

COMMENTARY

Treatment Concept with CAD/CAM-Fabricated High-Density Polymer Temporary Restorations¹

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Erosive and mechanical wear of the dentition is a common problem for many patients and usually presents a challenging restorative problem to solve. The authors present a case of severe teeth erosion and wear secondary to a history of bulimia nervosa.¹ Their use of three successive occlusal bite splints of increasing thickness allowed a gradual increase in the patient's vertical dimension of occlusion (VDO) to provide sufficient space to rehabilitate the worn dentition. As with any complex rehabilitation, establishment of a comfortable and functional VDO is essential prior to providing definitive restorations for the patient.

Although it is relatively common to deliver temporary restorations chairside with a combination of premade stents from the diagnostic wax-up and considerable adjustment time chairside, generally some degree of tooth preparation is required to create sufficient space for retention and material strength. The authors intentionally avoided significant tooth preparation during the temporization phase by utilizing a computer-aided design/computer-aided manufacturing (CAD/CAM) technique to design and mill the temporary restorations. This allowed them to utilize a high density, highly filled acrylic that was industrially fabricated in blocks. Because these materials are milled to shape, there is no volumetric change in size of the material due to polymerization shrinkage during fabrication. The blocks are free of porosity and voids, making them more color stable as well. The flexural strength of these materials is high enough (generally in the 180–200 MPa range) and coupled with the modulus of elasticity of a composite, they do not fracture easily under functional loads. This allows for more conservative thickness of material to be used while still maintaining clinical functional strength of the materials. They are also easily adjusted and polished chairside.

A unique ability of CAD/CAM technology is the ability to replicate the diagnostic wax-up in the milled temporary restorations.² The diagnostic wax-up can be scanned or imaged and essentially copied onto the scanned tooth preparations through the design software and milled to create the temporary restorations. This potentially avoids significant chair time to adjust the occlusion commonly associated with the chairside use of preformed stents and bis-acryl temporary materials.

Current CAD/CAM systems require the tooth preparations and opposing teeth to be scanned or imaged and the opposing models to be “virtually mounted” in the software program. This is generally accomplished with an additional scan from the buccal view with the opposing dentition in centric occlusion. Although the centric position can be accurately recorded, the software programs do not have the capability to reproduce lateral excursions. This necessitates an intermediate diagnostic step using a conventional mounting of stone casts on an articulator and diagnostic wax-up to design the new occlusal relationships at an increased vertical dimension as described by the authors. At some future time, digital impression systems may reproduce functional jaw movements, and this intermediate diagnostic design sequence may be totally managed on the computer to fabricate the desired temporary restorations at the new vertical dimension.

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The case report also illustrates a telling aspect of CAD/CAM dental procedures. The innovative technology can offer improvements in the current treatment process as well as the use of improved materials, but it does not allow one to ignore sound dental concepts and principles in the quest for a superior clinical result.

REFERENCES

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