Posterior Composite Resin Restorations

Overcoming traditional challenges with new materials.

By Joyce Bassett, DDS

Recentlyintroduced to help clinicians overcome the operative challenges traditionally faced when placing composite resin restorations in the posterior region, a new flowable, light-curing, radiopaque nanohybrid composite (Venus® Bulk Fill, Heraeus, www.heraeus-dental-us.com) offers the physical characteristics of conventional fill materials with the esthetics of composite resins.[1]

For use as a base in Class I restorations, in conjunction with a universal composite in Class II and Class V restorations, and for deep lesions, Venus Bulk Fill enables clinicians to complete fills up to depths of 4 mm. Highly conducive to light transmission, the material demonstrates unmatched translucency. Reducing the risk of shrinkage stress, Venus Bulk Fill also allows for highly predictable esthetic and functional results. Further promoting fast and efficient application, the bulk fill material adapts quickly to the preparation with little if any manipulation required. Additionally, Venus Bulk Fill is radiopaque.

Overcoming Traditional Challenges

Based on its chemical composition and physical characteristics, Venus Bulk Fill resolves many of the issues clinicians typically faced when using previous generations of direct posterior composite resins. For example, early composite resins demonstrated high polymerization shrinkage rates that increased with the size of fill.[2,3] The stress created by shrinkage often led to marginal leakage, sensitivity, secondary caries, and, consequently, restoration failure.[2,3] A more elastic material, Venus Bulk Fill demonstrates increased marginal adaptation in the gingival area and reduces microleakage and minimizes polymerization shrinkage.[4-7]

Additionally, due to previously encountered shrinkage problems, composite resins required time-consuming and tedious placement processes that attempted to prevent voids that could lead to restoration failure.[8,9] Saving the patient and dentist time and added stress, Venus Bulk Fill allows for fills of up to 4 mm, with the added benefits of quick adaptation and self-leveling characteristics.[8,9]

Eliminating the need for manipulation, the material is ideal when fast and efficient restorations are required.[8,9] With a compressive strength of 331 MPa and a high flexural strength of 120 MPa, Venus Bulk Fill demonstrates a higher resistance to wear, thereby providing stable restorations for the long term.[2]

Additionally, traditional direct posterior composites demonstrated poor translucency and radiopacity.[4] Venus Bulk Fill, however, was developed to be easily detectable on dental radiographs, with radiopacity of 300%-Al. Based on its high translucency and excellent optical properties, much of the guesswork of shade selection for creating esthetic posterior restorations is removed when using bulk-fill techniques and materials.[4] As a result, Venus Bulk Fill represents a new alternative in restorative products that enables dentists to achieve faster, easier, and more predictable direct posterior composite restorations.

Clinical Protocol

To demonstrate the use of Venus Bulk Fill composite, a case is described involving the restoration of an upper left first bicuspid that presented with interproximal decay, as seen on the radiograph (Figure 1).

The patient was anesthetized and a carbide bur was used to prepare the tooth. A caries-detecting agent was applied (Figure 2), and complete caries removal was achieved, in addition to placement of retention grooves on the facial and lingual line angles (Figure 3).

The tooth was acid-etched (Figure 4), with the etchant extending beyond the preparation margin. Once the etchant was removed by rinsing the preparation, an adhesive bonding agent (iBond® Total Etch, Heraeus) was applied and rubbed thoroughly around the preparation. Excess solvent was evaporated and the adhesive was cured for 20 seconds.

Then, the matrix was placed (Figure 5) and molded with a composite placement instrument to ensure a tight contact. It was held against the contact during placement of a nanohybrid composite (Venus® Diamond, Heraeus) and remained at this juncture while the curing light was used to activate and cure the composite for 20 seconds

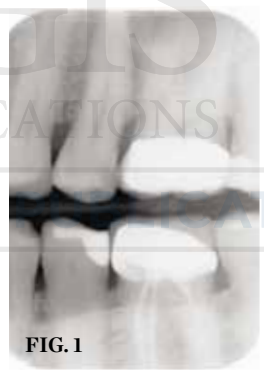
FIG. 1


FIG. 2


FIG. 3

TREATMENT (1.) Preoperative radiograph of the upper left first bicuspid shows interproximal decay. **(2.)** The tooth was prepared, after which a caries-detecting agent was applied. **(3.)** View of the retention groove prepared on the facial line angle.

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on the distal and the mesial to create the interproximal wall (Figure 6). A second increment of nanohybrid composite (Venus Diamond) was placed on the mesial and distal for marginal ridge adaption and cured for 20 seconds (Figure 7 and Figure 8).

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Venus Bulk Fill composite then was placed into the depth of the preparation (Figure 9), up to 4 mm, leaving 2 mm of space for placement of the final nanohybrid composite layer. The bulk fill composite was light-cured for 20 seconds (Figure 10). After this self-leveling composite was placed, the final nanohybrid composite layer (Venus Diamond) was applied to the occlusal surface, then cured (Figure 11). To finalize the restoration, polishing points (Venus® Supra Polishers, Heraeus) were used to enhance the restoration's finish (Figure 12).

Conclusion

Traditionally, predictably placing composite materials in the posterior region presented challenges for clinicians.[1] However, Venus Bulk Fill changes the way dentists deliver restorative care that can withstand years of clinical function by enabling fast placement of bulk fills up to 4 mm (Figure 13).[1]

References

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FIG. 4


FIG. 5


FIG. 6


FIG. 7


FIG. 8

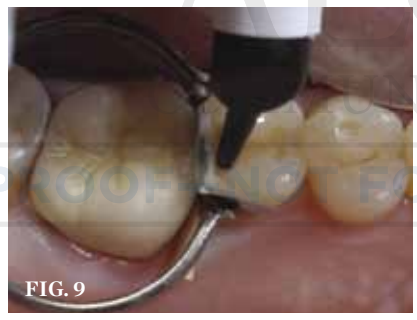
FIG. 9


FIG. 10


FIG. 11


FIG. 12


FIG. 13

TREATMENT COMPLETION AND FINAL RESULTS (4.) The tooth was acid-etched according to a total-etch technique. Note that the acid extended beyond the preparation margin. **(5.)** A matrix was placed, after which an adhesive bonding agent was applied. **(6.)** The matrix was molded with a composite placement instrument to ensure a tight contact; it was held against the contact during placement and curing of the first layer of Venus Diamond composite. **(7.)** The second incremental layer of Venus Diamond composite was placed for marginal ridge adaption and cured. **(8.)** Once the marginal ridge formation was complete, the restoration was ready for the bulk-fill composite. **(9.)** The bulk-fill material was placed in the preparation. **(10.)** The bulk-fill composite was light-cured and ready for the final layer of Venus Diamond. **(11.)** The final Venus Diamond composite layer was placed on the occlusal surface. **(12.)** Venus Supra Polishers polishing points were used to enhance the restoration's finish. **(13.)** View of the finished combination Venus Bulk Fill and Venus Diamond restoration.