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## Accreditation Clinical Case Report, Case Type 2: Direct Veneers on Teeth 6-11

Note: This case does not include technique steps, because it passed prior to implementation of the new Accreditation protocol.

### INTRODUCTION

Direct resin veneers have been an important part of the services provided by the cosmetic dentist for decades. They are natural-looking and subtly eliminate undesirable features of the dentition. Recent advances in these materials provide the dentist with a stronger, more esthetic and longer-lasting restoration. In addition, the incorporation of a variety of new shades makes it possible to create virtually life-like restorations. Procedures performed for strictly restorative and functional reasons also reap the benefits of a beautiful result. Because of what is available today, essentially all restorative dental care is, in fact, cosmetic and can be done in such a way that is undetectable to the untrained eye.

### HISTORY

The patient was a 27-year-old female. She was in excellent health and had seen a dentist regularly since childhood. She presented with maxillary anterior teeth that she characterized as "short and yellow"; in particular, she did not like her lateral incisors, which she felt were short (Fig 1). The patient had received orthodontic treatment as a teenager but, due to the unfortunate shortness of the laterals' roots, they were prevented from being extruded adequately. She wanted a more uniform, full, and whiter smile (Fig 2).



Figure 1: 1:2 full-smile frontal view, pretreatment.



Figure 2: 1:10 face, pretreatment.

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Figure 3: 1:2 retracted frontal view, pretreatment.



Figure 4: 1:1 retracted frontal view, pretreatment.

## CLINICAL DATA

Clinical examination of the patient revealed a full complement of adult teeth (minus her third molars, which had been removed). The patient had older amalgam restorations placed in the posterior of her mouth a number of times throughout her life. A porcelain-fused-to-metal crown on the lower right first molar had been placed after root canal therapy several years ago.

Periodontally, the patient had healthy gingival tissue with no significant pocketing and minimal bleeding upon probing. She had clefting on the free gingival margin of tooth #11; this "notch" was caused by her abnormal flossing pattern. Radiographs indicated sound bone support and visual inspection detected no recession. Temporomandibular joint function was normal and a thorough oral pathology exam noted all tissues to be within normal limits. Occlusally, the patient's dentition exhibited a Class I arrangement and the alignment of the

teeth was good. Canine guidance was minimally exhibited bilaterally due to deficiently sized canines.

Cosmetic evaluation found the pretreatment width-to-length ratio of the central incisors to be 78%. These central incisors were within an esthetic range, but could also afford to be lengthened slightly if desired, to match the contour of the entire anterior segment's incisal edges. This would be especially important when evaluating the relationship of her maxillary teeth to her lower lip. Golden proportion was .8/1/1.4 on the right and left (the ratio of the canine width, lateral width, central width). This indicated that the lateral incisors were proportionate in relation to the other teeth. The teeth also were balanced bilaterally. Her midline was centered and arch arrangement was not canted. Additionally, the contact point arrangement was appropriate, the axial inclination of her lateral incisors tipped too far distally, and gingival symmetry was good. Her full buccal

corridor was compromised by the low gingival height associated with her maxillary first bicuspids.<sup>1,2,3</sup> Tooth shade evaluation indicated an A3 Vita shade (Vident; Brea, CA) (Figs 3 & 4).

Overall, the patient has a beautiful appearance and improvements to her smile will enhance her image and her personal satisfaction.

## DIAGNOSIS

This patient's anterior dentition violated the ideal smile design. Her disproportionately small lateral incisors and the subtle inconsistency of her smile line compromised her smile. Furthermore, her buccal corridor was diminished due to the excessive gingiva protruding over her maxillary second bicuspids. Additionally, her teeth could be satisfactorily whitened. These issues necessitated cosmetic dental treatment. Correction of the problems would give the patient a more pleasing smile that would be straighter, bigger, and whiter.<sup>4</sup>

## TREATMENT PLAN

Clinical data, study models, 35 mm preoperative photographs, intraoral camera images, and a lengthy discussion of treatment options aided in the formation of the treatment plan. A combination of vital tooth bleaching, application of direct veneers in the form of composite resins on all maxillary incisors and canines, and gingivectomies on teeth #4 and #13 would allow successful resolution of the patient's cosmetic deficiencies.<sup>5</sup> Nite White Excel-2 (Discus Dental; Culver City, CA) 21% would be utilized for vital tooth bleaching and both Renamel (Cosmedent; Chicago, IL) and Vitalescence (Ultradent; South Jordan, UT) would be used for the composite resin.

Before tooth bleaching, the patient needed a complete prophylaxis for the debridement of stain, plaque, and calculus. The patient then applied the bleach solutions during the day for two hours using custom-made bleaching trays. A two-week waiting period is recommended between the last application of bleach solution and the commencement of restorative procedures.

A wax-up of the ideal and desired result was performed on the preoperative study models and an impression of this wax-up was made in polyvinyl-siloxane putty material. This impression was cut along the incisal edges and used as a matrix in the application of the resins.

After bleaching, the treatment progressed as follows:

1. Reduction of the facial tooth structure on teeth #6-11 in order to create space for the application of resins.
2. Layering of Renamel hybrid resin, Renamel microfill resin, Vitalescence micro-hybrid resin and Renamel composite stains onto the prepared tooth structure of teeth #6-11.
3. Contouring and polishing resin veneers.
4. Gingivectomies on teeth #4 and #13.

## ARMAMENTARIUM

1. Intraoral camera (Ultracam; Corpus Christi, TX)
2. Nikon 6006N 35 mm camera
3. Kodak Ektachrome EPP 35 mm slide film
4. Vita Shade Guide
5. Jeltrate Plus Alginate (Caulk/Dentsply; Milford, DE)
6. Yellow Hydrox stone (Kerr; Orange, CA)
7. Custom-fabricated polyvinyl-siloxane putty impression
8. Nite White Excel-2 (NSF) vital tooth bleaching system, 21% (Discus Dental)
9. Simply Perfect clear temporary matrix material and bite registration (Discus Dental)
10. Electrosurge unit (Coles; Philadelphia, PA)
11. Diamond burs #828-026, 6850-016, 6847K-016, 845KR-025, 10839-012, 8392-016, 8856-016 (Hornbrook Aesthetic Preparation Kit [Brasseler; Savannah, GA])
12. 330 carbide bur
13. Diamond wheel (#943-080 [Brasseler])
14. Rubber dam clamps (size 14A) (Ivory, Heraeus Kulzer; South Bend, IN)
15. Rubber dam (medium thickness) (Hygenic; Mahwah, NJ)
16. Pumice and chlorhexidine slurry
17. Superoxol (Moyco, Union Broach; York, PA)
18. Consepsis (Ultradent)
19. 37% phosphoric acid (Temrex; Freeport, NY)
20. Gluma (Heraeus Kulzer)
21. Optibond Solo-Plus (Kerr)
22. Soflex discs (3M; St. Paul, MN)
23. Accufilm
24. Renamel microfill composite resin, shades A1, Light Incisal (Cosmedent)
25. Renamel hybrid body composite resin, shade A1 (Cosmedent)
26. Renamel Creative Color composite stains (violet) (Cosmedent)
27. Renamel Insure Color Modifier (white) (Cosmedent)
28. Vitalescence micro-hybrid composite resin, shade TG (Ultradent)
29. DeOx (Ultradent)
30. Bend-a-brush (Centrix; Shelton, CT)

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31. Kreativ Kuring Light (Kreativ, Inc.; San Diego, CA)
32. Optilux 500 curing light-Demetron (Kerr)
33. Serrated strip (Horico; South Plainfield, NJ)
34. Interproximal finishing strip, coarse and medium (GC America; Chicago, IL)
35. Surgical telescopes 2.5X magnification (Designs for Vision; Ronkonkoma, NY)
36. Diamond burs #133F-010, 133EF-010, 8392-016, 392EF-016, 8274-016, 274EF-016, 379F-023, 379EF-023 (Hornbrook Aesthetic Finishing Kit [Brasseler])
37. Enamelize diamond paste (Cosmedent)
38. Felt discs (Cosmedent)
39. Flexi-Cups and rubber finishing discs (medium and superfine) (Cosmedent)
40. Glide® Floss (Gore; Flagstaff, AZ)
41. Waxed dental floss (Johnson & Johnson; New Brunswick, NJ)

## PREPARATION

Before the patient was scheduled for anterior restorative treatment, alginate impressions were taken to fabricate bleaching trays. She was instructed to fill these trays with Nite White Excel-21% (Discus Dental) bleaching solution each day for two hours.

The patient was scheduled to return two weeks after finishing the bleaching regimen. This two-week interval is

crucial when matching restorations to the adjacent natural teeth. During these two weeks the teeth rehydrate and the color stabilizes (commonly known as "fade back"). An attempt to match shades before the end of the two-week interval might result in a restoration that is too light.<sup>6</sup>

The results of the home vital bleaching were evaluated after the two weeks. The patient's pretreatment tooth shade had been A3 (Vita) and now it was A1 (Vita); she was pleased with the result. Prior to treatment, desired shade and translucency were discussed with the patient. She was anesthetized with lidocaine 2% (with epinephrine 1:100,000). Before preparation of the teeth, profound local anesthesia was confirmed.

Initially, depth cuts were placed with a #828-026 depth cutter diamond bur (Brasseler) on teeth #6-11 on all three planes across the facial aspect of the teeth. This established a 0.5 mm reduction of tooth structure across the three planes. These teeth were then prepared with a #6850-016 diamond bur (Brasseler), which is coarse and rounded at the tip. The teeth were all reduced 0.5 mm on all three planes across the facial aspect of the teeth.<sup>7</sup> A chamfer margin was developed supragingivally. The coarse diamond surface finish was left in order to create more surface area onto which to bond. This was done under 2.5X magnification.

Before the appointment, a full-contour wax-up had been done, creating ideal morphology and arrangement of the teeth. The incisal characteristics incorporated an arrangement which

were of squared mesial and distal angles. The incisal edges of the laterals were 1 mm apical to the centrals. Additionally, this wax-up reflected proper golden proportion (0.6 canine/1.0 lateral/1.6 central), width-to-length ratio (approximately 75%), and contact point arrangement (going apically as they go distally). The midline was correct without canting.

A polyvinylsiloxane putty impression was made of this wax-up and the impression was trimmed along the incisal edges to form a matrix. Essentially, this matrix guided the lingual and incisal formation of the teeth, and created a backdrop onto which the composite resins could be layered.

A rubber dam (Hygenic) was placed with 14A clamps (Ivory) placed on the maxillary first molars; this was done to isolate the teeth from moisture. Each of the preparations was cleaned with a pumice and chlorhexidine slurry. Next, Consepis was scrubbed onto the preparations as an antimicrobial agent.

Bonding was initiated with the placement of 37% phosphoric acid (Horizon) on the preparations for 15 seconds. The acid was rinsed off, then dampened with cotton pellets, leaving the surface moist. Next, a dentin sealer was placed (Gluma). A dentin primer and resin adhesive (Optibond Solo-Plus [Kerr]) was placed on the surface of the teeth and cured with a Kreativ Kuring light (Kreativ, Inc.) for 10 seconds.<sup>8,9,10</sup> The polyvinylsiloxane matrix was then positioned on the lingual aspect of the maxillary anterior teeth and was luted into place with clear bite registration material.



Figure 5: 1:2 retracted frontal view, post-treatment.



Figure 6: 1:1 retracted frontal view, post-treatment.

## RESIN APPLICATION

The initial layer of Renamel hybrid shade A1 was placed, extending over the entire facial surface and extending incisally above the tooth to the predetermined final length as indicated by the putty matrix. The area in the final incisal 3 mm was scalloped in a manner to imitate dentin lobes internally.

Very light and delicate application of resin stains was now placed. Renamel Creative Color (violet) (Cosmedent) was placed in extremely light strokes, which started at the incisal-most point and extended down approximately 1.5 mm. Each of these streaks was approximately .5 mm apart; they were placed across the entire incisal edge of all six maxillary anterior teeth. This almost-undetectable layer of shade was used to set the translucent tone of the restoration. Renamel Insure Color Modifier (white) (Cosmedent) was placed next, in a similar manner, just inside the interproximal surfaces. These streaks were used to subtly enhance the line angles of the restoration.

A layer of Renamel microfill Body A1 composite was placed over the entire facial surface of all six restorations. A thin layer of Renamel microfill incisal light composite was placed over the Body A1 layer; this established the surface layer of the composite resins. The initial surface anatomy was established with this application.<sup>11</sup>

The matrix was removed at this point, as was the rubber dam. The full contour of the resin veneers had been established.

A 330 carbide bur was used to place indentations into the dentin lobe areas of each tooth. These indentations were .3 mm deep and ranged from the incisal .5 mm to the incisal 1.5 mm. The surface was etched and a thin layer of Optibond Solo-Plus (Kerr) was applied and light-cured. A thin layer of Vitalescence Trans-Grey (TG) (Ultradent) resin was placed into these areas and a layer of Renamel microfill incisal light (Cosmedent) was placed over the labial surface. This TG layer offered an overall translucent tone to the direct restorations and imparted a

gray color, to match the patient's existing dentition (Fig 5). All restorations were light-cured for 40 seconds as each layer of composite material was placed.

Finishing began with the Brasseler fine diamond burs, which refined the full contour.<sup>12</sup> The interproximal regions were finished with a serrated strip (Horico) and interproximal finishing strips (GC). Soflex (3M) coarse and medium disks were used to smooth the contours and incorporate the embrasure spaces into the facial anatomy. Flexi-cups and Flexi-discs (Cosmedent) were next used to define and polish the facial surface. Enamelize polishing paste (Cosmedent) on a rotary felt disk provided the finished shine<sup>13</sup> (Fig 6).

The occlusion was checked in centric occlusion and interferences were removed. Additionally, the lateral and protrusive movements were meticulously evaluated and the interferences were again removed. These adjusted areas were then smoothed and polished.

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Figure 7: 1:2 full-smile frontal view, post-treatment.



Figure 8: 1:10 face, post-treatment.

Profound local anesthesia was confirmed and the width of gingival tissue on teeth #4 and #13 from free gingival margin to the crest of bone was determined. A minimum of 3 mm is necessary to maintain the integrity of the periodontal structures. In each case, 4 mm was present, which would allow us to remove at least 1 mm of free gingival tissue. Utilizing 2.5X magnification and electrosurge, 1 mm of free gingiva was removed around teeth #4 and #13.

## SUMMARY AND CONCLUSION

This article has addressed the use of composite resins to create an ideal smile. Upon the conclusion of this treatment, the patient was extremely gratified. She now has whiter teeth, which are straighter and more in proportion with her smile and her other teeth (Figs 7 & 8). *AF*

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