Esthetic Management of a Patient with Severely Fluorosed Enamel and Pigmented Gingiva: A Conservative Approach

Abstract
Isolated brown or white defects of less than few tenths of millimeter depth can be successfully treated with microabrasion. However, for deeper enamel defects, a combination of various techniques such as microabrasion/macroabrasion along with bleaching or full or partial veneering are available. Template-assisted direct veneering technique helps for better separation and contouring of individual tooth through which composite resin can be applied directly to tooth structure and artistically sculpted. Frequently, the gingival hyperpigmentation is caused by excessive melanin deposits mainly located in the basal and suprabasal cell layers of the epithelium. Recently, laser ablation has been recognized as one of the most effective, pleasant, and reliable techniques. This article describes a conservative approach for a complete smile makeover of a patient with severe fluorosis and pigmented gingiva with the help of enamel microabrasion and template-assisted direct composite veneering followed by laser depigmentation of gingiva.

Keywords: Composite veneering, fluorosis, laser depigmentation, microabrasion, template-assisted veneering

Introduction
Cosmetic dentistry aims to correct the smile esthetics of the patient which may be occasionally compromised due to some discoloration or stain either on an individual tooth or on all teeth or due to the gingival hyperpigmentation. Melanin, carotene, and hemoglobin are the most common natural pigments contributing to the normal color of the gums, but excessive melanin deposition in the basal and suprabasal cell layers of the epithelium may cause hyperpigmentation. Whereas, one of the most common reasons for tooth discoloration is dental fluorosis occurring among people residing in areas with high fluoride content in drinking water. Various noninvasive or minimally invasive methods have been suggested to remove or mask tooth discoloration such as vital or nonvital bleaching, microabrasion, macroabrasion, and direct or indirect veneering procedure. Gingival depigmentation has been traditionally carried out using surgical, chemical, electrosurgical, and cryosurgical procedures. Recently, laser ablation has been recognized as one of the most effective, pleasant, and reliable techniques.[1,2]

This article presents a conservative approach for correcting smile esthetics with the help of enamel microabrasion followed by template-assisted direct composite veneering done to mask discoloration and motting caused by fluorosis, as well as use of diode laser for gingival depigmentation.

Case Report
A 30-year-old male patient presented with gingival hyperpigmentation and intrinsic brown stains with pitting defects on all anteriors [Figure 1a]. After taking proper history, it was diagnosed as Grade III fluorosis. Several treatment options were proposed such as microabrasion, macroabrasion, in-office bleaching, direct or indirect veneering, and crowns. Enamel microabrasion followed by template-assisted direct composite veneering was chosen for correcting stains and motting of enamel.

Before treatment, the teeth were submitted to rubber cup prophylaxis with pumice/water slurry. The affected teeth were isolated with a rubber dam to avoid contact between the acidic material and other teeth as well as soft tissues of the oral cavity. Enamel macroabrasion of the affected enamel surfaces was performed, using a fine grit finishing bur [Figure 1b]. The enamel...
Microabrasion followed by template-assisted veneering

Ali, et al.: Microabrasion followed by template-assisted veneering

After etching and bonding of the prepared tooth surfaces, and the interproximal region were unaltered whereas the incisal edge cervical region, 0.5 mm and 0.7 mm reduction in the middle and incisal region, respectively, whereas the incisal edge and the interproximal region were unaltered [Figure 1i-1l]. After etching and bonding of the prepared tooth surfaces, microabrasive material (Opalustre, Ultradent Products Inc, Utah, USA) was applied with a rubber cup, mounted on a 10:1 gear reduction handpiece [Figure 1c and d]. A small quantity of the product was applied firmly in each region affected by stains, 3 times for 1 min each; and periodic rinsing with water was done between each application. After the last application, the teeth were copiously rinsed and dried [Figure 1e]. Next, a 2% neutral sodium fluoride gel was applied to the abraded dental enamel for 4 min in order to minimize postoperative sensitivity. Two clinical sessions of microabrasion were performed at the interval of 1 week [Figure 1f].

After completion, a diagnostic impression was made with alginate which revealed labially placed left central incisor, incisal edge discrepancy between both central incisors and diastema between left lateral incisor and canine. With the help of this diagnostic cast, a resin replica mock-up was performed [Figure 1g] and a soft template was fabricated over it, which could help for the approximation of natural tooth contours. This template was sliced interproximally as evident by passing the Mylar strip intended to keep the bonded teeth from being splinted together. Furthermore, interdental vents were made by carving away the embrasure spaces, thus facilitating better gingival contouring of the composite. A small hole was punched on the labial aspect of the template adjacent to each tooth, matching the size of the tip of the compule for delivering composite [Figure 1h].

Conservative veneer preparation was carried out on the maxillary anterior six teeth with 0.3 mm reduction in the cervical region, 0.5 mm and 0.7 mm reduction in the middle and incisal region, respectively, whereas the incisal edge and the interproximal region were unaltered [Figure 1i-1l]. After etching and bonding of the prepared tooth surfaces, template was adapted with Mylar strips being placed in the interproximal slits on either side of the tooth to be injected and the tip of the compule snugged into the receiving portal [Figure 2a]. Composite (IPS Empress Direct, Ivoclar vivadent) was injected through the portal and allowed to flow within the template under significant seating pressure to carve away the excess material [Figure 2b]. After the final carving and contouring of the restoration, composite was light cured. The final finishing and polishing of the restoration were carried out with the help of composite polishing kit (Shofu Inc., Japan) [Figure 2c].

After 2 days, laser depigmentation procedure was performed with the help of diode laser at a wavelength of 810 nm [Figure 2d]. No topical or local anesthesia was given to the patient. Melanin-pigmented gingiva was ablated by diode laser vaporization operated at 1.5 W irradiation power with a flexible, fiber optic handpiece in a contact mode and continuous wave motion along with water spray, under standard protective measures [Figure 2e]. Remnants of the ablated tissue were removed using sterile gauze dampened with saline. Analgesics and chlorhexidine 0.2% mouthwash were prescribed. The patient was instructed to avoid smoking and eating of hot and spicy foods for the first 24 h. The patient was recalled after 7 days for evaluation of any redness or discomfort, but no significant finding was observed [Figure 2f].

Discussion

Conservative treatment options such as microabrasion can produce dramatic improvements in brown and yellow discoloration, providing a satisfactory interim result before more invasive procedures such as veneers orcrowns are considered, if necessary. Enamel microabrasion corrects surface enamel hypomineralization and discoloration defects by removing superficial enamel. This may be
Microabrasion followed by template-assisted veneering

The Opalustre™ microabrasive slurry used in this case contains a lower concentration of hydrochloric acid (6.6%) and silicon carbide microparticles. Enamel microabrasion using acidic/abrasive products is a noninvasive, conservative, and a time-saving approach which gives immediate and permanent esthetic results, with insignificant and unrecognizable loss of enamel and thus causes minimal patient discomfort.[5]

Since it has an affinity for hemoglobin and melanin and does not interact with dental hard tissues, the laser is an excellent soft-tissue surgical laser, indicated for cutting and coagulating gingiva and oral mucosa and for soft-tissue curettage or sulcular debridement. The primary advantage of using laser for depigmentation of gingiva is hemostasis, relatively dry operating field, and minimal patient discomfort.[7]

Conclusion

Correct application of the microabrasion technique, complemented with template-assisted direct composite veneering, allowed for significant improvement in the appearance and color uniformity of the teeth. Furthermore, the use of a diode laser for gingival depigmentation was shown to be a safe and effective treatment modality to provide overall facial esthetics to the patient.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Chhabra N, Singhbal KP. Viable approach to manage superficial enamel discoloration. Contemp Clin Dent 2010;1:284-7.
2. Tal H, Oegiesser D, Tal M. Gingival depigmentation by erbium: YAG laser: Clinical observations and patient responses. J Periodontol 2003;74:1660-7.
3. Ng F, Manton DJ. Aesthetic management of severely fluorosed ineous in an adolescent female. Aust Dent J 2007;52:243-8.
4. Sundfeld RH, Sundfeld-Neto D, Machado LS, Franco LM, Fagundes TC, Briso AL, et al. Microabrasion in tooth enamel discoloration defects: Three cases with long-term follow-ups. J Appl Oral Sci 2014;22:347-54.
5. Pini NP, Aguilar FH, Lima DA, Lovadino JR, Terada RS, Pascotto RC, et al. Advances in dental veneers: Materials, applications, and techniques. Clin Cosmet Investig Dent 2012;4:9-16.
6. Goldstein M. Template assisted layered direct composite veneer splint: A case report. Priv Dent 2011.
7. Gupta G. Management of gingival hyperpigmentation by semiconductor diode laser. J Cutan Aesthet Surg 2011;4:208-10.