

ESTHETIC REHABILITATION OF ANTERIOR TEETH USING CERAMIC VENEERS: A CASE REPORT

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ABSTRACT: Ceramic laminate are a predictable treatment option for esthetic anterior restorations. This restorative modality can be offered as the treatment option in a wide variety of different cases such as correcting tooth defects, abrasion, orthodontics, diastema, tooth discoloration, coronal fracture or to adjust occlusion. Due to its color and optical properties, ceramic represents the material of choice when a high level of esthetics is required. This article reports the management of a case in which ceramic veneer used to achieve the desired esthetic results.

KEYWORDS: Ceramic laminates, Veneers, Anterior Esthetic Restorations.

INTRODUCTION

Conventional rehabilitation involves the use of full-coverage fixed dental prostheses¹. With the advent of new adhesive techniques and restorative materials, traditional prosthodontic procedures have been replaced by more conservative approaches for the preservation of the hard tissues. Most common among these new techniques is the use of ceramic laminate veneers (CLVs) and partial posterior restorations such as inlays, onlays, and overlays fabricated using ceramic and composite resin.^{2,3}

Studies have shown that ceramic veneers show wear patterns similar to those of enamel, low plaque adherence,⁴ and excellent dimensional stability⁵. Due to its color and optical properties, ceramic represents the material of choice when a high level of esthetics is required⁶. However, this material must be bonded to the tooth structure, and the success of bonding is dependent on surface treatment of the tooth and ceramic.⁷

Case Report

A 20-year male patient with discoloured maxillary & mandibular anterior teeth requested treatment to correct the discoloration. Complete history of the patient along with preoperative photograph was taken (Fig.1). Following a detailed clinical examination, his anterior teeth having brown stains were diagnosed as fluorosis. Non-invasive methods like bleaching were not considered due to severe fluorosis. Ceramic veneers were best suited for the condition.

Prior to beginning preparation of the teeth, mock wax up was done to evaluate the final outcome by closing the spaces present between the lateral incisors and

canines on both the sides in the maxillary arch. The incisal guidance was checked and the intended shade of ceramic veneers was selected.

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The eight cardinal rules for tooth porcelain veneer preparations are:

1. The preparation should be as conservative as possible.
2. It should allow for a covering of approximately 0.5 mm of porcelain without giving the tooth an overly thick appearance.
3. It should not penetrate into dentin if at all possible, especially at the peripheries where leakage is most likely.

4. It should allow for a cleansable gingival margin.
5. It should not include any sharp internal angles, especially at the incisal edge where the stresses will be greatest.
6. It should allow for a path of insertion of the veneer, which is free from undercuts.
7. At least enough clearance must be present interproximally to allow for a mylar strip to be placed between adjacent teeth during fusing.
8. Any area of tooth which is visually accessible should be covered by porcelain.

PREPARATION TYPES

Here are the six basic preparation types:

Type I. Minimal Preparation: In a minimal preparation, no tooth reduction is undertaken except for that necessary to provide a path of insertion that is free from undercuts.

Type II. Incisal Preparation: On occasion, for reasons of shade control, it is advantageous to have a greater thickness of porcelain at the incisal edge than provided by the Type I preparation. In these cases, it is suggested that the dentist cut into the incisal edge in such a way as to allow for an even thickness of porcelain as the incisal edge is approached.

Type III. Over the Incisal Edge: In this design, the porcelain extends beyond the incisal edge and mainly used to laminate already shortened teeth.

Type IV. Over the Incisal Edge with a Lingual Ledge: The Type IV preparation is very similar to the Type III preparation. The difference is that in the Type III preparation, the laminate ends in a knife edge but in the Type IV preparation, the lingual preparation has shoulder finish.

Type V. Maximal Preparation: This preparation type is used whenever maximum bulk of porcelain is desired for masking out underlying discolorations, or whenever any increase in labial bulk must be minimized.

Type VI. Double Preparation: The double preparation is used when the dentist desires maximum change between the natural color of the tooth and the final shade. This preparation consists of two stages. In the first stage the dentist prepares the tooth using a Type I (minimal) preparation and then takes an impression. When the veneers arrive, and after they are tried on for shape and size, the areas of the tooth requiring maximum change in color are reprepared into a Type V (maximal) preparation.

This creates a gap between the veneer and tooth sufficient enough to place a totally opaque masking layer of composite.⁸

Tooth reduction (Fig.2): Type IV reduction was done in maxillary anteriors & Type II reduction was done in mandibular anteriors.

Incisal Reduction: 1.5 to 2 mm incisal reduction was done in all excursive movements of the mandible.

Facial Reduction: After placing depth grooves, the facial surface was reduced to a depth of 0.5mm. Subgingival Chamfer finish line was given.

Lingual Reduction: The lingual margin was placed such that it was above the contact point & shoulder finish line was given.

Proximal Reduction: A long tapered chamfer ended diamond bur was used to create definite gingival and interproximal finishing line angles. The chamfer was taken slightly into the interproximal areas to allow the veneers to cover all the visible aspects of the teeth.

Impression making:

Full arch impressions were made using a polyvinyl siloxane impression material after placement of retraction cord.

Placement of Porcelain veneers on Prepared Teeth: (Fig. 3)

The veneers were tried on the prepared teeth to establish their fit, length, and mesio-distal dimension. The porcelain veneers were tried in using a try-in glycerine medium and the most convenient shade of luting agent was selected.

The retention of the veneer can be satisfactorily achieved by 3 factors:

- (1) Ceramic surface treatment from acid etching with Hydrofluoric acid,
- (2) An application of silane coupling agent to the ceramic material prior to cementing with a resin cement,⁹⁻¹⁶
- (3) Alumina oxide-particle abrasion¹⁷

The application of the silane coupling agent onto the etched ceramic surface increases the chemical bonding between the ceramic and resin materials due to its bifunctional characteristics¹⁸⁻¹⁹.

Silane coupling agents are bi-functional molecules capable of bonding to the OH groups on ceramic surfaces and copolymerizing with the organic portion of the resin cement or adhesive.

Technique:-

- The teeth were etched with 37% phosphoric acid gel for 15 seconds, rinsed with water spray for 30 seconds, and then air dried until a frosty white appearance was observed.



Fig.1. Pre Operative View



Fig.2. Maxillary and Mandibular Anterior teeth veneer reduction done



Fig.3. Post Operative View- Cemented Anterior Porcelain Veneers

- Following this, an adhesive bonding agent was applied on the prepared tooth surface, and light polymerization was performed for 20 seconds.
- The internal surface of ceramic veneers was then treated with 9.5% hydrofluoric acid.
- Silane solution was applied on the ceramic surface for 60 seconds, then air dried gently, and an adhesive bonding agent was applied on the ceramic surface.
- Resin cement (Relyx U 100) was mixed according to the manufacturer's recommendations.
- Mylar matrix strip was placed at the mesial & distal surfaces of the prepared tooth.
- The mixed cement was applied directly to both the prepared enamel and the ceramic.
- The ceramic was placed upon the flattened enamel surface with finger pressure.
- The excess cement was removed with an explorer after the initial polymerization; the resin cement was light polymerized for 40 seconds.
- Accessible margins and occlusion were finished with fine diamonds & finishing strips were used for the interproximal margins.

Conclusion

The success of treatment with ceramic veneers can be assured if the dentist follows a defined protocol with each patient to ensure that all factors such as smile design, margin placement, material and shade selection are considered. Communication between patient, dentist and technician must be rigorously controlled as well. Advances in ceramic materials and Veneering techniques allow practitioners to restore function and esthetics using conservative and biologically sound methods as well as promoting long term oral health.

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