# The Evolution of Treatment on a Maxillary Lateral Incisor

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The combination of composite resin and porcelain is an ideal treatment to meet the esthetic and functional demands of restoring small lateral incisors.

# Abstract

Small maxillary lateral incisors are a challenge frequently faced by clinicians. Some of the difficulties in treating these teeth include the young age at which the small laterals are noticeable, the continued eruption of these teeth as the patient ages, and the space constraints and ability to create proper form and contour. Other issues include the esthetic demands of recreating surface texture, translucency, and natural nuances present in the adjacent teeth, and, finally, the need for durable, long-lasting restorations. This article discusses a case in which the patient's congenitally small maxillary incisors were initially restored with composite resin and, a number of years later, the resin was removed, quality enamel was exposed, and conservative porcelain veneers were fabricated.

Key Words: peg laterals, feldspathic porcelain veneers, Case Type II

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## Introduction

The combination of composite resin and porcelain is an ideal treatment to meet the esthetic and functional demands of restoring small lateral incisors. Composite resin is an excellent choice to use early in the patient's life to establish form, function, and esthetics. It can be added to and repaired easily as tissue levels and tooth colors change. Upon completion of growth and the eruption of the tooth, porcelain gives another, more permanent option to restore an undersized lateral.



**Figure 1:** Preoperative full-face portrait view (1:10).

# **Case Presentation**

#### Patient History and Chief Complaint

This 24-year-old had been a patient in our practice her entire life (Fig 1). When she was 16, we bonded composite to her small maxillary lateral incisors (#7 and #10) after the patient had bleached her teeth for approximately one month. We wanted to establish an appropriate shape, maintain the spacing, and give her an esthetic smile until she was at a suitable age to pursue a more definitive restoration. We advised the patient and her parents that porcelain veneers would be an excellent treatment option in the future.1 Preoperative photographs revealed that she had more tooth eruption after the initial placement of the composite resin; this reinforces the importance of waiting for growth to be completed prior to performing definitive restorations. The initial gingival margin placement was equigingival. Now, however, due to growth, it was supragingival and showed some staining and roughness (Figs 2-4). She also had a retained primary tooth T with no permanent tooth #29. She never had any wisdom teeth or orthodontic treatment. Her medical history was not significant.

Now an actress living in New York City, the patient wanted to improve her smile and to have a permanent treatment for these small teeth. Her career was a driving force behind her desire for a more esthetic smile.

#### **Diagnosis and Treatment Plan**

The patient had congenitally small lateral incisors. When she was a teenager, she and her parents declined any orthodontic treatment that would have better aligned her teeth and positioned the maxillary lateral incisors to the ideal mesiodistal and buccolingual dimensions. I also believed that some orthodontic treatment would have perfected the position of her other teeth, but that this case could be successful without orthodontics. She did not have the time or the desire to have traditional orthodontic brackets or clear aligner treatment, especially in her line of work (there also were some scheduling challenges because the patient lives in New York City, while our office is in North Carolina). I prefer having the small



**Figures 2-4**: Preoperative maxillary frontal, right lateral, and left lateral retracted 1:1 views showing the existing composite veneers (placed when the patient was 16). The patient's growth was evident as the old composite was placed equigingival and now was noticeably supragingival. The staining had to be removed and the color and shape needed to be improved.

lateral positioned so that the root is central in the space, ideally allowing one-third of the additional width to be added to the mesial and two-thirds of the needed width to the distal, which prevents the restoration appearing to "reach out" in any one direction. Better root positioning of the lateral also aids in maintaining and creating the desired scalloped papilla.

As orthodontics were not an option, we proceeded with the veneers. The full smile and adjacent teeth were evaluated and discussed with the patient.<sup>2</sup> We agreed that only the lateral incisors would be treated. The pros and cons of composite and porcelain were discussed, with the patient opting for porcelain.

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**Wax-up and matrices:** The patient was going to be restored to her current maximum intercuspation (MI) position. Diagnostic casts were mounted on an articulator via facebow transfer (Sam 3, Great Lakes Dental Technologies; Tonawanda, NY). A diagnostic wax-up was completed following guide-lines for incisal edge position, mesiodistal and buccolingual dimensions, and also excursive movements completed on the semi-adjustable articulator to limit excessive lateral forces on the restorations.<sup>3</sup> The wax-up was evaluated and putty matrices (Exafast, GC America; Alsip, IL) were created to aid in preparation design and also provisional fabrication. A labial



**Figure 5:** Shade tab photo giving the ceramist a reference to aid in creating the final restorations. Hue, chroma, value, translucency, halo effect, surface texture, and internal nuances were all captured to create harmony with the existing dentition.

matrix was created and sliced vertically so we could evaluate facial reduction from a lateral view. Another matrix was created and sliced horizontally so facial reduction could be evaluated from an occlusal view. The final, full-coverage matrix was used for provisional fabrication. Preoperative photographs were taken (Nikon D7000, Photomed; Van Nuys, CA), and we were ready to proceed to the preparation appointment.<sup>4</sup>

Preparation: The patient was anesthetized with 4% Septocaine (Septodont; Lancaster, PA) after the application of topical anesthetic. One carpule was administered above #7 and one carpule above #10. A small amount of reduction was done to remove the existing composite. The putty matrix was loaded with bisacryl material (shade Bleach, Luxatemp Ultra, DMG America; Ridgefield Park, NJ) and the matrix was seated to create provisional veneers on both teeth. We prepared through the provisionals, achieving approximately 1 mm of incisal reduction, 1 mm of facial reduction, and tapering down to approximately .5-mm reduction on the gingival aspect of each tooth. The initial preparation was right at the tissue level. Non-epinephrine retraction cord (Size 00, Ultradent; South Jordan, UT) was placed in the sulcus after the initial preparation to better visualize the gingival margin. The preparation was extended approximately .5 mm more gingival. Size 0 cord was then placed on top of the size 00. The preparations were completed using an electric handpiece (Brasseler; Savannah, GA). The proximal contacts were broken through slightly and wrapped onto the lingual surface. I felt there was no choice but to wrap over the incisal edge and extend the preparation onto the lingual both interproximally and incisally due to the shape of the peg lateral incisors. I prepared into the enamel in some areas; no preparation was needed in other areas.

Preparing into the known final tooth shape makes it more likely that there will be no unnecessary removal of tooth structure and it also ensures that there will be uniform addition of porcelain in the final restoration, creating a more esthetically pleasing result.<sup>5</sup> The reduction matrices were utilized as another source of information to guide in the preparation



**Figure 6:** The stump shade was relayed to the ceramist to pick up the underlying color. The underlying preparation shade can aid in creating depth to the restoration and a very natural final result.

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design. We knew that the probing depth was 1.5 mm on the facial and that by placing the new margin .5 mm subgingival, we would not be invading the biologic width, there would be tissue stability, and it would not be susceptible to recession and an exposed margin.<sup>6</sup> A final impression was taken with polyvinyl siloxane material (Extrude, Kerr; Brea, CA).

**Provisionals:** Provisional restorations were fabricated with Luxatemp Ultra bisacryl material, shade Bleach. The internal aspects of the veneers were coated with adhesive (OptiBond Solo Plus, Kerr) and margins were relined with flowable composite (Filtek Supreme Ultra shade XW, 3*M*; St. Paul MN). The provisionals were refined and polished with a kit (Spear Provisional System; Brasseler) and a straight handpiece. We decided to spot-etch for retention of the provisional veneers. The temporization phase of veneers can be one of the most challenging aspects of the process; this comes to the fore especially when the patient is traveling from a distance and also has a career in which a missing tooth is not an option.

The provisionals were bonded by spot-etching an approximately 2-mm circumference area on the facial surfaces of each preparation with 35% phosphoric acid (Ultra-Etch, Ultradent). The etch was applied and left for 30 seconds, rinsed, dried but not desiccated, and OptiBond was applied over the etched surface only. Flowable composite shade XW was placed sparingly into the mid body of the veneer's intaglio surface and placed on the preparations. Prior to light-curing, the excess composite was cleaned with a micro brush (Microbrush International; Grafton, WI). A 10-second tack cure was completed and followed by more cleanup utilizing an explorer and a 12b blade (Integra Miltex; Princeton, NJ). Occlusion was checked and adjusted where needed to ensure there was no contact on the provisionals in MI position or any excursive movement. The patient loved the esthetics of the new provisional veneers and we stressed the importance of homecare and attention to her gingival tissue.

Laboratory communication: The desired shades conveyed to the ceramist were BL4 for the gingival half and BL3 for the incisal half (VITA; Yorba Linda, CA) (Fig 5). Additional information communicated to the ceramist included more translucency in the incisal half, some minor intricacies in the tooth to create a natural appearance as seen in the photographs, and appropriate surface texture to match the adjacent teeth. The preparation color was photographed, and that information was given to the ceramist through the stump shade guides (Fig 6). The ceramist then fabricated the final feldspathic porcelain restorations (IPS d.sign, Ivoclar Vivadent; Amherst, NY).

**Delivery appointment, cementation, and follow-up:** The patient returned to our office in North Carolina approximately one month later. She had done well with the provisionals



**Figures 7-9:** Postoperative frontal, right lateral, and left lateral retracted 1:1 views. The incisal translucency, halo effect, hypocalcification, and surface texture all combine for a very natural-looking appearance. The shape of the teeth has been greatly improved and the gingival health is excellent. The incisal imperfections also aid in creating restorations that blend imperceptibly with the natural dentition.

and her tissue was in good health. A half carpule of Septocaine 4% 1:200,000 epi was used over #7 and #10. We attempted to remove the provisionals with a spoon, but they were immovable. Each provisional was sectioned with a vertical groove on the facial utilizing a fine carbide flame-shaped composite finishing bur (ET6 FG H134.31.014, Brasseler). The groove went through the bisacryl material and special attention was given so as not to abrade the tooth. A separating instrument (EB134 Crown Spreader, Brasseler) was then used to pop off the sectioned provisional. If the sections did not debond, a second vertical groove was placed into each of the remaining pieces. Once all the provisionals and small composite resin were removed, the final restorations were tried in to verify the interproximal contacts, marginal integrity, color, surface tex-

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> ture, and overall appearance. The patient loved the new restorations and we were ready to proceed to cementation.

> The intaglio surface was cleaned with a universal cleaning paste (Ivoclean, Ivoclar), and silane (Monobond Plus, Ivoclar) was applied for one minute. The decision was made to cement one tooth at a time for maximum control. Plumber's tape was applied to each of the adjacent teeth and 35% phosphoric acid was applied to the tooth for 30 seconds, rinsed, and dried but not desiccated. Adhesive (Adhese, Ivoclar) was placed and scrubbed on the tooth for 30 seconds. Luting composite (Variolink Esthetic, Ivoclar) was placed inside the veneer: shade "light" was used on the incisal third, shade "neutral" in the middle third, and shade "warm" for the gingival third. Excess cement was cleaned with a micro brush and then tack-cured for 10 seconds. The remaining cement was cleaned with an explorer and the veneer was flossed and completely cleaned. A 12b blade was used to remove excess cement and bond. Occlusion was checked with articulating paper (TrollFoil, TrollDental; Newtown, CT) and adjusted where needed with an extrafine football-shaped diamond bur (DOS1EF FG 379EF.31.023, Brasseler). Final polish was completed on the lingual with medium- and fine-grit cup polishers (Dialite, Brasseler).

> The patient returned four weeks later. No adjustments were needed, and the patient was thrilled with the result. Final photographs are shown in **Figures 7 through 10**.

### Summary

Accreditation Case Type II tests our ability to mimic nature by utilizing one or two indirect restorations. The correct hue, chroma, and value must be achieved as well as ideal surface texture, polish, shape, optimal gingival health, and perfectly matching the imperfections and subtle nuances present in the adjacent teeth. The underlying tooth quality and color also pose challenges that must be met. Communicating this information to our ceramists is of the utmost importance. Every step throughout the treatment sequence must be completed with the ideal result in mind. Ultimately, when the quality of preparation, temporization, gingival management, and communication is matched by the ceramic artistry, the results can be extremely gratifying for the dental team, ceramist, and most importantly, life-changing for the patient.



**Figure 10:** The final full-face portrait view (1:10). The new shape and shade of the maxillary laterals have improved the patient's smile and given her the confidence to go for her next starring role.

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