



A TECHNIQUE FOR CONVERTING AN EXISTING DENTURE INTO A CAST METAL-REINFORCED IMPLANT-RETAINED OVERDENTURE

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Prosthesis fracture is a common complication associated with implant-retained overdentures. A new overdenture can be strengthened by incorporating a cast metal reinforcement during processing. The authors describe a technique for converting an existing conventional nonreinforced serviceable denture into an overdenture that includes a cast metal reinforcement and its attachments. (*J Prosthet Dent* 2010;104:397-400)

The implant-retained overdenture has been proposed as the standard of care for the restoration of the edentulous mandibular arch.¹ The McGill Consensus statement of 2002² and the York consensus statement of 2009³ discussed the advantages of the mandibular implant-retained overdenture when compared to the conventional complete denture prosthesis. The benefits include improved stability, retention, function, and esthetics, reduced ridge resorption, simplicity of fabrication, and the ability to convert an existing denture into an overdenture.⁴

Acrylic resin denture base fracture is a complication associated with implant-retained overdentures.^{5,6} Fracture of the prosthesis is less likely to occur when there is sufficient space for the attachment system and denture teeth. Solutions for the patient with limited interarch space have been proposed, including performing alveoloplasty at the time of implant surgery and the use of a low-profile attachment system.⁷ To further re-

duce the risk of denture fracture, metal reinforcement can be incorporated into the denture base.^{4,8-13} This reinforcement is particularly helpful when the implant-retained overdenture opposes natural teeth or an implant-supported prosthesis.¹⁴

Previous reports described various methods for incorporating a metal framework into a newly fabricated implant-retained overdenture using conventional denture fabrication procedures.¹⁴⁻¹⁶ The conversion of an existing mandibular prosthesis into an implant-supported overdenture (without incorporation of a cast framework) has also been described.¹⁷⁻²¹

To date, the authors have identified no published report that combines these techniques into a convenient and predictable method for converting an existing denture into a metal-reinforced implant-retained overdenture. The authors present a technique for converting a serviceable complete denture into a cast metal-reinforced implant-retained overdenture with attachments; this

method requires only one additional office visit.

During the surgical phase of implant treatment, the intaglio surface of the patient's denture is usually relieved and relined several times with tissue conditioner. This procedure may cause gradual deterioration of the denture base acrylic resin and weakening of the denture prosthesis. The technique presented replaces a significant portion of the denture with newly processed acrylic resin.

Incorporating a framework into an existing denture necessitates that the prosthesis be surrendered by the patient. In the technique described, it is necessary for the dentist to duplicate the existing denture prior to its conversion to provide the patient with an interim prosthesis. This additional procedure can, however, serve other functions. The duplicated denture can also be used as a scanning template during 3-dimensional imaging (barium sulfate can be incorporated into the acrylic resin at the time of duplicate denture fabrication, thereby

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making the prosthesis orientation visible on the radiographic images) and can be modified for use as a surgical template. The duplicated denture can also be used in the future if the definitive prosthesis needs to be surrendered by the patient for maintenance or repair.

A framework placed into an overdenture that has thin areas of acrylic resin may compromise esthetic goals if it becomes visible in function. Opaque media formulated to address this potential problem are available that can be applied onto the metal surfaces prior to processing the prosthesis.

The technique described gives the clinician and patient flexible treatment choices. The patient can have a conventional denture fabricated and can retain the option of having it converted into a cast metal-reinforced overdenture in the future.

TECHNIQUE

Clinical procedures

1. Duplicate the definitive prosthesis (DP) (Denture Duplicator; Lang Dental Mfg Co, Wheeling, Ill) following the manufacturer's instructions, using autopolymerizing acrylic resin (Jet Acrylic; Lang Dental Mfg Co) to fabricate an interim prosthesis (IP).
2. Insert the abutments (Loca-

tor; Zest Anchors, Escondido, Calif) onto the implants at the torque value recommended by the manufacturer. Position the Locator denture caps with black low-density polyethylene patrices (retentive elements) onto the abutments to function as transfer copings (Fig. 1).

3. Relieve the entire intaglio surface of the DP with a bur suitable for trimming acrylic resin (H251E Tungsten Carbide Cutter; Brasseler USA, Savannah, Ga), and confirm that each abutment/processing cap complex does not contact the denture.

4. Transfer the processing caps using a closed-mouth reline impression technique (Permadyne Garant 2:1; 3M ESPE, St. Paul, Minn).²² Upon removal of the prosthesis, confirm that the processing caps are fully seated in the impression material (Fig. 2).

5. Reline the IP with a resilient lining material (Coe-Comfort Edentulous Tissue Conditioner; GC America, Inc, Alsip, Ill). Instruct the patient to wear the IP while the DP is being altered. Send the DP to the dental laboratory.

Laboratory procedures

6. Insert the aluminum matrix analogs into the processing caps in the impression. Box and pour a definitive cast (Modern Materials Denstone Golden Type III; Heraeus Kulzer, Inc,

Armonk, NY) (Figs. 3 and 4).

7. Fabricate a plaster (Modern Materials Lab Plaster Regular Type II; Heraeus Kulzer, Inc) index (Fig. 5). Remove the pink acrylic resin base from the DP, leaving the denture teeth connected to each other.

8. Fabricate a refractory cast using investment material (V.R. Investment System; Dentsply Austenal, York, Pa) suitable for casting a cobalt-chromium framework.

9. Develop a wax pattern (Wire Wax Half Round Blue 12GA; Henry Schein, Inc, Melville, NY) for the fabrication of a cast metal reinforcement, with the denture teeth positioned in the plaster matrix that is seated on the refractory cast (Fig. 6).

10. Cast the framework and reposition it on the definitive cast (Fig. 7). Develop a wax pattern to recreate the denture base (Fig. 8).

11. Flask and heat polymerize the acrylic resin (Lucitone 199 Denture Base Resin, Light; Dentsply Intl), and then finish the denture using dental laboratory pumice (Laboratory Pumice Med/Fine; Henry Schein, Inc) and polishing compound (Ti-Gleam Polishing Compound: Ticonium Division of CMP Industries, Albany, NY) (Fig. 9).

12. Return the prosthesis to the clinician so that the black low-density polyethylene patrices can be replaced with nylon replacement patrices (de-



1 Processing caps used to capture orientation of abutments require less denture relief than taller impression copings offered by manufacturer.



2 Processing caps transferred in rebase impression.



3 Aluminum analogs inserted into processing caps in preparation for fabrication of definitive cast.



4 Definitive cast with keyways placed in land area to orient plaster index.



5 Land area of master cast is lubricated and plaster index is fabricated.



6 Plaster index and denture teeth placed on refractory cast permit technician to precisely develop wax pattern for cast metal overdenture reinforcement.



7 Completed cast metal reinforcement.



8 Plaster index is used to wax denture base pattern to its original contours.



9 Completed definitive prosthesis. Black low-density polyethylene patrices will be exchanged for nylon replacement patrices.

finite retentive elements) (Locator; Zest Anchors). The clinician should then perform insertion procedures to verify the fit and occlusion of the new prosthesis.²³

SUMMARY

A complete denture is generally fabricated without metal reinforcement. Fracture of the acrylic resin denture base is a complication associated with the overdenture prosthesis. Using the technique described, an existing denture can be converted into a cast metal-reinforced implant-retained overdenture prosthesis, with only one additional office visit required.

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