

Hollow Maxillary Denture: A case report

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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 cases having long lip length and/or severely resorbed maxillary and mandibular edentulous arches that are narrow and constricted with increased interarch space. This will provide decreased support, retention and stability and also consequent weight of the processed denture will compromise them further and try to dislodge denture .

The severely resorbed ridges can have various treatment options. Extreme resorption of denture-bearing area may lead to problems with prosthetic rehabilitation. The advantage of a hollow maxillary or mandibular denture is the reduction of excessive weight of acrylic resin, which normally replaces lost alveolar ridge in the interridge space of the denture wearer. This clinical report describes a case report of edentulous patients with resorbed ridges where a simplified technique of fabricating a light weight hollow maxillary complete denture was used for prosthodontics rehabilitation.

Key words: hollow denture, light weight denture, resorbed ridge, inter arch distances, ridge preservation

Introduction

Residual ridge resorption of the denture bearing area may lead to problems with prosthetic rehabilitation. This may lead to narrower or more constricted residual ridge. As resorption progresses, there is decreased supporting tissues and 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[1]. 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[2]. It improves the cantilever mechanics of suspension and overtaxing of the remaining supporting structures.

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. O'Sullivan et al (2004) described a modified method for fabricating a hollow maxillary denture[1]. 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.[3] 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[4]. Both portions of resin were attached using a heat polymerized resin.

In this case report, edentulous old female patient with increased inter-ridge distance was treated with a hollow maxillary denture, fabricated using clay and Aquasil light body impression material which can be readily removed without any difficulty

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Case Report:

A 65year old female patient reported to the Department of Prosthodontics, Rural Dental College Loni with the chief complaint of difficulty in chewing food, loose denture and heaviness in her upper denture. History revealed that patient was edentulous for past 18 years and had used three sets of complete dentures(Fig:1). On examination both maxillary and mandibular ridges were severely resorbed(Fig:2). Her upper lip was long, the inter-ridge distance was more and vertical dimension of occlusion(VDO) and vertical dimension at rest (VDR) were more than average . The previous denture of the patient was heavy with attrited teeth and was under extended. Hence, it was decided to fabricate a new set



Fig.1 : Preoperative



Fig.2 : Resorbed maxillary and mandibular ridge

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 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.

Technique

Preliminary and final impressions were made in conventional manner. During jaw relation due consideration was given to adjust the maxillary occlusal plane as to provide proper aesthetics to the patient with long upper lip. Teeth set was selected, arranged in balanced occlusion and try-in was done. Alginate impression of the trial maxillary denture was made and working cast was obtained.(Fig.3) For making the Maxillary denture hollow interchangeable flasks were used. The trial dentures were processed in the standard manner upto the wax elimination stage. 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 cure polymerizing resin (Trevalon, Dentsply, Gurgaon). This permanent record base was left undisturbed on the master cast. (Fig.4.)



Fig.3 : Cast for template



Fig.4 Heat cure permanent record base

Mixed light body aquasil material was loaded into gauze piece (Fig 5) and inserted on the heat cure record base over which Biostar sheet fabricated (Fig.6) from trial maxillary denture and loaded with clay was placed over ridge lap area of acrylic teeth including the buccal and palatal surface in the cope (Fig.7). The two halves of the were closed and then reopened flask Acrylization of the denture was done in usual manner. The area of gauze piece was arbitrarily marked and removed with bur and the entire gauze was removed. To make this area hollow,



Fig.5 : light body material loaded



Fig.6 : Biostar sheet fabricated



Fig. 7 : clay filled in template



Fig. 8 : modeling wax in hollow cavity

modeling wax was added on it and lastly a layer of self cure acrylic was added (Fig.8). Two small openings were made with a bur into the denture base distal to most posterior teeth to remove the wax . Hot water was injected through syringe and the molten wax was removed. The cavity was cleaned and disinfected. Later, these openings were closed with the autopolymerizing resin (Trevalon,Dentsply,Gurgaon) in dough stage. The dentures were then polished in usual manner. The sealing of the cavity was done. Hollowness was then verified by placing it in water, to see whether it was floating. (Fig.9). The dentures were inserted in the patient's mouth and instructions were given.



Fig. 9 : Floating 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 is geriatric with systemic illness, economic constrains, and possess reluctance for a long duration treatment procedure and is unwilling 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[5].

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 a prosthodontist . To increase the retention and stability of heavy prosthesis, many methods have been tried like utilizing the undercuts, modifying the impression technique, use of magnets, use of implants, etc[5]. 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 denture that may result into further resorption of 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 advantages of hollow dentures are reduction in the excessive weight of the acrylic resin, resulting in the lighter prosthesis making the patient more comfortable.

Summary

Hollow maxillary denture is the best method of rehabilitating the patient with severely resorbed ridge, increased interarch distance and long lip length. It not only reduces the weight of the denture but also the leverage action and makes the patient feel more comfortable. 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.

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