



CLINICAL APPLICATION OF DIRECT COMPOSITE VENEERS IN MANAGING ANTERIOR DISCOLORATION AND CARIOUS LESIONS: A CASE REPORT

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Abstract: The rehabilitation of dental aesthetics, particularly in the upper anterior region, remains a key focus in modern dentistry. Direct composite veneers have emerged as a conservative, cost-effective, and minimally invasive solution for addressing esthetic concerns such as discoloration, fractures, and irregularities. Unlike indirect veneers, this technique allows for immediate restoration in a single visit, utilizing adhesive bonding and composite resin layering to mimic natural tooth morphology and shade. This case report highlights the application of direct composite veneers for esthetic restoration in the upper anteriors, demonstrating their ability to achieve lifelike results while preserving tooth structure. The procedure involves careful shade selection, precise composite layering, and optimal light polymerization to ensure durability and aesthetics. With advancements in composite materials and adhesive techniques, clinicians can now deliver highly esthetic, functional, and long-lasting restorations without the need for extensive tooth preparation. The advantages of direct composite bonding include chairside customization, reparability, and patient affordability. However, success depends on proper case selection, meticulous technique, and an understanding of material properties. This report underscores the potential of direct composite veneers as a viable treatment option for patients seeking immediate, conservative, and natural-looking smile enhancements.

Keywords - Aesthetic Restoration, Adhesive Dentistry, Direct Composite Veneers, Minimally Invasive Dentistry.

INTRODUCTION

The restoration of natural dental esthetics has become a critical focus in contemporary dentistry, alongside functional and phonetic rehabilitation[1]. Structural, positional, or chromatic anomalies in anterior teeth often lead to significant patient concerns regarding aesthetics [2]. While full-coverage dental crowns have traditionally been employed to address such issues, their use necessitates aggressive tooth preparation and risks damage to surrounding soft tissues [3].

Advances in adhesive dentistry have transformed restorative practices, offering minimally invasive alternatives [4]. Among these, laminate veneer restorations have emerged as a conservative and esthetically driven solution [5]. These veneers can be categorized into direct and indirect techniques. Porcelain veneers, regarded as the gold standard for suitable clinical cases, provide excellent esthetics but require laboratory fabrication, incur higher costs, and often involve substantial tooth reduction [4]. Consequently, efforts to preserve tooth structure have spurred the development of alternative approaches [6,7].

Direct composite veneers, enabled by advancements in micro-hybrid and nano-hybrid composite resins, present a conservative and cost-effective option [8]. This technique involves the direct application of composite resin to prepared tooth surfaces, eliminating the need for laboratory procedures. Key advantages include minimal or no tooth preparation, affordability, reversibility, and simplified adhesive protocols [9,10]. Additionally, direct veneers allow for intraoral polishing, ease of repair for fractures or cracks, and superior marginal adaptation compared to indirect restorations [11,12]. However, limitations such as susceptibility to wear, discoloration, and fractures persist [5]. In contrast, indirect laminate veneers offer enhanced durability and resistance to discoloration but involve higher costs, prolonged chairside time, and complex cementation protocols [5].

The pursuit of minimally invasive yet esthetically successful outcomes underscores the value of direct composite veneers for addressing anterior dental anomalies [2,13]. Indications include tooth discoloration, diastemas, malpositioned teeth, coronal fractures, congenital malformations, abrasions, and erosion [1,2,13]. Despite their benefits, the technique demands clinical expertise due to its sensitivity to manipulation and challenges in achieving durable, esthetically consistent results [4].

Successful direct restorations require careful case selection, considering factors like discoloration, deformities, gaps, and misalignment. Proper diagnosis and treatment planning are essential. Clinicians must understand the optical and physical properties of the material for esthetically pleasing results, as Skilfully manipulating and sculpting composite resin to replicate natural tooth forms is an art that requires extensive practice and patience [4].

In this case report aesthetic rehabilitation of anterior teeth in middle aged man with direct composites veneers with follow-up of 6 months is discussed.

CASE PRESENTATION

A 33-year-old male patient presented to the Department of Conservative Dentistry and Endodontics with a chief complain of aesthetic dissatisfaction due to staining and discoloration in the maxillary anterior region. Intraoral examination revealed moderate brown extrinsic staining across all maxillary anterior teeth, accompanied by Class III carious lesions affecting the central and lateral incisors. No clinical signs of gingival inflammation or symptoms of pain or sensitivity. Radiographic evaluation revealed no evidence of periapical pathology.

The patient was informed of available treatment options for dental discoloration, including bleaching, crowns, and direct or indirect veneers. Following a discussion of risks, benefits, expense and esthetic outcomes, the patient opted for direct composite veneers. A treatment plan was established to restore carious lesions followed by placement of direct composite veneers on the maxillary anterior teeth.

PROCEDURE



figure 1: pre-operative



figure 2: caries excavation (buccal view)

Caries excavation was performed under rubber dam isolation using a high-speed handpiece with a round bur under water coolant. Indirect pulp capping was done with light-cured calcium hydroxide (Prevest DenPro Cal LC). A glass ionomer cement (GIC) base (GC Gold Label 2 / Fuji II) was applied, followed by definitive composite restoration (3M™ Filtek™ Z250 XT) to restore tooth structure.



figure 3: caries excavation (palatal view)



figure 4: composite restoration

The second visit was scheduled one week following the first appointment. Direct composite veneers were planned as the definitive treatment. A comprehensive supragingival scaling procedure was performed to establish an optimal foundation for the aesthetic rehabilitation. Shade selection was accomplished utilizing the composite button technique, complemented by cross-polarization macro dental photography.

Rubber dam isolation was established to ensure a contamination-free operating field. Minimal tooth preparation was executed using a coarse diamond bur, with reduction depths ranging from approximately 0.5 to 0.8mm. preparation was carried out in three planes with the cervical plane parallel to the long axis of teeth, preserving the natural gingival contours. Equigingival chamfer finish lines were established to maintain optimal periodontal health and facilitate precise marginal adaptation of the restorative material.

The teeth were etched for 15 seconds using 37% phosphoric acid (Prevest Denpro Actino Gel), followed by a 20-second rinse with water spray and air-drying. A dentin bonding agent (Adper Single Bond, 3M ESPE) was applied to the prepared surfaces in a thin layer using an applicator brush and polymerized for 20 seconds with a light-curing unit. Composite resin (3M ESPE Filtek Z350 XT, shade A2) was incrementally layered and cured for 40 seconds per increment. Finishing was performed with a yellow-banded diamond bur in a high-speed handpiece. Polishing was sequentially executed using discs (Shofu Super Snap Mini Kit CA) in a low-speed handpiece, progressing from coarse to fine grits, followed by polishing paste.



figure 5: tooth preparation



figure 6: immediately after



figure 7: after finishing and polishing



figure 8: follow up after 6 months

Oral hygiene instructions were provided, and a recall visit was scheduled at 6 months. At the 6-month recall, no discoloration, chipping, or postoperative sensitivity was observed. The patient reported satisfaction with the aesthetic outcome. A clinical examination confirmed overall good gingival health and good oral hygiene.

DISCUSSION

In contemporary dental practice, direct and indirect laminate veneers have emerged as viable treatment alternatives for addressing aesthetic concerns involving anterior dentition [2,14]. The decision-making process between these two therapeutic modalities necessitates careful consideration of financial implications, social factors, and time constraints [2]. Ceramic laminate veneer restorations, while offering significant advantages including superior colour stability and enhanced resistance to abrasive forces, are accompanied by certain limitations such as higher costs and longer clinical appointment times.[5]. Furthermore, several challenges persist with indirect veneers, including the requirement for supplementary adhesive cementation protocols, inappropriate case selection, communication difficulties between clinicians and laboratory technicians during shade harmonization, inadequate masking capability of underlying discolored dental substrates due to conservative preparation parameters particularly in the cervical region, longer chairside time, requirements for repair of minor fractures, and potential complications arising from procedural errors during the cementation process—all of which remain significant concerns that require further resolution.[5].

Contemporary composite resin materials demonstrate the capacity to address existing deficiencies, have enhanced physical properties, and present more aesthetically pleasing alternatives to traditional laminate veneer applications[1].modern dentistry emphasizes the need for conservative treatment approaches.[15]Therefore,composite laminate veneer restorations, characterized by minimal structural reduction of natural dentition, represent one of the most advantageous treatment modalities with the advantages such as single appointment,very low costs compared to the the ceramics, and elimination of long laboratory procedures.[5]Nevertheless, direct composite laminate restorations exhibit lower resistance to abrasive forces and fracture susceptibility compared to the indirect composite laminate veneers and ceramic laminates.[5]

The shade selection of the composite resin was performed prior to isolating the teeth to prevent color alterations due to dehydration.[16]The most advanced method for shade selection, cross-polarization dental photography combined with the composite button technique, was utilized.[17] This technique has been reported to eliminate light reflections on the tooth surface, which could otherwise mislead the clinician during shade matching.[17] Additionally, the surface of the composite button samples was flattened to minimize undesirable reflections.

The depth of the preparations was maintained within the enamel tissue as much as possible, considering that greater enamel preservation enhances adhesion.[18] To optimize enamel bonding while preventing dentin hypersensitivity, the selective etching technique was employed.[18]As a necessity in all the adhesive procedure, proper rubber dam isolation was ensured.[19]

According to the follow-up assessments, despite the restorations not being re-polished, they retained a high level of surface smoothness and gloss. Furthermore, no discoloration or demarcation lines were observed in any part of the restorations. This outcome may be attributed to the beneficial effects of the polishing system used during surface finishing, as well as the removal of the inhibition layer. Additionally, the physical properties of the composite resin utilized in this case likely contributed to these favorable results.[17]

Therefore, when applied with careful consideration and supported by proper patient hygiene motivation, direct laminate veneer restorations can serve as an effective treatment option for patients with anterior teeth esthetic concerns.

CONCLUSION

Direct composite veneers demonstrated excellent clinical performance as a conservative, cost-effective, single-visit treatment modality for anterior aesthetic rehabilitation. When executed with meticulous technique and appropriate material selection, these restorations provide a natural appearance, satisfactory durability, and resistance to discoloration.

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