

CASE REPORT

Hollow Denture for Completely Edentulous Maxillary Resorbed Ridges- A Case Report

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ABSTRACT

Basically, complete denture success relies on the factors like stability, retention, function, support and esthetics. Mostly severely resorbed maxillary ridges are constricted and narrow and the inter-arch distance is increased due to which there is a decreased stability, support and retention. In this case the weight of the complete dentures compromises the factors further. This case report depicts a simplified technique for fabricating the lightweight hollow complete denture for balancing the factors influencing the denture and also preserves the supporting tissues and bone

Keywords: Hollow denture; Inter arch distance; Light weight prosthesis; Resorbed ridges retention.

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INTRODUCTION

In severely resorbed residual ridges, a successful dental prosthesis has become a challenge due to increased inter arch distance and decreased support for the denture bearing area.¹ The weight of the denture plays a major role in retention and stability of prosthesis. To decrease the leverage forces the weight of the denture is reduced. Many authors have used different techniques to reduce the weight of the denture by using dimensional spacer such as modelling clay, dental stone, cellophane, wrapped asbestos etc during processing procedure to eliminate acrylic resin material from hollow cavity that is designed.² In this case report, fabrication of a simple innovative light weight hollow maxillary denture was described, and the patient showed optimal comfort, function and esthetics on delivery and follow-up.

CASE REPORT

A 65-year-old female patient reported, with a chief complaint of missing tooth in upper and lower arch in front and back region for past 2 years and wanted replacement. On examination the patient had severely resorbed narrow maxillary ridge (*Fig 1*) with an inter arch distance of 37 mm. The patient had extracted all the teeth, 2 years back and was not a denture wearer. Patient had no relevant medical history. Different treatment options were explained to the patient like conventional complete denture, hollow maxillary complete denture and implant supported complete denture. Due to the economic

constraints and available inter arch space a hollow maxillary denture and a conventional mandibular denture was planned for the patient.



Fig 1: Intra oral view of maxillary and mandibular arches

Technique:

1.Primary impression was made using impression compound and the secondary impression was made using zinc oxide eugenol impression paste.(*Fig 2*)



Fig 2: Secondary Impression

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All the procedures till the maxillary and mandibular trial dentures were done and patient was called for try in.

2. After try in, the trial denture was duplicated using irreversible hydrocolloid alginate (Fig 3), over this duplicated cast clear thermoforming hard template of 1 mm thickness was adapted using vacuum machine.



Fig 3: Duplicated trial denture

3. The trial dentures were invested and dewaxed in a conventional method. Two sheets of modelling wax was adapted on the master cast each wax which was approximately 1.5 mm in thickness.

4. Clear template vacuum sheet was placed over the definitive cast and a K - file was inserted through the template and the definitive cast, then the space was determined.(Fig 4)



Fig 4: Clear template placed and checked space using endo file

5. 3-dimensional putty spacer was fabricated using the polyvinyl siloxane putty impression material with a uniform thickness of 2.5 mm (Fig 5).



Fig 5: Placing putty spacer over the wax denture base

6. Then a heat cure acrylic denture base was fabricated separately with duplicated master cast in another flask using a conventional manner.

7. This denture base was placed inside the definitive cast over which this putty spacer was placed and stabilized using cyanoacrylate and packing was done using lower part of flask, which had teeth in it. The flask was closed in a conventional manner.

8. Processed denture was retrieved, trimming, finishing and polishing was done.

9. Two window holes were made posterior to the distal most tooth in the maxillary arch and one hole was made in the anterior region on the labial surface to remove the putty material (Fig 6). Later the window holes were closed by applying a layer of autopolymerising acrylic resin. Finishing and polishing of the hollow maxillary denture was done.

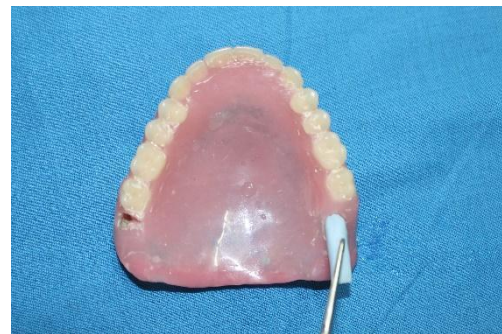


Fig 6: Removal of putty spacer from distal opening

10. The seal of the denture was checked by making the denture to float in a beaker containing water (Fig 7).



Fig 7: Denture floating

11. A pair of conventional denture without hollowness, was also fabricated for the patient by duplicating the master cast. This was useful for comparison between both conventional maxillary complete denture and hollow maxillary denture.

12. These dentures were weighed in terms of grams conventional denture was 29 grams and hollow denture was 25.4 grams. There was a difference of 3.6 grams.

13. Hollow denture was inserted into patients' mouth (Fig 8). Post insertion instructions were given regarding handling of the denture.



Fig 8: post insertion extra oral view of the patient

DISCUSSION

Severely resorbed maxilla could be a challenge for successful complete denture fabrication. Patient may experience many difficulties like speech, eating, mucosal pain, changes in facial appearance etc. Furthermore, there is decreased supporting area, with large inter-arch space. The usual weight of the denture may lead to increased residual resorption, by exerting more pressure on the residual ridge. Hence, in this case report, we have fabricated a hollow maxillary denture for overcoming of some disadvantages caused by conventional methods of fabrication of complete denture prosthesis. Holt et al, had used a spacer and a shim of acrylic resin on to the residual alveolar ridge which was removed and the two halves of the denture were luted with auto polymerized acrylic resin.³ Sullivan et al, has done some modification in fabricating the hollow maxillary denture by making a trial denture base with a clear matrix.⁴ Then the wax elimination for these trial dentures were done in a conventional manner. A shim was made using 2 mm of acrylic resin on the master cast using the second flask, a silicone putty was placed over the resin and its thickness was determined using a clear template. Over the putty and shim the original flask with the teeth, was placed and processing was done. Later, the putty is removed from the denture.

Fattore et al in 1988, had done some modifications in double flask technique for fabrication of hollow obturator by addition of heat polymerizing acrylic resin over the master cast, with a acrylic resin processed by minimal thickness surrounding the teeth. After which both the portions were attached using heat polymerized resin.⁵ Later this double flask method was illustrated by Barnett and Chalian MD in fabrication of hollow bulb for the obturator prosthesis.⁶ This same technique was followed when there was excessive resorption of ridge in the mandible so that fabrication of the hollow mandibular denture. They had used retentive locks for two parts of the denture to maintain vertical dimension at occlusion (VDO). Various other studies had incorporated newer techniques which were sensitive, produced discoloration and microleakage. Some resulted with excessive resin

thickness, increased vertical dimension of occlusion and accurate hollow space was unpredictable. Grunewald AH et al conducted a study using gold denture bases which weighed more and it was found that it had good retention and adaptability but for resorbed ridges it makes the condition worse.⁷ Hence, in this case the treatment plan was based on the clinical examinations done and choice of an appropriate plan. If conventional maxillary complete denture was fabricated it would have worsened the condition by increased residual resorption thereby reducing the denture bearing area further.

Some recent studies used plaster, pumice and sugar syrup, plaster pumice mix, modelling wax with self-cure acrylic, glycerine soap, thermocol and surgical catheter with orthodontic wires.⁸⁻¹³ In the current study maxillary hollow denture with silicone putty spacer decreased the weight of the denture, thereby preserving the supporting tissues. Advantages of this technique include reduction in the weight of the prosthesis and good retention with no microleakage at the junctions.¹⁴⁻¹⁶ A uniform thickness of hollow space could be achieved by using putty spacer. Disadvantages in this type of denture were that it was more prone to fracture, difficulty in the removal of putty and time consuming.

CONCLUSION

The best way for rehabilitating a severely resorbed residual ridge was fabrication of hollow maxillary complete denture. This improves the retention and stability of the denture, preserves the supporting tissues and bone. The putty spacer maintain equal amount of space, prevents saliva seepage into the cavity and resist deformation. This technique of fabrication was simpler and more cost effective. Hence this method was used for fabrication of light weight hollow prosthesis.

CONFLICT OF INTEREST

There is no conflict of interest

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