

An Innovative Technique to Fabricate Duplicate Denture in Severe Undercuts: A Case Report

Shefali Phogat^{1*} Nupur Dabas² Reshu Madan³ Puja Malhotra⁴ Sumit Singh Phukela⁵ Varun Gaur⁶

¹Senior Lecturer, Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

²Reader, Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

³Senior Lecturer, Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

⁴Professor, Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

⁵Professor, Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

⁶Post Graduate Student, Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

ABSTRACT

Background: Several techniques have been discussed in literature by various authors for the fabrication of duplicate denture. Various synonyms for duplicate denture are copy denture, replica denture or template denture. It is easier to make a copy denture in the absence of an undercut area. The presence of any undercut makes this procedure a challenging task for dentist. In the present case report, a technique for the fabrication of duplicate denture from a previous denture with undercuts has been described in details.

Keywords: Copy denture, duplicate, complete denture, undercut.

INTRODUCTION

A complete denture represents a one-piece prosthesis in which prefabricated denture teeth are integrated into the denture base and has been utilized for decades. Construction of the removable complete denture prosthesis is completed in a series of well accepted clinical and laboratory steps.¹⁻³ The obvious rationale for this sequential approach is based on the biomechanical prerequisites of denture function, aesthetic demands, and processing requirements of the denture material which allows successful fabrication of the denture prosthesis. Conversely, this traditional approach has some apparent limitations. Numerous clinical and laboratory steps require a significant investment of time on the part of clinician and dental technician, as well as numerous clinical appointments for the patient. As a result, there is a need for technique optimization and/or alternative approaches in the fabrication of a complete denture prosthesis.

The alternative approach in the fabrication of complete dentures includes the copy denture technique. Where in desirable characteristics of the existing denture are duplicated into a new definitive prosthesis. This approach has been most commonly advocated for patients who may have difficulties adapting to the new prosthesis and require only minor changes to the existing denture.⁴⁻⁵ one of the advantages of the copy denture approach is the reduced number of clinical procedures involved, since it eliminates the soft tissue impression and dentofacial evaluation.

Various techniques described in literature for denture duplication have been divided in two parts which includes denture duplication using autopolymerising acrylic resin and denture duplication using heat cure acrylic resin. Methods using autopolymerising acrylic resin includes modified flask method using silicone impression material (Manoli 1969)⁶, pour resin flask method (Boos and Carpenter 1974)⁷, modified flask method

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*Correspondence Dr. Shefali Phogat.

Department of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurgaon, India.

Email: shefaliphogat@gmail.com

(brewer & Morrow 1975 , nassif 1984)⁸,Cup flask method (wagner 1970, singer 1975)⁹⁻¹⁰,Two tray method (Cooper and watkinson 1976 , lindquist 1997).¹¹⁻¹² Techniques using heat cure acrylic resin for denture duplication uses, flask method (Azanther P & Azarmehr HY 1970)¹³, technique by Izharul Haque Ansari (1994)¹⁴,duplication procedure for complete dentures by CAD/CAM (Kawahata N et al 1997)¹⁵,technique by Lindquist TJ and Ettinger RL (1999)¹⁶,sectional mold technique (Mohamed TJ and Faraj SA 2001).¹⁷

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 3-4 mm 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 auto polymerizing resin and the flask was closed and held under pressure until the resin set. The duplicate denture was removed, trimmed and polished.

Boos and Carpenter⁷designed a special flask to be used with reversible hydrocolloid for making the mold. Tooth shade autopolymerising was painted into the tooth indentations with a brush and pour type of autopolymerising 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.⁹

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 coloured autopolymerising resins were used to fabricate the duplicate dentures.¹⁰

Brewer and Morrowin 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 lower part of the flask. Alginate filled denture was settled into the mix, as during the 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 tooth of the denture to minimize voids. The second pour would not stick to the first one. After the alginate has set, the flask was opened and denture and sprues were removed. Autopolymerising 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 byNassif J and jumbie R. ⁸ 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.¹¹ This technique was later modified byTerry Lindquist wherein he used a layer of putty consistency polyvinylsiloxane impression material to create a mold space.¹²

Soo and Cheng have also discussed a technique wherein they used selective pressure technique and zinc oxide eugenol impression paste to make secondary impressions in clear acrylic copies of existing dentures of the patient.¹⁸ All the techniques discussed in the above section involve the formation of the mold cavity using the original denture to be copied. Materials used for the formation of the mold are irreversible hydrocolloid,



Fig 1: Original denture.



Fig 2: Silicon lab putty indexed cast.



Fig 3: Maxillary alginate impression of lab putty cast to obtain dental stone master cast.



Fig 4: Mandibular alginate impression of lab putty cast to obtain dental stone master cast.



Fig 5: Flasking with the denture to obtain mould.



Fig 6: Mould with putty cast.



Fig 7: Dental stone cast replacing the putty cast using index and same mould size teeth.



Fig 8: Frontal view of original and duplicate denture.

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. But all the above techniques have a limitation of not being used in patients with severe undercuts. In the present study, copy denture is fabricated for the patient having severe undercuts. The technique described here, is of particular benefit where time saving is required, often because of transportation problems (as might be the case in rural areas or where the population is poor) and when large changes from old to new are unlikely to be tolerated well as for elderly patients.

CASE REPORT

A 65 years old male, teacher by profession, reported to the Department of Prosthodontics, Crown And Bridge and Oral Implantology, SGT dental college and hospital, Gurgaon for treatment. The patient wanted a new set of denture exactly like his previous denture. He was totally satisfied with his previous denture but wanted additional set of denture due to professional commitments.

A review of the dental history revealed that the patient had been edentulous for approximately one and a half year and was a denture wearer from past one year. On oral examination, well defined edentulous upper and lower ridges were present. The upper and lower dentures were examined and it revealed severe undercuts in maxillary anterior labial region and distobuccal region. Dentures were esthetically satisfactory with acceptable occlusion and vertical dimension. (Fig 1)

The patient wanted to get the denture made in a minimal time. The patient demanded the esthetics to be the same as in the previous denture. So it was planned to duplicate his existing denture to fulfill his entire requirement.

Technique

Patient's denture was taken from him for an hour, in order to duplicate the tissue surface, the tissue surface of maxillary and mandibular denture was duplicated using silicone lab putty (Coltene).

The positive replica/cast of lab putty were obtained (Fig 2). The indexing of lab putty replica was done (Fig 2). The replica was further imbedded into alginate contained in rigid bowl to get negative replica of lab putty cast (figure 3 and figure 4). The rigidity of bowl insures the minimal deformation of alginate and production of exact master cast. Now the next laboratory step is to flask the denture using compression moulding technique. Lab putty cast was wax sealed with denture followed by flasking (Fig 5 and Fig 6). After setting of gypsum flasks were opened, putty cast replaced by stone cast utilizing indexing (Fig 7). Exact teeth mould size were selected (Fig 7). It is followed by packing using conventional technique. Hence, the fabrication of duplicate denture is completed (Fig 8)

In the second clinical appointment, the dentures were inserted into the patient's mouth. The denture instructions were given to the patient followed by recall appointment.

STRENGTH OF THE STUDY

The technique described has several advantages: saving in clinical time, reduce material costs and less laboratory expenses. The major advantage of this technique is to copy the denture with severe undercuts.

CONCLUSION

In making complete dentures by a copying technique, it is necessary to decide not only the changes to be built into the new dentures but also the degree of accuracy required in copying. The technique described is designed to serve the majority of patients and to remain acceptable in terms of cost, technical services necessary and convenience to the patient.

The completed duplicated dentures are produced in two visits instead of the usual five visits and without loss of opportunity to check all their features at the second visit, before finishing.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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