

Esthetic Rehabilitation of Discolored Teeth with Ceramic Veneer- A Case Report

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Abstract: Aesthetic or cosmetic dentistry strives to merge beauty and function with the values and individual needs of every patient. Invention of the latest instruments, techniques and materials opens the door to the dental professionals in the field of conservative and aesthetic restorative dentistry. Veneers are the most frequently prescribed aesthetic restorations today. Ceramic veneers can be considered as the treatment option in a wide variety of different cases such as correction of tooth size discrepancy, discolorations, coronal fractures in teeth, abrasion, for diastema closure and for adjustment of occlusion. This case report highlights the improvement of esthetics in discolored upper anterior teeth with ceramic veneers.

Keywords: Ceramic veneers, Esthetics, Fluorosis, Pitted teeth

I. Introduction

The level of aesthetic requirement in clinical practice has increased over the past decade, and this has made it necessary for the clinician to explore this field in order to satisfy the exacting demand of patients. Discolored, unsightly, malposed, malformed anterior teeth and midline diastemas can make the individual psychologically depressed and socially less active. Esthetic dentistry strives to merge beauty and function with the values and individual need of every patient.

Since their introduction in the early 1980s ceramic veneers have been used widely as a primary choice of restoration in esthetic dentistry¹. They allow practitioners to restore function and esthetics using conservative methods as well as promoting long term oral health. A veneer is a layer of tooth-coloured material that is applied on a tooth to restore a localized or generalized defect and intrinsic discoloration². Ceramic veneers are thin bonded restoration that restores the facial surface and part of the proximal surfaces of teeth requiring esthetic restoration. They were introduced into dentistry as Hollywood veneers by Pincus, with survival rates ranging from 92% at 5 years to 64 % at 10 years³. One of the common reasons involved in teeth discoloration is dental fluorosis, which affects aesthetics⁴. Mc Kay and G.V. Black in 1916 published that fluoride can have beneficial effects on dental caries owing to its topical effect on teeth erupted in the oral cavity and show detrimental effects due to systemic absorption during tooth development resulting in dental fluorosis⁵. Dean and McKay suggested that optimum level of fluoride in water should be below 0.9 - 1.0 PPM⁶. Dental fluorosis is found to be true in individuals consuming drinking water containing upto 8.0 ppm fluoride, which is about eight times the recommended amount. Its clinical manifestations vary from white flecks on surface of enamel to severe brownish pigmentation with pitting of enamel surfaces. Various treatment options are available for dental fluorosis. The present case report describes the treatment of discolored anterior teeth with thin ceramic laminate veneers, to restore esthetics and function.

II. Case Report

A 21 year old female patient reported to the Post Graduate Department of Conservative Dentistry and Endodontics, Guru Nanak Institute of Dental Sciences and Research with the chief complaint of unaesthetic smile due to discolored teeth. Clinical examination revealed that all maxillary anterior teeth were discolored with brownish bands of discoloration prominently on the middle third and cervical third with presence of pits or grooves. Medical history were non-contributory. Intraoral examination revealed dental fluorosis involving the incisors with cracks identified under illumination. The teeth showed positive response during vitality testing. Radiographic and clinical examination did not reveal any periapical pathological condition, so esthetic correction with ceramic veneers on maxillary anterior teeth were planned. The shades of ceramic veneers were chosen and incisal guidance was checked.



Fig 1-Preoperative clinical examination of anterior

Tooth reduction started of teeth#11,#12,#21,#22 from the labial surface using depth cutting burs from mesioproximal line angle to distoproximal line angle. Three depth cuts in each cervical, middle, and incisal third of the teeth were prepared with the dimension of 0.3, 0.5, and 0.7 mm, respectively. The lingual margins were placed above the contact point to give a wrap around appearance. A long tapered chamfer ended diamond bur was used to reduce the buccal walls, creating definite gingival and interproximal finishing line angles. The bur was taken slightly into the interproximal areas to allow the veneers to cover the visible aspects of all teeth. Preparation was finished with yellow colour fine grit finishing diamond point. Gingival retraction was performed using retraction cord and chemical retraction agent. Full arch impressions was taken with a polyvinyl siloxane impression material and an occlusal registration was made with bite registration wax. Lab instructions included the underlying and final shades, the desired length, width and position of anterior teeth. At the dental laboratory, refractory stone models of the prepared teeth were made and two veneers from Emax porcelain were fabricated.



Fig 2,3-Tooth reduction of teeth #11,#12,#21,#22

Ceramic veneers were etched with 9%Hydrofluoric acid in the laboratory. A silane coupling agent (Pulpdent Corporation, USA) was applied to the internal surface of the veneers for 60 seconds and air dried. The prepared surfaces of teeth were cleaned with pumice slurry using rubber cup attached to a contra angle hand piece to remove the smear layer. The prepared teeth were etched using 37% phosphoric acid for 15 seconds, washed with water and dried with tissue paper. Bonding agent (Para Bond,Coltene whaledent) was applied on

the prepared teeth as well as on the bonding surfaces of veneers with the help of micro-applicator but not cured since curing may hinder the seating of veneers. Dual cure resin crown and bridge luting agent (Paracore, Coltene whaledent) was used for cementation. The veneers were spot cured for 5 seconds initially. Excess cement was removed with B.P. blade no. 12 and then complete curing was done for 20 seconds from each side. Proximal finishing was done using proximal abrasive strips. On completion of the cementation procedure, the occlusion was checked in centric and eccentric positions for interferences. The high points were removed and polished.

III. Discussion

Several treatment options have been proposed to restore the esthetics and self-esteem of a patient with discolored anterior teeth. For many years, the most predictable and durable aesthetic correction of anterior teeth has been achieved by the preparation of metal-ceramic or all-ceramic crowns. However, this approach is undoubtedly most invasive with significant removal of large amount of sound tooth structure and with possible adverse effects on adjacent pulp and periodontal tissues. The great progress in bonding capacity to both enamel and dentin made with the introduction of multi-step total-etch adhesive systems⁷ along with the development of high performance and more universally applicable small particle hybrid resin composites has led to a more conservative restorative procedure to deal with unaesthetic tooth appearance. However, such restorations still suffer from a limited longevity, because resin composites remain susceptible to discoloration and staining, marginal fractures and wear, thereby reducing the aesthetic result in the long term.

Another alternative treatment option is the use of Compoener which are polymerized, pre-fabricated nano-hybrid-composite veneers with excellent homogeneity and stability of the enamel shells. The extremely thin veneer coatings of 0.3 mm allow a high level of conservative tooth preparation. But they also have less durability and they show increased wear and staining. In search for more durable aesthetics, ceramic veneers have been introduced during the last decade. One of the most important advantages of ceramic veneers is that they allow conservative tooth preparation, keeping clear of the gingival margins, mainly confined within enamel, thus respecting mechanical, periodontal, functional and esthetic principles. They preserve the soft tissue integrity which constitutes one of the main advantages of this technique. They are suitable for young adults who have large pulp chambers and pulp horns close to the enamel surface. Another remarkable property of ceramic veneers is their durability. They are both resistant to abrasion and provides precise color stability and translucency similar to that of natural tooth. As long as sufficient tooth structure remains to provide adequate support for the bonded ceramic the incidence of fracture is low. Their durability allows for minimum tooth reduction resulting in decreased potential for pulpal involvement. The periodontal response is also outstanding. The restoration can blend imperceptibly with the cervical tooth structure, allowing the cervical margins to be kept in a supragingival position⁸. There is minor degree of tissue damage occurring during tooth preparation or making an impression. Also ceramic veneers provide easy access for toothbrush or dental floss to the margins thus promoting good maintenance of the periodontal tissues.

Care must be taken to maintain the preparation completely in enamel to achieve an optimal bond with the ceramic veneer. The vast majority of teeth receiving ceramic laminate veneers should have some enamel removal, usually approximately 0.5 mm, which allows for the minimal thickness of ceramic. Etching the inner side of the ceramic veneer with hydrofluoric acid and subsequently silanizing the etched surface makes the bond strength of a luting composite to the etched ceramic surface higher than the bond strength of a luting composite to etched enamel. The strength of the combined ceramic/luting composite/enamel bond (63 MPa) was significantly higher than the separate luting composite/etched enamel (31 MPa) and luting composite/etched-and-silanized ceramic (33 MPa) bond strengths. 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. When utilizing anterior veneers the current evidence suggests that when all of these factors are thoroughly considered, dentists can achieve predictable results which are satisfactory to their patients. This article describes the treatment of four anterior teeth with ceramic veneers. Excellent esthetics was achieved with minimal tooth reduction and higher bond strength.

IV. Conclusion

Advancement in the technique, ceramic materials, and luting cements made ceramic veneering the most accepted treatment for esthetic correction of the anterior teeth over full coverage restorations, direct composite restorations and composites. Detailed planning, correct selection of dental materials, shade and quality communication with the prosthetic technician contributed to a harmonious smile and satisfaction to both the patient and clinicians.

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