Compendium
February 2012, Volume 33, Issue 2
Published by AEGIS Communications

Single-Shaded Direct Anterior Composite Restorations: A Simplified Technique for Enhanced Results

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Key Take-aways

Nuance™ light-cured nanohybrid composite enables the re-creation of natural tooth esthetics with one body shade composite for the entire restoration.
In thinner areas, such as the incisal edge, it appears translucent; on the main tooth body, it absorbs and refracts light to impart dentin-like depth.
Only one shade is needed to complete an entire natural-looking restoration.
It demonstrates a flexural strength of 115 MPa; flexural modulus of 9,700 MPa; and compressive strength of 344 MPa.


Figura 1


Figura 2


Figura 3


Figura 4


Figura 5


Figura 6


Figura 7


Figura 8


Figura 9


Figura 10

Creating esthetic direct restorations requires dentists to combine artistic creativity with a fundamental knowledge of tooth structure along with selection and use of appropriate composite materials.1-3 This involves comprehensive understanding of tooth color, form, and function and the teeth's natural optical properties in order to select the most appropriate replacement materials.3-5

Such a summary of direct composite restoration considerations oversimplifies the challenges in ascertaining physical and optical tooth characteristics. Opalescence and opacity, as well as their variation within a tooth and among different teeth, create natural esthetic effects to be replicated in restorations.5

Enhancements in dental materials have delivered various composite systems with enamel and dentin shades for re-creating natural tooth anatomy, but mimicking inherent variations of tooth opacities and translucencies, chromas, and hues has required use of multiple composites for each distinct tooth structure.4,6,7 Complicating direct composite material selection are the material's physical properties, such as fracture, abrasion, and wear resistance; polymerization shrinkage; and polishability.7-9

To reduce postoperative sensitivity and marginal leakage, as well as facilitate better margins, direct composites should demonstrate a polymerization shrinkage rate within today's range of 0.9% to 1.5% to enable esthetically pleasing restorations that do not pull away or disrupt the hydrodynamics of the tubuli.8 Because polymerization can affect a restoration's color stability, material selection should consider polymerization effects on long-term esthetic satisfaction.10

Long-term esthetic durability also is predicated on material polishability. Initial final polish results should be sustained over time.11 Microhybrid and nanohybrid composites demonstrate enhanced luster and polish; microfills remain unmatched for polishing ease and longevity.7,8

Selecting appropriate direct composites also entails evaluating handling, sculptability, and viscosities, which affect final restorative outcomes, influence specific manipulation techniques, and impact delivery.6,7 Time from delivery to contouring and brushing are other aspects for consideration before undertaking direct restorative procedures.12

The Need for Simplification

Composite systems require mastery of multiple layers of dentin, body, and enamel composites to achieve natural-looking restorations based on optical properties and tooth anatomy. Because multiple physical characteristics are considered, it is time-consuming to evaluate material properties and determine suitability for specific cases or areas in the mouth. Simplification requires a universal direct composite that is esthetically capable of reflecting and refracting light in one shade layer and is strong enough to survive in the posterior.

A recently introduced light-cured nanohybrid composite (Nuance™, Philips Oral Healthcare, www.philipsoralhealthcare.com) enables the re-creation of natural tooth esthetics with one body shade composite for the entire restoration. Simplifying the composite restoration process in an unprecedented way, the material contains proprietary multi-faceted fillers that reflect and refract light, mimicking the opacity, translucency, and optical characteristics of tooth structure. In thinner areas, such as the incisal edge, it appears translucent; on the main tooth body, it absorbs and refracts light to impart dentin-like depth. Only one shade is needed to complete an entire natural-looking restoration.

The material's multi-faceted fillers reflect light from surrounding tooth structures, creating a seamless integration and making restorations nearly invisible. Its quality facilitates an accurate shade match every time.13,14 Because there is virtually no color or opacity shift during curing to compromise color stability, there is no guesswork when selecting a shade.

The new nanohybrid composite (Nuance) contains submicron filler particles for optimal strength and wear resistance for posterior teeth and predictable polishability for anterior teeth, making it universal. The mean particle size is 0.7 µm, and the universal composite is 77% filled by weight and 65% filled by volume. It

demonstrates a flexural strength of 115 MPa; flexural modulus of 9,700 MPa; and compressive strength of 344 MPa. Its volumetric shrinkage is consistent with industry lows, at 1.9%.

The flowable nanohybrid composite (Nuance Flowable) is filled 80% by weight and 61% by volume. It exhibits a flexural strength of 141 MPa; flexural modulus of 9,900 MPa; and compressive strength of 305 MPa. The linear shrinkage of the flowable nanohybrid composite is consistent with industry lows at 1.9%.

The innovative delivery design makes dispensing and working with the smooth and pliable composite easy and intuitive. The composite demonstrates a butter-like consistency that will not stick to dental instruments and significantly enhances handling, application, and sculptability. It extrudes effortlessly from the ergonomically advanced syringe, spreads and shapes easily, and smoothly forms tooth anatomy without slumping.

Nuance Universal Composite is indicated for direct anterior or posterior restorations (Class I through Class V), diastema closures, and intraoral repairs of fractured crowns and bridges. Nuance Posterior Composite is ideal for Class I and Class II cavities. Nuance Flowable Composite is indicated for direct anterior or posterior restorations, as a cavity base/liner, and intraoral repairs of fractured crowns and bridges.

Case Presentation

A patient presented with maxillary central and lateral incisors exhibiting minor to moderate wear and incisal edge breakdown as a result of parafunctional habits (Figure 1). Closer examination revealed a color mismatch between previously placed Class III restorations and natural tooth structures (Figure 2). The restorative composite used presented a higher opacity than the tooth enamel, and the restoration surface lacked the appropriate gloss. Minor enamel erosion was noticeable on the facial aspects of the central incisors. Because of the monochromatic nature of the tooth color, a single shade of nanohybrid composite (Nuance A2) was selected using a custom-made shade guide to re-restore the teeth (Figure 3).

Prior to preparation, a cast model wax-up was made to reestablish the incisal edge and embrasure contours, and a silicone matrix was created to replicate the intended final morphology. A rubber dam was placed in the patient's mouth, and the silicone matrix was tried in to access fit.

The teeth were prepared by removing the defective composite restorations and placing a 1-mm bevel along the cavosurface margins (Figure 4). Minor beveling was performed along the wear line of the incisal edges. A standard total-etch adhesive bonding technique was employed, and a dentin/enamel adhesive (Moxie™ TE, Philips Oral Healthcare) was applied, thinned, and cured according to the manufacturer's instructions.

A thin layer of Nuance A2 was evenly applied and spread out to conform to the ideal contour to facilitate the application of the resin (Figure 5). The silicone matrix was positioned and held firmly against the teeth, while the composite was carefully sculpted to conform to the matrix boundaries (Figure 6). This step established a thin lingual shelf that was then light-cured.

After light-curing, the silicone matrix was removed, and a single, thicker increment of the A2 shade composite was applied evenly to the facial aspect and packed into the Class III cavities (Figure 7). Final contouring was performed, and the restoration was light-cured.

Finishing discs (Sof-Lex™ XT, 3M ESPE, www.3MESPE.com) were used sequentially to establish proper primary anatomy. Finishing diamond strips (VisionFlex®, Brasseler USA, www.brasselerusa.com) and plastic strips (Epitex®, GC America Inc., www.gcamerica.com) refined and polished the proximal aspects. The same adhesive and restorative steps were repeated for the other teeth in a concomitant manner, using the same A2 shade composite, to optimize the restorative process. After final freehand sculpting of the remaining incisors, the restorations were light-cured.

To attain proper primary tooth anatomy, transitional line angles were drawn according to the teeth planes, and

finishing discs (Sof-Lex XT) were used sequentially. A F888 fine diamond (Axis Dental, www.axisdental.com) created surface texture and replicated a youthful enamel pattern. To visualize micro and macro texture details, extrafine glitter was brushed over the teeth surfaces. These were corrected until the final desired surface morphology was achieved.

Rubber finishing discs (FlexiCups and FlexiPoints, Cosmedent, www.cosmedent.com) finessed the restorations, which were subsequently polished with a felt disc (FlexiDisc, Cosmedent) and a polishing paste (Enamelize, Cosmedent) (Figure 8). Postoperative results presented optimal esthetics and harmonious integration of form, color, and surface gloss (Figure 9 and Figure 10).

Conclusion

Although a more elaborate composite layering technique may be used in complex esthetic scenarios, clinical reality frequently requires a simplified approach. Inherent in a single-shaded technique is the need to correctly implement anatomical concepts of primary anatomy and microtexture, without which direct composite restorations seem unnatural.

The new nanohybrid composite helps streamline the creation of esthetic direct composite restorations by providing a single-shade option. Its availability represents an innovative time- and money-saving alternative for delivering predictably esthetic restorations that satisfy dentist and patient expectations. The case presented here demonstrates the simplified protocol and results that can be achieved using this recently introduced composite.

Disclosure

Dr. Fahl has received honoraria from Philips Oral Healthcare.

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