Case Report

Injectable Vitamin C and Conventional Scalpel Surgery in the Management of Physiologic Gingival Hyperpigmentation: A Report of Two Cases

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ABSTRACT

Background: Physiologic gingival hyperpigmentation is a common aesthetic concern caused by increased melanin deposition within the gingival epithelium. Although benign, excessive pigmentation may adversely affect smile aesthetics, prompting many patients to seek treatment. Both surgical and minimally invasive techniques have been proposed for gingival depigmentation, each with distinct advantages and limitations. **Case presentation:** This report presents two cases of physiologic gingival hyperpigmentation managed using different treatment approaches. A 21-year-old female underwent four weekly sessions of intramucosal injections of 10% vitamin C, while a 35-year-old male was treated with conventional scalpel depigmentation. Clinical outcomes were evaluated using the Dummett–Gupta Oral Pigmentation Index (DOPI), Gingival Pigmentation Index (GPI), and Visual Analog Scale (VAS). Standardized clinical photographs were recorded before treatment and during follow-up. **Results:** Injectable vitamin C resulted in gradual improvement in gingival pigmentation with no postoperative pain, whereas scalpel surgery achieved depigmentation with satisfactory healing after one week and only mild postoperative discomfort. **Conclusion:** Injectable vitamin C offers a minimally invasive alternative with excellent patient comfort, whereas the scalpel technique provides predictable and immediate aesthetic improvement. Both techniques may be considered effective treatment options when selected according to individual patient needs.

Key words: Gingival hyperpigmentation; Injectable vitamin C; Scalpel depigmentation; Gingival aesthetics; Dummett–Gupta Oral Pigmentation Index.

INTRODUCTION

The colour and appearance of the gingiva contribute significantly to smile esthetic and patient confidence. While healthy gingiva is generally described as coral pink, its colour varies among individuals depending on vascularity, epithelial thickness, degree of keratinization, and melanin pigmentation. Increased melanin production by melanocytes within the basal cell layer of the gingival epithelium results in physiologic gingival hyperpigmentation, a condition regarded as a normal racial or ethnic variation rather than a disease.[1,2]

Although physiologic pigmentation does not compromise periodontal health, excessive gingival discoloration may become an aesthetic concern, particularly in patients with a high smile line. Consequently, demand for cosmetic gingival depigmentation has increased substantially over the past decade.[3]

Numerous treatment modalities have been described for gingival depigmentation, including scalpel surgery, bur abrasion, electrosurgery, cryosurgery, lasers, and chemical agents. Among these, the conventional scalpel technique remains widely practiced because it is simple, costeffective, and capable of producing immediate clinical results. However, the procedure is associated with intraoperative bleeding, postoperative discomfort, and the need for periodontal dressing during healing.[4,5]

Recently, minimally invasive approaches such as injectable vitamin C have gained attention as alternatives to surgical treatment. Vitamin C acts as a potent antioxidant and inhibits melanin synthesis by reducing tyrosinase activity while simultaneously promoting collagen synthesis and tissue repair. Several clinical

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studies have reported favourable aesthetic outcomes with locally administered vitamin C, although repeated treatment sessions are generally required to achieve noticeable depigmentation.[4,6]

The present report describes two patients with physiologic gingival hyperpigmentation managed using injectable vitamin C and conventional scalpel depigmentation. The clinical outcomes of both approaches were compared with respect to pigmentation reduction, patient comfort, and early healing.

CLINICAL ASSESSMENT

A comprehensive clinical examination was performed before treatment in both patients.

Gingival pigmentation intensity was assessed using the Dummett–Gupta Oral Pigmentation Index (DOPI)[3,7] while the distribution of pigmentation was recorded using the Gingival Pigmentation Index (GPI).[6] Postoperative pain was evaluated using a 10-cm Visual Analog Scale (VAS),[8] where 0 represented no pain and 10 indicated the worst imaginable pain.[7]

Standardized intraoral photographs were obtained at baseline and follow-up visits under comparable lighting conditions using the same camera settings. Clinical photographs were documented to facilitate objective comparison of treatment outcomes during follow-up. Written informed consent was obtained from both patients before treatment and publication of clinical photographs.

CASE REPORT

Case 1: Gingival Depigmentation Using Injectable Vitamin C

A 21-year-old female presented to the Department of Periodontology with the chief complaint of blackish discoloration of her gums, which she found aesthetically unappealing. The pigmentation had been present for several years and was not associated with pain or any other symptoms. Her medical history was non-contributory, and there was no history of smoking or systemic illness.

Clinical examination revealed diffuse brown pigmentation involving the attached gingiva from the central incisors to the premolar region in both arches (Figure 1A). The gingival tissues were firm, healthy, and free from signs of inflammation. Based on clinical evaluation, the pigmentation was recorded as DOPI Grade 2 and GPI Score 2, indicating moderate physiologic gingival pigmentation.

After completion of Phase I periodontal therapy and reinforcement of oral hygiene measures, the patient opted for a minimally invasive treatment approach. Following topical anesthesia, 1.25 mL of 10% injectable vitamin C was administered intramucosally using a 30-gauge insulin syringe (Figure 1B). Multiple small-volume injections were placed at approximately 2–3 mm intervals throughout the pigmented gingiva until the involved area was adequately infiltrated (Figure 1C). The procedure was performed once weekly for four consecutive sessions.

No intraoperative or postoperative complications were observed. The patient reported no pain (VAS = 0) throughout the treatment period and tolerated all four sessions well.

Figure 1A: Preoperative clinical photograph showing moderate physiologic gingival pigmentation.

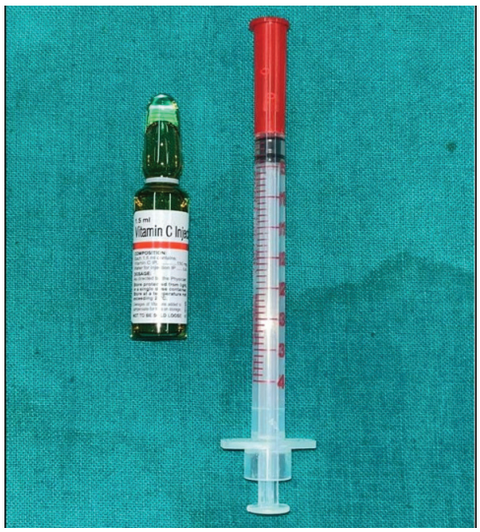

Figure 1B: Injectable 10% vitamin C and Insulin syringe used for intramucosal administration.

Clinical evaluation at the one-month follow-up demonstrated a mild but noticeable reduction in gingival pigmentation, with a more uniform gingival appearance compared with baseline (Figure 1D). The pigmentation score improved to DOPI Grade 1 and GPI Score 1. No evidence of recurrence or adverse tissue response was observed during the follow-up period, and the patient expressed satisfaction with the aesthetic improvement.

Figure 1C: Intramucosal administration of 10% injectable vitamin C using a 30-gauge insulin syringe.

Figure 1D: One-month postoperative photograph demonstrating mild reduction in gingival pigmentation following four sessions of injectable vitamin C therapy.

Case 2: Conventional Scalpel Surgical Depigmentation

A 35-year-old male presented with the complaint of dark-coloured gums that gave his teeth a dirty appearance while smiling. His medical history was non-contributory, and no contributing systemic or local factors were identified.

Clinical examination revealed diffuse physiologic melanin pigmentation extending from the central incisors to the premolars in both arches (Figure 2A). The gingiva was clinically healthy without signs of periodontal disease. The baseline pigmentation was recorded as DOPI Grade 3 and GPI Score 3, indicating severe and diffuse pigmentation.

Figure 2A: Preoperative clinical photograph showing diffuse physiologic gingival pigmentation.

Following Phase I periodontal therapy, surgical depigmentation was planned. After administration of local anaesthesia, the pigmented gingival epithelium, along with a thin layer of underlying connective tissue, was carefully removed using a No. 15C surgical blade (Figure 2B). The surgical site was irrigated with sterile saline, and bleeding was controlled using sterile gauze pressure. A Coe-Pak periodontal dressing was placed to protect the wound during healing.

The patient was prescribed analgesics and advised to rinse twice daily with 0.12% chlorhexidine mouthwash for one week. Postoperative instructions regarding oral hygiene and dietary precautions were provided.

Figure 2B: Immediate postoperative view following conventional scalpel depigmentation using a No. 15C blade.

At the one-week follow-up, the periodontal dressing was removed. The surgical site demonstrated satisfactory healing with healthy gingiva and no signs of infection or delayed wound healing (Figure 2C). The patient reported only mild postoperative discomfort (VAS = 2) during the initial postoperative period. Complete clinical depigmentation was achieved, with DOPI Grade 0 and GPI Score 0 recorded at review. The patient was satisfied with the aesthetic outcome.

Figure 2C: One-week postoperative clinical photograph showing satisfactory healing and restoration of healthy gingival color.

The two cases differed in terms of the severity of gingival pigmentation and the treatment modality employed, while both presented with physiologic gingival hyperpigmentation as the primary diagnosis. A comparative overview of the demographic characteristics, clinical presentation, baseline pigmentation indices, and treatment protocols is provided in Table 1, facilitating a comprehensive comparison of the clinical features and management strategies adopted for each case.

Table 1: Clinical Summary of Both Cases

Parameter	Case 1	Case 2
Age/Gender	21 years/Female	35 years/Male
Chief complaint Blackish discoloration of gingiva Blackish discoloration of gingiva Physiologic gingival		
Diagnosis hyperpigmentation	Physiologic gingival hyperpigmentation	
Baseline DOPI	Grade 2	Grade 3
Baseline GPI	Score 2	Score 3
Treatment	Injectable vitamin C (10%)	Conventional scalpel surgery
Number of sessions	4	Single procedure
Follow-up	1 month	1 week
VAS	0	2
Final DOPI	Grade 1	Grade 0
Final GPI	Score 1	Score 0
Complete depigmentation with Outcome satisfactory healing	Mild reduction in pigmentation	

DISCUSSION

Physiologic gingival hyperpigmentation is a benign condition resulting from increased melanin deposition in the gingival epithelium. Although it does not affect periodontal health, it may compromise smile esthetics, prompting patients to seek cosmetic treatment.[1-2]

The present report compared two treatment approaches for gingival depigmentation. Injectable vitamin C produced gradual improvement in pigmentation with excellent patient comfort and no postoperative pain. Vitamin C reduces melanin synthesis by inhibiting tyrosinase activity while promoting collagen formation and tissue healing. Haque et al. and Esmat et al. reported favourable aesthetic outcomes with injectable vitamin C, although repeated treatment sessions were required to achieve noticeable depigmentation.[6,7] Similar findings were observed in the present case, where mild clinical improvement was evident after four treatment sessions.

In contrast, the conventional scalpel technique achieved immediate clinical depigmentation after a single procedure. Chaudhary et al. and Al-Hajri et al. reported that the scalpel technique remains a simple, economical, and predictable method for gingival depigmentation despite mild postoperative discomfort.[9-10] The surgical case in the present report demonstrated complete removal of pigmentation with satisfactory healing after one week, consistent with these findings.

Clinical outcomes were assessed using the Dummett–Gupta Oral Pigmentation Index (DOPI),[3,7] Gingival Pigmentation Index (GPI),[6] and Visual Analog Scale (VAS),[8] allowing standardized evaluation of pigmentation and patient comfort.

The limitations of this report include the small sample size and short follow-up period. Further well-designed clinical trials with longer follow-up are required to evaluate the long-term stability and recurrence of gingival pigmentation following both treatment modalities.

CONCLUSION

Both injectable vitamin C and conventional scalpel surgery were effective in managing physiologic gingival hyperpigmentation. Injectable vitamin C provided a minimally invasive approach with excellent patient comfort and gradual improvement, whereas the scalpel technique achieved immediate depigmentation with satisfactory healing. Larger clinical studies with longer follow-up are required to confirm the long-term effectiveness of both treatment modalities.

CLINICAL SIGNIFICANCE

Injectable vitamin C may be considered a promising minimally invasive alternative for patients seeking gingival depigmentation with minimal postoperative discomfort. Conversely, conventional scalpel depigmentation remains a simple, cost-effective, and predictable technique for achieving immediate aesthetic improvement.

DECLARATION OF PATIENT CONSENT

The authors certify that appropriate written informed consent was obtained from both patients for treatment and publication of their clinical information and clinical photographs. Every effort has been made to maintain patient anonymity.

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