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Review Article

**TREATMENT OF GINGIVAL HYPERPIGMENTATION USING
SCALPEL BLADE AND DIODE LASER TECHNIQUES:
A REVIEW**¹Aziz Aloufi¹College of Dentistry, Qassim University, Buraydah city, Saudi Arabia, E-mail:
aziz1415aziz@gmail.com**Abstract:**

Introduction: an attractive smile is determined by the form, color shade and teeth alignment in the dental arch as well as the gingiva. The normal color of gingiva is pale pink, but part of the population has a dark shade of the gingiva, this dark color shade is caused by an excessive melanin deposition by the melanocytes mainly present in the basal and suprabasal cell layers of the epithelium. The aim of this review to evaluate two different methods of gingival depigmentation "Diode laser and scalpel blade" in terms of post-operative pain, healing, patient's satisfaction and recurrence of pigmentation.

Methodology: An electronic search was carried out in PubMed database and google scholar for related studies published from 2009 to 2015 using the following keywords: "gingival hyperpigmentation" and "gingival depigmentation" and "scalpel blade" and "diode laser".

Results: 11 studies were yielded from the searching in the literature, 4 of them were excluded according to the criteria mentioned above. Only studies that compared diode laser to scalpel blade depigmentation were evaluated in this review.

Conclusion: Taking into consideration the excellent outcome, patient satisfaction and efficiency of the procedure, the diode laser is an excellent alternative technique of gingival depigmentation. Clinical trials with large sample sizes are needed for reliable results.

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INTRODUCTION:

Attractive smile is determined by the form, color shade and teeth alignment in the dental arch as well as the gingiva. Gingival mucosa is the most pigmented tissue among the different oral mucosa. Gingival color is determined by multiple factors such as epithelium thickness, rate of gingival keratinization and the amount of pigments present in the gingival tissue.

The normal color of gingiva is pale pink, but part of the population has a dark shade of the gingiva, this dark color shade is caused by an excessive melanin deposition by the melanocytes mainly present in the basal and suprabasal cell layers of the epithelium. [1] There are two types of gingival hyperpigmentation, physiologic and pathologic. Physiologic hyperpigmentation is seen in some of the population with all racial groups, but more common in the dark skinned people. This type of hyperpigmentation is attributed to genetics. [2]

Melanin hyperpigmentation of the gingiva is completely benign and does not cause any medical problem. However, complaints of “black gums” are very common, especially in patients showing a very high smile line (gummy smile).

Gingival depigmentation is a periodontal plastic procedure in which the hyper pigmented gingiva is removed or reduced by several methods such as: scalpel blade technique, electro surgery, cryosurgery, bur abrasion and laser therapy. Selecting any of these techniques is depending on clinical experience and personal preference of the clinicians. [3]

The aim of this review to evaluate two different methods of gingival depigmentation “Diode laser and scalpel blade” in terms of post-operative pain, healing, patient’s satisfaction and recurrence of pigmentation.

METHODS:

An electronic search was carried out in PubMed database and google scholar for related studies published from 2009 to 2015 using the following keywords: “gingival hyperpigmentation” and “gingival depigmentation” and “scalpel blade” and “diode laser”.

Titles and abstracts of the studies yielded from the researching in the databases were assessed, and further evaluation was obtained through reviewing the full text of the studies that fulfilled the criteria. The inclusion criteria based on in this review were

case reports and clinical studies that met the following:

The patients included in the study must be affected by normal physiologic gingival hyperpigmentation, not due to any systemic disease. Known follow up periods must be determined precisely, and any information regarding re-pigmentation must be reported accurately. The exclusion criteria were:

- Patients with gingival hyper-pigmentation secondary to a systemic disease or related to a certain medication.
- Studies compared other types of lasers “rather than diode” to scalpel blade technique.

RESULTS:

11 studies were yielded from the searching in the literature, 4 of them were excluded according to the criteria mentioned above. Only studies that compared diode laser to scalpel blade depigmentation were evaluated in this review. The evaluation has done based on post-operative pain, healing, patient’s satisfaction and recurrence of pigmentation.

Grover, et al. [4] investigated and compared the response of the patient and the duration of the recurrence using laser and scalpel technique in a sample of 20 patients, 11 male and 9 female, within the age range of 15-30 years. The study evaluated the two depigmentation methods using split mouth technique, right anterior segment was the scalpel procedure and the left was the diode laser. The laser group reported less pain perception than scalpel group but no statistical significance was found. The study showed no significant difference of the healing process between the two methods, both procedures healed uneventfully after 30 days and restored the normal features with no scar formation. Out of 20, 11 patients “4 laser and 7 scalpel” observed with patchy recurrence at the end of 3 months.

Butchibabu, et al. [3] studied the difference between the two procedures in 8 patients, 4 males and 4 females. The patients were divided into 2 groups, 2 males and 2 females for each group. The patients were followed up at the 1st, 3rd, and the 7th day to assess the postoperative pain. The study revealed a significant difference in the pain levels between the two groups during the intraoperative and on the 3rd postoperative day, the scalpel group experienced more pain compared to the diode laser group. There was no significant difference in pain levels during the first 24 hours and the 7th day postoperatively. All the two groups healed uneventfully after one week. No recurrence reported after a 6 month follow up.

Shah, et al. [5] applied the two procedures using split mouth approach on a 19 years old female. The case report revealed uneventful healing on both sides after one week. This particular case reported more pain experience in the laser procedure side. No signs of recurrence were noticed after 1 year follow up.

Bhardwaj, et al. [6] evaluated and compared between the laser diode and scalpel blade using the split mouth technique on a 21 years old female. The patient did not report any pain on the laser treated side. There was a little discomfort but not pain on the scalpel side. Complete healing was observed after 1 week on both sides. No recurrence was reported at the end of the second month of the follow up period. Three patients were described by Lagdive, et al. [7] with age range from 22 to 30 years old. All the patients were treated by diode laser on the right side and scalpel blade on the left side. The diode laser procedure side showed a delayed healing compared to the scalpel side. 2 patients reported moderate pain and 1 patient reported severe pain on the scalpel side. Sides treated with laser reported slight or no pain.

Murphy, et al. [8] evaluated the results of two patients were treated by diode laser and scalpel blade. The study reported a delayed healing in the patient treated by laser compared to the scalpel blade. The scalpel treated patient complained of a moderate pain which reduced completely 1 week after the surgery. In contrast, there was a slight or no pain experience in the diode laser. There was no evidence of recurrence in both procedures at the end of 3 months.

The effectiveness of the diode laser and scalpel blade was described on a 22 years old female patient by Mani, et al. [9] Scalpel blade was carried out for the upper pigmented gingival and diode laser for the lower. A delayed healing was observed in the diode laser and less pain was described by the patient compared to scalpel blade. Unlike the scalpel region, No recurrence was reported on the laser treated region at the end of 3 months follow up.

DISCUSSION:

Scalpel blade procedure is considered as one of the first and most accepted procedures in gingival depigmentation. The procedure requires surgical removal of the epithelium and a layer of connective tissue beneath it, and then allowing healing by secondary intention. The new epithelium that forms after healing is without melanin pigmentation. [5]

On the other side, diode laser has been considered recently as one of the most effective procedures in gingival depigmentation. The diode is emitted in

continuous wave mode. Laser light from 800 to 980 nm is poorly absorbent in water but highly absorbed in the melanin and other pigments. Another advantage of diode laser is the less harmful to the dental hard tissues and less penetration, which make it an excellent choice over scalpel blade and the rest of used laser techniques such as Nd: YAG laser. [7]

All the studies mentioned above reported excessive bleeding during the scalpel surgery procedure, unlike the diode laser which has a good hemostasis effect resulting from sealed blood vessels of smaller diameter in the ablated tissues. [3] On the other hand, Delayed healing during the laser technique was reported in most of the studies.

Diode laser has a superior effect on the patient satisfaction as it is almost painless compared to scalpel blade which reported responses ranging from moderated to severe pain experience. The less pain experienced in diode laser is attributed to protein coagulum formed on the wound surface which seal the ends of the sensory nerves and act as a biological wound dressing. [3]

Although follow up periods were relatively short term follow ups, recurrence of pigmentation was highly variable among the studies above. Long term follow up period is recommended to accurately evaluate the recurrence. The mechanism of recurrence is not clear. According to the migration theory, states that the melanocytes migrate from the adjacent pigmented tissues to the treated areas, which cause repigmentation. [3]

CONCLUSION:

The revolution of lasers has changed the face of dentistry and the same for the field of periodontics. With their ease of use, good efficiency and minimal postoperative pain and discomfort, lasers have proved their role in periodontal therapy and simplified the difficult procedures.

Taking into consideration the excellent outcome, patient satisfaction and efficiency of the procedure, the diode laser is an excellent alternative technique of gingival depigmentation.

For the future studies discussing this subject, more sample size and clinical trials are required to obtain reliable results. Moreover, long term follow up periods are recommended for accurate evaluation.

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