

Success Through Collaboration: Case Type I

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Abstract

AAACD Accreditation Case Type I is one of the easiest in concept yet can be the most challenging in execution. Not only is this case an ideal demonstration of the necessity of prior planning from a smile design perspective, but it also demonstrates how dependent the successful execution is on communication with a skilled laboratory partner. Dental technicians must translate nuances such as surface texture and translucency to a visual form. It is through this collaboration and vision that a successful smile design can be achieved and exceed a patient's expectations.

Key Words: gingival esthetics, lab communication, porcelain veneers, smile design, Accreditation Case Type I



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

Introduction

In Accreditation Case Type I, the candidate is required to deliver six or more indirect restorations within the maxillary arch, creating an ideal smile that harmonizes with the patient's face and existing dentition. It is a challenging task that necessitates careful attention to details, including smile design and selection of restorative material. In particular, close collaboration between the clinician and laboratory technician is critical to a successful result.

Case Presentation

Patient Complaint and History

The patient presented seeking an overall change in her smile (Fig 1). She had previous bonding that was starting to show signs of age, and orthodontic positioning of the teeth during adolescence had created black triangles due to the coronal placement of the contact points. She was getting married in six months and wanted a beautiful smile for her wedding photos.

Evaluation, Diagnosis, and Treatment Plan

The patient had received regular general dental care with fillings and cleanings, but she had not had any extensive dental work. Her oral hygiene and soft tissue health were excellent. Radiographic and oral cancer examinations were within normal limits. She had no endodontically treated teeth in the anterior region (#19 was endodontically treated) nor any symptoms or periapical pathology.

There was no temporomandibular joint pain, clicking, or popping upon examination. The biggest concern during the exam was the black triangles that resulted from her previous orthodontic treatment. We concluded that changing the position of the contacts would enable the creation of a more esthetic smile.

The major problems with the patient's smile included the tooth shape discrepancy and black triangles associated with her anterior teeth due to prior orthodontic treatment (Figs 2 & 3). The orthodontic treatment had also led to white spot lesions, and bonding had been placed in various areas to mask them. Knowing that we wanted to change the size of her teeth and shape of her smile, it was determined that 10 indirect porcelain restorations would be fabricated to create harmony and establish symmetry in the smile. Diagnostic impressions would be taken, and a diagnostic wax-up would be performed. The diagnostic wax-up would serve as a blueprint of the patient's desires so that we could minimize the amount of enamel that had to be removed.¹ Our goal was to improve the smile by eliminating the black triangles with 10 porcelain restorations as well as developing the buccal corridor (Fig 4).



Figure 2: Right lateral retracted view (1:1) showing black triangles that concerned the patient.



Figure 3: Frontal retracted view (1:1); prior composite bonding placed to mask decalcifications.



Figure 4: Full-smile frontal view (1:2) showing a wide smile with an extensive buccal corridor.

Treatment

Record-taking: Diagnostic impressions were taken to record the positions of the teeth. A diagnostic wax-up was created based on the ideal position and shape of the teeth. The wax-up was used to create a reduction matrix as well as a lingual matrix out of polyvinyl siloxane (PVS) putty (Flexitime, Kulzer; South Bend, IN). This putty matrix would be the method by which to transfer the new position of the incisal edge and facial contours of the final restorations to the mouth. Before preparing the teeth, the reduction guide was placed over the teeth, and areas that were touching the matrix were noted.²

Preparation: The teeth were anesthetized (4% Articaine with 1:100k epinephrine, Septodont; New Castle DE), and a retractor (Optragate, Ivoclar Vivadent; Amherst, NY) was placed to provide adequate lip retraction. The teeth were prepared with veneer reduction burs (Axis Dental; Chelmsford, MA), taking into account the final reduction desired and attempting to keep the margins equigingival. The final reduction provided adequate space for the addition of the porcelain. The matrix was used often to ensure that the shape of the diagnostic wax-up would allow for the proper shape of the porcelain. There were several areas where a prior Class 3 restoration ended at the margin. To stay conservative and not wrap these restorations around to the lingual, the decision was made to replace these restorations.³ They were removed using a #2 round bur (Axis). The restorations were etched for 20 seconds with 35% phosphoric acid (Ultra-Etch, Ultradent Products; South Jordan, UT) and rinsed, then Scotchbond Universal (3M; St. Paul, MN) was scrubbed into the restorations for 20 seconds and air-dried and cured for 10 seconds. Nanocomposite (Filtek Supreme, 3M) was placed in the prepared area, adapted, and cured for 20 seconds.

Lab communication and impressions: Once the preparations were completed, the teeth were smoothed with a goat hair brush (Jiffy, Ultradent). A natural dentin shade photo was taken to communicate with the technician regarding ingot selection. Finally, a periodontal probe was used where the veneer preparation design broke interproximally to determine bone height to convey where the lab should place the contact point relative to the margin to guarantee no black triangles.⁴



Figure 5: Full-smile frontal view (1:2); provisionals showing very square tooth forms.

The gingival tissues were retracted with retraction paste (3M) for four minutes, then rinsed. A full-arch PVS impression (Imprint 4, 3M) was taken and allowed to set for four minutes. The impression was removed from the mouth, rinsed, disinfected, and air-dried, and the margins were verified under magnification.

Etching, bleaching, and occlusion: The teeth were spot-etched with Ultra-Etch for 20 seconds on the facial surfaces, and Scotchbond Universal was placed in the etched area using a micro brush and then light-cured (Bluephase, Ivoclar Vivadent) for 10 seconds. The PVS matrix was filled with a bleach shade bis-acryl (Luxatemp, DMG; Englewood, NJ) and placed over the prepared teeth for three minutes. The facial surfaces of the teeth were cured for 20 seconds, and the excess material was removed with an interproximal mosquito bur (Axis). Occlusion was verified with articulating paper (TrollFoil, Troll-Dental; Newtown, CT), making sure all the teeth had centric contacts and proper excursive and lateral forces. The patient went through phonetic verification with "F" and "V" sounds to test the position of the incisal edges. The teeth were polished using Jiffy cups and points. A follow-up appointment was scheduled for 72 hours later to make any modifications to the provisionals as well as take photos for communication with the technician.

Modifications: At the next visit, there were several changes that the patient desired to see in the final restorations (Fig 5). These included more surface texture and for the incisal embrasures to be a more rounded shape. These modifications were

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Figure 6: Postoperative retracted right lateral view (1:1) showing that tissue fill-in still needed to occur.



Figure 7: Postoperative retracted frontal view (1:1); healing of the tissue after 72 hours still showed black triangles.

made in the provisionals, and the patient approved them. Finally, she requested that the final restorations be more chromatic than the provisionals. Once the patient approved the provisionals' size, shape, and color, a PVS (3M) impression of the temporaries was taken along with a facebow (Whip Mix; Louisville, KY), and the AACD series of photos were taken for communication with the technician. The patient was asked to return for try-in and delivery of the final restorations.

Try-in and delivery: The teeth were anesthetized (4% Articaine with 1:100,000 epinephrine), and an Optragate was placed to provide adequate lip retraction. The temporary restorations were sectioned using a bur and removed with a crown spreader (Brasseler; Savannah, GA). The spot-bonded areas were roughened to remove any residual bonding material that could prevent the restorations from seating. The veneers were then tried in two at a time from #8 and #9 to #5 and #12, to check for marginal fit.

Once the marginal accuracy was verified, the teeth were tried in with two different try-in pastes (translucent and +1, Variolink II, Ivoclar Vivadent) to increase value. The patient was given a hand mirror, and she approved the restorations' size and shape. She preferred the teeth with the higher value try-in paste. The restorations were removed, and the try-in pasted was rinsed off. Cleaning paste (Ivoclean, Ivoclar Vivadent) was placed on the previously etched surfaces of the restorations for 20 seconds to remove any phosphates from saliva contamination. The surfaces were rinsed and then coated with Monobond (Ivoclar Vivadent) and allowed to sit for 60 seconds before being air-dried. The teeth were rinsed with water to remove any residual try-in paste. The teeth were etched with Ultra-Etch for 20 seconds, then rinsed. With the surface of the teeth still moist, Adhese Universal (Ivoclar Vivadent) was scrubbed onto the surface for 20 seconds using the built-in micro brush. The teeth were air-dried to remove any pooled

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bonding material. The restorations were filled with luting composite (+1, Variolink II) and placed from #8 and #9 to #5 and #12. Any excess cement was removed with a 2 × 2 cotton gauze on the facial and lingual surfaces and with a micro brush interproximally. A glycerin paste (Liquid Strip, Ivoclar Vivadent) was then applied to the margins of the restorations, and the veneers were cured for 20 seconds. Excess material was removed using fine diamonds and interproximal saws (Axis). The margins were polished with Jiffy polishing cups and points and finishing strips (GC America; Alsip, IL). The interproximal contacts were verified, making sure that all excess cement was removed, and that floss could pass between the restorations with a secure contact. Radiographs were taken to ensure all excess cement was removed. The occlusion was verified, ensuring that all the teeth had centric contacts and proper excursive and lateral forces. This was verified using articulating paper (Troll-Foil) and a computerized bite force sensor (T-Scan Evolution, Tekscan; Boston, MA).



Figure 8: Postoperative retracted right lateral view (1:1); final healing of the gingival tissues showing closure of black triangles.



Figure 9: Postoperative retracted frontal view (1:1); final healing of the gingival tissues showing closure of black triangles.

Final follow-up: The patient returned 72 hours later to check the occlusion as well as tissue healing. The papillae had returned to better positions, but black triangles remained (Figs 6 & 7). However, since the contact positions were placed 4 mm from the crest of the bone interproximally, we believed that the tissue would mature into the proper position in just a few weeks.⁵ This is evident from the final photos taken six weeks after delivery (Figs 8 & 9). Ultimately, the patient had a much-improved smile overall, with the expanded buccal corridor and the natural transitions in shade (Figs 10 & 11).

Summary

A successful case begins with having a vision, and this vision begins by identifying the challenges and risk factors that must be overcome. By utilizing a diagnostic work-up in either a digital or traditional wax format, a plan can be both developed and executed. Working with a skilled dental technician who understands the language of esthetics and smile design is a must in these cases.

Acknowledgments

The author thanks James Forgeng, CDT (Synergy Dental Lab; Virginia Beach, VA) for his ceramic work on this case.

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Figure 10: Postoperative frontal view (1:2); final smile with filled out buccal corridor.



Figure 11: Postoperative final full-face portrait view (1:10).

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Disclosure: The author did not report any disclosures.