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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 arenarrow and constricted with increased interarch space provide decreased support, retention and stability. The consequent weight of the processed complete denture only compromisesthem 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 putty[8] or modeling clay[9] have been used during laboratory processes to exclude denture base material from the planned hollow cavity of the prosthesis.

Fattore*et 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 andthe 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 difficultto gauge resin thickness in the cope area.

O'Sullivan *et al.*[11] described a modifiedmethod for fabricating a hollow maxillarydenture. A clear matrix of trail denturebase was made. The trail denture base wasthen 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, thedistance from the teeth to 3 mm of the denture basewas calculated. The rest of the denture base till theborder was then calculated, therefore, the spacerwould occupy the area between the shim of 2 mmthickness and the teeth with 3 mm of the denturebase [Figures 1 and 2].

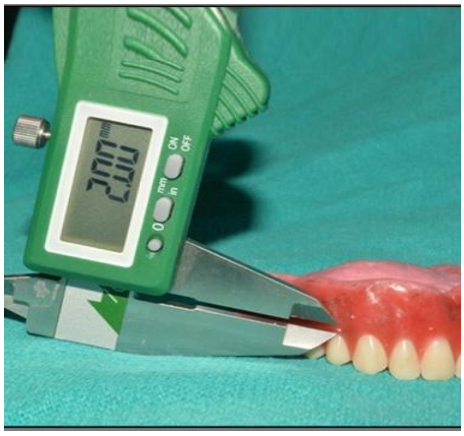

Fig 1.

Fig 2.

Till the tryin stage the denture is fabricated inconventional manner. [figure 3].

Fig 3.

Two split denture flasks with interchangeablecounters were used for processing. The trial denture was then processed in thestandard manner up to the wax elimination stagein base 1 counter 1 flask. With the wax shim, 2 sheet thickness of base platewax 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 usingheat cure acrylic resin. After deflasking,the clear matrix was placed on the definitive cast(base 1) using the indices in the land area as seatingguides[Figure 4].

Fig 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 cynoanocrylate [Figure 5].

Fig 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].

Fig 6.

Fig 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.[12]

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 [12].

The prosthodontic treatment plan chosen for this patientwas based on several findings noted during case historyand examination. Resorbed residual ridge length resulted in increased interridgedistance. If conventional maxillary denture wasconstructed then it would have resulted in increasedweight of the maxillary denture that may result intoresorption of maxillary edentulous foundation at a higherrate. Reducing the weight of maxillary prosthesis,however, has been shown to be beneficial whenconstructing prosthesis for rehabilitation of edentulouspatient. This can be achieved by making the maxillarydenture hollow.

CONCLUSION

Hollow maxillary complete denture considerablyreduces the weight of the prosthesis, which in turnprevents transmission of the detrimental forces, whichwould otherwise be transmitted from a conventionalheavy 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 thethickness of acrylic to resist deformation and preventseepage of saliva into the cavity. A simplified techniquefor fabricating light weight maxillary dentures using Thermocol as spacer and putty as a spacer that can be left in the denture without compromising denturestrength.

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