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Smile Enhancement in a Patient with Tooth Discoloration: A Case Report

Dr. Chitra Kiri[1]; Dr. Rajesh Kumar[2]; Dr. Sunil Kumar M.V.[3]

[1]PG Student, [2]Professor & Head, [3]Professor

[1, 2, 3] Department of Prosthodontics Crown and Bridge, Jaipur Dental College, Jaipur, Rajasthan, India

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Abstract:

- ***Background:***

The demand for esthetic dental treatments has significantly increased in recent years, with ceramic veneers emerging as a popular option due to their superior esthetic and functional properties. Veneers offer a conservative solution to manage spacing, discoloration, and minor malalignment without extensive tooth reduction.

- ***Case Report:***

A 26-year-old male patient presented to Department of Prosthodontic crown and bridge with a chief complaint of aesthetic concerns regarding his front teeth. The patient expressed dissatisfaction with the discoloration of anterior tooth and slight asymmetry of the lower tooth, which affected his smile. The patient sought treatment to improve dental aesthetics and achieve a more harmonious smile. The patient was highly satisfied with the final outcome in terms of both function and appearance.

- ***Conclusion:***

With appropriate case selection, meticulous planning, and execution, ceramic veneers provide an effective, minimally invasive solution for smile enhancement. This case reinforces the importance of adhesive protocols and demonstrates the long-term viability of E. max veneers for anterior esthetic rehabilitation.

Keywords: *Ceramic Veneers; E. Max; Esthetic Dentistry; Lithium Disilicate; Tooth Preparation; Smile Design; Veneer Bonding; Adhesive Restoration; Minimally Invasive Dentistry.*

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I. INTRODUCTION

The concept of aesthetics originates from the Greek term “aisthetike,” which was introduced by philosopher Alexander Gottlieb Baumgarten in 1735. He defined it as the study of perception through the senses. In dentistry, esthetic or cosmetic dentistry refers to the application of artistic and scientific principles to improve or restore an individual’s dental appearance within the confines of functional and biological parameters.

When dealing with teeth that are malformed, slightly misaligned, or minimally damaged, conservative restorative methods using direct and indirect adhesive materials can achieve significant aesthetic enhancements with minimal invasiveness and preservation of natural tooth structure.

Resin composites are commonly utilized to mask discolorations or reshape teeth. Despite their versatility, these materials are prone to discoloration, staining, wear, and marginal fractures, which may compromise their long-term aesthetic performance.[1] Laboratory polymerization of composite resins—whether by light, heat, or other techniques—causes most of the shrinkage to occur before the restoration is placed. This means that only a thin luting layer undergoes shrinkage at the interface between the tooth and the restoration, reducing marginal gaps and minimizing issues like sensitivity, leakage, recurrent caries, and staining. Additionally, laboratory curing enhances polymerization efficiency, thereby improving physical properties such as hardness and tensile strength, contributing to the durability of the restoration.[2]

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In 1938, Charles Pincus introduced porcelain veneers to enhance the smiles of film actors temporarily. These veneers soon gained popularity due to their excellent aesthetic qualities, durability, and precise marginal adaptation, along with good soft tissue compatibility. Moreover, they conserve more natural tooth structure compared to traditional full-coverage crowns, including those made from porcelain-fused-to-metal or all-ceramic materials.

Laminate veneers emerged as a preferable solution to traditional crowns, especially when extensive tooth preparation posed risks to pulpal vitality. Veneer systems commonly use materials such as sintered feldspathic porcelain and hot-pressed glass ceramics because of their translucency and ability to be fabricated in thin layers.[3–5] These materials come in a range of shades—from opaque to translucent—enabling a natural replication of the tooth's appearance and achieving highly satisfactory aesthetic outcomes.[6]

➢ *According to Manuele Mancini, Ceramic Veneers can be Considered in a Wide Range of Clinical Situations, Including:*

- Cases of dental abrasion;
- Fractured crowns;
- Correction of structural anomalies (e.g., closure of diastemas, or reshaping malformed teeth when full crowns are unnecessary);
- Diastema correction;
- Minor orthodontic corrections (such as reshaping teeth with disproportionate size or morphology);
- Intrinsic tooth discoloration that is unresponsive to bleaching or micro-abrasion;
- Adjustments in occlusion (e.g., alignment of teeth that are rotated, protruded, or positioned inwards).

Among the available veneer options, ceramic veneers show superior long-term survival rates compared to both direct and indirect resin composite veneers.[7–8] Hence, this case series explores the use of ceramic veneers as an effective esthetic strategy to restore harmony and attractiveness in the patient's smile.

➢ *Case Report*

A 26-year-old male patient presented to Department of Prosthodontic crown and bridge with a chief complaint of aesthetic concerns regarding his front teeth. The patient expressed dissatisfaction with the discoloration of anterior tooth and slight asymmetry of the lower tooth, which affected his smile. The patient sought treatment to improve dental aesthetics and achieve a more harmonious smile. After a comprehensive examination, multiple treatment modalities were explored and discussed in detail with the patient. Considering his esthetic expectations and existing oral condition, the application of ceramic veneers was proposed as the most suitable treatment option. Given that ceramic veneers primarily serve an esthetic purpose, a thorough consultation was conducted to explain the advantages, potential risks, and the procedural steps involved, ensuring informed consent and realistic expectations.

➢ *E.max Indirect Veneers*

Initial diagnostic impressions were taken, followed by a facebow transfer, which was accurately mounted onto an articulator. The maxillary and mandibular casts were then secured in the articulator. A diagnostic wax-up was prepared to evaluate the proposed esthetic outcome. Using a silicone index, a mock-up or test drive was performed and presented to the patient prior to initiating any tooth preparation. This step allowed for the assessment of esthetic parameters, occlusion, speech, and phonetics. After thorough clinical and functional evaluation, and upon receiving the patient's consent, shade selection was finalized, and the tooth preparation was initiated.

An feather edge preparation design was chosen for teeth 11, 12, 13, 14, 21, 22, 23,24 and 31, 32, 33, 41, 42, 43. This preparation technique was selected due to its suitability for a wide range of clinical cases, ease of fabrication for the dental technician, and predictable handling by the clinician due to its positive seating during cementation. Moreover, the An feather edge design enhances support for the restoration by distributing occlusal forces more evenly across a broader surface area. Additionally, this design allows for improved translucency and esthetics in the incisal third due to controlled reduction.

Tooth preparation included a labial reduction of approximately 0.3 mm using a depth-cutting bur. A chamfer finish line was established, and all internal line angles were rounded to prevent stress concentration.

For gingival management, a 2-0 retraction cord was placed. An digital impression made by using Prime intraoral scanner. Provisional restorations were fabricated using a tooth coloured acrylic and delivered to the patient.

A bisque trial was conducted to evaluate marginal fit, contour, and accuracy. Following clinical verification and the patient's satisfaction with the esthetics, the final veneers were glazed and assessed for color, translucency, and harmony with adjacent teeth. Once patient approval was secured, the final cementation protocol was carried out.

➢ *Veneer Bonding Protocol*

- *Preparation of Veneers for Bonding*

To ensure optimal adhesion of the veneers to the prepared teeth, the following steps were undertaken:

✓ The internal surfaces of the restorations were thoroughly cleansed using acetone or Cavilax to eliminate contaminants and ensure a clean bonding surface.
✓ Each veneer was etched with 10% hydrofluoric acid for 10 seconds, followed by thorough rinsing with water and gentle air-drying.
✓ A silane coupling agent was applied for 60 seconds, then gently air-dried without rinsing, as per manufacturer recommendations.
✓ The treated veneers were stored in a light-proof container to prevent premature curing until the final bonding procedure was initiated.

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➢ *Preparation of Teeth for Bonding*

Simultaneously, the prepared tooth surfaces were conditioned as follows:

- The enamel surfaces were cleaned, followed by etching with 37% phosphoric acid for 15 seconds, then rinsed and gently air- dried.
- A bonding agent was then applied to the tooth surfaces and light-cured for 10 seconds to ensure proper polymerization.

➢ *Cementation of Veneers*

A veneer luting cement was selected for final cementation. Each veneer was carefully placed onto its corresponding tooth preparation under gentle, controlled pressure to facilitate the escape of excess cement and minimize the risk of air entrapment or misfit. An initial spot curing of 5 seconds was performed to stabilize the veneer.

Excess resin cement was meticulously removed using an explorer. This was followed by complete light-curing for 20 seconds to ensure full polymerization of the luting agent. The same procedure was repeated for the cementation of all veneers. The patient expressed high satisfaction with the final aesthetic and functional result.

➢ *Post-Cementation Protocol*

Following cementation, several finishing steps were undertaken:

- Residual cement was carefully removed using a sharp carver, and interproximal areas were cleaned using dental floss to eliminate any excess luting material.
- Finishing and polishing were accomplished using a combination of carbide burs, polishing discs, and rubber points to refine margins and restore luster.
- Occlusal contacts were verified and adjusted where necessary to ensure harmonious function.

The patient was instructed to adhere to a regular follow-up schedule at 1 week, 3 months, and 6 months to monitor treatment stability, evaluate occlusion, and reinforce oral hygiene practices.

II. DISCUSSION

Careful patient selection plays a pivotal role in determining the success of ceramic veneers. In the present case, veneers were chosen as a conservative and esthetic solution, particularly appropriate given the patient's young age, adequate overjet and overbite, a harmonious smile line, absence of parafunctional habits, and the availability of sufficient enamel—all of which are ideal prerequisites for veneer application.

The selection of ceramic veneers offers several biological and functional advantages. These restorations exhibit high chemical stability, low cytotoxicity, and minimal potential for irritation or postoperative sensitivity, making them well-tolerated by the oral tissues. Their highly polished glazed surfaces resist plaque accumulation and facilitate easy oral hygiene maintenance.[8–10]

Despite their inherent brittleness prior to bonding due to minimal thickness (typically 0.3–0.5 mm), ceramic veneers gain significant mechanical strength and resilience when bonded to the etched enamel surface. This adhesive interface results in a strong integration with the underlying tooth structure, enhancing both durability and functional longevity.[8–9] The synergy between etched enamel, silanated porcelain, and a resin luting agent forms a reliable and long-lasting restorative system.[11–12]

However, veneer placement is contraindicated in certain clinical scenarios. These include teeth with insufficient enamel, non-vital or root canal-treated teeth, presence of bruxism or clenching habits, malpositioned teeth, or poor oral hygiene practices. Such factors increase the risk of veneer failure and compromise clinical outcomes.

Additional risk factors for failure include bonding over existing composite restorations, operator inexperience, and using veneers as a solution for severely worn, fractured teeth with substantial dentin exposure or inadequate residual tooth structure. In such cases, alternative restorative approaches should be considered for long-term success.

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Fig 1 Pre-Operative Intraoral View (a) Frontal View (b) Right Lateral (c) Left Lateral

Fig 2 Pre-Treatment Intraoral View (a) Upper Occlusal (b) Lower Occlusal

Fig 3 after Tooth Preparation

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Fig 4 Temporization Using Tooth Colour Acrylic

Fig 5 Finished and Polished Veneers.

Fig 6 Final cementation of upper and lower veneers

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Fig 7 Post-Operative Intraoral View (a) Right Lateral (b) Left Lateral

Fig 8 Pre-operative and Post-Operative

III. CONCLUSION

Ceramic veneers, particularly those made from lithium disilicate (E.max), offer an ideal combination of esthetics, function, and conservative tooth preparation. In the present case, a carefully planned and executed veneer restoration achieved excellent esthetic enhancement while preserving the natural tooth structure. Proper patient selection, accurate diagnosis, and strict adherence to clinical protocols—ranging from tooth preparation to bonding—are essential to ensure long-term success. This case highlights how modern adhesive techniques, when combined with high-quality ceramic materials, can provide predictable and satisfying outcomes for patients seeking smile enhancement.

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