

Maxillary Esthetic Zone Restoration with a **Monolithic BruxZir® Implant Bridge**



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Advances in clinical techniques and materials continue to revolutionize dentistry, enabling clinicians to practice with a greater degree of predictability and confidence than ever before. With increasingly affordable dental implants, more and more patients are opting for crown & bridge services that preserve natural tooth structure and underlying ridge width. Custom, prefabricated provisional appliances provide the patient with a more natural and highly functional temporary prosthesis during the healing phase. Monolithic CAD/CAM restorations provide a superior combination of strength and esthetics — and a precise fit — at a fraction of the cost of noble metals. Clinicians taking advantage of these solutions, particularly in combination, are reporting reduced chairtime and increased patient satisfaction — the principal ingredients of a thriving practice in this modern age of dentistry.

Case Description

The patient in this case presented with a complaint of constant throbbing pain on tooth #7, which served as an abutment tooth for an anterior maxillary bridge spanning teeth #7–10 (Fig. 1). Moreover, the patient expressed displeasure with the overall appearance of his smile in the esthetic zone, noting the discoloration of his canines. Upon clinical examination, it was discovered that tooth #11 had undergone endodontic therapy within the prior three years and required full coverage. For tooth #7, a probing depth of about 11 mm was discovered. In addition, the tooth demonstrated significant mobility and increased pain on biting. These symptoms indicated a vertical fracture in this abutment tooth.



Figure 1: Preoperative retracted view of the maxillary anterior

After careful evaluation of the patient's requests and needs, a treatment plan was created. The plan consisted of extracting and grafting tooth #7 and #10, with consecutive socket preservation utilizing grafting material. For the healing phase, the patient would receive a BioTemps® provisional bridge (Glidewell Laboratories; Newport Beach, Calif.), so that he would not have to wear a flipper. Upon sufficient healing of the ridge and socket grafts, Inclusive® Tapered Implants would be placed in the areas of tooth #7 and #10, followed by a period of osseointegration and, ultimately, the delivery of two Inclusive® Custom Abutments (Glidewell Laboratories) and a four-unit monolithic BruxZir® Solid Zirconia bridge (Glidewell Laboratories). Finally, tooth #6 and #11 would be restored with individual BruxZir crowns.

Atraumatic extraction of tooth #7 and #10 proceeded as planned (Fig. 2), and grafting was performed to establish the necessary bone quantity for eventual implant placement. Tooth #6 and #11 were each prepared for an eventual BruxZir crown. The strength of the BruxZir material allows for a conservative, feather-edge preparation similar to that used for cast gold, requiring as little as 0.5 mm occlusal clearance. Before leaving the office, the patient was fitted with his custom BioTemps bridge (Fig. 3), which was digitally prefabricated from conventional diagnostic impressions. Among the advantages of the BioTemps bridge is that it is designed to seat passively over the ridge, affixing in this case to tooth #6 and #11, and is cemented (or screw-retained, according to preference) to feel and function more like natural teeth. A BioTemps bridge or crown also helps to sculpt the soft tissue for a more natural emergence profile and serves as a preview of the final restoration (Fig. 4). Computer-aided design helps to ensure a precise fit, while the biocompatible poly(methyl methacrylate) (PMMA) material can easily be modified if necessary. Having this provisional on hand, pre-milled for the day of surgery, eliminates chairtime that would otherwise be required to create a custom temporary.



Figure 2: Atraumatic extraction of tooth #7 & #10



Figure 3: BioTemps provisional bridge spanning teeth #6-11



Figure 4: BioTemps provisional seated with TempBond® Clear™ with Triclosan (Kerr Corporation; Orange, Calif.)

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Figure 5: Inclusive Tapered Implant (3.7 mm x 13 mm)

A period of nearly five months was allowed for the bone grafts to heal, after which time the patient returned for placement of two Inclusive Tapered Implants. The Inclusive Tapered Implant (Fig. 5) is machined from high-grade titanium alloy and features industry-standard properties such as an anatomically tapered body, RBM surface treatment and an internal hex prosthetic connection for ease of placement and reliable long-term function. The prescribed length of each implant (13 mm) was based on the radiographic location of the nasal cavities, while the prescribed diameter (3.7 mm) was based on the available bone width. Implants were placed as planned in the areas of tooth #7 and #10 using the convenient hand carrier (Fig. 6), and seated to depth using a torque wrench with a final torque value of 35 Ncm, indicating good primary stability. To eliminate the need for a second surgery when taking impressions, collared 5 mm tall healing abutments were placed and later removed, creating nice emergence profiles. The BioTemps bridge was cemented back into place to serve as a provisional restoration during the osseointegration period.

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Approximately four months later, the patient returned for evaluation and final impressions. The BioTemps bridge was removed and adequate implant fixation verified using an Osstell® ISQ implant stability meter (Osstell; Linthicum, Md.), which uses resonance frequency analysis as a method of measurement (Fig. 7). Full-arch, implant-level impressions were taken using the appropriate Inclusive® Closed-Tray Transfer copings (Glidewell Laboratories) (Fig. 8) and Capture® PVS impression material (Glidewell Laboratories). The impressions and bite registration were submitted to the laboratory along with a prescription for the final custom abutments, final crowns and final four-unit bridge.

The Inclusive® Titanium Custom Abutments were received on a stone model with soft tissue mask (Fig. 9). The abutments were securely seated on tooth #7 and #10, with the abutment screws tightened to 25 Ncm and the screw



Figure 6: Preliminary placement of Inclusive Tapered Implant in the area of tooth #10



Figure 7: Osstell ISQ reading of 76 indicating solid osseointegration



Figure 8: Inclusive Closed-Tray Transfer copings affixed to implants for the final impression

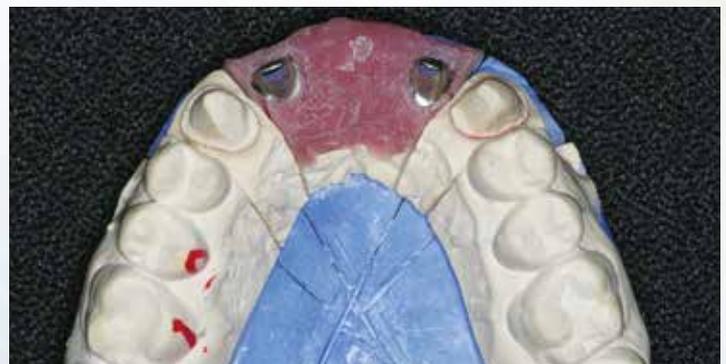


Figure 9: Inclusive Custom Abutments on stone model with soft tissue mask

access holes (Fig. 10) were filled with two cotton pellets and TempoSIL® (Coltène Whaledent; Cuyahoga Falls, Ohio) and covered with Premise™ universal nanohybrid composite (Kerr Corporation). Due to the patient-specific design of the abutments, minimal blanching was observed. Final seating of the 4-unit anterior BruxZir bridge over the custom abutments was followed by final seating and cementation of the individual BruxZir crowns on the natural preps of tooth #6 and #11 (Fig. 11). The precise CAD/CAM techniques by which BruxZir restorations are produced resulted in a precise fit requiring minimal chairside adjustment. And the material itself, a monolithic, tooth-shaded ceramic uniquely processed to exhibit high translucency while maintaining its class-leading strength, resulted in a pleasing esthetic outcome.

Summary

Today's clinicians have at their disposal a wealth of tools designed to increase the efficiency and predictability of their treatment offerings, using methods and materials that serve to lower costs while improving patient results. High-quality dental implants are becoming ever more affordable, making them an attractive option to patients who might otherwise sacrifice healthy teeth to conventional crown & bridge treatment, or resort to using removable or fixed partial dentures. A BioTemps provisional appliance provides the patient with an immediate, custom temporary that is both functional and esthetic, helping guide the case toward a predictable conclusion. Custom implant abutments can be precisely designed to provide ideal support of the restoration and underlying soft tissue, while all-ceramic crowns & bridges milled from BruxZir Solid Zirconia, boasting a flexural strength far greater than layered porcelain, now exhibit sufficient esthetics for use in the anterior. The CAD/CAM technology inherent in the production of these restorations not only reduces their costs, but also limits the need for adjustments or remakes, resulting in less chairtime per patient.

While conventional materials and techniques continue to serve as they have for decades, most clinicians today are seeking to maximize both the potential of their practice and the satisfaction of their patients. Those failing to take advantage of the benefits that advanced dental technology has to offer are missing out on a key opportunity.



Figure 10: Intraoral seating of Inclusive Custom Abutments



Figure 11: Final BruxZir crowns on tooth #6 & #11 and BruxZir bridge for #7-10