

Hollow Maxillary Denture Using 3-D Spacer: A Case Report

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Abstract

Numerous factors affect the success of complete denture such as retention, stability, support, aesthetic and masticatory function. The prosthodontist’s expertise lies in how they apply these principles in their clinical practice efficiently in all especially critical situations. Severely atrophied maxillary edentulous ridges with increased inter ridge distance often pose a clinical challenge during fabrication of a successful maxillary complete denture. This article describes a case report of an edentulous patient with increased inter ridge distance where a vacuum formed thermoplastic sheet was used to fabricate the light weight hollow maxillary complete denture.

Key words: Hollow maxillary denture, inter ridge distance, retention, rehabilitation, light weight prosthesis.

Introduction

Atrophied edentulous ridges are the challenge for prosthetic rehabilitation in the dentistry. In spite of the fact that resorption process is generally a more serious clinical problem in the mandibular arch, remarkable loss of alveolar bone in the maxillae can prove equally problematic. Atrophic maxillary ridges usually leads to increase in height as well as weight of the maxillary denture and consequently loses its peripheral seal which compromise the retention and resistance.

Hollowing maxillary denture has been reported to be beneficial similar to fabricating a hollow obturator for a

large hemimaxillectomy defect.^{2,3} In the literature, several approaches toward hollowing maxillary or mandibular complete dentures have been documented by creating a solid three-dimensional spacer. This is achieved by including dental stone⁴⁻⁷, cellophane wrapped asbestos⁸, silicone putty^{9, 10}, or modeling clay.^{11,12}

This case report describes a new technique for the fabrication of a light weight hollow maxillary denture by making a hollow thermoplastic tube. Advantage of this technique is removal of viscous spacer material by creating holes is avoided so that fluid seepage into the hollow cavity is eliminated.

Case report

A 62 years old male patient reported to Department of Prosthodontics, Narsinhbhai Patel Dental College And Hospital, Visnagar, Gujarat, India with the chief complaint of difficulty in eating and speaking due to loss of all teeth. On clinical examination, it was found that maxillary and mandibular ridges were atrophied with increase inter-ridge distance. Conventional method of fabricating removable denture leads to heavy complete dentures that may compound the poor denture-bearing ability of the tissues and lead to decreased retention and stability of prosthesis. Hence hollow maxillary complete denture was planned for this patient.

Technique

1. Fabricate the maxillary denture up to the trial denture stage in the conventional manner.
2. Index the land area of the cast using a bur and duplicate the trial denture in irreversible hydrocolloid (Tropicalgin, Zhermack,) and pour in type III dental stone. (Gyprock)

3. Fabricate a template from 1.5mm thick thermoplastic sheet on recovered cast using vacuum heat-pressed machine (Biostar, Scheu Dental GmbH) to obtain the external contours of trial denture.
4. Place the template on the definitive cast using the indices in the land area as seating guides. Use an endodontic file with a rubber stop to measure the space between the template and the definitive cast. (Fig. 1)
5. Adapt two layers of Modelling wax (Cavex, Modeling wax) to the definitive cast while conforming to the border extensions.
6. Mix the condensation silicon using putty consistency (Zhermack Zetaplus), Adapt it on the cast and Shape to the approximate contours of the ridge form. Shape the polymerized putty with a bur to leave 2-3mm of space between the Putty and Template. Provide additional space of 1mm over the tooth portion of the denture. (Fig .2)
7. Place the putty index in the vacuum heat pressed machine and form a half part of the tube. Similarly, form another part after inverting the index. Approximate both the matrices after removing the putty and join the both matrices together using auto-polymerizing acrylic resin (DPI-RR cold cure) to form a hollow encasement. (Fig. 3, 4)
8. Invest the trial denture into flask (cope) and place the counter flask (first drag) in the standard or conventional manner and complete the dewaxing stage.
9. Adapt the same temporary record base to the definitive cast (cope) and seal the borders adequately. This maintains the thickness of record base and provides more space for hollowing.

10. Take another flask (second drag) to invest the record base and complete the wax elimination in a conventional manner.
11. Pack heat cure polymethylmethacrylate (Meliodent Heat Cure, Kulzer dental) in dough stage and fabricate permanent denture base. (Fig. 5)
12. Place hollow tube over the permanent denture base and fix it with epoxy cyanoacrylate super glue. (Fig. 6)
13. Reseat the original cope on the drag and verify it for complete closure of the flask. (Fig. 7) Pack and process the heat cure resin. Recover, finish and polish the processed denture in the usual manner and insert the denture.

Discussion

When the huge volume of denture base material is provided, it causes weak denture bearing ability due to severe residual ridge resorption. It is tried to make the hollow denture to reduce weight.¹³ The hollow denture helps in reducing the weight as well as additional load on the tissues and residual bone.¹⁴

The procedure described for the fabrication of hollow denture in this article incorporates the use of 3-D thermoplastic tube. This method is advantageous over other previously described methods as it eliminates the fluid seepage, difficulty in gauging resin thickness and tedious retrieval of high viscosity materials such as putty or thermocol by creating a large opening on Cameo surface of denture.

After fabrication of hollow denture weight of denture with thermoplastic tube and another denture which was fabricated by duplicating the definitive cast was measured and that confirms the reduction of the overall density of the prosthesis. (Fig. 8, 9)

Conclusion

A technique for fabrication of a hollow complete denture is described. In this method 3D-spacer was fabricated using a thermoplastic matrix, which was then incorporated within the denture base material during packing stage. This in turn reduces the extra laboratory procedures such as removal of viscous spacer material by creating holes and also prevents complications like fluid seepage into the hollow cavity.

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Legends Figures

Fig. 1 Template with endodontic file, lateral view

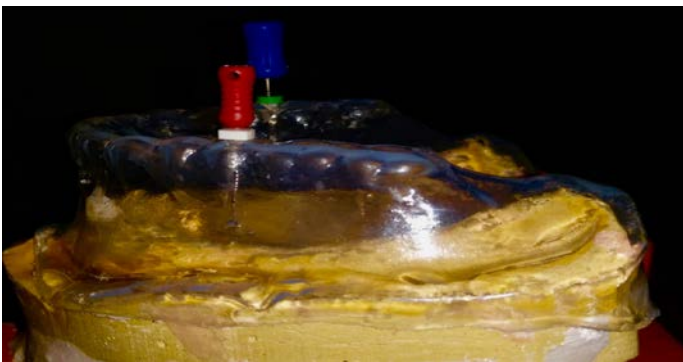


Fig. 2 Putty adapted and shaped to approximate contours of template



Fig. 3 Putty index placed in the vacuum heat-pressed machine



Fig. 4 Hollow thermoplastic tube



Fig. 5 Processed heat cured denture base



Fig. 6 hollow tube fixed with denture base



Fig. 9 Arrow showing Thermoplastic tube

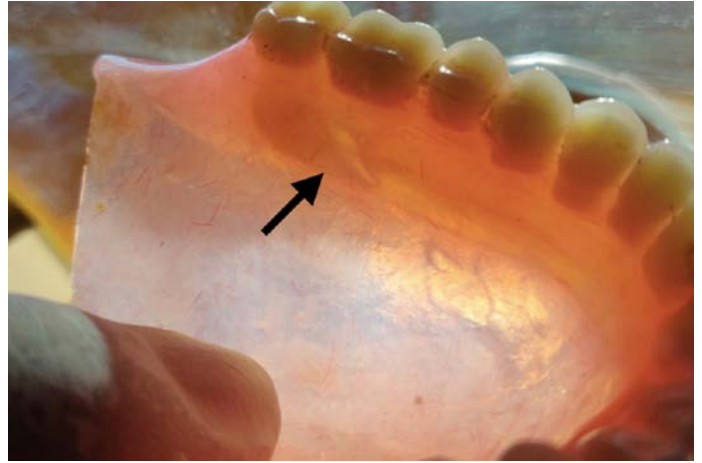


Fig. 7 Original cope for Final closure with processed heat cure record base and hollow tube



Fig. 8 Weight of the hollow denture without and with thermoplastic tube

