



## Chemo Exfoliation (Ascorbic Acid) Technique of Gingival Melanin Depigmentation- A Case Report”

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### KEYWORDS

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### ABSTRACT:

**Introduction:** Gingival melanin hyper pigmentation is an perioaesthetics problem which concern many individuals. Gingival hyper pigmentation can be defined as a darker gingival colour beyond what is normally expected various surgical and non-surgical approaches have been reported for its management but most of them are associated with hazardous effects.

**Objective:** Evaluate the efficiency of vitamin C as a depigmenting agent in patients with physiologic gingival hyper pigmentation and assess its clinical effect on the patients' gingival health.

**Case Description:** Anterior gum region of both maxillary and mandibular arches were anesthetized topically by Lignocaine 15% w/w. Intra epidermal injection of vitamin C was repeated once per week until no visible pigmentation. The patients were recalled after 15 days, 1, 3 and 6 months after treatment for follow up. Dummet-Gupta Oral Pigmentation Index (DOPI) along with patient satisfaction using a 5 grade assessment scale by Huh and pain assessment using Visual Analog Scale was taken at baseline and at respective follow-ups.

**Result:** There is a decrease in pigmentation indices scores and reduction in the area with a significant difference between pre-operative visit and both injection as well as follow-up visits. Vitamin C showed effective depigmentation of gingiva after 6 months

**Conclusion:** Vitamin C injection is a safe, minimally invasive non-surgical depigmenting technique which improves health of gingival tissues.

### Introduction:

Perioaesthetics have become a major demand in dentistry now a day; treatment protocols should address both the functional and biological problems. It is necessary to establish harmony between white and pink. The macro anatomical feature of healthy gingiva is its pink colour which diverges into various shades depending on the thickness of the gingiva, the degree of vascularization, the degree of keratinization, reduction of haemoglobin, and the presence of melanocytic cells. [1] Gingival hyper pigmentation is caused by external or internal influences. It is maybe due to pathological or physiological factors, which cause the excessive deposition of melanin granules in melanocytes in the basal and suprabasal

layers of the epithelium. [2] Gingival hyper pigmentation can cause a cosmetic problem that may have an adverse psychological impact on patients, especially those with short lips and high smile lines. [3]

Many non- surgical approaches as well as surgical intervention have been suggested for the management of melanin hyperpigmentation including 90% phenol, 95% ethanol solutions, free gingival grafts, gingivectomy and de-epithelialization by bur abrasion, scalpel, laser and cryosurgery[4]. However ,most of these modalities cause harmful effects such as chemical burn, high incidence of repigmentation and relapse, prolonged healing, excessive pain, alveolar bone loss, difficulty to control depth of de-epithelialization[5]. New therapeutic modalities were



introduced after well understanding of regulation of melanogenic pathway .They can interfere with the melanogenesis and inhibit melanin production by acting on one or more steps. Linoleic acid, soy, licorice, methimazole, mulberry, niacinamide (vitamin B3) and vitamin Care examples of these agents.<sup>[6]</sup>

Vitamin C also known as Ascorbic acid is a water-soluble vitamin. It was initially discovered by Albert Szent-Györgyi in 1912. It was isolated by Walter Norman Haworth in 1928. It was the first vitamin to be produced chemically in 1933. In 1937, Dr. Albert Szent Goyrgi was awarded the Nobel Prize for his work in isolating the Vitamin C molecule from red peppers and identifying its role in Scurvy. <sup>[7]</sup> It plays significant functions in the body. It is essentially required for the growth and maintenance of healthy bones, teeth, gums, ligaments, and blood vessels.<sup>[8]</sup> vitamin C prevents the adhesion of melanocytes to the adjacent keratinocytes by scavenging the calcium and copper content, which are necessary for cellular binding. This failure of melanocytes to adhere to adjacent keratinocytes prevents the activation of melanocytes, thereby reducing the production of melanin.<sup>[9]</sup> Topical application of Vitamin C (concentration range of 1 - 20%) is essentially safe to use daily for long durations. Rarely, stinging, erythema, and dryness were observed, which could be easily treated using a moisturizer.<sup>[10]</sup> Different formulations were used for gingival depigmentation either in form of oral administration, topical application, intravenous injection, intraepithelial injection, creams, serum, and transdermal patches.<sup>[11]</sup>

#### Case Report:

A 22 year old female patient reported with the chief complaint of black-looking gums. Past dental history, medical history, and family history were non-significant. There was no reported allergy or hypersensitivity to any medications. Extra-oral & Intra-oral examination revealed no significant findings. Gingival examination revealed generalized mild melanin hyperpigmentation. Periodontal examination revealed a healthy periodontium.

#### Vitamin C Administration :

The procedure was explained to the patients and informed signed consent was obtained. Full mouth scaling and root planing was done. Patients were educated to maintain good oral hygiene. An intra-oral

clinical photograph was taken at baseline before the beginning of the procedure (Fig. 1). The area was anesthetized by a topical anesthetic agent (Lidocaine USP 15% w/w). About 0.1 – 0.2ml of Vitamin C was injected intraepithelial into the inter dental papilla concerning each tooth, using an insulin syringe (Fig. 2). The patients were recalled after 2weeks for evaluation. (Fig. 3) Vitamin C administration was repeated at 4weeks and then patient was recalled after 1month (Fig. 4), 3months (Fig. 5) and 6months (Fig.6) for follow up. **Composition of Vitamin C: each 1.5ml contains 150 mg of Vitamin C**



Fig.1: At Base line



Fig.2:Vitamin C administration



Fig. Fig.3: 2 weeks follow up



Fig.4: 1 month follow up



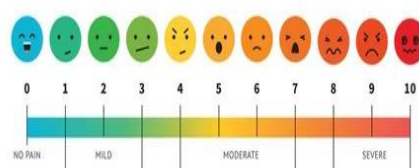
Fig.5: 3 months follow up



Fig.6: 6 months follow up

During and after the intra-epidermal injection, itching was the predominant unpleasant sensation which enforced the patient's desire to scratch. Its evaluation ranges between verbal questionnaire and severity assessment using visual analog scale (VAS) by Reich. [12]

The visual analogue scale (VAS) is divided into vertical and horizontal parts. The horizontal part (numerical) consists of 10 cm line with two end points represents "no pain" to "severe pain possible".



While the vertical scale (verbal) measured by 5 points (Table 1), patient satisfaction was performed by using a 5-graded self-assessment analysis (Table 2) given by Huh [13]

Table 1: Vertical scale (Verbal)

POINTS	ASSESSMENT
0	No itching
1	Mild itching
2	Moderate itching
3	Severe itching
4	Extremely severe itching

Table 2: 5- Graded self-assessment analysis

GRADES	ASSESSMENT	REMARKS
4	Excellent	Improved over 75%
3	Good	Improved 50-75%
2	Moderate	Improved 25-50%
1	Fair	Improved less than 25%
0	No change or Worse	Not improved or darkened



**Table 3:** Dummet- Gupta Oral Pigmentation Index (DOPI) Values<sup>[14]</sup>

	Values
Pre operative	3
15 days post operative	2
1 month post operative	2
3 months post operative	1
6 months post operative	1

**Table 4:** Visual Analog Scale( Vertical Part)

	Values
Pre operative	3
15 days post operative	2
1 month post operative	1
3 months post operative	0
6 months post operative	0

### Results:

The degree of gingival color, patient satisfaction, pain and itching score were measured.

**Table 5:** Visual Analog Scale (horizontal Part)

	Values
Pre operative	3
15 days post operative	3
1 month post operative	2
3 months post operative	1
6 months post operative	0

**Table 6:** Patient Satisfaction

	Values
Pre operative	0
15 days post operative	1
1 month post operative	1

3 months post operative	2
6 months post operative	3

### Discussion:

Recently, Vitamin C which is a potent antioxidant, has emerged as a new agent for depigmentation. Enzyme tyrosinase (Cu containing) is responsible for melanin production. Enzyme Tyrosine is converted to Dopaquinone with the help of an enzyme called Tyrosinase. A Series of chemical reactions convert this dopaquinone into melanin. There are few studies reported on the application of Vitamin C for the treatment of gingival melanin hyperpigmentation. Sheel V, Purwar P, Dixit J. and Rai P (2015)<sup>[15]</sup> evaluated the efficacy of Vitamin C as a gingival depigmenting agent after surgical scalpel depigmentation and reported satisfactory esthetic results throughout nine months of follow-up. Shimada Y (2009)<sup>[16]</sup> reported that ascorbic acid gel inhibited gingival melanin pigmentation in a split-mouth double-masked placebo-controlled trial. Intraepithelial injections were used on gingiva (Yussif NM 2016;<sup>[17]</sup> Esmat 2023<sup>[18]</sup>), which helps in the direct delivery of Vitamin C at the desired area. There was a statistically significant reduction in the pigmentation scores and surface area of pigmentation after four weeks. No recurrence of pigmentation was observed after three months. Injectable Vitamin C is a considerably effective, economic and minimally invasive technique of depigmentation especially in individuals with a thin gingival biotype.

Stages of color improvement during vitamin C injection:

1-Immediately following injection; the gingival tissues fainted and then darkening of the pigmented areas occurred.

2-Stage 1 (15 days): fainting of the whole color of the gingival tissue and the tissues became glossy and stretched. The areas of least pigmentation turned pink

3-Stage 2 (1 month): More fainting action appeared in relation to the whole gingival tissues and the pinkish color began to spread. A whitish coat covering the gingival tissues appeared clearly, which could be rubbed off easily using cotton. This coat resembled material Alba. On rubbing, the underlying tissues appeared totally healthy and intact.



4-Stage 3 (3 months): Further fainting with the pink color predominated. The gingival tissues became glossier and highly stippled.

5-Stage 4 (6 months): almost pinkish gingival tissue detected

Study done by Krutika 2024 used Dermapen to deliver Vitamin C to the affected area also revealed significant results.<sup>[19]</sup> The dermapen was used in intermittent motion on the sextant gingival area for 30-40 seconds/tooth. When bleeding pinpoints were observed on all areas of pigmented gingiva, the gingival mucosa was irrigated with a saline solution and sterile gauze was applied to dry the area. Then, topical AA powder (1000 mg/ml) was mixed with saline in a small glass dish forming a paste. The mixed slurry paste was applied to the gingival mucosa using for 10 minutes as and the treated area was left without dressing.<sup>[18]</sup> Application of Vitamin C as a non-surgical gingival depigmentation agent has some advantages; namely: non-surgical technique, minimally invasive, minimal bleeding, doesn't require placement of periodontal dressing, and doesn't require sophisticated instruments. However, it has few disadvantages; namely it's not effective in moderate to severe pigmentation, slow process of depigmentation, and needs multiple patient visits.

#### Conclusion:

Esthetic expectations have increased with time and nowadays patients are more concerned with gingival esthetics and smile designing. Gingival pigmentation especially on the labial aspect of anterior teeth has become an important component of esthetics. Vitamin C as a non-surgical gingival depigmentation agent was found to be effective in mild gingival melanin hyperpigmentation during a six months' follow-up period. Further long-term follow-up studies need to be conducted to assess the role of Vitamin C as a non-surgical gingival depigmentation agent.

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