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Esthetic treatment of severe dental fluorosis using porcelain veneers: A case report

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ABSTRACT

Dental fluorosis is a disorder that causes tooth deformity due to excessive fluoride ingestion during tooth development. Bleaching and micro abrasion have been previously suggested as a treatment for those cases. Though studies now show its ineffectiveness, these options can be used as a transient or temporary enhancement. On the contrary, Porcelain veneers are an excellent candidate to treat these discolorations by their effectiveness in retaining the teeth's color, shape, function and biocompatibility. In this case, a 26-year-old male patient from Yemen presented to Riyadh Elm University Dental Hospital with a chief complaint of generalized teeth discoloration since childhood. This case highlights the use of porcelain veneer to treat the generalized teeth discoloration casing by dental fluorosis. The patient was delighted with the final esthetic outcomes.

Keywords: Dental fluorosis, Porcelain veneer, Esthetic, Teeth Discoloration

1. INTRODUCTION

Dental fluorosis is a common type of intrinsic teeth discoloration caused by excessive exposure to high concentrations of fluoride intake in amounts exceeding the optimal daily dose of 1 ppm during teeth development (Den-Besten and Li, 2011). The clinical consequence of fluorosis is composed of different ranges from mild white opacities of intact enamel to severe brown staining and discrete pitting of the enamel exists. Severe dental fluorosis is considered esthetically unpleasing in both young and adult patients (Nair et al., 2016). This can lead to a negative effect of patient self-perception, social and psycological distress (Nilchian et al., 2018).

Bleaching and micro abrasion of severe dental fluorosis have been shown to be ineffective on enhancing the appearance of teeth. In some cases, these options can be used as transient improvement (Den-Besten and Li, 2011). Porcelain veneers are used to treat severe types of dental fluorosis by retaining color, shape, function and biocompatibility. In comparison to conventional full-coverage crowns, these veneers preserve more tooth structure with teeth preparation. The amount of tooth structure that had to be removed for a porcelain veneer was two to four times less than for a full crown (Edelhoff and Sorensen, 2002; Radwan et al., 2021). Porcelain veneers have been investigated on literature to have high survival rates, color

masking, matching with a good level of esthetic outcome and patient satisfaction in cases of severe dental fluorosis (Al-Jazairy, 2021). This case report describes the aesthetic treatment of dental fluorosis with a ceramic laminate veneer.

2. CASE REPORT

A Yemeni man, age 26, arrived at the dental hospital at Riyadh Elm University with a major complaint of an unattractive smile due to extensive staining of the upper and lower teeth. This discoloration was reported since childhood with his family members who lived in the same area. No systemic disease or relevant medical history was reported. Radiographic examination showed good periodontal status with no alveolar bone loss and few occlusal caries in some of the posterior teeth (Figure 1).

Figure 1 Panoramic radiograph

The occlusion was normal with Angle's Class I dental malocclusion. Dental examination showed generalized brown staining and pitting affecting all the permanent dentition, more prominently seen on upper and lower anterior teeth. The fluorosis stains in this patient were categorized as severe according to Dean's fluorosis index.

3. TREATMENT

Several treatment options were explained and discussed with the patient along with the prognosis and cost of each option such as micro abrasion, resin infiltration, combined of home and in-office bleaching, composite veneering, laminate percaline veneers and crowns. Porcelain veneers for upper and lower anterior teeth were chosen for long-term esthetic results with minimal loss of tooth structure and complete masking of the underlying fluorosis. Intraoral preoperative photographs (Figure 2) with the impression of upper and lower teeth were obtained for diagnosis of teeth and to evaluate the occlusion. Based on the patient's smile, the final treatment included the upper and lower teeth from canine to canine.

The planned teeth were anesthetized and conservative veneer preparation (incisal overlap) was carried out using the depth grooves on the facial surface to achieve a minimal invasion of the teeth. Guidance grooves were created at a depth of 0.3 mm on the gingival surface, 0.5 mm in the middle region and 0.7 mm on the incisal surface. The preparation was extended proximally on the both sides without breaking the contact point to conserve the tooth structure. Using a diamond bur with a flat end and tapered tip, a chamfer finish line was created supragingivally. Afterward, gingival retraction cord number #00 was placed in the sulcus using a hemostatic agent with aluminum chloride. Final impressions with the putty wash technique were taken using polyvinyl siloxane material and an occusal registration was made. Provisional restorations were fabricated with Direct Composite Resin using spot-etching and spot-bonding technique to provide interim esthetics as well as comfort and function to the patient.

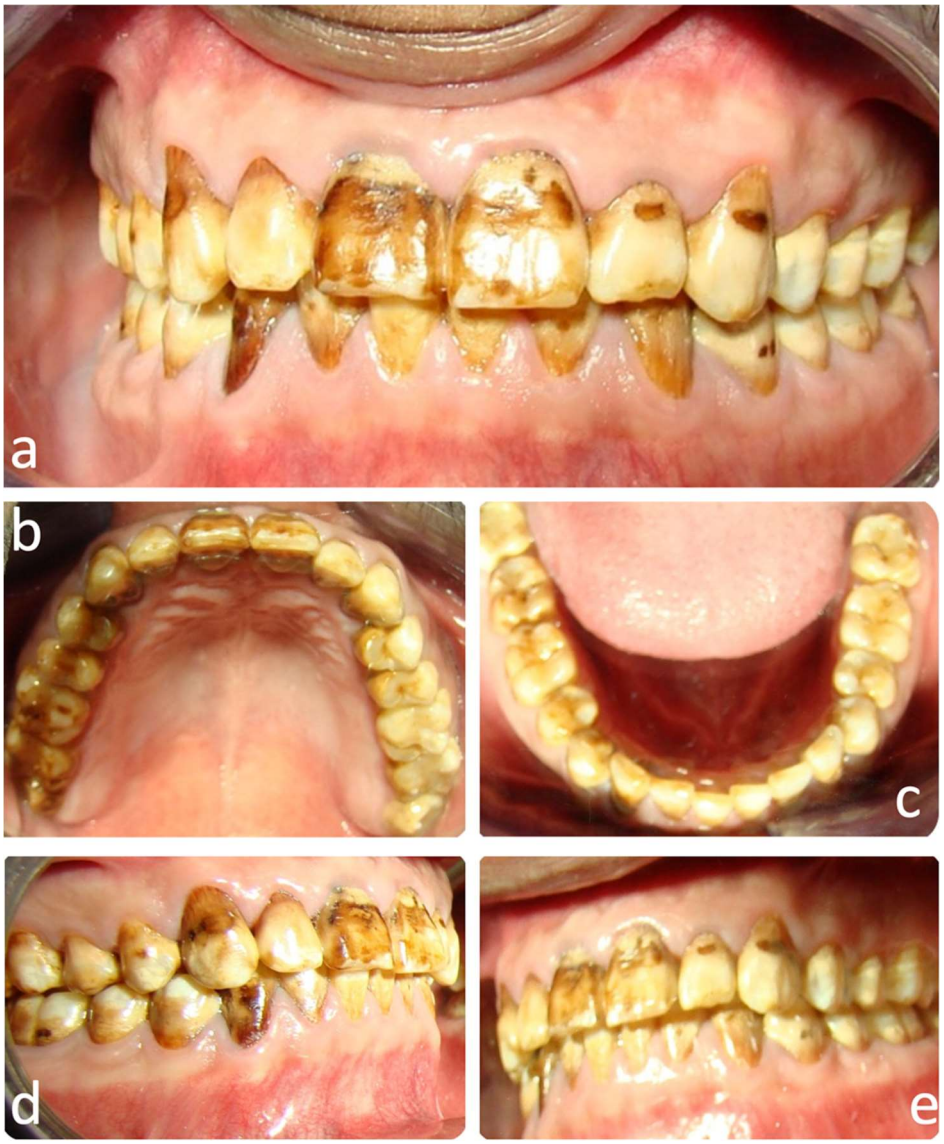

Figure 2 Preoperative clinical photographs: (a) Frontal view, (b) Maxillary occlusal view, (c) Mandibular occlusal view, (d) Right lateral view and (d) Left lateral view

Once the provisional restorations were removed, prophylaxis was done using pumice and a rubber cup to clean all the prepared teeth surfaces for surface treatment of veneers and teeth before the bonding. The inside surface of the veneers was etched for 20 seconds with 5% hydrofluoric acid, then washed and dried, followed by silane application for 60 seconds and air drying. 37% phosphoric acid was used to treat the surfaces of the teeth for 15 seconds, rinsed thoroughly with water and dried. A scrubbing of layer of bonding agent was applied to all tooth surfaces and gently dried for 2-5 seconds followed by curing for 20 seconds.

Dual cure cement was applied on the inner surfaces of veneers and carefully placed on prepared teeth. Flash curing for 5 seconds was done followed by excess cement removal. Final curing was made for 40 seconds on incisal, buccal and palatal aspects. Occlusion was checked in centric and eccentric interferences. The final treatment outcome showed a significant improvement in the patient's esthetics and satisfaction (Figure 3).

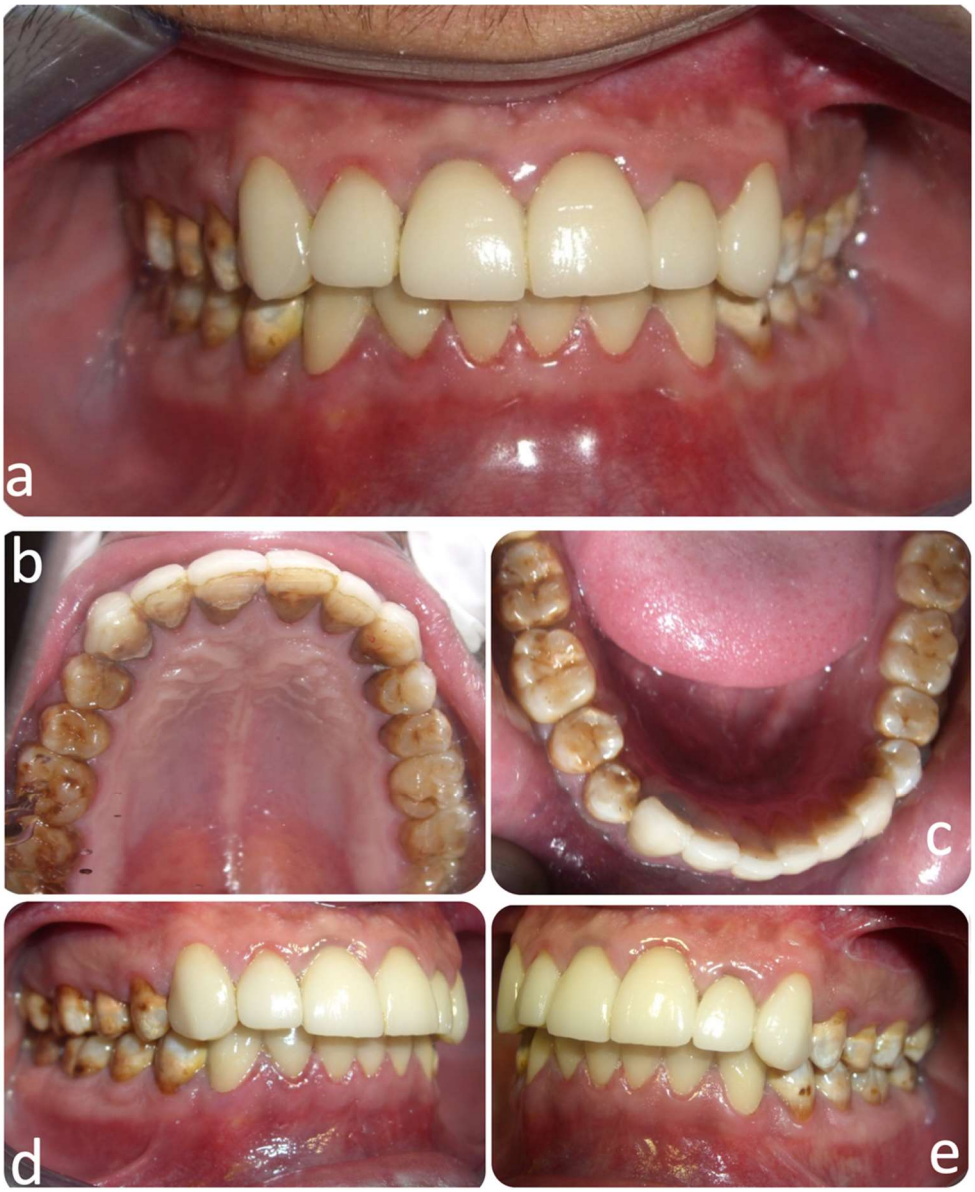

Figure 3 Postoperative clinical photographs: (a) Frontal view, (b) Maxillary occlusal view, (c) Mandibular occlusal view, (d) Right lateral view and (d) Left lateral view

4. DISCUSSION

The unpleasant appearance of teeth caused by dental fluorosis is the result of exposure to excessive amounts of fluoride during development. The patient treated in this case grew up in Al-Dhala governorate, Yemen which is an area that contains a level of (0.31 to 18.30 ppm) fluoride ion in the ground water. It reported that higher dental and chronic skeletal fluorosis is major dental public health problem among population in Al-Dhala basin region (Al-Amry et al., 2020).

Ceramic veneers are the treatment of choice to cover tooth discoloration and improve the appearance of the teeth in patients of moderate to severe fluorosis, where the discoloration and substantial enamel defects are significant. Porcelain veneers have been observed to provide long-lasting and successful treatment in cases with moderate to extensive fluorosis, with a high success rate over 10 years (Demirekin and Turkaslan, 2022).

5. CONCLUSION

This clinical report demonstrated comprehensive esthetic rehabilitation by using porcelain veneers with severe dental fluorosis. The patient was happy with his attractive smile, thus improving self-esteem and psycho-social status with excellent esthetic and functional appearance.

Informed consent

Written and oral informed consent was obtained.

Funding

This study has not received any external funding.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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