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Case Report

# Gum grief: Unprecedented fenestration post microneedling procedure for gingival depigmentation – A case report

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ABSTRACT

**Background**: A harmonious appearance of the teeth and gingiva, including the colour of the gingiva, is crucial in smile aesthetics. There are various treatment options for gingival hyperpigmentation, with surgical intervention being the gold standard procedure.

**Aims & Objective:** This study aims to explore microneedling procedure as a minimally invasive, painless and comfortable treatment option and highlights the shortcomings of the established protocol for the procedure through a case report where the patient develops a fenestration defect post microneedling procedure.

**Materials and Methods**: A healthy 24-year old male patient had a gingival pigmentation score of 1 according to the Dummett oral pigmentation index (DOPI), 1964, in the mandibular anterior region. Microneedling technique was performed in the mandibular anterior region using a Dermapen under local anaesthesia until mild micro bleeding points were clearly visible in the area.

**Results**: The patient was re-evaluated at regular intervals where he demonstrated noticeable improvement in the pigmentation score but the patient had developed fenestration and gingival recession post the microneedling procedure.

**Conclusion**: Microneedling using dermapen is a simple, minimally invasive and effective treatment option for gingival hyperpigmentation. However, there is a need to revise the standard protocol for microneedling procedure when used intraorally along with a need of a design better suited for intraoral usage.



## 1. Introduction

In the current era, smile aesthetics have become a vital aspect in dentistry to attain a harmonious appearance of the teeth and gingiva. The colour of the gingiva plays a key role in terms of overall aesthetics and appearance. Along with treating biological and functional challenges, the periodontist is in a position to achieve satisfactory gingival aesthetics.

Gingival hyperpigmentation is a deep colour of the gingiva that is due to several exogenous and endogenous elements. It is mainly physiological due to the production of melanin. The pigmentation degree differs depending on the melanoblastic interactions of each individual.[1]

Treatment for gingival hyperpigmentation can be through the following approaches: surgical, non-surgical, or chemical. Some of the most common surgical approaches are scalpel surgery, bur abrasion, laser ablation, cryosurgery, electrocautery, and radiosurgery. The most common non-surgical approach is chemical cauterization. There are ways of masking the colour of the gingiva, for example, free gingival autograft and acellular dermal matrix allograft.

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The surgical intervention is the gold standard procedure. It is the most commonly used method, where excision of the entire thickness of the epithelial and the papillary connective tissue layer is carried out. Despite being advantageous, this method is still a source of apprehension for patients seeking a painless and comfortable treatment option. Therefore, alternative less invasive treatment methods for gingival depigmentation are required.[2]

A minimally invasive technique which is being used in recent times for gingival depigmentation is microneedling (MN) technique. It is a nonsurgical procedure that is known as collagen induction therapy. It is widely used in dermatology and cosmetology and involves repetitive punctures on the skin. Application of microneedling for gingival depigmentation is based on the concept of using microneedling in the treatment of hyperpigmented skin.

The microneedles separate the cells instead of cutting through forming microconduits which cause minor surface bleeding and initiation of a wound-healing pathway. There are various types of MN devices including dermaroller, dermastamp, and dermapen. These devices have certain physical limitations when it comes to intraoral usage. Dermapen is the only device that can be applied intraorally due to its small size and changeable head.[3]

Many studies have been conducted on the use of microneedling technique for cosmetic purposes. However, there are very few studies investigating its use in dentistry, particularly discussing the protocol for the procedure of microneedling (dermapen) for the treatment of gingival hyperpigmentation.

Hence, this study describes an unusual complication of microneedling using dermapen and highlights the shortcomings of the established protocol for microneedling for gingival depigmentation procedure through a case report of a patient who developed a fenestration defect after the use of microneedling.

## 2. Case Description

A 24-year old male patient reported to the Department of Periodontics with the chief complaint of unesthetic smile in relation to the colour of his teeth as well as gums in the front tooth region. On examination, the patient had a gingival pigmentation score of 1 according to the Dummett oral pigmentation index (DOPI), 1964, in the mandibular anterior region along with dental fluorosis in the maxillary and mandibular anterior teeth, as seen in Figure 1. The patient had no relevant medical history and was a non-smoker.

### *2.1. Clinical procedure*

The patient was explained about the microneedling procedure for gingival depigmentation and informed consent was taken prior to the procedure.

Thorough oral prophylaxis was performed as well as oral hygiene instructions given to the patient before any intervention. An appointment for gingival depigmentation was given to the patient subsequently. The procedure for microneedling was carried out in accordance with a study conducted by Morsy S in 2022**.**

On the day of microneedling procedure, local anaesthesia (1:80,000 Adrenaline) was administered in the mandibular anterior region following which the gingival tissue thickness was measured using an endodontic file with a rubber stopper at 1 site each bilaterally. The endodontic file was inserted perpendicularly into the soft tissues about 1 mm apical to the marginal gingiva and the width was measured with the help of a digital vernier calliper.

According to the measured gingival thickness, the penetration depth of microneedles was adjusted. Dermapen was laid perpendicular to the surface of gingiva and microneedling was carried out on each tooth for about 4-5 times until mild micro bleeding and mild erythema was clearly visible in the area. Post-operatively, analgesics were prescribed if the patient reported pain in the area. This procedure was planned to be repeated for a second time after 14 days.

### *2.2. Clinical outcomes and follow-up*

Immediate post-operative view shows micro bleeding points which can be appreciated in Figure 2.

Figure 3 shows one day post-operative view where inflammation was seen in the treated area and mild pain was reported by the patient.

One week post-operatively wound healing was satisfactory with the exception of a fenestration seen on the labial surface of mandibular right canine as shown in Figure 4. There was a reduction in gingival pigmentation with respect to mandibular anterior region.

Figure 5 shows 2 weeks post-operative view where an improvement in the fenestration along with further reduction in gingival pigmentation can be appreciated.

3 weeks post-operative view shows that there was satisfactory healing of the fenestration defect after which the second session of the dermapen procedure was carried out in the same manner as the previous session (Figure 6).

Figure 7 shows 1 month post-operative view. There was further reduction in gingival pigmentation and complete healing of the fenestration defect. Gingival recession was seen with respect to mandibular right canine on the labial aspect.

Figure 8 shows 6 month post-operative view where gingival repigmentation can be seen along with improvement of gingival recession in right mandibular canine area.

**Figure 1:** Pre-operative view

**Figure 2:** Immediate post-operative view

**Figure 3:** One day post-operative view

**Figure 4:** One week post-operative view

**Figure 5:** 2 week post-operative view

**Figure 6:** 3 week post-operative view

**Figure 7:** 1 month post-operative view

**Figure 8:** 6 months post-operative view

## 3. Discussion

The first concept of microneedles was patented by Gerstel and Place from Alza Research in the 1970s in the US. Nevertheless, it took another 25 years to do mass production by economically feasible methods because they could not be commercially produced. These devices have the advantage of being less painful and creating less needle phobia in patients, thus increasing patient compliance.[4]

Microneedles are available in various shapes and designs like pens, rollers and patches. These are most commonly used on the skin for cosmetic procedures. A design for convenient intraoral usage will be advantageous in the future.

In this case report microneedling was done with the help of a dermapen, which is the only design out of the commercially available ones that could be used intraorally in spite of its limitations.

Dermapen is a wireless, reusable device with interchangeable head incorporated with microneedles. It could be used in a stamp-like motion in the anterior region but could not be used in the posterior areas due to its straight design.[5]

Dermapen is an ergonomic device that makes use of disposable needles and guides to adjust needle length. Microneedling with dermapen is a simple in-office procedure having a duration of 10 to 20 minutes depending on the area to be treated. The treatment endpoint is the appearance of uniform pin-point bleeding spots which is easily controllable.[6]

Zaaya et al in 2024 demonstrated microneedling as a less invasive graft-less approach in the surgical treatment of single RT1 recession defects in patients with a thin gingival phenotype in the aesthetic zone. They stated that microneedling was effective in increasing keratinised tissue thickness, which is in contrast to the present study where fenestration and gingival recession was seen post microneedling procedure.[7]

Assessing the gingival biotype is essential before the procedure. Gingival biotype can be classified as thick and thin. There are various defining factors of gingival biotype such as tooth dimensions, papillary height and area, bone morphotype, keratinised mucosa, palatal mucosa, tooth position and movement and bleeding on probing. Long and slender teeth with long and thin interdental papilla usually show a thinner biotype. Thick gingival biotype has a denser and more fibrotic soft tissue curtain and are resistant to acute trauma. Thin gingival biotype is delicate and friable with possible presence of fenestrations and dehiscence.[8]

Thin gingival biotype is thinner in the bucco-lingual direction and their covering oral epithelium has a comparatively thinner keratin layer. A thin gingival unit will not inevitably lead to gingival recession or persistence of inflammation per se, but there is likelihood of buccal or lingual recession in such cases, especially when mechanical trauma, surgical injury or irritants are present.[9]

Therefore, when the biotype of the gingiva differs from tooth to tooth it requires a change of settings in the device with respect to the depth of the needle when operating on each tooth. The gingival tissue thickness should be measured at each tooth unlike the current protocol where it is measured at one site. This case report describes the occurrence of fenestration and gingival recession post microneedling procedure which appears to be a consequence of shortcomings in the established protocol for the procedure of its intraoral usage.

## 4. Conclusion

Microneedling using dermapen is a simple and effective treatment option for gingival depigmentation for patients seeking a minimally invasive and relatively painless treatment. Unesthetic complications due to an aesthetic procedure is undesirable. Therefore, there is a necessity to revise the standard protocol for microneedling procedure when used intraorally. Furthermore, a design better suited for intraoral usage must be fabricated with a smaller and adjustable head which can be used in all the areas of the oral cavity with relative ease.

## 5. Source of Funding

None.

## 6. Conflict of Interest

None.

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