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Accreditation Clinical Case Report, Case Type IV: Class IV Direct Resin Restoration

INTRODUCTION

There has been a great evolution in composite materials to help clinicians achieve strong, conservative, and esthetic direct restorations. Although polishability of the new microhybrids still does not compare to that of microfills, clinicians can take advantage of the new microhybrids' ease of handling and place the final layers with microfills. This technique will result in restorations that are reasonably strong, look natural, and are easier to place than the layered techniques used with the previous generation of materials.^{1,2}

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HISTORY

The patient was a 32-year-old male in excellent health. He came to our office wanting to improve the appearance of his upper front tooth. He had suffered an injury to #8 and #9 as a teenager and still had a dark, discolored composite restoration on tooth #8. His goal was to have a more natural-looking central incisor. He wanted an economical solution as finances were a concern (a personal fitness trainer, he was in the process of developing his own health club). Various options were discussed, including porcelain veneers on teeth ##5-12 but, for the time being, he wanted just to improve the appearance of #8 (Figs 1-4).

CLINICAL DATA

Teeth #4, #12, #20, and #29 had been removed for orthodontic treatment when the patient was a teenager. His wisdom teeth had been removed soon after the orthodontic treatment.

The restoration in tooth #8 was in the mesial-incisal one-third, with a separate Class III restoration in the distal-lingual (Fig 1). Tooth #8 tested vital and the existing composite on the preoperative radiograph appeared not to be near the pulp. The patient's periodontal health was within normal limits. No bone loss was noted and zones of attached gingival tissue were within normal limits. Black triangles were noted between #7 and #8, #8 and #9, #9 and #10, and #10 and #11. Slight gingival recession was noted at teeth #6, #10, #13, #20, #29,



Figure 1: Retracted frontal view before treatment, 1:1.



Figure 2: Full-face view before treatment, 1:10.



Figure 3: Natural full smile, frontal view before treatment, 1:2.



Figure 4: Retracted frontal view before treatment, 1:2.

and #30 (recession was most prominent at tooth #10) (Figs 1, 3, & 4). The mandibular canines showed signs of incisal wear and the incisal edges of the maxillary canines were restored with composite (Fig 4).

The patient's temporomandibular joint (TMJ) was symptom-free. Clinically there were no TMJ or myofacial findings. The patient was

aware that he ground his teeth at night and he had been wearing a soft nightguard when he slept. The patient had canine guidance due to the restored maxillary canines.³ There was no tooth mobility. Restorations were noted on several posterior teeth, which were all functional. The entire dentition was caries-free. Radiographs did not reveal any periapical pathology.

The patient had good tooth show when he smiled.⁴ The shade of teeth ##7-10 was A-1; the canines and premolars were closer to shade A-2. Tooth #9 was slightly wider than #8. The midline was off to the left by approximately .5-1 mm and also was not perpendicular to the long axis of the patient's face (Figs 1-4). The value of #8 and #9 was slightly lower than the rest of the dentition.

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The restoration on #8 was dark, discolored, and too short incisally (Fig 4).

Teeth #7 and #10 were too short in relation to his smile line. The gingival architecture was fairly well-balanced except #10 and #13, with #10 being too far apical by 1–2 mm (Fig 4).⁴

DIAGNOSES

The diagnoses were a defective restoration on tooth #8 and nocturnal bruxism causing wear to # 6, #11, #22, and #27 (#6 and #11 had been restored). Due to the history of trauma, there could be possible future pulpal changes at #8 and #9 that might require endodontic treatment.

The lingual matrix was placed and a thin layer of occlusal white hybrid composite was applied to cover the entire lingual and incisal surface...This created a lingual shell to act as a support for the rest of the restoration.

TREATMENT PLAN

Clinical data were obtained; mounted study models, 35-mm pre-operative slides and photographs, and digital images were taken; and three options were presented to the patient: Restoring ##4–13 with porcelain veneers, restoring ##4–13 with direct composites, or restoring only #8 with a direct composite. With all three options, a flat plane split would be fabricated at the end of treatment.

Because cost was the patient's main concern, he selected the third

treatment plan. I was comfortable with his choice as it was a conservative treatment plan and it met his esthetic requests. The patient knew his lateral incisors would look shorter in relation to his central incisors when treatment was completed. He also understood that he would have to wear the flat plane splint every night to maximize the longevity of his new restoration.³

ARMAMENTARIUM

- C 440 digital camera (Olympus; Melville, NY)
- N60 35-mm camera (Nikon; Melville, NY)
- E100SW Extachrome film (Kodak; Rochester, NY)
- Lumin shade guide (Vident; Brea, CA)
- clear mylar strips (3M ESPE; St. Paul, MN)
- Sil-Tech putty (Ivoclar Vivadent; Amherst, NY)
- Consepis (Ultradent; South Jordan, UT)
- Ultra-etch 35% phosphoric acid (Ultradent)
- Optibond Solo Plus (Kerr; Orange, CA)
- De-Ox (Ultradent)
- Filtek Supreme (3M ESPE)
- Renamel microfill, hybrid, and opaquers (Cosmedent; Chicago, IL)
- IPC Carver (Cosmedent)
- #1 and #2 brushes (Cosmedent)
- Optilux 400 curing light (Demetron; Danbury, CT)
- Midwest 330 bur, 7902 finishing bur, and 7406 egg-shaped

bur (Dentsply Professional; York, PA)

- Mopper anterior composite preparation and finishing system (Brasseler; Savannah, GA)
- blue and pink cups and points (Cosmedent)
- interproximal finishing strips 1954N (3M ESPE)
- Soflex XT large and small discs (coarse through fine) (3M ESPE)
- Flexibuff discs (Cosmedent)
- Enamelize polishing paste (Cosmedent)
- mint waxed floss (Johnson & Johnson; New Brunswick, NJ)
- Citanest 4% plain (Dentsply Pharmaceuticals; York, PA)
- Septocaine with 1:100,000 epinephrine (Septodont; New Castle, DE)

PREPARATION AND COMPOSITE PLACEMENT

Because the surrounding teeth will dry out during the bonding process, I made a shade map before starting and also had a full-page digital photograph of the upper anterior teeth to provide a guide to the natural color of the teeth.² I decided to match the shade and surface texture of #9 as the patient was not committed to restoring the rest of the anterior dentition.

A Sil-Tech putty matrix was made from the diagnostic wax-up; this would be a valuable aid in transferring the incisal and lingual contours developed in the wax-up to the dentition.⁵ Topical and local anesthetics were administered as follows: Approximately .5 cc of Citanest 4%



Figure 5: Retracted frontal view after treatment, 1:1.

plain was initially infiltrated adjacent to tooth #8 (the basic acidity of this anesthetic makes for a more comfortable injection). Then 1.0 cc of Septocaine with 1:100,000 epinephrine was injected in the same site. Once the patient was comfortable, the teeth were polished to remove any plaque. Then I began the preparation of #8.

I used a 330 stainless steel bur to remove the old composite restoration; a 7902 carbide bur was then used to create a long bevel on the buccal and lingual. The facial bevel was carried 2–3 mm beyond the fracture area to provide room to blend the composite into the gingival one-third of the tooth. The bevel was made with an up-and-down motion so that the finishing line would not go straight across and would seem to “disappear” in the gingival one-third more effectively.² Tooth #9 was reshaped on the mesial to correct the midline cant that was present. The adjacent teeth were protected with clear mylar strips while the etch was placed first on the enamel and then on the dentin. After 12 seconds the tooth was thoroughly rinsed for 10 seconds and cleared

of excess water. Optibond Solo Plus was applied and was lightly rubbed on the preparation for 20 seconds, after which it was lightly dried until glossy. The adhesive was light-cured for 20 seconds.

The lingual matrix was placed and a thin layer of occlusal white hybrid composite was applied to cover the entire lingual and incisal surface.^{1,2} This layer was cured for 40 seconds. This created a lingual shell to act as a support for the rest of the restoration. The lingual matrix was removed and a mylar strip was placed on the mesial of #8. The dentin for the next layer, was recreated with Filtek Supreme shade A-2-D. Mamelons were sculpted and then cured. The next layer consisted of A-2 opaquer to accent the mamelons, create more internal color at the mesial-incisal one-third, and to help hide the fracture line. Then it was cured. The facial layer was created with A-1 microfill; in the incisal

one-third, room was left to add light incisal microfill. This was sculpted and facial anatomy was added to create slight developmental depressions. This final layer was sculpted with the IPC carver and #1 and #2 brushes. Then it was cured for 60 seconds with De-Ox.⁶

FINISHING

The contours were refined with the Mopper composite finishing kit. The finish was generated with blue and pink points and cups, large and small Soflex XT pop-on discs, 1954N finishing strips, and Flexibuff discs with Enamelize paste (Fig 5).⁶ The length of the patient's centrals was checked in cross-over and protrusive positions and adjusted to create the proper guidance. I wanted to keep the posterior teeth discluded when transitioning from canine guidance to cross-over position and have broad and even contacts on both #8



Figure 6: Full-face view after treatment, 1:10.

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Figure 7: Natural full smile, frontal view after treatment, 1:2.



Figure 8: Retracted frontal view after treatment, 1:2.

and #9 in a protrusive movement.³ The centrals were made a little longer in relation to the laterals as this provided better cross-over protection and created more of a convex smile line (Figs 6-8).⁴

By following the above technique in using microhybrid composites for strength and then veneering with microfill composites for esthetics and polishability, it is possible to offer patients very conservative, strong, and esthetic restorations.

SUMMARY AND CONCLUSION

The treatment was completed by fabricating a hard acrylic mandibular flat plane splint for the patient to wear overnight. At his six-month follow-up appointment we took the "after" slides and a final radiograph. The patient reported that he was comfortable and very happy with his new restoration (Fig 6).

By following the above technique in using microhybrid composites for strength and then veneering with microfill composites for esthetics and polishability, it is possible to offer patients very conservative, strong, and esthetic restorations. Initially, I believed that these layering techniques were difficult and time-consuming, but after taking several AACD workshops and with some practice I gradually began to achieve nice, consistent results.

I am grateful to the Accreditation process, which has guided me out of my previous comfort zone and challenged me to provide better esthetic restorations for my patients. This process has been my most rewarding time in dentistry and has been a learning experience second to none. *Atp*

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