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VITAMIN C AS A NON-SURGICAL GINGIVAL DEPIGMENTATION AGENT – CASE STUDY

Sanadi Rizwan M[1,2], Deshmukh Revati S[3]

1. PhD Student, Bharati Vidyapeeth Deemed to be University, Dental College & Hospital, Satara Road, Katraj, Dhankawadi, Pune – 411043

2. Professor, Department of Periodontics, Dr GD Pol Foundation's YMT Dental College, Kharghar, Sector – 4, Navi Mumbai – 410210

3. Professor & PhD Guide, Head of Department of Oral Pathology & Microbiology, Bharati Vidyapeeth Deemed to be University, Dental College & Hospital, Satara Road, Katraj, Dhankawadi, Pune – 411043

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Corresponding author*
Sanadi Rizwan M*

ABSTRACT

CASE REPORT

The teeth and gums (gingiva) are an important component of an aesthetic smile. Gingival melanin hyperpigmentation results in an unaesthetic smile, especially in individuals with gummy smile. Vitamin C is a water-soluble vitamin that is essential for the growth and maintenance of healthy bones, teeth, gums, ligaments, and blood vessels and is involved in important metabolic functions. It has been used for depigmentation of hyper pigmented spots on the skin. There is limited documentation on the use of Vitamin C as a depigmenting agent for gingival melanin hyperpigmentation. This article discusses the application of Vitamin C as non-surgical gingival depigmentation agent.

INTRODUCTION

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. [1] 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. [2]

Vitamin C (ascorbic acid) is synthesized by all plants and most animals. [3] It is an essential substance for humans, because the gene for gluconolactone oxidase, the terminal enzyme in the Vitamin C synthesis pathway has undergone a mutation that makes it non-functional in humans. [4] Thus, humans obtain it from diet and/or vitamin supplements. [5] It is an important nutrient for the biosynthesis of collagen, L-

carnitine, and the conversion of dopamine to norepinephrine. [6] It interacts with the copper ions at the tyrosinase active site and inhibits the action of the enzyme tyrosinase (the rate-limiting enzyme required for melanin biosynthesis), thereby reducing melanin formation. [7]

Vitamin C is used as a treatment modality in the depigmentation of hyperpigmented spots on the skin. Different formulations were used either in form of oral administration, topical application, intravenous injection, intraepithelial injection, creams, serum, and transdermal patches. It is an almost colorless weak acid and extremely unstable in an aqueous solution. On exposure to light, it gets oxidized to Dehydro Ascorbic Acid (DHAA), which imparts a yellow color. [8] 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. [9]

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) [10] 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, et al (2009) [11] 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, et al 2016; [6] Yussif NM, et al 2019 [12]), which helps in the direct delivery of Vitamin C at the desired area.

Case reports:

The present article discusses the application of Vitamin C as a non-surgical gingival depigmentation agent in two female patients aged eighteen years and twenty years respectively who 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.

Administration of Vitamin C: The entire 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 gingiva concerning each tooth, using an insulin syringe (Fig. 2). The patients were recalled after 2weeks for evaluation. Vitamin C administration was repeated at 4weeks and then monthly intervals for 6months. No adverse events were reported. Follow-up evaluation was done at 2weeks (Fig. 3), 1month (Fig. 4), 3months (Fig. 5) and 6months (Fig. 6).

Intra-oral clinical photographs of Case 1 and Case 2:

Case 1

Fig. 1

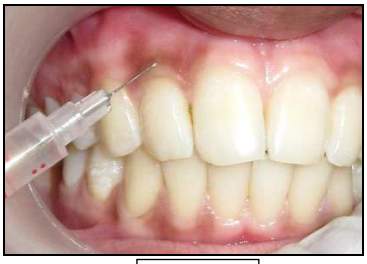

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Case 2

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Intra-oral clinical photographs

1. Fig. 1 - At Baseline
2. Fig. 2 - Vitamin C administration
3. Fig. 3 - Two weeks follow up
4. Fig. 4 - One month follow up
5. Fig. 5 - Three months follow up
6. Fig. 6 - Six months follow up

DISCUSSION

Melanin pigmentation is caused because of melanin deposition by melanocytes that are situated at the basal and suprabasal layers of the oral epithelium. Different treatment modalities have been used for the removal of pigmentation in the process of depigmentation (Pontes et al, 2006). [5] Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by different techniques namely: Scalpel technique (Conventional technique), Gingival Bur Abrasion technique, Diode Laser, Electro surgery, Cryosurgery and injection of Vitamin C. [13] The choice of a specific technique depends on numerous factors; namely: clinical experiences, gingival biotype/ periodontal phenotype, the extent of pigmentation, patient acceptability, affordability, satisfaction & preferences.

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.

We noticed that there was a reduction in the gingival melanin hyperpigmentation in both cases during a six months' follow-up period. Both the cases had mild gingival melanin hyperpigmentation and desired a non-surgical treatment for the same. Hence, Vitamin C was used as a non-surgical gingival depigmentation agent.

Vitamin C as a non-surgical gingival depigmentation agent was found to be effective in mild gingival melanin hyperpigmentation in the above two cases 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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