



RESEARCH ARTICLE

QUADRANT WISE COMPARISON OF FOUR DIFFERENT TREATMENT MODALITIES FOR THE MANAGEMENT OF HYPERPIGMENTED GINGIVA: A QUOTIDIAN EVALUATORY CASE REPORT.

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Abstract

Smile is the nonverbal communication of person in his social life. Two main elements that can influence a confident smile are teeth and the gums. The color of gingiva plays a pivotal role in evaluating health and disease condition. Gingival melanin pigmentation is a focal pigmentation of endogenous origin. Although it is not a medical issue, complaints of 'black /dark gums' are common primarily for esthetic purposes. To address these complaints gingival depigmentation is performed using various treatment methods like bur abrasion, scalpel scraping, split thickness flap, cryosurgery, electrosurgery and lasers. However, each of these methods have their own pros and cons. In this case report a quadrant wise comparison has been made between the different techniques for gingival depigmentation which include electro cautery, conventional scalpel technique, cryosurgery and diode laser and the patient was evaluated on a daily basis for 3 weeks to compare the healing pattern. This clinical case report is an attempt to help the practitioner to decide from the various methods available for gingival depigmentation and the various factors to consider for a better clinical outcome.

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Introduction:-

A smile is the gestural communication of a person in his/her civic life. Two main components that can affect a confident smile are teeth and the gums. Various elements add to the attractive smile such as teeth colour, gingival colour, and position of the teeth in the oral cavity. The colour of the gingival surface is decided by the number and size of blood vessels, the degree of keratinization, the coloured pigments within the epithelium, and thickness of the epithelium¹. Melanoblasts fabricate the melanin in gingival epithelium which adds the brown color to the gingiva. Gingiva happens to be the highly pigmented part of the oral mucosa².

The variation in the degree of gingival hyperpigmentation among different populations is considered a racial trait and is not related to gender or age of the individual^{1,3}. Hyperpigmentation is related to the melanoblastic activity of the epithelial cells in gingiva, its degree differs from person to person⁴. Usually, the occurrence of gingival pigmentation is persistent and symmetrical without causing any alteration of the gingival structure. Gingival melanin pigmentation is mostly observed in African and East Asian population as its predilection is more in dark skinned ethnic populations^{5,6}. Although gingival melanin pigmentation is not representing a pathologic problem, it is of esthetic concern particularly if the pigmentation is visible during speaking and smiling. Hence, there is a huge potential for cosmetic therapy of gingival melanin pigmentation. Various methods like surgical scraping, bur

abrasion, electro-surgery, cryosurgery, and split thickness flap excision techniques including lasers have been used for gingival depigmentation with varying degrees of success².

Case report:-

A female patient aged 20 years reported to the department of periodontology, Yenepoya dental college, Mangalore with the chief complaint of dark gums. She gave a history of the brownish discoloration of her gums since her childhood, evocative of physiologic melanin pigmentation. On intraoral inspection, hyper-pigmented gingiva in both the arches extending to the region of first premolars of both arches were noticed. There was no significant medical history.

The initial treatment began with phase-I therapy i.e. scaling, polishing and advocating oral hygiene instructions to the patient.

Depigmentation procedure was scheduled on the second visit. Different techniques i.e. electrosurgery, scalpel technique, diode laser and cryosurgery respectively for the four different quadrants from canine to canine were advocated.

Before starting the procedure, gingival pigmentation index (Dummet Index, 1964)³ was recorded.

DUMMET ORAL PIGMENTATION INDEX (1964)³: The degree of melanin pigmentation was determined based on the following scoring system:

- 0- No clinical pigmentation (pink- colored gingiva)
- 1- Mild clinical pigmentation (mild light brown pigmentation)
- 2- Moderate clinical pigmentation (moderate brown tissue)
- 3- Heavy clinical pigmentation (deep brown to black tissue).



Fig 1 (pre-op)

In the first quadrant, electrocautery unit was used to de-epithelize the hyper-pigmented areas from the canine to the central incisor.

Ablation of the affected tissues was carried out under standard protective measures using ball end electrode of the electrocautery unit. The procedure was done with great caution as extended contact with one area can lead to tissue damage due to excessive heat.

**Fig 2**

Therefore, the tip was kept in constant movement and light brushing strokes were used. Saline-soaked sterile gauze was used to remove the excised tissue fragments. This technique was continued till the desired amount of pigmented tissue was ablated.

Depigmentation procedure from canine to central incisor of second quadrant was done with scalpel blade (no.15) using the slicing technique. The gradual scraping of the gingival epithelium was done until the pigmentation was completely removed. Pressure was applied with sterile gauze moistened in saline to control haemorrhage throughout the procedure.

**Fig 3**

Gingival depigmentation was done from canine to central incisor of the third quadrant with diode laser having wavelength 810 nm (zolar photon) at 1 W power in a continuous mode.

Activation of the laser was done after the desired power was set. Local anesthetic (1:80,000 adrenaline) was infiltrated at the site and the procedure was carried out in contact mode. The tip was held in light contact with the gingiva and light sweeping brush strokes were used. The charred tissue was discarded with wet saline gauze. The

patient did not experience any pain during the procedure. Following the procedure, no periodontal dressing was given.



Fig 4

In fourth quadrant, from canine to central incisor depigmentation procedure was carried out using cryosurgery (gas expansion cryoprobe using liquid nitrogen at -190 degree celsius). Following the administration of local anesthesia, the area was exposed to cryoprobe. Immediately after its removal, the tissue was frozen solid, taking on the appearance of a ball of ice. Thawing of the tissues occurred in 15-20 sec with the progression from the periphery to the centre of the ice ball. Thirty minutes after freezing, the tissue area was imperceptible from the adjacent gingiva. Analgesics (diclofenac 50 mg twice times daily for 3 days) and 0.2% chlorhexidine digluconate rinse twice daily for 2 weeks were prescribed.



Fig 5

The patient was evaluated on a daily basis to assess the healing and pain with clinical pictures and Visual Analog Scale (VAS) for a month. The gingival pigmentation was assessed using Dummet Index after 3 months to check for any recurrence.



Fig 6(immediate post –op electrocautery technique)



Fig 7 (immediate post-op scalpel technique)



Fig 8 (immediate post-op cryosurgery and laser)



Fig 9 (1 month post-op)

Discussion:-

Gingival hyperpigmentation is seen as a hereditary trait in some populations, and is more appropriately entitled physiological or racial gingival pigmentation⁷. Although physiologic gingival pigmentation is a common condition in most cases, complaints of black gums resulting from esthetic concerns are particularly common among adolescents⁸. Pigmentation can be removed for esthetic reasons using different treatment modalities. Of all these methods, scalpel scraping, diode laser, cryosurgery, electrocautery, gingivectomy with free gingival autografting and bur abrasion are commonly used in dental setting.

In this study, electrosurgery, scalpel technique, diode laser and cryotherapy are used. Patient had moderate pain and burning sensation in the first (electrocautery) and third quadrant (diode laser) for the initial 3 day but it subsided in the subsequent days. No such complaints were reported in the second (scalpel) and the fourth quadrants (cryosurgery). Periodontal pack was given on the electrosurgery and scalpel treated quadrants for 7 days⁹. The primary advantage of laser is hemostasis and a relatively dry field¹⁰. There are many advantages of laser over surgical procedure according to Wigdor et al, 1995¹¹. These include instant sterilization of surgical site, reduced bacteremia, less mechanical trauma, minimal post-operative scarring, swelling and post-operative pain.

There is abundant evidence in literature comparing Laser with Scalpel (Lagdive S. et al, 2009; Desai U et al, 2013)¹². In a case series by Pradeep et al, split mouth de-epithelialization procedure using a scalpel, bur abrasion and electrosurgery were successfully used to treat gingival hyperpigmentation¹³. It was reported that electrosurgery required a lot of precision but increased the efficacy of work, giving a cleaner and neater work field. Scalpel de-epithelialization was reported to be easier and gave profound results and patient satisfaction¹³. However, no study compared these four methods in one patient as done in the present case report. Inadequate removal of pigmentation observed in area treated with cryotherapy may be attributed to inadequate dosage of cryo agent as the results of this therapy cannot be viewed immediately. The tissue biotype (thickness of gingiva) may be an important factor in the recurrence of the pigmentation. Scalpel de-epithelialization is relatively simple and effective, and most economical of all the other techniques available. It does not require any sophisticated armamentarium, is easy to perform and, most importantly, requires minimum time and effort¹⁴. Electrosurgery requires more expertise than the techniques mentioned above. Prolonged or repeated application of current to the tissues induces heat accumulation and undesired tissue destruction¹⁵. Contact of electric current with the periosteum and vital teeth should be avoided¹⁰. Hence, it is to be used in light brushing strokes and the tip has to be kept moving. Lasers combine the advantages of rapid healing of the scalpel surgery and the minimal bleeding of electrosurgery. Easy handling, short treatment time, hemostasis, sterilization effects and excellent coagulation (small vessels and lymphatics) are its known advantages. However, laser surgery does have some disadvantages. Delayed type of inflammatory reaction may occur with mild post-operative discomfort lasting up to 1–2 weeks. Epithelial regeneration (re-epithelialization) is delayed (lack of wound contraction) as compared to conventional surgery. Moreover, expensive and sophisticated equipment makes the treatment relatively more expensive¹⁶. Another disadvantage is loss of tactile feedback while using lasers. Perlmutter and Tal⁴ have reported that no permanent results are seen with gingival surgical procedures performed solely for cosmetic reasons.

Conclusion:-

Growing esthetic concerns require the removal of unsightly pigmented gingival areas to create a pleasant and confident smile, which altogether may alter the personality of an individual. This could be easily attained by using any of the above mentioned methods. The choice of the management option should be tailored according to the individual circumstances, clinician expertise and equipment availability. Subjects should be clearly informed about pros and cons of each treatment option available along with recurrence potential of gingival hyperpigmentation. More data is required on comparative techniques to ensure the long-term predictability and success.

Conflict of interests

There are no conflicts of interest related to this article.

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