

Case study

COMPREHENSIVE SMILE MAKEOVER: A CASE REPORT AND 1 YEAR FOLLOW UP.

ABSTRACT

Introduction: Tooth discoloration due to fluorosis is one of the common causes of an unpleasant smile and can affect individual's self-confidence. Dental fluorosis can be mild or severe, depending on various factors, including duration and amount of fluoride exposure, individual differences, weight, age, degree of physical activity, nutritional factors, and bone growth.

Description: This case report was focused on a comprehensive smile makeover of a patient with discoloration and the treatment planning via rehabilitating the esthetics, form and function of the teeth followed by a successful follow up.

Key Words: Fluorosis, Microabrasion, Bleaching, Porcelain Veneers.

INTRODUCTION

Dental fluorosis becomes a cosmetic concern particularly if it affects the anterior teeth. It can be mild or severe, depending on various factors, including duration and amount of fluoride exposure, individual differences, weight, age, degree of physical activity, nutritional factors, and bone growth. The mild form of fluorosis may appear as small, unnoticeable white streaks. In moderate-to-severe fluorosis, brownish discoloration can

be seen with pitting and abrasion on the enamel surface due to poor mineralization of the enamel ¹.

Bleaching and microabrasion have been recommended for treating mild cases of fluorosis; however, in moderate to severe cases, bleaching and microabrasion are either ineffective or may lead to only transient improvement ², while composite restorations are prone to discoloration, chipping, and debonding. Ceramic veneers are the restoration of choice for moderate to severe cases of fluorosis given their color maintainability, wear resistance, and biocompatibility ³.

Although the causes and characteristics of dental fluorosis have been widely reported, fewer studies ^{3,4} have discussed the proper treatment of fluorosed teeth. The selection of an appropriate treatment plan depends on the severity of fluorosis.

This case report presented a step-by-step aesthetic rehabilitation of a patient with severe fluorosis by using ceramic veneers and crowns.

CASE REPORT

A 32-year old patient reported to the department of conservative dentistry and endodontics with a chief complaint of discoloration and spacing in upper front teeth and wanted treatment of the same. The medical history of the patient was insignificant. On clinical examination, discolored teeth with rotation w.r.t 12, 22, 23 and spacing w.r.t. 12,13,22,23 (Figure 1). The final clinical diagnosis was **moderate fluorosis i.e. Score 3** (Dean's Fluorosis Index) and the treatment plan of microabrasion and bleaching for upper and lower arch followed by full veneer (IPS e.max Press, Ivoclar Vivadent, Schaan, Liechtenstein) crowns wrt 12,22 and ceramic veneers (IPS e.max) wrt 11,13,21,23.

The pre operative shade (4M-3) was matched using VITA 3-D master shade guide. This was followed by microabrasion using slurry of pumice and HCL (Figure 2) with in-office

bleaching (Pola Office – 35% H₂O₂ – SDI Limited, Australia) for upper and lower arch respectively to achieve a uniform shade. This was followed by crown preparation wrt 12, 22 using fine grit flat end tapered diamond bur with a shoulder finish line. Temporization was done post preparation of the tooth.

For the ceramic veneers preparation, depth guides were oriented and tooth preparation was performed 0.8mm into the enamel using round end tapered diamond burs with a chamfer finish line and a butt-joint design. The proximal margin was extended into the facial and gingival embrasures.

Following tooth preparation, gingival retraction was achieved using retraction cords (Ultrapak Cord #00, Ultradent Products Inc., South Jordan, UT, USA) soaked in a hemostatic agent. Impressions were taken with a polyvinylsiloxane material (Kulzer) (Figure 3).

Ceramic veneers were fabricated with a lithium disilicate-reinforced glass ceramic material (IPS e.max). The teeth were cleaned using pumice and ceramic veneers were tried-in using a transparent shade try-in paste (Variolink Veneer try-in paste, Ivoclar Vivadent, Schaan, Liechtenstein) to assess marginal adaptation and shade.

The intaglio surface of the veneer was etched with 10 % hydrofluoric acid (Angelus Industries - Brazil) for 60 seconds, washed and dried. A layer of silane coupling agent (Monobond Plus, Ivoclar Vivadent, Schaan, Liechtenstein) was applied on the veneers' fitting surfaces and gently air-dried after one minute. Then, the prepared teeth were isolated and etched using 37% phosphoric acid for 30 seconds, rinsed, and dried. A clear mylar strip was placed interproximally to prevent inadvertent bonding to the adjacent tooth and to facilitate the subsequent removal of excess resin cement in the embrasures. A layer of universal bonding agent (3M- universal bond – 3M Industries, USA) was applied on prepared tooth surface.

The inner surface of the veneers was covered with light-cured resin cement (Variolink Veneer, transparent shade, Ivoclar Vivadent, Schaan, Liechtenstein). Veneers were positioned appropriately on the teeth by applying gentle pressure (Figure 4), following

which excess resin cement was carefully removed with an explorer before light curing. Light curing was first performed for 2 seconds, and the excess resin cement was removed with a microbrush. After that, each veneer was light-cured from the facial aspect for 40 seconds and from the lingual aspect for 40 seconds. The two veneers of the central incisors were first simultaneously cemented. This was followed by cementation of the veneers of the two lateral incisors. Then, the veneers of the two canines were cemented.

Minimal gingival flash of the resin luting cement was removed with a number 12 scalpel blade. A flame-shaped fine diamond bur was used to finish the ceramic margins and to contour the embrasure surfaces. Flossing was performed to ensure interproximal contact patency. Occlusion was assessed and adjusted. Ceramic polishing was performed using a series of polishing cups and points (OptraFine polishing system, Ivoclar Vivadent, Schaan, Liechtenstein). Interproximal contacts were finished with finishing and polishing strips. Final surface luster was achieved by using a diamond polishing paste with a rubber prophylaxis cup. The postoperative clinical photographs are shown in Figure 5 and the patient was satisfied with the final shade i.e. 2M-3.

The patient was recalled after 7 days, 3 months and 1 year for follow up. (Figure 6)

DISCUSSION

Dental fluorosis is a tooth malformation characterized by outer hypermineralization and subsurface hypomineralization, and it is caused by the chronic ingestion of fluoride during tooth development ⁵.

Treatment options for dental fluorosis include micro/ macro etching, bleaching, composite restorations, veneers, and full crowns. Other conservative techniques for treating dental fluorosis include composite veneers, resin infiltration, and tooth jewelry. Since dental fluorosis is an endemic public health problem, availability of such treatment options can provide better outcomes in patients.

The aim of the treatment in this case was to improve the patient's smile and aesthetic rehabilitation of teeth. This goal was achieved using a combination of microabrasion, bleaching and ceramic veneers, which are the treatment of choice to mask tooth discoloration in cases of moderate to severe fluorosis. To achieve a uniform shade, initial microabrasion was performed which was followed by in-office bleaching. A diagnostic wax up was prepared before the tooth preparation, which enabled the patient to understand the final shape of his teeth. This was followed by tooth preparation extending onto the interproximal area to mask the shade defects and luting of the veneers and crowns.

Ceramic veneers can completely mask the discolored tooth with minimal reduction of sound tooth substance because they require a minimally invasive design preparation. In addition, advances in ceramic materials have facilitated this process. Ceramic veneers provide both predictable and long-lasting aesthetic rehabilitation ^{6,7}

But the main dilemma here is about the efficiency of bonding porcelain veneers to fluorosed teeth, if it is the same as to non fluorosed teeth or not. In this context, use of an etch-and-rinse adhesive luting procedure performs better than the use of the self-etch bonding system. Moreover, the etch-and-rinse dentin bonding system has no effect on the shear bond strength of glass-ceramics to both non-fluorosed and moderate fluorosed enamel surfaces. ⁸

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 successful restoration with an estimated survival probability of 93.5% over 10 years ⁸. Satisfactory results were obtained in a case of fluorosed teeth restored with porcelain laminate veneers over a 6-year follow-up ⁴. Furthermore, numerous studies have demonstrated acceptable aesthetic outcomes in cases of moderate to severe fluorosis where restoration with porcelain veneers was performed ⁹.

CONCLUSION

Ceramic veneers are considered one of the most popular restorative materials in aesthetic dentistry. They provide excellent aesthetic results when an appropriate treatment plan and protocol are used during the clinical and laboratory fabrication stages. This case report describes the use of a combination of procedures to enhance the appearance of fluorosed teeth, thus improving the patient's smile and, consequently, self-esteem.

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FIGURE 1. Discolored teeth with rotation

FIGURE 2. Microabrasion using slurry of pumice and HCL.

FIGURE 3. Impressions were taken with a polyvinylsiloxane material (Kulzer)

FIGURE 4. Veneers were positioned appropriately on the teeth by applying gentle pressure

FIGURE 5,6. Postoperative clinical photographs

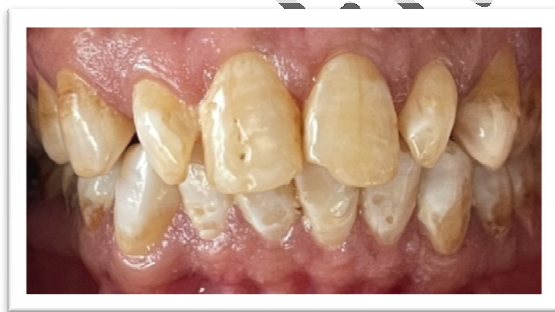


FIGURE 1



FIGURE 2



FIGURE 3

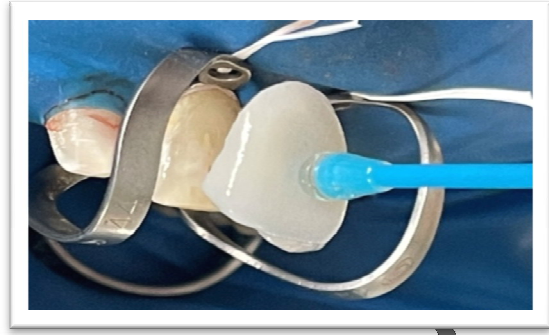


FIGURE 4



FIGURE 5



FIGURE 6

UNDER PEER REVIEW