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Suction tip: A tip for hollow denture -A case report

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Abstract

The fabrication of complete denture has many challenges. Prosthodontic rehabilitation of completely edentulous maxillary and mandibular arches which are severely resorbed residual ridges may result in increased weight and height of the prosthesis which will compromise the retention and stability of the complete denture. This article describes a novel technique for the fabrication of a hollow complete maxillary denture using a simple suction tip to create a cavity with appropriate dimensions, maintaining structural integrity of the denture base for optimal weight reduction.

Keywords: Severely resorbed ridges, hollow denture, light weight denture. suction tip.

Introduction

The residual ridge resorption is a chronic irreversible disorder which is affected by anatomic, prosthetic, metabolic, systemic, functional and aesthetic factors [1]. The size of residual ridge is reduced most rapidly in the first six months, but the bone resorption activity continuous throughout life at a slower rate resulting in removal of large amount of jaw structure. The rate of residual ridge resorption is different among persons and even at different sites in the same person.

This phenomenon leads to apparent loss of sulcus width and depth, changes in inter -alveolar ridge relationship with increased inter- arch space with long lip length. Restoration of the vertical dimension and aesthetics thus demands increased height of the prosthesis and in turn leads to an increase in prosthesis weight. Reducing the weight of the denture enhances stability and retention and reduces further resorption of the jaw, thereby favoring the prognosis of the denture. [2]

So, the main goal of the prosthodontist will be to rehabilitate these patients with complete denture which has good retention, stability and support. Conventional denture leads to an extensive volume of denture base material especially in the maxillary denture which leads to increase in the weight of denture thereby questioning the retention of the denture.

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In the literature many authors have suggested various methods to reduce the weight of the prosthesis using a solid three- dimensional space, including dental stone, silicone putty, cellophane-wrapped asbestos, light-body coated gauze, modelling clay, salt, thermocol, caramel and glycerine. This article describes a more easy and convenient method of fabrication of hollow denture using a simple suction tip.

Case report

A 82 years old male patient reported to the Department of Prosthodontics, The Oxford Dental College, Bangalore with a completely edentulous maxillary and mandibular arches. His chief complain was inability to chew properly due to his attrited old ill - fitting denture. Patient had a history of diabetes and hypertension and was on medication. Intra oral examination revealed well rounded ridges with increased inter ridge distance in class 1 relationship. His upper lip was long with increased vertical dimension at rest and vertical dimension of occlusion. The treatment options were explained to patient and it was decided to fabricate a hollow maxillary denture and a conventional mandibular denture.

The steps for the fabrication of a hollow maxillary denture with suction tip are as follows

1. Primary impression was made with impression compound using edentulous stock tray in relation to maxillary and mandibular arches.

2. The casts were poured in dental plaster.

3. Custom trays were fabricated with a spacer (1 mm; 4 tissue stops) for both the arches. [Fig 1]

4. The tray was placed in patients mouth and trimmed 2 mm short of sulcus.

5. Border moulding was performed using low fusing green stick compound and secondary impression was

made using zinc oxide eugenol impression material. [Fig 2]

6. Master cast was poured in type 3 dental stone.

7. Denture base and occlusal rims were fabricated in a conventional manner and facebow transfer and was done. [Fig 3]

8. Teeth were arranged in balanced occlusion and try in was done in the conventional manner. [Fig 4]

9. The distance from the ridge lap area of the tooth to the denture base was measured. [Fig 5].

10. From the total length 3 mm thickness of denture base and 2 mm thickness from ridge lap area were subtracted considering the strength of the denture. [Fig 5]

11. The value thus obtained will determine the area of the spacer.

12. The denture will be flasked and Dewaxing will be done in the conventional manner.

Preparation of the suction tip

The suction tip is adapted into the mould space. The length of the suction tip is decided according to the arch form. The excess length of the suction tip will be cut using the B.P blade. As the suction tip has an incorporated wire, the arch form will be maintained and also will aid in easy retrieval of the tip after the denture processing. The ends of the tip will be sealed using putty material. [Fig 6]

13 The heat cure denture base material is manipulated until dough stage and then placed in the mould space. [Fig 7]

14 Following which the prepared suction tip is placed on the heat cure denture base material and then another layer of heat cure denture base material is added upon the suction tip.

15 Then the flasked are closed and cured in the conventional manner.

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16 The processed denture is recovered and the suction tip along with the putty is retrieved using an orthodontic plier. [Fig 8]

17 The openings created by the putty material is sealed using the auto polymerizing resin. [Fig 9]

18 Finishing and polishing are done are performed in a usual manner.

19 Denture is delivered to patients with the post insertion instructions and reviewed after 24 hours. [Fig 11]

Discussion

The highly resorbed ridges can be successfully treated with proper prosthodontic approach. Patient convivence, cost, surgical complications and most importantly the age factor also determines the treatment plan. Prosthodontic treatment without surgical intervention is considered as a best option in most situations especially in geriatric patients with systemic illness and economic constrains they possess reluctance for a long duration of treatment procedure and unwillingness for any kind of surgical procedure.

So, while fabricating the complete denture in the patients with resorbed ridges various authors have tried to decrease the weight of the prosthesis to increase the retention and stability of the maxillary denture using various methods.

Different weight reduction approaches have been achieved earlier using a solid three-dimensional spacer, including dental stone (Ackermen, 1955), cellophanewrapped asbestos, silicone putty or modelling clay during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.

Holt processed a shim of indexed acrylic resin over the residual ridge and used a spacer which was then

removed and the two halves and was luted with auto polymerized acrylic resin. [3]

Fattore et al. used a variation of the double flask technique for obturator fabrication by adding heatpolymerized acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth using different drag. Both portions of resin were attached using a heat-polymerized resin. [4]

O'Sullivan et al. described a modified method for fabricating a hollow maxillary denture. A clear matrix of the trial denture base was made. The trial denture base was then invested in the conventional manner till the wax elimination. A 2-mm heat-polymerized acrylic shim was made on the master cast, using the second flask. Silicone putty was placed over the shim and its thickness was estimated using a clear template. The original flask with the teeth was then placed over the putty and the processing was done. The putty was later removed from the distal end of the denture and the openings were sealed with auto polymerizing resin. The technique was used in estimation of the spacer thickness, but the removal of the putty was found to be difficult, especially from the anterior portion of the denture. Moreover, the openings made on the distal end had to be sufficiently large to retrieve the hard putty.[5]

Chaturvedi et al. used dough of dental plaster – pumice and sugar syrup rolled and placed it over heat-cured base to act as a spacer. Heat polymerizing resin was then mixed, packed, and processed. Two small openings were made with bur into denture base distal to most posterior teeth. Dental plaster – pumice and sugar syrup were then removed by scraping and keeping it in water. The opening was then closed by auto polymerizing resin.[6] Shetty et al. used a denser thermocol and placed it over the roughened acrylic shim along the ridge and luted with cyanoacrylate. [7]

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Aggarwal H et al describes a case report of an edentulous patient with resorbed ridges where a simplified technique of fabricating a hollow maxillary complete denture using lost salt technique was used for preservation of denture bearing areas. [8]

Hollow denture not only decreases the weight of the denture but also reduce the detrimental force acting on the underlying tissues and decrease the rate of resorption of bone.

The procedure described in this article where the suction tip is used to create a uniform hollow cavity is advantageous as it is less expensive, biocompatible, easy availability, minimal steps of fabrication and less time consuming and also allows easy retrieval with less repair area so that the structural integrity of the denture is maintained.

Conclusion

Completely edentulous ridges with atrophic ridges can be successfully treated with complete denture if there is a careful approach to the case from impression making till denture fabrication. Suction tip will surely act as a best tip for the hollow denture as the physical properties and handling make it practically suitable for fabricating hollow denture.



Fig 1: Fabrication of custom tray



Fig 2: Border moulding and secondary impression made with ZOE.



Fig 3 : Facebow transfer done.



Fig 4 :Try in done and centric relation is verified.



Fig 5: Measurement to determine the mold space.



Fig 6: preparation of the suction tip.



Fig 7 : Suction tip placed in the mold space.



Fig 8 : The suction tip is pulled out from the processed Denture.



Fig 9: The holes are sealed using auto polymerizing resin.



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Fig 10: Hollow maxillary denture.

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Fig 11 : Before insertion of denture.



Fig 12 : After insertion of denture.

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