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Gingival depigmentation & crown lengthening by laser & bur abrasive technique - A case report

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Abstract

Excessive gingival display and gingival hyperpigmentation are major concerns for a large number of patients visiting the dentist. Esthetic periodontal plastic surgery is especially rewarding in such individuals with compromised esthetics. In the present case report, an effort has been made to assess the procedure of melanin depigmentation & crown lengthening using laser and bur abrasive techniques.

Keywords: Bur abrasive, Crown lengthening, Depigmentation, Laser,

Introduction

Any feeling of pleasure, happiness, laughter or simply greeting leads to a smile resulting in exposure of teeth and gingiva. Smile is not only a method of communication but also a method of socialization. A harmonious smile is determined not only by shape and position of the teeth but also by the colour of the teeth and gingiva [1]. Pigments that contribute to the colour of the gingiva includes melanin, melanoides, carotene, oxyhaemoglobin and reduced haemoglobin. Among various pigments melanin is the most common pigment that contributes to the colour of the gingiva. Melanin is synthesised by the process of melanogenesis. It takes place in the cytoplasmic organelles called melanosomes of melanocyte. Melanocytes are stimulated by stress hormones, sunlight etc, leading to production of chemical messenger like melanocyte stimulating

hormone. The melanosomes are transferred from melanocytes to keratinocyte which are cells of skin, located above the melanocyte, after which melanin become clinically visible on the surface [2]. Excessive deposition of melanin in basal and para basal layer of epithelium will result in hyperpigmentation of gingiva.

Etiology

Physiological factors: - Pigmentation is most commonly seen in attached gingiva followed by interdental papillae, marginal gingiva and alveolar mucosa in decreasing order. It is more common on the labial aspect than the lingual or palatal aspect. The physiological pigmentation does not cause any medical issues but it affects the esthetics and self-confidence of an individual.

Pathological factors: - endocrine diseases (e.g., Addison's disease, Albright's syndrome), heavy metals (e.g., lead, bismuth, mercury, lead), drug's (e.g., minocycline, chloroqunine, zidovudine, ketaconazole, belomycine), malignant lesion (e.g., Kaposi's sarcoma, malignant melanoma), tobacco associated (e.g., smoking), others (e.g., graphite tattoo, amalgam tattoo) [3].

Depigmentation can be defined as a periodontal plastic surgical procedure whereby hyperpigmentation is reduced or removed by various techniques.

A. Methods to remove the hyperpigmentation includes

1. Chemical methods
2. Surgical method
1. Scalpel
2. Laser
3. Bur abrasive
4. Electrocautery
5. Radiosurgery
6. Cryosurgery

B. Method to mask the hyperpigmentation

1. Free gingival graft
2. Acellular dermal allograft [4].

Excessive gingival display

A conservative display of approximately 2-3 mm of the marginal gingival is generally considered as a part of the ideal esthetic smile. In contrast, excessive gingival display can severely compromise the appearance of the individual. Etiology for excessive gingival display includes:

1) Vertical maxillary excess,

2) Gingival hyperplasia,

3)Altered passive eruption.

Excessive gingival display due to gingival enlargement or altered passive eruption can be effectively corrected by a gingivectomy procedure, whereas correction of vertical maxillary excess requires more complicated osseous resection surgeries [5].

Case report

A 25-year-old female patient reported to the department of periodonotology with the chief complaint of black gums and excessive gingival display which affected her smile and speech. On clinical examination, it was found that her clinical crown was much shorter than the anatomic crown, and the patient had the personal desire to have "longer teeth" along with the correction of her dark gums (Fig 1). Routine oral prophylaxis was carried out and oral hygiene instructions were given. Complete medical, family history and blood investigations were carried out to rule out any abnormalities. After written consent was obtained from the patient, laser-assisted crown lengthening and depigmentation of the gingiva in the anterior region from premolar to premolar in the maxillary arch (Fig 2) and depigmentation by bur abrasive method in mandibular arch was planned (Fig 5).

Laser technique

After infiltration of local anaesthesia, crown lengthening was completed and checked for tissue tag. Following this depigmentation in the maxillary left 1st premolar to right 1st premolar was done using diode laser of 980mn (clean cut ®). It was used with gated pulse mode at power of 2W, using fibreoptic delivery system in the contact mode. The melanin pigments were ablated with painting strokes, and the remanent ablated tissue was removed with sterile gauze damped in saline (Fig 3 A & B). During the procedure, protective equipment for the patient, operator and assistant were used.

Bur abrasive method

Depigmentation of mandibular left 1st premolar to right 1st premolar was done by bur abrasive method using low speed rotatory instruments. After giving adequate local anaesthesia, grit football shaped diamond bur and long tapered bur diamond bur was used to denude the pigmented epithelium. It was moved in feather light strokes along with adequate saline irrigation, without giving any pressure. Bur should not be held in one place for longer time as it may cause damage to the underlying tissues. The bleeding was controlled with gauze damped in saline and checked for remnant tissues (Fig 6). Care should be taken while doing the procedure because inappropriate use may result in gingival recession, delayed healing, loss of enamel, injury to underling periosteum& bone.

Post operative care

Patient was asked to continue with routine oral hygiene procedure to maintain the oral health without any trauma to surgical site. Patient was prescribed with tablet of paracetamol 325mg and aceclofenac 100mg twice daily for 3 days after food and was also instructed to use chlorhexidine mouthwash 0.2% twice daily 30 minutes after brushing.

Patient was reviewed after 2 weeks and the healing was satisfactory without any post-surgical complication (Fig 4). The gingiva appeared firm and pink with slight pigmentation. The patient was satisfied with the color of the gingiva. At the end of 1 month, re epithelization was completed, however certain aeras of re-pigmentation were seen.

Discussion

Hyper pigmentation of Gingiva plays a crucial role in the esthetics of an individual. Physiological cause of hyperpigmentation is more common than pathological causes. Depigmentation is mainly done for cosmetic reasons. On comparison of different techniques, Scalpel technique of depigmentation is the most economical one as compared to other techniques. It is relatively simple, requires minimum time and effort. However, this technique has the disadvantage of unpleasant bleeding during and after the operation and it is necessary to cover the surgical site with dressing for 7 to 10 days [6].

Cryosurgery procedure is followed by considerable swelling and it is also accompanied by increase soft tissue damage. Depth control is difficult and optimal duration of freeze is not known but prolonged freezing increases tissue destruction [7].

Electrosurgery requires more skill than scalpel surgery. Prolonged application of electrical energy to a tissue induces thermal damage to the tissue. Thus, contact with the periosteum or alveolar bone and the vital teeth should be avoided [8].

Free gingival grafting is quite invasive and extensive procedure and it has not been advised for depigmentation procedure routinely because of the disadvantage of second surgical site, discomfort to patient, poor tissue colour matching at the recipient site [8].

Abrasive technique is simple, safe, non-aggressive method which can be performed easily and can be readily repeated. This technique does not require any costly equipment and hence it is economical. Care should be taken to control the speed and pressure of the bur so as not to cause unwanted pitting of the tissue [9].

The diode laser is a solid-state semiconductor laser that typically usescombination of gallium, arsenide, and other elements such as aluminium, indium to change the electrical energy into light energy. Dental laser energy has an affinity for different tissue components. Since the diode laser has an affinity for melanin and other dark pigments; it works more efficiently when the beam is applied under the presence of pigments. The advantage of laser is easy and short time treatment, bloodless field, less discomfort, minimal postoperative pain and swelling, no periodontal dressing required [10].

For this case, both laser & bur abrasive techniques were performed. laser technique of depigmentation & crown lengthening was performed in the maxillary arch & bur abrasive method of depigmentation was performed in the mandibular arch. Both the techniques had its own advantages & disadvantages

Firstly, the laser technique had,

1.Bloodless field

2.Less discomfort to patient during the procedure

3.No need of periodontal dressing

4.Less post operative pain

Whereas the bur abrasive technique

1.Was easy to perform

2.Simple & economical

3.Non aggressive.

Comparing both the techniques from clinical &esthetic stand point, the results produced from the laser technique were quite long lasting compared to bur abrasive technique. After 1 month & 2 month follow up, in the laser denuded areas there were no areas of repigmentation. But in mandibular arch, where bur abrasive technique was used, diffuse patches of repigmentation appeared (Fig 7, 8).

Conclusion

With increasing esthetics demands & time constraints of the patient during the clinical appointments, a technique like laser which is more patient friendly with respect to short clinical working time is mostly preferred. It also produces long lasting esthetic results which is more important from the point of view of patient's satisfaction. With laser technique, both can be ensured with promising results.

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Legend Figures

Fig. 1: Pre-operative.

Fig. 2: Laser methods.

Fig. 3A

Fig. 3B

Fig. 3 A & B: immediate post operative- Crown lengthening & depgimentation laser method.

Fig. 4: Two weeks post operative.

Fig: 5 Bur abrasive method.

Fig. 6: Immediate Post operative-bur abrasive method.

Fig.7: One month follow up.

Fig. 8: Two months follow up.