The goal of esthetic and restorative dentistry is the replacement of lost or damaged tooth structures with synthetic materials that possess biological, physical, and functional properties that are similar to those of natural teeth.

The characteristics of beautiful composite restorations often are described as though one were describing a work of art. "Blends of colors," "tooth shaping," and "polishing" are some of the artistic expressions cosmetic dentists use to describe their masterpieces.

Contemporary composite systems offer a multitude of shades, translucencies, opacities, and effects that, together with placement techniques, make it possible to create restorations that faithfully mimic the polychromatic and optical variations that exist in natural teeth.1-3 This evolution of materials, techniques, and concepts allows clinicians to treat a wide range of problems in everyday practice by utilizing direct composite resin restorations in a reliable, predictable, and conservative way.4

Clinical examination revealed that #9 had suffered a large Class IV fracture.

Patient History and Diagnosis

The patient was a healthy 9-year-old male who had been involved in a playground accident one week earlier. He presented with a traumatic Class IV fracture of tooth #9 (Fig 1). The patient’s parents wanted a conservative restorative treatment option to restore the fractured tooth to its original appearance.

Clinical examination revealed that #9 had suffered a large Class IV fracture, involving approximately 35-40% of the mesial-incisal corner (Fig 2). The fracture line extended into the dentin but did not involve the pulp.
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CASE HISTORY

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© 2008, Biolase® *in many cases
The patient reported that the fractured tooth had been “sore to touch” for a few days but was now sensitive only to cold. Radiographic and vitality assessments indicated no pulpal involvement or pathology. The patient’s periodontal health was good and no additional fractures were observed in the adjacent dentition. It was also determined that tooth #9 likely was not fully erupted, which in turn would influence treatment options (Fig 3).

**Treatment Plan**

Treatment options were discussed in detail with the patient and his parents. Due to the patient’s age, the desire to conserve tooth structure, and the fact that #9 might not be fully erupted, the treatment selected was restoration with a Class IV composite.

Because the fracture in #9 was quite large (Figs 4 & 5), it was essential to plan ahead for the shape of the final restoration, to avoid compromising the spatial orientation of the composite layers. Study models were taken and used to construct a diagnostic wax-up of #9.

A high-velocity putty index was made from the diagnostic wax-up to aid in assessing the volume of composite material needed for the restoration. By incorporating this technique, an appreciation of the spatial relationship can be achieved throughout the restorative process.

**Armentarium**

- Reflection vinyl polysiloxane impression material (Patterson Dental; St. Paul, MN)
- 2% lidocaine, 1:100,000 epinephrine (Septodont; New Castle, DE)
- E1195 diamond round tapered bur (Brasseler; Savannah, GA)
- P11.007 fine diamond mosquito bur (Brasseler)
- Ultrapak cord, #00 (Ultradent; South Jordan, UT)
- Mylar matrix strips (Palmero Health Care; Stratford, CT)
- Gel Etchant 37.5% phosphoric acid (Kerr Corp.; Orange, CA)
- Adper Single Bond 2 adhesive (3M ESPE; St. Paul, MN)
- Microbrush (Microbrush International; Grafton, WI)
- Filtek Supreme composite; shades WE, CT (3M ESPE)
- Esthet•X composite system; shades A2, A2O (Dentsply Caulk; Milford, DE)

The patient presented with a large fracture in his left central incisor (1:10, full-face view). After; 1:10, full-face view.
Figure 2: Before; unretracted smile, 1:2 view. After; unretracted smile, 1:2 view.

Figure 3: Before; retracted smile, 1:2 view. After; retracted smile, 1:2 view.

Figure 4: Before; retracted left lateral, 1:2 view. After; retracted left lateral, 1:2 view.
Treatment

Preparation

On the day of the restoration appointment, the patient was given a prophylaxis and the shade was selected using the Esthet•X shade guide. Tooth #9 was anesthetized with one carpule of 2% lidocaine, 1:100,000 epinephrine. Preparation of #9 was kept to a minimum, as the treatment was mostly an additive procedure.

Class IV direct composite restorations are an excellent treatment choice for clinicians who are faced with restoring incisal edge fractures of anterior teeth.

A medium-grit diamond bur was used to create a scalloped 1- to 1.5-mm 45° bevel in the enamel. To facilitate transitioning of the enamel shade composite into the remaining tooth structure, a second bevel of 2 to 3 mm was made with a fine-grit diamond around the entire margin. This preparation design would allow the restoration to bond to as much enamel as possible, as well as to attain an imperceptible margin.

Composite Technique

After preparation, the tooth was cleaned with pumice slurry, rinsed, and dried. Retraction cord #00 was placed in the sulcus of #9, along with clear Mylar strips separating and protecting the adjacent teeth. A 37.5% phosphoric acid-etch gel was applied to the dentin for 15 seconds, and on the enamel of the entire tooth for 20 seconds. The gel was then rinsed off with water and lightly blown dry with air. Several coats of bonding agent were applied following manufacturer instructions prior to being light-cured for 20 seconds.

Using the putty index, a thin layer of lingual composite was placed and light-polymerized using the WE shade. This created a lingual shell, which acted as a three-dimensional framework to support the additional layers of composite. Shade A2O composite was chosen to simulate the internal mamelons, and as an opaques layer to control any show-through. A thin coat of pink opaque tint was used at the fracture line to mask it and allow a seamless transition from the tooth to the restoration. The next composite layer to be applied was shade A2 as the body dentin. Using a #11 artist brush, tints of white and lavender were...
used to simulate hypo-calcifications and slight incisal translucencies in the coronal one-third of tooth #9. The final enamel layer was placed using shade CT, and sculpted to proper contours (Fig 6). The entire restoration was then covered with an oxygen-inhibiting gel and light-cured for 40 seconds from the facial and lingual aspects.

**Finishing and Polishing**

The primary anatomy was developed with a medium-grit diamond bur, followed by medium-grit polishing discs. The occlusion was checked to ensure that there were no premature contacts. A rubber Brownie point was used to place the secondary anatomy. To mimic the tertiary anatomy, a coarse diamond bur was run across the restoration at stall-out speed to simulate the appearance of perikymata. The entire tooth was then polished with fine pumice on a prophylaxis cup, using firm pressure to aid the removal of any irregularities and blend the composite with the tooth. A fine composite polishing paste applied with a felt disc was used under light pressure to achieve the final finish.*

**Conclusion**

Class IV direct composite restorations are an excellent treatment choice for clinicians who are faced with restoring incisal edge fractures of anterior teeth. Not only is the treatment very conservative in nature, but it also allows the clinician complete control to create a restoration that rivals the best ceramics. This treatment remains one of the great values in dentistry, leading to high levels of patient satisfaction and allowing cosmetic dentists to express their artistry.

**Acknowledgments**

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**References**


Being an Accreditation Examiner for the American Academy of Cosmetic Dentistry takes a great deal of dedication and time. Examiners must take time from their busy schedules to evaluate clinical cases, research the literature and write test questions for the Accreditation Written Exam, attend regular Examiner calibration training sessions, mentor candidates, teach Accreditation courses, and administer Oral Exams. Why do people volunteer to be Examiners?

The truth is, being an Examiner is extremely rewarding. Helping others achieve Accreditation, which is our purpose, is a way we give back to dentistry and honor those who taught us. This is a privilege and a charge to keep that is not taken lightly. Examiners work hard for your benefit and we measure our success by how many beautiful Accreditation cases we see, such as the one Dr. David Chan has presented here.

Case Type IV is a direct resin case that can be either a Class IV or a diastema closure restoration. The Class IV must replace at least 10% of the facial surface of an upper incisor. The diastema closure must be a closure of 1 mm or greater, which involves placement of resin on two adjacent teeth (upper incisors and/or canines).

Most Examiners agree that this is the easiest of the five clinical cases. It measures a candidate’s ability to handle direct resin in such a way as to obtain a seamless transition and shade match with the natural tooth structure. Tooth morphology is also important, while smile design does not come into play.

Dr. Chan did an outstanding job with a Class IV direct resin case on a fractured central incisor. His case selection—a straightforward case without any complicating issues—was excellent.

Examiners passed this case unanimously. In the 1:1 views, the finish line was visible, which cost Dr. Chan some points. A couple of Examiners felt that the maverick characterization did not match that in the contralateral tooth, and another felt that the finish and polish were not the same as that in the contralateral tooth. These were all minor faults.

Dr. Chan showed great skill in his handling of composite resin. The elements of dental anatomy were excellent, and his composite layering and use of tints and opaques led to a very convincing blend with the natural tooth structure. Dr. Chan deserves to be very proud of the outstanding dentistry that he has done for his patient.