

Direct Esthetic Rehabilitation of Teeth with Severe Fluorosis Using Uvener Facial Template: A Case Report.

Vinay Bal Singh Thakur¹, Kanika Gupta², Kulwant Rai¹, Haritima Kahol³, Kritika Gupta², Prabhat Mandhotra¹

¹Senior Resident, Himachal Dental College, Mandi, Himachal Pradesh.

²PG student, Himachal Dental College, Mandi, Himachal Pradesh.

³MDS, Himachal Dental College, Mandi, Himachal Pradesh.

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ABSTRACT

“Dental fluorosis,” a specific disturbance in tooth formation and an esthetic condition, is defined as a chronic, fluoride-induced condition, in which enamel development is disrupted and the enamel is hypomineralized. Fluorosis can be prevented by having an adequate knowledge of the fluoride sources, knowing how to manage this issue and therefore, avoid overexposure. Controlling the fluoride intake is the best preventive measure for dental fluorosis, however when this is already installed and causing esthetic problems to the patient, many treatment techniques are recommended.

This article describes an esthetic rehabilitation of a case of severe fluorosis using a new system for placing direct composite veneer, the Uvener System (Ultradent) which simulates predictable shape and symmetry of natural teeth. In cases of severe dental fluorosis, the tooth enamel usually becomes porous and tooth whitening methods are not recommended. Therefore, minimally invasive technique of direct composite veneering using facial templates is the treatment of choice as it is easy to use, enhance clinical productivity, saves time, requires minimal preparation and is cost effective.

Keywords: Dental Fluorosis, Esthetic rehabilitation, Direct composite restoration, Uvener system (Ultradent).

INTRODUCTION

Dental fluorosis is an irreversible condition caused by excessive ingestion of fluoride during the tooth forming years. The first documented effect of fluoride on dentition was dated back in 1916 published by McKay and GV Black. Dean and McKay suggested that optimum level of water fluoride should be between 0.9 to 1.0 ppm.^[1] Fluoride-containing dental products and drinking water are two main potential sources for this developmental tooth disorder. Fluoride related alterations in enamel lead to surface hypermineralization and subsurface hypomineralization which are characterized by white opaque appearance with secondary brown stain.^[2]

Name & Address of Corresponding Author

Dr. Vinay Bal Singh Thakur
Senior Resident, Himachal Dental College,
Mandi, Himachal Pradesh.

It was found that both pitting & staining are a post eruptive phenomenon. This implies a qualitative and quantitative defect in affected enamel. Fluoride at high concentration affects the function of the ameloblasts by exerting a direct inhibitory effect on their enzymatic functions. This results in matrix

defect which also translates into mineralization defect.^[3]

The safe level for daily fluoride intake is 0.05 to 0.07mg F/kg/day, above which the risk of developing fluorosis will be more eminent (Burt, 1992).^[4]

In the mild cases of dental fluorosis, clinical appearance is characterized by opaque white areas presenting as horizontal lines and cloudy patches on the enamel surface. Bleaching and microabrasion have been recommended for these forms of fluorosis. In the moderate-to-severe level of fluorosis, all tooth surfaces are affected by white opacities, brown stains and pits may also be observed. Treatments include microabrasion, direct composite esthetic veneers or crowns.^[2]

Direct composite veneers can be considered in the treatment plan rather than resorting to more invasive procedures in young patients, patients with healthy dentition and in cases of financial concern. In this case report we present a minimally invasive technique to treat discoloration due to fluorosis, using a new system for placing direct composite veneer, the Uvener System (Ultradent) which offers precise anatomic “facial tooth contour” of the templates(for maxillary central and lateral incisors, canines, and premolars) thereby yielding a final different thicknesses of composite (less toward the

incisal third and gingival areas and greater in the middle of the facial surface). This creates different effects and values and, as a result, only one shade of composite is needed in many cases to get a natural gradient effect. This system is easier and faster to create direct composite veneers with predictable shape and symmetry.^[4,5]

CASE REPORT

13 yr old boy from district Mandi, Himachal Pradesh presented to the department of pediatric dentistry with chief complaint of generalized staining of teeth which compromised his smile. No relevant medical history was enquired. Dental history revealed that primary teeth were not affected. Clinical examination revealed severe brown stained enamel surfaces and opacities in all teeth with some areas of pits with good periodontal status and very little evidence of occlusal dental caries seen only in respect to 16, 25 and 46. Final diagnosis of dental fluorosis classified as Dean's severe type was reached. Based on discussions with the patient about treatment plan, direct resin composite veneering with minimal tooth preparation was planned as it sounds cost effective and less time consuming.

Procedure

Supragingival scaling and polishing followed by shade selection with vita classic shade guide was performed. Isolation of the operating area was achieved with cotton rolls as patient was experiencing gagging with rubber dam. Carious lesions on 16, 25 and 46 were excavated and restored using composite resin. Maxillary anteriors were minimally prepared with a coarse diamond tapered bur. A window preparation was made to a depth roughly equivalent to half the width of the thickness of the facial enamel ranging from 0.5 mm mid-facially tapering down to a depth of about

0.2mm along the gingival margin. A fine chamfer finish gingival margin line was given and remaining undercuts were refined. The preparation was cleaned with pumice slurry and water using rubber cup, and then dried. The preparation was etched with 37% phosphoric acid for 30 seconds, rinsed with water and air dried. A single layer of bonding agent (Gluma) was applied according to the manufacturer's direction and cured for 10 seconds with the visible light source. Flowable composites (3M ESPE Filtek™ Z350) were used to restore small pits on non stress bearing areas and light cured for 40 seconds. Next the appropriate Uvener templates were selected from the kit and tried against the teeth and microhybrid composite (3M ESPE, Valux TM Plus, shade A2) was selected and applied to the tooth surface of upper right central incisor such that the central line of Uvener facial template(Ultradent) was aligned with the long axis of the tooth and pressed gently [Figure 1]. Excess composite was removed from around the edges of the veneer to reduce need for trimming after curing. The composite was then cured through the Uvener template. Then, the template was removed by gently lifting on the handle. Finally, excess was removed and contouring at the gingival and labial margin performed. Overhanging residual composite was checked using a dental floss and explorer. Finishing, contouring and polishing were done with a super snap mini kit (shofu) and polishing paste refines the embrasure space. After completion, clinical photographs were taken to evaluate the post operative smile design. In second visit, mandibular anterior teeth were prepared and the same procedure was performed for each tooth. In third visit maxillary and mandibular premolars were restored in a similar fashion. The patient was recalled for regular follow up of 2months for further re- evaluation of color stability and other surface properties of composite veneers [Figure 2].



Figure 1: A: Preoperative clinical photograph B: Uvener facial template on right central incisor C: Uvener kit (Ultradent)



Figure 2: A: Post-operative clinical photograph B: Post operative smile design

DISCUSSION

“Dental fluorosis,” a specific disturbance in tooth formation and an esthetic condition, is defined as a chronic, fluoride-induced condition, in which enamel development is disrupted and the enamel is hypomineralized.^[6] Teeth that develop and mineralize later in life such as premolars have a higher prevalence of fluorosis, and are more severely affected. Rarely are the primary dentition and lower incisors affected.^[7]

The differential diagnosis between fluorosis and non-fluoride-induced opacities needs to establish differences between symmetrical and asymmetrical and/or discrete patterns of opaque defects. These criteria imply that all symmetrically distributed and non-discrete opaque conditions of enamel are fluorosis. Different treatment plans have been proposed for the treatment of discoloration in the fluorosed teeth depending on the severity of the fluorosis.^[8]

It has been reported that the more severe the enamel fluorosis, the more deep-seated the subsurface porosities. Thus, Akpata suggested that mild fluorosis should be managed by bleaching (using Mc Innes solution), as the subsurface porosities may be sufficiently superficial for the entrapped extrinsic stains to be removed by the bleaching agent.^[9] To make it easier for the bleaching agent to penetrate to the area of enamel subsurface porosities, the hypermineralized surface enamel may be etched with phosphoric acid. Enamel microabrasion technique (using 18% HCl mixed with pumice slurry) can be considered a definite treatment for teeth with mild or moderate fluorosis before bleaching. If there is no improvement after 12-15 application of the acid, then another procedure must be chosen.^[10] In cases of severe dental fluorosis the tooth enamel usually becomes porous and tooth whitening methods are not recommended.^[4] A direct composite restoration was a conservative alternative for such cases which offered the ability to

correct the shape and the contour of teeth in addition to the removal of discoloration.^[2]

In this case we discuss the minimally invasive technique using a direct composite veneer to remove the fluorosis induced browns spots as they are becoming more popular in repairing cosmetic defects and deliver an esthetically pleasing smile (Pincus, 1937). This procedure requires less removal of tooth structure compared to a full coverage crown, less expensive and less time consuming to complete the procedure. During preparation with tapered bur, the light chamfer gingival margin provides greatest strength for composite veneer.^[4] The optimum etching times are 15 seconds for healthy enamel and mild fluorotic enamel, and 30 seconds for moderately fluorotic enamel. For the severely fluorotic enamel, the etching did not provide optimal surface roughness and depth profile values, and the clinical success for this condition is uncertain depended on whether the surface enamel was intact or detached. The use of a micro-abrasion to remove external layers of fluorosed enamel prior to application of phosphoric acid could help to improve the enamel surface, providing a better retention for adhesive bonding applications.^[11] In addition to direct composite veneers, preformed universal templates offer more benefits in clinical practice. They are easy to use, enhance clinical productivity, saves time (minimal time required for carving and polishing), requires minimal preparation and is cost effective.^[12] Surface smoothness, polishability, luster (surface gloss), specific shade attributes and techniques all play important roles in the achievement of optimal esthetics. Microhybrid composites currently are the predominant direct esthetic restorative materials used since their physical and mechanical characteristics are generally superior to those of conventional composites. They have almost universal clinical applicability while flowable composites offer favorable wettability, ease of use, and handling properties make them suitable to use in non-stress bearing areas.^[13] The colour stability of flowables is an important factor to

maintain the longevity of these restorations relating to aesthetic concerns.

CONCLUSION

Direct composite veneer using Uveneer facial templates provides improved esthetics, cost and time effectiveness due to absence of laboratory procedure and completion of work in few appointments. This minimally invasive technique is a better option in treatment of dental fluorosis as compared to full crown coverage restorations.

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