CASE REPORT

Maxillary Hollow Denture: A Case Series

Laxman Singh Kaira

ABSTRACT

Retention, stability and support are the basic principles on which the success of a complete denture relies on. The skill lies in applying these principles efficiently in critical situations. Residual ridge resorption occurs at a three times faster rate in mandibular arch than in the maxillary arch. The severely resorbed maxillary and mandibular edentulous arches that are narrow and constricted with increased interarch space provide decreased support, retention and stability. The consequent weight of the processed complete denture only compromises them further. The severely resorbed jaw can have various treatment option. This clinical report describes three case reports of an edentulous patients with resorbed ridges where a simplified technique of fabricating a light weight hollow maxillary complete denture was used for the preservation of denture bearing areas.

Keywords: Resorbed ridge, Hollow maxillary denture, Resorption.

How to cite this article: Kaira LS. Maxillary Hollow Denture: A Case Series. J Orofac Res 2012;2(2):109-112.

Source of support: Nil

Conflict of interest: None declared

INTRODUCTION

'No step in denture construction should be stopped short of perfection yet many dentures are worn which have imperfections built into them provided they have peripheral seal sufficient to hold them in place'. In the large maxillofacial defects and in severely resorbed edentulous ridges, there is a decreased denture bearing area for support, retention and stability. 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 three-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 polymerizing acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth using a different drag. Both portions were attached using a heat polymerized resin.

Holt et al[8] processed a shim of indexed acrylic resin over the residual ridge and used a spacer which was then removed and the two halves luted with autopolymerized acrylic resin. The primary disadvantage of such technique is that the junction between the two previously polymerized portions of the denture occurs at the border of the denture which increases risk of seepage of fluid into the denture cavity. Another disadvantage is that it is difficult to gauge resin thickness in the cope area.

O'Sullivan et al[11] described a modified method for fabricating a hollow maxillary denture. A clear matrix of trail denture base was made. The trail denture base was then 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 remove from the distal end of the denture and the opening were sealed with autopolymerizing resin. This case reports describes three technique for fabrication of a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges and increased interridge distance.

CLINICAL REPORT

A 59-year-old male patient reported to the Department of Prosthetic Dentistry of Institute of Dental Sciences, Bareilly, Uttar Pradesh 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 4 to 5 years and the maxillary denture were loose. Intraoral examination revealed severely resorbed maxillary and mandibular edentulous ridges with increased interridge distance (Fig. 1). Hence, hollow maxillary complete denture and conventional mandibular denture was planned for this patient.

Technique

1. Keeping in mind the strength of denture, the distance from the teeth to 3 mm of denture base was calculated. The rest of the denture base till the border was then calculated therefore, the spacer would occupy the area between the shim of 2 mm thickness and teeth with 3 mm of the denture base (Figs 1 and 2).
2. The maxillary denture was fabricated up to the try in denture stage in the conventional manner.
3. The land area of the cast was indexed using a conical bur and the trail denture was sealed to the definitive cast.
4. The trail denture was duplicated in reversible hydrocolloid and poured in die stone.

Fig. 1: Preoperative photograph

Fig. 3: Placement of clear matrix over denture base with endodontic files

Fig. 2: Clear template adaptation

Fig. 4: Putty adaptation and placement of matrix with file checking space

5. A template of the duplicated trail denture was made by adapting 1 mm thermoplastic sheet on the recovered cast using vacume heat-pressed machine (Fig. 3).
6. Two split denture flasks with interchangeable counters were used for processing.
7. The trial denture was then processed in the standard manner up to the wax elimination stage in base 1 counter 1 flask.
8. With the wax shim two sheet thickness of base plate wax were adapted to the definitive cast in the drag, conforming to the border extensions (Fig. 4). A second flask (counter 2) was used to pour this base plate wax and processed in conventional manner using clear heat cure acrylic resin (Fig. 5).
9. After deflasking the clear matrix was placed on the definitive cast (base 1) using the indices in the land area as seating guides. An endodontic file with the rubber stop was used to measure the space between the matrix and the processed base (Fig. 6).

Fig 5: Hollow denture floating in jar

10. 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 and matrix.

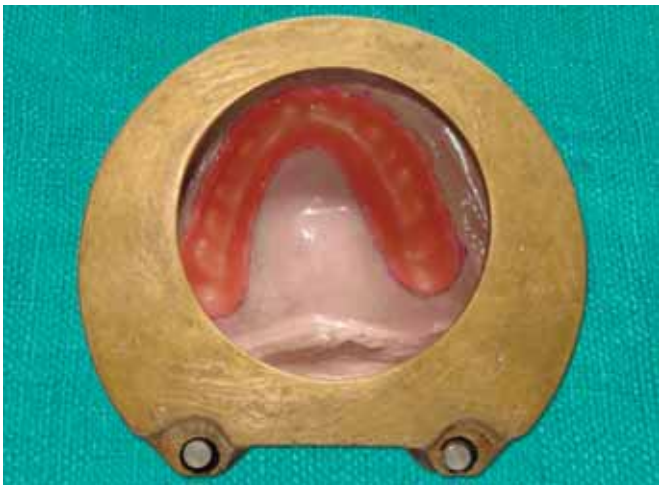

Fig. 6: Top half of the second split flask over the wax shimmed

Fig. 7: Silicone putty in place in processed alveolar part of denture

An additional 1 mm space was provided over the tooth portion of the denture. The putty was fixed to base using cyanoarcylate (Fig. 7).

11. The original cope (counter 1) was reseated on the drag (base 1) and vertified for complete closure of the flask. Then acrylic resin was packed over putty and processed. The processed denture was recovered in the usual manner.
12. After finishing the denture two openings were cut with a bur into the denture base distal to the most posterior tooth. The silicone putty removed using a sharp instrument and thick orthodontic wire. The opening were widened as necessary, to facilitate access. After complete removal of putty, to covers were fabricated using clear autopolymerizing resin. The clear resin cover were attached using autopolymerizing resin.
13. The denture was polished in the usual manner (Figs 8 and 9) and the seal was verified by immersing the denture in water. (air bubbles should not be evident after immersing the denture in water) (Fig. 10). Patients was satisfied with the hollow complete denture (Fig. 11).

Fig. 8: Acrylic shim on the processed alveolar part of the denture

Fig. 9: Separate the silicone putty and autopolymerizing acrylic resin shim

DISCUSSION

The technique overcomes the disadvantage of the older techniques. Problems with leakage and difficulty in gauging resin thickness are overcome. The small window in the cameo surface facilitates recovery of the spacer in an area that is not commonly adjusted after denture insertion and has a small margin along which leakage can occur. The clear resin window allows verification of the integrity of the denture at patient recall. The thickness of resin can be controlled through the use of putty and clear matrix, ensuring an even depth of resin to prevent seepage and prevent deformation under pressure of flask closure. In the technique silicone putty was used as spacer because it is stable, it can be carved and it does not adhere to acrylic resin. The cyanoacrylate bond between the resin and the putty is easily removed.[11]

Fig. 10: Floating hollow denture

Advantages of Technique

1. Reduce leakage at the junction of the two portions of the denture.
2. Commonly used materials are used for its fabrication.
3. Reduces weight of the prosthesis which in turn enhances retention.

Disadvantages

1. Time consuming procedure.
2. Hollow denture is prone to fracture.
3. Removal of putty from the cavity is difficult.

Precautions

1. There should be adequate thickness of resin around the cavity.
2. Seal around the window should be perfect and should be checked for leakage.
3. Denture care instructions should be given to the patients.
4. Special instructions regarding handling of the denture should be given as the dentures are prone to fracture.[11]

CONCLUSION

Hollow maxillary complete denture considerably reduces the weight of the prosthesis which in turn prevents transmission of detrimental forces which would otherwise be transmitted from a conventional heavy 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 shaping of putty spacer to ensure an even thickness of acrylic to resist deformation and prevent seepage of saliva into the cavity. A simplified for fabricating light weight maxillary dentures using putty as a spacer that can be left in the denture without compromising denture strength.

REFERENCES

1. El Mahdy AS. Processing a hollow obturator. J Prosthet Dent 1969;22:682-86.
2. Brown KE. Fabrication of a hollow bulb obturator. J Prosthet Dent 1969;21:97-103.
3. Chalian VA, Drane JB, Standish SM. Intraoral prosthesis. In: Chalian VA, Drane JB, Standish SM (Eds). Maxillofacial prosthetics: Multidisciplinary practice. Williams and Wilkins, Baltimore 1971;133-37.
4. Fattore LD, Fine L, Edmonds DC. The hollow denture: An alternative treatment for atrophic maxillae. J Prosthet Dent 1988;59:514-16.
5. Gardner LK, Parr GR, Rahn AO. Simplified technique for the fabrication of a hollow obturator prosthesis using vinyl polysiloxane. J Prosthet Dent 1991;66:60-62.
6. McAndrews KS, Rothenberg S, Minsley GE. An innovative investment method for the fabrication of a closed hollow obturator prosthesis .J Prosthet Dent 1998;80:129-32.
7. Nidiffer TJ, Shipman TH. Hollow bulb obturator for acquired palatal openings. J Prosthet Dent 1957;7:126-34.
8. Worley JL, Kneiejski ME. A method for controlling the thickness of hollow obturator prosthesis. J Prosthet Dent 1983;50:227-29.
9. Holt RA Jr. A hollow complete lower denture. J Prosthet Dent 1981;45:452-54.
10. Jhanji A, Stevens ST. Fabrication of one piece hollow bulb obturators. J Prosthet Dent 1991;66:136-38.
11. O'Sullivan M. The hollow maxillary complete denture: A modified technique. J Prosthet Dent 2004;91:591-94.

ABOUT THE AUTHOR

Laxman Singh Kaira

Senior Lecturer, Department of Prosthodontics, Institute of Dental Sciences, Bareilly, Uttar Pradesh, India

CORRESPONDING AUTHOR

Laxman Singh Kaira, Senior Lecturer, Department of Prosthodontics Room No. 97, Opposite Suresh Sharma Nagar, IDS Bareilly, Uttar Pradesh India, Phone: 8755902525, e-mail: luckysinghkaira111@gmail.com