CASE REPORT

A Comparative Study to evaluate Gingival Depigmentation using Scalpel Blade Technique and CO_2 Lasers

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ABSTRACT

Gingival pigmentation is the change in color of the oral mucosa or gingiva which can occur as a result of different lesions and conditions. Clinically melanin pigmentation is not a disease and does not have any symptoms, but only act as a major esthetic concern for people. Most of the oral pigmentation is physiologic and caused by melanin deposition. It can be treated by scalpel surgery, chemical agents (Phenol 90%), gingival abrasion, free gingival grafts, electrosurgery, cryosurgery and lasers. The treatment should be less expensive, easily available, and easy to use with minimum discomfort and pain. It should be effective for a longer time.

The present study compares two effective surgical gingival depigmentation techniques—scalpel blade surgery and CO_2 laser surgery.

Keywords: Pigmentation, Depigmentation, CO_2 laser, Melanin.

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INTRODUCTION

Pigmentation is the change in color of oral mucosa or gingiva due to different lesions and conditions. The pigments are normal physiological vital substance in the body. The pigments of biological origin are present all over the body. In oral cavity also pigmented lesions are found. Such lesions may occur due to physiologic changes (e.g. racial pigmentation) or as a result of any systemic illnesses (e.g. Addison's disease) or even due to malignant neoplasms (e.g. melanoma and Kaposi's sarcoma).[1,2]

The color of healthy gingiva is variable, ranging from a pale pink to a deep bluish purple hue. Between these limits of normalcy are a large number of pigmentation mosaics which depend primarily upon the intensity of melanogenesis, depth of epithelial cornification, and arrangement of gingival vascularity.[3] Moreover, color variation may not be uniform and may exist as unilateral, bilateral mottled, macular, or blotched, and may involve gingival papillae alone or extend throughout the gingiva on to other soft tissues. Most pigmentation is caused by five primary pigments. These include: Melanin, melanoid, oxyhemoglobin, reduced hemoglobin, carotene, bilirubin and iron.[4]

Discoloration of the gingiva remains mostly the complaint of individuals who are fair-skinned with high smile line (gummy smile) and are more conscious about their smiles. This can be treated by a periodontal surgical procedure called the gingival depigmentation. This procedure involves removal of gingival hyperpigmentation through different techniques.[5,7]

Lasers are used in dentistry since 1980s. Lasers have the ability to remove the mucosa, from the basal layer of the epithelium. Various wavelengths have been reported for removal of melanin pigmentation. Types of lasers used commonly are CO_2, diode, Nd:YAG[8], Erbium (ER). CO_2 laser ablation for gingival pigmentation is one of the most effective and reliable technique but expensive. It has wavelength spectrum ranging more than 10,000 nm, which allows high levels to be absorbed by soft tissues and melanin pigments. The ability of melanocytes to absorb the laser light is dependent on the wavelength and its ability to penetrate the tissues. The rapid rise in intercellular temperature and pressure leads to cell rupture and char formation.

The present study compares two surgical techniques, which is easier to practice by all dentists. The Scalpel blade surgical technique and CO_2 laser surgical technique for depigmentation of gingiva, to create better esthetics for the patient.

MATERIALS AND METHODS

Ten patients who visited the dental hospital with the chief complaint of 'black colored gums', are treated in this study.

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Fig. 1: Preoperative view

Fig. 2: During scalpel surgery

Fig. 3: Six months after scalpel surgery

Medical history of patient was recorded and ruled out for any contraindications for surgery (Fig. 1). On intraoral examination gingival status shows change in color of gingiva in relation to maxillary anteriors and premolars on both the sides. Oral hygiene status was found to be good and periodontal status does not reveal any periodontal disease. Routine blood investigations were carried out before surgery and found to be within normal limits. All the 10 patients had mild, and moderate gingival melanin pigmentation. The patients with Dummett-Gupta Oral Pigmentation Index scores 1 and 2 were included in the study and patients with index score 3 are excluded.

Dummett-Gupta oral pigmentation index scoring criteria (1964)[9,10] are as follows:

1. No clinical pigmentation (pink gingiva).
2. Mild clinical pigmentation (mild light brown color).
3. Moderate clinical pigmentation (medium brown or mixed pink and brown color).
4. Heavy clinical pigmentation (deep brown or bluish black color).

Surgery was performed for the maxillary anteriors and premolar region. For the maxillary left quadrant CO_2 laser was used. For maxillary right quadrant a scalpel blade technique was used.

TREATMENT

Two types of periodontal plastic surgical procedures were used.

SCALPEL BLADE SURGICAL TECHNIQUE OR SPLIT THICKNESS EPITHELIAL EXCISION TECHNIQUE

Scalpel technique was followed on maxillary right quadrant of all the ten patients. After achieving local anesthesia in the desired surgical site with 2% lignocaine, the outline is initially marked with an incision using 15 BP blade. Depigmentation is done by removing the entire pigmented gingival epithelium and also a layer of underlying connective tissue (Fig. 2). This will leave a layer of connective tissue get exposed which heals by secondary intention. Depigmentation was done carefully in the free gingival margin area to prevent any gingival recession. Bleeding occurring during surgery was controlled by applying pressure using sterile gauze for few minutes. Proper measures are made to avoid leaving any remnants of melanin.[11] After completing the procedure, exposed surgical area is covered with coe-pack. Postoperatively patients are prescribed with antibiotics and anti-inflammatory drugs for 5 days. Out of ten patients, four patients reported pain and discomfort after 2 days. Periodontal pack was removed after 10 days. Initial healing took place within 14 days. Healing and re-epithelization were completed by the end of 1 month. After 3 months, the gingiva appeared healthy without any pigmentation (Fig. 3).[12-14]

CO_2 LASER SURGERY

CO_2 laser technique was followed on the maxillary left quadrant for all the ten patients. Local anesthesia is achieved using topical lignocaine spray. CO_2 Laser with the wavelength of more than 10,000 nm, was used. Light brushing stroke was used for depigmentation and the laser tip was kept moving all the time. CO_2 laser can remove excessive melanin by ablating the tissues in the basal layers of the epithelium. This procedure was repeated till the desired depth of tissue removal was achieved (Fig. 4).[15-17] Care is taken to prevent any damage to gingival margin, periosteum, bone and adjacent teeth.

The main advantage when using CO_2 laser is bleeding which is very minimal and the patients comfort during the procedure. Postoperatively patients are prescribed with 10 ml

Fig. 4: During laser surgery

Fig. 5: Postoperative view after 6 months

of 0.2% chlorhexidine mouth wash twice daily to maintain good oral hygiene. Healing occurs by epithelization which is completed within 6 weeks. After 4 months, gingiva appears normal without any pigmentation (Fig. 5).

DISCUSSION

Melanin pigmentation causes black color discoloration of the gingiva which affects both maxillary and mandibular gingiva equally. Both males and females are affected and it occurs in all races. The intensity and distribution of pigmentation varies between different races also within individuals of same race and varies with different areas inside the oral cavity. The pigmentation also varies with complexion of individuals which is lighter in individuals with fair complexion than darker individuals. The gingival color varies among different persons and appears to be correlated with cutaneous pigments. Dark skinned patients were excluded from the study.

There are various factors in determining the treatment for gingival melanin pigmentation which include pigmentation type, skin complexion, esthetic importance and patient's acceptance for treatment. The treatment should be easily available and effective for a longer time. This should cause minimal discomfort and pain, less bleeding and not expensive for patient.

In this study, we treated ten patients who complained of black colored gums in anterior and premolar region on both, sides. A split mouth study design was made by performing depigmentation with scalpel blade in the maxillary right quadrant and using CO_2 laser for the maxillary left quadrant.

Using scalpel blade surgery[15] for depigmentation is difficult and needs dentist experience because of need to take a split thickness epithelial excision which if not done properly may lead to tearing of tissues. The advantage of this scalpel technique is that it is less expensive and can be done in all dental clinics without need of any sophisticated instruments. But the disadvantages are bleeding which occurs during and also after the procedure. Time consuming procedure and placement of periodontal dressing is necessary. This cannot be done in patients with systemic disease. Certain areas where gingival was thin are left untreated, in order to avoid exposure of bone and postoperative gingival recession. The healing occurs by re-epithelization which was completed at the end of 1 month and the gingiva appeared normal without any pigmentation at the end of 3 months with satisfactory esthetic results. Recurrence after surgery has been reported by many authors.[15]

Using CO_2 laser surgery[16,17] can remove a thin layer of epithelium. The advantages of CO_2 laser are it causes minimal damage to the underlying periostium and bone under the gingiva being treated, rapid healing and minimal bleeding and no need for a periodontal dressing, easy handling and short treatment time. But it has certain disadvantages like it is expensive and sophisticated equipments are necessary, which is not available in many dental clinics. Lasers should be used cautiously to avoid damage to the adjacent teeth and gingiva. CO_2 lasers can reduce the melanin production by ablating the melanocytes in the basal layer of epithelium. Lasers have the advantage of repigmentation after laser surgery also has been reported by many authors.[13]

The same procedure can be repeated if signs of repigmentation appear after several years. Both the techniques showed good esthetic results and change in the color of the gingiva after 4 months (Fig. 6).

CONCLUSION

The patients' esthetic concern requires the removal of pigmented areas in the gingiva to create a pleasant smile, which can be achieved by depigmentation using either with a scalpel blade surgery or with a CO_2 laser surgery. Results obtained by both the procedures has satisfied the patients.

If scalpel surgery is attempted to depigment the gingiva it is difficult to practice unless experienced and there may some mild postoperative discomfort. But it is cost-effective and provides esthetically acceptable results to the patient and it can be done in all dental clinics.

Fig. 6: Before and after surgery

CO_2 lasers also showed very good results, but expensive and not available in all dental clinics. There was minimal postoperative complications and less bleeding. So, we conclude that all dentists can follow scalpel blade surgery for depigmentation of gingiva and if available CO_2 lasers can also be used.

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