Advantages of direct composite resin veneers when masking tooth discoloration restorations

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Not all discolored teeth are responsive to conservative approaches like nightguard vital bleaching
(NGVB) or non-vital bleaching. Even if an excellent initial outcome is achieved, sometimes relapse occurs. Therefore, when bleaching fails, restoration consideration should be given to a masking procedure using indirect or direct composite resin veneers. Using a direct composite resin veneer (https://online.speareducation.com/course/the-foundation-of-anterior-direct-resin-aesthetics) over an indirect approach for single anterior units has some advantages:

- The operator controls the restoration's masking, layering, and morphology.
- The procedure can be completed in a single visit.
- The procedure is more cost-effective.

The exception is teeth that are structurally compromised, for example, endodontically treated teeth with large Class III restorations.

Composite Resin Veneer Selection

Composite resin is supplied in many shades and three main opacities:

1. Highly Translucent Achromatic Enamel

For example, Kulzer Venus Pearl clear (CL) or Tokuyama white enamel (WE) mimic enamel in areas where the underlying layering wants to be seen. Typically, this is placed as a final layer on the incisal third of the facial surface.

2. Medium Translucency Chromatic Enamel

For example, DMG Ecosite Elements A2 or Dentsply TPH Spectra ST A1 are used where translucency and a degree of color (chromaticity) are required. Usually, these are used as a final layer on the gingival or mid-third of the tooth.

3. Opaque Chromatic Dentin

For example, Ivoclar A3 dentin or GC G-aenial AO2 are highly opaque (light blocking) masses with color. These are used for dentin replacement or for masking discoloration.

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Figure 1: A 44-year-old female presented an existing composite resin veneer to her endodontically treated upper right central incisor.

Figure 2: Although the veneer was of good quality, the patient had concerns about the marginal breakdown. A decision was made to replace this with a new resin veneer.

Figure 3: The teeth were isolated with a split rubber dam and retraction cord. The old resin veneer was removed with a combination of diamond burrs and discs to reveal the discolored tooth substrate.

Figure 4: A direct composite resin veneer (https://www.dentistrytoday.com/direct-resin-veneer-technique-using-a-single-shade-composite/) was placed to mask the discoloration and emulate the adjacent 2.1 in terms of shade, effects, and morphology.

Figure 5: A direct composite resin veneer was placed to mask the discoloration and emulate the adjacent 2.1 in terms of shade, effects, and morphology.

Due to its inherent translucency, the composite resin (https://online.speareducation.com/course/composite-vs-ceramic-esthetic-clinical-protocols) is limited in its opaquing ability, especially in thin sections. Specialized opaquers must be employed when masking discoloration to increase value and decrease chroma.

Opaquers are highly pigmented resins containing metal oxides responsible for opacification. These metal oxides are usually titanium or aluminum oxide and achieve increased opacity by increasing absorption and scattering light within the resin.

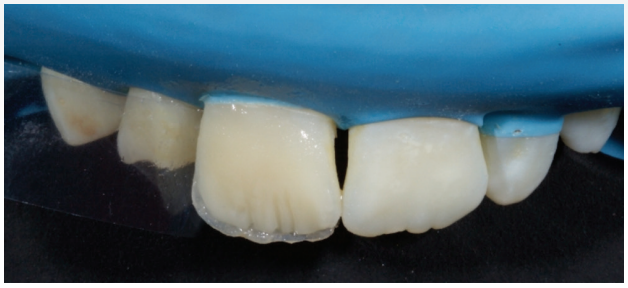

Figure 6: Paste opaque chromatic placed into an achromatic enamel shell to create incisal edge anatomy in a young patient.

Figure 7: A flowable opaquer is incrementally built up to increase value and reduce chroma, therefore, to mask discoloration.

Figure 8: A flowable opaquer is incrementally built up to increase value and reduce chroma, therefore, to mask discoloration.

Figure 9: A flowable opaquer is incrementally built up to increase value and reduce chroma, therefore, to mask discoloration.

Opaque chromatics may be sub-divided into:

1. Paste Opaques: These opaque resins have the same viscosity as standard packable composite resin. I use these when a degree of control is required to shape the resin. For example, creating dentin mamelon effects.

2. Flowable Opaquers: These are opaque resins with similar viscosity to flowable composite resin. An example would be Kulzer Venus Baseliner. I use these where masking of discoloration is required in a very thin section. The resin is typically applied in thin layers with a brush and light cured between layers.

3. Pink Opaquers: This is a flowable opaquer with a pink hue and is used when managing an extremely discolored substrate or masking metal.

Clinical Tips: Applying Flowable Opaquers

1. Chose an opaquer, like the desired dentin shade in terms of chromaticity (hue and chroma). The chromaticity can be modified by adding composite resin tints (often brown, amber, ochre, or white) before applying the opaquer.

2. Apply an even homogenous layer of the opaquer to avoid the appearance of spotting (shine through of highly opaque or discolored areas (/spear-review/2018/07/how-to-restore-severely-discolored-teeth) in the final restoration).

The opaquer is usually applied with a No. 3 artist's brush or Tokuyama No. 24 brush. Initially, the brush is loaded, which means it is dipped into a composite modeling resin (e.g., BISCO modeling resin). Loading the brush leads to a more even application of the opaquer. Excess modeling resin is removed by wiping the brush on gauze. The opaquer is then applied in multiple thin, even layers polymerizing each layer before the next application. The opaquer is applied from gingival to incisal, taking care to avoid pooling. Usually, 3-5 layers are required, according to a 2013 paper by J.S. An.

3. Care should be taken to allow a minimal thickness of 0.4 mm for the layering of the resin veneer on completion of the application of opaquer, according to Felippe and Baratieri.

Bleach Gone Bad: A Case Study

Figure 10: A 44-year-old man requested esthetic improvement of his upper right central incisor, which was traumatized by a childhood accident.

Figure 11: The tooth was non-vital with proper endodontic treatment, short at the incisal edge, and discolored.

Figure 12: The tissue level was more coronal than the adjacent upper left central incisor.

Figure 13: Surgical crown lengthening with an apically repositioned flap and osseous recontouring were performed to equalize the gingival margin levels of 1.1 and 2.1.

Figure 14: Surgical crown lengthening with an apically repositioned flap and osseous recontouring were performed to equalize the gingival margin levels of 1.1 and 2.1. Initially, the modified walking bleach approach was attempted to whiten the tooth conservatively but unfortunately relapsed. In 1988, Friedman reported a 21% failure rate for this approach.

Figure 15: After discussion with the patient, a decision was made to mask the discoloration and restore the incisal edge of 1.1 with a direct composite resin veneer. The teeth were isolated with a split rubber dam and retraction cord. The facial surface of 1.1 was prepared to a uniform depth of 0.7 mm using depth dimples and a chamfer burr in a 1.5-speed increasing handpiece.

Figure 16: The incisal edge was reconstructed using an opaque chromatic paste composite resin. A palatal stent fabricated from a diagnostic wax-up was used to guide the incisal reconstruction. This layer was approximately half of the anticipated final buccolingual thickness of the tooth.

Figure 17: A layer of flowable opaquer was placed over the entire facial surface with a brush in a section of around 0.3 mm. Multiple layers were placed, polymerizing between layers. The opaquer masked the discoloration by reducing chromaticity and increasing value.

Figure 18: The facial surface was then reconstructed with a chromatic enamel, building to full thickness in the gingival and middle thirds of the tooth while leaving the incisal third under-contoured. Tints were used to characterize the restoration — white hypocalcifications and enamel infractions alongside a warmer ochre at the distal lobe. A grey was used to create an opalescent effect at the incisal edge.

Figure 19: An achromatic enamel was employed on the facial surface of the incisal third to protect the tint effects and reduce their intensity. At this point, the surrounding dentition will have dehydrated, resulting in the adjacent teeth being of higher value. This regular occurrence should not cause concern.

Figure 20: The restoration was finished and polished with a burr, discs, and silicone points.

Figure 21a: The appearance at a two-week recall appointment.

Figure 21b: The appearance at a two-week recall appointment.

Figure 21c: The appearance at a two-week recall appointment

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