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Unconventional denture fabrication technique for patient with increased vertical dimension: An innovative alternative

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Abstract

The success of complete denture depends upon the principles of retention, stability, and support. Increased interridge space due to Progressive resorption of alveolar ridge mainly because of disuse atrophy often lead to fabrication of complete denture with exceptional heavy-weighted which has inherent ability for action of leverage forces, hence affecting the retention, stability, and support. This article describes the case of a completely edentulous patient with increased interridge space, which was successfully rehabilitated with a hollow denture fabricated using corrective compound impression technique and Alternative Technique to Remove the Silicone Putty.

Keywords: autopolymerizing resin; hollow denture; interarch space, corrective compound impression

Introduction

According to Atwood *et al* in 1971 Residual ridge resorption is a chronic irreversible physiological/ pathological process that affects the height and width of the alveolar ridges resulting in reduced denture bearing area and an altered inter-alveolar ridge space⁽¹⁾. This increased inter-ridge distance provides a large restorative space, resulting in a heavier maxillary complete denture due to the incorporation of a greater volume of denture base material. Consequently, decreased denture bearing area, increased the weight of the prosthesis and gravity can negatively affect the retention of the prosthesis^[2].

Because of heavier denture it is important to reduce the weight of upper maxillary denture by different hollowing techniques. Fabrication of hollow dentures has been tried to decrease the weight of the prosthesis which in turn increases the retention and stability. Weight reduction approaches have been achieved using a solid three dimensional spacer using different material such as:

1. cellophane- wrapped asbestos^[3]
2. silicone putty^[4-6]
3. light-body coated Gauz^[7]
4. thermocol^[8]
5. dental stone^[9]
6. play dough^[10]
7. salt^[11].

Fatlore *et al*. used a variation of a double flask technique for obturator fabrication by adding heat polymerizing acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth using a different drag. Both portions of resin were then attached using heat polymerized resin. Holt processed a shim of acrylic resin over the residual ridges and used a space. (Insta-mold, Nobilium, Albany, NY). The resin was indexed and the second half of the denture processed against the spaces and the shim. The spaces were then removed and the two halves looted with auto polymerized acrylic resin using the indices to facilitate positioning^[12] using this two technique as an guide this article describes an alternative method

to remove the silicone putty and to make the maxillary denture into 2 halves and join it with auto polymerizing acrylic resin.

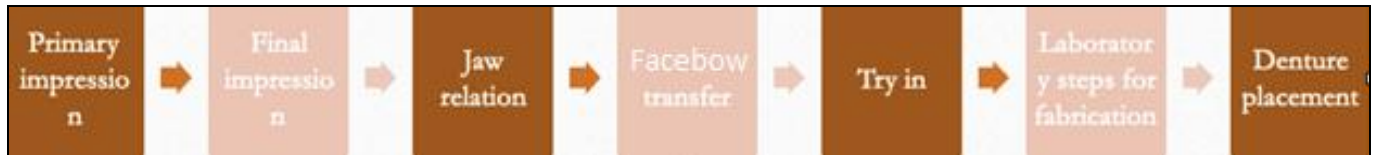
Case Report

A male patient named Devendra of age 52 years reported to the Dept of Prosthodontics & Crown & Bridge with normal gait and body posture presented with completely edentulous maxillary and mandibular arch, with a chief complain of difficulty in eating and speaking.

On Intraoral examination it reveals that Patient has a Order I

in the maxillary ridge and Order VI mandibular ridge ^[13] with Class I tongue position according to wright classification ^[14] and increased Inter ridge distance.

On extraoral examination it revealed that patient has ovoid facial form with straight facial profile, lip examination reveals thick competent medium lips, mouth opening is adequate ie 45mm no deviation seen in mandible. patient has been explained about different treatment option but due to financial problem. Patient desired a removable prosthesis for both maxillary and mandibular arches.



Procedure

1. impression of maxilla was made using corrective compound impression technique followed by primary impression of mandible using admixed technique (fig 1,2)
2. Master cast was obtained from secondary impression.
3. Jaw relation was done. fabrication of wax occlusal rim of maxilla with increase height and keeping the mandible rim with decrease height in order to decrease the horizontal cantilever action on the mandible. since the mandible alveolar bone is resorbed severely hence it is required to keep the height of lower rim as small as possible. (fig 3)
4. try in was done (fig 4.)
5. maxillary denture was prepared for dewaxing procedure (fig 5).
6. upper part of flask was packed with silicone putty (fig 6).
7. Dewaxing was performed.
8. The Trial denture base was flaked and de waxing was done. The teeth get transferred to the upper lid of the flask and the permanent denture base is in the lower lid. 2 layer thickness of base plate wax is adapted over the teeth and trough like depression is made in the base plate wax to create space for the silicone putty (fig 9, 10)
9. Silicone putty is mixed and made in the form of rope and adapted over the trough region (fig 7).
10. On the same time 2 layer of wax was adapted on the retrieved maxillary cast, using this heat cure permanent denture base is obtained (fig 8).
11. Then the flask lids with permanent denture base were closed and the silicone putty placed inside the wax trough is transferred to permanent denture .
12. A cellophane sheet is adapted over the silicone putty present over the permanent denture base and the base plate wax covering the teeth is removed (fig 11, fig 12)
13. Heat polymerized acrylic resin (Trevalon C) is mixed and placed over the removed wax area and the flask is closed and processing is done.
14. After processing, the flasks are separated and permanent denture base is present in flask and silicone putty is transferred to the upper half of the maxillary denture where teeth is present (fig 13)
15. Cellophane sheet and silicone putty is removed and upper Hollow Half of the maxillary denture with teeth is joined with the permanent denture base using auto polymerizing acrylic resin (fig 14)
16. Polish the denture in the usual manner. Verify that the cavity is sealed by immersing the denture in water.

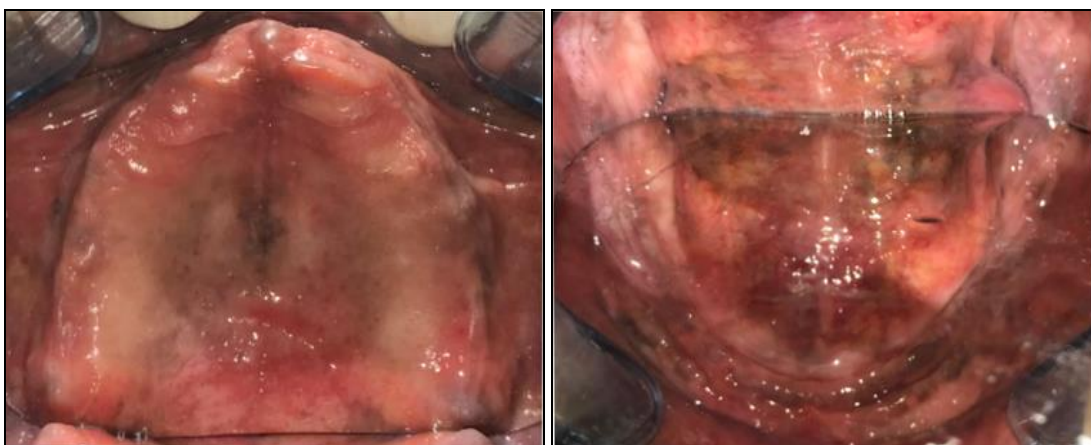


Fig1: pre operative image of maxillary and mandibular ridges



Fig 2: impression of maxilla was made using corrective compound impression technique , border molding was done over this impression , followed by final impression made using light body polyvinyl silicone impression material

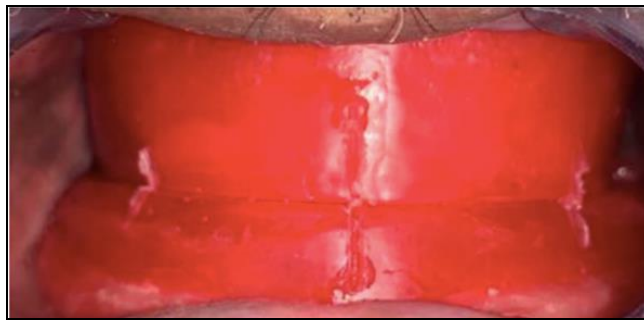


Fig 3: Tentative jaw reaction was performed



Fig 4: Maxillary Try In Denture



Fig 5: Silicone putty adapted over the wax

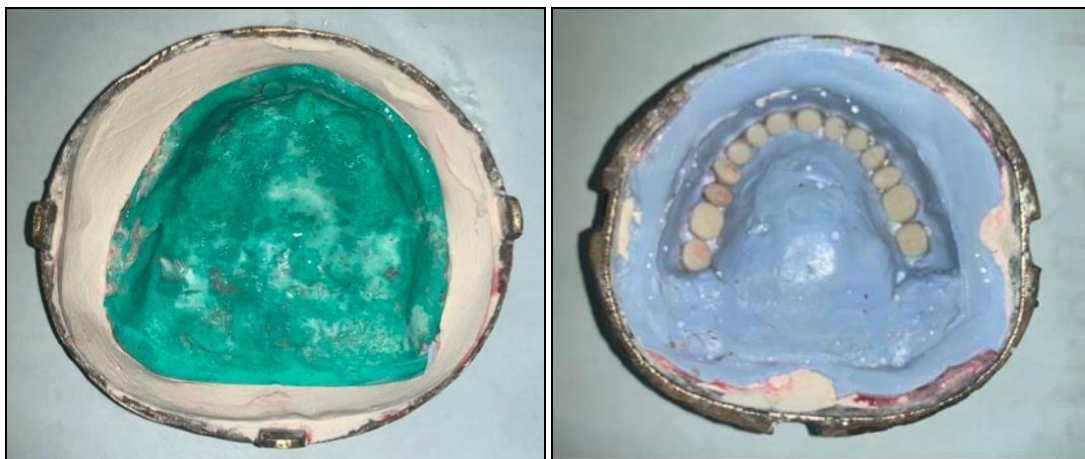


Fig 6: Dewaxing Done for Maxillary



Fig 7: Wax adapted over the teeth

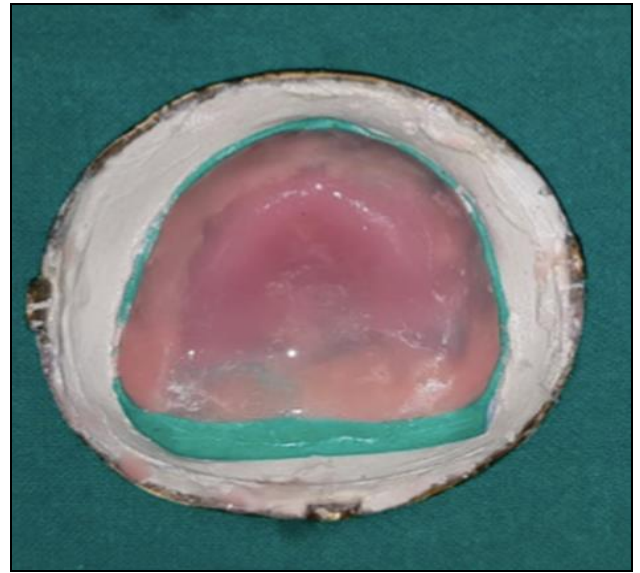


Fig 10: heat cured denture base is obtained



Fig 8: Silicone putty adapted over the wax



Fig 11: Silicone putty transferred to the denture base



Fig 9: two layer of wax sheet is adapted over the retrieved maxillary cast



Fig 12: Cellophane sheet adapted over the silicone putty

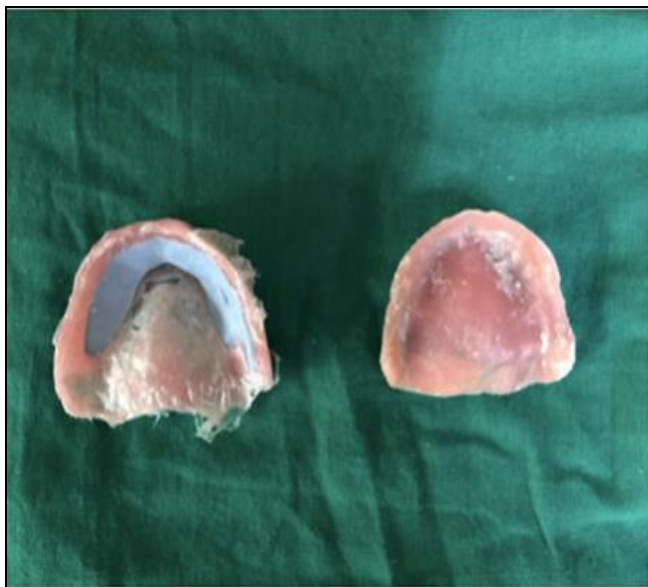


Fig 13: Silicone putty transferred to the upper half of maxillary denture.

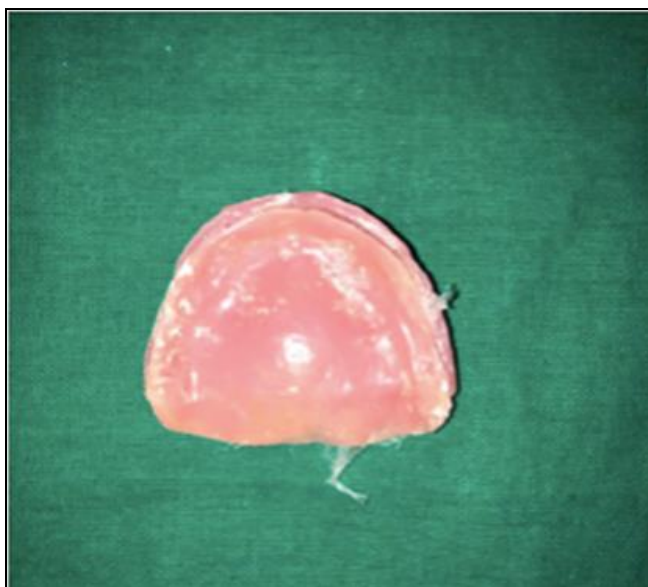


Fig 14: Silicone putty transferred removed and cure denture base is fixed with upper half of denture using cold cure and cyanoacrylate



Fig 15: light weight denture for maxillary region

Discussion

The goal of prosthodontic treatment is to palliate the anatomical and functional deficiencies resulting from tooth loss. Tooth loss leads to residual ridge resorption which is a complex phenomenon driven by various anatomic, prosthetic, functional and metabolic factors. Extreme resorption of either ridge will lead to a reduced denture-bearing area, which in turn will affect retention, stability and support for the complete denture. Excessive ridge resorption also results in a large restorative space between the residual ridges. Prosthetic rehabilitation in such scenarios often results in increased height and weight of the prosthesis, overloading the residual ridges and further compromising the retention and stability of the prosthesis.

Fabrication of hollow dentures has been tried to decrease the weight of the prosthesis which in turn increases the retention and stability. Weight reduction approaches have been achieved using a solid three dimensional spacer, including cellophane-wrapped asbestos, silicone putty, light-body coated gauze, thermocol, dental stone, play dough and salt during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis. Although successful, the biggest disadvantage of these techniques is the tedious retrieval of the three dimensional spacer especially from the anterior region of the prosthesis between the canines due to the curvature of the arch. To overcome these problems authors have used a double flask technique for fabrication of hollow denture. Double flask technique means these techniques utilized a pair of split dental flasks with interchangeable counters where one set of flasks was used to first obtain a permanent record base followed by using a second set of flasks to pack heat cure acrylic resin over the teeth this creates a long junction which increase the risk of seepage of fluid into the denture cavity. Furthermore, this junction is a common site for post insertion adjustment increasing the risk of leakage.

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