

Esthetic Rehabilitation of Severely Discolored Maxillary Anterior Teeth with Porcelain Laminate Veneers: A Case Report

Dr. Shikha Nandal¹, Dr. Himanshu Shekhawat²

¹M.D.S. (Prosthodontics) Senior Resident, Dept. of Prosthodontics, PGIDS, Rohtak, Haryana

²M.D.S. (Prosthodontics) Senior Lecturer, Dept. of Prosthodontics, ESIC Dental College, Delhi

Abstract: Advances in the technology of bonding porcelain to enamel created the possibility of porcelain veneers as an alternative to the use of full crowns for the treatment of many clinical conditions, such as treatment of diastemas, malaligned teeth, worn dentition, chipped teeth, and excessively discolored teeth. Veneers are considered to be a more conservative treatment approach than full crowns because preparation of the teeth for veneers involves less tooth reduction than full crown preparations. This article presents a case report of a patient with severe discoloration of teeth due to fluorosis treated by porcelain laminates in maxillary anterior teeth and hence improving the esthetics of the patient.

INTRODUCTION

It has been the goal of the dentist to fabricate esthetic looking restorations since ages. Porcelain Laminate Veneer is used widely throughout the world for esthetic correction for discolored and damaged tooth structures¹. The presence of metal in porcelain fused to metal restorations prevents light from passing through as occurs in natural teeth, which reduces the final esthetic result, also the metal ceramic restorations exhibit an undesirable greyline at the gingival margin. The all ceramic systems have changed the entire concept of esthetics from yellowish metal ceramics to metal-free ceramics. Laminates are used widely for treating discolored and damaged tooth throughout the world as it mask or reduce the discoloration and can reproduce the characteristics of the tooth structure². Therefore, in recent years, laminate veneer restorations, as a more esthetic and more conservative treatment option, have been used in dentistry^{3,4}.

CASE REPORT

A 22 year old male patient reported to the dept. of Prosthodontics and crown & bridge, PGIDS Rohtak with the chief complaint of severe yellowish discoloration of teeth and wanted to get his teeth whitened for the improvement of his esthetics. After a thorough history taking and intra-oral examination, it was found that patient was having discolored teeth because of dental fluorosis due to intake of fluoridated water during the first 8 years of life [Figure 1].



Figure 1: Pre-operative front view

Various treatment options were explained to the patient i.e bleaching, macro & microabrasion, composite laminates and porcelain laminates. The fluorosis was severe (Dean's Fluorosis Index grade 4 i.e all tooth surfaces affected; discrete or confluent pitting; brown stain present [Figure 2, Figure 3] and hence could not be treated with bleaching or macroabrasion or micro-abrasion.



Figure 2: Pre-operative intra-oral view



Figure 3: Pre-operative occlusal view

The treatment option of direct composite laminates was also dropped considering the less durability and poor color stability of composite laminates. Hence after discussion with the patient it was decided to provide porcelain laminates with respect to tooth numbers 13, 12, 11, 21, 22 and 23 i.e for maxillary anteriors, considering it to be the best conservative and durable treatment approach for this patient. Patient had a deep bite and hence mandibular anteriors were not much visible, thus it was decided not to involve them.

PROCEDURE

1. Diagnostic casts were prepared and mounted on articulator and it was found that this was a case of Class II Div. II with overjet of 5mm and overbite of 5mm. [Figure 4].



Figure 4: Mounted diagnostic casts (a Class II Div I case)

2. Tooth preparations for porcelain laminates with respect to tooth numbers 13, 12, 12, 11, 21, 22, and 23 were done as follows
- The basic principles of tooth preparation were followed. Tooth preparation was done in four parts i.e Labial reduction, Interproximal extension, Cervical marginal placement and Incisal preparation.
 - A three tier diamond depth cutter was used for labial reduction to a depth of 0.5 mm. After preparation of the orientation groove, the remainder of the tooth surface was reduced using round end tapered diamond point. All efforts were made during tooth preparation to remain in enamel, not exposing the dentin since bonding to enamel is most reliable and ensures long lasting and strong bonds.
 - The preparation was extended till the interproximal contact areas without opening the contact points. A deep chamfer margin was prepared. **[Figure 5].**



Figure 5 Tooth preparations for porcelain laminates with incisal overlap # 13, 12, 12, 11, 21, 22, 23

- d. The preparation was also extended on palatal surface (preparation with incisal overlap) **[Figure 6]**



Figure 6 Occlusal view of tooth preparations

- e. The finishing was done using extra fine diamond point.
- Maxillary and mandibular impressions were made after gingival retraction, with vinyl siloxane impression material (Aquasil, DENTSPLY) using the putty-wash technique.
 - Temporization was done immediately using composite resin after spot etching of the prepared tooth surface without bonding.
 - The porcelain laminates were fabricated for 13, 12, 12, 11, 21, 22, and 23. **[Figure 7]**



Figure 7: Porcelain laminates # 13, 12, 12, 11, 21, 22, 23

6. Try-in of the veneers was done to check the marginal fit and shade matching.
7. The internal surface of laminates were etched with 10% HF for 5-10 minutes [Figure 8] followed by application of silane-coupling agent.

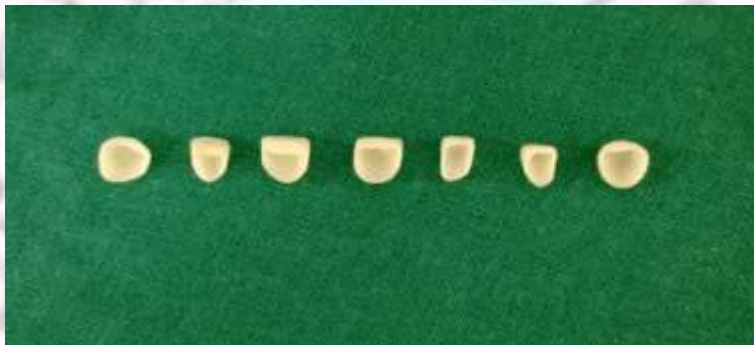


Figure 8: Internal surface of Porcelain laminates etched with 10% HF

8. The tooth surface was cleaned using slurry of pumice and gingival retraction was done to control the gingival crevicular fluid.
9. Acid etching of the teeth was done for 15 sec and the etchant was thoroughly rinsed off. All the teeth surfaces were coated with bonding agent in thin layer and light polymerized for 15 sec.
10. Resin cement (Superbond) was used [Figure 9] for luting of porcelain laminates following the manufacturer's instructions [Figure 10, Figure 11].



Figure 9: Resin cement (superbond) for luting the laminates



Figure 10 Porcelain laminates cemented with superbond



Figure 11 Occlusal view (after cementation)

Thus, the porcelain laminates after cementation improved the esthetics of patient [Figure 12] and the patient was highly satisfied with the esthetics and the overall treatment even after 2 years of follow-up period.



Figure 12: Post-operative front view

DISCUSSION

A veneer is a thin layer of restorative material placed over a tooth surface either to improve the aesthetics of a tooth or to protect a damaged tooth surface. There are two main types of material used to fabricate a veneer, composite and dental porcelain^{5, 6}. A composite veneer may be directly placed (built-up in the mouth) or indirectly fabricated by a dental technician in a dental laboratory, and later bonded to the tooth, typically using resin cement such as Panavia. In contrast, a porcelain veneer may only be indirectly fabricated^{7, 8}.

Bonded porcelain veneers have a number of significant advantages over metal-ceramic or all-ceramic crowns^{9, 10}. One of the most important advantages is that they are extremely conservative in terms of tooth structure. Conservation of tooth structure is a major factor in determining the long-term prognosis of any restorative procedure. Another remarkable advantage of porcelain veneers is their durability. As long as sufficient tooth structure remains to provide adequate support for the bonded porcelain the incidence of fracture is very low. This durability allows minimal reduction resulting in decreased potential pulpal involvement. The periodontal response is outstanding. The restoration can blend imperceptibly with the cervical tooth structure, allowing the cervical margins to be kept in a supragingival position¹². These cervical margins should be placed in enamel; however, with contemporary dentin bonding systems, margins can be successfully placed on the dentin/cementum when necessary¹².

Ceramic laminates give better color stability and wear resistance as compare to direct composites¹³. Thus, ceramic veneers are the most popular choice of treating patients with fluorosis.

CONCLUSIONS

Porcelain veneers are useful adjuncts to dentist armamentaria and they help in the management of esthetic problems, minimizing dental tissue reduction. These are good looking in appearance and also cover up for the damaged or discolored tooth. They require the dentist to pay close attention to detail throughout the whole clinical procedure. A case of porcelain laminate veneers on highly discolored maxillary anterior teeth affected by fluorosis has been discussed in this article.

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