

CASE REPORT

Management of resorbed maxillary ridge with Hollow Maxillary Complete Denture - A Case Report

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ABSTRACT

Fabrication of a successful maxillary complete denture for severely atrophic maxilla with large interridge distance often poses a clinical challenge not just due to decreased denture base area for retention, stability and support but also due to increased height and weight of the prosthesis which exerts excessive and constant pressure leading to further bone resorption. This clinical report describes a simple technique of fabricating a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges with increased interridge distance which reduces the weight of the prosthesis, aids in preserving of the existing residual alveolar ridge thereby enhancing the retention and stability.

Keywords: Hollow maxillary denture, Light weight prosthesis, Residual ridge resorption, Increased interridge distance.

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INTRODUCTION

The severely atrophic maxilla poses a clinical challenge for fabrication of a successful complete denture. In addition to this increased interridge distance often results in heavy maxillary complete denture that further reduces the retention of the prosthesis. Reducing the weight of a maxillary prosthesis has been shown to be beneficial to improve retention and stability. Different approaches like using a solid 3-dimensional spacer, including dental stone¹⁻⁵ cellophane wrapped asbestos⁶, silicone putty^{7,8}, or modelling clay and salt⁹ have been used during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.

Fattore et al² and Holt⁷ have used different techniques for fabricating a hollow prosthesis. The primary disadvantage of such techniques is that the junction between the two previously polymerized portions of the denture occurs at the borders of the denture which increases risk of seepage of fluid into the denture cavity. Furthermore, this junction is a common site for post insertion adjustment increasing the risk of

leakage. Another disadvantage is that it is difficult to gauge resin thickness in the cope area. Also, the problem encountered while using salt is its inability to sustain pressures produced during flask closure resulting in a failure to achieve a hollow cavity inside the prosthesis. Hence, no substantial difference in weight of the prosthesis can be achieved.

This clinical report describes a technique for fabrication of a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges and increased interridge distance.

CASE REPORT

A 70-year-old male diabetic patient reported to Department of Prosthodontics, Indira Gandhi Government Dental College and Hospital, Jammu, India with the chief complaint of difficulty in eating due to loss of teeth. History revealed that he had lost his teeth due to periodontal involvement and had been edentulous for 1 years. Medical history revealed that patient was diabetic and was on oral hypoglycemics since 5 years. On intra oral examination it was found

that maxillary and mandibular ridges were atrophic with increased interarch space. (Fig. 1a,b).

Labial, buccal mucosa, hard palate, soft palate and floor of the mouth were normal. Various treatment options available like implant supported prosthesis, hollow maxillary denture and conventional complete dentures were discussed with patient. Due to the cost and the surgical procedure involved in an implant-supported prosthesis patient decided in favour of hollow maxillary complete denture and conventional mandibular denture was planned for this patient.

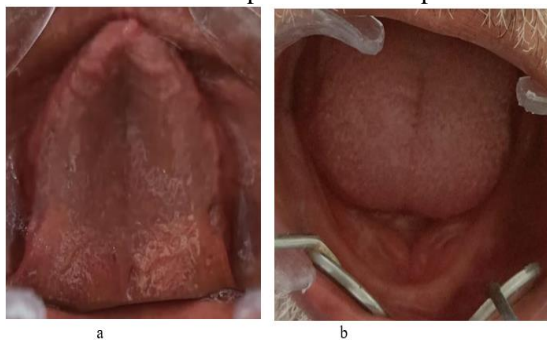


Fig. 1(a) Resorbed maxillary edentulous ridge. (b) Resorbed mandibular edentulous ridge

TECHNIQUE¹⁰:

1. The maxillary denture was fabricated up to the trial denture stage in the conventional manner. Functional technique at the definitive impression stage and a neutral zone impression technique was employed for the mandibular atrophic ridge.
2. The land area of the cast was indexed using V shaped notches and the trial denture was sealed to the master cast (Fig. 2). The trial denture was duplicated in reversible hydrocolloid and poured in dental stone.



Fig. 2: Trial maxillary denture sealed to indexed master cast

3. A template of the duplicated trial denture was made by adapting 1 mm thick thermoplastic sheet using vacuum heat-pressed machine (Biostar) on the working cast to obtain the trial denture external contours.
4. The trial denture was then processed in the standard manner up to the wax elimination stage. (Fig 3).
5. Two layers of modelling wax (2mm thick) were adapted to the definitive cast in the drag,

conforming to the border extensions (Fig. 4) 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. A second flask was used to invest this baseplate wax (Fig 5) and dewaxing was done in a conventional method (Fig 6).

6. A permanent maxillary record base was fabricated using clear acrylic and during the packing stage patient's unique Aadhaar card identification number and barcode issued by Unique Identification Authority of India (UIDAI) was embedded in the clear acrylic for denture identification (Fig 7)



Fig. 3: Wax up of trial maxillary denture done.



Fig. 4: A 2mm thick modelling wax adapted over the master cast to ensure adequate and uniform resin thickness in the complete denture.



Fig 5: Interchangeable flask used.



Fig 6: Dewaxing of permanent record base



Fig 7: Permanent record base with identity obtained.

7. After deflasking the clear matrix was placed on the definitive cast using the indices in the land area as seating guides. An endodontic file with a rubber stop was used to measure the space between the matrix and the processed base (Fig. 8)



Fig 8: File used to measure the space between matrix and base

8. Vinyl polysiloxane putty [Aquasil, Dentsply Corporation, Germany] was mixed and adapted on the base and shaped to the approximate contours of the matrix (Fig. 9). The polymerized putty was shaped to leave 2–3 mm of space between the putty and matrix. An additional 1 mm space was provided over the tooth portion of the denture. The putty was fixed tooth base using cyanoacrylate.



Fig 9: Putty adapted and shaped to approximate contours of matrix.

9. The original cope was resealed on the drag and verified for complete closure of the flask. Then acrylic resin (Lucitone 199, Dentsply, Germany) was packed over putty and processed. The processed denture was recovered in the usual manner.
10. After finishing the denture two openings were cut with a bur into the denture base distal to the most posterior tooth. The silicone putty was removed using a sharp instrument and thick orthodontic wire. The openings were widened as necessary, to facilitate access (Fig. 10). After complete removal of putty, autopolymerizing acrylic resin was used to seal the openings.



Fig 10: Maxillary denture with openings

11. The denture was polished in the usual manner and the seal was verified by immersing the denture in water. If no bubbles are evident, an adequate seal is confirmed. (Figs.11).



Fig 11: Hollow denture floating in water.

DISCUSSION

This technique overcomes the disadvantages of the older techniques. The thickness of resin can be controlled through the use of putty and clear matrix, ensuring an even depth of resin to prevent seepage and prevent deformation under pressure of flask closure. Problems with leakage and difficulty in determining resin thickness are overcome. The small window facilitates recovery of the spacer in an area that is not commonly adjusted after denture insertion and has a small margin along which leakage can occur. In this technique silicone putty was used as a spacer because it is stable, it can be well adapted giving the required uniform hollow space, and it does not adhere to acrylic resin⁸. Also, patient's unique identification number and barcode printed in the patient's Aadhaar card issued by Unique Identification Authority of India (UIDAI) are used as denture markers which is a simple, quick, and economical method for identification of individual.

Some of the drawbacks of the technique used is that removal of putty from the cavity is difficult and hollow denture is prone to fracture so it is important to maintain adequate thickness of resin around the cavity and special instructions regarding handling of the denture should be given to the patient.

CONCLUSION

Hollow maxillary complete denture considerably reduces the weight of the prosthesis which in turn prevents transmission of detrimental forces which would otherwise be transmitted from a conventional heavy prosthesis to the underlying tissues thereby helps to preserve underlying tissues and residual alveolar ridge. Also, the clear matrix of the trial denture helps to facilitate shaping of silicone putty spacer to ensure an even thickness of acrylic to resist deformation and prevent seepage of saliva into the cavity.

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