

# New Technologies and Materials are Transforming Dentistry

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**Digital impressions and innovative new materials provide improved physical and optical properties in a model-less workflow for restorative dentistry.**

This multi-crown case was completed using an all-digital, model-free workflow.

## Case Study and Clinical Considerations for Success

A 40-year-old female patient presented with a molar with a porcelain-fused-to-metal crown (PFM) that was chipped on the lower left side, tooth no. 19 (Fig. 1, 2). The porcelain was chipped at the porcelain/metal interface. This created an open contact between that tooth and the tooth behind it, and the patient complained of food getting lodged in the space between her teeth. Additionally, she felt her teeth looked bad and she could feel the sharp edge where the porcelain sheared off with her tongue.

Upon examination, it was obvious the large amalgam restorations adjacent to that crowned tooth required attention, teeth 18 and 20 (Fig. 3). As it is always better to do quadrant dentistry to save the patient extra visits, we needed to determine a treatment plan for those two adjacent teeth.

We elected to replace the premolar (tooth no. 20) with a direct restoration. Tooth (no. 18), had significant cracks. We could have opted for a direct restoration as well, but the size (more than half the width of the tooth), and multiple fractures indicated the tooth required cuspal coverage. In my opinion, it was only a matter of time before that tooth needed a crown, so we decided to place crowns on both teeth in the same visit.

The final treatment plan included direct bonded restorations on the smaller two forward teeth, replacing the crown that failed, and a cuspal restoration on the back tooth.

## Initial Case Presentation

Once the crown was off, we created occlusal clearance first. The amalgam was shallow, so a composite base was not needed. After occlusal reduction was done, approximately 1.2 mm on the occlusal surfaces, axial reduction was completed. In this particular case, we needed a minimum of .8 mm for our material of choice (3M™ Lava™ Esthetic Fluorescent Full-Contour Zirconia). The occlusal clearance needed to be enlarged to create ideal anatomy. Once the axial areas were reduced, margins were cleaned and refined (Fig. 4).



Fig. 1



Fig. 2



Fig. 3



Fig. 4

## Prep for Scan

We then retracted the tissue using retraction paste (3M™ Retraction Capsule), placing it subgingival around both preps (Fig. 5, 6), letting it sit and then washing it out (Fig. 7).

After this, we applied high-resolution scanning spray (Fig. 8) and dried the sulcus to clear any excess spray and made digital impressions for the preps, getting all the margins first, using the 3M™ Mobile True Definition Scanner. The quadrant scans included up to the canine on both arches. We also completed a patient bite scan in centric occlusion plus soft tissue healing and shaping.

The patient was fitted with temporaries (3M™ Protemp™ Plus Temporization Material) (Fig. 9). The provisionals are important to hold the teeth in place and maintain occlusion.

We completed the prescription and sent it off to the lab. They handled all the margin markings, the design, and milled out the restorations (Fig. 10, 11). With one or two-unit restorations like this, we typically use a model-free workflow. When using digital impressions, we find that the temps and restorations have a very consistent, accurate fit that does not require models. Seating the crowns: After verifying dry fit of both crowns we noted excellent occlusion, proximal and marginal fit. After cleaning the intaglio of the crowns, they were then filled half way with a self-adhesive resin cement (3M™ RelyX™ Unicem™ 2 Self-Adhesive Universal Resin Cement) and seated. We spot tacked for one second on each buccal and lingual. The excess cement is easily removed using this technique. The interproximal areas are then flossed, and occlusion rechecked. Final restorations in situ (Fig. 12, 13, 14).



Fig. 5

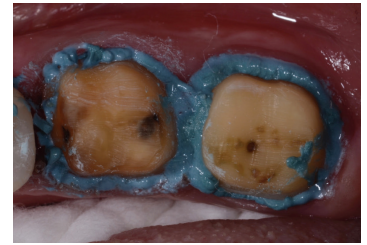


Fig. 6



Fig. 7



Fig. 8



Fig. 9

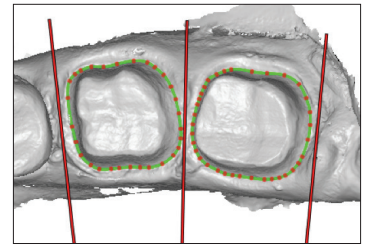


Fig. 10

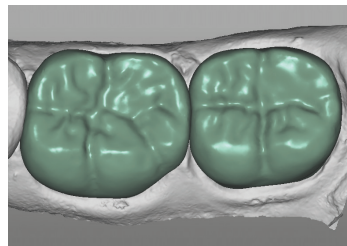


Fig. 11



Fig. 12



Fig. 13



Fig. 14

(56941)  
3M™  
Retraction  
Capsule



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True Definition  
Scanner



(46962)  
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Material



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3M™ Lava™  
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Dr. Weston has received honorarium from 3M Oral Care.

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