

Hollow Maxillary Denture: A Simplified Approach

Saurabh Chaturvedi, A.K. Verma, Mariyam Ali, Preeti Vadhvani

Department of Prosthodontics and Crown and Bridges, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow-226060

(Received November, 2011)

(Accepted July, 2012)

Abstract:

It is the dentist's responsibility to fabricate a prosthesis incorporating stability, retention and support which ultimately provide satisfaction to the patient. But in the critical conditions such as long lip length or severely resorbed ridges with increased inter arch distance, the weight of a maxillary denture is often a dislodging factor. Hence, a light weight denture is required for better retention. This article describes a case of completely edentulous patient successfully rehabilitated with a hollow denture where a simplified technique of fabricating a light weight maxillary denture was used.

Key Words: Complete denture, hollow maxillary denture, inter ridge distance, light weight denture, residual ridge resorption.

Introduction:

Extreme resorption of the maxillary denture bearing area may lead to problems with prosthetic rehabilitation. These may be due to narrower, more constricted residual ridge as resorption progresses, decreased supporting tissues and a resultant large restorative space between the maxillary and mandibular residual ridge. Long lip length adds to this problem. This may result in a heavy maxillary denture that may further compound the poor denture-bearing ability of the tissues and lead to decreased retention and resistance (O'Sullivan et al, 2004).

The dentist should use his specialized training and prosthetic abilities to overcome the above stated problems with simple techniques. To decrease the leverage, reduction in the weight of the prosthesis would be beneficial (Brown, 1969; el Mahdy, 1969). It improves the cantilever mechanics of suspension and overtaxing of the remaining supporting structures.

In this case report, edentulous old male patient with increased inter-ridge distance and long lip length was treated with a hollow maxillary denture, fabricated using Dental Plaster & Pumice (Prevest Denpro Ltd., Jammu)-Sugar syrup paste which is water soluble and can be readily removed without any difficulty.

Various weight reduction approaches have been achieved using a solid three dimensional spacer, including dental stone (Ackermen, 1955), cellophane

wrapped asbestos (Worley & Kniejski, 1983), silicone putty (Holt, 1981) or modelling clay (DaBreo, 1990) during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.

Holt (1981) 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 auto polymerized acrylic resin.

Fattore et al (1988), used a variation of the double flask technique for obturator fabrication by adding heat polymerized 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.

O'Sullivan et al (2004) 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 2mm heat polymerized acrylic shim was made on the master cast, using a 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 autopolymerizing resin.

The technique was useful in estimation of the spacer thickness, but 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.

Corresponding Author: Dr. Preeti Vadhvani, Department of Prosthodontics, Career Post Graduate Institute of Dental Sciences & Hospital, Lucknow-226060
Phone No.: 07800722615
E-mail : dr.preeti_vadhvani@yahoo.com

Case Report:

A 55year old male patient reported to the Department of Prosthodontics with the chief complaint of difficulty in chewing food and heaviness in his upper denture. History revealed that patient was edentulous for past 18 years and had used many sets of complete dentures. On examination, it was found that patient was dolicocephalic. Both maxillary and mandibular ridges were severely resorbed. His upper lip was long, the inter-ridge distance was more than normal and vertical dimension of occlusion(VDO) and vertical dimension at rest (VDR) were more than average (Fig. I). The previous denture of the patient was heavy with attrited teeth and was under extended. Hence, it was decided to fabricate a new set of denture for the patient. The treatment options for complete denture available to the patient were:

- a. Implant supported complete denture
- b. Conventional Complete denture
- c. Hollow maxillary complete denture and conventional mandibular complete denture.

After analysing each available option, it was decided to fabricate hollow maxillary complete denture. The patient also approved of the treatment modality as it was light in weight, inexpensive and non-surgical procedure.

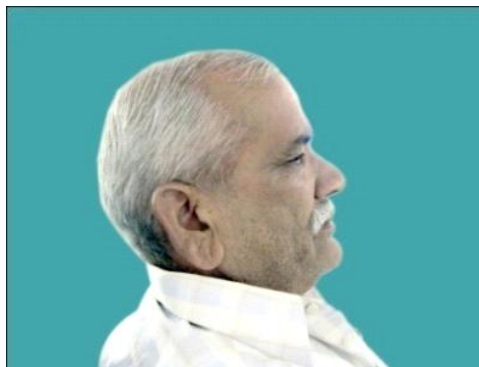


Fig. I: Preoperative extraoral profile view.

Technique:

Preliminary and final impressions were made in conventional manner. At the time of jaw relation due consideration was given to adjust maxillary occlusal rims properly as to provide proper aesthetics to the patient with long upper lip. Teeth were selected and arranged in balanced occlusion and try-in was done first for anterior teeth and then for posterior teeth.

For making the Maxillary denture hollow interchangeable flasks were used. The trial dentures

were processed in the standard manner upto the wax elimination stage (Fig. IIa). The maxillary trial denture base was sealed (on the definitive cast) with the modelling wax and a second flask was used to invest the modelling wax till the wax elimination stage. The cope (upper half of the flask/cavity side) was packed and processed with heat polymerizing resin (Trevalon, Dentsply, Gurgaon). This permanent record base was left undisturbed on the master cast (Fig. IIb).

Dough of Dental Plaster-Pumice and Sugar syrup was made and rolled. It was then placed over the heat cure record base (it acted as a spacer) (Fig. IIIa). To harmonise the space for heat cure resin, strips of modelling wax was placed on the ridge lap area of acrylic teeth including the buccal and palatal surface in the cope (Fig. IIIb). The two halves of the flask were closed and then reopened. The thickness of the wax was then assessed with the help of the wax gauge and necessary modifications were done(spacer material was scraped wherever the wax was exposed or thinned out). This process was further repeated till the uniform

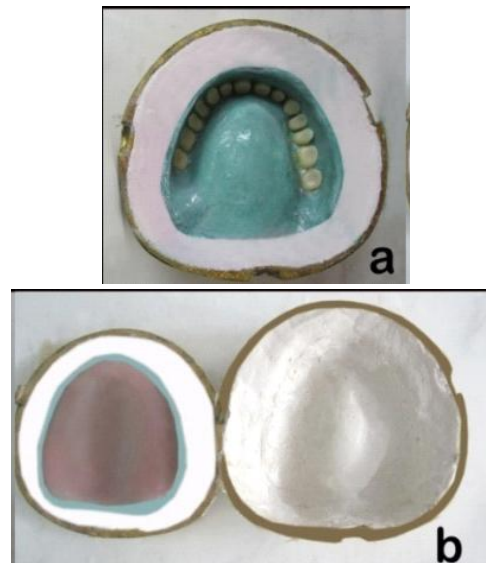


Fig. II: Interchangeable flasks: (a) Dewaxed flask; (b) Permanent record base.

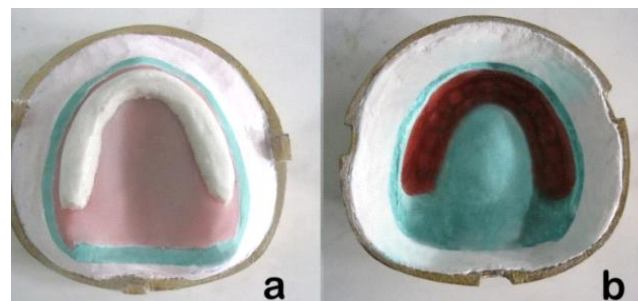


Fig. III: (a) Dough of Dental Plaster-Pumice & Sugar syrup; (b) Adapted gauged wax strip

thickness of the wax was achieved and thus ensured uniform space of 1.5-2mm for the heat cure acrylic resin.

Wax strip was then removed from the acrylic teeth. The heat polymerizing resin was then mixed, packed and processed for 7-8 hours (as per the manufacturer's instructions). After curing, lab-remounting was done and the processing errors were corrected.

Two small openings were made with a bur into the denture base distal to most posterior teeth to remove the spacer (Fig. IVa). The Dental Plaster- Pumice- - Sugar syrup paste was then removed by scraping and putting it in water (dough dissolves easily in water). The cavity was cleaned and disinfected. Later, these openings were closed with the autopolymerizing resin (Trevalon,Dentsply,Gurgaon) in dough stage(Fig. IVb). The dentures were then polished in usual manner. The sealing of the cavity was then verified by placing it in water and checked for any bubbles(Fig. IVc). The dentures were inserted in the patient's mouth and instructions were given (Fig. V).

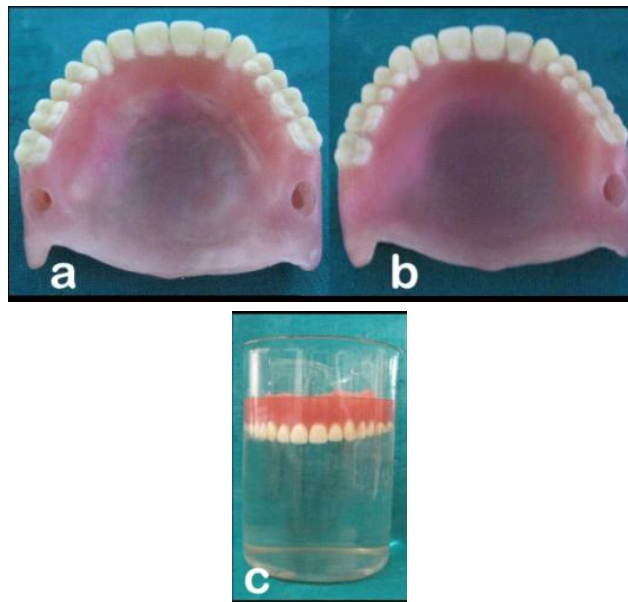


Fig. IV: (a)Denture with open channels for spacer removal; (b) Sealed channel; (c)Light weight hollow denture

Discussion:

Rehabilitation of patient with severely resorbed ridges and long lip length is a challenge to the dentist. Even though, the choice for rehabilitation can be implant supported overdenture, and ridge augmentation but many a times the patient who come with such a problem are geriatric patients with systemic illness, economic constrains, possess reluctance for a long



Fig. V: Post operative Frontal view.

duration treatment procedure and unwillingness for any kind of surgical procedure. Hence, the best way is to rehabilitate them with the conventional way. Apart, from modifying the impression technique to get maximum denture bearing area, modifying the type of denture may also be better accepted by the patient (Kalavathy et al, 2010).

In general, a conventional (heavy) denture whether maxillary or mandibular is likely to cause poor denture bearing ability. Extensive volume of the denture base material in prosthesis provided to patients with large maxillofacial defects or severe residual ridge resorption is always a challenge to prosthodontists. To increase the retention and stability of heavy prosthesis, many methods have been tried like utilising the undercuts, modifying the impression technique, use of magnets, use of implants, etc (Kalavathy et al, 2010). The prosthodontic treatment plan chosen for this patient was based on several findings noted during case history and examination. Resorbed residual ridge (compounded with long lip) length resulted in increased interridge distance. If conventional maxillary denture was constructed then it would have resulted in increased weight of the maxillary denture that may result into resorption of maxillary edentulous foundation at a higher rate.

Reducing the weight of maxillary prosthesis, however, has been shown to be beneficial when constructing prosthesis for rehabilitation of edentulous patient. This can be achieved by making the maxillary denture hollow.

The method in this case report has advantages over previously described techniques for the hollow denture fabrication. Plaster-Pumice-Sugar syrup readily dissolves in water and can be easily removed, unlike the tedious efforts made to remove putty from the denture especially from the anterior region. Moreover, the openings made for spacer removal was

also small compared to the openings made for the other varieties of spacer used. The thickness of the resin can be controlled by adapting an even thickness of wax sheet all around after measuring it with wax gauge. This will ultimately ensure even depth of resin to prevent seepage and prevent deformation under pressure of flask closure.

The advantages of hollow dentures are reduction in the excessive weight of the acrylic resin, resulting in the lighter prosthesis making the patient more comfortable.

Source of Support : Nil.
Conflict of Interest: None declared.

Summary:

Hollow maxillary denture is the best method of rehabilitating the patient with severely resorbed ridge and long lip length. It not only reduces the weight of the denture but also the leverage action of the same. This ultimately results in increased retention and stability and upto some extent it is also possible to preserve the existing residual alveolar ridge. This technique is simple to execute and allows control of spacer thickness. Light denture weight for healthy and comfortable living.

Bibliography:

1. Ackerman AJ. Prosthetic management of oral and facial defects following cancer surgery. *The Journal of Prosthetic Dentistry*, 1955;5(3):413-432.
2. Brown KE. Fabrication of hollow-bulb obturator. *The Journal of Prosthetic Dentistry* 1969;21(1): 97-103.
3. DaBreo EL: A light cured interim obturator prosthesis: A clinical report. *The Journal of Prosthetic Dentistry*, 1990;63(4):371-373.
4. elMahdy AS: Processing a hollow obturator. *The Journal of Prosthetic Dentistry*, 1969;22(6):682-686.
5. Fattore LD, Fine L, Edmonds DC: The hollow denture: An alternative treatment for atrophic maxillae. *The Journal of Prosthetic Dentistry*, 1988;59:514-516.
6. Holt RA (Jr.): A hollow complete lower denture. *The Journal of Prosthetic Dentistry*, 1981;45(4):452-445.
7. Kalavathy N, Shetty MM, Premnath, Pawashe K, Patel RKV: Hollow mandibular complete denture - A case report. *SRM University Journal of Dental Sciences*, 2010;1(3): 243-246.
8. O'Sullivan M, Hansen N, Cronin RJ, Canga DR: The hollow maxillary complete denture: A modified technique. *The Journal of Prosthetic Dentistry*, 2004; 91(6):591-594.
9. Worley JL, Kniejski ME: A method for controlling the thickness of hollow obturator prosthesis. *The Journal of Prosthetic Dentistry*, 1983;50(2):227-229.