



Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/13573
DOI URL: <http://dx.doi.org/10.21474/IJAR01/13573>



RESEARCH ARTICLE

SCALPEL VERSUS DIODE LASER FOR GINGIVAL DEPIGMENTATION: A CASE REPORT

Subuhi Mudassar, Soundarya Singh, Mayur Kaushik and Abrar Khan

Manuscript Info

Manuscript History

Received: 24 August 2021

Final Accepted: 27 September 2021

Published: October 2021

Key words:-

Depigmentation, Gingival
Hyperpigmentation, LASER, Scalpel

Abstract

Gingival hyperpigmentation is believed to be a genetic trait in populations and is more appropriately termed physiologic or racial gingival pigmentation; a condition, which affects all races differently. Gingival depigmentation is most frequently performed as an esthetic periodontal plastic surgical procedure. There are various procedures like scalpel, laser. Cryosurgery, diamond burs and chemical methods have been used in this procedure. This case report compares the efficacy of two techniques. Maxillary anterior region was treated with scalpel technique and the mandibular anterior region was treated using Diode Laser. Both the treatment modalities were effective in terms of patient acceptance. Scalpel depigmentation resulted in uneventful healing of the treated site. Laser depigmentation showed some beneficial effects like bloodless field during surgical procedure which healed uneventfully. Patient discomfort was more in laser treated site during the initial healing period as compared to scalpel.

Copy Right, IJAR, 2021,. All rights reserved.

Introduction:-

Smile is a manifestation of self-confidence involving aesthetic and psychological factors that include teeth, lips, and gingival tissue.¹ The harmony of smile is determined by the shape, position and color of the teeth, and also by the gingival tissues. Melanin pigmentation of the gingiva occurs in different amount in different races. Melanin, a brown pigment, is the most common cause of endogenous pigmentation of gingiva. In some population, Gingival hyperpigmentation is seen as a genetic trait and is more appropriately termed as racial or physiologic gingival pigmentation.² Oral melanin pigmentation may have multifaceted etiologies including genetic factors, tobacco use, systemic disorders and prolonged administration of certain drugs especially antimalarial agents and tricyclic antidepressants.³ Melanin hyperpigmentation is not present as a dental problem, but reveal unesthetic appearance. This is commonly seen in patients with excessive gingival display while smiling.⁴

The normal color of healthy gingiva is coral pink. However, wide variations are observed. The factors affecting gingival color include vascularity, thickness, keratinization and gingival pigmentation.⁵ Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by various techniques.⁶

Methods of Depigmentation:

1. Scalpel surgical technique.
2. Cryosurgery
3. Electrosurgery

4. Lasers: Neodymium; Aluminum-Yttrium Garnet (Nd- YAG) lasers. Erbium-YAG lasers. Carbon-di-oxide CO₂ laser
5. Chemical methods of depigmentation.
6. Methods aimed at masking the pigmented gingiva with grafts from less pigmented area free gingival graft, acellular dermal matrix allograft.

Here is a case- report of gingival hyperpigmentation in which two different techniques were used in different quadrants to treat the condition and to compare the clinical efficacy of scalpel and laser.

Case Report:

Materials and Method:-

A 19 year old female patient visited to the department of Periodontology & Implantology, Subharti Dental College & Hospital, Swami Vivekanand Subharti University, Meerut with the chief complaint of black gums (Fig-1). Patient was systemically healthy with good oral hygiene. Considering the patient's esthetic concern she was explained about the various treatment options available and the possibility of repigmentation after certain period of time. A split mouth approach comparing scalpel technique with diode laser was carried out. Local infiltration of lignocaine was administered. Exposure parameters are set using the recommended guidelines, followed by careful removal of epithelium containing melanin layer. There was absolutely no bleeding during the procedure.

Procedure

After explaining the whole procedure to the patient a written informed consent was signed by the patient. A detailed medical history, along with blood investigations were carried out to rule out any contraindication for surgery.

Conventional technique of scalpel was planned for upper anterior region using a #15 blade, followed by periodontal dressing over the surgical area. Laser for mandibular anterior region was planned.

Conventional Technique

After local infiltration of 2% lignocaine, conventional technique of scalpel was planned for upper anterior region using a #15 blade (Fig-2). Pigmented tissue was excised, maintaining the normal architecture of the gingiva (Fig-3). Bleeding was controlled using pressure pack with sterile gauze. The exposed depigmented surface was covered with CoePak periodontal dressing for 1 week (Fig-4). Analgesic was prescribed for the management of pain. After 1 week, the pack was removed and the surgical area was examined. On 1 month postoperative follow-up, the areas were completely healed (Fig-5).

Laser Technique

Depigmentation in mandibular anterior teeth was done using a diode laser of 980 nm wavelength (Sunny Gold) ® (Fig-6). 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 under standard protective measures. Laser has the advantages of easy handling, short treatment time, hemostasis, and 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 damped with saline. This procedure was repeated until the desired depth of the tissue (Fig-7). After total ablation of the pigmented mucosa, the exposed depigmented surface was covered with CoePak periodontal dressing for 1 week (Fig-8). The patient returned after 30 days presenting healthy gingiva and the absence of melanin repigmentation.

Patient was recalled after 1 week for re-evaluation. Wound healed uneventfully on both the sides. Patient experienced pain on the laser treated site for three days post operatively. On 1 month postoperative follow-up, the areas were completely healed (Fig-9). At 1 year follow up there were signs of repigmentation (Fig-10).

Discussion:-

Melanin pigmentation is frequently caused by melanin deposition by active melanocytes located mainly in the basal layer of the oral epithelium. Pigmentations can be removed for esthetic reasons. Different treatment modalities have been used for this aim. The selection of a technique for depigmentation of the gingiva should be based on clinical experience, patient's affordability and individual preferences.⁷

Scalpel surgical technique, one of the first and most accepted, techniques to be employed was the surgical removal of undesirable pigmentation using scalpels. The procedure involves surgical removal of gingival epithelium and some part of connective tissue and allowing it to heal by secondary intention. The new epithelium that forms is without melanin pigmentation.⁸

In this particular case the scalpel method of depigmentation showed better results from both clinical and patients' point of view. The area healed completely in 10 days with normal appearance of gingiva.

It is known that the healing period for scalpel wounds is faster than other techniques; scalpel surgery may cause unpleasant bleeding during and after the operation. However, it is necessary to cover the exposed lamina propria with periodontal dressing for 7 to 10 days.⁹

Recently, laser ablation has been recognized as one of the most effective, comfortable and reliable techniques for gingival depigmentation.¹⁰ The word laser is an acronym for light amplification by stimulated emission of radiation. **Maiman** (1960) developed the first working laser. The first application of a laser to dental hard tissue was reported by **Goldman** et al and **Stern** and **Sognaes** described the effects of the ruby laser on enamel and dentin.¹¹

Laser was used in the gated pulsed mode. Taking into account the undue heating that could be caused to the surrounding normal and pink tissues where the melanin pigmentation was absent; a gated pulsed mode provided the necessary thermal relaxation as against using a continuous pulse mode.¹²

The laser procedure was more acceptable to the patient as the procedure took less time and was more comfortable and there was absence of post-operative pain and hemorrhage. Also, from the operator's point of view, the laser technique was easier and faster to perform than the epithelial excision technique. **Ribeiro** et al¹³ and **Simşek Kaya** et al¹² found similar results: That the subjects experienced a higher extent of discomfort/pain on the side treated by the scalpel technique as compared with the diode laser-treated side during the first post-therapy week. Also, the use of a diode laser presented advantages in terms of less discomfort/pain during the post-therapy period and a reduction of treatment chair time. The present study did not show any significant difference in healing of depigmented areas of the gingiva, although mild pain and inflammatory changes were seen in the surgical excision area.

Clinical reappearance of melanin pigment following a period of clinical depigmentation is known as repigmentation. The exact mechanism of this condition is not known but according to 'migration theory', active melanocytes from adjacent pigmented tissues migrate to treated area and cause failure. However, the phenomenon of repigmentation is not universal. It might be attributed to the thoroughness of the procedure done and expertise of the clinician.¹⁴ In the present case, certain localized areas of repigmentation were seen at the end of 1 year.

Also, **Perlmutter** et al¹⁵ reported the case of one patient in whom gingival repigmentation occurred 7 years after removal of gingival tissues. **Dummet** and **Bolden**¹⁶ observed partial recurrence of hyperpigmentation in six out of eight patients after gingivectomy at 1-4 months.

Nakamura et al¹⁷ described depigmentation with CO₂ laser in 10 patients. No repigmentation was seen in the 1st year, but four patients showed repigmentation by 24 months. The recurrence of pigmentation can be due to the nature of the melanocytes. These cells arise from the neural crest ectoderm and enter the epithelium as melanocytes from about the 8th gestational week and, by the 14th week, these cells may have reached densities of 2000/mm² in some regions.

The success of the depigmentation procedure may be weighed only by the extent of depigmentation achieved and by the time taken for reappearance of pigments, prolonged follow-up is necessary. As the post-operative follow-up of the present study was short, it is proposed that further studies be taken up for a longer period of monitoring along with histopathological assessment to understand the process of repigmentation.

Figure Legends

Fig-1- Pre-Operative View

Fig-2- No.15 blade used to remove the pigment layer in maxillary anterior gingiva.

Fig-3- Immediate postoperative view

- Fig-4- Operative area covered with Periodontal dressing
- Fig-5- 1 month Post-Operative View
- Fig-6- Laser Technique
- Fig-7- Immediate postoperative view
- Fig-8- Operative area covered with Periodontal dressing
- Fig-9- 1 month Post-Operative View
- Fig-10- 1 year Post-Operative View with areas of re-pigmentation

Figures:-



Fig-1:- Pre-Operative View.



Fig-2:- No.15 blade used to remove the pigment layer in maxillary anterior gingiva.



Fig-3:- Immediate postoperative view.



Fig-4- Operative area covered with Periodontal dressing.



Fig-5:- 1 month Post-Operative View.



Fig-6:- Laser Technique.



Fig-7:- Immediate postoperative view.



Fig-8:- Operative area covered with Periodontal dressing.



Fig-9:- 1 month Post-Operative View.



Fig-10:- 1 year Post-Operative View with areas of re-pigmentation.

Conclusion:-

As per this study, no difference was seen in the comparison of both techniques in terms of efficiency and repigmentation. The results of this study indicated that both scalpel as well as laser was efficient for depigmentation of the gingiva. Both the procedures did not result in any post-operative complication and the gingiva healed uneventfully.

References:-

1. **Suragimath G, Lohana MH & Varma S.** A split mouth randomized clinical comparative study to evaluate the efficacy of gingival depigmentation procedure using conventional scalpel technique or diode laser. *J Lasers Med Sci* 2016;7:227-232.
2. **Shah C, Dave R, Shah M, Dave D.** Evaluation of Scalpel versus Diode Laser for Gingival Depigmentation: A Case Report. *Int J Adv Health Sci* 2014;1:24-27.
3. **Almas K, Sadig W.** Surgical treatment of melanin-pigmented gingiva: An esthetic approach. *Indian J Dent Res* 2002;13:70-73.

4. **Gokhale ST, Vatsala V, Gupta R, Gupta I.** Treatment of gingival hyperpigmentation by scalpel surgery and electrosurgery: A split mouth design. *Indian J Dent Sci* 2011;3:10-11.
5. **Newman MG, Takei H, Klokkevold PR, Carranza FA.** Carranza's clinical periodontology. 11th ed. Los Angeles: Elsevier; 2011:12-27.
6. **Roshna T, Nandakumar K.** Anterior Esthetic Gingival Depigmentation and Crown Lengthening: Report of a Case. *J Contemp Dent Pract* 2005;3:139-147.
7. **Pontes AE, Pontes CC, Souza SL, Novaes AB, Grisi MF, Taba M.** Evaluation of the efficacy of the acellular dermal matrix allograft with partial thickness flap in the elimination of gingival melanin pigmentation. A comparative clinical study with 12 months of followup. *J Esthet Rest Dent* 2006;18:135-143.
8. **Cobb CM.** Lasers in Periodontics: A Review of the Literature. *J Periodontol* 2006;77:545-564.
9. **Almas K, Sadiq W.** Surgical Treatment of Melanin Pigmented Gingiva: An Esthetic Approach. *Indian J Dent Res* 2002;13:70-73.
10. **Berk G, Attici K, Berk N.** Treatment of gingival pigmentation with Er, Cr: YSGG laser. *J Oral Laser Applications* 2005;5:249-253
11. **Grover HS, Dadlani H, Bhardwaj A, Yadav A, Lal S.** Evaluation of patient response and recurrence of pigmentation following gingival depigmentation using laser and scalpel technique: A clinical study. *J Indian Soc Periodontol* 2014;18: 586-592.
12. **Kaya GS, Yavuz GY, Sumbullu MA, Dayi E.** A comparison of diode laser and Er: YAG lasers in the treatment of gingival melanin pigmentation. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2012;113:293-299.
13. **Ribeiro FV, Cavaller CP, Casarin RC, Casati MZ, Cirano FR, Correa M D, et al.** Esthetic treatment of gingival hyperpigmentation with Nd: YAG laser or scalpel technique: A 6-month RCT of patient and professional assessment. *Lasers Med Sci* 2014;29:537-544.
14. **Arun A, Kaushik M, Singh R, Tomar N.** Surgical correction for gingival depigmentation using electrosurgery-a case report. *Int J Sci Res* 2021;10,1-2.
15. **Perlmutter S, Tal H.** Repigmentation of the gingiva following surgical injury. *J Periodontol* 1986;57:48-50.
16. **Dumett CO, Bolden TE.** Post surgical clinical repigmentation of the gingiva. *Oral Surg Oral Med Oral Pathol* 1963;16:353-357.
17. **Nakamura Y, Hossain M, Hirayama K, Matsumoto K.** A clinical study on the removal of gingival melanin pigmentation with the CO(2) laser. *Lasers Surg Med* 1999;25:140-147.