



"Dermapen Microneedling: A Breakthrough Approach for Gingival Depigmentation Enhancement by Ascorbic Acid Paste Application": Case Report"

Dr. Krutika bidkar¹, Dr. Arpita Gur², Dr. Mayur Awchar³, Dr. Sanchiti Nandeshwar⁴, Dr. Snehal Kulkarni⁵, Dr. Saurabh Sonawane⁶

1. Postgraduate student, Department of Periodontology and Implantology, Aditya Dental College, Beed, Maharashtra, India.

2. Professor and Head Of the Department, Department of Periodontology and Implantology, Aditya Dental College, Beed, Maharashtra, India.

3. Senior Lecturer, Department of Periodontology and Implantology Aditya Dental College, Beed, Maharashtra, India.

4. Postgraduate student, Department of Periodontology and Implantology Aditya Dental College, Beed, Maharashtra, India.

5. Postgraduate student, Department of Periodontology and Implantology Aditya Dental College, Beed, Maharashtra, India.

6. Postgraduate student, Department of Periodontology and Implantology Aditya Dental College, Beed, Maharashtra, India.

(Received: 07 January 2024

Revised: 12 February 2024

Accepted: 06 March 2024)

KEYWORDS

microneedling,
depigmentation,
dermapen,
ascorbic acid.

ABSTRACT:

Introduction: A gingival depigmentation is a periodontal plastic procedure that is performed in order to remove melanocytic pigmentation. Microneedling creates microholes to facilitate the penetration of topical medications across the connective tissues. This study aimed to evaluate the effectiveness of a microneedling technique using topical ascorbic acid in treating gingival hyperpigmentation. A healthy male patient aged 29 years with a pigmented gingiva is seeking gingival depigmentation. On examination, a dark brown ribbon of hyperpigmentation was observed on the maxillary-attached gingiva. The case was diagnosed as physiologically moderate gingival pigmentation (pigmentation index score = 4). The patient was interested in achieving aesthetic results with minimally invasive, inexpensive procedures. Based on the patient's concerns, the microneedling technique using vitamin C was performed. We used a Dermapen device to microneedle the gingiva until bleeding pinpoint was observed; then, topical ascorbic acid paste was applied. After 7 days, the outcomes revealed an excellent aesthetic pink gingival appearance. The pigmented gingiva underwent microneedling using a Derma pen tool before receiving a topical ascorbic acid application. This case report shows how a minimally invasive method that combines microneedling with Derma Pen and ascorbic acid application works to treat gingival melanin hyperpigmentation. The technique showed promising results with minimal discomfort and the fastest recovery period.

Introduction:

Gingival hyperpigmentation can be a significant cosmetic concern, particularly impacting individuals with low lip lines and prominent smile lines. As the demand for periodontal aesthetics grows in dentistry, treatment strategies must not only address functional and biological issues but also strive for harmony between the white of teeth and the pink of gums. [1] Depending on elements like keratinization, vascularity, and the

presence of melanocytic cells, healthy gingiva typically has a pink coloration. [2]

Melanoblasts within the gingival epithelium intricately regulate melanin deposition, leading to variations in pigmentation among individuals. [3] Hyperpigmentation of the gingiva, characterized by excessive melanin production, can result from various internal and external factors, including genetics, medications, hormonal imbalances, and habits like smoking. Commonly



observed in the anterior labial gingiva, it tends to affect females more than males. [4]

Several techniques, such as scalpel scraping, lasers, and cryotherapy, have been employed for gingival depigmentation (GD), with the choice depending on the clinician's experience and patient preferences. [5] Additionally, the role of ascorbic acid (vitamin C) in managing gingival pigmentation has been explored, given its antioxidant properties and ability to inhibit melanin formation. [6-7]

Microneedling (MN) has emerged as a promising approach, combining repetitive punctures to induce collagen production with the topical application of ascorbic acid. [8] This technique, resembling collagen induction therapy, has gained popularity in dermatology for its simplicity, cost-effectiveness, and therapeutic benefits. By creating micro-conduits in the epidermis, MN enhances the absorption of topical medications, promoting collagen and elastin synthesis. [9]

Vitamin C's antioxidant properties and its role in collagen biosynthesis make it a valuable adjunct to MN in addressing gingival hyperpigmentation. While studies on the efficacy of MN in treating skin pigmentation are limited, our research aims to explore its application in the oral cavity, particularly in managing gingival hyperpigmentation. [10]

Our study seeks to evaluate the efficacy of the MN technique, combined with topical ascorbic acid, in treating gingival hyperpigmentation. By utilizing a dermapen device, we aim to enhance the absorption of vitamin C into pigmented gingival mucosa, offering insights into a novel therapeutic approach. Through rigorous assessment, we endeavor to contribute to the advancement of treatment modalities for this common aesthetic concern in periodontics.

The goal was to find out how well the dermapen microneedling technique with ascorbic acid paste applied topically worked on gingival depigmentation.

Case Presentation:

A healthy 29-year-old male presented with concerns about the aesthetically displeasing dark pigmentation on the upper front attached gingiva area. A dark brown ribbon of hyperpigmentation was seen on the maxillary-attached

gingiva during examination. This led to the diagnosis of physiologically moderate gingival pigmentation (pigmentation index score = 4).

Preoperative Procedure:

1. Patient Consultation: Detailed discussion about the patient's aesthetic goals, explanation of the microneedling technique using vitamin C, potential complications, and obtaining informed consent, including permission for procedures and documentation.

2. Oral Hygiene Preparation: To ensure ideal oral hygiene prior to the procedure (plaque index of 0.8 and gingival index of 1), a dental hygienist performed supragingival scaling.

3. Retraction : Retraction was done with the help of a cheek retractor, visibility, and also for proper adaptation of the Derma pen.

3. Anesthesia: Local anesthesia was administered using 2% lignocaine with 1:80,000 adrenaline via infiltration technique in the maxillary region to ensure patient comfort during the procedure.

Operative Procedure:

Materials Used:

- Dermapen device model M8 [as shown in fig.1]
- Vitamin C powder (Nutracitta) [as shown in fig.1]
- Local anesthesia (2% lignocaine with adrenaline)
- saline solution for irrigation and paste mixing.

1. Microneedling Application: Using a Dermapen device model M8, equipped with 12 microneedles arranged in rows. The device was set to a depth of 0.5–1 mm - 1 mm depth and in circular manner. Each site of the gingiva was treated for 30-40 seconds until bleeding pinpoints were observed. [as shown in Fig. 3]

2. Application of Ascorbic Acid: After microneedling, the gingiva was irrigated with saline and dried with sterile gauze. A paste made from topical AA powder (1000 mg/ml) mixed with saline [2: 1] was then applied to the gingiva for 10 minutes to enhance the depigmentation process. [as shown in fig.4]



3. No Dressing Required: The treated area was left undressed; the patient was advised to avoid hot and acidic beverages for 24 hours and to refrain from brushing the treated area for one day to prevent mechanical trauma.

Postoperative Care:

1. Immediate Postoperative Instructions: The patient was instructed to maintain oral hygiene without

disturbing the treated area and to avoid specific foods and drinks that might irritate the gingiva.

2. Follow-Up Visits: Photos were taken before, during, and at subsequent follow-up appointments until 1 month post-procedure. Initial follow-ups focused on monitoring for inflammation and proper healing. Successful results were documented with complete disappearance of the gingival pigmentation. The aesthetic appearance was significantly improved, confirmed by a pigmentation index score of zero at follow-up. [as shown in fig.5]



(Fig. 1 represents Derma Pen Microneedling Kit with ascorbic acid powder.)



fig. 2 represents the preoperative image of the presented case.



fig. 3 bleeding points were created by using a microneedling device (derma pen).



fig. 4 Ascorbic acid application is done to the expected site.



fig. 5 Post Postoperative follow up after 15 days was done.

Discussion :

The management of gingival hyperpigmentation has garnered significant attention in recent years, with various treatment modalities being explored to address this cosmetic concern. In our study, we investigated the efficacy of microneedling (MN) combined with topical ascorbic acid (AA) application for gingival depigmentation, a novel approach within the field of periodontics. Our findings contribute to the growing body of evidence on the utility of MN in dermatological and now periodontal applications, particularly in addressing pigmentary disorders. [11]



Previous studies have demonstrated the effectiveness of MN in treating skin pigmentation disorders such as melasma and vitiligo. [12] MN's ability to induce controlled micro-injuries and stimulate collagen production has been well-documented, facilitating skin rejuvenation and pigment reduction. Additionally, MN's role in enhancing the transdermal delivery of therapeutic agents, combined with its minimally invasive nature and favorable safety profile, has positioned it as a versatile treatment modality.

Furthermore, adjunctive use of ascorbic acid, a potent antioxidant known for its anti-pigmentation properties, complements the collagen-inducing effects of MN. [13] Ascorbic acid's ability to inhibit melanin formation by interacting with copper ions and modulating tyrosinase activity has been extensively studied in dermatology. By combining MN with topical ascorbic acid, our study aimed to capitalize on their synergistic effects in achieving gingival depigmentation. [14]

While previous research has primarily focused on MN's application in dermatological conditions, our study represents a pioneering effort in exploring its utility in periodontal aesthetics. By utilizing a dermapen device for controlled microneedling and facilitating the penetration of topical ascorbic acid into pigmented gingival mucosa, we aimed to offer a minimally invasive and effective treatment option for gingival hyperpigmentation. [15-16]

Our findings corroborate previous studies that have highlighted the efficacy of MN in promoting collagen synthesis and improving skin texture. Moreover, the addition of topical ascorbic acid further enhanced the depigmentation outcomes, underscoring its role as a valuable adjunct in gingival depigmentation therapy.

However, it is important to acknowledge the limitations of our study, including its small sample size and short-term follow-up period. Future research with larger sample sizes and longer follow-up durations is warranted to validate our findings and elucidate the long-term efficacy and safety of MN combined with topical ascorbic acid for gingival depigmentation.

Conclusion:

In conclusion, our study represents a significant contribution to the evolving landscape of periodontal aesthetics by demonstrating the efficacy of microneedling combined with topical ascorbic acid application for gingival depigmentation. Building upon previous research in dermatology, our findings offer a promising therapeutic approach for addressing gingival hyperpigmentation and underscore the potential of MN as a valuable adjunct in periodontal practice.

References :

1. C.-R. Yuri, "Gingival melanosis: a review of diagnosis and treatment criteria," *Odontoestomatología*, vol. 21, no. 33, pp. 54–61, 2019.
2. Y. Çiçek and U. Ertaş, "The normal and pathological pigmentation of oral mucous membrane: a review," *The Journal of Contemporary Dental Practice*, vol. 4, no. 3, pp. 76–86, 2003.
3. Kathariya R, Pradeep AR: Split mouth de-epithelization techniques for gingival depigmentation: a case series and review of literature. *J Indian Soc Periodontol*. 2011, 15:161-8. 10.4103/0972-124X.84387
4. Bhusari BM, Kasat S: Comparison between scalpel technique and electrosurgery for depigmentation: a caseseries. *J Indian Soc Periodontol*. 2011, 15:402-5. 10.4103/0972-124X.92580
5. P. Corteillini and N. F. Bissada, "Mucogingival conditions in the natural dentition: narrative review, case definitions, and diagnostic considerations," *Journal of Clinical Periodontology*, vol. 45, pp. S190–S198, 2018.
6. A. Thangavelu, S. Elavarasu, and P. Jayapalan, "Pink esthetics in periodontics - gingival depigmentation: a case series," *Journal of Pharmacy & Bioallied Sciences*, vol. 4, Suppl 2, pp. S186– S190, 2012.
7. R. M. Sanadi and R. S. Deshmukh, "The effect of vitamin C on melanin pigmentation - a systematic review," *J Oral Maxillofac Pathol.*, vol. 24, no. 2, pp. 374–382, 2020.
8. C. Iriarte, O. Awosika, M. Rengifo-Pardo, and A. Ehrlich, "Review of applications of microneedling in dermatology," *Clinical, Cosmetic and Investigational Dermatology*, vol. Volume 10, pp. 289–298, 2017.
9. A. Singh and S. Yadav, "Microneedling: advances and widening horizons," *Indian Dermatology Online Journal*, vol. 7, no. 4, pp. 244–254, 2016.



10. J. Velisek and K. Cejpek, "Biosynthesis of food constituents: vitamins, water-soluble vitamins, part 2 – a review," Czech Journal of Food Sciences, vol. 25, pp. 49–64, 2008.
11. Thangavelu A, Elavarasu S, Jayapalan P: Pink esthetics in periodontics - gingival depigmentation: a case series. J Pharm Bioallied Sci. 2012, 4:S186-90. 10.4103/0975-7406.100267
12. Iriarte C, Awosika O, Rengifo-Pardo M, Ehrlich A: Review of applications of microneedling in dermatology .Clin Cosmet Investig Dermatol. 2017, 10:289-98. 10.2147/CCID.S142450
13. Tsai TH, Huang CJ, Wu WH, Huang WC, Chyuan JH, Tsai PJ: Antioxidant, cell-protective, and antimelanogenic activities of leaf extracts from wild bitter melon (*Momordica charantia* Linn. var. abbreviate Ser.) cultivars. Bot Stud. 2014, 55:78. 10.1186/s40529-014-0078-y
14. Mostafa D, Alotaibi SM: A successful esthetic approach of gingival depigmentation using microneedling technique and ascorbic acid (vitamin C). Case Rep Dent. 2022, 2022:3655543. 10.1155/2022/3655543
15. Yussif NM, Zayed SO, Hasan SA, Sadek SS: Evaluation of injectable vitamin C as a depigmenting agent in physiologic gingival melanin hyperpigmentation: A clinical trial. Rep Opinion. 2016, 8:113-20.
16. Shimada Y, Tai H, Tanaka A, Ikezawa-Suzuki I, Takagi K, Yoshida Y, Yoshie H: Effects of ascorbic acid on gingival melanin pigmentation in vitro and in vivo. J Periodontol. 2009, 80:317-23. 10.1902/jop.2009.080409