

## Case Report

# TREATMENT OF GENERALIZED DENTAL FLUOROSIS WITH COMPOSITE RESIN VENEER USING A MINIMALLY INVASIVE TECHNIQUE: A CASE REPORT AND REVIEW

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## INTRODUCTION

Esthetics plays an important role in any individual's life and discoloration of teeth can have a tremendous effect on overall quality of life. Discoloration of teeth can be (a) extrinsic stains or (b) intrinsic stains. Intrinsic stains being more complicated to treat compared to extrinsic stains. The increased incidence of dental fluorosis in developing countries over the last few decades is considered to be largely due to the wide spread usage of fluoride. Discoloration due to fluorosis can affect both vital and non vital teeth. Vital teeth may be discolored at the time the crown formation with causative factors including hereditary disorders, medications (particularly tetracycline preparation), excessive fluoride and high fever associated with early childhood illness and trauma. The presence of excessive fluoride in drinking water and other sources at the time of teeth formation can result in a type of intrinsic stains called fluorosis Edward (2006). Esthetic changes in permanent dentition are of greatest concern in dental fluorosis, which occur more commonly in children who are excessively exposed to fluoride between 20 and 30 months of age. Skeletal and Dental fluorosis has been discussed extensively in literature with a common consensus that the critical period of over exposure is between 1 and 4 years of age Rodrigues *et al.*, (2002). 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). India is in the geographical fluoride belt that extends from Turkey to China, with nearly 12 million of the 85 million tons of fluoride deposits on the earth's crust being found in India. It is therefore not surprising that dental fluorosis is endemic across 15 states of India. The highest rates of endemic fluorosis have been reported from Andhra Pradesh , Haryana , Karnataka , Tamil Nadu, Uttar Pradesh, Assam , Kerala , Maharashtra , Rajasthan, Gujarat , Bihar , West Bengal , Delhi and Orissa Jagan (2008) . Restoration of discolored anterior teeth and re-establishing a radiant and confident smile is a daunting task even to the most astute clinicians. Modern dentistry provides us many techniques and materials in our armamentarium to create the esthetically perfect smiles Keri (2009). Generalized fluorosis of anterior teeth can be cosmetically treated , but the cost of the success can vary significant depending on the treatment options include tooth bleaching , microabrasion and direct composite veneer / or porcelain veneer and crown Dental (2009). The option in direct composite veneers can also be considered in the treatment plan in circumstances where conservative treatment are not only indicated but should be used as primary therapy before resorting to more invasive procedures. It is great alternative to full coverage crown 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 with direct composite veneer.

## CASES

A 17 years old female patient hailing from district Unnao in Uttar Pradesh, known for its high fluoride content in water, reported to the Department of Conservative Dentistry and Endodontics at our centre with chief complaint of discoloration of anterior teeth (Figure 1). Examination revealed severe brown stained enamel surfaces in all teeth with a good periodontal status and no radiographic evidence of hard tissue

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disease. Temporomandibular joint was asymptomatic and dentition was caries free with non contributing medical history.

A differential diagnosis of dental fluorosis, idiopathic white flakes of enamel, discoloration from tetracycline's and hypoplasia was formed. Final diagnosis of dental fluorosis classified as Dean's severe type was reached Dental (1998). The treatment options included the use of porcelain fused to metal (PFM) crowing, vital bleaching, microabrasion, direct resin composite veneering involving minimal tooth preparation and porcelain veneering. Based on discussions with the patient about treatment plan, resin composite veneering with minimal tooth preparation was planned.



**Figure 1: Preoperative clinical photograph**

### **PROCEDURE**

Supragingival scaling 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. Both mandibular central and lateral incisors were minimally prepared with a coarse diamond bur. A window preparation was made to a depth roughly equivalent to half the width of the thickness of the facial enamel ranging from 0.5mm mid-facially tapering down to a depth of about 0.2mm along the gingival margin. A light chamfer finish gingival margin line was given and the preparation cleaned with pumice slurry, water washed and dried. The preparation was etched with 34% phosphoric acid for 30 seconds, rinsed with water and air dried. A single layer of bonding agent (prime and Bond NT Dentsply Calk) was applied according the manufacturer direction and cured for 10 seconds with the visible light source. A thin layer of hybrid composite (A3-esthetic-X micro restorative Densply Caulk) was incrementally applied to the tooth surface and light cured for 40 seconds. Finally shaping was done with afluted carbide bur on the facial surfaces, excess was removed and contouring at the gingival and labial margin performed. Finishing, contouring and polishing were done with a super snap mini kit (shofu) and polishing was done with a super snap mini kit (shofu) and polishing paste. At the end clinical photographs were taken (Figure 2) to evaluate the post operative smile design (Figure 3).



**Figure 2: Post operative clinical photograph**



**Figure 3: Post operative smile design**

Then the patient was recalled for post operative check up on next day. In second visit mandibular premolars were prepared and the same procedure was conducted for each tooth. In third visit maxillary anteriors and premolars were restored in the similar manner. The patient was come to regular follow up to 2months.

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### **DISCUSSION**

The differential diagnosis between fluorosis induced stains and non fluoride induced opacities needs to establish differences between symmetrical and asymmetrical and/or discrete patterns of opaque defects (Thylstrup and Fejerskov, 1978). These criteria imply that all symmetrical and non- discrete opaque conditions of enamel are classified under dental fluorosis. Diagnostic difficulties occur most evidently with mild fluorotic conditions. It's important to emphasize that non – fluoride enamel opacities include all categories of opacities not defined as fluorosis i.e. dental hypoplasia, lesion that commonly characterized as discrete, demarcated white or discolored opacities often affecting a single tooth and less frequently multiple teeth with a symmetrical distribution. 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, several treatment options have been described and will depend on the severity of condition. Systemic consideration of most conservative's first choice is vital bleaching which can be done in superficial staining, it does not however respond in case of severe intrinsic stains. Its main disadvantage is prolonged sensitivity because of the increased Intrapulpal temperature and inflammatory changes associated with use of hydrogen peroxide. Tooth whitening in cases of mild fluorosis can be achieved by the abrasion of the outer layer of the enamel in order to remove surface stains. In cases of severe dental fluorosis the tooth enamel usually becomes porous and tooth whitening methods are not recommended as treatment. Treatment for severe cases of fluorosis requires covering the affected teeth with restoration, such as composite veneering / porcelain and full coverage are crowing. In this case we discuss the ability of a minimally invasive technique using a direct composite veneer to remove the fluorosis induced browns spots in an esthetic and functional manner. Direct composite veneers are becoming more popular in repairing cosmetic defects and to resurface teeth such as to make them appear straight and possess an esthetically pleasing smile (Pincus, 1937). Direct composite veneers also have high patient satisfactory rate because they can be replaced in one day, therefore giving immediate results (IDATM, 2006). This procedure requires less removal of tooth structure compared to a full coverage crown, less expensive and less time taking to complete the procedure. In the present case before making the veneers with composite, the tooth was prepared using a large tapered diamond bur. The light chamfer gingival margin provides greatest strength for composite veneer. Composite veneer was prepared by using esthetic-x (micromatrix, Dentsply Caulk), a light cured, micro-hybrid composite designed for use as a direct restorative in all cavity classes in the anterior and posterior teeth. Esthetic-x has excellent polishability, beautiful esthetics, is non-sticky with sculptable handling and exhibits superior properties Esthetic. Direct composite resin has excellent smoothness, strength, color and is relatively easy to use. They require minimal removal of tooth structure and the color and the blending of the restorative material can match almost any tooth color and contour (Gordon and Christensen, 2004). Whereas ceramic veneers are more expensive as they involve custom impression in the dental office and custom fabrication by a dental laboratory technician. The patient very much appreciated the treatment as the discoloration of her dentition was quickly repaired with less cost. Patient was totally asymptomatic during the two month follow-up period and fully satisfied with the treatment provided.

### **CONCLUSION**

Direct composite veneer provides good esthetic result at the lesser cost and time due to absence of laboratory procedure and completion of work in single appointments. This minimally invasive technique is a better option in treatment of dental fluorosis compared to full crown; however studies with larger sample size have to be performed on Indian population before it can become first choice of treatment.

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