgery and Free Gingival Graft in Treatment of Gingival Hyperpigmentation: A Clinical Study

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Abstract

The present study was designed to compare and evaluate the effectiveness of electrosurgery with free gingival graft in the treatment of gingival hyperpigmentation in aesthetic areas. A total of 10 systemically with physiologic gingival pigmentation on facial surfaces of anterior region were randomly assigned to test (Free gingival graft) and control group (Electrosurgery). Both procedures, electrosurgical technique as well as FGG were found to be effective for gingival depigmentation. No recurrence was seen with either of the procedure upto 3 months post-operatively. However, there was less post-operative discomfort and pain in electrosurgical group as compared to FGG.

Keywords: Depigmentation, hyperpigmentation, Free gingival graft, electrocautery, pigmentation.

INTRODUCTION

A charming smile can open doors and knock down barriers that stand between you and a successful life. Dark patches of pigmentation on the facial surfaces of the gingiva might be seen during smile or speech. This defect in their social presentation brings them to us. The colour of healthy gingiva is variable, ranging from pale pink to deep bluish purple. Between these limits of normalcy a large number of colour variations are observed, which depends primarily upon the vascular supply, the thickness of epithelium, degree of keratinization, and the presence of melanin pigment producing cells. The degree of pigmentation varies from one individual to another which is mainly dictated by the melanoblastic activity [1]. Melanin pigmentation of gingiva is symmetric and persistent and it does not alter normal gingival architecture. Melanosis of gingiva is frequently encountered among dark skinned ethnic groups, as well as in medical conditions such as Addison's syndrome, Peutz Jegher's syndrome, and Von Recklinghausen's disease (neurofibromatosis) [2]. A good pink smile is desirable by all the age groups and it can be of concern especially when the gingiva is seen, as in cases with a gummy smile.

In recent years, there is an increasing need for esthetics and growing cosmetic demands for a pleasing smile in many individuals. Attempts have been made to answer these cosmetic demands by various methods including surgical blade, diamond burs, electrosurgery, cryosurgery, LASER, ADM graft and free gingival graft to eliminate these dark patches of pigmentation on facial aspects of gingiva. Prasad *et al*., [3] treated 3 cases by electrosurgery, bur abrasion-scraping and epithelial excision each and concluded that electrosurgery showed better results; but few sites showed remnants of pigmentation at 3 months. They suggested future follow-up to reveal if these remnants will lead to faster recurrence of pigmentation. Tamizi and Taheri [4] used free gingival graft to eliminate dark gingival pigmentation on facial surfaces of anterior teeth in 10 patients, and reported no evidence of re-pigmentation upto 4.5 years. The present study was designed to compare and evaluate the effectiveness of electrosurgery with free gingival graft in the treatment of gingival hyperpigmentation in aesthetic areas.

MATERIAL AND METHOD

A total of 10 systemically and periodontally healthy patients with age between 18 to 25 years (mean 21.2 ± 2.61 years) with physiologic gingival pigmentation on facial surfaces of anterior region were selected for the study. However patients with history of habits like smoking, tobacco chewing, history of any relevant medication, which may cause hyperpigmentation, periodontitis demonstrating clinical attachment loss of ≥ 3mm, pregnant women or nursing mothers were excluded from the study.

Study Design

10 patients with diffuse gingival pigmentation on facial surfaces of anterior teeth were randomly assigned to test and control group.

Test group → treated with free gingival graft (FGG)

Control group → treated by electrosurgical technique.

Clinical Measurements

The clinical measurements recorded were

Assessment of gingival status

Plaque index (PI) [5]

Papillary Bleeding Index (PBI) [6]

Assessment of Gingival Pigmentation

Measuring the Area of Pigmentation

A rectangular cellophane paper was adapted to patient's mouth and area of pigmentation was traced. This tracing was then kept on a graph paper and no. of squares in the tracing are counted (n). This is converted into percentage to record re-pigmentation using the formula:

$$A = \frac{n \times 100}{N}$$

Where,

A – Percentage area of re-pigmentation

N – Area in no. of squares pre-operatively

n – Area in no. of squares post-operatively.

Dummett Oral Pigmentation Index (DOPI)

Score:

- 0 – Pink tissue (No clinical pigmentation)
- 1 – Mild light brown tissue (Mild clinical pigmentation)
- 2 - Medium light brown or mixed brown and pink tissue (Moderate clinical pigmentation)
- 3 - Deep brown/blue-black tissue (Heavy clinical pigmentation)

Post-Operative Evaluation of Pain

Patients were called on the next day, after 7 days and 6 weeks postoperatively for the assessment of pain by using the following criteria as described by Gedalia and Brayer 1978 [8]:

Score:

0 – No pain

1 – Discomfort but can't be said as pain

2 – Mild pain

3 – Moderate pain

4 – Severe pain

Surgical Procedure

Procedure for Depigmentation by Electrocautery

After administration of local anesthesia epithelial excision was performed with the electrosurgery unit using the loop electrode and similar care was taken not to expose the bone on the attached gingiva and not to remove excessive tissue on the marginal gingiva thereby disturbing the gingival harmony. The surgical area was covered with a periodontal pack. After 1 week recall, the pack was removed and the surgical area was examined.

Procedure for Depigmentation by Free Gingival Graft

After administration of local anesthesia, initial incision was given at the mucogingival junction. The recipient bed was de-epitheliased in such a way that the bony surface would remain covered with periosteum and thin connective tissue. A surgical template was prepared according to the recipient site and was then transferred to the unpigmented area of the palate to obtain the free gingival graft. A No. 15 scalpel was used to elevate a split-thickness section of a 1- to 2-mm-thick graft. The harvested graft was cut into two halves. The graft was placed in close contact with the recipient site and held in place by simple sutures of 4-0 silk. The surgical area was covered with a periodontal pack.

Post Operative Care

Immediately after surgery periodontal dressing was placed on the recipient site and the donor site. After surgery, a non-steroidal anti-inflammatory (Ibugesic-Ibuprofen + Paracetamol B.D for 5 days) was prescribed. No systemic antibiotics were utilized. Patients were instructed not to brush the teeth in the treated area. All patients were placed on 0.2% chlorhexidine gluconate twice daily, for one minute, for 4-6 weeks. They were instructed not to disturb the pack and to avoid to disturb the pack and to avoid undue trauma to the treated site.

One week following surgery, periodontal pack was removed. At this time the healing was observed and a second periodontal pack was placed if necessary. After irrigation with saline, polishing was done with the help of polishing paste and rubber cusp, taking care that it did not traumatize the treated site. Patient were instructed to clean the treated site with cotton pellet saturated with 0.2% chlorhexidine gluconate for additional 3-4 weeks in an apico-coronal direction and later on using a soft tooth brush with Charter's method of brushing. The patients were recalled at 6 month following surgical treatment. At each recall visit, scaling and polishing was performed.

RESULT

A total of 10 patients with gingival hyperpigmentation were treated by using electrosurgery (5 patients) and free gingival graft (5 patients). Both procedures, electrosurgical technique as well as FGG

were found to be effective for gingival depigmentation. No recurrence was seen with either of the procedure upto 3 months post-operatively. However, there was less post-operative discomfort and pain in electrosurgical group as compared to FGG.

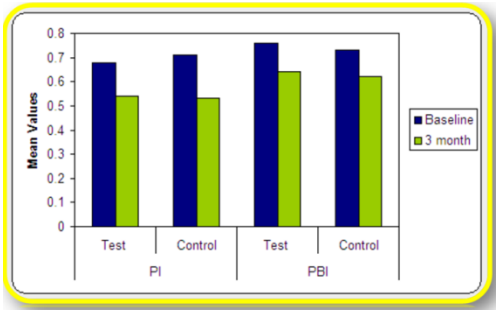

Fig-1: Mean Plaque Index (PI) and Papillary bleeding Index (PBI) score at Baseline and at 3 months in Test (FGG) and Control (Electrosurgical) group

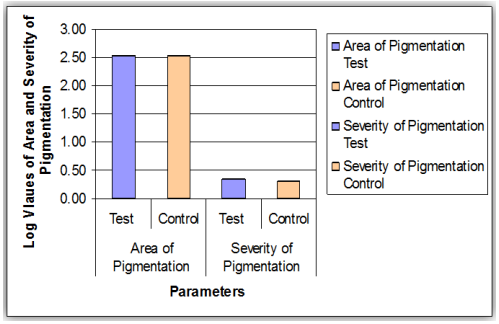

Fig-2: Mean Area and Severity of gingival pigmentation in test and control group at baseline

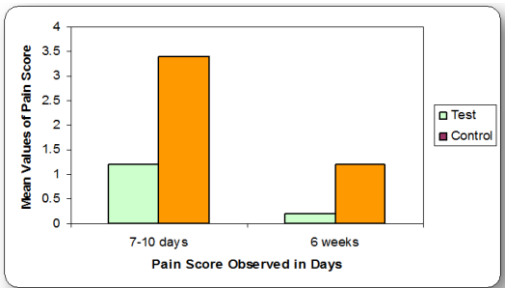

Fig-3: Comparison of Severity of Pain between Test and Control Group at different time intervals

Surgical Procedure for Depigmentation by Electrosurgery

Fig-4: Pre-operative view

Fig-5: Electrocautery tip over pigmented area

Fig-6: Gingival Depigmentation Completed

Fig-7: Periodontal Pack placed

Fig-8: Post-Operative view

Surgical Procedure for Depigmentation by Free Gingival Graft

Fig-9: Pre-Operative

Fig-10: Incision on mucogingival junction

Fig-11: Excised gingival pigmented tissue

Fig-12: De-epitheliased Surgical Area

Fig-13: Surgical template of recipient bed

Fig-14: Template over palatal donor site

Fig-15: Harvested Free Gingival Graft cut into 2 halves

Fig-16: Hemostasis achieved at palatal donor site

Fig-17: FGG sutured on recipient bed

Fig-18: Periodontal Pack Placed

Fig-19: Post-Operative

DISCUSSION

The present study was designed to compare and evaluate the effectiveness of electrosurgery with free gingival graft in the treatment of gingival hyperpigmentation in aesthetic areas. A total of 10 patients with gingival hyperpigmentation were treated by using electrosurgery (5 patients) and free gingival graft (5 patients). Both procedures, electrosurgical technique as well as FGG were found to be effective for gingival depigmentation. Electro surgery led to no recurrence in 5 treated patients in our study over a 3 months period.

It has certain advantages like:

- Minimal bleeding,
- Clean tissue separation,
- Reduced chair side time,
- Pressure less and precise technique.

However, electrosurgical technique requires more expertise over the use of sophisticated equipment. Moreover, prolonged or repeated application of current to tissue induces heat accumulation and undesired tissue destruction [7]. It holds the possibility of faster recurrence of pigmentation [3]. In the present study, FGG was equally effective in eliminating gingival pigmentation. Moreover, post-operative healing with FGG procedure was uneventful. In addition, depigmentation by FGG procedure leads to no recurrence for more than 4.5 years [4].

The mechanism of re-pigmentation according to cell migration theory [1], is that active melanocytes from the adjacent pigmented tissues migrate to treated areas, causing failure. Successful results observed with FGG could be because of inhibition of migration of active melanocytes by basal epithelial layers of graft which remain intact and represent focus of epithelisation.

CONCLUSION

Both procedures, electrosurgical technique as well as FGG were found to be effective for gingival depigmentation. No recurrence was seen with either of the procedure upto 3 months post-operatively. However, there was less post-operative discomfort and pain in electrosurgical group as compared to FGG. Also no technique has shown superiorly over the other, therefore the choice of the technique is largely dependent on the clinician's expertise and patient's preference to undergo procedure.

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