achieved by means of the photoinitiator Ivoicer® for example, which is employed by Ivoco Vivadent. Good mechanical properties such as high flexural strength and wear resistance are also important in order to make a composite resin suitable for use in occlusal bearing areas [8].

Tetric® N-Ceram Bulk Fill from Ivoclar Vivadent combines all of these qualities. This light-curing composite resin suitable for use in occlusion bearing areas has its good polishability, which is an ideal option for the restoration of deeper cavities using the bulk-filling technique. The successive build-up tech nique makes it possible to ensure correct occlusal morphol ogy through the incremental placement of composite. Thinned placement instruments and special brushes are used to sculpt and contour the restored site. The composite is applied in bulk increments to rebuild each anatomical entity of the affected area. Each cuspal papilla is reconstructed with one increment of composite resin, imparting to each of the cusps its adequate anatomical form. The size and location of the cusp is determined by the poured stone model and the included tooth. Medium-sized and large cavities are restored with several increments. Each increment is rehardened with an increment of maximum 4 mm thickness. Anatomical features of the occlusal surface should be taken into consideration during the application of the composite resin to mimic the natural tooth structure. Insensitivity to light is a considerable advantage of Tetric N-Ceram Bulk Fill. This material has a high opacity and is thus capable of masking the darker colour of the underlying dentin.

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In summary, with these systems the clinician can take a digital impression as well as design and fabricate the final crown in one visit, and to fabricate cosmetic crowns, onlays and veneers. With the current systems, the contours and tooth shade and finally it enhances the accuracy of the final restorative preparation to the preparation.

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Discussion
Marginal adaptation is an important factor affecting the longevity of all-ceramic restorations. Considerable research has been invested in the margin fit and internal adaptation of all-ceramic restorations. Software limitations as well as accuracy of milling devices may affect the fit of CAD/CAM restorations. Most clinicians agree of the need to be different for the margin gap should not be greater than 100 μm. It has been reported in the literature that margins produced by CAD/CAM systems can have marginal gaps of 0.5-50 μm which is considered to be within the acceptable range.

Giannopoulos S and Ai investigated and compared the marginal integrity of ceramic copings constructed with the CEREC and the EVEREST system employing three different margin angles. They explored what extent these CAD/CAM machines can produce marginally acceptable ceramic copings with restoring creations with acceptable margins. They found...
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Discover the new time-saving composite

4 mm to success
- Bulk filling is possible due to Ivocerin®, the patented light initiator
- Special filler technology ensures low shrinkage stress
- Esthetic results are achieved quickly and efficiently in the posterior region
that the average Chipping Factor (CF) of the CEREC copings was 2.8% for the 0° bevel angle, 5.5% for the 50° bevel angle, 10% for the 60° bevel angle. For the EVEREST copings, the average CF was 0.6% for the 0° bevel angle, 5.2% for the 50° bevel angle, and 2.0% for the 60° bevel angle. Univariate Analysis of Variance and multiple comparisons showed that there was a statistically significant difference in the quality of margins between the two systems for the 0° and 60° bevel finishing line.10 Mjör and Al have evaluated CAD/CAM restorations and found that they have a marginal fit as good as or superior to that of traditional impressions. A further benefit found with CAD/CAM restorations has been the reduced incidence of secondary caries (the leading cause of direct restoration failure) with both amalgam and composite materials, attributed to the high accuracy of the proximal fit and the ability to ascertain that this is accurate prior to completion of the restoration and cementation.31

Another study evaluated the accuracy of marginal and internal fit between the all-ceramic crowns manufactured by a conventional double-layer computer-aided design/computer-aided manufacturing (CAD/CAM) system and a single-layer system. Ten standardized crowns were fabricated from each of these two systems: conventional double-layer CAD/CAM system (Procera) and a single-layer system (Cerec 3D). Marginal discrepancies of Procera copings and Cerec 3D crowns were significantly smaller than those of Procera crowns and Cerec 3D crowns (p < 0.05). On internal gaps, Cerec 3D crowns showed significantly larger internal gaps than Procera copings and crowns (p < 0.05). Within the limitations of this study, the single-layer system demonstrated acceptable marginal and internal fit.32

On the other hand, depending on the preparation design, either an adhesive or a non-adhesive luting cement can be used with these materials. CAD/CAM restorative materials can be cemented with either traditional luting cements such as zinc phosphate, poly-carboxylate cement, glass ionomers, or resin-modified glass ionomers. Materials that can be sealed with these include zirconia, lithium disilicate, alumina, and resin nano-ceramics.33

Concerning the resin adhesive cements, they offer superior aesthetics and low viscosity. They chemically bond to the restoration surface and the tooth surface, either providing all of the retention or, for retentive preparations, improved retentive strength. They also have greater compressive strength.34 Meanwhile zirconia fixed partial dentures showed good to sufficient marginal integrity in combination with Panavia/ED, Compolute/EBS and RelyX Unicem.35 When evaluating the initial and the artificially aged push-out bond strength (PBS) between ceramic and dentin produced by one of five resin cements, there was a significant effect of resin cement (p<0.0001). RelyX Unicem showed significantly higher PBS than the other cements. Syntac/Varion-link II showed significantly higher PBS than SmartCem2 (p<0.001). No significant differences were found between SpeedCem, SmartCem2, and iCEM. The predominant failure mode was adhesive failure of cements at the dentin interface except for RelyX Unicem which in most cases showed cohesive failure in ceramic.36

Conclusion
Digital impressions tend to reduce repeat visits and retreatment while increasing treatment effectiveness. Patients will benefit from more comfort and a much more pleasant experience in the dentist’s chair.37

The quality of adaptation of CAD/CAM-generated restorations is an area of current interest. Studies demonstrate the clinically acceptable durability of CAD/CAM restorations for color matching, interfacial staining, secondary caries, anatomic contour, marginal adaptation, surface texture, and postoperative sensitivity.38

Adhesive cementation seems to be the key for the long-term clinical success of CAD/CAM inlays and onlays.39

References

Full list of references is available from the publisher.

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