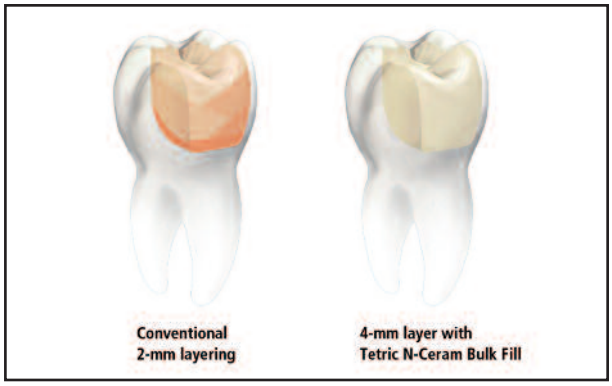
Beautiful, strong and fast: the next level of posterior composite restorations

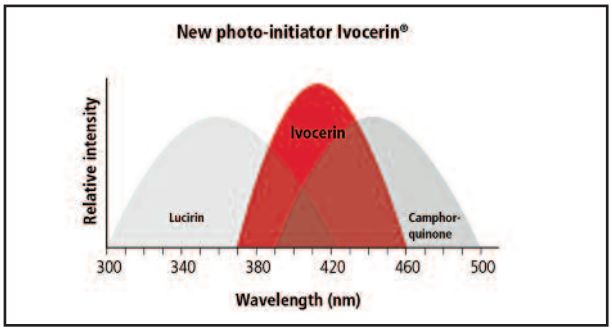
Michael Dieter[1]

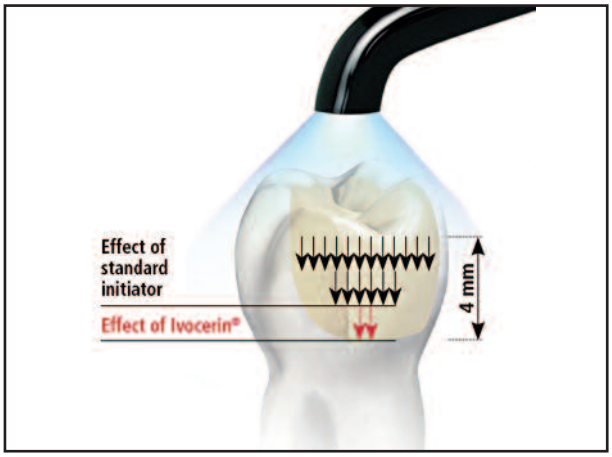
In direct restorative dentistry, there is a strong trend towards faster, more efficient placement techniques for resin composite restorations. Additionally, dentists are demanding composite materials that allow simple, yet predictable application in the daily practice. The question is, however, whether an increase in efficiency and simplicity will compromise the quality and esthetics of the restoration.

With Tetric N-Ceram® Bulk Fill (Ivoclar Vivadent, Schaan, Liechtenstein), the clinician has a material which offers an ideal combination of efficiency, quality and esthetics. Increments of up to 4mm that require a short curing time of only 10 seconds (at a light intensity of > 1,000 mW/cm^2) can be placed .

Tetric® N-Ceram Bulk Fill features the patented photo initiator Ivocerin® to boost polymerization and to ensure a complete curing of the entire composite increment. Ivocerin is more reactive in contrast to conventional initiators. This means that it is also activated in deep cavities, thus allowing the material to be reliably cured within a very short time. Clinically, this results in substantial time-saving and makes posterior direct restorations significantly more efficient.







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Given its smooth consistency, Tetric N-Ceram Bulk Fill can be easily adapted to the cavity walls. To avoid excessive shrinkage stress at the cavity margins upon polymerization Tetric N-Ceram Bulk Fill contains a shrinkage stress reliever. This is a more elastic filler with a specific surface treatment that can absorb shrinkage stress within the material - similar to a microscopic spring. Less shrinkage stress is thus transferred to the cavity walls, resulting in better marginal quality – one of the prerequisites for a long-lasting restoration.

With Tetric N-Ceram Bulk Fill it is not necessary to place a separate flowable composite as a base liner. The entire restoration can be completed with the same material, resulting in a uniform restoration with homogenous strength.

These restorations blend well with the surrounding tooth tissue because the translucency level of the material is ideally adjusted to natural enamel. Thus, esthetic restorations with a natural appearance can be created within a shorter treatment time.

Case presentation

A pre-existing composite restoration of a second lower premolar of a 28-year old male patient needed to be replaced due to marginal staining and an open cervical margin with caries (Figure 1).

Prior to the removal of the defective restoration, Tetric N-Ceram Bulk Fill shade IVA was selected and verified by applying & curing a small composite sample on the tooth (Figure 2).

Upon removal of the old composite restoration and the decay, all enamel margins were finished with an osscillating ultrasonic-driven preparation tip (Figure 3) The occlusal floor was approximately 3mm deep (Figure 4), and the proximal box of the cavity approximately 6mm deep (Figure 5).

Figure 1

Figure 2

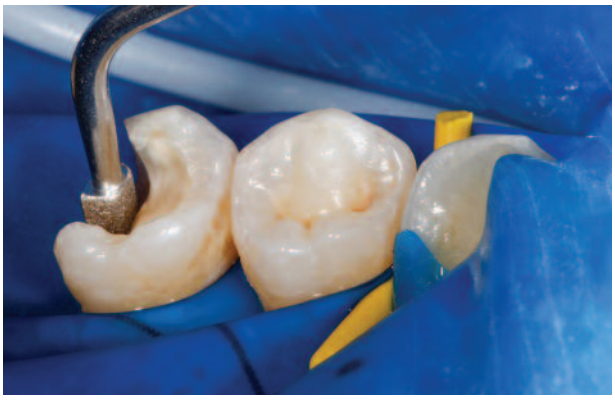

Figure 3

Figure 4

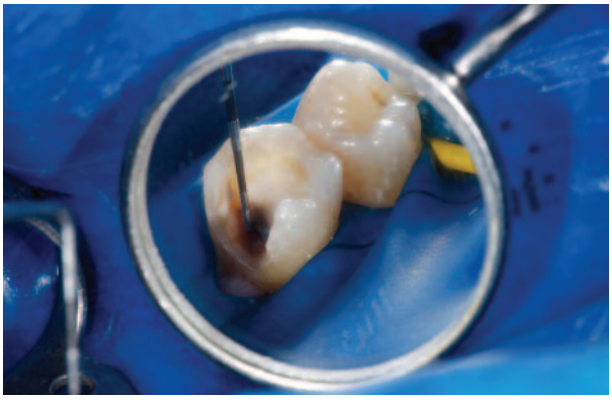

Figure 5

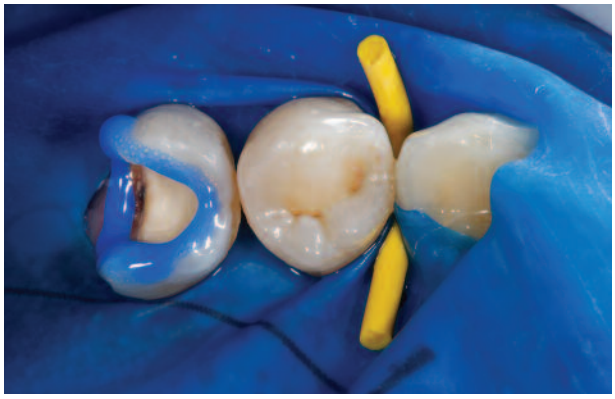

Figure 6

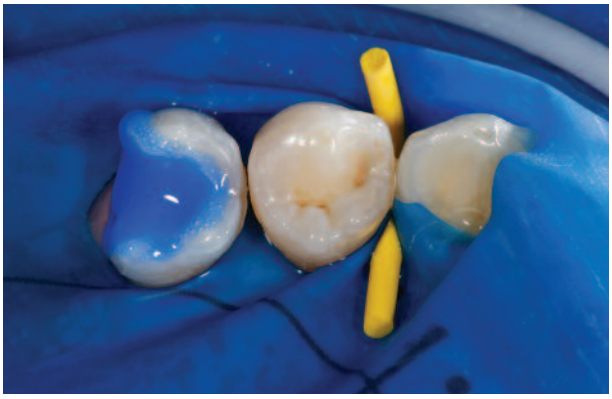

Figure 7

Figure 8

Figure 9

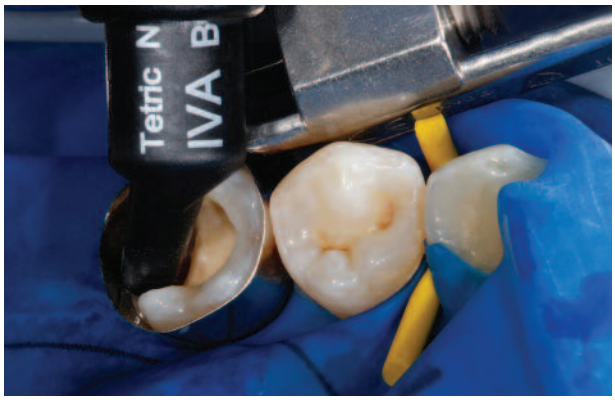

Figure 10

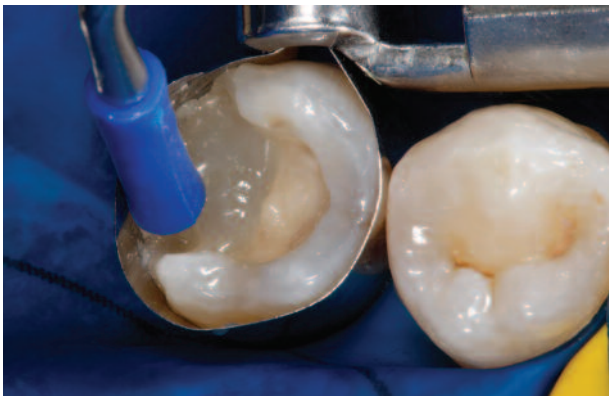

Figure 11

To optimize the bond quality, all enamel margins were covered with a phosphoric acid gel and left to react for 20s (Figure 6). The etching gel was then spread to the entire dentin surface and left to react for another 10 seconds (Figure 7). The etchant was rinsed off with water spray for 10 seconds and briefly air-dried, leaving the dentin surface with a glossy wet appearance.

Tetric N-Bond® was then applied with a Vivapen® (Figure 8). An exact amount of bonding agent was applied directly to all etched tooth surfaces and agitated for 10 seconds with a brush cannula

A circular stainless steel matrix was applied on the tooth and Tetric N-Ceram Bulk Fill injected into the proximal box using a Cavifil (Figure 10). The material was easily adapted

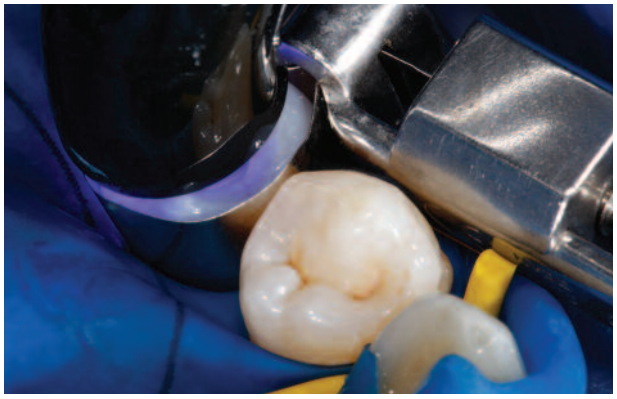

Figure 12

Figure 13

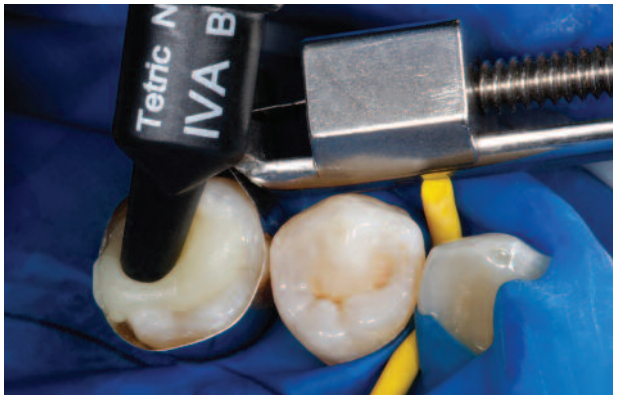

Figure 14

Figure 15

Figure 16

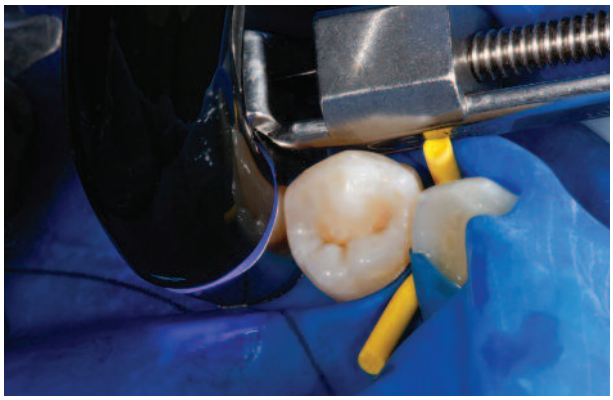

Figure 17

on the cavity floor (Figure 11) with OptraSculpt® (cylinder shape) and polymerized with an LED high-power curing light (Bluephase® Style, Figure 12)

Depth measurement of the cavity with a periodontal probe revealed a remaining depth of 3mm (Figure 13). Hence, the remaining cavity was filled with a single layer of Tetric N-Ceram Bulk Fill, shade IVA using the Cavifil (Figure 14).This final layer was quickly adapted and sculpted with OptraSculpt (chisel shape) to create anatomical tooth contours (Figures 15 and 16).

A final polymerization of 10 seconds was conducted using Bluephase Style. The 10mm light guide facilitates a single curing cycle as it covers the entire cavity (Figure 17). The anatomical tooth contours were refined and

Figure 18

Figure 19

Figure 20

Figure 21

finished with a football-shaped, fine diamond bur (Figure 18)

To adjust the colour of the occlusal fissure system to the adjacent tooth, a small amount of a light-curing ochre staining material (Tetric® Color) was applied and polymerized (Figure 19). The entire restoration was polished in one step to a glossy lustre using OptraPol® Next Generation (Figure 20). Figure 21 shows the final restoration directly after high gloss polishing.

Conclusion

With Tetric N-Ceram Bulk Fill it is now possible for the clinician to restore posterior teeth in a much more efficient, yet esthetically pleasing way. Due to the bulk application of up to 4mm and light polymerization of 10 seconds, the total treatment time was significantly reduced without compromising the overall quality of the final restoration.