

Provisional Restoration for an Osseointegrated Single Maxillary Anterior Implant



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“Clinical Showcase” is a series of pictorial essays that focus on the technical art of clinical dentistry. The section features step-by-step case demonstrations of clinical problems encountered in dental practice. If you would like to contribute to this section, contact editor-in-chief Dr. John O’Keefe at jokeefe@cda-adc.ca.

The preparation of esthetically appealing and anatomically correct implant-supported provisional restorations facilitates fabrication of the final implant-supported crown. The provisional restoration is used to mould and manipulate the soft tissue and acts as a blueprint or template for the final crown (Fig. 1).^{1,2,3} This type of restoration should be placed several weeks before the final impression is taken, to allow for maturation of the peri-implant tissue.

My preferred method involves chair-side fabrication of a fixed provisional restoration using an acrylic denture tooth affixed to a screw-retained temporary cylinder. The acrylic denture tooth is attached to the temporary cylinder with autopolymerizing acrylic, which is then retained to the implant fixture with a screw.

The following technique provides an esthetic, functional and stable provisional restoration.

Details of the Procedure

- 1) Remove the healing abutment and immediately replace it with a screw-retained temporary cylinder (Fig. 2). Any delay may result in collapse of the gingival tissue over the fixture platform, which will make it difficult to seat the temporary cylinder.
- 2) Adjust the cylinder by reducing its length enough to allow the teeth to meet in centric occlusion.
- 3) Roughen the cylinder surface to enhance adhesion of the acrylic (Fig. 3), and then seal the lingual screw hole with boxing wax to protect the screw from the autopolymerizing acrylic that will be used (Fig. 4).
- 4) Select an appropriate acrylic denture tooth with matching shade, colour and form. Reduce the lingual surface of the acrylic denture tooth, keeping the labial veneer intact (Fig. 5). The lingual surface should be concave and should fit around the temporary cylinder with the labial



Figure 1: Patient’s appearance before removal of tooth, grafting and placement of implant fixture.



Figure 2: The temporary cylinder has been screwed to the implant fixture.



Figure 3: The temporary cylinder has been adjusted into occlusion and the surface roughened to enhance adhesion of the acrylic.



Figure 4: The access hole for the lingual screw has been sealed with red boxing wax to protect the abutment screw from the acrylic to be used.

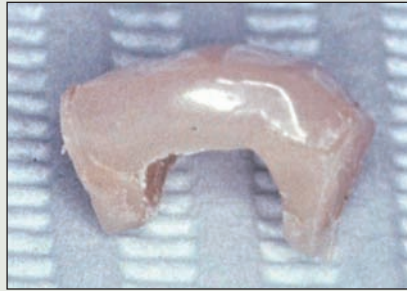


Figure 5: The lingual surface of the acrylic denture tooth is hollowed to fit around a temporary cylinder; the labial surface of the veneer remains intact.



Figure 6: The labial veneer of the acrylic denture tooth is fitted around a temporary cylinder in preparation for fastening to the cylinder with autopolymerizing acrylic.

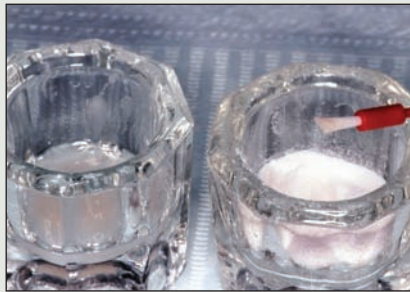


Figure 7: Acrylic monomer and polymer are applied with a brush technique.



Figure 8: The labial veneer of the acrylic denture tooth is attached to the temporary cylinder with autopolymerizing acrylic, which is then allowed to set.

surface in reasonably good esthetic orientation (Fig. 6).

5) Position the labial veneer of the shaped acrylic denture tooth around the seated temporary cylinder and then fasten it to the temporary cylinder with autopolymerizing acrylic using a brush technique (Figs. 7 and 8).

6) Remove the temporary cylinder with the attached labial veneer surface from the fixture platform and immediately replace it with a conventional healing abutment (Fig. 9).

7) Complete the fabrication of the desired final tooth form by adding and shaping the autopolymerizing acrylic. The acrylic provisional restoration will need to be tried in and adjusted a few times to achieve the desired shape; polishing will then be required (Fig. 10).

By varying the subgingival contour of the provisional restoration, the peri-implant gingival

tissue may be moulded and manipulated. On the labial surface of the provisional restoration, the more convex the subgingival contour, the further the gingival tissue may be moved in the apical direction. Conversely, the less convex or flatter the subgingival surface, the more the tissue may be moved in the coronal direction. The papilla may be moved incisally by making the subgingival interproximal acrylic contour more convex, which pushes the tissue toward the proximal surface of the adjacent tooth and moves it incisally (within reason, taking biologic constraints into account). Proceed with caution, as too great a pressure will restrict the vascular supply to the papillary tissue and cause necrosis. Adjust the tooth contour and form to establish appropriate esthetics, occlusion and soft-tissue support.

The soft tissue, both on the ridge and on the adjacent structures, will play a role in how much tissue moulding and manipulation are possible.^{4,5}



Figure 9: The labial veneer of the acrylic denture tooth has been luted intraorally to the temporary cylinder; it is then removed for completion of the anatomic form.

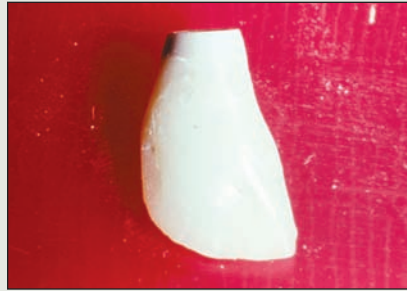


Figure 10: Labial view of the contoured, finished and polished provisional restoration.



Figure 11: Lingual view of the provisional restoration affixed to the implant fixture with an abutment screw.



Figure 12: The provisional restoration is checked 1 week after insertion.



Figure 13: Appearance of the final restoration 6 weeks after insertion.



Figure 14: Appearance of the final restoration 1 year after insertion.

At this stage, the health and esthetic appearance of the peri-implant tissues, the anatomy and form of the provisional restoration and occlusal issues are of great importance; the shade of the provisional is of lesser concern.


8) Insert the implant-supported provisional restoration and tighten the screw (**Fig. 11**). Then, cover the abutment screw with cotton pellets and seal the screw access hole with an easily removable temporary filling material.

9) One week later, verify the screw-retained provisional restoration for esthetics, form and function and the peri-implant tissues for health and contour, making adjustments if necessary (**Fig. 12**).

10) Upon optimal development of the peri-implant tissues, several weeks after insertion of the provisional restoration, take an impression for fabrication of the final restoration. A customized impression coping may be used to capture

the contour of the subgingival peri-implant soft tissues. A diagnostic model of the provisional, secured to the fixture, is prepared and articulated with the counter-model. Photographs of the provisional, both in the patient's mouth and on the laboratory bench, are taken and sent with the models to the laboratory for fabrication of the final restoration. The diagnostic model and photographs will help the dental technologist in reproducing the form of the carefully crafted provisional restoration in the final crown. This technique should minimize the chairside adjustments required to the final restoration. Upon completion of the screw-retained crown, place it in the patient's mouth and follow the usual protocol for torqueing and sealing. Check the restoration for tissue health, occlusion and integration, and recheck at regular intervals (**Figs. 13 and 14**).

Conclusion

Placement of an esthetic and functional implant-supported provisional restoration facilitates fabrication of the final implant-supported crown. More chairside time is spent with the patient before taking the impression for the final restoration than after. The fixed provisional restoration enhances patient satisfaction and is financially advantageous. In some cases, this provisional restoration technique may be used before osseointegration of the fixture. The decision to apply immediate or early loading to an implant depends upon numerous factors, which are determined during treatment planning or at the time of surgical placement of the implant.^{6,7} 

References

1. Santosa RE. Provisional restoration options in implant dentistry. *Australian Den J* 2007; 52(3):234–42.
2. Burns DR, Beck DA, Nelson SK; Committee on Research in Fixed Prosthodontics of the Academy of Fixed Prosthodontics. A review of selected dental literature on contemporary provisional fixed prosthetic treatment: report of the Committee on Research in Fixed Prosthodontics of the Academy of Fixed Prosthodontics. *J Prosthet Dent* 2003; 90(5):474–97.
3. David RJ, Muroff F. Following removal of a maxillary anterior tooth, what is your preferred method of provisionalization in preparation for an implant restoration? [Point of Care] *J Can Dent Assoc* 2004; 70(3):184–5.
4. Kois JC. Predictable single tooth peri-implant esthetics: five diagnostic keys. *Compend Contin Educ Dent* 2004; 25(11):895–900.
5. Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol* 1992; 63(12):995–6.
6. Attard NJ, Zarb GA. Immediate and early loading implant protocols: a literature review of clinical studies. *J Prosthet Dent* 2005; 94(3):242–58.
7. Avila G, Galindo P, Rios H, Wang HL. Immediate implant loading: current status from available literature. *Implant Dent* 2007; 16(3):235–45.

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