Novel Copy Denture Technique—A Practical Approach for Duplicating Existing Dentures

Mehwish Khan1 Syed Murtaza Raza Kazmi2 Sameer Quraeshi3 Shah wazir3

1 Department of Prosthodontics, Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University, Karachi, Pakistan
2 Department of Prosthodontics, Aga Khan University Hospital, Karachi, Pakistan
3 Department of Prosthodontics, Fatima Jinnah Dental College and Hospital, Karachi, Pakistan


Abstract

Provision of copy dentures to complete denture patients is often needed in clinical practice. Several edentulous patients want an additional set of dentures to avoid being without them in case the existing ones are broken or lost, whereas some patients have adapted to their old dentures so much that they do not want them to be replaced by a completely new prosthesis. This article presents a technique for the fabrication of a copy denture that allows duplicate dentures to be processed in heat-cure acrylic resin in two clinical visits, without leaving the dentures at dental office.

Keywords

► copy denture
► duplicate denture
► denture copy technique

Introduction

The management of the complete denture patients can be a challenging experience for a dentist.1 Adaptation to a new prosthesis is a continuous struggle for the frail and older patients who are accustomed to their existing dentures.2 Several edentulous patients are anxious about being without the dentures in case the existing ones are broken or lost and concerned about being without them during the repair process,3 whereas some patients have adapted to their old dentures so much that they do not want them to be replaced by a completely new prosthesis. These patients are best managed by making a replica or duplicate denture with minimum alteration in the new dentures. The main purpose of the replica or copy denture is to duplicate the existing denture’s polished surface with minimal changes, sometimes also improving the impression surface of the denture.4 Copy denture is often needed by the patient who is completely satisfied with the existing prosthesis and only want a spare set of denture, in case of unrepairable fracture of the otherwise satisfactory denture, or occasionally when the patient wants to change the color of denture base or artificial teeth. It is not indicated when the existing denture has major deficiencies in occlusal or impression surface. Several procedures for duplicating dentures have been described in the literature.1,3–5 Some have used alginate,1,3 whereas some authors have utilized silicone-based impression materials4,5 and some recommend using a combination of both materials5 for the procedure. Almost all of them involve preparing a mold of the present denture and creating a replica in wax or auto-polymerizing acrylic resin. Most of them require at least three to four visits of the patient to the dental office. This article presents a technique for the fabrication of a copy denture that does not necessitate the patient to leave the dentures with the practitioner and dentures are made in heat-processed acrylic resin without any additional clinical appointment. Additionally, in cases where the exact mold of the artificial teeth in the existing prosthesis is not known, a proposed technique for duplicating the teeth has also been described.

Case Presentation

A 60-year-old male, complete denture patient referred to the Department of Prosthodontics, in a Private Dental Teaching
Hospital, Karachi, Pakistan. He had a set of complete dentures made 2 months ago in the same hospital with which he was satisfied. He was traveling out of the country within a week and wanted to get a duplicate of his existing dentures, which he could use in case the existing one is lost or broken. The patient was fit medically. On intra-oral examination, well-formed edentulous maxillary and mandibular ridges were found. The patient’s existing dentures were esthetically and functionally satisfactory and exhibited adequate vertical dimension of occlusion, retention, and stability. However, the patient expressed his concerns over the dark color of denture base and teeth and preferred a lighter color in the duplicate one. Other treatment options given to the patient were conventional complete denture, implant-supported overdenture, and implant-supported fixed prosthesis but the patient preferred a copy denture due to time constraint. As medical history of the patient was not contributory and no surgical procedure was planned, fabrication of copy denture was proceeded without further investigations.

Procedure

- The patient’s dentures were taken and cleaned by using a denture cleansing solution. The fitting surface of the denture was filled with polyvinyl siloxane (PVS) impression material of putty consistency (3M ESPE Express STD), covering 2 mm of the peripheral borders of the denture (Fig. 1A–B). Petroleum jelly was applied as separating media over the borders, and PVS impression material was adapted over the polished and occlusal surface of the denture smoothly joining the impression of fitting surface (Fig. 1C). Dentures were retrieved from the impressions, and molds of polished and fitting surfaces were inspected for any defects which can be filled with light body PVS impression material (3M ESPE Express Light Body). Siloxane putty mold with the denture in place was flaked in the usual manner using dental plaster (Gypsum) type II (Fig. 1D). After setting of the dental plaster, the denture was retrieved, cleaned, and returned to the patient. Shade and mold of the teeth to be used was carefully chosen using a commercially available acrylic shade guide (HI-I VITACRILIC), before returning the dentures to the patient. The existing denture had shade no. 3, whereas lighter shade no.1 was selected for copy denture teeth due to the patient’s preference.
- This technique requires approximately 45 minutes of clinical time. Since the PVS impression material has long-term dimensional stability, the process of duplication can be completed later at a suitable time. Selected teeth were then placed into the mold formed by the polished and occlusal surface of the denture after minor adjustments in the ridge lap. Teeth were stabilized in position using super glue (Fig. 1E). Dentures were then processed using heat-cure acrylic resin by a compression-molding technique (dough technique) (Fig. 1F). To minimize processing errors, acrylic polymer and monomer were mixed in the proper ratio of 3:1 by volume and processed at 74°C for approximately 2 hours followed by boiling at 100°C for 1 hour. After finishing and polishing, the dentures were inserted with minor occlusal adjustments (Fig. 2).
- Initial follow-up visit was done after 24 hours and then after 6-months. Other than a few occlusal adjustments, the patient was satisfied with the copy denture. For cases where the exact mold of teeth used in the original denture is unknown or existing denture has teeth that exhibit considerable wear, then the teeth can be custom made in self-cure acrylic resin (Fig. 3A–D). A separate mold for teeth was formed by taking the PVS impression of only the occlusal surface of the existing denture and poured in die.
**Fig. 2** Comparison of patient’s existing dentures (on right) with copy dentures (on left).

**Fig. 3** Custom-made teeth with auto-polymerizing acrylic resin. (A) Maxillary copy denture fabricated using custom-made teeth opposing mandibular original denture. (B) Siloxane putty impression of the teeth in the flask. (C) Teeth ground off from dental stone. (D) Cured and finished custom-made teeth strip.
stone. This was then flaked in the usual manner using a
dental plater (►Fig. 3B–C). On separation of the two
halves of the flask, teeth were ground off on the die stone
model (►Fig. 3C). Self-cure acrylic resin (tempron) was
used to fill the putty mold, and the flask was closed and
allowed to bench cure under pressure. Teeth strip was
retrieved from the flask and finished with appropriate
gingival contours (►Fig. 3D). This teeth strip can then be
used for copy denture using above-mentioned technique
(►Fig. 3A).

Discussion
An inadequate prosthesis may be used by a patient for a
long period because it is comfortable and a patient has
developed muscular skills to control it. To get accustomed to
a new prosthesis, a different learning sequence is required.
Therefore, the practitioner must identify the patients who
are reluctant to learn new skills and will have difficulty
adapting to the new prosthesis.9,10 Lindquist and Ettinger5
used addition silicone impression material for replication of
polished and tissue surfaces of the existing denture and
fabricated record bases of auto-polymerizing resin from the
silicone impression for the subsequent denture-making
procedure. A somewhat similar technique was described
by Habib and Vohra1 except that they used irreversible
hydrocolloid impression material in place of silicone. Both
of these techniques required at least four clinical appoint-
ments of the patient with increased laboratory time and
cost. Mohamed and Faraj11 described a technique which
utilizes the dental stone to replicate the denture which is
associated with increased chances of fracture of the existing
denture and the mold itself, whereas Nassif and Jumbelic3
advocated the use of irreversible hydrocolloid molds of the
existing denture followed by denture fabrication using
auto-polymerizing acrylic resin. On contrary to the above-
mentioned techniques, the technique described in this case
report to duplicate a denture is easy and requires reduced
chair-side and laboratory time. Greater patient satisfaction
is achieved as the patient does not need to leave the denture
during the duplication process. Use of face-bow or jaw
record appointment and denture trial are not required.
Furthermore, the use of PVS impression material makes
this technique preferable for situations with undercuts;
furthermore, dental stone used for flaking provides a rigid
support to silicone putty mold minimizing errors during
packing and curing. One limitation of this technique is that
it does not allow modifications/corrections in jaw relation,
occlusal vertical dimension, or fitting surface of the den-
ture. However, if improvements in denture retention and
support are required, reline procedure may be done once
the patient has worn the copy denture satisfactorily. And if
slight changes in the impression or fitting surface of the
denture are required, this technique can be modified by
taking PVS impression of the edentulous ridges with the
dentures by closed-mouth technique before investing them
in the flask.

The technique presented provides a time-efficient solu-
tion for a patient needing a spare set of denture ensuring
greater patient satisfaction when the mold of teeth is known.
It also describes modification when the exact mold of teeth
cannot be found. However, such self-cure acrylic resin cus-
tom-made teeth are prone to staining and have low wear
resistance. The use of other materials with improved prop-
eries is suggested for better esthetic results in this tech-
nique. Some of the newer materials for denture teeth include
multiplex polymer matrix resin teeth, resin teeth containing
an IPN of polymers, double crosslinked resins, and nano-
filled composite resin teeth.9 The use of optical scanner and a
3D printer for copying complete dentures has been described
recently.12 Digital imaging provides a quick procedure with
minimal errors, little waste of material, and lesser chair-side
time.12,13 But the increased cost of the system and lack of
training have limited the practice of digital techniques for
duplicating dentures. However, with enhancements in the
digital techniques, they may replace the conventional tech-
niques in near future.

Conclusion
The technique described offers a time-efficient and easy
method for the fabrication of copy denture in a patient
who needs a spare set of denture providing a satisfactory
solution for the treatment of elderly patients who cannot
tolerate long appointments and are accustomed to their
existing prosthesis.

Conflict of Interest
None declared.

References
1 Habib SR, Vohra FA. Replacing existing dentures by copy-denture
265
2 Lindquist TJ, Narhi TO, Ettinger RL. Denture duplication technique
3 Nassif J, Jumbelic R. Duplicating maxillary complete dentures. J
Prosthet Dent 1984;52(05):755–759
4 McCord JF, Hannah VE, Cameron D, Watson D, Donaldson AC. An
update on the replica denture technique. Dent Update 2010;37
(04):230–232, 235
5 Lindquist TJ, Ettinger RL. Patient management and decision making
in complete denture fabrication using a duplicate denture proce-
6 Ghani F. The provision of new complete dentures by duplicating
13:29–34
7 Duthie N, Lyon FF, Sturrock KC, Yemm R. A copying technique for
replacement of complete dentures. Br Dent J 1978;144(08):
248–252
8 Zarb GA, Hobkirk J, Eckert S, Jacob R. Prosthodontic Treatment for
Edentulous Patients: Complete Dentures and Implant-Supported
Prostheses. 13th ed. St. Louis, MO: Elsevier Health Sciences; 2013:
134–143
9 Yemm R. Analysis of patients referred over a period of five years to
a teaching hospital consultant service in dental prosthetics. Br