CLINICAL REPORT

Esthetic anterior composite resin restorations using a single shade: Step-by-step technique

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Esthetic anterior composite resin restorations are essential in modern dentistry. Bonding to enamel is reliable if the correct technique is used, and the improved optical properties of today’s composite resins allow accurate replication of tooth shade and translucency.

Accidents that cause anterior teeth to fracture are common in children and young adults and are mainly related to sports. Even though direct and indirect treatment options exist, the common treatment option for these patients is a direct composite resin restoration because it is conservative, predictable, repairable, and inexpensive. The esthetic demands of the patient or parents should be considered before deciding on the technique (layered monochromatic or layered multichromatic restoration) to be used, so that the esthetics of the smile and face can be restored. Strictly monochromatic restorations are a common approach but often cannot reproduce the highly chromatic incisal third of young incisors. However, multichromatic restoration (combining different opacities) can be complex and time consuming, and if different opacities are not combined correctly, the results can be compromised. This article describes a straightforward technique using a single body shade (B) composite resin and color modifiers to successfully restore a (Class IV) fractured central incisor and the esthetic appearance of a compromised smile.

CLINICAL REPORT

A caries-free, 23-year-old Hispanic man expressed dissatisfaction with the appearance of his smile. His dental history revealed that he had fractured the maxillary right central incisor during a high school wrestling match and that it had been restored 11 years previously (Fig. 1). The esthetic evaluation revealed that the previous composite resin restoration did not match the contralateral tooth in color, length, contour, or texture. The incisal third of this tooth was fairly translucent with a white opaque line at the incisal edge that created a halo appearance. The mesial incisal line angle was uniform and sharp, whereas the distal angle was rounded with a pronounced incisal embrasure (Fig. 1). The vitality and periodontal health of the affected tooth were normal.

After reviewing the direct and indirect restorative options with the patient, a decision was made to place a direct composite resin restoration. As has been recommended, a diagnostic cast and waxing were developed (Fig. 2), and a polyvinyl siloxane (Sil-Tech; Ivoclar Vivadent) lingual matrix was fabricated. After local anesthesia with infiltration of 2% lidocaine with 1:100,000 dilution of epinephrine (Xylestesin-A 2%; 3M ESPE) was administered, the tooth was isolated with rubber dam, and the previous restoration was removed. A 1.5-mm 75-degree functional esthetic enamel bevel was prepared with a diamond rotary instrument (product no. 8888; Brasseler) on the facial surface (Fig. 3). The lingual bevel was a 45-degree functional bevel. A coarse
disk (Sof-lex; 3M ESPE) was then used to extend the bevels interproximally and extend the facial bevel apically toward the middle third of the facial surface (Fig. 4), to create what has been called an infinite bevel. Poly-tetrafluoroethylene (Teflon) tape was placed on both of the maxillary lateral incisors to prevent bonding to adjacent teeth. This was followed by application of 35% phosphoric acid (3M ESPE) to the enamel (on the facial surface it extended to the infinite bevel) and dentin for 15 seconds. The acid etchant was then rinsed for 30 seconds, excess water was eliminated, and 2 layers of a dental adhesive was applied by agitating the adhesive onto the tooth surface for 20 seconds. (Scotchbond Universal; 3M ESPE). A gentle stream of air was used to eliminate the
solvent, and the adhesive was light polymerized for 20 seconds. The lingual matrix was first seated to ensure proper fit (Fig. 5), followed by the application of a thin layer of A3 body shade nanofilled composite resin (Filtek Supreme Ultra; 3M ESPE) onto the matrix, which was then seated (Fig. 6). A second increment of the same composite resin was then placed on the portion of the lingual bevel not covered by the first increment and on the incisal aspect of the fracture with sufficient opacity to hide the fracture line (Fig. 7). A3 body shade composite resin was shaped into 3 lobes to mimic the natural anatomy and left approximately 1 mm short of the incisal edge. This increment was also extended over the beveled facial surface (Fig. 8). The space between each lobe and
the spaces between the lobes and incisal edge were used to add iridescent blue and opaque white color modifiers (Vit-l-esence; Ultradent Products Inc) to recreate the halo effect and decalcification spots (Fig. 9). A final increment of the same shade was placed on the facial surface extending from the beveled area toward the incisal edge, with the composite resin placement instrument lubricated with wetting resin (Ultradent Products Inc) to facilitate handling of the composite resin (Fig. 10). The finishing process was initiated with coarse and medium coarse disks (Sof-lex; 3M ESPE), following the contours of the contralateral tooth, followed by the fine (8888; Brasseler USA) and extrafine diamond rotary instruments (ET6; Brasseler USA) for texture and microanatomy. Finishing strips (Sof-lex; 3M ESPE) were used interproximally to eliminate flush, and coarse, medium, and fine rubber polishing points were used on the lingual surface (Jiffy Polishers; Ultradent Products Inc) after occlusal adjustment (Fig. 11). Definitive esthetic quality of the shade and texture of the restoration was evaluated 7 days postoperatively (Fig. 12).

DISCUSSION
Preoperative esthetic analysis, including the use of photographs, is a key factor in selecting the restorative technique to be used. The decision to use a single shade (and opacity) or a combination of shades (2 or more opacities) depends on the individual characteristics of the incisal third. Some patients will present with little to no intrinsic effects at this level, and a monochromatic restoration will serve them well. However, other patients will have a combination of translucency, white spots, and a halo effect that will require special attention to detail by the clinician.

With the improved optical properties of today’s composite resins, a monochromatic restoration enhanced by the use of resin color modifiers can deliver excellent results and eliminate the possibility of either an opaque or translucent restoration when an inadequate combination of shades is used. By incorporating the lingual matrix technique, the clinician has a guide with which to develop the correct lingual proportion and shape created in the diagnostic waxing that helps save chair time. The intermediate composite resin layer was placed in a way that recreated the dentin mamelons. If a monochromatic restoration were chosen for treatment, a uniform dentin layer would achieve a good result. Between the mamelons, a thin layer of the chosen color intensifiers was placed. Opaque white, translucent gray, ochre, and iridescent blue are used the most, and choosing the appropriate one depends on each individual patient.

The facial aspect of the restoration should be developed in 3 separate increments. The first and second layers should recreate the mesial and distal line angles. In the clinical treatment presented, this was created by means of the Mylar pull technique, in which the strip is displaced to the lingual side prior to light polymerization. The third layer should be a flat layer of composite resin filling the area between the line angles. Special attention should be given, while restoring this area and during the finishing process, because many young patients will require creation of developmental grooves and secondary anatomy in the incisal third. The finishing process should be minimal and oriented toward duplicating gingival and incisal embrasures as well as creating a polished surface that resembles the texture present in the neighboring teeth.

SUMMARY
The high predictability and simplicity of the technique and the improved optical, physical, and handling properties of the materials presented in this article allow them to be used by any experienced clinician to achieve a natural definitive appearance that can meet or many times exceed both the patient’s and the clinician’s expectations.

REFERENCES

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