Simplification at its best

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Is there a need for another posterior restorative in dentistry? Clearly, the answer is yes. What is desired is a product that offers the mechanical properties users of products like 3M™ ESPE™ Filtek™ Supreme XTE Universal Restorative are familiar with, but allows for a more time-efficient placement procedure.

For this purpose, 3M ESPE developed the new 3M™ ESPE™ Filtek™ Bulk Fill Posterior Restorative. The material contains true nanotechnology and is available in five shades. It may be placed in increments of up to 5 mm, but if desired, a layering technique is also possible. In combination with the fact that the new material does not require a covering composite layer and is easily sculptable right after placement, this ensures a fast and easy filling procedure ideal for all kinds of posterior restorations.

Reducing shrinkage stress

Traditionally, a reduction in shrinkage and shrinkage stress has been accomplished by optimizing the filler composition as in Filtek Supreme XTE Universal Restorative. This restorative uses an innovative filler technology with silica and zirconia particles and clusters. The shrinkage inherent to any methacrylate matrix is low in this material and does not compromise its clinical performance when placed in layers of 2 mm.

In order to allow for increments of up to 5 mm in Filtek Bulk Fill Posterior Restorative, the nanofiller technology was adopted, but a different matrix developed. The composite contains a new aromatic dimethacrylate with high molecular weight (AUDMA) and a novel addition-fragmentation monomer (AFM). Due to AUDMA, the polymer matrix developing during polymerization obtains a higher flexibility. AFM changes the polymerization reaction: Typically, light curing causes chains of monomers to form and crosslink with each other, resulting in a polymer network. Those monomers which are closest to the light source react immediately and the chains grow from this point. The increasing rigidity and decreasing volume of the network cause stress to develop at the margins. In contrast, AFM contains an additional reactive site that enables cleavage of the forming molecular chains during polymerization. The obtained fragments are more evenly distributed so that the network relaxes and stress is prevented. Cross-linking again at a later stage, the final polymer structure is obtained.

Conclusion

The uniform network formation and the increased flexibility of the matrix result in a restoration that causes less shrinkage stress even when applied in 5 mm increments.

As a consequence, a tight marginal seal is obtained and the risk of post-operative sensitivities is minimized, while superior physical properties are achieved.

This was confirmed in initial tests: Properties such as the shrinkage stress preventing mechanism in 3M™ ESPE™ Filtek™ Bulk Fill Posterior Restorative.

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<th>Shrinkage stress preventing mechanism in 3M™ ESPE™ Filtek™ Bulk Fill Posterior Restorative.</th>
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<td>Without AFM</td>
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<td>Stress during light cure: AFM molecules</td>
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