

TIPS FROM OUR READERS

Adaptation of an interim partial removable dental prosthesis as a radiographic template for implant placement



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Historically, dental implant placement was driven by the amount of existing bony support and the implant fixture was positioned where bone was abundant. Compromised biomechanics, esthetics, cleansability, unusable implants, and biological failure have resulted from not envisioning the definitive restorative and functional outcome.¹

With the introduction of 3-dimensional (3D) imaging techniques and specialized software, the optimal observation of a specific implant site in multiple planes is possible, as too is the ability to perform direct 1:1 measurements.¹ The use of radiographic guides allows the transfer of the prosthodontic plan to a cone-beam computed tomography (CBCT) scan, which combined with the enhanced assessment of the alveolar ridge, allows the clinician to determine the best position for implant placement.¹⁻³

Several techniques can be used to obtain a radiographic template. The most common consists of duplicating an existing restoration or a diagnostic waxing or trial restoration with a radio-opaque material.^{2,3} Before the CBCT scan, the adaption of the template should be verified clinically in relation to the remaining teeth and soft tissues.² With technologic developments in imaging hardware and software, variations of the previously mentioned classic approach have recently been reported. Scherer and Roh³ incorporated a radio-opaque tissue-bearing surface impression onto an existing complete denture, allowing for the digital visualization of tooth position, denture base contours, and the edentulous ridge without the need to fabricate a distinct radiographic

template. Lanis et al⁴ described the fabrication of a modifiable radiographic template in combination with a double CBCT scan protocol for immediate implant placement and loading. Both techniques incorporate modifiable or non-irreversibly adjustable templates while

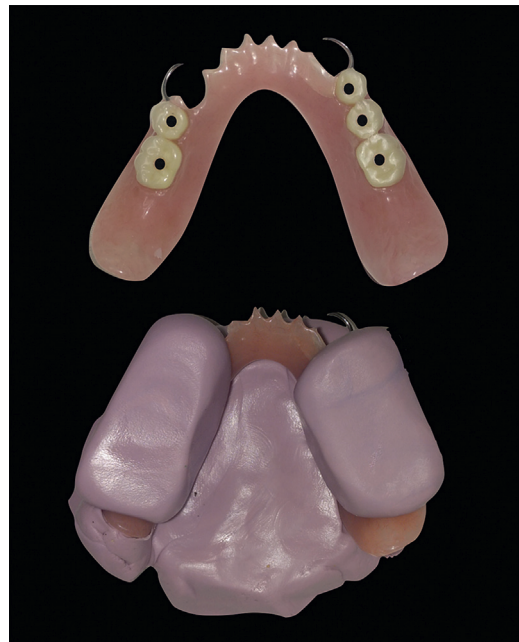


Figure 1. Interim partial removable dental prosthesis (top). Intaglio and occlusal indices placed (bottom).

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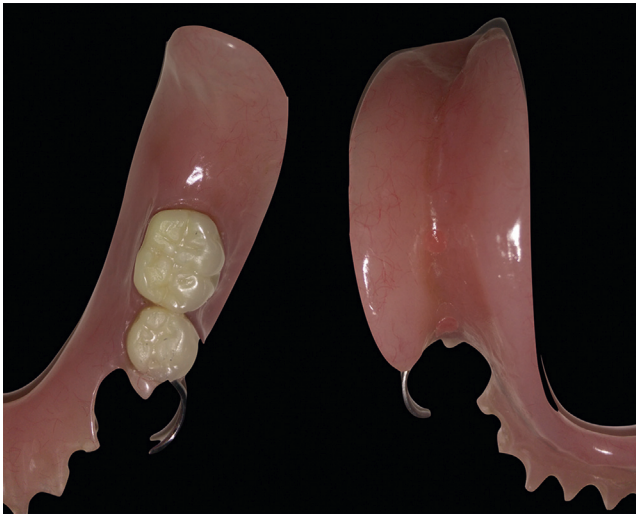


Figure 2. Occlusal (left) and intaglio (right) surface detail.

using readily available material and eliminating additional appointments and associated costs.^{3,4}

The present article illustrates a straightforward technique for the adaptation of an interim partial removable dental prosthesis (IPRDP) to be used as a radiographic template for implant planning.

PROCEDURE

1. Create occlusal and intaglio surface indexes of the existing IPRDP (Lab-Putty hard; Coltène/Whaledent).
2. Perforate the IPRDP with a round bur (H71 E; Komet USA) from an occluso-apical direction along the long-axis of the prosthetic tooth, creating a channel (Fig. 1).
3. Seat the IPRDP over the index of the intaglio surface. Fill and condense the most apical portion of the occlusal access channel with gingiva-colored composite resin (anaxGUM; Anaxdent).
4. Polymerize the gingiva-colored composite resin by applying the polymerization light from both the occlusal surface and intaglio surfaces.
5. Fill the remaining portion of the created channel with restorative dental composite resin (Filtek Supreme XTE; 3M ESPE) of the same shade as the prosthetic teeth and seat the previously made occlusal index.
6. Remove the occlusal index and any excess restorative material and light-polymerize from the occlusal surface (Fig. 2).
7. Evaluate the IPRDP and verify the seating of the intaglio surface and the occlusal contacts. Make adjustments and polish if necessary.
8. Instruct the patient to wear the IPRDP during the CBCT scan (Fig. 3).

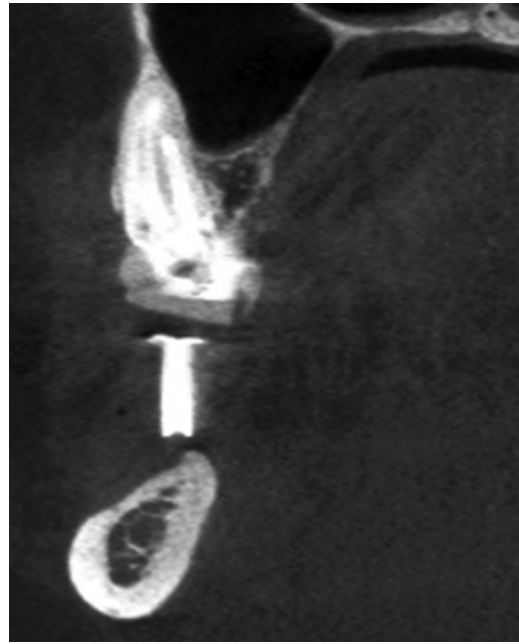


Figure 3. Cone-beam computed tomography view.

The technique converts an existing laboratory processed IPRDP into a radiographic template for implant placement. The advantages include:

- Minimal chairside and laboratory time
- Cost savings because prosthesis duplication and additional adjustment appointments are not needed
- Fidelity of the radiographic guide versus duplication distortion of the surgical guide
- Ability to create a modifiable surgical guide after duplicating the IPRDP/radiographic template

REFERENCES

1. Worthington P, Rubenstein J, Hatcher DC. The role of cone-beam computed tomography in the planning and placement of implants. *J Am Dent Assoc* 2010;141(Suppl 3):19S-24S.
2. Scherer MD. Presurgical implant-site assessment and restoratively driven digital planning. *Dent Clin North Am* 2014;58:561-95.
3. Scherer MD, Roh HK. Radiopaque dental impression method for radiographic interpretation, digital alignment, and surgical fabrication for dental implant placement. *J Prosthet Dent* 2015;113:343-6.
4. Lanis A, Padial-Molina M, Gamil R, Alvarez del Canto O. Computer-guided implant surgery and immediate loading with a modifiable radiographic template in a patient with partial edentulism: a clinical report. *J Prosthet Dent* 2015;114:328-34.

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