

# The Direct Class IV Restoration

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**P**atient demand for aesthetic dentistry with minimally invasive procedures has resulted in the extensive use of freehand bonding of composite resin to anterior teeth.<sup>1</sup> Preservation of remaining tooth structure and using as much enamel to bond to, has made the procedure very predictable. In order to achieve maximum esthetics, the dentist must be able to use multiple layers of composite, along with opaquers and tints. The stratification and proper placement of opaquers and tints will help replicate the polychromatic characteristics of the natural dentition.

The clinician must have an

understanding of color in order to replicate natural teeth. In natural teeth, differing colors are distributed through the enamel and dentin; hence a variation in hue, chroma, and value renders the tooth polychromatic.<sup>2</sup> Hue, the “name of color,” constitutes the first dimension of the polychromatic effect and corresponds to the wavelength of light reflected by teeth.<sup>3</sup> The second dimension, chroma, can be defined as the intensity of a color or the dimension of hue saturation. Value is represented as the brightness of color<sup>4</sup> and is the most important of the three dimensions of the polychromatic effect. If the value is too low, the tooth will appear

grey or dark. Too high a value, renders the tooth white or opacious. Utilization of opaquers and tints, will allow the clinician to control the opacity and translucency of teeth. The dentin imparts the color of the tooth and the enamel acts as a fiber optic structure that conducts light through its rods to capture the color.<sup>4</sup>

Anatomical form must also be followed in order to replicate a natural tooth. One of the advantages of a direct resin restoration over a porcelain restoration is that the clinician is able to maintain control and customize the materials throughout the procedure. What will assist the dentist



FIGURE 1



FIGURE 2



FIGURE 3

in creating the desired esthetic result is the use of an opacious micro-hybrid, overlaid with a microfill, and customized with opaquers and tints. This combination of materials will mimic natural tooth structure far more effectively than using just a hybrid or microhybrid composite system alone. Since no single monochromatic composite resin can duplicate the complex orientation of the colors evident in the natural dentition, the ability to select a variety of appropriate composite resin shades must be acquired.<sup>5</sup>

There is a distinct advantage of using a sandwich technique of

micro-hybrid and microfill composite. The micro-hybrids can be used for strength and opacity. The microfills can be used for translucency and maintaining polishability.

Finishing and polishing the restoration is fundamental to achieving a beautiful final aesthetic result, and is paramount to maintaining the restoration over several years.

In fractures of teeth, the extent of the trauma must be assessed clinically and radiographically, before treatment is rendered. If the fracture is too large for a direct composite restoration, then

an indirect restoration could be used. It is very difficult to match a single anterior tooth. The technique of using direct resin as a restorative material, is an acquired skill, and requires practice to develop outstanding clinical results. The following procedure, describes a process in which layers of different materials are used in order to make the restoration invisible.

A 45 y/o patient presented to the office with a fractured mesial-incisal edge of his upper right central incisor.<sup>11</sup> The patient fractured it in an accident and desired it to be restored. Upon clinical evaluation, the mesial-incisal



FIGURE 4



FIGURE 5



FIGURE 6



FIGURE 7



FIGURE 8



FIGURE 9



FIGURE 10



FIGURE 11



FIGURE 12



FIGURE 13



FIGURE 14



FIGURE 15



FIGURE 16



FIGURE 17



FIGURE 18

edge was fractured, without pulpal involvement (Fig. 1). The full smile (Fig. 2) shows polychromatic teeth, which would be difficult to restore using a single shade of composite resin. A 2mm bevel was placed on the facial (Fig. 3) with a flame shaped diamond bur (Brasseler USA) and an approximate 1.5mm bevel/chamfer on the lingual. Due to its ability to minimize the potential of microleakage and enhance bond strength to dentin and enamel, the “total-etch” technique was utilized.<sup>7</sup> The preparation was etched for 15 seconds using Ultra-etch 35% phosphoric acid gel (Ultradent, Inc.) (Fig. 4).

A clear matrix band was used to prevent the acid from contacting the adjacent tooth. This would be left in, until the bonding agent was applied. The tooth was rinsed for 15 seconds and lightly air-dried, but not enough to desiccate the tooth. The enamel did appear frosty. The dentin could be rewetted with a wetting agent, but this was not necessary. A fifth generation bonding system was utilized. One-Step Plus bonding agent (Bisco) was applied in several

coats (Fig.5) over a 20 second period and lightly air-thinned to remove the solvent. This was light cured for 20 seconds.

The first material used for the lingual backing was a micro-hybrid material with a medium value to simulate enamel. The

### PULL QUOTE to be determined

Renamel Occlusal White Micro-hybrid (Cosmedent) was placed in a very thin layer of 0.3mm or less to form a lingual rampart and was light cured for 20 seconds (Fig. 6). This layer should be viewed from the occlusal to make sure there is still room for the internal layers (Fig. 7). It should be thin and only placed to the

leading edge of the long bevel on the facial surface, not onto it. If you desire, the matrix can be left in place, or removed prior to placing the final layer. If etch was allowed to contact the adjacent tooth, it would bond and be very difficult to separate the teeth. Therefore, care must be used during etching. With this technique, you are guaranteed a contact every time.

In order to block out the shine through in the body of the tooth, a Vita Shaded composite, Renamel Micro-hybrid A-2 (Cosmedent) was used in a very thin layer and sculpted to the long bevel (Fig. 8). Light curing for 20 seconds was done. This layer was kept short of the incisal edge to allow some translucency in the final restoration. You do not want to go onto the bevel at this point or a line of demarcation may show. Due to shine through and the possibility of lowering the final value of the restoration, an opaquer was utilized as the next layer. In order to determine if an opaquer is necessary, you must look at the materials previously placed and see if

you can see through them. If you can, you must use a little opaquer corresponding to the shade that you are using for the restoration, only in the area that needs blocking out. Creative color opaquer Vita A-2 was placed onto the edge of the bevel, but not over the bevel to achieve proper block out (Fig. 9). As we build up the multiple layers, less shine through is evident. We still want to have some interproximal and incisal translucency, therefore we don't place the opaquer in these areas. Figure 10 shows the cured opaquer following application.

Renamel microfill A-2 (Cosmedent) was applied, and allowed to go over the bevel and blended into the tooth. This was sculpted past the bevel in order to not have a line of demarcation in our final restoration (Fig. 11). This layer was light-cured for 20 seconds.

Prior to starting the restoration, a color map was done, and it was determined that tints would be needed to recreate the same shade as the adjacent central incisor. White Opaque from the Creative color kit (Cosmedent) was applied very thin in areas of the facial and incisal (Fig. 12). This was cured for 20 seconds and followed by the application of Creative color light brown tint (Cosmedent) in the center of the tooth (Fig. 13).

To expedite the procedure, a Resin-keeper (Cosmedent) was used to dispense all the materials and tints prior to starting the restoration. A lid is used to protect the material from light. When using tints, it is important not to use them too heavily. They are very chromatic, and upon final polish will shine through your final restoration. Tints cannot be allowed to be finished on the surface. They must be covered with a final layer or resin. An Incisal light



FIGURE 19



FIGURE 21



FIGURE 20



FIGURE 22

microfill (Cosmedent) was placed over the cured tints and blended into the tooth (Fig. 14). This was light cured for 40 seconds prior to initiating the final contouring and polishing.

The final high glaze is applied using A Flexi-buff with Enamelize polishing paste (Cosmedent) (Fig. 18). The final restoration is shown on the day of completion (Fig. 19). The final full smile shows a highly chromatic result (Fig. 20). The one year post ops are shown in Figures 21 & 22.

## PULL QUOTE to be determined

Initial contouring was started using an ET9 bur (Fig. 15) (Brasseler USA) on the facial. This will allow us to create the proper facial contour. Flexi-discs (Cosmedent) are used to create a highly polished restoration and to prevent future marginal leakage or white lines (Fig. 16). An OS1 bur (Fig. 17) (Brasseler USA) is used on the lingual to create an invisible margin and allow the composite to disappear into the tooth.

Without the proper use of all the materials described in this article, it would be impossible to achieve an invisible result. The polychromatic teeth cannot be recreated using one shade of composite. Proper finishing and polishing will allow the patient to maintain the restorations for several years. Direct composite resins require a certain amount of skill, and therefore, hands on courses and daily practice will allow the clinician to reach a high level of proficiency. **OH**

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*Oral Health welcomes this original article.*

REFERENCES MISSING

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