American Academy of Cosmetic Dentistry®

Laboratory Technician
Clinical Case Type II

One or Two Indirect Restorations

AACD Member ID # 00000

EXAMPLE REPORT

Treatment List
• #8, #9 All Ceramic Crowns

Restorative Material
• IPS Empress Esthetic Staining Technique
• Ingot EOC 1

Adhesive System
• Acid Etch (Ultradent)
• Prime and Bonding Agent (OptiBond-Kerr)
• Variolink II (Ivoclar)
Introduction

Advances in dental materials today allow for restorations in anterior teeth to blend very well with natural dentition. Choosing a restorative ceramic material for anterior teeth adjacent to natural teeth is always a challenge. There are many porcelain systems available, both pressed, and layered, that could accomplish this same goal. Communication between the laboratory and the dentist is crucial, as well as the desires of the patient. This patient’s chief complaint was the dark color and discoloration of the old bonding on his two front teeth. No matter what restorative system is ultimately chosen, it is up to the ceramist to utilize all information available to match the restorations to the natural dentition. Pressed porcelain crowns were chosen to restore this particular case because of the wide range of ingots to choose from, and the ease of use and predictability.

History

The patient, a 17-year-old male, presented with #8 and #9 discolored from previous root canal therapy, as a result of a baseball accident. Both #8 and #9 had bonding on the facial incisal areas, which had become quite discolored; and, he had a diastema between them as well. He was self-conscious about his smile and wished to improve upon the color discrepancy. The patient mentioned that the tissue around #8 and #9 were also traumatized in the accident, however a thorough examination by the dentist revealed nothing significant. It was also noted in the clinical examination that the centrals did not have the proper length-to-width ratio.

Diagnosis and Treatment Plan

After a successful comprehensive clinical examination and diagnosis by the dentist, it was determined that porcelain crowns would be prescribed to restore this patient’s smile. The treatment would consist of two all-ceramic restorations, and the goals would include:

- correct the color discrepancies
- close diastema between #8 and #9
- improve symmetry between #8 and #9
- improve length-to-width ratio and central dominance
- restore broken teeth
- improve uneven incisal edges
- get #8 and #9 to blend with natural adjacent teeth

Preoperative impressions were taken by the dentist and sent to the laboratory along with proper records to fabricate a diagnostic wax-up of #8 and #9 full crown restorations.

Once the diagnostic wax-up was accepted by the patient, the dentist was ready to proceed with the treatment. He then prepared teeth #8 and #9 to receive full ceramic crowns. It was determined that internal bleaching of the preps would be carried out in order to lighten the existing prep color, and to improve the predictability of the final shade of the restorations.

After completion of the bleaching—approximately two weeks—temporary restorations were made again, and an impression was taken. The case was sent to the laboratory along with all the required photographs and information needed to fabricate the final restorations.

**Laboratory Procedure**

After receiving the case in the laboratory, and reviewing the information included, stone models were poured, trimmed, and cross-mounted on a Denar articulator—utilizing all the records provided.

The preparation design consisted of #8 and #9 full porcelain crown preparatory, with shoulders to receive pressed porcelain. Both preps were of good color due to the internal bleaching, and Empress Esthetic pressed porcelain was the material chosen to restore this case. The dentist had indicated on the laboratory script that Empress Esthetic was the desired material, however the final decision is determined after reviewing the case.

The models were then prepared for the wax-up phase. Using the temporary model as a guide, wax was applied to the master model and shaped to full contour. All information gathered from the dentist—including all photographs and written information was used to help determine the final shape and design of these two teeth, and accomplish the desired goals.
After the wax-up was finalized, it was then separated, sprued, and invested according to the manufacturer’s instructions.

Empress Esthetic Ingot EOC 1 was chosen for this case—based on the prep design and color—and the color of the adjacent teeth. The patient, being very young, had rather dense dentition, with not much translucency in the incisal 1/3. In the photos, a “bleach” shade tab of OM 3 (Vita 3-D Master) was shown next to one of the laterals, and the natural teeth seemed to be more dense than the shade tab. Ingot EOC 1 is more dense than the TC ingots of the same system, and seemed to be the correct blend of density and translucency to be able to blend with the adjacent teeth. With a little incisal layering, it would seem that they would match well.

The restorations were then pressed in an Ivoclar press furnace, cooled and then devested. They were cut off from the sprues, and fit back to the master die model.

Stump dies were fabricated to replicate the color of the preparations. A clinical photograph depicted the prep shade to be ST 9.

The pressed restorations were then contoured to the final shape. Occlusion was checked and adjusted; the midline was checked and re-checked with the full-face photos. Contacts and margins were also checked to be intact. An incisal edge matrix was made using Sil-Tech putty, to index the location, shape, and length of the finalized incisal edge.

Using the photos as a guide, it was determined how much of the incisal 1/3 to cut back. Only the facial aspect of the incisal edge was cut-back due to the low level of translucency of the natural teeth. Using a diamond-impregnated wheel, the restorations were cut-back to allow for the layering of porcelain. The cut-back was designed to look like what would be “inside” the incisal of the adjacent teeth. The matrix served as a guide in re-establishing the previously determined incisal edge position.

The cut-back pressed restorations were then sand-blasted with aluminum oxide, steam cleaned, and put on the stump dies with a small amount of Empress Universal Stain and Glaze liquid on the internal surfaces. This is used as a wetting agent, and ensures that there is very little air between the restorations and the stump die—and helps in evaluating the shade.
No stain bake was performed before the “neutral” interface layer, because of low translucency in photos. The cut-back was character enough, and provided the necessary internal effects.

Empress Esthetic Veneer wash paste “neutral” was applied to the restorations and fired at 840 degrees C. This wash bake helps bond the layering porcelain to the pressed porcelain.

After the restorations were cooled, they were placed back on the master die model and prepared for the incisal porcelain application. This was done in two bakes.

Because of the low level of incisal translucency in the adjacent teeth, Empress Esthetic Incisal Opal “low translucent” was used to layer the incisal areas of these restorations.

- using a fine-tipped brush, the veneering porcelain was applied and built to contour

The restorations were then placed on a firing tray and baked at 840 degrees C.

A second incisal bake using the same porcelain was performed to fill in the final contours and deficient areas. They were placed on a tray and fired again at 840 degrees C.

After the restorations had cooled, they were fitted back to the master model—making adjustments to the contacts and occlusion as necessary—making sure the midline was in the correct position.

The fired incisal porcelain areas were then contoured to blend in with the already contoured 2/3 of the crowns using various diamond burs, and shaped back to the original form—re-connecting the incisal 1/3 in a seamless flow into the body of the restorations.

When final contouring was completed, surface morphology and anatomy was added using diamond burs to mimic as closely as possible the surfaces of the adjacent teeth. A thin layer of silver paste was painted over the surface to check how the crowns blended with the natural teeth. After some adjustments, the crowns were steam-cleaned, fitted to the solid model, and adjusted again for contour and contacts. Margins were checked and rubber-wheeled under magnification for accuracy.
After checking the restorations on the solid model on the articulator, and making sure all excursive and protrusive movements and all other contours were satisfactory, they were ready to be stained and glazed. This was done in several steps as follows:

- they were placed on the stump dies with medium and checked for initial color

- medium solution was brushed on in a thin layer and color was checked with the shade guide and photos

- Empress Universal Shade 110/120 mixed with a tiny amount of “basic red” (pink) was used at the gingival to mimic the slight peach color depicted in the photos

- the restorations were fired at a temperature of 770 degrees C to set the stain

- then a separate stain bake was preformed using “white” to mimic the hypo calcification markings on the gingival and incisal areas

The stain was done in two separate bakes, so that the white stain was layered on top of the “peach” stain and did not melt into each other. It is also important to protect the layered stain with a separate glaze bake and seal the color.

After being satisfied with the color and characterization from the stain program, a thin layer of Empress Universal Glaze Paste was then brushed on to the restorations and baked at 840 degrees C.

They were fitted to the solid model and checked for contacts and any deficient areas.

Using Empress add-on material, very small additions were added between #8 and #9, and the contact areas. It was also necessary to repair a small chip on the facial margin of #8. They were fired at 770 degrees C.

Contacts were checked again, using shim stock on the solid model and polished using a slightly abrasive rubber wheel.

When everything was satisfactory, they were then ready for final diamond polishing.
After being lightly sandblasted with aluminum oxide on the internal surfaces and steam-cleaned, they were very lightly rubber-wheeled on the facial lobes and lingual highlighted areas using the photos as a guide to determine the reflective areas. They were then diamond polished with Deashine “fine” polishing paste and a bristle brush. This took several attempts of rubber-wheel and polish in order to achieve the desired surface texture.

They were then steam-cleaned, air-dried, and fitted back to the solid model.

After thoroughly checking and re-checking to be sure all criteria had been accomplished, they were ready to be etched, salinated, rinsed, and dried.

The case was then packaged and sent to the dentist’s office. They were seated successfully.

**Conclusion**

Pressed porcelain crowns restored this patient’s smile and improved esthetics. The strength and lifelike attributes of Empress Esthetic porcelain blended well with the existing dentition. The patient was very pleased with the result, and it gave him more confidence and self esteem.

**References**


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