

By Allen L. Schneider, DDS, FAGD, DICOI, Daria Hamrah, DMD, FADSA,
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Paradigm Shift in Today's Digital Dentistry

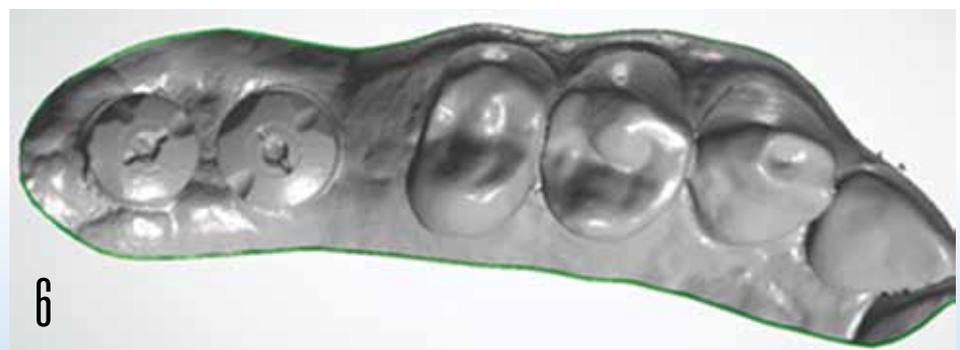
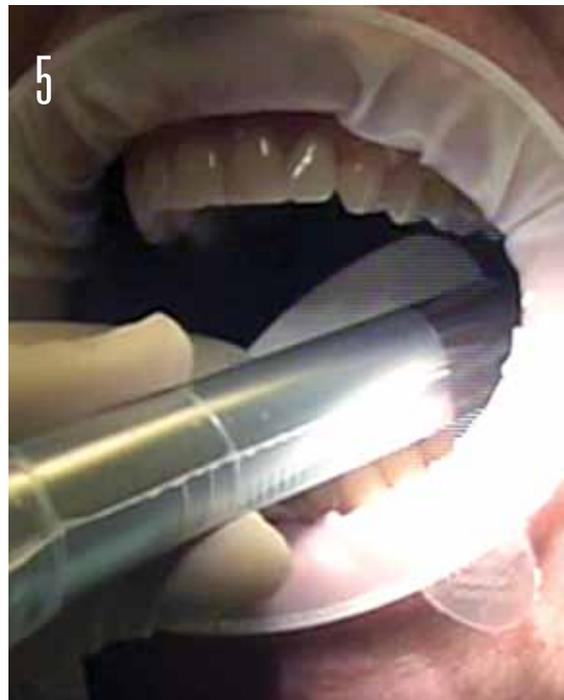
In today's economy, coupled with today's educated dental patients, it is imperative that dentists can deliver functional, esthetic and timely service. With the introduction and advances in dental digital technology, it is now possible to create and deliver authentic implant abutments with full zirconium crowns in just one week.



A 60-year-old man with a history of controlled hyperthyroidism and gastro-esophageal reflux disease presents with non-restorable carious teeth #14 and #15 (**Fig. 1**). The teeth had been previously treated endodontically as well as full crowns. No active infection was present at the time of the initial examination and the time of surgery.

The affected teeth were extracted and immediate implants were placed in the molar extraction sites with healing abutments placed in a single stage fashion (Biomet 3i T3 tapered prevail, 6/5 mm x 11.5 mm (**Fig. 2**).

A cortico-cancellous demineralized allogeneic bone graft was placed into the extraction sockets around the implants and wounds were re-approximated with 3-0 chromic gut sutures. Post-operative Amoxicillin 500mg po qid was prescribed



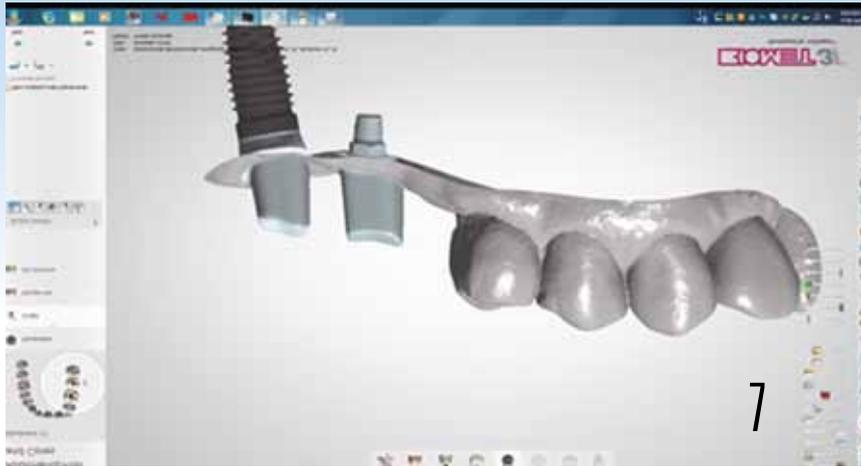
together with Chlorhexidine Gluconate 0.12% oral rinse for one week post-operatively.

The decision to place immediate implants was made due to lack of bone height and a hyper-pneumatized maxillary sinus. Delaying implant placement would make future placement unpredictable due to further loss of bone height in the first four months of healing. Encode healing abutments were attached to the implants supra-gingivally to protect the surgical sight and hold the tissue (Fig. 3). An x-ray was done to confirm seating (Fig. 4).

During the osseointegration phase the oral surgeon and restoring dentist examined the patient to make sure the tissue was healing nicely, to review the adjacent teeth contacts for parallelism and to acquire a tooth shade. After four months the implants were assessed by the oral surgeon. Both implants were torque tested to 20Ncm and osseointegration was confirmed. A radiograph was performed to confirm seating of the encode healing abutments prior to an intra-oral digital scan.

A scan using the 3M Lava IOS scanner of the Encode healing abutments and surrounding dentition along with a virtual bite was performed (Figs. 5, 6). A prescription form was filled out to a designated laboratory. The patient's file was sent to 3M Lava to verify the scan for accuracy and clean up the images.

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3M Lava then sends the file to the designated dental laboratory. At the lab a dental technician, in virtual reality, articulates, splits the dies and marks the margins. The file is then sent to 3M Lava for a SLA model to be fabricated (standard protocol). Due to the modeless fabrication of the final restoration the model fabrication was denied by the laboratory. The file is then imported and completed through the 3Shape software. As this laboratory has purchased a license from 3i, they can now proceed with the design. The abutments are patient specifically designed, capturing the proper interocclusal distance, axial wall taper, margin depth and proper emergence profile contours (Fig. 7). The abutment images are saved. The full contour zirconium crowns are then designed over the abutments in virtual reality (Fig. 8). The file is uploaded to Biomet 3i where Bellatek titanium abutments were milled (Figs. 9, 10).

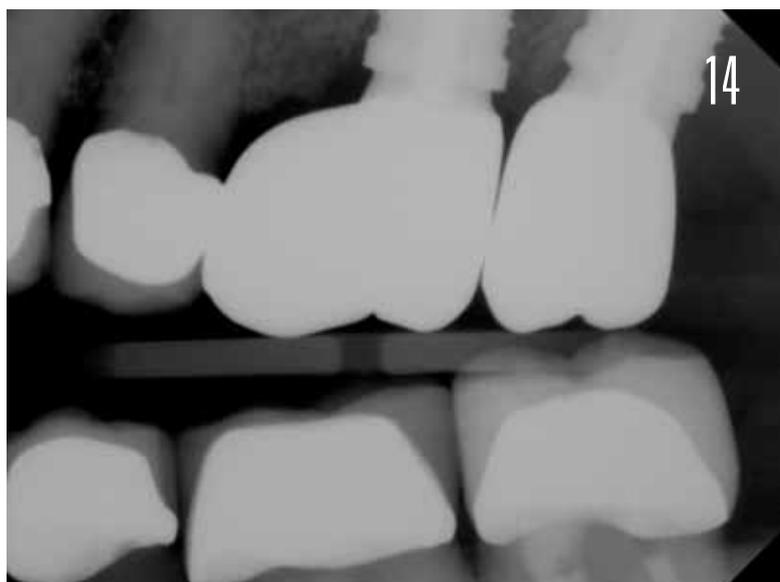
While the abutments are being milled the laboratory mills the full zirconium crowns. After completion of the milling of the crowns they are then removed from the zirconium block and placed in a dipping solution to achieve the desired shade. The crowns are now placed in a sintering oven for 12 hours to complete the hardening process. When the laboratory receives the Bellatek abutments within 48 hours the full zirconium crowns are checked on those abutments for fit and to thin out the margins. The

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crowns are now glazed in a porcelain furnace and sent to the restorative dentist in only one week (Figs. 11, 12).

At the first restorative appointment the Encode healing abutments are removed and the Bellatek Encode abutments are placed onto the implants and torqued to 20 Ncm using a gold screw (Fig. 13). The full contour zirconium crowns are tried in over the abutments and checked for seating, contact accuracy and occlusion. An x-ray is taken to confirm seating of the abutments (Fig. 14). The crowns are removed and the screw access holes are filled with medical grade Teflon tape to protect the screws from the cement (Fig. 15). The crowns are cemented onto the abutments using FujiCEM from GC America, a glass ionomer resin infused cement. Using patient-specific



abutments with ideally positioned margins is a key to facilitating proper removal of final cement. A final check of the inclusion is performed and the case is completed (Fig. 16, 17).

Summary: In today's dentistry the expense and learning curve of digital integration into the dental office is imperative. If professionals in the industry master this technology it is a game changer. The accuracy, cost and immediacy is the future. This technology allows less chair time and quicker turn around. This is a win for the dentist and a win for the patient. **JDT**

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Allen L. Schneider, DDS, FAGD, DICOI, received his dental degree from Georgetown University Dental School. Dr. Schneider has achieved a fellowship to the Academy of General Dentistry and a Diplomat to the International Congress of Implant Dentistry. Consulting and lecturing for numerous dental manufacturers around the world, he is also an Adjunct Instructor to Tufts University School of Dental Medicine in the Restorative Department. Dr. Schneider still maintains his private practice for the last 35 years in Springfield, Va.



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