# Optimizing Anterior Esthetics with the Inclusive® Tooth Replacement System

*by* ***Timothy F. Kosinski, DDS, MAGD***

Implant treatment has changed so much over the years. In the past it was acceptable to place the implant in the maximum amount of bone and focus on restoring the implant once osseointegration had occurred. Although limitations were apparent, improvements in implant and prosthetic design enabled the fabrication of implant crowns that could be placed predictably, with confidence in the long-term success of the restoration. The creation of internal retention designs in the implant body, such as notches, morse tapers and internal hexes, further improved outcomes. As restorative outcomes have become more predictable, expectations for implant cases have made a substantial shift toward esthetics.

So how do we best go about optimizing the esthetics of implant restorations while ensuring proper function and periodontal health? With the understanding that implant dentistry is prosthetically driven rather than surgically driven, we now have a process that simultaneously fosters predictability, function and esthetics.

With a root-form design, patient-specific components mimic the shape of the tooth being replaced. This offers clinicians the opportunity to establish a natural emergence profile and allows for a restoration that is virtually identical to the natural tooth. The Inclusive® Tooth Replacement System (Glidewell Laboratories; Newport Beach, Calif.) provides all of the components needed to accomplish this including a custom healing abutment, custom temporary abutment, provisional crown, custom impression coping, final custom abutment, and the final all-ceramic crown. Because each of these components is designed with the final prosthetic out-

come in mind, they help to ensure that the same restorative-driven approach is maintained throughout treatment.

Dental technicians at the lab use the latest CAD/CAM technology to design these components to conform to the unique gingival anatomy of each patient, thus shaping the patient's soft tissue to replicate the contours and margins of the original tooth throughout healing.[1,2] The ultimate goal is to facilitate a predictable transition to the final custom abutment and crown. By utilizing custom components and positioning dental implants physiologically, we can create nice esthetics, even in the relatively challenging smile zone.

For many years, stock abutments with predetermined margins that were uniform around the entire abutment were the norm. Generic, prefabricated components helped to save money on laboratory costs. Oftentimes, custom abutments were simply prepared stock abutments with some scalloping. These abutments would frequently result in margins that were significantly subgingival, creating a potential for periodontal and bone regression around the implant due to improper design or cement irritation.

Today, with the proficient use of CAD/CAM technology, we can create ideally scalloped custom healing abutments that allow for physiologic healing of the tissue surrounding the implant site.[3] We have the ability to scan our hard models and virtually place and restore implants before surgery even begins. After healing has occurred, we can take a final impression with a custom transfer coping in place, ensuring that the precise position of the implant and final soft tissue anatomy is accounted for when the final restoration is designed.[4] The final custom abutment can then be contoured to establish optimal esthetics and margins for the definitive crown.

## Case Report

The following case, involving a patient with a critical dental situation in the esthetic zone, illustrates the Inclusive Tooth Replacement System protocol. Because treatment was urgent, stock healing components and impression techniques were initially used after placing the implant. These techniques are what most of us are using today for our dental implant restorations. However, after some initial healing had occurred, a restorative approach that leverages the latest in CAD/CAM technology and prosthetically driven treatment planning was utilized in order to create an even healthier and more esthetic final result in the anterior maxilla.

The patient presented with gingival discomfort in the area of his maxillary right central incisor. Although there were no medical complications, he was obviously distraught at losing his front tooth. The patient was offered various treatment options, including attempting to retain the remaining root structure with periodontal crown lengthening, fabrication of a new post-and-core and crown, extraction and a conventional three-unit bridge, or removal of the tooth root and immediate placement of a single dental implant. The patient elected for implant therapy as he had no confidence in the long-term prognosis of the remaining root and did not want his healthy adjacent teeth "cut" down.

Provided the urgency of the patient's situation, the patient was scheduled for root removal and a partial removable appliance was quickly fabricated. The extraction needed to be atraumatic in order to maximize esthetics. Physics Forceps (Golden Dental Solutions Inc.; Detroit, Mich.) were used to perform the extraction, elevating the root form coronally and facially without causing any damage to the adjacent teeth or the facial plate of bone. This created a socket where a 4.7 mm x 13 mm dental implant could be easily and immediately placed.

The implant osteotomy was positioned approximately 3 mm apical to the adjacent cemento-enamel junction and 3 mm palatal to the facial contour of the adjacent natural teeth, allowing for ideal physiologic response. Because treatment began under emergency conditions, a stock 3 mm healing abutment was initially placed to the level of the soft tissue and a removable flipper appliance seated.

After some initial healing and implant integration, the soft-tissue esthetics were far from ideal, so the Inclusive Tooth Replacement System was chosen to help improve the gingival contours. Based on a traditional impression technique using a standard 4.5 mm diameter impression coping, the lab fabricated and scanned a master cast, upon which the custom healing and restorative components could be designed. CAD/CAM software was utilized to create a titanium healing abutment that mimicked the root structure of the original tooth. This would establish proper tissue cuffs and periodontal health during the remainder of healing. A custom temporary abutment was created with the same shape and design, providing the option of provisionalizing the case with a BioTemps® crown (Glidewell Laboratories).

Anatomically correct tissue contours were established during the remainder of healing. Following completion of osseointegration, the final impression was taken with the custom impression coping in place, conveying the precise position and final soft-tissue anatomy to the lab for digital design of the final custom abutment and monolithic zirconia crown. Because this case was in the esthetic zone, the final abutment was fabricated from zirconia in order to eliminate the metal show-through that can occur with titanium. Upon delivery, the final restoration exceeded the patient's expectations, providing optimal support of the gingival margins and contours established during healing while achieving a natural emergence profile that mimicked that of the original tooth.

***Figure 1:*** *The patient presented with a symptomatic and mobile maxillary right central incisor. The adjacent teeth are unrestored.*

***Figure 2:*** *Radiograph illustrates a horizontal fracture in the maxillary right central incisor.*

4a

4b

***Figures 4a, 4b:*** *Physics Forceps were used to atraumatically remove the root structure, maintaining the facial plate of bone and thus facilitating predictable, immediate placement of a dental implant.*

***Figure 3:*** *The clinical crown was removed using simple finger pressure, revealing a compromised root structure. Note the inflammation of the surrounding tissue due to the movement of the horizontally fractured tooth.*

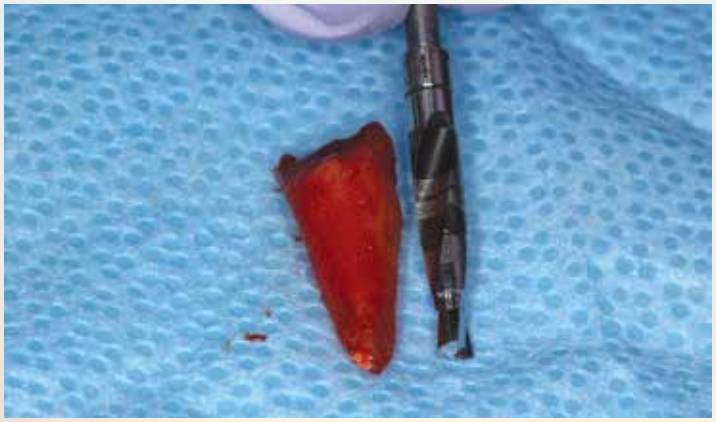
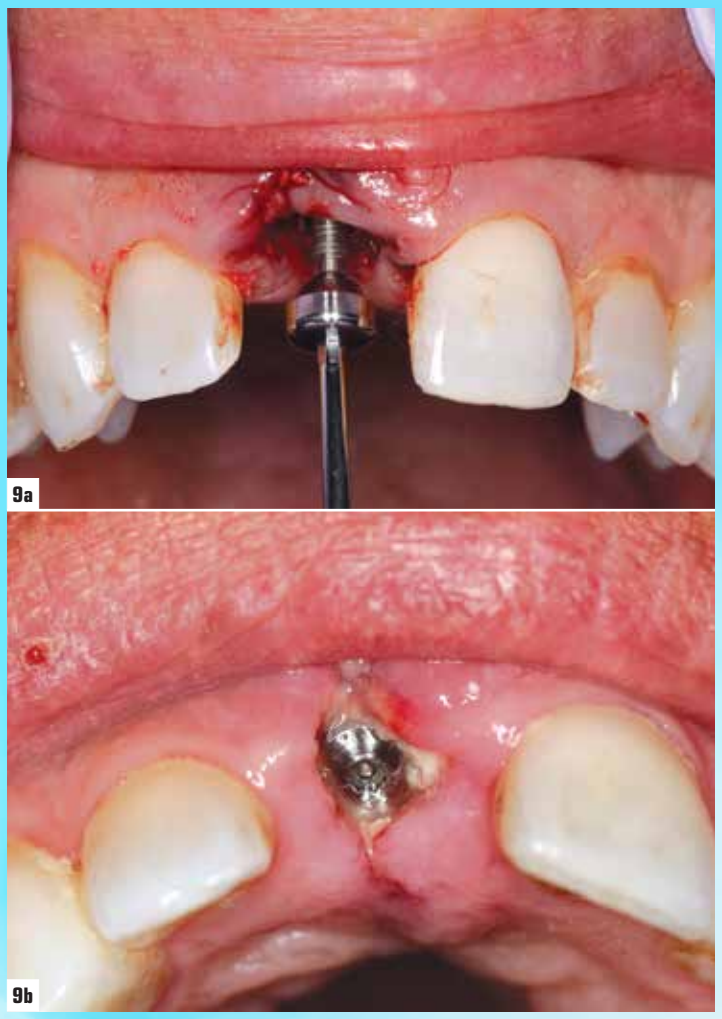


***Figure 5:*** *The root anatomy was assessed to determine the appropriate length of the subsequent implant. The facial-lingual and mesial-distal dimensions of the root were evaluated so the tooth could be replaced using the Inclusive® Tooth Replacement System.*

***Figure 6:*** *The drills included with the system were used to prepare the extraction site for the dental implant.*

***Figure 7:*** *A 4.7 mm x 13 mm Inclusive® Tapered Implant (Glidewell Direct; Irvine, Calif.) was threaded into the prepared socket site.*




***Figures 9a, 9b:*** *Because the implant was optimally placed at the crest of the ridge, a 3-mm-tall healing abutment was initially placed into the implant and torqued to 25 Ncm.*

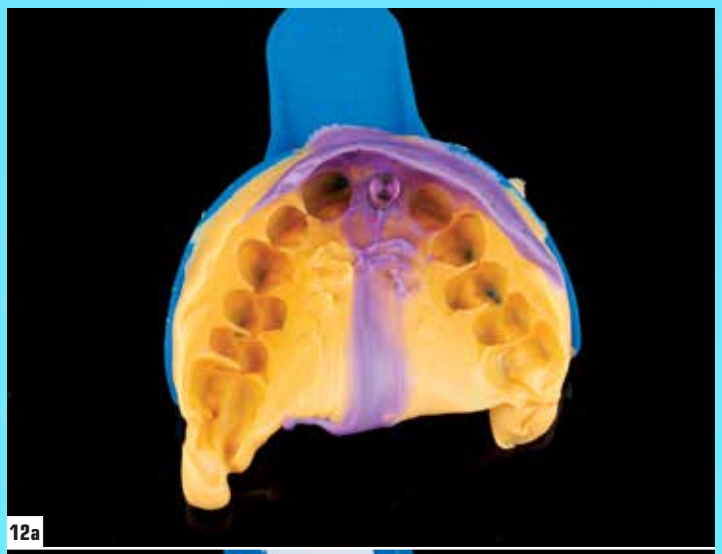
***Figure 8:*** *Digital radiograph of the implant in ideal position at the crest of the edentulous ridge.*

***Figure 10:*** *A removable transitional appliance was immediately seated for esthetics.*

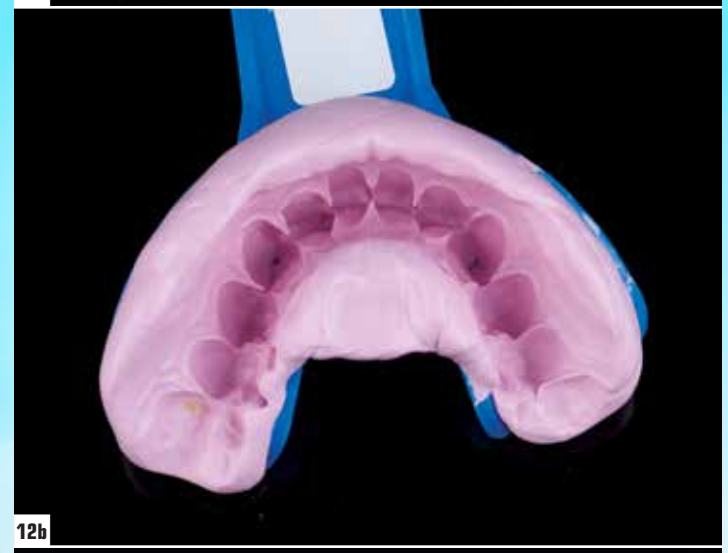
11a

11b

***Figures 11a, 11b:*** *Two and a half weeks following implant placement, a traditional impression of the implant was made. Note that although the position of the implant was ideal, the tissue contours and interdental papillae had not yet been established because a traditional round healing abutment was placed immediately following implant placement.*

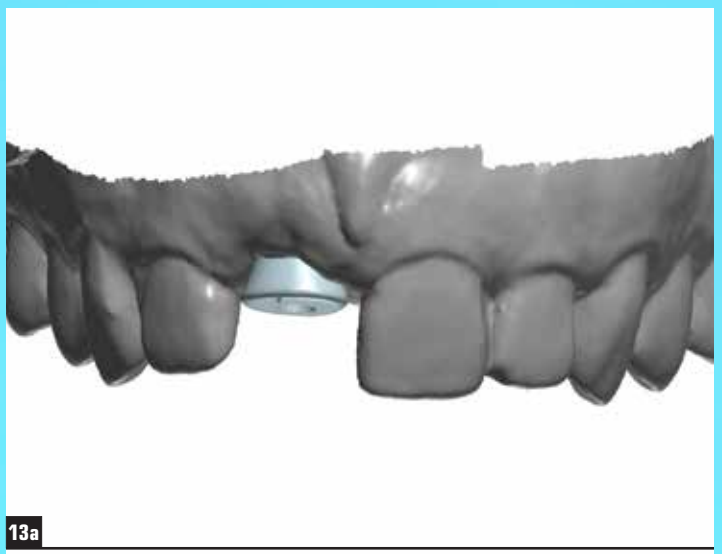
12a



12b

12c

***Figures 12a–12c:*** *A clean, crisp final impression with no voids or distortions was made along with an opposing impression and bite registration.*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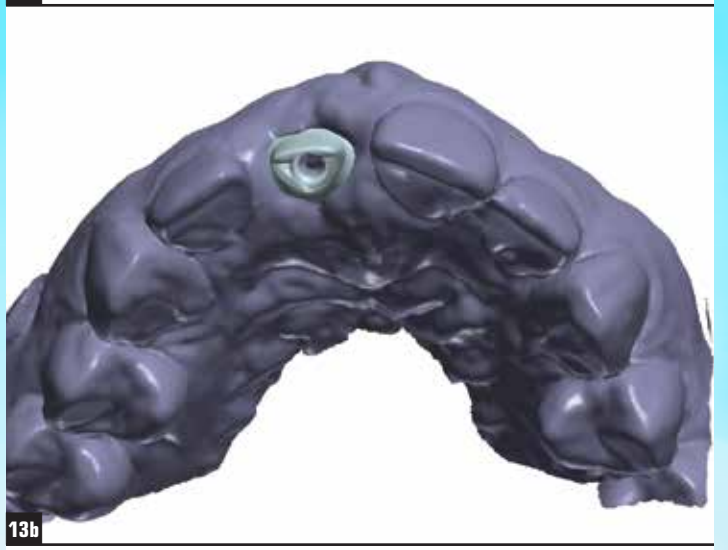
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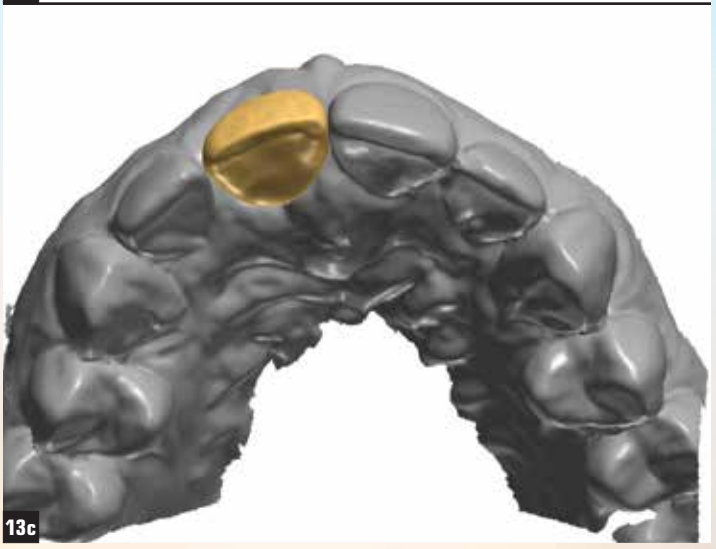

13c

***Figures 13a–13c:*** *After pouring and scanning the master cast, CAD software was utilized to design the custom healing components.*


14a

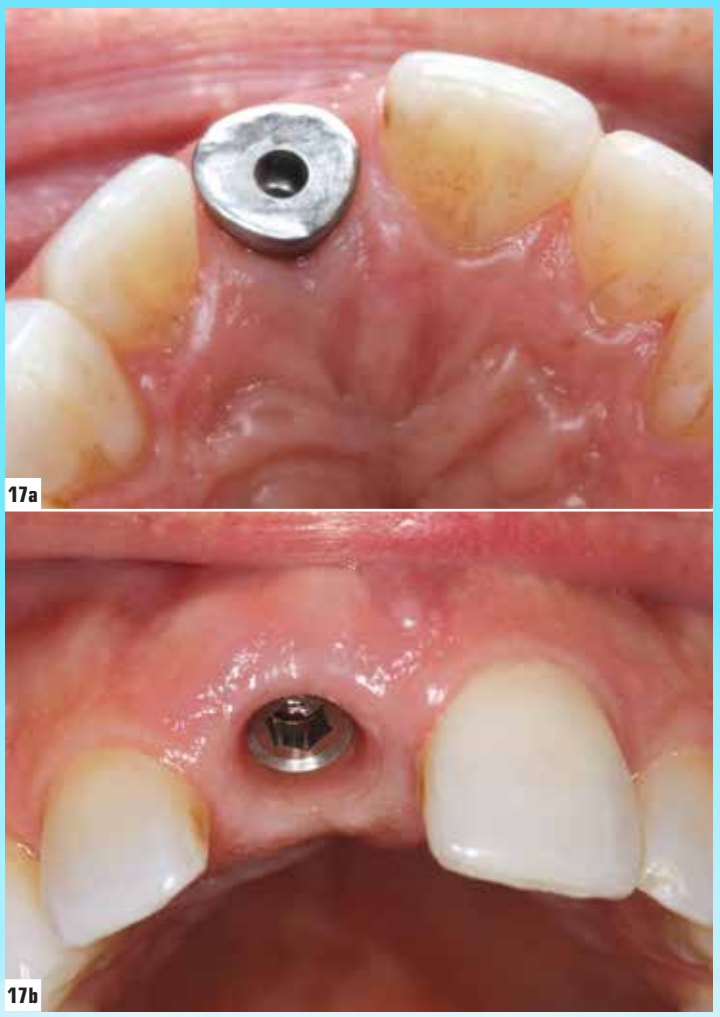

14b


14c

***Figures 14a–14c:*** *Custom healing components were produced by the lab and seated on the master cast. The custom-milled, root-contoured healing components would be essential in establishing an optimal emergence profile, esthetic tissue contours, and interdental papillae for the final restoration.*

***Figure 15:*** *The custom healing abutment, custom impression coping, and custom temporary abutment were milled with precision from titanium, while the BioTemps® transitional crown was fabricated from poly(methyl methacrylate) (PMMA). All were provided to the doctor in order to maximize clinical options and idealize the esthetics of the final implant-retained crown.*

***Figure 16:*** *After receiving the CAD/CAM-produced components from the lab, the custom healing abutment was placed in order to train the soft tissue to mimic the original root shape of the tooth. The patient wore a partial removable appliance until the final impression appointment.*




***Figures 17a, 17b:*** *Following four months of healing, the patient returned to the office for the final impression, exhibiting excellent tissue health surrounding the custom healing abutment. The custom healing abutment was removed, revealing anatomically correct contours that would facilitate an ideal emergence profile.*



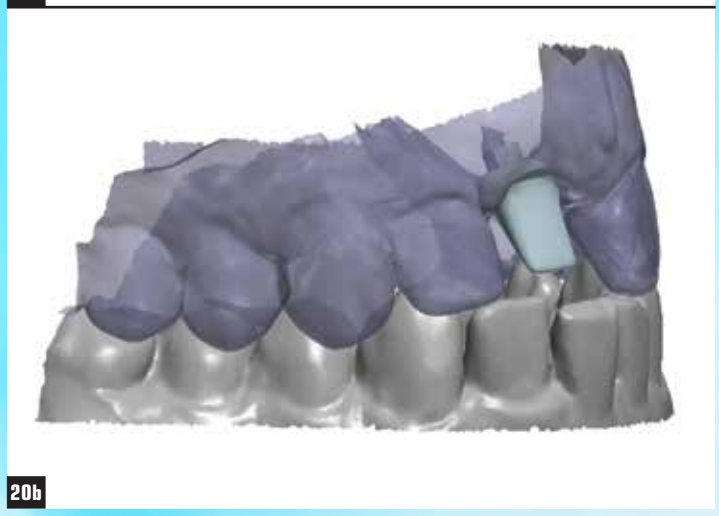
***Figure 18:*** *The final implant impression was made using the custom impression coping, which has the same patient-specific contours as the custom healing components. This allows the lab to accurately design the final crown while accounting for the final soft-tissue anatomy.*


19a

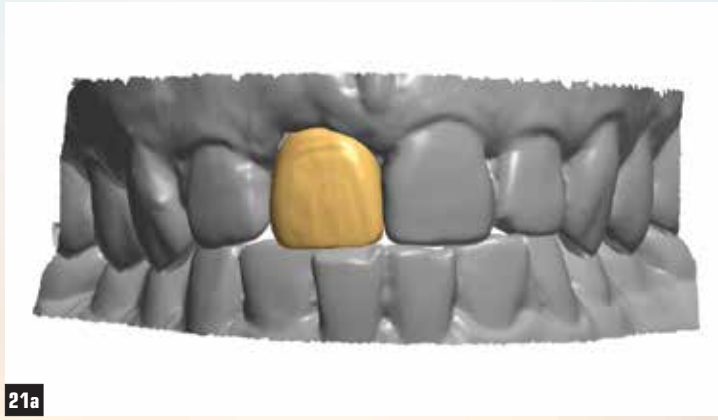

19b

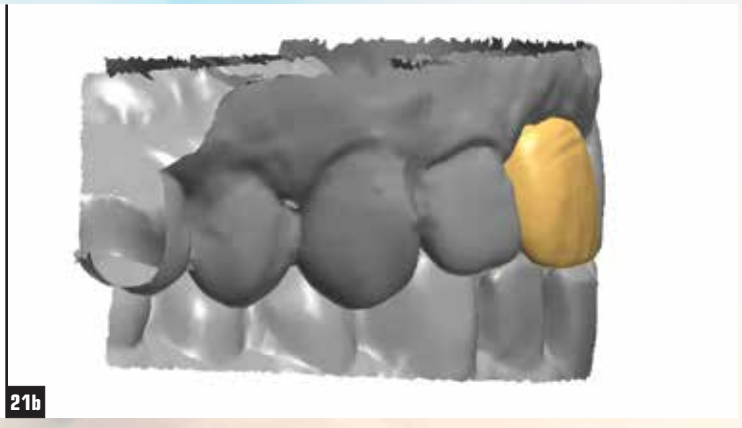
***Figures 19a, 19b:*** *The custom temporary abutment and BioTemps® provisional crown were placed in order to further establish the emergence profile and interdental papillae while the final custom abutment and crown were fabricated by the lab.*


20a


20b

***Figures 20a, 20b:*** *The design for the definitive implant abutment was finalized based on the final impression. The morphology of the custom abutment mimics the root form of the tooth being replaced, fostering a natural emergence profile for the final restoration.*


21a


21b

***Figures 21a, 21b:*** *The final implant-retained crown was designed to mirror the shape of the natural left central incisor. The final soft-tissue architecture of the implant site allowed for the construction of an anatomically correct crown shape.*

***Figure 22:*** *The laboratory provided a seating jig to help position the final abutment in proper alignment, allowing for torquing of the abutment screw to 25 Ncm without risk of affecting the implant.*

***Figure 24:*** *The digital radiograph illustrates ideal margins of the custom abutment and complete seating into the body of the implant.*



***Figures 23a, 23b:*** *Note the natural emergence profile and ideal gingival margins of the final monolithic zirconia abutment, helping to eliminate any periodontal concerns of residual subgingival cement.*



***Figures 25a, 25b:*** *The final BruxZir® crown was cemented into place. Note how the interdental papillae and tissue contours established by the custom healing components allow for ideal crown margins.*

***Figure 26:*** *The patient was thrilled with the final implant restoration in the esthetic zone.*

## Conclusion

Creating ideal, natural-looking gingival margins is essential to achieving esthetic implant restorations. This is especially true in the anterior maxilla, where patients can be extremely sensitive regarding esthetics. The general dentist restoring dental implants should appreciate any tools that make this end result more predictable. Being able to simply and cost-effectively create custom abutments that idealize the individual situation is uplifting for those of us who have had less than ideal results in the past. Providing an outstanding service to our patients at a reasonable fee makes implant dentistry more commonplace and allows us to routinely give our patients something that is very special. The Inclusive Tooth Replacement System allows any practitioner to achieve the most natural-looking soft-tissue contours possible, meeting the esthetic needs of our patients. **IM**

### *REFERENCES*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3. *Kutkut A, Abu-Hammad O, Mitchell R. Esthetic Considerations for Reconstructing Implant Emergence Profile Using Titanium and Zirconia Custom Implant Abutments: Fifty Case Series Report. J Oral Implantol. 2013 Oct 31.*
4. *Hinds KF. Custom impression coping for an exact registration of the healed tissue in the esthetic implant restoration. Int J Periodontics Restorative Dent. 1997 Dec;17(6):584-91.*