



Evaluation the rate of recurrence of gingival pigmentation removed by cryotherapy and electrosurgery for 6 months



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Abstract:

Aim or Purpose: The aim of this study is evaluation of the recurrence rate of gingival pigmentation removed by cryotherapy and electrosurgery in physiologic gingival depigmentation, according to Dummett-Gupta Oral Pigmentation Index.

Materials and methods: I- Patient selection: ten patients were selected from the outpatient's clinic of Oral Medicine, Periodontology, Diagnosis and Oral Radiology Department, Faculty of Dentistry- Mansoura University. Inclusion criteria: Patients with physiological gingival pigmentation with healthy gingival condition, the age range from 18-30 years old. Exclusion criteria: Patients with systemic diseases, smokers, pregnant women and patients taking any immunosuppression drugs.

II- Study design: standard photographs and complete medical and dental history were recorded pre-operatively. We divided the anterior segment into right and left parts, one segment was treated randomly by cryosurgery and the other by electrosurgery. The pigmented area was assessed and compared pre-operatively and 3-6 months post operatively according to Dummett-Gupta Oral Pigmentation Index (DOPI).

Results:

In electrosurgery group, significance differences were found when comparing the preoperative score of DOPI versus both after 3 and 6 months. While no significance difference was found when comparing between the DOPI at 3 months and 6 months. Concerning cryosurgery group significance differences were found when comparing the preoperative score of DOPI versus both after 3 and 6 months, while no significance difference was found when comparing between DOPI at 3 months and 6 months. Mild degree of pigmentation occurred in 2 cases in both groups which was not esthetically significant.

Conclusions: Electro-surgery and cryosurgery techniques were helpful for removal of gingival pigmentation with no recurrence significance for 6 months observation.

Clinical Significance: There was no significant difference in recurrence between cryotherapy and electro-surgery groups.

Keywords: Cryosurgery, DOPI, Electro-surgery, physiologic gingival depigmentation, liquid nitrogen.

Introduction

Gingiva appearance and health considered to be the vital measures of a smile ⁽¹⁾. Gingiva coloring is several amongst dissimilar persons and this one is supposed to be related with pigmentation of the cutaneous, it differs from light to black or dark brown ⁽²⁾. The nature of skin, color and texture vary in several races and regions ⁽³⁾.

Pigmentation of the gingiva is a gingiva staining due to a diversity of conditions and lesions related to numerous exogenous and endogenous **etiologic** types ⁽⁴⁾. It might vary from signs of systemic illnesses (e.g. Addison's disease) to malignant neoplasms (e.g. melanoma and Kaposi's sarcoma) to physiologic causes (e.g. racial pigmentation). It is necessary to appreciate the reason of pigmentation of mucosa beforehand preparation the treatment method of such like these lesions ⁽⁵⁾. Pigmentation of melanin can treated by numerous means that contain chemical methods using alcohol, ascorbic acid, phenol and surgical methods of depigmentation such as gingival abrasion method ⁽⁶⁾, split thickness epithelial excision ⁽⁷⁾.

Electro-surgery treatment was supposed to be enhanced organized for the reason that less pressure was wanted to split

tissue. The procedure was demanded to be much less hemorrhagic because of simultaneous coagulation of blood vessels. No variances in clinical wound healing were detected ⁽⁸⁾.

The greater effectiveness of electro-surgery could be clarified based on "exploding cell theory ⁽⁹⁾." According to the model, it is expected that the electrical energy leads to molecular disintegration of melanin cells present in basal and supra-basal cell layers of operated and surrounding sites. Therefore, electro-surgery has a strong effect in retarding migration of melanin cells from the locally situated cells, which were noticed clinically to be detached.

In latest years, cryosurgery, a real technique of tissue damage by freezing, is achievement significance as a therapeutic technique ⁽³⁾. Cryosurgical applications suggestion a simple, economically possible technique for the reason that they are somewhat inexpensive, easy to handle and do not need the strict procedure as essential for laser application ⁽¹⁰⁾. Cryotherapy is a technique depends on a rapid freezing for tissue destruction. The cytoplasm freezes of the cell, as a result of freezing, cell death due to denaturation of proteins.

This method does not need to use of local anesthesia, less bleeding, comparatively a painless procedure, with a relative

lack of scarring ; this procedure does not even need a periodontal dressing and has been revealed to produce excellent results ^(11,12,13).

Consequently based on these topics, in this research, it was scheduled to evaluation of the recurrence rate of gingival pigmentation removed by cryotherapy and electrosurgery.

MATERIALS AND METHODS:

I-Patient selection:

Ten patients were selected from the outpatient's clinic of Oral Medicine, Periodontology, Diagnosis and Oral Radiology Department, Faculty of Dentistry- Mansoura University.

Study design

Standard photographs and complete medical and dental history were recorded pre-operatively. We divided the anterior segment into right and left parts, one segment was randomly treated via electrosurgery and the other by cryosurgery. The area of pigmentation was assessed according to Dummett-Gupta Oral Pigmentation Index (DOPI) ⁽¹⁴⁾ and compared pre operatively and 3-6 months post operatively.

II-Clinical Procedure

A) Pre-surgical Therapy: The initial preparatory phase consisted of implementation of specific oral hygiene regime along with scaling and polishing. Following phase-I therapy and achievement of satisfied oral hygiene, written informed consent was signed by all subjects with bilateral gingival melanin pigmentation participating in this study. The selected (maxillary right anterior and maxillary left anterior) sites were assigned randomly (by using a coin-toss randomization) into Cryosurgery group and Electrosurgery group. After the evaluation of phase-I therapy the following clinical parameters were recorded

Procedure: An intraoral antiseptis was ensured with a pre-procedural rinse of 0.2% chlorhexidine gluconate. In the first step, surgical site was isolated using suction and cotton rolls; then melanin pigmented areas were dried by air spray.

Local anesthesia was not required in the cryosurgery site since the removal of pigmented tissue was by deep-freezing method. Normal saline was applied to gingiva. Nitrous oxide (with the temperature of -75°C) was applied using cryosurgery probe.

Tissue was frozen for three cycles of 20 seconds & then, surgical areas were debrided with tongue depressor .All clinical parameters were recorded.

Electrosurgery Technique: In form of infiltration at the site to be treated by electrosurgery device *, local anesthetic solution was administered. Remnants of ablated tissue were removed using sterile gauze dampened with saline.

B) Postoperative care

Oral hygiene was maintained by using chlorhexidine solution for 1 minute twice a day for 7 days.

RESULTS:

Out of 10 patients, 6 were females and 4 were males with age ranging from 18 to 30 years (mean age 21.5 ± 3.5). Dummett-Gupta Oral Pigmentation Index scoring was compared between both techniques. Regarding DOPI, in electrosurgery group. Significance differences were found

when comparing the preoperative score of DOPI versus both after 3 months and 6 months. While no significance difference was found when comparing between the DOPI at

3 and 6 months. Concerning cryosurgery group significance differences were found when comparing the preoperative score of DOPI versus both after 3 months and that at 6 months, while no significance difference was found when comparing between DOPI at 3 and 6 months.

When comparing both electrosurgery and cryotherapy, there was no significance difference between both techniques (Table1). Examples of the pictures taken before and one month after depigmentation procedure are illustrated in (Figure 1).

* Surtron diathermy 50D, Surton Company, Made in Italy.

** Brymill's Cry-Ac hand-held devices, Brymill Company, made in USA.

DISCUSSION:

The patient's smile window is directly hampered and it's recognized that physiologic gingival melanin pigmentation is not a medical problem; however patients may complain of unesthetic "black gums". People nowadays are getting more aware of the esthetics and that has given rise to the dawn of various treatment modalities for the management of gingival hyperpigmentation. In the present study, we have tried to compare cryosurgery technique with electrosurgery technique. Electro-surgery methods have been used for many years to prepare sulcular tissue for restorative impressions. Advantages over conventional techniques of tissue preparation had been definite by early advocates of electrosurgery in dentistry ⁽¹⁵⁾. The use of cryosurgery has been incorporated for the treatment of a wide range of lesions in the oral and maxillofacial region. Several researches have been done in the latter half of the previous century. Cold temperatures have beneficial analgesic along with anti-inflammatory effects ⁽¹⁶⁾. The present study focused on evaluation of the recurrence rate of gingival pigmentation removed by cryotherapy and electrosurgery. Ten patients with physiologic gingival pigmentation were selected. Regarding DOPI, in electrosurgery group, significance differences were found when comparing the preoperative score of DOPI versus both after 3 and 6 months. While no significance difference was found when comparing between the DOPI at 3 months and 6 months. This is in agreement with Elavarasu *et al* (2015) ⁽¹⁷⁾ who made a comparative evaluation of depigmentation techniques in split-mouth design with electrosurgery and laser, in regarding to electrosurgery group after patient evaluation for 3 months they found healthy pink gingiva with no repigmentation. Concerning cryosurgery group significance differences were found when comparing the preoperative score of DOPI versus both after 3 and 6 months, while no significance difference was found when comparing between DOPI at 3 months and 6 months. This is in agreement with Yeh (1998) ⁽¹⁸⁾ who made cryosurgical treatment for 12 participants by direct application for 20 to 30 seconds of liquid nitrogen with a cotton swab, within 1 to 2 weeks after 1 or 2 cryosurgical

treatments the treated gingiva appeared normal, the treatment acceptance was excellent. No significance difference was found when comparing both electrosurgery

and cryotherapy groups for 6 months, this in agreement with Pathak and Waghmode (2017)⁽¹⁹⁾ they compare DOPI in

electrosurgery and cryosurgery depigmentation and found no clinical significance between both techniques.

CONCLUSIONS:

Comparing these two treatment modalities, there was no significant difference in physiologic gingival depigmentation; Electro-surgery and cryotherapy techniques were helpful for removal of gingival pigmentation with no recurrence significance for 6 months observation.

References

1. Verma S, Gohil M, Rathwa V: *Gingival depigmentation. Indian J Clin Pract.* 2013; 23: 801-03..
2. Prabhuji M, Madhupreetha S, Archana V: *Treatment of gingival hyperpigmentation for aesthetic purposes using the diode laser. Laser.*2011; 2: 18-19.
3. Kumar S, Bhat S, Bhat M. *Comparative evaluation of gingival depigmentation using tetrafluoroethane cryosurgery and gingival abrasion technique: two years follow up. J Clin Diagnostic Res.* 2013; 7: 38994.
4. *Pigmented lesions of the oral cavity. review, differential diagnosis of case presentation. J Can Dent Assoc.* 2004;70: 682-83.
5. Jonathan AS, Martin SG, Michael G (Eds.): *Burket's oral medicine: pigmented lesions of the oral mucosa (tenth ed.), BC Decker Inc, Hamilton Ontario (2003).*
6. Shimada Y, Tai H, Tanaka A, Ikezawa-Suzuki I, Takagi K, et al: *Effects of ascorbic acid on gingival melanin pigmentation in vitro and in vivo. J Periodontol.* 2009; 80:317-23.
7. Dummett CO, Bolden TE. *Post surgical clinical repigmentation of the gingiva. Oral Surg Oral Med Oral Pathol.* 1963;16:353-65.
8. Kenneth L. and Kalkwarf: *Healing of electrosurgical incisions in gingiva: Early histologic observations in adult men. J Prosthet Dent.* 1981; 86(6):662-72.
9. Oringer MJ, editor: *Electrosurgery in Dentistry. 2nd ed. Philadelphia: W.B. Saunders Co; 1975*
10. Ahmed SK, George JP, Prabhuji ML: *Cryosurgical treatment of gingival melanin pigmentation - A 30-month follow-up case report. Clinic Adv Periodontics .*2012; 2: 73-8.
11. Deepak P, Sunil S, Mishra R, Sheshadri: *Treatment of gingival pigmentation: A case series. Indian J Dent Res.* 2005; 16:171–76.
12. Tal H, Landsberg J, Koztovsky A: *Cryosurgical depigmentation of the gingiva: A case report. J Clin Periodontol.* 1987;14:614–17.
13. Yu CH, Chen HM, Chang CC, Hung HY, Hsiao CK, et al.: *Cotton-swab cryotherapy for oral leukoplakia. Head Neck.* 2009; 31:983–88.
14. Malkoc S, Buyukyilmaz T, Gelgor I and Gursel M: *Comparison of two different gingivectomy techniques for gingival cleft treatment. Angle Orthod.* 2004; 74(3): 375-380.
15. Morley J. *The role of cosmetic dentistry in restoring a youthful appearance. J Am Dent Assoc.* 1999; 130:116672.
16. Leopard PJ and Poswillo DE. *Practical cryosurgery for oral lesions. Br Dent J .*1974;136:185-96.
17. Elavarasu S, Thangavelu A, Alex S. *Comparative evaluation of depigmentation techniques in split-mouth design with electrocautery and laser. J Pharm Bioall Sci.* 2015;7: 786-90.
18. Yeh C: *Cryosurgical treatment of melanin-pigmented gingiva. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology.* 1999 ;86:660-3.
- 19 Pathak KH and Waghmode VR: *Comparative evaluation of cryosurgery and electrosurgery in gingival pigmentation, Intern J of Peri and Implant,* 2017; 2(1):8-1

Table (1):

Comparison between electrosurgery and cryosurgery according to Dumet-Gupta oral pigmentation index

Dumet-Gupta oral pigmentation index	Pre-operatively	After 3 months	After 6 months
Electrosurgery (n = 10)			
Median (Min. – Max.)	2.0(1.0 – 3.0)	0.0(0.0 – 0.0)	0.0(0.0 – 1.0)
Sig. between each two groups (electro)	p ₁ <0.001*, p ₂ =0.002*, p ₃ =0.655		
Cryosurgery (n = 10)			
Median (Min. – Max.)	2.0(1.0 – 3.0)	0.0(0.0 – 0.0)	0.0(0.0 – 1.0)
Sig. between each two groups (cryo)	p ₁ <0.001*, p ₂ =0.002*, p ₃ =0.655		
Sig. between electro and cryo at each time interval (p)	(1.000)	(1.000)	(1.000)



Figure (1): Before depigmentation procedure and 1week and 4 weeks after depig