DOI: 10.21276/sb

Scholars Bulletin
(A Multidisciplinary Journal)
An Official Publication of "Scholars Middle East Publishers",
Dubai, United Arab Emirates
Website: http://scholarsbulletin.com/

ISSN 2412-9771 (Print)
ISSN 2412-897X (Online)

Reducing the Burden with a Hollow Maxillary Denture: A Case Report

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Abstract: Success of a complete denture relies on the basic principles of retention, stability and support. The increased interarch space in severely resorbed ridges of maxilla and mandible provides decreased support, retention and stability. In order to decrease the leverage, reduction in the weight of the dentures is recommended. This article describes a case report of an edentulous patient with severely resorbed maxillary ridge in which a simplified technique for fabricating a light weight hollow maxillary complete denture was used.

Keywords: long lip length, increased interridge distance, heavy maxillary complete denture, severely resorbed ridges, hollow maxillary denture.

INTRODUCTION

Severely atrophic maxillary ridge coupled with increased inter ridge distance and long lip length, often results in a heavy maxillary complete denture along with compromised retention. If forces are applied in a direction which deviates from normal, bone resorption will follow. Forces of greater intensity exceeding the limits of tolerance of the tissue, whether they exert pressure or tension, lead to tissue destruction. It is believed that gravity and increased weight of the prosthesis reduces the retention and stability of the maxillary denture. In order to reduce the weight of the prosthesis, the denture base can be hollowed thus decreasing its weight by 25%. Reducing the weight of the maxillary complete denture often provides better retention, especially in patients with severely resorbed maxillary ridges [1,2].

It has been proved that prosthesis weight can be reduced by making the denture base hollow. Approaches like using a solid 3-dimensional spacer, including dental stone [1-6], silicone putty [7], modelling clay [8-9], or cellophane wrapped asbestos[10] have been used for laboratory processing for excluding denture base material from the planned hollow cavity of the prosthesis.

Seepage of oral fluids into the denture cavity through the junction between the two previously polymerized portions of the denture is the main disadvantage of the previous techniques. Also, it is difficult to gauge resin thickness which is excluded in the denture base. This case report describes a technique for fabrication of a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges and increased interridge distance.

CASE REPORT

A 79 year old male patient reported to the Department of Prosthodontics with the chief complaint of ill-fitting and heavy maxillary complete denture. He had been edentulous for a period of over 15 years and had changed two sets of dentures in the due course with the same chief complaint. On examination, it was seen that the maxillary residual ridge of the patient was severely resorbed. Also the patient had long lip length which added to an increase in the height of the maxillary denture. The previous dentures were conventionally fabricated.

For the new set of dentures, primary and final impressions were made with the conventional technique. The primary impressions were made in impression compound and the final impressions were made after border molding in zinc oxide eugenol impression paste. The secondary impressions were poured in dental stone. Denture bases were fabricated in autopolymerising acrylic resin. Facebow records were made and jaw relations were recorded. Teeth were arranged in balanced occlusion. Try in was done first for the anterior teeth and then for the posterior teeth. After the patient was satisfied with the try in, the processing of the denture was proceeded for.

Putty index of the try in maxillary denture was made in order to measure the amount of space from which denture material is to be excluded (Figure 1).

Fig-1: Putty index of the try in maxillary denture

Processing was carried out in the conventional manner until the dewaxing step. After dewaxing, a wax shim of two layer thick baseplate wax was placed on the residual ridge and ridge lap surface of the denture teeth to harmonise the space for heat cure resin (Figure 2).

Fig-2: A wax shim of two layer thick baseplate wax placed on the residual ridge

Baseplate wax of thickness, gauged with the help of putty index, was used as the spacer. This ensured uniform dimensions of the hollow cavity. The heat cure acrylic polymerizing resin was then mixed, packed and processed as per the manufacturer's instructions. Heat cure resin replaced the wax shims and spacer was placed between the resin (Figure 3).

Fig-3: Heat cure resin replaced the wax shims and modeling wax used as spacer placed between the resin

The maxillary complete denture was processed for 7-8 hours in a conventional method. (As per the manufacturer's instructions).

After curing, lab remounting of the processed dentures was done and the processing errors were corrected. Trimming and polishing of the dentures was done. Two small openings were made into the denture base distal to most posterior teeth (Figure 4).

Fig-4: Two small openings made into the denture base distal to most posterior teeth

To remove the baseplate wax from the cavity, the denture was placed in hot water. The wax melted and flowed out from the cavity and the cavity was cleaned, disinfected and air dried. These openings were then closed with the auto polymerizing methylmethacrylate resin in dough stage. The denture was again polished and the sealing of the cavity was verified by placing it in water, checking for any bubbles (Figure 5).

Fig-5: Maxillary denture placed in a beaker with water to verify sealing of the cavity

The dentures were checked for retention, stability and support by inserting in the patient's mouth. The patient was instructed about handling of dentures and proper oral hygiene maintenance. Patient was satisfied with the esthetics and function of the new set of dentures (Figure 6).

Fig-6: Patient satisfied with the esthetics and function of the new set of dentures

DISCUSSION

The choice for rehabilitation of edentulous patients with resorbed ridges can be implant supported overdenture or ridge augmentation. But many a times these may not be possible due to systemic illnesses, financial constraints or patient's unwillingness as also reluctance for a long duration treatment procedure. Hence, rehabilitation of such patients with severely resorbed ridges and long lip length is a challenge to the dentist. The only way to rehabilitate them is with conventional dentures by either modifying the impression technique to get maximum denture bearing area or by modifying the type of denture. To increase the retention and stability of heavy prosthesis, methods like utilising the undercuts, use of magnets,[11] etc. can be carried out. By modifying the conventional denture to a hollow denture not only increases the retention by reducing the weight of the prosthesis by 25% but also increases the stability of the denture. The technique described above is a simple, economical and time saving procedure with compounded advantage of reduction in the excessive weight of the prosthesis. There is minimal extra laboratory procedure, there is tedious efforts are required to remove the spacer material. It increases the patient's psychological comfort and confidence in using the prosthesis. This technique also overcomes certain disadvantages of the older techniques like problems with leakage and difficulty in gauging resin thickness. The small openings made in the cameo surface of the denture facilitate 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. Also it is an economical technique and can be performed using commonly available materials.

CONCLUSION

Hollowing a denture considerably reduces its weight. A prosthesis with reduced weight prevents the transmission of detrimental forces to the underlying tissues by reducing leverage action. This results in an increase retention and stability of the prosthesis. It also upto a certain extent reduces the further resorption of the residual ridge. Rehabilitating severely resorbed ridges with hollow denture using the described technique is easy to implement and less time consuming. Reduced weight hollow dentures provide for a healthy and comfortable living for the geriatric edentulous patient.

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