

Alternate technique for fabrication of a custom impression tray for definitive obturator construction

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Prosthetic rehabilitation for an acquired maxillary defect begins immediately at the time of surgical resection.^{1,2} Abrupt alteration of physiologic functions such as speech, mastication, deglutition, and salivary control associated with ablative surgery requires timely prosthetic intervention.³

Prosthetic rehabilitation begins with a surgical obturator, which is inserted at the time of surgery to help retain the packing, prevent oral contamination of the surgical wound and skin graft, and to allow the patient to speak and swallow during the initial postoperative period. The surgical obturator is commonly converted into an interim obturator with the addition of resilient lining material to adapt to the defect.⁴ The interim prosthesis is periodically readapted and relined to capture the dimensional change that accompanies tissue healing within the defect. This process improves patient function and comfort.^{5,6}

Definitive obturation is initiated approximately 3 to 4 months after surgery when healing is complete. The impression for a definitive obturator prosthesis should include the skin-graft mucosal junction, lateral aspect of the orbital floor, and the dynamic physiology of the velopharyngeal mechanism during speech and swallowing.^{1,2} The obturator bulb must also be contoured to prevent obstruction of nasal breathing and to maintain nasal resonance during speech.³⁻⁶

A custom tray is required for the definitive impression procedure due to the extensive nature of the surgical defect. Proper extension and adequate contour of the tray is essential for the success of the impression procedure.⁷⁻⁹ The conventional method of custom tray fabrication involves eliminating undercuts on the diagnostic casts for completely edentulous patients, or on the final casts for partially dentate patients, to prevent fracture of the cast during tray removal. Although this procedure preserves the cast, it does introduce errors in the fit of the tray, which may require careful, time-consuming readaptation to the defect.

The interim obturator is a tested and proven replica of the intraoral defect. It has adequate extension into the

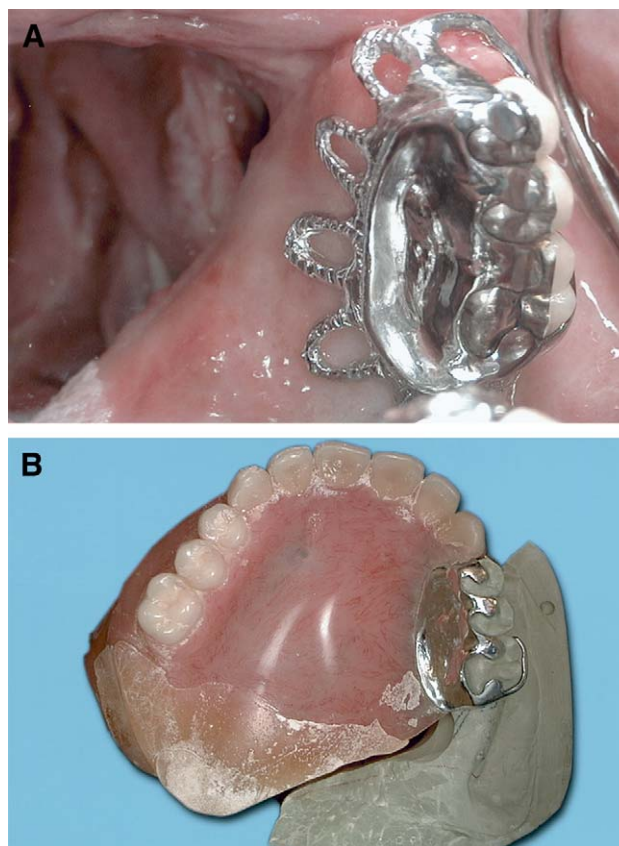


Fig. 1. A, Metal framework evaluated intraorally. B, Positioning of existing obturator on sectioned final cast.

defect, imparts the contour of the skin-graft mucosal junction, and features anatomic details of the defect. Duplication of the interim prosthesis would serve as an accurate custom tray to make an impression for a definitive prosthesis.^{7,8} Duplication of the intaglio surface of the interim prosthesis has been described using hard-setting plaster; however, the rigidity of plaster frequently requires additional laboratory procedures, including fracturing of the cast.⁷ Use of flexible silicone putty material is convenient, less time-consuming, and allows for easy retrieval of the tray without fracturing the cast. A simple method for fabricating a custom tray with the use of an interim prosthesis and vinyl polysiloxane putty impression material is described.

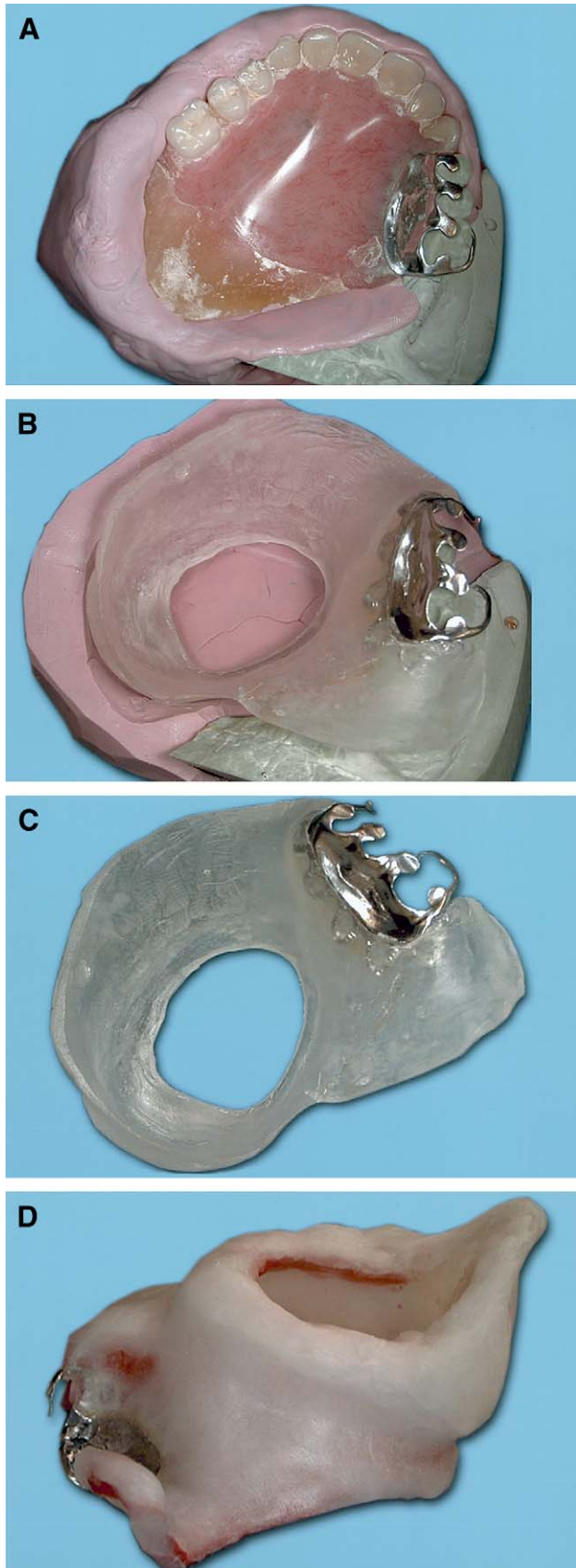
PROCEDURE

1. For partially edentulous patients, evaluate the metal framework intraorally and adjust physiologically for

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passive fit (Fig. 1, A). Section the palate and the surgical defect area to be recorded in the corrected definitive impression, and remove from the final cast by cutting with a rotary instrument (Cut-Off Disk; Shofu, Kyoto, Japan). Cut index grooves, using tungsten carbide burs (Abbott-Robinson HP Burs; Buffalo Dental Mfg Co Inc, Syosset, NY), in the base of the cast to provide mechanical retention for the putty material.

2. Position the interim (or existing) prosthesis on the prepared cast (Fig. 1, B) and further trim the cast, as necessary, to prevent binding with the prosthesis and to ensure complete seating.
3. Mix laboratory silicone putty impression material (Lab-Putty; Coltene/Whaledent Inc, Cuyahoga Falls, Ohio) homogenously, and adapt it to the intaglio surface of the prosthesis with finger pressure to capture the dimension and configuration of the obturator bulb (Fig. 2, A). Engage the index grooves prepared in the base of the cast with silicone putty to secure the positional relation to the cast.
4. Separate the prosthesis from the cast following complete polymerization of the silicone putty.
5. Seat the metal framework of the definitive prosthesis on the cast. Mix the correct proportion (liquid-to-powder ratio 1:3) of autopolymerizing clear acrylic resin (Teets; Co-Oral-Ite Dental Mfg Co, Diamond Springs, Calif) in a mixing jar. Adapt the acrylic resin mix to the lateral walls of the defect to a uniform 3-mm thickness when it reaches doughy stage. Maintain palatal and superior openings in the tray to provide access to the defect for border molding, and reduce the weight of the tray to further facilitate the impression procedure.
6. Extend the resin to the finish line of the metal framework with finger pressure and remove the excess with a sharp knife (Bard-Parker; Keystone Industries, Cherry Hill, NJ) while the material is still soft.
7. Allow the acrylic resin to polymerize, and retrieve the resin-metal framework complex from the cast as a single piece (Fig. 2, B).
8. Adjust the borders of the tray with silicone carbide abrasive (Arbor Band; Buffalo Dental Mfg Co) for proper extension. Trim excessive tissue undercut areas and relieve the skin graft-mucosa junction areas to avoid undesirable tension during the definitive impression procedure. Cut back the tray to allow even space, approximately 1 to 2 mm, for border molding and definitive impression procedures

Fig. 2. **A**, Vinyl polysiloxane putty adapted to intaglio surface of obturator to create index for custom tray. **B**, Removal of resin-framework complex from resilient putty index. **C**, Trimmed resin-framework complex. **D**, Definitive impression of maxillary defect with thermoplastic wax using custom tray.

(Fig. 2, C). Evaluate signs of pressure and/or displacement of soft tissue using pressure-indicating paste (Mizzy Inc, Cherry Hill, NJ).

9. Border mold with modeling plastic impression compound (ISO Functional; GC Corp, Tokyo, Japan).
10. Use thermoplastic wax (Impression Wax; D-R Miner Dental Products, Medford, Ore) or tissue-conditioning materials (Visco-Gel; Dentsply DeTrey GmbH, Konstanz, Germany) for functional molding of the definitive impression to the defect (Fig. 2, D). Close the palatal opening and recreate palatal contours with a layer of baseplate wax (Modern No 3 Pink Wax; Jelenko, Armonk, NY), prior to the impression procedure, for partition of nasal and oral cavities and simulation of oro-nasal function.

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