

Hollow Maxillary Complete Denture: A New Technique Using Customized 3d Heat Cure Acrylic Resin Shim

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Abstract

Retention, stability and support are the factors which gives success to complete denture. But in severely resorbed ridges these factors are compromised. And the weight of the denture makes the task more difficult. So this article describes a new technique to fabricate a hollow denture in severely resorbed maxilla and mandible (in excessively increased inter ridge distance) by fabricating a hollow 3D heat cure customized acrylic resin shim. The weight of the denture is reduced and it improves the retention, stability and support of complete denture making the prosthesis more comfortable to wear for the patient.

Keywords: Severly resorbed ridges, hollow denture, 3D heat cure acrylic resin shim

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I. Introduction :

Residual Ridge Resorption (RRR) is a relentless phenomenon. Size of the bony ridge under the mucoperiosteum is continuously depleting.^[1] It occurs very fast during the first year after tooth loss.^[2] This results in increased inter-arch space and decreased denture foundation area .^[3] So it is the job of prosthodontist to decrease the weight of the denture and making it comfortable for the patient to wear. This article describes a new technique for fabrication of a hollow maxillary complete denture using customized 3 D heat cure acrylic resin shim.

II. Clinical Case Report

A 70-year-old male patient was registered with the chief complaint of replacement of old dentures to the Department of Prosthodontics, Government dental college and hospital Aurangabad. Past dental history showed that the patient has been a denture wearer for 25 years, and the maxillary prosthesis was quite heavy for the patient. And conventional method of denture fabrication would have resulted in same. So it was decided to deliver hollow maxillary complete denture and a conventional mandibular denture.^[5]



Figure1. Resorbed maxillary and mandibular ridges with increased inter-ridge distance.

III. Technique

1. Primary impression, final impression and jaw relation of complete denture was recorded .
2. Trial of maxillary complete denture was done in conventional manner in patients and sealed to the definitive cast.(fig.1)
3. Indexing was done on the cast using a conical bur for orientation.
4. Duplication of the trial denture was done in reversible hydrocolloid impression material (zhermack tropicalgin) and poured in type 3 dental stone (Gold stone).(fig 2a,b)
5. A template of the duplicated trial denture was made by adapting 1 mm hard thermoplastic sheet on the recovered cast using vacuum heat pressed machine Biostar.
6. Now the clear template was placed on the definitive cast (with DPI modeling wax, of 2mm thickness adapted over land area of cast) using the indices in the land area as orientation guides.
7. Condensation silicon putty (zeta plus zhermack) was mixed and adapted on the wax sheet on final cast and shaped to the approximate contours of the matrix.⁽⁶⁾
8. The polymerized putty was cut by scalpel blade in such a way to leave 2mm of space between the putty and the cervical portion of the clear template and also all over the matrix side.(fig.3)
9. To measure the space between the template and the adapted putty an endodontic file with a rubber stopper was used to check for equal amount of 2mm space left.⁽¹⁾ (fig.4)
10. Now for fabrication of 3D heat cure acrylic resin shim wax of 2 mm thickness was adapted over all surfaces of putty spacer.(fig.5a,b)
11. Then this upper maximum part of the shim and its lid was processed separately in two flasks .(fig.6a,b)
12. And these parts were fabricated in heat cure acrylic resin material (DPI Heat cure acrylic resin material) by conventional method.(fig.7a,b)
13. These two processed parts were joined by autopolymerizing acrylic resin material (DPI Cold cure acrylic resin material). This hollow heat cure acrylic resin 3D shim is tested by immersing in the beaker of water.(fig.8a,b)
14. The accuracy of the 3 D hollow shim was assessed from all aspects by placing it between the master cast (with 2 mm modelling wax adapted to it) and the biostar template.
15. The trial denture was then processed in the conventional manner upto wax elimination stage.
16. After this, a trial closure was carried out using the 3D shim. The flasks were opened and the shim was retrieved .The mold space was visually assessed for adequate resin thickness all around the shim area and the flasks were closed by reinserting the shim inside. And the denture was fabricated in conventional manner with the hollow 3D shim inside.(fig.9a,b)
17. The denture was retrieved and finished ,polished in the usual manner.⁽⁷⁾
18. The seal was verified by immersing the denture in water.(fig.10)
19. Denture insertion was done in patient.(fig.11a,b)



Fig.2.a

Fig.2.b

Figure2(a,b) Trial of maxillary denture was done and duplicated in dental stone

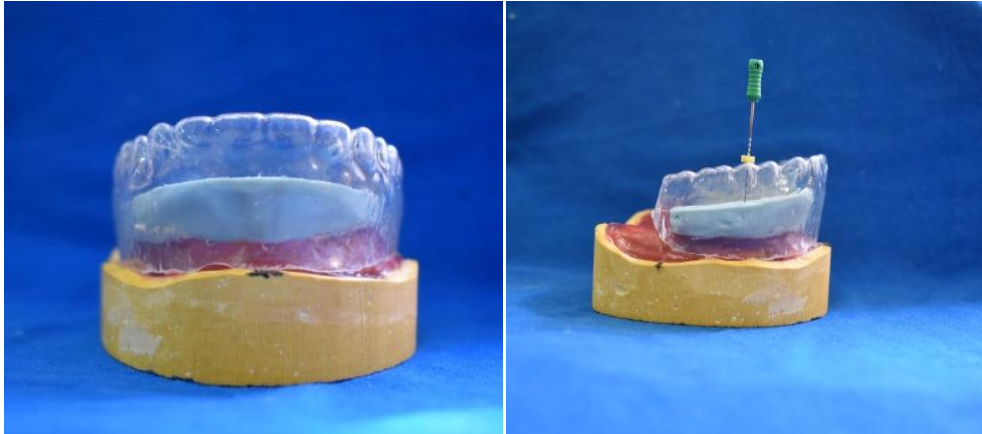


Fig.3

Fig.4

Figure 3 : 3 mm of space left between putty and cervical region of clear template.
Figure 4: Distance between template and putty is measured with the help of an endodontic file having rubber stopper.



Fig.5.a

Fig.5.b

Figure 5 (a,b) 1 mm of modelling wax adapted over trimmed putty to fabricate one part of hollow shim and rechecked for space availability



Fig.6.a

Fig.6.b

Figure 6. Processing customized shim (one major part in one flask and lid in another flask)



Fig.7.a

Fig.7.b

Figure 7(a,b) Major part of 3D hollow shim was fabricated



Fig.8.a

Fig.8.b

Figure 8(a,b) Lid fabricated and joined with other major part by autopolymerizing resin which makes the hollow shim to float in water



Fig.9.a

Fig.9.b

Figure 9(a,b) Hollow shim is packed in the counter part (containing teeth) after assessing it from all side .



Fig.10

Hollow denture floating in water .



Fig.11.a



Fig.11.b

Denture insertion in patient and post operative view.

IV. Discussion

The method described in this article is to fabricate a hollow denture by processing a separate customized heat cure acrylic resin shim to incorporate it in conventional packing method of fabrication of complete denture. Most of the techniques described earlier used some materials which were incorporated inside and retrieved after denture by making holes at the end and sealing with autopolymerizing resin which created problem like leakage of fluid, some fabricated two parts of denture and joined with autopolymerizing resin causing discoloration later, some used two flask technique which is a cumbersome job. But in this technique the hollow space of the denture is fabricated previously in heat cure acrylic resin shim (3D) and then incorporated in the packing stage of the conventional denture fabrication technique. In spite of being technique sensitive this technique offers one piece fabrication of the denture without any need of retrieval of inserted material.

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