

ACCREDITATION CLINICAL CASE REPORT, CASE TYPE II: ONE OR TWO INDIRECT RESTORATIONS



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INTRODUCTION

Porcelain laminate veneers offer some of the most exciting restorative and esthetic alternatives in dentistry today. With minimal tooth reduction, current adhesive materials allow for remarkable changes in appearance while using an extremely conservative approach.

Patient perceptions, expectations, general health, periodontal health, occlusion, condition of remaining dentition, and tooth and gingival alignments are some of the factors influencing treatment planning in these cases. Others are tooth shapes, colors, lengths, and relative sizes.

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PATIENT HISTORY

The patient was a 49-year-old male in excellent health, with no significant medical history. He stated that he had not sought professional care for several years and he desired to get his mouth and teeth back in shape. He was also interested in improving smile esthetics. The patient reported having lost a lower left first molar due to decay, and he wanted to replace it. He also was aware of dentistry's more contemporary esthetic restorative materials and wanted to have all of his past metal-based dentistry removed and replaced with esthetic restorations. Teeth #8 and #9 had been injured two years earlier in a boxing match and they had darkened over the previous 18 months (Fig 1). There were no other symptoms reported.

Examination revealed several defective amalgam restorations and a fractured and decayed #18. In the area of the lower left first molar, the edentulous area showed significant bone loss. Tooth #4 had been treated endodontically



Figure 1: Preoperative portrait.

and was held together with a large amalgam buildup. Periodontally, the patient presented with a Type II condition (American Dental Association [ADA])¹ characterized by generalized gingivitis and posterior pocket depths measuring 3 mm to 4 mm with bleeding. He had an Angle Class I relationship with proper anterior guidance both protrusively and laterally. The lower incisors were slightly crowded, giving them uneven heights incisally. There were wear facets in the upper and lower lateral incisors that occurred in the lateral protrusive positions. The discoloration reported by the patient in #8 and #9 was apparent. Radiographs showed periapical pathology radiolucency on #9.

The patient had several cosmetic dental concerns:

- There was a small “black triangle” at the gingival embrasure between #8 and #9.
- Teeth #8 and #9 were dark, especially in the gingival one-half.
- Tooth #4 appeared dark.
- The lower incisors were “uneven.”

- The lower canines were too pointed.

Other observations were as follows:

- The patient had an attractive smile.
- He had very bell-shaped central incisors.
- There were diastemata present between #5 and #6, #6 and #7, and #10 and #11.
- The buccal corridors filled the smile; however, the premolar areas revealed short teeth and a “gummy” appearance.

CLINICAL FINDINGS

Clinical findings were as follows:

- There were wear facets on the lateral incisors due to function in lateral protrusive movements.
- There was periapical pathology at #9 and nonvital pulps in both #8 and #9, as confirmed by an endodontist.
- There was ADA Type II periodontal disease.
- Tooth #18 was decayed and had a crown fracture.

- Tooth #19 was missing.
- Several posterior amalgam restorations were in disrepair but did not need immediate replacement.
- The black triangle at the gingival embrasure #8 and #9 was due to the bell-crown shape of these teeth.
- The dark nature of #8 and #9 was most probably due to the trauma they had experienced and blood product leaching into the teeth.

If the goal in this case had been to build ideal esthetics and restorations in the entire upper anterior segment, the treatment plan would have required the restoration of 10 teeth. However, the patient informed me early on that he was not concerned about the diastemata since they were not apparent from a frontal view, and he had no interest in changing the tissue heights in the bicuspid areas or in making those teeth larger. He also had no interest in a cosmetic restoration of his crowded lower incisors. His main concerns were the dark #8 and #9, the black triangle, and the uneven



Figure 2: Natural die shades for laboratory communication; approved provisionals.



Figure 3: Preoperative and postoperative smile.

lower incisors. The treatment plan was based upon health, function, esthetics, and the patient's desires.

TREATMENT PLAN

The treatment plan comprised the following steps:

1. Endodontic therapy on teeth #8 and #9, performed by an endodontist.
2. Interceptive periodontal therapy utilizing ultrasonics, diode lasers, and reevaluation.
3. Cosmetic recontouring and polishing #7, #10, ##22-27.
4. Internal bleaching, access closure, and porcelain veneers #8, #9.
5. Posterior dentistry at a later date to replace failing dentistry and to replace tooth #19 with bone grafting, an implant, and a crown.

We initially were concerned with the amount of "step" in length between the central and lateral incisors, but when the patient and I viewed an overlay mock-up during treatment planning we felt the canine size, the expanse of the smile, and amount of tooth display made

our proposed contours and length look natural.²

TREATMENT

ENDODONTIC AND PERIODONTAL

The endodontic and periodontal procedures were carried out with excellent results. Teeth #7, #10, and ##22-27 were recontoured to provide improved esthetics, remove the remnants of wear from #7 and #10, and maintain proper anterior guidance. We were now ready to treat #8 and #9. After internal bleaching, the endodontic access closures were



Figure 4: Initial cutback of pressed OM2 ingot; initial stacking of porcelain powder to create translucency.



Figure 5: Preoperative and postoperative 1:2 retracted view.

achieved with resin and we proceeded to the porcelain veneers.

PREPARATION

Prior to the preparation appointment, a diagnostic wax-up was done on models mounted in a SAM 3 articulator (Great Lakes Orthodontics; Tonawanda, NY) with facebow in centric relation (CR). A Sil-Tech (Ivoclar Vivadent; Amherst, NY) putty index was made of this wax-up and a clear stent preparation guide was created to facilitate conservative preparations.

Shade mapping was done prior to preparation and documented with photographs. The patient had also made a trip to the laboratory to verify shades and characterization. Anesthetic was administered using 2% lidocaine with 1/100,000 epinephrine. The teeth were initially prepared with depth cuts in three planes: Gingival one-third, middle one-third, and incisal one-third. A round-end diamond (Brasseler USA; Savannah, GA) was used to reduce remaining tooth structure to these depths, again holding the bur in three distinct planes of reduction.

Uniform reduction was carried out and distinct chamfer marginal finish lines were carried right to the free gingival margin. Interproximal finish lines in the contact areas were carried to the mesiolingual and distolingual areas to aid in correcting width. The reduction stent was used with a periodontal probe to ensure uniform reduction as dictated by the diagnostic wax-up. Shades of the prepared teeth were taken with an Ivoclar Stumpf guide and documented with photographs. These shades were equivalent to the Ivoclar IPS natural die shade ND-6 in



Figure 6: Preoperative and postoperative 1:1 retracted view.

the gingival one-half and ND-7 in the incisal one-half (Fig 2).

PROVISIONAL FABRICATION

Fine finishing strips (Cosmedent; Chicago, IL) were used interproximally to slightly open the contacts to allow distinct visualization and finishing by the dental laboratory.³ The teeth were rinsed, dried, and smoothed with fine finishing diamonds (Brasseler). After further rinsing and drying, an impression was taken with a combination of light-bodied polyvinyl siloxane (Aquasil Ultra, Dentsply Caulk; Milford, DE) syringed over the teeth and a heavier-bodied material in a stock tray. The impression was removed, inspected and set on the bench. A facebow record, CR bite, and stick bite were taken and the stick bite photographed for the laboratory.⁴ Provisionals were fabricated with a spot-etch technique, etching the midfacial of each preparation with a small dot of 35% phosphoric acid (Ultradent; South Jordan, UT).⁵

A putty matrix of the wax-up was used to make a Luxatemp B-1 shade provisional (Zenith/DMG; Englewood, NJ).⁶ After trimming and pol-

ishing, the provisional was bonded for 60 seconds on each tooth. Occlusion was checked and adjusted in centric, protrusive, and lateral excursive movements. The patient was given postoperative instructions and asked to return to the office in three days. At that time, photographs and an impression were taken of the approved provisionals for laboratory usage. Vita (Vident; Brea, CA) shades 1M2 and 1M1 with moderate translucency would serve as our primary color guide (Fig 3).

LABORATORY COMMUNICATION AND FABRICATION

The laboratory prescription was very detailed in describing the porcelain veneer restorations. The technician and I prescribed Vita pressed porcelain veneers cut back and characterized with Vita layering porcelain as the restorative material. Our experience with these materials allows us to provide ultimate control in color mapping, characterization, and translucency. This is an excellent choice for pressed porcelain because of its ability to cover the dark prepared dentin in these teeth. The OM2 ingot was used to reach 1M1 as a base final shade, with the lay-

ering porcelain adding a little more opacity at the gingival and the rest of the color character to the case (Fig 4). Included with the prescription were preoperative photographs, the impression, opposing impression, shade photographs, bite registrations, facebow record, photographs of dentin shades, photographs of the approved provisionals, and an impression of the provisionals. Our technician also had his own shade verification on record.

INSERTION AND FINISHING

The veneers were inspected on working and soft tissue solid models for integrity of margins, contacts, and passive fits. An incisal putty guide was fabricated from the provisionals and checked against the incisors of the finished restorations to ensure adherence to our specifications. All aspects appeared acceptable.

The patient was given anesthetic and the provisionals were removed. The spot-etched areas were carefully trimmed back and cleaned to ensure that no bonding agent remained on the prepared surface. This allows proper seating of the veneers and



Figure 7: Postoperative full-face view.

etching of the enamel in the area. The prepared teeth were pumiced, rinsed thoroughly, and dried. The restorations were tried in, first individually to ensure fit and marginal integrity, and together to observe contacts and relative contour in the mouth. The patient was extremely happy with the color, shape, characterization, and translucency of the restorations. A clear try-in gel (Insure; Cosmedent) was placed in the veneers for further evaluation. The value of #9 appeared slightly lower and several try-in pastes were tested to find improvement. When #9 was tried in with Insure clear paste and #8 with Insure YR light try-in paste, I was satisfied. The color was very pleasing and the patient was allowed to view the restorations while sitting in the chair, standing upright in front of a wall mirror, and at a window with natural light. He was happy with all views (Fig 5).

The veneers were carefully cleaned with cotton pellets and water, dried, and decontaminated with Ultradent phosphoric acid, rinsed, dried, and silanated. A thin layer of unfilled OptiBond light-cure adhesive (Kerr; Orange, CA) was coated over the silanated surface, air-thinned, and covered to

protect from polymerization from ambient light.⁷ The prepared teeth were isolated with a rubber dam, scrubbed with Consepsis, rinsed, and dried. A 35% phosphoric acid gel was applied to the teeth for 12 seconds.² The veneers were placed simultaneously to control relative position and midline.² The teeth were rinsed and dried and coated with Gluma desensitizer (Heraeus Kulzer; Armonk, NY) for re-wetting of the dentin. The teeth were then saturated with several coats of Opti-Bond dentin primer. Following the manufacturer's recommendation, after 20 seconds the excess was gently air-thinned to evaporate the solvent with a light, warm moisture-free air spray. The teeth were then coated with a thin layer of OptiBond unfilled resin. The clear shade of Insure luting resin was chosen as the luting agent for #9 and YR Light for #8, and placed into the veneers.

The veneers were placed on the teeth with light, even pressure until fully seated and the excess luting resin removed with Cosmedent brushes, Hu-Friedy explorer (Chicago, IL), and Ultradent resin applicator. Initial curing was a spot-tack to create stability for further resin cleanup before full curing.² The remaining

resin was removed with brushes, explorer, and floss. The margins were covered with DeOx (Ultradent) to prevent an oxygen-inhibited layer.⁷ Each veneer was cured for 90 seconds from all angles. Further excess cement was removed with a #12 Bard-Parker interproximal carver (Becton Dickinson; Franklin Lakes, NJ) and Cosmedent fine finishing strips. The lingual margins were blended and refined with Brasseler fine finishing diamonds. The proximal areas were refined with fine finishing strips, both metal and plastic. Occlusion was evaluated and adjusted in centric, protrusive, and lateral excursive movements.⁸ All surfaces were smoothed and polished with Cosmedent rubber porcelain polishing points and finished with Ultradent porcelain polishing paste. The patient was seen one week later for a postoperative appointment to refine occlusion, esthetics, and comfort. All appeared satisfactory (Fig 6).

SUMMARY AND CONCLUSION

This case is a good example of relatively conservative treatment that can make a big difference for the patient. We as dentists often look at a case and envision doing

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more dental treatment to attain optimal esthetics. Often, however, if we listen to the patient and what really is important to them we can see a more subtle solution that creates an excellent improvement. This may satisfy the patient and still leave open the possibility of more improvement later (Fig 7).

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AACD Acknowledgment

The AACD recognizes Dr. Gorman as an AACD Accredited Member (AAACD).

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EXAMINERS' PERSPECTIVE FOR DR. STEVEN A. GORMAN



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Accreditation Clinical Case Type II is an assessment of the ability to match one or two indirect restorations of the maxillary incisors to the natural dentition.

In this case, two discolored central incisors were treated. Preoperatively, these two teeth were attractive except for the discoloration and the slight tapering at the cervical, which contributed to development of the dark triangle. One of the most conservative treatment options would be to bleach the teeth, then add fullness to the cervical contour with direct resin application to eliminate the unsightly space. However, when whitening yields limited results, as in this case, further treatment is necessary to obtain the match to the natural teeth. Dr. Gorman chose porcelain veneers to achieve this objective.

Accurate communication and fine collaboration between the dentist and the ceramist are vital to the success of Case Type II; this case was no exception. In fact, additional skills and artistry were demanded due to the need to mask the underlying discoloration. Dr. Gorman and his ceramist conquered such challenges and presented us with an outstanding result.

Minor faults observed by the examiners included the facial contour, which was somewhat convex and lacked line angle and lobe development. The margins were visible in several areas. The examiners also found the opacity/value to be slightly higher than the natural teeth. Once again, these few imperfections were considered minor. No major faults were noted.

Accreditation Examiners passed this case unanimously. Congratulations to Dr. Gorman and his ceramist on this accomplishment.

The AACD has established a mentoring program comprising examiners who volunteer their time to help members in the process through different steps in the Accreditation process, including case selection. To find a mentor, visit www.aacd.com.

AACD Acknowledgment

The American Academy of Cosmetic Dentistry recognizes Dr. Rebecca K. Pitts as an AACD Accredited Fellow Member (FAACD) and Accreditation Examiner.

