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Optimizing Esthetics with Ceramic Veneers: A Case Report

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Abstract : *Veneers are the most frequently prescribed aesthetic restorations today. Ceramic veneers 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. This case report describes the restoration of the anterior dentition with porcelain laminate veneers. The advances in bonding of porcelain to tooth structure make this treatment a feasible alternative to restore teeth with alteration in shape and position in cases in which the esthetic demand is high. Before preparing the teeth a complete analysis should be carried out in order to optimize the result. In this way it can be ensured that the teeth being veneered will need only minimal preparation, or in some areas none at all.*

KEYWORDS: *SMILE, CERAMIC VENNEERS, EROSION*

I. Introduction

Since their introduction in the early 1980 ceramic veneers have gained wide acceptance as a primary mode of restoration in esthetic dentistry1. As patients esthetic expectations continue to increase, dental teams are challenged to identify a systematic approach for achieving natural oral and facial esthetics with ceramic veneers. 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 health2,3. Esthetics, treatment planning and clinical care should be considered in accordance with the interrelationship between the teeth, gingival tissues, lips and face. Considered as to how the facial and physiological parameters can influence a natural smile design must also be taken into account. Because ceramic veneers are primarily indicated for the improvement of aesthetics, the design of the smile should respect the symmetry and the harmonious arrangement of dento-facial elements.

The laminate veneer facings have greatly evolved and presently can be divided into two broad categories: Indirect veneers and Direct veneers.

Indirect veneers: Indirect veneers include -Preformed laminates, Lab fabricated acrylic resin, Microfill resin and Porcelain veneers.

Direct veneers: Composite resin veneers which are free-hand placed. Porcelain veneers are more stable and have better esthetics. If a porcelain veneer is bonded with a correct adhesive technique and optimal oral hygiene care is maintained, studies have shown that the long-term survival rate of veneers is very high.[6-8]

II. Case report

A 30-year-old male patient reported to the Department of Conservative Dentistry and Endodontics at K M Shah Dental College and Hospital, Vadodara with a chief complaint of chipped of restoration with upper front teeth region. The patient had been asymptomatic and gave a history of restoration which had been chipped 4 months back. The patient gave a history of gastro-esophageal reflux disease and history of restoration with upper anterior 6 months back. Chipped of tooth coloured restoration was seen in relation to upper right and left central incisor (11 and 21). There was absence of tenderness on percussion, sinus tract was absent with no signs of bleeding on probing and periodontal pockets. Midline diastema was present between upper right and left central incisors (11 and 21).

2.1 Investigation:

An intraoral periapical radiograph was taken which demonstrated no abnormality with detected with both upper left and right central incisors. Electric pulp testing for 11 and 21 showed a normal response and 11, 12, 22. 21 were responsive on cold test. Based on clinical and radiographic findings, the diagnosis of chipped of restoration and erosion with 11 and 21.

2.2 Treatment:

Before the commencement of the treatment, oral prophylaxis was done in the patient. Various treatment options were discussed which included ceramic veneers and composite veneering. Owing to its minimally invasive nature and excellent aesthetic qualities it was decided to enhance his appearance using porcelain laminate veneers with upper central incisors. Maxillary and mandibular diagnostic casts were made. The colour of ceramic veneers was selected and incisal guidance was checked. Depth orientation grooves were placed on the facial surface of the tooth with 0.3mm and 0.5mm three-wheel diamond depth cutter on the gingival half and incisal half respectively. The structure remaining between the depth orientation grooves were removed with a round end tapered diamond. Doing so, the aprismatic top surface of mature unprepared enamel, which is known to offer only a minor retention capacity, was removed. A chamfer finish line was placed lightly subgingivally in the maxillary anterior teeth Distally the tooth preparation was extended into the contact area but terminated facial to the contact area.

An overlapped incisal edge preparation was chosen because incisal overlap provides a vertical stop that aids in the proper seating of the veneer. The veneer extended onto the lingual surface will enhance mechanical retention and increase the surface area for bonding. All sharp angles of the preparation were rounded off. After gingival retraction, impression was made with polyvinylsiloxane by putty-wash technique. Temporary restoration was done with light cured composite resin.

2.3 Veneer Cementation:

The temporary veneers were removed; the teeth were cleaned using pumice and was dried. The porcelain veneer made up of IPS-emax was tried on to the tooth with selected shade of try in paste to verify its color and fit . The esthetics and fit were acceptable, the veneers were removed from the tooth, rinsed thoroughly, and dried. The inner side of porcelain veneer was etched with 5% hydrofluoric acid (IPS Ceramic etching gel) for 20 seconds, washed under running water and dried.A layer of silane coupling agent (Monoborid-S, Ivoclar vivadent) was applied on the inner surface of veneer and gently air dried after one minute.The silane coupling agent forms a chemical bond between the porcelain and resin, besides it also reduces the marginal leakage and discolouration.

The silanized surface was then coated with a thin layer of bonding agent thinned with air from the air syringe. The resin layer was polymerized with light. The prepared teeth were etched with 37% phosphoric acid for 30 seconds, rinsed thoroughly and dried. A layer of bonding agent (Adper single bond 3M ESPE USA) was applied on to the tooth surface. A dual cure resin cement (Variolink II, Ivoclar vivadent, Liechtenstein) was used for bonding the veneer to the tooth.. The selected shade of base paste and catalyst paste were mixed in proportion to get the shade that was obtained during the try in stage, and a layer of cement was applied on the inner surface of veneers. The veneers were then positioned on the teeth correctly with slight pressure, the excess cement was removed with a brush.

Light curing of the luting composite was done through the Liquid strip for 10 seconds and the veneers were tacked to the teeth. After the initial set the remaining excess cement was removed. The polymerization was continued for 60 seconds by directing the light initially from lingual side, so that the resin cement shrinks towards tooth providing more retention. Then each segment of veneer was light cured for 40 seconds. Occlusion was checked to ensure that no contact existed on tooth-porcelain interfaces. The patient was satisfied with his new smile

Figures

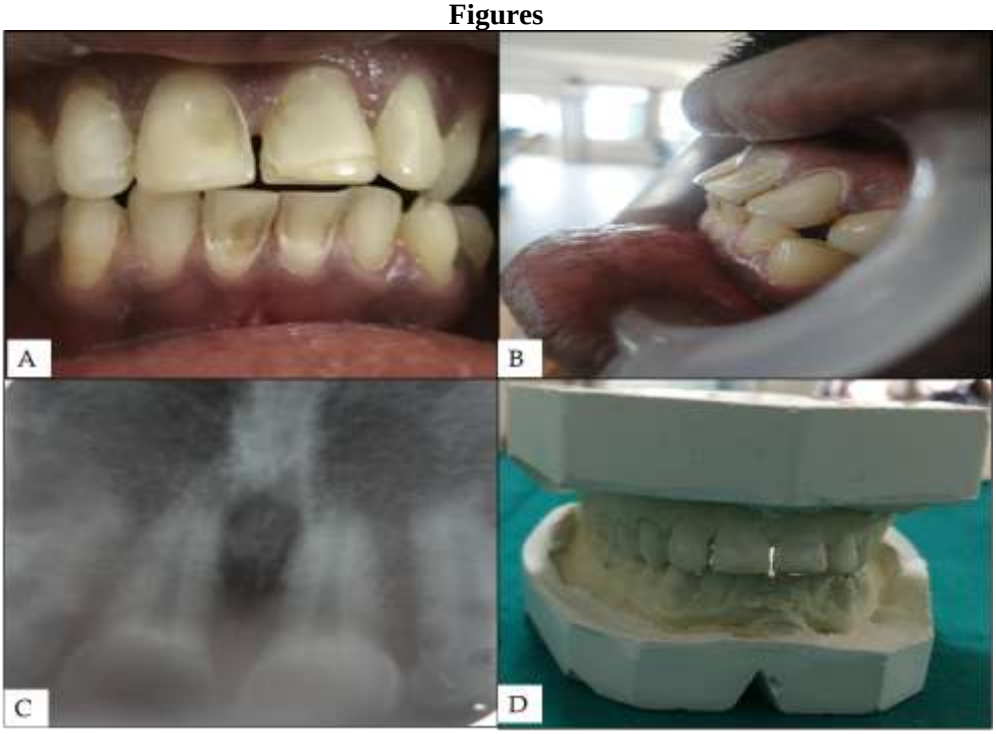

fig 1: A and B) pre-operative clinical photograph C) Pre-operative radiograph D) Diagnostic Cast

fig 2: A) Labial preparation of veneers B) incisal overlap preparation

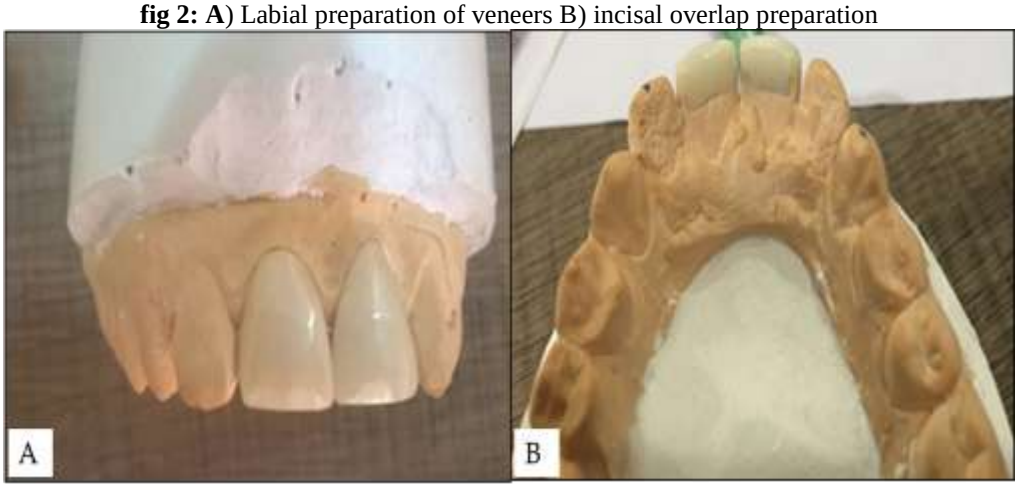

fig 3: Laboratory Preparation. A) Labial Surface B) Incisal overlap

fig 4: Post-operative Photograph

III. Discussion

Ceramic veneers have been shown to be a good conservative and aesthetic treatment option. However, they do have limitations and it has been shown that lack of enamel is one of the main causes of failure. Before treating a patient with ceramic veneers, the favourability of the environment should assessed. If this is not favourable and margins will be on dentine or if excessive enamel will need to be removed, then alternative/adjunctive treatment options should be considered eg orthodontics and or periodontics. It is important to follow correct treatment protocols and strive for clinical and laboratory composite thickness ratio of above 3:1. When this ratio is large, the forces created by the polymerisation shrinkage of the luting cement may cause fracture of the thin ceramic veneer. Post bonding cracks are an acknowledged, rare, complication of ceramic veneers.[1,6,7,9]

Tooth veneering is a minimally invasive procedure that enables the practitioner to apply biomimetic principles in cosmetic dentistry, finding a balance between ceramic and enamel. The great majority of restorative procedures violates the balance between enamel and dentin in natural teeth.

Unlike these procedures, the use of ceramic veneers offers an excellent combination of hardness, resistance, and resilience.15,16 According with Magne and Belser 13, a tooth restored with a ceramic veneer that is subjected to posterior-anterior force recovers 89 to 96% of its coronary stiffness when compared with a healthy tooth.

The IPS Empress Esthetic ceramic system used in our case contains leucite crystals dispersed in a glass matrix, forming a homogeneous interlocking structure that prevents internal crack propagation.[10-12] The composition and injection molding mechanism of this system provide an increase in flexural strength and fracture resistance when compared with the conventional ceramic system. These characteristics contribute to an easier and faster execution of the clinical and laboratory steps involved in restoration. They also enable the production of very thin veneers, further reinforcing the minimally invasive aspect of the technique.

Clinical factors such as remnant/substrate color, laminate thickness and luting system are known to potentially interfere with the final esthetic result. That said, the professional may resort to clinical interventions prior to optimizing esthetic results, as well as promote the use of minimally invasive or conservative techniques.[13,14]

IV. Conclusion

Etched porcelain veneer technology has demonstrated long-term clinical success. The minimally invasive, conservative ceramic veneer technique is an extremely versatile clinical procedure, with excellent esthetic results when performed according to a well-designed treatment plan and a strict protocol during the clinical and laboratory stages. Ceramic veneers can be a better choice as compared to composites as it is more esthetic and more conservative than full veneer crown.

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