

Light Weight Complete Denture Prosthesis - A Case Report

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ABSTRACT

Retention, stability and support are the basic principles on which the success of a complete denture relies on. Extreme resorption of the maxillary denture-bearing area leads to a narrower, constricted residual ridge with decreased supporting tissues and a larger restorative space between the maxillary and mandibular residual ridge. Rehabilitation in such cases may result in increased weight and height of the prosthesis further compromising its retention, support and stability. So, to prevent further resorption of ridges, the weight of the prosthesis needs to be reduced which can be achieved by making hollow prosthesis. This case report describes a novel technique of fabricating maxillary hollow maxillary complete denture.

INTRODUCTION

No step in denture construction should be stopped short of perfection yet many dentures are worn, which have imperfections built into them, provided they have peripheral seal sufficient to hold them in place. Increased inter ridge distance would lead to the fabrication of heavy-weighted dentures which results in leverage forces affecting the principle of mechanics in the fabrication of complete dentures. Different weight reduction approaches have been achieved earlier using a solid three-dimensional spacer, including dental stone, cellophane-wrapped asbestos¹, silicone putty², or modelling clay³ during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis. This case report describes most convenient and easy method of fabrication of hollow denture using putty spacer and auto polymerizing acrylic resin.

CASE DESCRIPTION

A 65-year-old male patient reported to the Department of Prosthodontics and Crown-Bridge in B.P. Koirala Institute

of Health Sciences, Dharan, Nepal with a chief complaint of difficulty in chewing food due to worn out dentures, which was in use till date since 11 years. Clinical examination revealed a flat maxillary alveolar ridge with severely resorbed mandibular ridge. His long lip length, adequate inter-ridge distance and unwillingness to any surgical procedures directed us to plan a hollow maxillary denture using a novel technique.

Steps for conventional complete denture fabrication were followed up till the try-in stage with the exception of using admix technique to obtain the final impression for the flat and resorbed mandibular edentulous ridge.

TECHNIQUE

1. V-shaped notches were made at three different sites on the land area of the maxillary cast and the waxed maxillary denture was sealed to the master cast. The maxillary trial denture was duplicated with irreversible hydrocolloid impression material (Zelgan, DENTSPLY ISO 13485) and poured in Type IV dental stone (Kalrock, Kalabhai Pvt., Ltd., Mumbai, India) to obtain a working cast.

2. A template of 1mm thick BIOPLAST (Scheu Dental GmbH, Iserlohn, Germany) transparent film was then fabricated on this working cast with the help of a BIOSTAR (Scheu Dental GmbH) heat and vacuum press to obtain the trial denture external contours [Fig 1a].
3. The maxillary trial denture was invested and de-waxed in the conventional manner.
4. Modelling wax (2mm thick) was adapted over the master cast to ensure uniform and adequate thickness of resin all around the planned hollow cavity in the completed denture and subsequently eliminated during a second de-waxing cycle prior to packing.
5. For the purpose of achieving the hollow cavity, first a temporary putty spacer was fabricated, adjusted for suitability and used for all the steps of denture fabrication up till the trial closure. A glycerine soap replica of the putty spacer was hand carved using a Le Cron carver for use during the final closure and acrylization.
6. The accuracy of the 3D spacer from all aspects was assessed by placing between the master cast (with 2mm modelling wax adapted to it) and the BIOSTAR template (Fig 1b).

Fig 1 (a, b): Maxillary trial denture duplicated and adaptation of thermoplastic sheet on duplicated cast which is subsequently used for the verification of putty shim and uniform hollowness of denture



7. The 2mm base plate wax adapted over the maxillary cast was acrylized using interchangeable flasks to obtain permanent intaglio surface of final prosthesis.
8. After this, a trial closure was carried out using the temporary putty spacer. The flasks were opened and temporary putty spacer retrieved. The mold space was visually assessed for adequate resin thickness all around the hollow cavity. The hollow space left by the

temporary putty spacer was now filled with the soap spacer and final closure of the flasks was achieved [Fig2]. The denture was acrylized in conventional manner.

Fig 2: Trial closure; putty replaced with soap shim



9. The denture was retrieved in the usual manner following processing. Using a micromotor handpiece, openings were cut into the denture base distal to the second molar. The denture was then immersed in a bowl of water to allow dissolution of soap. Also, a cleaning brush was pushed in and out through the openings to aid in mechanical removal of the soap. Water spray was used to flush traces of soap completely. The hollow cavity was air dried, and the openings were sealed using autopolymerizing acrylic resin.
10. The denture was immersed in water overnight and weighed before and after immersion to assess leakage into the cavity. A water test was performed to evaluate the hollow space as evident by the floating denture (Fig 3).
11. Upper/lower dentures were then finished, polished, and delivered to the patient [Fig 4]. The patient was reviewed after a week, and minor adjustments were made.

Fig 3: Hollow denture



Fig 4: Prosthesis *in situ*



DISCUSSION

Rehabilitation of a patient with increased inter ridge distance and long lip length is a challenge to the dentist. Conventional denture leads to an extensive volume of the denture base material. Fabrication of hollow denture has been tried to decrease the weight of the prosthesis which in turn increases the retention and stability^{3,4}. The technique described here, uses a soap spacer, specifically hand carved out of a soap due to its easy retrievability⁵. The advantage of using soap spacer is that it can sustain curing temperature and does not interfere with polymerization of heat cure acrylic resin or leave any residues inside the hollow cavity. Most authors have used a double flask technique for fabrication of hollow denture⁵. Double flask technique means this technique utilized a pair of split dental flasks with interchangeable counters where first set of flasks was used to obtain a permanent record base followed by using a second set of flasks to pack heat cure acrylic resin over the teeth.

CONCLUSION

This technique overcomes the disadvantages of the older technique. The soap spacer has advantages of easy retrievability, ease of carving and it doesn't adhere to acrylic resin. Hollow maxillary complete denture is a boon to patients with increased inter ridge distance and severely resorbed ridges. It besides enhancing the retention considerably reduces the weight of the prosthesis and prevents transmission of detrimental forces to the underlying tissues.

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