

Three Applications of

BruxZir® Solid Zirconia Over Implants

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Implant therapy is a long-lasting mode of tooth replacement with a tremendous variety of applications. Patients have every reason to expect that an osseointegrated implant will last for their entire lives. At the same time, clinicians are demanding restorative materials that can withstand the considerable forces that implant restorations are subject to in the absence of the periodontal ligament. As durability has become an increasingly serious concern for clinicians restoring implant cases, monolithic materials such as BruxZir® Solid Zirconia have surged in popularity.

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Monolithic zirconia exhibits exceptionally high fracture toughness. Its flexural strength is significantly higher than that of a conventional PFM.¹ Its monolithic construction affords exceptional resistance to breakage, chips and fractures. Despite the superlative strength of BruxZir restorations, they are extremely friendly to surrounding teeth, minimizing the wear

to which opposing dentition is subject.² Importantly, this durability is complemented by a lifelike appearance, with natural-looking translucency and color.

BruxZir Solid Zirconia has proven itself remarkably versatile, with applications ranging from single-unit implant cases, to bridges, to full-arch implant prostheses. The cases that follow demonstrate just a few of the ways in which this exceptionally strong material can be used in implant restorations. While the excellent esthetics and precise fit achieved in these cases were immediately pleasing to the patient, it is the long-term function and resilience of monolithic zirconia that will benefit these cases most.

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Case 1: Two-Unit Posterior

A longtime patient, male, with a history of intermittent dental appointments over the course of 20 years, presented with two significantly decayed teeth in the posterior mandible. It had been five years since the patient's last visit. Radiographs revealed large carries on tooth #27 and #28 (*Fig. 1*). During intraoral examination, the explorer could be run beneath the crowns at the cervical, indicating that the coronal portions were completely separated from the roots

Two restorative options were explained to the patient: Root canals could be followed by a post-and-core restoration, or extractions could be performed followed by the immediate

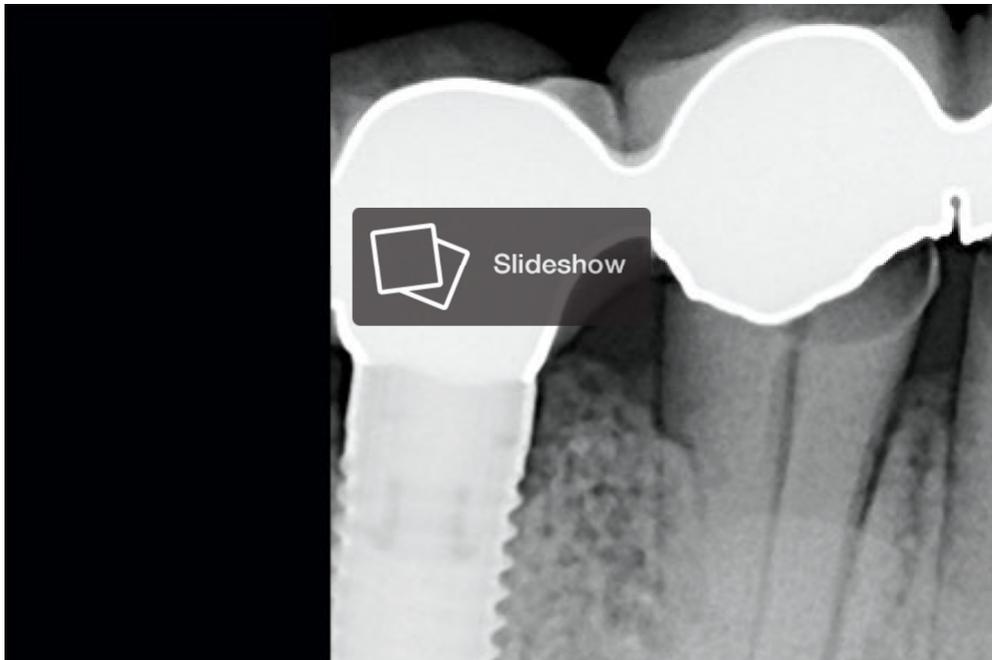
placement of implants. The patient had implants placed and restored in similar situations in the past, and was very satisfied with their long-term function, as evidenced by his implant restoration in the area of tooth #29. It was explained that, were the patient to opt for a post-and-core restoration, by the time he received endodontic treatment, posts and crowns, the difference in cost when compared to implant treatment would have been small. Furthermore, post-and-core treatment presented an uncertain prognosis compared to implant therapy, which offers a predictable, extremely high success rate over the long term.³ The patient elected for implant treatment.

The patient presented for treatment with the crowns of tooth #27 and #28 splinted to the implant restoration in the area of tooth #29 and to the anterior crowns on teeth #24–26.

Therefore, treatment began by cutting between the crowns of tooth #28 and #29, as well as the crowns between tooth #26 and #27. The crowns on tooth #27 and #28 simply fell off as they were disconnected from the roots due to the advanced carries. Next, the roots were carefully extracted so as to not fracture the facial bone plates. Following removal of the roots, the extraction sockets were curetted to ensure that no pathology or granulation tissue remained.

The areas of tooth #27 and #28 were prepared to receive two NobelReplace® Select tapered implants (Nobel Biocare; Yorba Linda, Calif.). Primary stability of 45 Ncm was achieved upon implant placement. Therefore, temporary abutments were placed, and two provisional crowns were fabricated. The crowns were adjusted so there was minimal occlusal contact in all excursions and were cemented into place with temporary implant cement.

Three months later, the provisional crowns and temporary abutments were removed in order to place closed-tray transfer copings for an implant-level impression. The implant-level impression, a bite registration, and an impression of the opposing arch were sent to the lab (*Figs. 2a, 2b*). Based on the final impression, the laboratory produced custom abutments along with acrylic positioning jigs and the final BruxZir crowns (*Figs. 3a, 3b*). The custom abutments were seated into the implants using the positioning jigs. The final crowns were then placed on the abutments to check for proper fit and occlusion. After verification, the abutment screws were torqued to 35 Ncm (*Fig. 4*). The crowns were cemented into place, with extreme care taken to ensure that there was no residual excess cement. The final restorations exhibited an excellent emergence profile and color that blended seamlessly with the adjacent dentition (*Figs. 5, 6*).



Case 2: Anterior Bridge

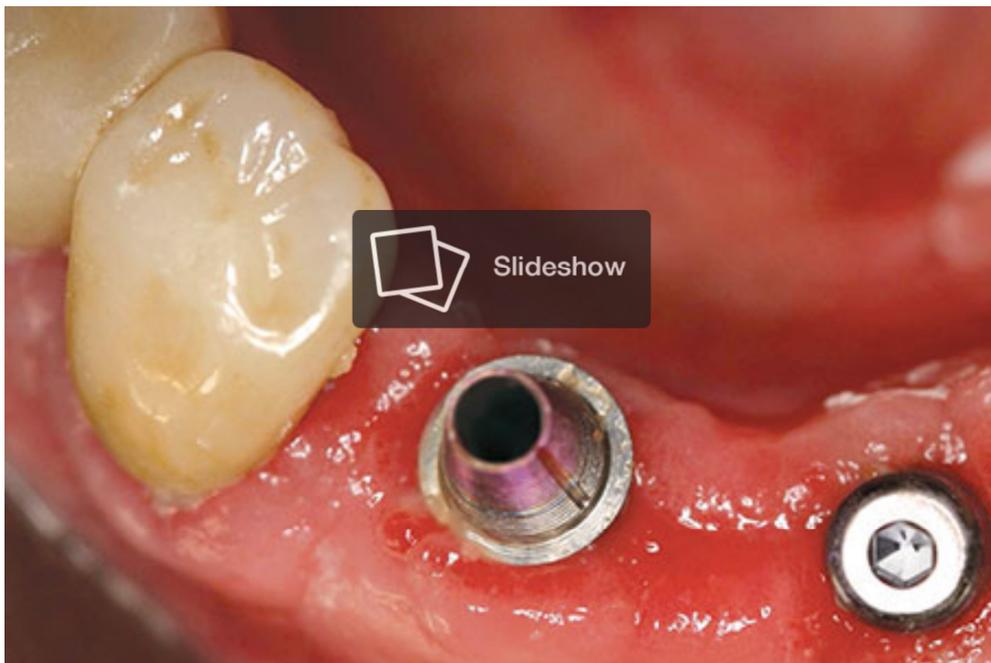
The patient presented to the dental office with a span of five non-restorable teeth in the mandibular anterior. Intraoral examination and radiography revealed adequate vertical and horizontal bone thickness for the placement of three dental implants. With no contraindications to implant therapy, the patient was presented with a treatment plan to replace teeth #23–27 with an implant-retained five-unit bridge.

Following patient acceptance of the proposed treatment plan, the five lower anterior teeth were extracted and three 3.5 mm x 13 mm NobelReplace Select tapered implants were placed. The implants were positioned to accommodate the available bone while providing maximum support for the proposed five-unit bridge. Next, temporary abutments were placed, and a fixed provisional was fabricated and cemented into place using Improv® temporary implant cement (Alvelogro; Snoqualmie, Wash.).

The patient returned to the office three months following surgical placement of the implants. The provisional, which served the patient well and helped to contour the soft tissue during the healing phase, was removed (*Fig. 1*). The temporary abutments were removed so transfer copings could be placed, revealing healthy soft tissue surrounding the implant site (*Fig. 2*). An implant-level impression was taken and sent to the lab for fabrication of titanium custom abutments and a five-unit BruxZir implant bridge (*Figs. 3a, 3b*).

After receiving the final custom abutments and implant-retained bridge from the lab, the provisional restoration and temporary abutments were removed. The three titanium custom abutments were placed and torqued to 35 Ncm (*Fig. 4*). Radiography was

used to confirm complete seating of the custom abutments (Fig. 5). Then, the five-unit BruxZir bridge was seated over the custom abutments and checked for proper fit and occlusion before being cemented into place (Fig. 6). The patient was so happy with the esthetics that he requested BruxZir crowns for his three natural teeth that needed to be restored.



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Case 3: Maxillary Full-Arch Restoration

This patient originally visited the dental office to inquire about implants in 1979. She had been wearing a complete upper denture for over 25 years, and still had her natural teeth in her lower arch. The patient had experienced quite a lot of maxillary

bone resorption, which is common in edentulous patients who have natural teeth opposing a denture. She didn't have sufficient bone for endosseous implants, which were mainly blade-form in those days. Root-form implants were not as widely used back then as they are today. The predictable bone-grafting materials and techniques offered by modern implant dentistry weren't available either. Thus, a subperiosteal implant framework was placed to retain a ceramic-metal fixed bridge spanning across the patient's upper arch. The ceramic-metal fixed bridge was attached to five abutments, which were part of the implant framework (*Fig. 1*).

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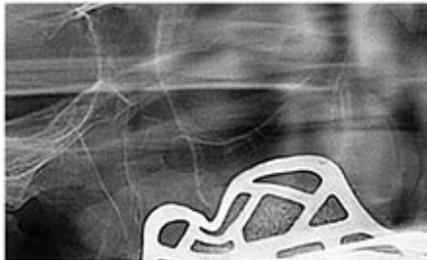


Figure 1: The patient presented with a fixed ceramic-metal bridge retained by a subperiosteal implant framework.

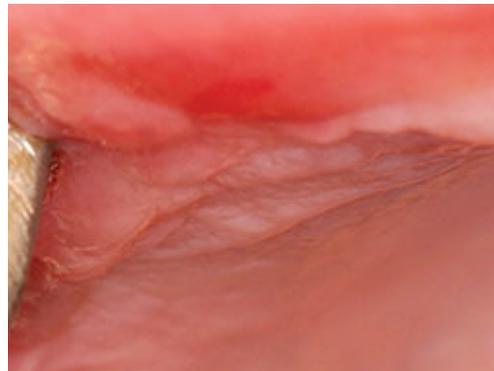


Figure 2: The original fixed implant bridge was removed, leaving the implant abutments intact.

Several years after placing my first maxillary subperiosteal implants in 1976, I found that they weren't as predictable as mandibular subperiosteals due to continued bone resorption under the implant framework. This resorption would at times result in soft-tissue inflammation. In order to maximize the function and health of the maxillary bone and soft tissue in this particular patient, it was necessary to remove some of the struts and parts of the implant framework. Around 1986, the

patient returned to the office, and non-resorbable alloplastic bone material was placed over the implant framework. This greatly helped to reduce bone resorption.

Through the many subsequent years, the porcelain began to chip and break away from the metal framework of the full-arch bridge, resulting in an esthetic problem. A proposal to replace the original fixed bridge with a full-arch restoration fabricated from BruxZir Solid Zirconia was accepted by the patient.

Because the ceramic-metal bridge was affixed to the abutments with permanent cement, an immediate provisional restoration needed to be fabricated to replace the original restoration after cutting the bridge off of the implant posts (*Fig. 2*). Thus, a full-arch impression was taken with the bridge in place and sent to the lab for the fabrication of two BioTemps® provisional restorations. One would be utilized as a fixed immediate temporary and the other for a try-in bridge and bite registration. Some problems with the patient's soft tissue were discovered after removing the ceramic-metal bridge, and were resolved via surgical intervention. A small portion of the implant framework was removed from the upper-left posterior and a dense non-resorbable barrier was added.

The BioTemps provisional and try-in bridge were fabricated from the impression of the original restoration and then modified to seat over the original abutments (*Figs. 3a–3c*). The try-in bridge was sent to the dental office so the esthetics and occlusion could be verified intraorally. After seating the try-in bridge, the form and function of the proposed restoration were verified, and minor adjustments were made (*Figs. 4a, 4b*). A bite registration was taken before returning the case to the lab for fabrication of the fixed full-arch BruxZir bridge (*Fig. 5*). The

BioTemps provisional was delivered, and functioned well in the interim (*Fig. 6*).

After seating the try-in bridge, the form and function of the proposed restoration were verified, and minor adjustments were made.

The lab fabricated the final restoration based on the try-in bridge and bite registration (*Figs. 7a, 7b*). Changes made to the try-in bridge were thus carried over to the definitive design. The final BruxZir bridge fit well upon delivery, and was cemented into place over the original abutments. The patient was extremely satisfied with the final restoration, which offers the patient greatly improved esthetics and superlative resistance to the sort of wear, chips and fractures that damaged the original restoration (*Fig. 8*).



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Conclusion

Provided the long-term prognosis of implant therapy, it's imperative to select a durable, lasting restorative material. BruxZir Solid Zirconia addresses this challenge while delivering excellent esthetics suitable for a wide array of clinical situations.

References

1. Guess PC, Att W, Strub JR.
Zirconia in fixed implant
prosthodontics. Clin Implant Dent
Relat Res. 2012 Oct;14(5):633-45.
2. Clinicians Report. Jun 2014;7(6).
3. Wittneben JG, Buser D, Salvi GE,
Bürgin W, Hicklin S, Brägger U.
Complication and failure rates with
implant-supported fixed dental
protheses and single crowns: a 10-
year retrospective study. Clin
Implant Dent Relat Res. 2014
Jun;16(3):356-64.