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Case Report

Minimally invasive esthetic rehabilitation using direct composite veneers: A case report

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Abstract

Conventional full-coverage crowns have long been used for anterior esthetic restorations such as discoloration, enamel defects, and minor malformations. However, these restorations often require extensive tooth reduction. With the rise of minimally invasive dentistry, direct composite veneers have emerged as a conservative, esthetic, and cost-effective alternative for smile enhancement. This case report describes the clinical management of a patient with enamel hypoplasia and fluorosis using direct composite veneers, emphasizing a minimally invasive approach while achieving high esthetic standards. A 21-year-old female presented with generalized discoloration and enamel surface irregularities, most severe on the maxillary anterior teeth. Clinical findings and history confirmed a diagnosis of moderate dental fluorosis with enamel hypoplasia. The treatment plan involved minimally invasive esthetic rehabilitation using direct composite veneers. After shade selection (A2, Estelite Anterior, Tokuyama) and intra-enamel preparation (0.3–0.5 mm), the teeth were etched using 37% phosphoric acid, bonded with a self-etch adhesive (Palfique Bond, Tokuyama), and restored with nanohybrid composite resin. The restorations were polished to a high gloss. Follow-up at one and six months showed excellent surface integrity, marginal adaptation, and patient satisfaction. This case highlights the value of direct composite veneers as a minimally invasive and esthetically effective approach for anterior smile rehabilitation. By preserving healthy tooth structure and achieving natural esthetics, this technique meets modern demands for conservative and patient-centered restorative dentistry.

Keywords: Direct composite veneer, Minimally invasive dentistry, Esthetic rehabilitation, Enamel hypoplasia, Case report

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1. Introduction

Aesthetic standards continue to influence societal perceptions of beauty, shaping how individuals view their bodies, hair, skin—and notably, their smiles.[1] Anterior teeth, due to their prominence, play a significant role in facial aesthetics.[2] Discoloration, malformation, positional anomalies, and diastemas can result in considerable aesthetic concerns for patients, often affecting their confidence and social interactions.[3] Traditionally, full-coverage crowns were employed to address these issues. However, the invasive nature of crown preparation—often involving significant removal of healthy tooth structure—raises concerns about the long-term integrity of teeth and potential damage to surrounding periodontal tissues, especially the gingiva.[4,5] With the advent of minimally invasive dentistry, there is now a greater emphasis on conservative treatment options—such as composite or ceramic laminate veneers that offer high aesthetic outcomes while requiring minimal tooth preparation.

The demand for minimally invasive aesthetic dental treatments has significantly increased in recent years, driven by patients' desire for immediate and natural-looking smile enhancements. Composite veneering has emerged as a conservative, cost-effective, and versatile option for the restoration of anterior teeth, particularly in cases involving discoloration, enamel defects, minor misalignments, diastemas, or shape anomalies.[6]

Unlike porcelain veneers, composite veneers can often be completed in a single visit with little to no tooth preparation, preserving the natural tooth structure. Composite resins have undergone substantial advancements in terms of mechanical properties, polishability, and shade matching, making them ideal for direct veneering procedures. When placed with appropriate technique and attention to detail,

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composite veneers can achieve excellent functional and aesthetic outcomes with good longevity and ease of maintenance.[6,8]

This case report presents the clinical management of a patient requiring aesthetic correction of anterior teeth using direct composite veneering, highlighting the diagnostic approach, material selection, clinical protocol, and final outcome.

2. Case Presentation

A 21-year-old female patient presented to the Department of Conservative Dentistry and Endodontics with a chief complaint of discolored front teeth. The patient expressed significant esthetic concern regarding the dark stains on her upper anterior teeth and requested early intervention.

On detailed history taking the patient reported no relevant medical history nor any previous dental treatments. Upon clinical examination, generalized discoloration of the teeth was noted, with severe involvement seen in the anterior teeth. The maxillary anterior teeth exhibited dark brown stains concentrated in the middle and incisal third of the clinical crowns as shown in **Figure 1**. Other teeth, including mandibular anterior and all the posterior teeth, showed milder involvement, characterized by opaque white spots on the enamel surfaces.

The pattern and severity of the discoloration, in conjunction with enamel surface irregularities, were consistent with diagnosis of enamel hypoplasia accompanied by moderate dental fluorosis. The enamel defects were primarily intrinsic in nature, and no signs of active caries or structural compromise were observed.

Figure 1: Preoperative images showing moderate fluorosis

Given the patient's age, high esthetic demands, and the extent of the enamel defects, a conservative treatment approach was planned using direct composite veneers for which the patient agreed. This option was chosen for its minimally invasive nature, excellent esthetic potential and ability to preserve sound tooth structure while keeping in mind the time constraints expressed by the patient.

Shade selection was performed under natural lighting conditions prior to the start of treatment using the VITA classical A1–D4® shade guide (VITA Zahnfabrik, Bad Säckingen, Germany). Due to generalized discoloration and the presence of white spots on both the upper and lower teeth, shade matching presented a challenge. The base shade was determined by referencing the unaffected areas of the teeth and considering the patient's skin tone for a harmonious aesthetic result. Ultimately, shade A2 was selected (**Figure 2**), and Estelite Sigma Quick Anterior composite (Tokuyama Dental Co., Tokyo, Japan) was chosen for the restoration.

Figure 2: Shade selection

Tooth preparation was done as described by Goldstein in his book *Esthetics in Dentistry*.[9] Depth orientation grooves were created in maxillary anterior teeth (**Figure 3**) using depth-cutting burs (Shofu Veneer Preparation Kit, Shofu Inc., Kyoto, Japan) to facilitate the removal of superficially discolored enamel, with a depth ranging from 0.3 to 0.5 mm. This approach ensured minimal and controlled tooth preparation, confined strictly within the enamel. Limiting the preparation to the enamel layer helps achieve more predictable and durable bonding while preserving maximum natural tooth structure.

Figure 3: Depth orientation grooves

Rubber dam isolation was done and minimal surface preparation was performed in the upper anterior teeth (**Figure 4**) to remove superficial discoloration and roughen the enamel for better bonding. Minimal tooth preparation was carried out using flame-shaped and needle-shaped burs to refine the surface contours. Fine and extra-fine grit burs were employed subsequently to achieve a smooth and well-polished enamel surface, ensuring optimal bonding and esthetic integration of the composite veneers.

Figure 4: Rubber dam isolation (left) and Tooth preparation (right)

The affected teeth were etched (**Figure 5**) with 37% phosphoric acid, rinsed, and dried thoroughly. A Self-etch adhesive system, Palfique bond (Tokuyama Dental Co., Tokyo, Japan) was applied and light-cured.

Figure 5: Etching of Enamel (left); post etching photograph (right)

Direct composite veneers were placed incrementally using Estelite Sigma Quick Anterior composite (Tokuyama Dental Co., Tokyo, Japan) to replicate the natural form, texture, and translucency of enamel. After complete build-up and polymerization, the restorations were finished and polished to a high luster using fine polishing discs (Kenda Polishing Kit, Kenda AG, Vaduz, Liechtenstein) and paste.

Figure 6: Composite buildup followed by finishing and Polishing

Post-operative results showed a significant improvement in the esthetic appearance of the anterior teeth, with good shade matching and surface gloss. The patient expressed satisfaction with the result and reported improved confidence in her smile. Follow-up was scheduled at one month and six months to assess the marginal adaptation and surface integrity of the restorations. Polishing was repeated in the follow-up appointments.

Figure 7: Pre-operative photograph (left) and post operative photograph (right)

3. Discussion

Laminate veneers, whether direct or indirect, serve as a conservative alternative to full-coverage crowns, significantly reducing the amount of tooth preparation required. When deciding between direct and indirect laminate veneers, several factors must be considered.[4,5]

Indirect laminate veneers offer superior longevity, color stability, and wear resistance.[10] However, they also have notable disadvantages, including higher treatment costs, longer treatment duration due to multiple appointments, and potential shade-matching discrepancies arising from miscommunication between the dentist and dental laboratory.[10]

Direct laminate veneers, on the other hand, involve slightly less tooth preparation, can be completed in a single visit, are more cost-effective, and eliminate the need for laboratory involvement. Shade selection is often more accurate, allowing the clinician to achieve highly aesthetic outcomes through precise chairside layering and contouring techniques.[10]

In this case, the patient requested a prompt completion of the treatment; therefore, direct composite laminate veneers were chosen as an alternative to ceramic laminate veneers. Incisal and proximal surfaces were preserved and a window preparation was adopted since the area of concern was only discolouration. Tooth preparation was limited until fresh enamel was obtained for bonding. This enabled better bonding while preserving maximum healthy tooth structure.

While laminate veneers are among the most preferred options for addressing anterior esthetic concerns, the choice between direct, indirect composite, and indirect ceramic veneers must be made carefully. Success depends on thorough clinical evaluation, accurate diagnosis, and appropriate case selection. The clinician must also take into account the patient's esthetic expectations, oral hygiene status, and socioeconomic considerations before finalizing the treatment plan.

4. Conclusion

In summary, this case demonstrates that direct composite veneers represent a practical, conservative, and highly esthetic treatment option for patients presenting with moderate fluorosis and enamel hypoplasia. The approach

allowed for significant improvement in smile esthetics while preserving the integrity of natural tooth structure through minimal or no enamel reduction.

The direct composite technique provided excellent color matching, surface texture, and contour, resulting in a natural and harmonious smile. Moreover, it offers the advantages of reversibility, cost-effectiveness, and ease of repair compared to indirect restorative options such as porcelain or ceramic veneers.

This case underlines the importance of individualized treatment planning, meticulous execution, and careful selection of restorative materials to achieve predictable, long-lasting outcomes. With proper maintenance and follow-up, direct composite veneers can serve as a durable and esthetically pleasing solution for managing developmental enamel defects and discolorations.

5. Source of Funding

None.

6. Conflict of Interest

None.

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