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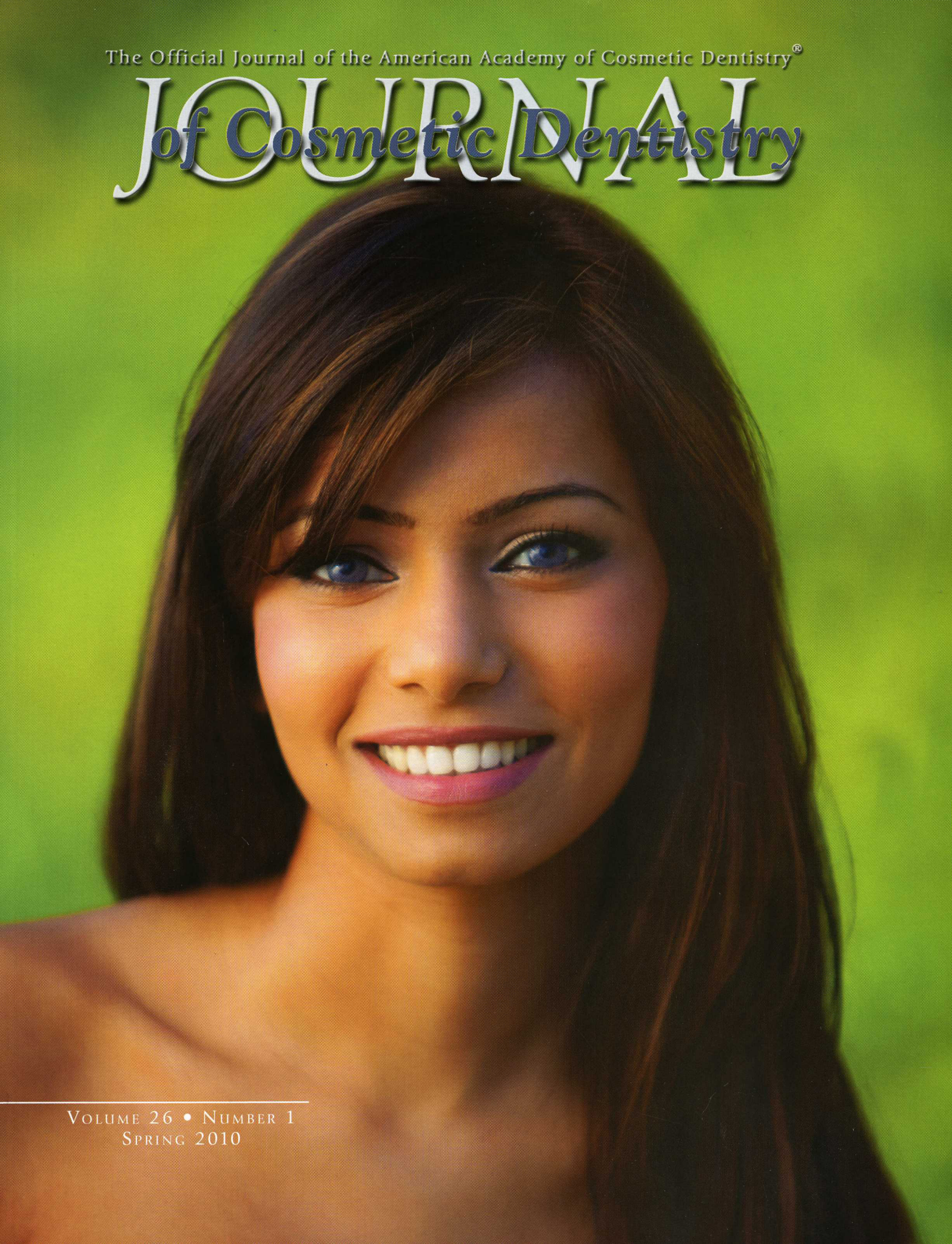

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Accreditation Clinical Case Report, Case Type II: One or Two Indirect Restorations

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Introduction

With advances in cosmetic dentistry, the restorative dentist has the ability to restore anterior teeth with amazingly natural results. Porcelain veneers often are the preferred treatment by both clinicians and patients due to the conservative nature of tooth preparation. However, restoring maxillary central incisors remains challenging for clinicians, especially when one tooth is discolored and all-ceramic bonded restorations are selected as the treatment of choice. Dentists should base their choice of material on the requirements of the teeth being restored. Situations involving tooth discoloration, wear, or fracture may require a restoration that entails the removal of more tooth structure but does not necessitate a conventional complete-coverage crown.[1] Often it can be difficult to blend the discolored tooth to the rest of the natural dentition because the underlying tooth structure is likely to show through the veneer. With proper photography and communication with the laboratory, coupled with knowledge of materials and techniques, veneers can be created that are esthetic and natural looking.

Patient History

The patient was a 25-year-old female with no known medical contraindications or allergies to medications. She had noticed that her central incisors were disproportionate in contour and that they were becoming discolored in relation to the rest of her smile (Fig 1). There also were some surface fracture lines and flaring, which she disliked. She desired to achieve a more natural and beautiful smile with correction of her two front teeth (Figs 2 & 3).

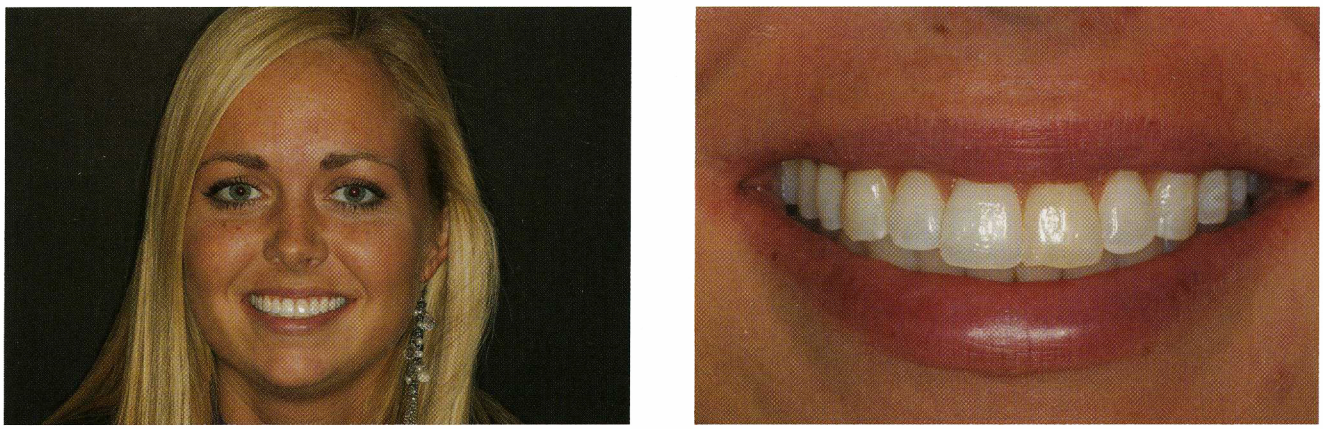

Figure 1: Preoperative portrait and smile, showing discoloration of #9 and the unharmonious blend of the two central incisors.

The patient mentioned that as a young adult she had bumped her mouth several times by accident. As a teenager, she had orthodontic treatment. Over the years, the traumatic injuries to tooth #9 had caused the tooth to discolor and the canal to calcify.

Clinical Examination and Findings

The patient had received routine dental cleanings, and her oral hygiene and soft tissue health were excellent. Her radiographic and oral cancer examinations were within normal limits. Endodontic consultation for #9 revealed that no endodontic treatment was warranted (Fig 4). There was no temporomandibular joint dysfunction. Previous dental treatment included orthodontia and home whitening. She wore a lower retainer that had been provided to her after orthodontic treatment.

Diagnosis and Treatment Planning

Diagnostic models and bite records were made using the Kois Dento-Facial Analyzer (Panadent; Colton, CA). Radiographs and the 12 required AACD images were taken. These were necessary for proper communication with the laboratory.

For color stability purposes, only light-cured resin cement should be used when luting veneers.

The patient's chief complaints about her smile were as follows (Figs 5 & 6):

- discoloration of #9
- flaring of the incisal edges of the centrals facially
- width of the two centrals being wider at the incisal edge
- "bottle-necked" appearance of her centrals cervically
- crack lines present on #8.

Oral hygiene and home care were excellent and the patient was happy with previous home whitening results.

The treatment plan included placing veneers on both #8 and #9. Placement of an opaquer on #9 was planned to mask the naturally darkened tooth. For color stability purposes, only light-cured resin cement should be used when luting veneers.[2] Empress Esthetic veneers (Ivoclar Vivadent; Amherst, NY) were selected as the restorative material.

Treatment

Preparation

When the patient returned for restorative treatment, shade selection (shade 020, Chromascop shade guide, Ivoclar Vivadent) was done prior to any other procedures to prevent improper color match that might result from dehydration and elevated values. A photographic record of the shade matching was made for laboratory communication (Fig 7).

An impression was taken of the anterior teeth using Silgimix (Sultan Health Care; Englewood NJ) in an anterior stock tray. The provisional restorations would be fabricated using the impression as the starting point and contoured to the patient's esthetic goals.

Topical and local anesthetic was delivered for #8 and #9. Veneer preparation was done using diamond burs. Both teeth were prepared uniformly. Chamfer margins

Figure 2: Preoperative retracted view, showing discoloration of #9 as well as the irregular incisal edge contours and shape of the central incisors.

Figure 3: Postoperative retracted view, revealing a more harmonious contour of the central incisors as well as a beautiful shade match that blends well with the natural dentition.

Figure 4: Preoperative x-ray, showing #9 with calcified canal. No endodontic treatment was warranted prior to veneer preparation.

were created up to the free gingiva. Interproximal finish lines in the distal contact areas were broken and carried to the disto-lingual areas to aid in correcting width and contours. The incisal third was prepared to allow the correction of the incisal inclination. Occlusal clearance was verified. The preparations were refined and smoothed with a very fine round-end diamond bur. A1 opaquer (Cosmedent; Chicago, IL) was placed on the facial surface of #9 to blend it to match #8 via traditional bonding techniques (Fig 8). ND2/A1 was the natural die shade closest to A1; this was communicated to the laboratory.

Retraction cord (Dux Dental; Oxnard, CA) size 00 and 0 was placed in the sulcus of both teeth. After five minutes, the top retraction cord was removed and a final polyvinyl silane impression was taken. The impression was examined to ensure that all required details had been captured. An opposing arch impression was taken again for the laboratory (previous impression taking had been done for diagnostic models and evaluation). A maximum intercuspation bite record also was taken for laboratory communication.

PROVISIONALS

A provisional restoration was made using the Silgimix mold. The provisionals were recontoured and shaped, starting from the patient's original contours, eliminating the incisal-facial flare, thinning out the width along the incisal third, and contouring the distal line angles of both central incisors so that the teeth looked thinner overall. As enough tooth structure was reduced along the incisal third facially, porcelain

Figure 5: Preoperative retracted right and left 1:2 (1:3) views, showing the two centrals with flaring, incisal edge wear, discoloration, and disharmony with the rest of her teeth.

fabrication could be done to correct the incisal inclination. Similarly, when the provisionals were made from her original contours, there was enough thickness of temporary material along the incisal third to allow it to be thinned with a Brasseler (Savannah, GA) ET-9 bur. These were minor changes that resulted in a huge visual improvement. The provisionals were fabricated with attention to creating less incisal flare facially and much more harmonious distal line angles.

Although the provisionals were fused together, the margins were carefully trimmed to provide optimal gingival health. Splinting multiple restorations can significantly enhance the primary stability of the provisional restoration.[3]

The approved provisionals were refined to closely represent the final restoration in appearance and occlusion. A layer of glazing liquid (Lasting Touch, Dentsply Caulk; York, PA) was applied to the surface and light-polymerized. Gluma (Heraeus; South Bend, IN) desensitizer was applied to the prepared teeth to disinfect and desensitize prior to the provisionals being seated with TempBond Clear (Kerr; Orange, CA). The provisionals were photographed for the laboratory (Fig 9). Study model impressions were also taken of the provisional restorations.

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Try-In Appointment

The patient was anesthetized (3.6 ml lidocaine 2%) and the veneer shade and contour were assessed with try-in paste. Variolink Veneer (Ivoclar Vivadent) high-value +3 try-in paste was used and compared to Variolink Veneer medium-value 0. The high value was selected to blend with the natural dentition. The patient viewed the veneers in natural light as well as in-office fluorescent lighting. The intraoral fit was examined. Approval for final cementation was given.

Cementation

The Empress veneers had been pre-etched by the laboratory. However, the restorations were cleaned with 37% phosphoric acid after removal of the try-in paste to remove any organic debris and to acidify the restoration for bonding.[4] The veneers were silanated and then coated with two coats of All-Bond 3 bonding agent (Bisco; Schaumburg, IL). The restorations were then set aside.

The prepared teeth were pumiced and etched with 37% phosphoric acid with benzalkonium chloride for 15 seconds and rinsed thoroughly. Excess water was removed using a foam pellet, leaving the preparation visibly moist. A rewetting agent (Gluma) was placed and excess was suctioned off. Two coats of bonding agent (All-Bond 3 parts A and B) were placed on the prepared teeth. The teeth were gently but thoroughly air-dried until there was no visible movement of the material and the surface appeared to be shiny.[5] The bonding agent was then light-cured for 10 seconds. Variolink Veneer high-value +3 cement was placed on both veneers. The veneers were seated using inward and upward pressure. The "tack and wave" technique was then used.[2,4,6] Each restoration was polymerized "dead center" for one second with a 2.0-

Figure 6: Preoperative 1:1 view, showing crack lines on #8 as well as the "bottle-necked" appearance of both centrals.

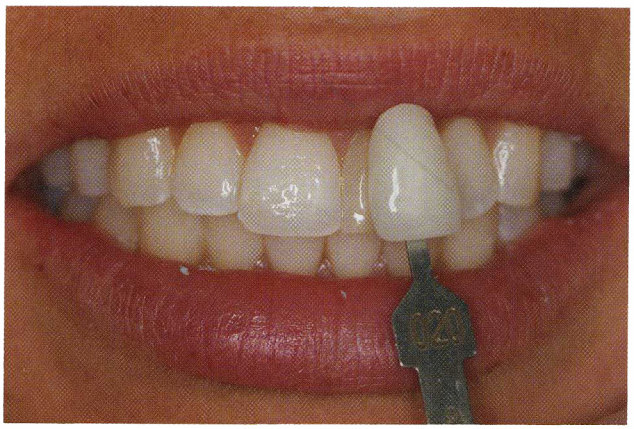

Figure 7: Shade tabs 010 and 020. Shade 020 was chosen, but the laboratory was asked to create incisal edge translucency, internal characterization, and white spots to match the lateral incisors.

mm light guide. The light was then moved along the lingual and facial for three seconds each to effect a "rubbery" phase and make the cement easy to clean up. The goal here was simply to get the cement to its gel state without completely curing it, as the more cleanup that was done now, the less there would be to clean up with a handpiece later[2] Excess cement was "picked away" using an explorer and scaler. A serrated saw (Brasseler) was used to remove cement through the contacts. Waxed floss was also used, being carefully pulled through to the lingual in the direction of the veneer placement in order to prevent the veneer from shifting or popping off. A secondary oxygen inhibition layer remained because the restorations were not yet fully polymerized after the "tack and wave."[4] Due to oxygen inhibition during polymerization, margins polymerized without glycerin gel show a rapid degradation compared to air-blocked margins.[3,7] A glycerin gel was placed on the margins of the restorations prior to final cure. Each restoration was light-cured for 20 seconds from the buccal, lingual, and proximal aspects with the gel in place. The water-soluble glycerin was rinsed off, x-rays were taken, and excess cement was removed. The occlusion was checked. The margins were finished with an extra-fine diamond finishing bur where needed. The adjusted areas were polished and smoothed with Porcelize (Cosmedent) diamond polishing paste using silicon points and a felt wheel.

CONCLUSION

Excellent esthetic results can be obtained with careful diagnosis, treatment planning, and execution. By listening to the patient's chief

Figure 8: Preparation of both central incisors, as well as opaquer A1 on #9 to mask the darker tooth.

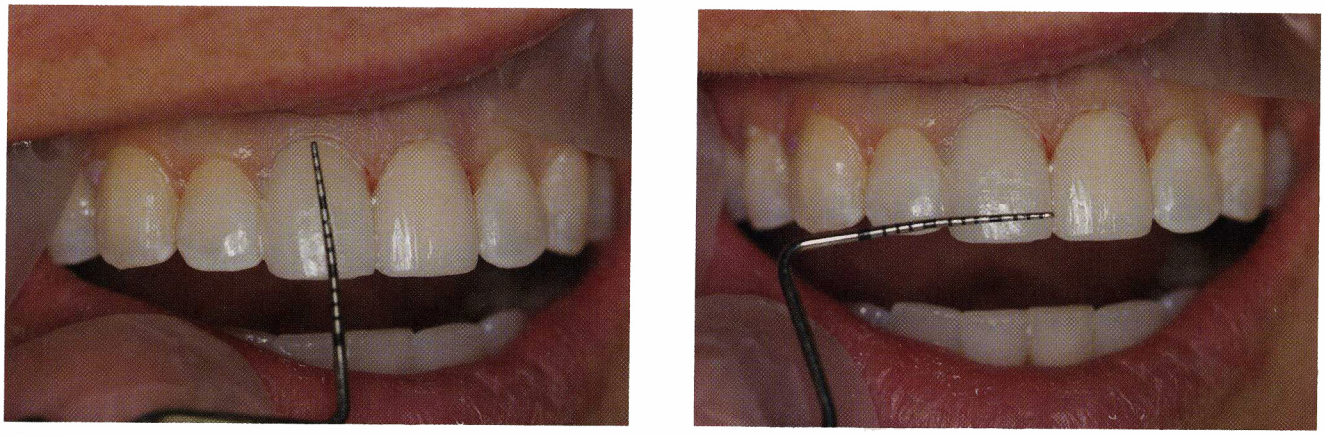

Figure 9: Approved provisionals with measurements for length and width being established.

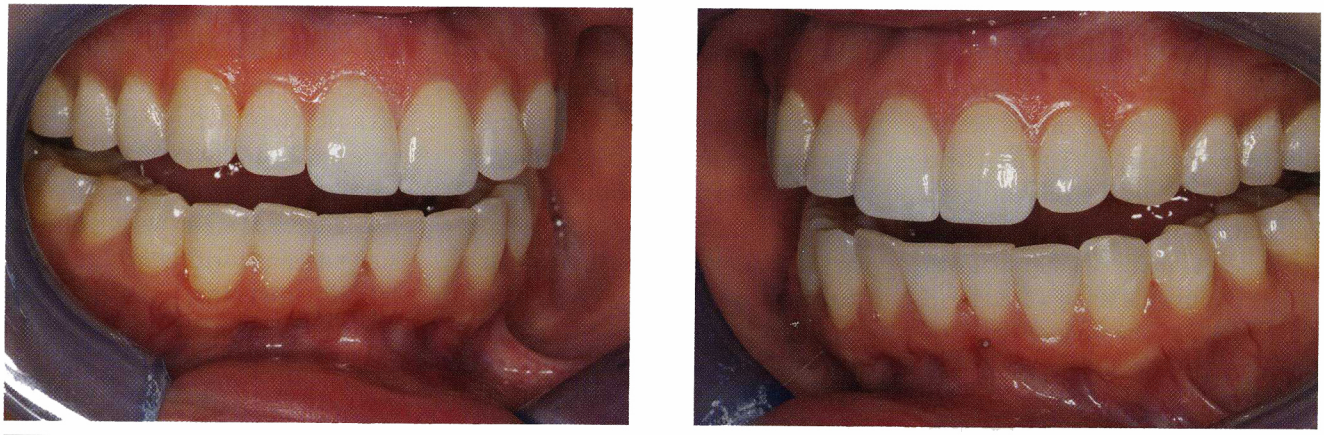

Figure 10: Postoperative retracted right and left 1:2 (1:3) views.

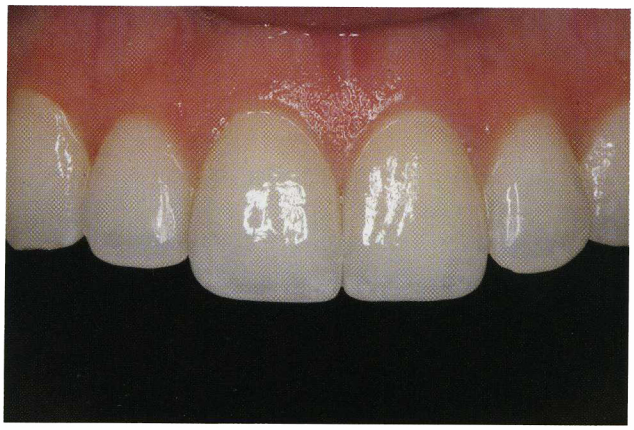

Figure 11: Postoperative 1:1 (1:1.1.5) view, showing the incisal edges blended to match the lateral incisors.

Figure 12: Postoperative 1:1 (1:1.5) portrait and smile.

complaints we were able to create the desired contours and esthetics. The symmetry, incisal characterization, and color were well blended to match her natural dentition harmoniously (Figs 10 & 11). The patient was very satisfied with her new esthetic and natural-looking smile (Fig 12).

Acknowledgements

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