

Aesthetic Rehabilitation of Fluorosed Teeth with Indirect Laminate Veneers- A Case Report

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ABSTRACT

Dental fluorosis is a condition caused by chronic ingestion of excess fluoride during tooth enamel formation. This induces subsurface porosities to varying extents depending on the severity of fluorosis. Such patients consult dentist mainly for aesthetic reasons. Selection of an appropriate treatment plan for such cases depends on the severity of the condition. Laminate veneers is a conservative method of restoring the appearance of discoloured, pitted teeth, and teeth with diastemas that provide extremely good aesthetic results. They are considered as the treatment of choice for moderate to severe cases of dental fluorosis given the optimum aesthetics, wear resistance, biocompatibility, and long-term results of these veneers.

KEYWORDS: Veneer, aesthetics, fluorosis

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INTRODUCTION

Dental fluorosis is an anomaly of the tooth, caused by chronic ingestion of fluoride during the developmental phases of teeth, which leads to outer hyper mineralization and sub-surface hypomineralization.¹ Dental fluorosis can be characterized by white opaque appearance of teeth with secondary brownish staining.

Treatment of fluorosis depends on the severity of fluorosis.²

In mild cases, teeth present with opaque white areas, which are seen as horizontal lines and presence of cloudy patches are seen on the enamel surface. Bleaching and micro-abrasion have been recommended for such cases. In moderate to severe cases of fluorosis, all tooth surfaces are affected and they present as white opacities. Also, some pits and brown stains can be seen on the surfaces. Treatments for such cases include micro abrasion, direct composite restorations, aesthetic veneers or crowns or combination of the above-mentioned techniques.³ Bleaching and micro abrasion have seen to be either ineffective or leading to only transient improvement, while composite restorations are prone to discoloration, chipping, and debonding. Therefore,

laminate veneers are considered as the restoration of choice for moderate to severe cases of dental fluorosis, given their colour maintainability, wear resistance, and biocompatibility.⁴

The present case report offers a step-by-step process of aesthetic rehabilitation of a patient with severe fluorosis with the help of ceramic laminate veneers.

CASE REPORT

A 23-year-old female patient had reported to ITS Dental College, Muradnagar, with the chief complaint of discoloured teeth. The patient expressed that she was not satisfied with her smile. The clinical examination and history revealed that the discoloration was due to generalized fluorosis (figure 1) which represented as opaque patches, subsurface brown staining and small pits in enamel which is categorized as severe fluorosis based on Dean's fluorosis index. Patient had few missing (16, 26 and 27) and carious teeth (14,15,17 and 25) in the maxillary posterior region. Therefore, endodontic therapy followed by zirconia crowns were fabricated for the patient with respect to

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14,15,16,17 and 24,25,26,27,28 The remaining maxillary anterior teeth were planned for aesthetic correction with the help of lithium disilicate veneers and the step of fabrication was as follows:

1. After the clinical examination, radiographs and preoperative photographs the maxillary and mandibular diagnostic impressions were made followed by facebow transfer.
2. Diagnostic models were mounted and the occlusion was analysed. This was followed by diagnostic wax-up for previewing the desired appearance of the patient's teeth and a template for fabrication of temporary restorations (figure 2).
3. The teeth were prepared starting first from the labial surface using depth cutting burs, and then further continued from mesio-proximal line angle to disto-proximal line angle. A definitive chamfer margin was prepared. The preparations were terminated at linguo-incisal line angle (figure 3).
4. Following shade selection, impressions were made using polyvinyl siloxane impression material (by putty-wash technique) and cast was poured in Type IV gypsum product.
5. A pre-fabricated transparent matrix was loaded with a self-cure acrylic and was placed on the tooth for fabrication of the temporary crowns. Adjustment in the occlusion were made followed by polishing and cementation of the temporary restorations.
6. Veneers were fabricated with lithium disilicate-reinforced glass ceramic material. They were tried-in to assess the marginal adaptation. Veneers were then prepared for bonding. Fitting surfaces of veneers were etched with hydrofluoric acid (figure 4) for 60 seconds and then washed under running water for another 60 seconds. They were then dried with an air syringe. A layer of silane coupling agent was applied on the fitting surfaces and gently air-dried after one minute. Afterwards, the prepared teeth were etched using 37% phosphoric acid for 30 seconds, rinsed, and dried (Figure 5). To prevent inadvertent bonding to the adjacent tooth and to facilitate the subsequent removal of excess resin cement in the embrasures, a clear mylar strip was placed inter-proximally. A layer of bonding agent was applied on the prepared tooth surfaces and was air-thinned (figure 6). The inner surface of ceramic veneers was covered with light-cured resin cement. Veneers were positioned on the teeth by applying gentle pressure, following which excess resin cement was carefully removed with an explorer before light curing. First light curing was performed for 2 seconds (Tack cure) and then the excess resin cement was removed using a microbrush. Following that, each veneer was light-cured for 40 seconds from the facial aspect and then 40 seconds from the lingual aspect. The two veneers of the central incisors were first cemented

simultaneously, followed by cementation of the veneers of the two lateral incisors. Then, the veneers of the two canines were cemented (figure 7). Occlusion was assessed and adjusted. To ensure interproximal contact patency, flossing was performed. The patient was extremely satisfied with the final outcome (figure 8).

DISCUSSION

Laminate veneers are an excellent treatment option for masking tooth discoloration in cases of severe fluorosis with minimal reduction of sound tooth structure. They provide both predictable and long-lasting aesthetic rehabilitation.^{5,6} Laminate veneers are considered to be a more conservative treatment approach than full crowns because preparation of the teeth for veneers requires less tooth reduction than full crown preparations. They provide precise colour matching and translucency to the natural tooth and fulfil the need for adequate retention and are a very suitable for young adults who have large pulp chambers and pulp horns close to the teeth enamel surface.⁷

They are of two different types: direct laminate veneers and indirect laminate veneers. In direct laminates veneers composite resin material are applied on prepared tooth surfaces directly in the dental clinic. There is absence of necessity for tooth preparation in these cases and involve low cost as compared with indirect techniques and other prosthetic approaches. Also, the treatment has reversibility and there is no need for any additional adhesive cementing system. Although using direct composite provides excellent aesthetics; the fracture resistance, wear resistance and colour stability of composite resin is lower than that of indirect porcelain restorations.⁸ Indirect laminate veneers have high resistance against attrition and fractures and discolorations. However, longer chair time, higher cost and use of an adhesive cementing system are the main disadvantages of indirect laminate veneer restorations. Bonding procedure of fluorosed teeth can be challenging.

In the present case, some modifications in the etching time and selection of adhesive system had to be done. It is recommended to grind the fluorosed enamel surface to remove the hypermineralized layer.⁹ In normal enamel, etching with phosphoric acid for 15 seconds gave the best results, while in moderately fluorosed teeth the best etching results were obtained at 30 seconds. Increased etching time for severe fluorosis resulted in less retentive surface. It has been observed that fluorosis adversely affects the bond strength of all the adhesive systems to enamel. Fluorosed dentin is more susceptible to acid, especially in the severely affected teeth in contrast to surface enamel. Therefore, etch-and-rinse systems are not recommended for bonding the dentin in the affected teeth. It has been stated that reliable adhesion can be obtained using two-step self-etch adhesive system.¹⁰ The durability and clinical success of porcelain veneers have been widely investigated in the literature. It has been reported that ceramic veneers provide durable and

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successful restoration with an estimated survival probability of 93.5% over 10 years.¹¹ Furthermore, numerous studies have demonstrated acceptable aesthetic outcomes in cases of moderate to severe fluorosis where restoration with porcelain veneers was performed.¹²

CONCLUSION

Laminate veneers are one of the most popularly used restorative materials in aesthetic dentistry. When a proper treatment plan is formulated and a proper protocol is used during the clinical and laboratory fabrication stage, it has seen to give excellent aesthetic results. In this case ceramic veneers were used to improve the patient's smile and consequently self-esteem.

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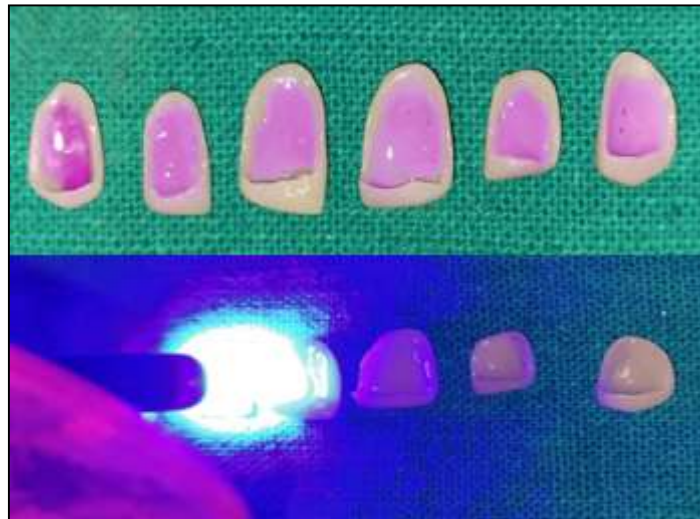
Figure 1. Intra-Oral Pre-operative view



Figure 2. Diagnostic Wax up



Figure 3. Tooth preparation for laminate veneer



(A)

Figure 4. Preparation of veneers outside the mouth



Figure 5. Preparation of mouth before cementation of veneers



Figure 6. Cementation of veneers



Figure 7. Pre-operative and Post-operative photograph