

# jcd

vol. 31 issue 2

Journal of Cosmetic Dentistry

## "Contact Lens" Porcelain Veneers

R.A. Decurcio, P. de Carvalho Cardoso,  
A.P. Rodrigues de Magalhães, & E. Medeiros

Included—  
Nanotechnology, Step-by-Step Approaches,  
& Unique Interdisciplinary Cases

SUMMER 2015

AAO  
American Academy  
of Cosmetic Dentistry

# Creating a Symmetrically Balanced Smile

## Reshaping Peg Laterals with Indirect Restorations

Ingrida Ivance, DDS

// ...resin composites remain susceptible to discoloration, wear, and marginal fractures, thereby reducing the esthetic result in the long term. //



**Key Words:** case selection, minimally invasive, peg laterals, Case Type II (one or two indirect restorations)

### Introduction

A smile's harmony can be negatively affected by anomalies such as changes in tooth shape, size, position, color, or texture. Resin composite veneers can be used to correct unesthetic tooth forms. However, such restorations still suffer from limited longevity because resin composites remain susceptible to discoloration, wear, and marginal fractures, thereby reducing the esthetic result in the long term.<sup>1</sup>

Another treatment option is adhesive porcelain veneers, which have been proven to be very strong and durable complexes with superior esthetics both in vitro and in vivo.<sup>2</sup>



**Figures 1a & 1b:** Preoperative 1:10 full-face and 1:2 full-smile frontal views: Note disharmony of the smile due to the unesthetic shape and size of teeth #7 and #10.

## Case Presentation

### Chief Complaint and History

A 17-year-old female desired cosmetic enhancement of her malformed maxillary lateral incisors. Because she was planning to leave the country soon to study overseas for a lengthy period of time, she wanted a fully functional, permanent solution with an uncompromised esthetic appearance that required little or no professional maintenance of the restored teeth.

The patient had no contributory medical history and took no medications. Her dental history included 14 months of orthodontic treatment from ages 15 to 17. After the treatment the lateral incisor form was corrected by the orthodontist with direct composite restorations.

### Diagnosis

A thorough examination was performed and appropriate radiographs were taken. The patient exhibited excellent dental health, with only a superficial carious lesion on the mesial aspect of tooth #3. Periodontally, the soft and hard tissues were healthy. Photographs were taken for review and study of the AACD Accreditation views (Figs 1a-5).<sup>3</sup>

The photographs, along with other records and data, were reviewed with the patient. During this review, smile design concepts, composite resin, and ceramic materials were discussed so that she could become more involved in the planning of her treatment. Clinical samples were presented so she could see for herself the differences between composite resin and ceramic restorations in the long term.

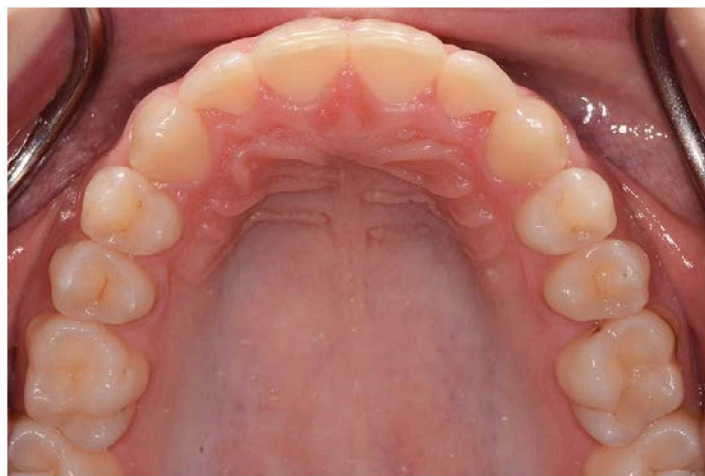


**Figure 2:** Preoperative 1:2 occlusal view: Note the shallow facial embrasures due to orthodontic treatment and poor placement of composite resin.

“The patient exhibited excellent dental health, with only a superficial carious lesion on the mesial aspect of tooth #3.”



**Figures 3-5:** Preoperative 1:1 retracted frontal, right, and left lateral views: Close-up photographs revealed lateral incisors of unequal size, gingival asymmetry, poor proportions, and poor composite placement.

The following esthetic problems were noted:

- the lateral incisors were malformed
- the distal aspects of #7 and #10 were inadequately covered with composite
- there was gingival asymmetry on ##7-10
- the maxillary frenum was impinging into the area of attached gingiva above the central incisors.

#### Treatment Plan

To address the patient's chief concern, the treatment plan included the following elements:

- bleaching
- maxillary labial laser frenectomy to create a more natural smile line, allowing free and unrestricted movement of the upper lip
- gingivectomy at ##8-10 to correct the gingival position
- feldspathic porcelain veneers on #7 and #10 to lengthen the teeth, alter the tooth shapes, and create a more pleasing smile.

Porcelain veneers were chosen over composite restorations because the patient was planning not to have regular professional maintenance and care for a long period of time. Studies have shown higher plaque adhesion on resin composite when compared with ceramic restoration.<sup>4</sup> This case was a good selection for Accreditation Case Type II; it usually is easier to achieve excellence by treating one or two laterals or two central incisors than by treating a single central incisor.<sup>5</sup> The proximity and prominence in the arch of the laterals provides a more favorable opportunity for comparison than adjacent central incisors.<sup>6</sup>

After the author consulted with a partnering AACD Accredited laboratory technician, feldspathic porcelain layered on platinum foil was chosen based upon its highly esthetic values and little-to-no preparation requirements. By keeping preparation to a minimum, less tooth structure is lost and procedures are much less invasive, which is exactly what the patient wanted.<sup>7</sup>

## Treatment

### Frenectomy and Gingivectomy

One week after completing home whitening, the patient returned for the frenectomy and gingivectomy. A topical anesthetic gel (Topicale, Premier Dental; Plymouth Meeting, PA) was applied and the patient was anesthetized with Septanest with adrenaline 1:100,000 (Septodont; Saint-Maur-des-Fossés, France). While it is acceptable for the laterals to display the same gingival level as that of the centrals, the resulting smile may be too uniform. It is preferable to have a rise and fall in the soft tissue by contouring the gingiva over the laterals toward the incisal, compared to the tissue level on the centrals and cuspids.<sup>8</sup> To create symmetry between the gingival zeniths of the patient's anterior teeth, a gingivectomy was needed for ##8-10. Periodontal sulcus depths at the height of contour of the facial tissue margins of those teeth measured approximately 2.5 mm. This allowed for 1.5 mm of marginal tissue removal, leaving a 1.0 mm sulcus depth, which did not violate the biologic tissue attachment complex. A laser was chosen to minimize bleeding, reduce healing time, and eliminate the need for sutures. A soft tissue diode laser (Epic, Biolase; Irvine, CA), set to 1.3 watts continuous power, was used to perform the frenectomy and gingivectomy. A gel with hyaluronic acid 0.8% (Gengigel Prof, Ricerfarma; Milan, Italy) was applied to the gingiva to promote and accelerate tissue healing. The patient was instructed to follow a relatively soft diet, avoid spicy and crunchy foods, and use only gentle pressure when brushing and flossing.

### Preparation

The patient returned two weeks later for the preparation appointment. Shade determination was done before the teeth became dehydrated and changed value during treatment. A spectrophotometer reading (Shadepilot, DeguDent; Hanau-Wolfgang, Germany) was taken on ##6-8 to help determine the appropriate shade for the final porcelain veneers. The body shade was A-2 (VITA Classical Shade Guide, VITA Zahnfabrik; Bad Säckingen, Germany). Shades A1 and A2 (VITAPAN Classical Shade Guide, Ivoclar Vivadent; Schaan, Liechtenstein), which closely matched the patient's teeth, were selected and photographed for the laboratory. A neutral gray contrastor was used as a standard achromatic (no single color dominant) background for shade matching and color perception (Figs 6a & 6b). Looking at this background is very restful to the cones and enhances our ability to render hue.<sup>9</sup>



**Figures 6a & 6b:** Intraoral view under flashlight with shade tabs. A neutral gray contraster that has no complementary color was used for shade matching and color perception.



**Figures 7a & 7b:** The same view under cross-polarized light revealed the fine details of dental structures, aiding visual interpretation during color registration photography.

Additional photographs were taken with a cross-polarized filter (polar\_eyes, Emulation; Athens, Greece), which allows the user to take images eliminating the unwanted specular reflections that cause inaccurate visual interpretation during color registration photography (Figs 7a & 7b).<sup>10</sup>

Before preparation, putty polyvinyl siloxane (PVS) material (Speedex, Coltène-Whaledent; Altstätten, Switzerland) was adapted over the unprepared #5-12 to minimally cover the gingival tissues; this would provide a matrix for the provisionals on #7 and #10.

After local anesthesia was achieved, #7 and #10 were prepared for porcelain veneers. Reduction of approximately 0.5 mm was done using a tapered, round-end bur (8882-014, Komet; Lemgo, Germany) with a chamfer at the crest of the tissue.

The deflection cord (#00 Ultrapak, Ultradent Products; South Jordan, UT) was used to improve visibility during preparation of the paragingival margin.<sup>11</sup> The edges were smoothed with aluminum oxide finishing stone (Dura-White FL2 Flame FG, Shofu Dental; Kyoto, Japan).

A natural die (ND2, Natural Die Material shade guide, Ivoclar Vivadent) that matched the patient's teeth was selected and photographed for the laboratory. One-step, double-mix impressions<sup>11</sup> of the maxillary and mandibular teeth were taken using PVS impression material (Aqualil heavy body and light body Ultra XLV, Dentsply DeTrey; Konstanz, Germany). A bite registration was then taken (Variotime Bite, Heraeus Kulzer; Hanau, Germany) in habitual intercuspation.

Petroleum jelly was applied to the preparations, neighboring teeth, and gingiva prior to fabricating the provisional restorations on #7 and #10.<sup>11</sup> The putty matrix filled with provisional material (A2 Dentin, New Outline, anaxDENT; Stuttgart, Germany) was placed in the patient's mouth, with rubbing pressure applied to the gingiva area to remove excess material. The index was removed after curing was complete. The margins of the temporary veneers were finished with an extra-fine diamond burr (392EF, Komet) to eliminate overhangs. This would ensure proper tissue health at the bonding appointment.

A complete laboratory prescription with impressions and a bite registration was forwarded to the laboratory. Four weeks later, the provisionals were carefully removed from the teeth. The porcelain veneers were tried in to verify the fit and esthetics. After the patient's approval, the porcelain and the teeth were prepared for bonding.

### Finishing

The internal surface of feldspathic porcelain (Noritake CZR, Kuraray; New York) was cleaned. A 5% hydro-fluoric etching gel (IPS Ceramic Etching Gel, Ivoclar Vivadent) was applied to the internal surfaces of the veneers for 60 seconds to achieve the proper etch pattern and remove contaminants. After etching, the restorations were thoroughly rinsed with water, placed in distilled water in an ultrasonic bath<sup>11</sup> for two to three minutes, and air-dried. That was followed by silanization (Monobond Plus, Ivoclar Vivadent) for 60 seconds, and gentle air-thinning. Complete evaporation of the solvent was achieved using a hair dryer for 60 seconds.<sup>11</sup> The final preparation of the ceramic surface was obtained by applying one coat of adhesive resin (Heliobond, Ivoclar Vivadent) to the inner surface of the ceramic.

The prepared #7 and #10 were sandblasted with 50- $\mu$  aluminum oxide (Microetcher IIA, Danville Materials; San Ramon, CA) to clean the preparation and enhance adhesion. Acid-etching with 38% phosphoric acid (Etch-Rite, Pulpdent; Watertown, MA) was performed over enamel for 30 seconds. After rinsing the acid with water for 30 seconds, adhesive (Syntac, Ivoclar Vivadent) was applied and air-thinned. Using a veneer-placement handpiece (LUMIGrip, DenMat; Lompoc, CA),<sup>12</sup> the veneers were loaded with a light-cure luting cement (Low Value -1, Variolink, Ivoclar Vivadent), seated, and polymerized using a "wave" technique.<sup>13</sup> The cement excess was removed using a scaler. The restorations were covered with a water-soluble glycerine gel (Ivoclar Vivadent) to prevent formation of an oxygen-inhibited layer.<sup>14</sup> The final polymerization was then carried out on the palatal and facial tooth sides.

The patient was examined for occlusal harmony. Extra-fine diamond burs (T&F Hybrid Points, Shofu Dental) were used to remove excess material and for occlusal adjustment. The final gloss was obtained by polishing surfaces with a bristle brush and polishing paste (DiaShine, VH Technologies; Lynnwood, WA). The patient was given homecare instructions and scheduled to return two weeks later for a final check of function and esthetics, and to complete radiographic and photographic documentation.

At the follow-up appointment, computerized occlusal analysis (T-scan, Tekscan; South Boston, MA) was performed. After computer-guided occlusal adjustments, the bilateral balance of occlusal force was obtained. Postoperative radiographs and photographs were taken (Figs 8-18b).



**Figures 8-10:** Postoperative 1:2 full-smile views under cross-polarized light revealed harmonious integration of the final restorations of #7 and #10.



**Figures 11-13:** Postoperative 1:2 retracted views under flashlight revealed harmonious integration of the final restorations of #7 and #10.



**Figure 14:** Postoperative 1:1 retracted frontal view: Note the healthy tissue and symmetry among the gingival zeniths; the value of the restored teeth is compatible with that of the sound teeth.



**Figure 15:** The occlusal view under cross-polarized light showed facial embrasures that mimic the morphology of the natural dentition.



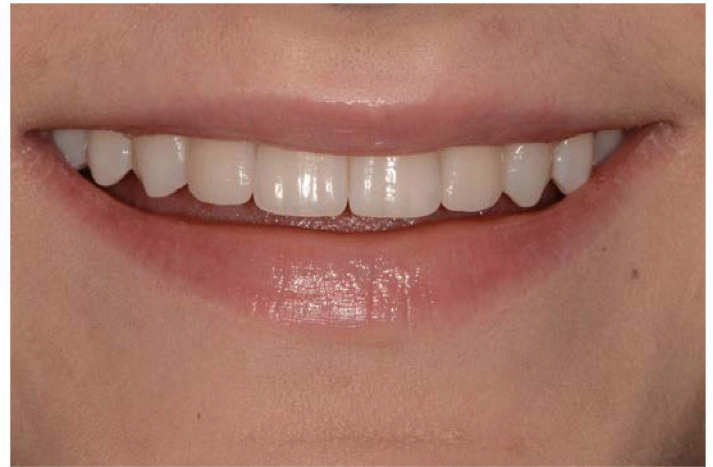
**Figures 16a & 16b:** Periapical radiographs of #7 and #10 revealed intimate porcelain veneers adaptation.

“By keeping preparation to a minimum, less tooth structure is lost and procedures are much less invasive, which is exactly what the patient wanted.”



**Figure 17:** The patient's portrait was taken in a portraiture setup in a dental office.<sup>15,16</sup>

// While it is acceptable for the laterals to display the same gingival level as that of the centrals, the resulting smile may be too uniform. //



**Figures 18a & 18b:** The completed treatment reflects a symmetrically balanced smile.

## Summary

The final restorations demonstrated a harmony of form and value with the opposing and adjacent dentition. The patient was thrilled with her new, natural-looking smile, saying, "it looks as if no dentistry has been done at all."

The esthetic procedures described in this article provided a natural look and improved the patient's smile by creating a symmetrical balance. The patient's satisfaction with her appearance increased and her self-esteem was enhanced.

## Acknowledgment

*The author thanks Craig Galbraith, CDT, AAACD (da-Vinci Dental Studios, West Hills, CA) for his expertise and skill in fabricating excellent restorations.*

## References

1. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. The 5-year clinical performance of direct composite additions to correct tooth form and position. I. Esthetic qualities. *Clin Oral Investig*. 1997 Feb;1(1):12-8.
2. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers: a review of literature. *J Dent*. 2000 Mar;28(3):163-77.
3. American Academy of Cosmetic Dentistry (AACD). Photographic documentation and evaluation in cosmetic dentistry: a guide to Accreditation photography. Madison (WI): AACD; 2015.
4. Eick S, Glockmann E, Brandl B, Pfister W. Adherence of *Streptococcus mutans* to various restorative materials in a continuous flow system. *J Oral Rehabil*. 2004 Mar;31(3):278-85.
5. Zase M. AACD Accreditation track Case Type II: one or two indirect restorations. *J Cosmetic Dent*. 2009 Fall;25(3):62-5.