

The use of healing abutments for the fabrication of cement-retained, implant-supported provisional prostheses

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This article describes the intraoral preparation of healing abutments for use as prefabricated abutments for a cement-retained, implant-supported prosthesis. After the healing abutments are prepared, an impression is made with irreversible hydrocolloid, and the provisional restoration is fabricated indirectly. This technique is an easy and economical alternative for the fabrication of provisional fixed partial dentures or crowns but may be contraindicated for severely misaligned implants. (*J Prosthet Dent* 2002;87:333-5.)

Dental implants were introduced for the treatment of the totally edentulous patient¹ but soon became a valid treatment modality for the partially edentulous patient as well.^{2,3} The use of provisional restorations in partially edentulous patients is advantageous for numerous reasons. First, provisional restorations help confirm the diagnostic design,^{4,5} esthetics,⁴⁻⁶ contours,⁴⁻⁸ and phonetics⁸ and allow duplication of the results to the definitive restoration.⁹ Second, they facilitate clear communication between patient, dentist, and technician. Third, provisional restorations permit evaluation of the patient's oral hygiene^{8,10} and the healing response around the abutments and remaining dentition. Fourth, they enable healing of the soft tissue around the implants according to the contours of the final restoration.^{6,11,12} Fifth and finally, provisional restorations allow for observation of implant osseointegration and potential progressive loading.¹² This article describes the use of healing abutments to fabricate provisional cement-retained, implant-supported fixed partial dentures.

TECHNIQUE

A 67-year-old Caucasian female presented at the Center for Prosthodontics and Implant Dentistry, Loma Linda University, seeking treatment for partial edentulism from the maxillary right to left canines. A decision was made to replace the missing maxillary anterior teeth with root-form dental implants (Steri-Oss; Nobel Biocare, Yorba Linda, Calif.) and to replace the existing 15-year-old crowns on the maxillary right second molar through first premolar and the maxillary left first premolar through second molar due to poor marginal adaptation. At second-stage surgery, the dental implants appeared immobile and lacked any radiographic sign of pathosis. Healing abutments were placed and subsequently used to anchor the provisional prosthesis. The following technique was used.

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Fig. 1. Healing abutments in place.

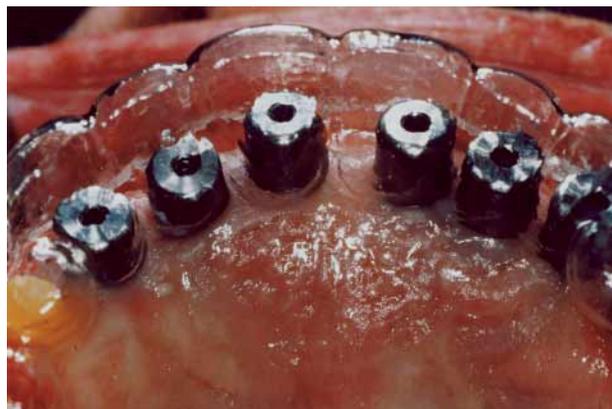


Fig. 2. Vacuum stent used as guide for healing abutment preparation.

1. Evaluate the tissue around the healing abutments for signs or symptoms of pathosis (namely, bleeding, redness, or pain) (Fig. 1).
2. Fabricate a transparent vacuum stent (Clear temporary splint sheets; Ultradent Products Inc, South Jordan, Utah) in accordance with the diagnostic wax-up,^{6,13,14} and place the stent on top of the healing abutments as a guide for abutment preparation (Fig. 2). The stent will also serve as a guide for



Fig. 3. Stent used to ensure adequate reduction of healing abutments.



Fig. 4. Facial view of prepared and polished healing abutments.



Fig. 5. Prosthesis after cementation.



Fig. 6. Cemented provisional restoration in place.

selection of the proper healing abutment height to ensure adequate thickness of the autopolymerized acrylic resin material and adequate retention and resistance.

3. Prepare the healing abutments with carbide burs at high speed to reduce heat generation.¹⁵ Use the stent to evaluate abutment reduction (Fig. 3).
4. Intraorally polish the healing abutments with a high-speed handpiece and polishing burs (Brasseler USA, Savannah, Ga.) (Fig. 4).
5. Place temporary restoration material (Cavit-G; ESPE, Seefeld, Germany) at the access hole, and make an impression with irreversible hydrocolloid (Alginate; Dentsply International Inc, York, Pa.).
6. With the aid of the vacuum stent, fabricate the provisional restorations with autopolymerizing acrylic resin (Jet acrylic; Lang Dental Manufacturing Co, Wheeling, Ill.) with the indirect technique.^{13,14} Use a pressure pot and warm water to increase the strength and reduce the porosity of the material.¹⁶ Before fabricating the provisional restoration, evaluate the prepared abutments on the stone cast for the presence of undercuts.
7. Trim and polish the provisional restorations. Insert

the restorations in the patient's mouth (Fig. 5), and evaluate the margins. If necessary, add additional autopolymerized acrylic resin with the sprinkle-on method.

8. Lute the provisional restorations with noneugenol temporary cement (Temp-Bond; Kerr Corp, Romulus, Mich.) (Fig. 6). The provisional prosthesis should be maintained for 12 to 20 weeks for accurate determination of the gingival crest location.¹⁷

DISCUSSION

This technique is an alternative method for the fabrication of cement-retained, implant-supported provisional fixed partial dentures. The procedure should be attractive to the restorative dentist, given that the healing abutments are prepared intraorally in much the same manner as when a natural tooth is in place. Assuming that the length of the healing abutments is correct, the restorative dentist will not need to unscrew the abutments.

It has been reported that ideal soft tissue contours can be achieved if a provisional restoration is placed during^{12,14} or after^{18,19} second-stage surgery. To

achieve ideal contours, however, an impression of the implants must be made. With the described technique, a provisional restoration can be fabricated at second-stage surgery or after the tissue has healed around the healing abutments without the need for an implant-level impression. Laboratory steps⁷ are thereby eliminated, and the cost of the procedure is reduced.

The use of anatomic abutments reportedly enables natural contours on the periimplant tissues during the healing phase.¹¹ However, anatomic abutments have limited shape that cannot approximate all contours.⁸ A provisional restoration that enables customized contours and shape can provide the optimum healing response around the implants.^{6,8,12}

The use of screw-retained provisional restorations may be problematic with anterior teeth, given that a slightly misplaced implant toward the labial surface will necessitate the placement of the access hole at the incisal edge or even labially, compromising esthetics and function.^{14,19-20} The cemented prosthesis¹⁸ described in this article avoids this problem since there is no occlusal/incisal access hole.

With the same steps outlined above, a provisional prosthesis can be fabricated during implant installation with a 1-stage procedure.²¹ In this situation, the occlusal contacts must be eliminated. The hard and soft tissue around the implant are allowed to heal simultaneously, expediting the treatment. Although the 1-stage approach has been demonstrated to be safe,^{22,23} further research is needed to validate its effectiveness.

The described technique may be contraindicated for severely misaligned implants that require extensive reduction of the healing abutment. In this situation, the abutment access hole may have to be eliminated to provide space for the restorative material, making removal of the healing abutment challenging since the screwdriver would no longer be useful.

SUMMARY

An easy and economical alternative for the fabrication of a cement-retained, implant-supported provisional prosthesis has been described. This technique can be used for fixed partial dentures or single crowns but may be contraindicated for severely misaligned implants.

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