Hollow Maxillary Denture in the Management of Resorbed Edentulous Ridges with Increased Inter Ridge Distance: A Case Report

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ABSTRACT

The severely resorbed maxillary and mandibular edentulous arches that are narrow and constricted with increased interarch space provide decreased support, retention and stability. The consequent weight of the processed complete denture only compromises them further. In the success of the complete denture the basic principle involves are retention, stability and support. In cases of resorbed ridges and increased inter ridge distance there is always difficulties because of the weight of a maxillary denture is often a dislodging factor. Hence, a light weight denture is required for better retention. This article describes a case of completely edentulous patient successfully rehabilitated with a hollow denture.

Key Words: Complete denture, hollow maxillary denture, inter ridge distance, residual ridgeresorption.

INTRODUCTION

The severely atrophic ridges pose a clinical challenge for the fabrication of a successful complete denture because of decreased supporting tissue and denture bearing area. Also as the ridge resorption progresses, the resultant large inter-ridge space leads to fabrication of heavy complete dentures which adds to decrease in retention and stability of the denture. Increase interridge space compounds this problem. To decreased the leverage forces, reduction in the weight of the prosthesis was recommended and was also found to be beneficial.¹,² Different weight reduction approaches have been achieved using a solid 3 dimensional spacer, including dental stone,¹-⁶ cellophane wrapped asbestos,⁷ silicone putty⁸ or modeling clay⁹ have been used during laboratory processes to exclude denture base material from the planned hollow cavity of the prosthesis.

Fattoreet al.¹⁰ used a variation of the double flask technique for obturator fabrication by adding heat polymerizingacrylic resin over the definitive cast andprocessing a minimal thickness of acrylicresin around the teeth using a differentdrag. Both portions were attached using a heat polymerized resin.

Holt et al.⁸ processed a shim of indexedacrylic resin over the residual ridge andused a spacer, which was then removed and the two halves luted with autopolymerized acrylic resin. The primary disadvantageof such technique is that the junction between the two previously polymerizedportions of the denture occurs at theborder of the denture, which increases risk of seepage of fluid into the denture cavity. Another disadvantage is that it is difficult to gauge resin thickness in the cope area.

O'Sullivan et al.¹¹ described a modified method for fabricating a hollow maxillary denture. A clear matrix of trail denturebase was made. The trail denture base was then invested in the conventional manner till the wax elimination. A 2 mm heat polymerized acrylic resin shim was made on the master cast using a second flask. Silicone putty was placed over the shim and its thickness was estimated using the clear template. The original flask with the teeth was then placed over the putty and shim and the processing was done. The putty was later removed from the distal end of the denture and the opening was sealed with autopolymerizing resin.
In this case report we are describing the technique of fabrication of a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges and increased interridge distance.

**CASE REPORT**

A 60-year-old male patient reported to the Department of Prosthodontics & crown & bridge, for prosthetic rehabilitation of maxillary and mandibular edentulous ridges. Patient medical history was not significant. Past dental history revealed that patient was a denture wearer since 15 years, and the maxillary denture were loose. Intraoral examination revealed severely resorbed maxillary and with increased interridge distance. Hence, hollow maxillary complete denture and conventional mandibular denture was planned for this patient.

**TECHNIQUE**

Keeping in mind the strength of the denture, the distance from the teeth to 3 mm of the denture base was calculated. The rest of the denture base till the border was then calculated, therefore, the spacer would occupy the area between the shim of 2 mm thickness and the teeth with 3 mm of the denture base [Figures 1 and 2].

Two split denture flasks with interchangeable counters were used for processing. The trial denture was then processed in the standard manner up to the wax elimination stage in base 1 counter 1 flask. With the wax shim, 2 sheet thickness of base plate wax were adapted to the definitive cast in the drag, conforming to the border extensions. A second flask (counter 2) was used to pour this base plate wax and processed in the conventional manner using heat cure acrylic resin. After deflasking, the clear matrix was placed on the definitive cast(base 1) using the indices in the land area as seating guides [Figure 4].
Vinyl polysiloxane putty was mixed and adapted on the base 1 and shaped to the approximate contours of the matrix. The polymerized putty was shaped with a bur to leave 2 to 3 mm of space between denture base and matrix so that a hollow space is created. An additional, 1 mm space was provided over the tooth portion of the denture. The putty was fixed to the base using cyanoacrylate [Figure 5].

The original cope (counter 1) was reseated on the drag (base 1) and verified for a complete closure of the flask. Then acrylic resin was packed over the polyvinyl siloxane putty and processed. The processed denture was recovered in the usual manner. 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 a thick orthodontic wire. The opening was widened as necessary, to facilitate the access. After complete removal of putty, two covers were fabricated using clear autopolymerizing resin. The clear resin cover was attached using autopolymerizing resin. The denture was polished in usual manner and the seal was verified by immersing the denture in the water (air bubbles should not be evident after immersing the denture in the water) [Figure 6 and 7].
DISCUSSION

Prosthetic management of patient with severely resorbed ridges is a challenge to the dentist. Even though, the choice for rehabilitation can be implant supported overdenture, and ridge augmentation but many a times the patient who come with such a problem are geriatric patients with systemic illness, economic constrains, possess reluctance for a long duration treatment procedure and unwillingness for any kind of surgical procedure. Hence, the best way is to rehabilitate them with the conventional way. Apart, from modifying the impression technique to get maximum denture bearing area, modifying the type of denture may also be better accepted by the patient.  

In general, a conventional (heavy) denture whether maxillary or mandibular is likely to cause poor denture bearing ability. Extensive volume of the denture base material in prosthesis provided to patients with large maxillofacial defects or severe residual ridge resorption is always a challenge to prosthodontists. To increase the retention and stability of heavy prosthesis, many methods have been tried like utilising the undercuts, modifying the impression technique, use of magnets, use of implants, etc  

The prosthodontic treatment plan chosen for this patient was based on several findings noted during case history and examination. Resorbed residual ridge length resulted in increased interridgedistance. If conventional maxillary denture was constructed then it would have resulted in increased weight of the maxillary denture that may result into resorption of maxillary edentulous foundation at a higherrate. Reducing the weight of maxillary prosthesis, however, has been shown to be beneficial when constructing prosthesis for rehabilitation of edentulous patient. This can be achieved by making the maxillary denture hollow.

CONCLUSION

Hollow maxillary complete denture considerably reduces the weight of the prosthesis, which in turn prevents transmission of the detrimental forces, which would otherwise be transmitted from a conventional heavy prosthesis to the underlying tissue and bone. Thus, it helps to preserve underlying tissue and bone. Also, the clear matrix of the trial denture helps to facilitate the shaping of putty spacer to ensure even the thickness of acrylic to resist deformation and prevent seepage of saliva into the cavity. A simplified technique for fabricating light weight maxillary dentures using Thermocol as spacer and putty as a spacer that can be left in the denture without compromising denture strength.

REFERENCES