

Efficacy of Different Techniques of Gingival Depigmentation: A Comparative Evaluation with a Case Report

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ABSTRACT

Excessive gingival pigmentation is a major esthetic concern for many people. Melanin pigmentation is known to be caused by melanin granules within the gingival epithelium. Though it is not a medical pathology, many people complain of dark gums as unesthetic. A case is reported here of hyperpigmentation treated with scalpel, diode laser and electrosurgical procedure in a split mouth design with a note on comparison of healing.

Keywords: Laser, Electrocautery, Scalpel, Depigmentation.

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INTRODUCTION

Smile expresses a feeling of joy, success, affection and courtesy and also reflects self-confidence. The harmony of a smile is not only determined by the shape, position and color of the teeth, but also by the gingival tissues. Gingival health and appearance are essential components of an attractive smile.¹ Oral melanin pigmentation is well documented in the literature and is considered to have multifaceted etiologies including genetic factors, tobacco use, systemic disorders and prolonged administration of certain drugs especially antimalarial agents and tricyclic antidepressants.² It has been observed that there is a positive correlation between gingival pigmentation in children and parental smoking. This pigmentation may be induced by the stimulation of melanocytes by stimuli present in tobacco smoke such as nicotine and benzopyrene.³

Melanin pigmentation of the gingiva occurs in all races. In dark skinned and black individuals, increased melanin production in the skin and oral mucosa has long been known to be a result of genetically determined hyperactivity of their melanocytes. Earlier studies have shown that no significant difference exists in the density of distribution of melanocytes between light skinned, dark skinned and black individuals. However, melanocytes of dark skinned and black individuals are uniformly more reactive than in light skinned individuals.⁴

Though hypermelanin pigmentation of the gingiva does not present a medical problem, patient's complaint of 'black gums' is more of an esthetic problem and embarrassment,

particularly if gingiva is visible during speech and smiling (high lip line).⁵

The gingival color of normal healthy person is typically coral pink. However, wide variations are observed. The factors which affect the gingival color include vascularity, thickness, keratinization and gingival pigmentation.⁶ Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by various techniques.⁷ The techniques that have been tried in the past to treat gingival hyperpigmentation include chemical cauterization, gingivectomy, scalpel scraping procedure and abrasion of the gingiva. The latest techniques of gingival depigmentation like cryotherapy, free gingival autograft and laser therapy have achieved satisfactory results. Recently, laser ablation has been recognized as one of the most effective, comfortable and reliable techniques.⁸ But due to the high cost of the laser equipment and technique sensitivity, it is not being frequently used. Also very few studies are conducted to compare their efficacy.

Presented here is a case of gingival hyperpigmentation in which three different techniques were used in different quadrants to treat the condition and to compare the clinical efficacy of scalpel, laser and electrocautery.

CASE REPORT

A 15-year-old male patient visited the Department of Pedodontics and Preventive Dentistry, Subharti Dental College, Meerut, with the chief complaint of 'blackish gums'. The medical history was noncontributory. Intraoral examination revealed generalized blackish pigmentation of the gingiva; though it was healthy and completely free of any inflammation (Fig. 1). Considering the patient's esthetic concern, different options were explained to the patient and after getting approval from the institutional ethical committee, the procedure was planned.

PROCEDURE

After explaining the whole procedure to the patient as well as to his parents, and taking written consent, we planned scalpel technique for upper anterior region, electrosurgery for mandibular right anterior teeth and laser for mandibular left anterior teeth. A complete detailed medical and family history, along with blood investigations were carried out to rule out any contraindication for surgery.

Conventional Scalpel Technique

After block anesthesia using 2% lignocaine, two vertical incisions were made distal to permanent canine of right and left side using No. 15 scalpel blade. A split thickness flap was raised and excised (Figs 2 and 3), maintaining the normal architecture of the gingiva. Bleeding was controlled



Fig. 1: Preoperative view



Fig. 2: Conventional scalpel technique

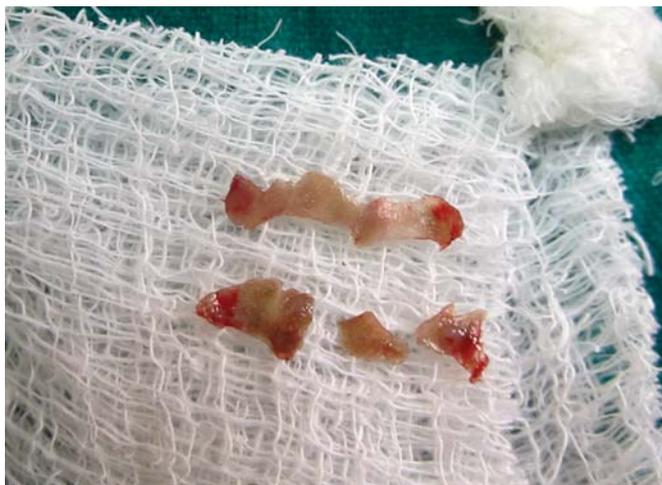


Fig. 3: Excised tissue

using pressure pack with sterile gauze. Sterile saline-soaked gauze was placed on the recipient site to control bleeding. The exposed depigmented surface was covered with Coe-Pak periodontal dressing for 1 week. Analgesic was prescribed for the management of pain. After 1 week, the pack was removed and the surgical area was examined.

Electrosurgical Technique

Depigmentation procedure for mandibular right anterior teeth was planned using electrosurgery. The electrosurgical apparatus used was of Bonart[®]. It was used at a power setting of 5 and in cutting and coagulation mode. After local anesthesia, loop electrode was used for excision (Fig. 4) and ball electrode was used to coagulate. Minimal bleeding with a clean field increased the efficacy of the work. Light brushing strokes were used and the tip was kept moving all the time. Prolonged or repeated application of electrode to the tissue was avoided as it could induce heat accumulation and may cause undesired tissue destruction. Since it is known to cause undesired effect, enough care was taken to avoid contact of current with the periosteum and vital teeth.

Laser Technique

Depigmentation in mandibular left anterior teeth was done using a diode laser of 980 nm wavelength (Sunny Gold[®]). The laser was used in continuous mode at a power output of 2 W. Melanin pigmented gingiva was ablated with a flexible, hollow-fiber delivery system in the contact mode (Fig. 5), under standard protective measures. Laser has the advantages of easy handling, short treatment time, hemostasis, decontamination and sterilization effects. After local anesthesia, the procedure was performed on all pigmented areas. Remnants of the ablated tissue were removed using sterile gauze dampened with saline. This procedure was repeated until the desired depth of tissue



Fig. 4: Electrosurgical method

removal was achieved. Laser was found to be a good and safe choice for removal of pigmented gingiva. Figure 6 shows the immediate postoperative picture after application of the three modalities.

After application of all three modalities, the patient was recalled for re-evaluation after 1 week (Figs 7 and 8), 1 month and 9 months (Fig. 9).



Fig. 5: Laser technique



Fig. 6: Immediate postoperative view

RESULTS

Results were compared with regard to the postoperative pain, swelling, time, cost efficiency and healing after application of the three modalities. In the scalpel technique, after 1 week, the wound area was still erythematous and raw (Fig. 7). This was in contrast to the electrosurgical side, where erythema was less, although edema was more. The best clinical picture was seen in the laser operated site, where both erythema and edema were not present (Fig. 8).

The healing, however, was comparable at 1 month and after 9 months for all three clinical modalities used. The overall clinical picture was more or less same with no recurrence of pigmentation observed in all three modalities at the end of 9 months (Fig. 9).

However, with regard to patient discomfort, at the end of 1 week, least amount of discomfort was reported in the laser site, followed by the electrosurgical site, while maximum pain was reported in the scalpel side.

From the clinician's point of view, least amount of manual dexterity and time was required in the laser surgery, followed by electrosurgery, while scalpel technique required the maximum time and dexterity.



Fig. 8: One month postoperative view



Fig. 7: One week postoperative view



Fig. 9: Nine months postoperative view

Bleeding during surgery was more for the scalpel technique, while almost no bleeding was seen in laser and electrosurgery.

DISCUSSION

Oral pigmentation occurs in all races of man. There is no significant difference in the oral pigmentation between males and females. However, the intensity and distribution of pigmentation of the oral mucosa is variable. It not only varies between races, but also between different individuals of the same race and also within different areas of the mouth of an individual. Physiologic pigmentation is probably genetically determined, but the degree of pigmentation is partially related to mechanical, chemical and physical stimulation also (Cicek, 2003 and Dummet, 1960).

Melanin pigmentation is caused by melanin deposition by active melanocytes located mainly in the basal layer of the oral epithelium. Pigmentation can be removed for esthetic reasons. Demand for cosmetic therapy of gingival melanin pigmentation is common and various methods have been used for depigmentation, each with its own merits and limitations (Pontes et al., 2006). The selection of a technique for depigmentation of the gingiva should be based on clinical experience, patient's affordability and individual preferences.

Scalpel surgical technique is highly recommended in consideration of the equipment constraints that may not be frequently available in clinics. However, scalpel surgery causes unpleasant bleeding during surgery, pain and discomfort after surgery and it is necessary to cover the surgical site with periodontal dressing for 7 to 10 days.⁹ The scalpel technique by some authors, has been reported to be relatively simple and versatile and it requires minimum time and effort⁴ but actually in the present case, more time and dexterity was required.

Superior efficacy of electrosurgery as compared to scalpel has been explained on the basis of Oringer's (1975) 'exploding cell theory'. According to this theory, it is predicted that the electrical energy leads to molecular disintegration of melanin cells present in basal and suprabasal layers of the operated and the surrounding sites.¹⁰ Thus, electrosurgery has a strong influence in retarding migration of melanin cells from the locally situated cells. However, in the present case report, no difference in the recurrence of pigmentation was observed between scalpel and electrosurgical technique. Also, it has been reported that electrosurgery requires more expertise than scalpel surgery.¹¹ Here again, the results were in contrast to the present study, where dissection of the partial thickness flap by scalpel required more surgical expertise as compared to electrosurgery.¹² Electrosurgery, however, has the disadvantage that prolonged or repeated application of

current to tissue induces heat accumulation and undesired tissue destruction. Thus, contact with periosteum or alveolar bone and vital teeth should be avoided.¹³

The laser group experienced less pain postoperatively compared to the scalpel group. It can be theorized by the fact that the protein coagulum formed on the wound surface, serves as a biological wound dressing¹⁴ and seals the ends of sensory nerves.¹⁵ This is in accordance with other studies which claim that laser therapy has the advantage of easy handling, short treatment time, hemostasis, decontamination and sterilization effect, and also does not require even a periodontal dressing.¹⁶

CONCLUSION

It can be said that all the three techniques produced comparable results with regard to healing and there was no recurrence with any of the procedures seen. However, with regard to immediate postoperative evaluation, the scalpel technique left a bleeding surface, while no such bleeding was seen with regard to the electrosurgical and laser techniques as the charred layer served as a surgical bandage to arrest bleeding. Although laser and electrosurgery need to be used with caution and have the advantage of minimal bleeding, technical expertise is required. Also, the high cost of the laser apparatus has to be taken into consideration. However, the healing at 1 week was best with electrosurgery as compared to the other two techniques. Thus, within the confines of the present case report, it can be concluded that, all three modalities produce comparable results in the long term.

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