REVIEW ARTICLE
Duplication of complete dentures using autopolymerizing acrylic resin: a review of techniques
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Abstract
Duplicate dentures for edentulous patients serve as important reserve replacement dentures. Several methods for duplicating dentures have been discussed in the literature. They involve a variety of materials, from autopolymerizing acrylic resin to flexible mold materials. This article reviews the techniques for fabrication of duplicate complete dentures using autopolymerizing acrylic resin.

Key words: Duplicate dentures, Copy dentures, Complete dentures.

Introduction
Ettinger et al have reported that older adults often wear the same complete dentures for 20 years, even up to 50 years (1). Replacement dentures may be difficult for some persons, especially when major changes are made in occlusion and the denture bases. The prosthodontist must keep in mind that the degree of adaptive ability possessed by patients is related to the health of the supporting tissues, their neuromuscular co-ordination and their motivation to learn new skills. These patients will benefit from treatment that makes minimum change from the old to new dentures, such as the use of duplicate denture fabrication procedure because it makes an easier transition to the new prosthesis(2). Duplicate denture is a second denture intended to be a replica of the first(3).

The duplicate denture can serve as an impression tray, temporary denture, an initial replacement in the fabrication of a new denture, a radiographic and surgical stent during fixture placement in implant therapy, or it can be used for research purposes.

Over the years, a variety of techniques have been developed and various materials are available for denture duplication. In one of the first duplication procedures the denture was irreversibly altered during the process(4). However, as materials and techniques have evolved, the procedure requires no alteration to the denture base.

Procedures
An oral examination and evaluation of the patient and the prosthesis is completed prior to the duplication procedures. The denture should be examined and evaluated for existing or repaired fractures, craze lines, and missing or replaced teeth. Esthetics, phonetics, accuracy of fit, and vertical and centric relation must also be verified. The patient is then advised whether the existing dentures should be duplicated or remade(5).

Techniques of denture duplication
I. Denture duplication using autopolymerizing acrylic resin.
1. Modified flask method using silicone impression material (Manoli 1969) (6)
2. Pour resin flask method (Boos and Carpenter 1974) (7)
3. Modified flask method (Brewer & Morrow 1975, Nassif 1984) (8,9)
5. Two tray method (Cooper and Watkinson1976, Lindquist 1997) (12,13)

II. Denture duplication using heat cure acrylic resin.
1. Flask method (Azarmehr P & Azarmehr HY 1970) (14)
2. A technique by Izhurul Haque Ansari (1994) (15)
3. Duplication procedure for
complete dentures by CAD/CAM. (Kawahata N et al 1997) (16)


5. Sectional mold technique (Mohamed TJ and Faraj SA 2001) (18)

Manoli and Griffin in 1969 explained modified flask method using silicone impression material for denture duplication(6). Silicone rubber was painted on the tissue surface of the denture and reinforced with dental stone. The denture with the silicone rubber lining and stone cast was invested in the lower half of a flask. A uniform layer of silicone rubber approximately 3-4mm thick was applied to the polished surfaces of the denture and to the teeth. The upper half of the flask was placed in position on the lower half and the flask was filled with plaster. After half an hour, the denture was removed from the flask and the teeth of the same shade and mold were placed. The mold was filled with a “pour-in” type of autopolymerizing resin and the flask was closed and held under pressure until the resin set. The duplicate denture was removed, trimmed and polished.

Boos and Carpenter designed a special flask to be used with reversible hydrocolloid for making the mold(7). Tooth shade-autopolymerizing resin was painted into the tooth indentations with a brush and pour type of autopolymerizing resin was used to form the duplicate denture in the mold. The disadvantages involved were the requirement of a special flask and the equipment and formation of voids in the denture.

Wagner (1970) has described a method of duplicating complete dentures by using reversible or irreversible hydrocolloid and a cup as a flask(10). Singer (1975) has modified the method by introducing a particularly convenient zipper technique that uses dental floss to section an alginate irreversible hydrocolloid mold poured in a 12-ounce ceramic cup. Pour type of resin and tooth colored autopolymerizing resins were used to fabricate the duplicate dentures(11).

Brewer & Morrow in their technique modified the denture flask by removing a rectangular section from the upper part to provide access for the sprues(8). Sprues made of utility wax with a diameter of 15 mm were attached to the lingual surface of the heels of mandibular dentures and to the palatal surface of the tuberosity region of maxillary dentures. Alginate was mixed and placed into the interior of the denture with a finger or a brush, taking care to avoid the entrapment of air and resultant voids. The remainder of the alginate mix is placed in the lower part of the flask. Alginate filled denture was settled into the mix, as during a routine flasking procedure. After the alginate had set upper part of the flask was placed in position, and the wax sprues were adapted to seal the rectangular opening. Alginate was mixed and poured into the flask slowly. A finger or brush was used to wipe alginate onto the teeth of the denture to minimize voids. The second pour would not stick to the first one. After the alginate had set, the flask was opened, and the denture and sprues were removed. Autopolymerizing tooth-colored resin of the proper shade was added to the teeth indentations by the sprinkle-on or paint-on method. Pour-type resin was mixed and poured into one sprue until the resin filled the mold and extruded through the other sprue. The denture was cured at 20 psi for 30 minutes.

A modification in the above technique was given by Nassif J and Jumbelic R(9). The change was in the fabrication of the teeth before going ahead with the flasking procedure.

Cooper and Watkinson introduced a technique in which they used two impression trays along with the impression material and the sprued denture to be duplicated to create a
mold(12). This technique was later modified by Terry Lindquist where in he used a layer of putty consistency polyvinylsiloxane impression material and also lined the tissue surface of the denture with light bodied polyvinylsiloxane impression material to create a mold space(13).

Discussion
All the techniques discussed in the above section involve the formation of a mold cavity using the original denture to be copied. Materials used for the formation of the mold are irreversible hydrocolloid, reversible hydrocolloid, and elastomers of different viscosities. The accuracy of the reproduction of the details in the duplicate denture depends on the accuracy of the material used in the formation of the mold. As per the studies of the accuracy of the impression materials it can be assumed that the most accurate reproduction will be produced by the elastomers(19,20).

The polymerization shrinkage and dimensional stability of the autopolymerized acrylic resin used in the fabrication of the duplicate dentures may also affect the accurate reproduction of the denture surfaces and the positions of the teeth.

Considering the above variables it can be emphasized that the refinement of occlusal contacts is of utmost importance during the insertion of the duplicate dentures.

Summary
Patients may have difficulty adapting to a new prosthesis for either physical or psychological reasons. This article reviews procedures for duplicating an existing denture. Techniques using autopolymerizing acrylic resins have been discussed. The duplicate denture fabrication minimizes the changes to the new denture, making it easier for the patient to adapt to new dentures.

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References

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