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AN INSIGHT INTO DIFFERENT TECHNIQUES FOR GINGIVAL DEPIGMENTATION: A CASE SERIES

Periodontology

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ABSTRACT

Aim: To evaluate the results of different treatment modalities of gingival pigmentation. **Materials and Methodology:** In present case series depigmentation was done using four different techniques -Scalpel technique, Diode Laser, Electro surgery and Cryosurgery and the results were noted for each treatment modality at the end of 1 week. **Conclusion:** All four techniques showed difference in healing, time taken for completion of treatment, patient perception and post-operative discomfort. Laser was considered to be the most accepted form of treatment. When aesthetics is a concern, depigmentation is not a clinical indication, but more of a treatment of choice. Also time taken for completion of treatment, patient perception and post-operative discomfort are important points that need to be taken into consideration while choosing any treatment.

KEYWORDS

Depigmentation, Scalper, Laser, Electro cautery, Cryosurgery.

INTRODUCTION

Aesthetics is any particular detail which makes something/someone appealing to the eye. It's an important attribute of an individual which has huge impact on psychological state. Aesthetic/Cosmetic dentistry combines both the patient's needs, beauty and function into one to provide best treatment and utmost patient satisfaction.

Oral melanin pigmentation is a multifactorial condition that can be either physiological or pathological [1]. Melanin is a naturally occurring brown pigment causing endogenous pigmentation of gingiva. It's derived from melanocytes, present in basal and spinous layer [2]. These cells are dendritic in nature and originate from neuroectoderm. It's a non-haemoglobin derived pigment.

The melanin pigments play a role in photo protection from Ultraviolet (UV) rays. It's seen in gingiva 3 hours after birth [3]. The distribution of melanin pigmentation and its intensity varies from person to person depending on hormones, UV radiation, activity of melanocytes or the genetic constitution of an individual [4]. In 1971 Dummett–Gupta gave the oral pigmentation index (DOPI) classifying gingival pigmentation based on colour of gingiva. **(Table 1)**

Table 1: Dummett and Gupta's Oral pigmentation index

DOPI INDEX 1971	
SCORE	*CHARACTERISTICS*
1	No clinical pigmentation (pink gingiva)
2	Mild clinical pigmentation (mild light brown colour)
3	Moderate clinical pigmentation (medium brown or mixed pink and brown)
4	Heavy clinical pigmentation (deep brown or bluish black).

Various treatment modalities are available for treatment of gingival pigmentation like chemical agents, scalpel technique, bur abrasion, electro surgery, LASER, cryosurgery, free gingival graft and acellular dermal matrix allograft. The present case series describes four simple and effective surgical depigmentation techniques – Conventional scalpel technique, Electro surgery, Lasers and Cryosurgery.

Case Reports

Case 1: Scalpel Technique

A 25-year-old male patient complaining of discoloration of gums visited the OPD. On examination, DOPI score was 3 **(Fig.1-a)**. After Scaling and root planning (SRP) local anesthesia (LA) was administered by infiltration method. A no. 15 Bard parker (BP) blade was used and the pigmented epithelial layer was scrapped off till the mucogingival junction, leaving the underlying connective tissue intact. Minor post-operative discomfort was seen and healing was uneventful. One week post-operative examination showed epithelized gingiva which was pink in colour **(Fig.1-b)**.

Case 2: Laser Technique

A 27-year-old male patient complaining of heavily pigmented gums visited the OPD with a request for aesthetic treatment of black gums. On examination, the DOPI score was 4 **(Fig.1-c)**. A Diode Laser was used and patient and clinician wore protective glasses provided by Manufacturer. After administration of LA, ablation was carried out using hand piece with fiber optic filament, 320 µm in diameter set at 0.8 W in contact mode, in cervico-apical direction on all pigmented areas. The ablated wound healed completely in 1 week and gingiva was generalized pink in colour and healthy in appearance **(Fig.1-d)**.

Case 3: Electrosurgery Technique

A 23 year old male patient visited OPD with the chief complaint of black gums. The DOPI score was 4 **(Fig.1-e)**. After administration of LA a loop electrode was used with light brushing strokes and the operator made sure that the tip was in motion at all times, in order to avoid excessive build-up of heat. After 1 week pigmentation was absent in newly formed epithelium, and gingiva appeared pale pink in colour **(Fig.1-f)**.

Case 4: Cryosurgery Technique

A 29 year old male patient visited the OPD with the chief complaint of black gums. The DOPI score was 3 **(Fig.1-g)**. After administration of LA, liquid nitrogen (-75 °C) was used as the cryogen. It was applied using an applicator. After 1 week there was uneventful healing, with absence of pigmentation on newly formed epithelium and gingiva appeared pale pink in colour **(Fig.1-h)**.

In all four techniques, the area was covered using periodontal dressing (Coe-Pak) for 1 week, for protection of surgical site and patient comfort. Analgesics (Ibuprofen 400mg) was prescribed to patient for 3 days, post-operative instructions were given and patient was recalled after 1 week.

Figure 1: Pre and post op pictures of various techniques (a) and (b) Scalpel technique; (c) and (d) LASER technique; (e) and (f) Electrosurgery technique; (g) and (h) Cryosurgery technique

DISCUSSION

Pigmentation of gingiva gives rise to aesthetic concerns in patients which make them seek aesthetic/cosmetic treatment. Many treatment modalities have been advocated and presented over the years which range from simple scalpel method to more sophisticated methods like LASER [7].

In present case series, four techniques were selected for depigmentation. Post-operative wound healing, time taken for completion of treatment, patient perception and post-operative discomfort were evaluated.

Depigmentation with scalpel is a simple, non-invasive, easy to perform and cost effective treatment modality. Almas and Sadiq (2002) [6] showed that scalpel wounds healed comparatively faster. Drawback includes excessive bleeding and more patient discomfort both during and surgery and post operatively. [8]

In depigmentation with Diode LASER radiation energy is transformed into ablation energy causing rupture of melanocytes in basal and suprabasal layers of gingival epithelium and homogeneous ablation of epithelial cells and rete pegs. They have high affinity to penetrate into haemoglobin and melanin pigments, which makes it a preferred treatment modality for depigmentation of gingiva. According to Atsawasuwan and Greethong (1999) [9] laser beam produces bloodless field for surgery, causes minimum damage to the periosteum and underlying bone. Advantages include shorter treatment time, no periodontal dressing, shorter healing period, very slight pain or no pain, no hemorrhage, hemostasis and decontamination and sterilization effects. The limitation is that the cost of the Laser unit is on the higher end and hence acquiring it is not cost effective.

In electrosurgical technique, heat is generated by transmission of high-frequency electrical energy to tissues leading to coagulation or cutting. The "Exploding cell theory" by Oringer in 1975 [10] stated that electrical energy produced caused molecular disintegration of melanin cells present in basal and suprabasal layer at operated and the surrounding. Hence it plays a strong role in retardation of migration of melanin cells.

Bleeding control, tissue contouring and less scar tissue formation favor the use of this technique for gingival depigmentation. But patient discomfort during the initial healing period is a drawback along with need for clinical expertise.

Prolonged or repeated application can lead to accumulation of heat and undesired tissue destruction in that area. Contact of electrosurgical tip to teeth, periosteum or alveolar bone, can cause damage. [11, 12]

Cryosurgery involves application of cryogens, like liquid nitrogen, at very low temperatures (-75 °C). This causes epithelium of gingival tissue to undergo cryonecrosis which eliminates gingival pigmentation. It is inexpensive with rapid healing, long-term superior aesthetic results and low recurrence rate. Advantages include no bleeding, pain or scar formation, no anesthesia, ease of application at marginal and papillary areas, and requirement of simple instruments. Disadvantages include difficulty in controlling the depth of penetration and post-operative swelling. [13, 14] The comparison of all four techniques is given in the table below **(Table 2)**

Table 2: Comparison of different techniques of depigmentation

PARAMETERS	CASE 1 Scalpel surgery	CASE 2 Electro surgery	CASE 3 Laser surgery	CASE 4 Cryosurgery
Instrumentation	BP handle and Blade	Electrosurgical unit and loop electrode	Laser unit	Cryogen-Liquid nitrogen (-75 C)
Bleeding during procedure	Moderate	Mild	None	None
Patient comfort	Fair	Good	Good	Good
Cost	Low	Moderate	High	Moderate
Post-operative healing (after 1 week)	Fair	Good	Good	Good
Immediate Post-operative pain	More	Less	Less	Less
Post-operative aesthetics and patient satisfaction	Good	Good	Excellent	Fair
Treatment time	More	Less	Very Less	Very Less

CONCLUSION

The growth in awareness regarding aesthetics and aesthetic concern, has led to development of new treatment modalities for removal of pigmented areas of gingiva to create an aesthetically pleasing and confident smile which plays a role in altering the personality of an individual.

Desired results with good patient satisfaction is ultimately the goal of any therapy. When comparing these four treatment modalities, results showed that scalpel technique was more time consuming as compared to other techniques but most cost effective. Electrosurgery, Laser and Cryosurgery resulted in better patient perception and less post-operative pain. Patient satisfaction and post-operative esthetics were best with Laser Surgery.

Hence Laser Surgery resulted in better patient perception, less post-operative discomfort and pain as compared to other techniques. Also patient satisfaction and post-operative esthetics were best with Laser Surgery and hence it can be chosen as an effective treatment modality for gingival pigmentation.

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