

## Direct Laminate Veneers with Resin Composites: Two Case Reports with Five-Year Follow-ups

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### Abstract

**Aim:** The aim of this report is to present five-year follow-ups of two different applications for the use of direct laminate resin-based composite veneers to improve esthetics.

**Background:** Defects in the maxillary anterior teeth, such as enamel hypoplasia and peg lateral, can present esthetic challenges. Furthermore, a treatment plan that can be completed in a single appointment is highly desirable. This case report presents two different clinical cases involving the use of direct laminate resin-based composite veneers with five-year follow-ups.

**Case Report:** Case 1: A 17-year-old female patient was referred for treatment of her anterior teeth, which were unesthetically altered due to enamel hypoplasia and dental caries. A treatment plan was developed that included restoring the affected teeth with direct resin-based composite laminate veneers to improve the patient's appearance. The six maxillary anterior teeth were prepared for and restored with direct resin-based composite laminate veneers. At the five-year follow-up, the patient was satisfied with the restorations both esthetically and functionally.

Case 2: A 15-year-old female patient also was referred for treatment to improve the appearance of her maxillary anterior teeth. A treatment plan was developed with two objectives: (1) to restore the undersized supernumerary crown in the area of the maxillary right lateral incisor and (2) to close the anterior diastemas. The facial surfaces were conservatively prepared and resin-based



composite was applied with the aid of transparent crown forms. After completion of the treatment, the patient was recalled at six-month intervals. At the five-year follow-up appointment, the restorations were intact, no adverse effects were noted, and the resultant appearance was highly satisfactory for the patient.

**Summary:** The use of direct resin-based composite laminate veneers and adhesive bonding systems has been shown to provide an esthetic alternative to metal-ceramic or all-ceramic crowns for the rehabilitation of anterior teeth. This treatment option offers another advantage, namely a lower cost compared to an indirect technique. Other more complex and costly treatment options in the future are not ruled out.

**Clinical Significance:** In the present two cases, the initial and five-year follow-up results support the use of direct resin-based composite laminate veneers with minimal altering of healthy tooth structure. Such results should encourage clinicians to seek a cost-effective technique such as direct resin restorations to improve a patient's esthetic appearance in a single appointment.

**Keywords:** Direct resin-based composites, composite restorations, enamel hypoplasia, supernumerary teeth, peg lateral, laminate veneers.

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## Introduction

Patients' demand for esthetic restorations and their increasing desire to preserve remaining sound tooth structure are pushing dentists to broaden the clinical indications for direct resin-based composite restorations.<sup>1</sup>

The improvement in modern adhesive techniques, enhanced handling characteristics of resin-based composites, and preparation designs allow clinicians to use a more conservative treatment protocol involving a reliable and direct chairside protocol for the restoration of the teeth.<sup>2-4</sup>

Completion of the treatment in the anterior region in a single appointment is one of the major goals of the restorative approach.

The use of laminate veneers is a conservative method of restoring the appearance of teeth that are discolored and pitted, while potentially eliminating a midline diastema. Such veneers also can provide extremely good esthetic results, yet are conservative in nature and a sound alternative to more extensive restorative procedures.<sup>5</sup> A conservative veneer technique involves the application of the resin-based composites without tooth reduction. Furthermore, resin-based composite veneers can be altered and repolished *in situ*, which is very useful when

subtle changes in contour, such as alteration of the emergence profile, are desired. Also, composite resin veneers are not as expensive when compared to porcelain laminate veneers.<sup>6</sup>

Enamel hypoplasia is a defect in tooth enamel characterized by less enamel than normal.<sup>7</sup> Defects include small pits or dents in the tooth that are so widespread that the entire tooth is small and/or misshaped.<sup>8</sup> The absence of normal enamel morphology invariably results in severely compromised esthetics.<sup>9</sup> Treatment options depend on the severity of the enamel hypoplasia of a particular tooth and the changes associated with it. The most conservative treatment consists of bonding a tooth-colored restorative material to the affected surface to prevent or reduce sensitivity and to achieve the desired esthetic outcome.<sup>10</sup>

On the other hand, when supernumerary teeth are present, treatment might include orthodontic and surgical intervention for both functional or esthetic reasons.<sup>11</sup> Supernumerary teeth are classified according to location and morphological type, of which there are four: conical, tuberculate, supplemental, and odontome.<sup>12</sup> Treatment depends on the type and position of the supernumerary tooth and on the corresponding effects on adjacent teeth.<sup>12</sup>

A peg lateral, for example, is defined as "an undersized, maxillary lateral incisor"<sup>13</sup> that may be associated with other dental anomalies, such as canine transposition and overretained deciduous teeth. Individuals with malformed lateral incisors often display a diastema in the midline region caused by the distal movement of the central incisor.<sup>14</sup> Due to their reduced size, malformed lateral incisors also may allow the formation of other diastema in the anterior region. Patients with peg lateral incisors can exhibit otherwise normal dentitions. Treatment options include porcelain laminate veneers, metal-ceramic restorations, and all-ceramic crowns, as well as minimally invasive procedures such as direct resin-based composite bonding.<sup>15</sup> With improvements in adhesive dentistry, a number of different materials and treatment options are available for restorative esthetic procedures.

The aim of this report is to present five-year follow-ups of two different applications of direct laminate resin-based composite veneers to improve esthetics.

## Clinical Report

### Case 1

A 17-year-old female patient was referred to the Department of Restorative Dentistry at Ataturk University for evaluation and treatment of multiple carious lesions involving her anterior teeth. Prior to treatment, detailed dental, medical, and social histories were obtained.

Intraoral examination revealed enamel hypoplasia affecting the anterior teeth with dental caries in the four maxillary incisors accompanied by a midline diastema (Figure 1). The patient's periodontal status was assessed and found to be otherwise healthy and noncontributory. A treatment plan was developed with the goal of restoring the carious maxillary left and right incisors and canines and improving the patient's appearance with direct resin composite laminate veneers. The treatment plan was approved by the patient. Intraoral photographs were taken for publication.



**Figure 1.** Case 1. Preoperative appearance of the anterior teeth.



**Figure 2.** Case 1. Postoperative appearance of the teeth.

Shade selection was performed on clean, hydrated teeth followed by removal of the dental caries using a round tungsten carbide bur (SS White Burs, Lakewood, NJ, USA) in a slow-speed handpiece. For the six maxillary anterior teeth, 0.5 mm of facial reduction was achieved using high-speed water-cooled diamond burs for direct resin-based composite laminate veneers. The cervical margin was placed 0.5 mm supragingivally. All tooth preparations were free of sharp internal line angles, and the cervical margins had chamfer finish lines.

The prepared teeth were then etched with 35 percent orthophosphoric acid: 15 seconds for dentin and 30 seconds for enamel (Vococid; Voco, Cuxhaven, Germany). The teeth were rinsed with water to remove the etching agent. One-bottle bonding agent was applied (Single Bond, 3M-ESPE, St. Paul, MN, USA) following the manufacturer's instructions. Then resin-based composite (Valux Plus; 3M-ESPE, St. Paul, MN, USA) was used in the restoration



**Figure 3. A and B.** One-year follow-up of Case 1.



**Figure 4.** Case 1. Five years after treatment completion. Esthetic appearance has been improved and the composite laminate veneers are still satisfactory, although not ideal in appearance. Resin chipping led to the reappearance of the entire midline diastema.

of the patient's maxillary anterior teeth. The composite resin was visible light polymerized for 40 seconds and any residual excess at the restorative margin was removed with a series of finishing burs, followed by polishing to a high luster using aluminum oxide discs (Sof-Lex; 3M ESPE, St. Paul, MN, USA) (Figure 2). The patient was recalled approximately every six months for follow-up examinations. At the one-year follow-up appointment, no chipping, discoloration, or secondary caries were noted (Figure 3). During the follow-up examination pulp vitality testing was conducted using a vitalometer (Parkell Electronics Division, Farmingdale, NY, USA). The periodontal status of the restored teeth was evaluated using a gingival index (GI) by pocket probing (Hu-Friedy, Chicago, IL, USA). At the five-year follow-up visit, neither secondary caries nor marginal discoloration were detected. However, the diastema between the central incisors was evident again, apparently due to chipping of the composite resin, but it was not as wide as its original dimension (Figure 4). Despite the return of the midline diastema, the patient was quite satisfied with the composite laminate veneers both esthetically and functionally.

### Case 2

A 15-year-old female patient was referred to the Department of Restorative Dentistry at Ataturk University for evaluation and possible treatment of her maxillary anterior teeth. Prior to treatment, detailed dental, medical, and social histories were obtained from the patient.



**Figure 5.** Appearance of teeth before treatment in Case 2.

Clinical and radiographical examinations revealed a supernumerary tooth between the maxillary right central and lateral incisors and a peg-shaped maxillary left lateral incisor (Figure 5). Different treatment plans were offered to the patient to include extraction of the supernumerary tooth and repositioning the teeth with orthodontic treatment, conversion of the supernumerary tooth to a lateral incisor, revision of the maxillary right lateral incisor to a canine, and restoring the maxillary left peg lateral incisor to normal size with a direct, resin-based composite restoration. The patient declined orthodontic treatment because of the duration of therapy and expressed a desire to retain the supernumerary tooth but have it restored with a direct resin-based composite restoration.

The spaces in the dental arch were measured prior to treatment. The shade selection was completed on clean and hydrated teeth. The facial surface was conservatively prepared in the enamel with a long, tapered diamond bur without involving dentin. A two-step total etching system was applied (Vococid; Voco, Cuxhaven, Germany, and Single Bond; 3M-ESPE, St. Paul, MN, USA) for adhesive conditioning of the enamel surface. Transparent crown forms of an appropriate size (Strip Crown Forms; 3M-ESPE, St. Paul, MN, USA) were selected and adapted to the teeth. Then composite resin (Valux Plus; 3M-ESPE, St. Paul, MN, USA) was applied using the transparent strip crown and polymerized for 40 seconds from both the labial and palatal aspects.

The restorations were contoured and polished with polishing discs (Sof-Lex; 3M ESPE, St.



**Figure 6.** Case 2. Appearance of teeth after treatment.



**Figure 7.** Case 2. One year after completion of the treatment.



**Figure 8.** Case 2. Facial (A) and lateral (B) views five years after the restorations had been placed. The patient was still quite satisfied with the outcome and had no complaints about the restorations.

Paul, MN, USA). Any necessary occlusal equilibration was accomplished with an egg-shaped bur and the final polishing was repeated. At the completion of placement (Figure 6), the importance of rigorous and effective oral hygiene was reemphasized, and the patient was recalled at six-month intervals. One-year follow-up results showed this treatment was a viable technique in esthetic enhancement of the anterior region (Figure 7).

At the five-year follow-up appointment, there were no adverse effects in the restored teeth, and the resultant appearance was highly satisfactory for the patient, who had no complaints about the restorations (Figure 8).

## Discussion

Maxillary anterior malformations, such as enamel hypoplasia and peg lateral incisors can present esthetic problems.<sup>16,17</sup> Such situations also can

demand expeditious treatment from a psychosocial point of view.<sup>18</sup> A great number of treatment modalities are available for the treatment of anterior teeth affected by enamel hypoplasia.<sup>19,20</sup> However, resin-based composite restorations allow for minimally invasive preparations, or no preparation, when assuming the replacement of decayed or missing tooth structures. This thinking is part of a new concept called “bio-aesthetics,” giving priority to nonrestorative or additive procedures such as bleaching, microabrasion, enamel recontouring, and direct composite resins.<sup>20</sup>

Resin-based composite laminate veneers have been extensively investigated and supported by several clinical and laboratory studies.<sup>22,23,24</sup> However, there are a few long-term follow-up studies with direct resin-based restorations. The case reports presented here depict two different clinical cases involving direct composite resin restorations with long-term follow-up (five years). Both cases resulted in satisfactory outcomes for the patient and dental team. In addition, there was

no gingival inflammation observed at the five-year recall. In both cases, a two-step, total-etch system was utilized. Although Bekes et al.<sup>25</sup> showed no differences between the total-etch and self-etch in Class I and II restorations, studies have shown that total-etch systems were more successful than self-etch system for enamel bonding.<sup>26,27</sup> In the two cases presented, no chipping was detected on the restorations in long-term follow-up, except the mesial restorations of the central incisors in Case 1.

The esthetic defects in patients with peg lateral incisors consist of both a malformed tooth and the presence of diastema between the teeth. Treatment has two primary objectives: (1) restore the undersized crown and (2) close the diastema.<sup>22</sup> Esthetic enhancement of the anterior region can be accomplished using a variety of methods. In the most severe cases, porcelain veneers may be the better option.<sup>19</sup> However, conservative restorative dentistry with directly applied resin-based composite restorations should be considered a primary treatment option among the conservative esthetic treatment techniques.<sup>20,28</sup>

## Summary

The use of the direct laminate veneer technique with adhesive bonding systems and composite resin materials is shown for two cases with good esthetic results. Another advantage of this type of treatment is the reduced cost compared to an indirect technique. A significant advantage of resin-based restorations, over other restorative materials, is that repairs may be possible intraorally without the risk of modifying esthetics or mechanical performance.

## Clinical Significance

In the present two cases, the initial and five-year follow-up results were found to be satisfactory for both patients and the treatment team involved. Such results should encourage clinicians to seek a cost-effective technique such as direct resin-base restorations to reestablish the esthetic appearance of patients in a single appointment.

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