

Immediate loading of single root form implants with the use of a custom acrylic stent

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This article describes a technique for fabricating a provisional screw-retained restoration for immediate loading of single implants. Until immediate loading of single implants becomes a well-documented treatment modality, this technique should be used cautiously. (*J Prosthet Dent* 2001;85:382-5.)

Dental implants have become a predictable treatment option for totally¹⁻³ or partially⁴⁻⁶ edentulous patients. A healing period of 3 to 6 months usually is recommended to achieve osseointegration before loading the implants with a prosthesis.⁷ Immediate loading of endosseous root form implants has been cited in the literature as 1 way of eliminating the traditional healing period. The technique has been described in combination with mandibular bar-retained overdentures⁸⁻¹¹; full-arch, implant-supported, screw-retained mandibular prostheses¹²⁻¹⁶; full-arch maxillary treatment^{17,18}; and partial edentulism.^{19,20}

This article describes a method for immediately loading single root form implants with a provisional screw-retained restoration.

TECHNIQUE

A 67-year-old white female patient presented at the Center for Prosthodontics and Implant Dentistry at Loma Linda University seeking treatment for a partial edentulism in the area of the maxillary left first premolar (Fig. 1). The missing tooth had been extracted 5 months before. A decision was made to treat the partial edentulism with a single root form implant. The steps below were followed.

1. The original cast was modified by performing a diagnostic wax-up (Sculpturing wax; Williams Co, Amherst, Mass.) of the prospective restoration (Fig. 2).
2. An impression was made from the modified cast with irreversible hydrocolloid (Coe Alginate; GC America Inc, Alsip, Ill.).
3. The impression was poured in type III dental stone (Microstone; Whip Mix Corp, Louisville, Ky.).
4. A transparent vacuum stent (TVS) (Clear temporary splint sheets; Ultradent Products Inc, South



Fig. 1. Clinical view of edentulous area.



Fig. 2. Diagnostic wax-up of missing tooth.

Jordan, Utah) was fabricated and trimmed on the duplicate cast.

5. The TVS was used as a guide to simulate the final implant position on the original cast (Fig. 3). A drill longer and wider (16 × 5 mm) than the anticipated implant size (4.3 × 13 mm) was used to

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Fig. 3. Prospective implant site prepared with vacuum stent.

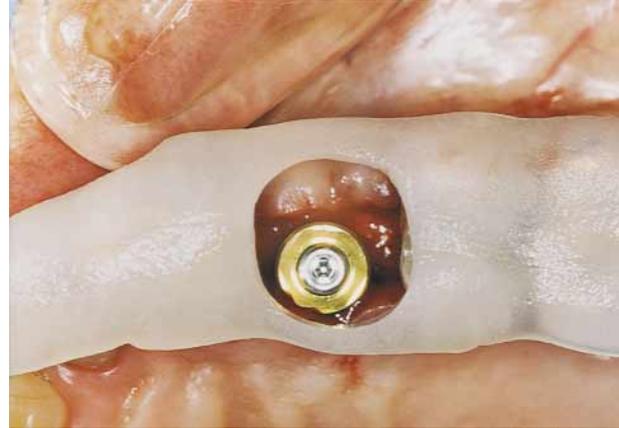


Fig. 5. Template in place after insertion of implant.



Fig. 4. Fabricated acrylic template. Occlusal access hole maintained around occlusal surface of missing tooth.

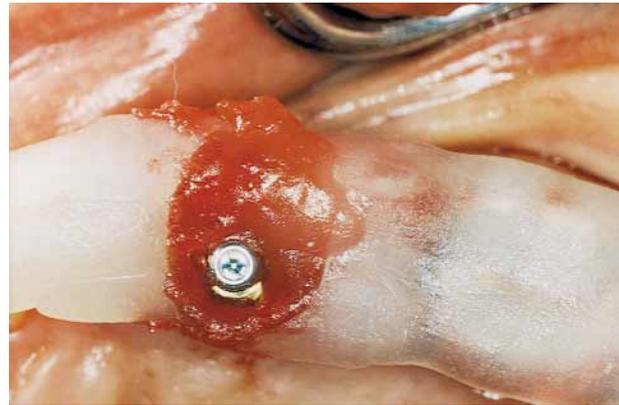


Fig. 6. Autopolymerizing acrylic resin applied between implant mount and template.

ensure space adequacy. A recipient site for an implant analogue (RSIA) was created.

6. A photopolymerized acrylic resin template (Triad; Dentsply International Inc, York, Pa.) was fabricated on the duplicate cast (Fig. 4). An access hole was maintained at the occlusal surface of the prospective restoration.
7. The template was used as a guide during implant surgery (Fig. 5). A 4.3 × 13-mm threaded HA-coated root form implant (Replace; Nobel Biocare, Yorba Linda, Calif.) was placed.
8. Autopolymerizing acrylic resin (Pattern resin; GC Co, Tokyo, Japan) was applied between the access hole of the template and the implant mount (Fig. 6).
9. After polymerization of the acrylic resin, the template was removed. An implant analogue was screwed onto the implant mount, and the stent

was placed on the original cast. The analogue was inserted into the RSIA, and the space between the analogue and stone was filled with autopolymerizing acrylic resin (Fig. 7).

10. After polymerization of the acrylic resin, a temporary hexed abutment was placed, and the implant position was confirmed with the TVS (Fig. 8). The abutment height was reduced according to the interocclusal space.
11. After the appropriate tooth color was selected, autopolymerizing acrylic resin (Alike; GC America) was inserted into the TVS and allowed to autopolymerize onto the cast. Separating medium (Al-Cote; Dentsply International Inc) was applied previously.
12. The provisional restoration was trimmed in the laboratory (Fig. 9) and adjusted intraorally to approximately 40 μm out of occlusion with the



Fig. 7. Implant analogue after polymerization of acrylic resin.

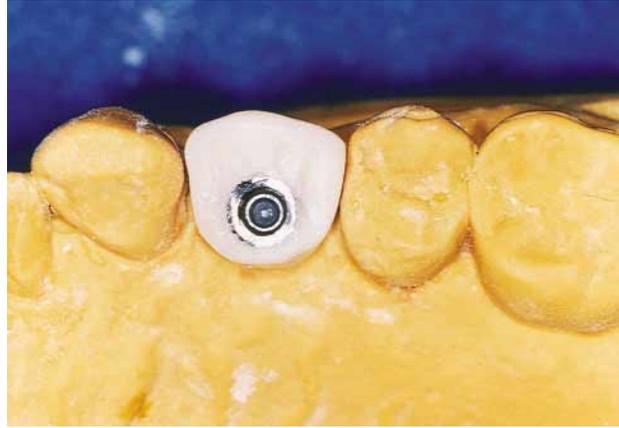


Fig. 9. Provisional restoration on cast.



Fig. 8. Vacuum stent placed and occlusal access hole maintained through temporary abutment.



Fig. 10. Occlusal view of final provisional restoration in mouth.

assistance of 4 layers of shim stock (Artus Corp, Englewood, N.J.), each 10 μ m thick. The interproximal contact points were evaluated with a single layer of the same type of shim stock. The buccolingual size was reduced to minimize bending moments²¹ (Fig. 10).

DISCUSSION

This technique offers an alternative for fabricating screw-retained acrylic resin provisional restorations for immediately loaded single implants. The restoration is fabricated extraorally during the surgical appointment, eliminating the need for an interim removable prosthesis. Gomes et al²⁰ described a technique for fabricating a similar type of restoration in the laboratory before implant surgery. However, it has been our experience that a slight deviation in implant placement will necessitate significant intraoral adjustments.

One disadvantage of the described technique is that it may not be suitable for anterior teeth because the occlusal access hole can interfere with the esthetics if the implant is placed in a labial direction. In addition, the laboratory work and required clinical time may increase the total time and cost of the procedure.

Immediate loading has been described mostly for the fully edentulous mandible.⁸⁻¹⁶ It has been shown that early micromotion of fixtures can lead to differentiation of cells into fibroblasts.²²⁻²⁶ It may be hypothesized that cross arch stabilization in the reported fully edentulous patients could have provided the necessary stability. With the technique previously described, the interproximal contacts can provide such stability. The occlusal clearance obtained was an attempt to reduce early micromovement due to occlusal load.

It also has been demonstrated that controlled micromotion can stimulate bone growth.^{27,28}

However, data from the available clinical studies indicate that the survival rate of immediately loaded implants is significantly inferior to that of implants placed with the well-documented 2-stage approach.²⁹ Additional research is required before definitive conclusions can be drawn.

SUMMARY

The described technique can be used to fabricate a provisional screw-retained restoration for immediately loaded single implants with relatively minor intraoral adjustments. However, until immediate loading of single implants becomes a well-documented treatment modality, this technique should be used cautiously.

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