ORIGINAL RESEARCH PAPER

Dental Science

A SIMPLIFIED TECHNIQUE FOR FABRICATION OF MAXILLARY HOLLOW COMPLETE DENTURE

KEY WORDS: Hollow Maxillay Denture, Light Weight Prosthesis.

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ABSTRACT

Retention, stability, support, esthetics, and masticatory function are the important factors that determine the success of any dental prosthesis. The inter ridge distance between the maxillary and mandibular residual ridges is increased in severely resorbed ridges leading to increased weight of the prosthesis. This may compromise the retention, stability and support, which are the key factors for a successful prosthesis. This article describes a simplified technique of fabricating a hollow maxillay complete denture to improve the retention in the patient with increased inter ridge distance.

INTRODUCTION

Excessive residual alveolar ridge resorption poses a clinical challenge in fabricating a successful complete denture[1,2]. Severely resorbed ridges result in reduced denture bearing area and increased inter ridge or restorative space. This increases the height and weight of the prosthesis which in turn overloads the residual ridges and further compromise the retention of the prosthesis[3]. Many authors have documented that hollowing the dentures has decreased the weight of the dentures thereby improving their retention. Different materials like cellophane wrapped asbestos, silicone putty, ice, dough of dental plaster and pumice, caramel, soap, modelling clay, thermocol and salt were used to fabricate hollow dentures[1-9]. The materials which are used as spacer must not react with the heat polymerizing acrylic resin and must be easily removed after polymerization to create even thickness of hollowness.

In literature there exist two techniques to fabricate a hollow removable prosthesis. The first technique is a single flask technique in which the whole prosthesis is fabricated using a single flask and the prosthesis is fabricated as a single unit. The second is the double flask technique which uses two flasks and the prosthesis is processed in two halves. Later the two halves are united using auto polymerizing or heat polymerizing acrylic resin[1].

CASE REPORT

A 60 year old male patient reported to the department of Prosthodontics, KSR Institute of Dental Science and Research, Tiruchengode, Tamil Nadu for prosthodontic rehabilitation of completely edentulous maxillary and mandibular ridges. Medical history revealed no underlying systemic disorders. Patient was edentulous and had been wearing complete denture for past 5 years. The problem faced with old denture was looseness of the maxillary denture.

Intraoral examination revealed resorbed edentulous ridges with increased inter ridge distance (30 mm). Labial mucosa, buccal mucosa, hard palate, soft palate, tongue and floor of the mouth were normal without any abnormalities. The poor prognosis of the conventional complete denture associated with increased inter ridge distance and the weight of the prosthesis was explained to the patient. Hence, to decrease the weight of the prosthesis and to enhance retention of the denture, maxillary hollow complete denture and mandibular conventional complete denture were planned. Steps for conventional complete denture fabrication were followed till the try-in stage. The increase in the inter ridge distance was evident in the mounted casts (Figure 1).

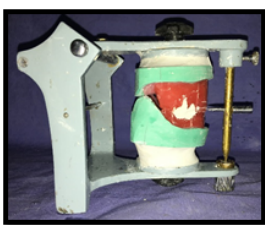

Figure 1: Mounted casts showing increased inter ridge distance

STEP 1:

Wax-up, flasking and dewaxing (Figure 2) were done in a conventional manner.

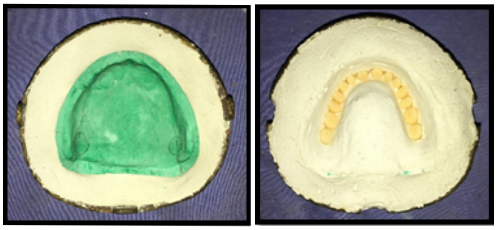

Figure 2: Dewaxing done in conventional manner

STEP 2: In the dewaxed flask base with the maxillary cast, a 2mm uniform thickness of the wax was adapted (Figure 3). Body and lid portion of another flask which fits into the

dewaxed flask base was selected and used for flasking. Dewaxing, packing and curing was done conventionally to get a maxillay permanent denture base (Figure 4).

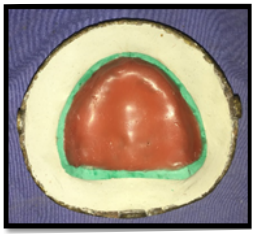

Figure 3

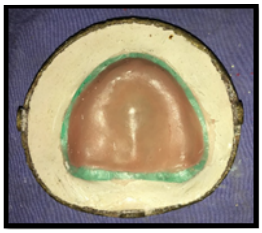

Figure 4

Figure 3: 2 mm baseplate wax adapted over maxillary cast. Figure 4: Processed maxillary permanent denture base.

STEP 3:
In the first dewaxed mold (used in the step 1), the distance from the ridge lap area of the tooth to the sulcus margin was measured using a divider and metal scale (Figure 5).

STEP 4:
From the total distance measured, 2 mm thickness for the denture base and 2 mm thickness from the ridge lap of the tooth were subtracted to get the thickness of the spacer for fabrication of hollow maxillary denture.

STEP 5:
Wax spacer of approximately 8 mm in radius was adapted over the ridge region on the processed permanent denture base which was not retrieved from the cast in flask base used in the step 2 (Figure 6).

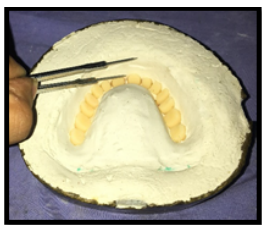

Figure 5

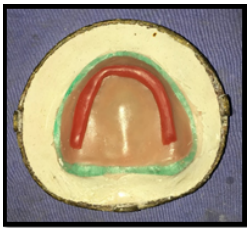

Figure 6

Figure 5: Distance from the ridge lap area of the tooth to the sulcus margin was measured using a divider. Figure 6: Wax spacer adapted over the processed maxillary permanent denture base.

STEP 6:
The wax spacer was softened and made to a moldable consistency. Trial closure was done using the dewaxed flask mold space in step 1 and flask base containing wax spacer adapted over processed maxillary heat cure denture base. It was ensured that the softened wax spacer did not stick to the mold space. This indicated that there was adequate thickness for the acrylic resin (2 mm) to flow underneath the ridge lap region of the tooth as calculated.

STEP 7:
Packing of the heat cure acrylic was done in the mold space and curing was carried out. The denture was retrieved from the flask, trimmed and polished.

STEP 8:
Two small windows (4 mm radius) were made on the right and left cameo surface distal to the last molar on the maxillary denture to eliminate the wax.

STEP 9:
The wax was eliminated by using a steam cleaner. The tip of the steam cleaner was placed at one end of the window and the wax was eliminated through the other window (Figure 7).

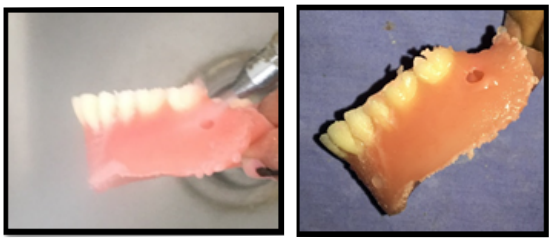

Figure 7: Elimination of wax by steam cleaning

STEP 10:
Ligature wire was inserted through one end of the window and the wire passed through the hollow space and exited through the other window (Figure 8). This was done to ensure that the wax was completely eliminated and created a uniform hollow space. The windows created were closed using auto polymerizing acrylic resin and the denture was finished and polished. The lightness of the maxillary denture was tested using the floating test (Figure 9).

Figure 8

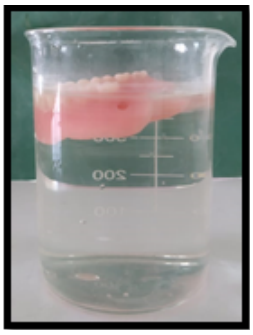

Figure 9

Figure 8: Ligature wire passed through the hollow cavity of processed denture. Figure 9: Positive floating test.

The dentures were inserted and post insertion instructions were given to the patient. As the hollow denture are more prone to fracture, the patient was advised to handle the denture with care. The patient was reviewed after 24 hours, 1 week and 6 months intervals. The patient was esthetically and functionally satisfied with the hollow maxillary prosthesis.

DISCUSSION
The method described here is simple, less time consuming, cost effective and less laborious over the previously reported techniques. Wax was used as spacer in this case because it is moldable and can be easily shaped, readily available, less expensive, does not interact with acrylic resin, soluble in water and can be easily removed by steam cleaning. If steam cleaner is not available, the wax spacer in the processed denture can be eliminated by spraying hot water through the window using a disposable syringe[3].

Fluid seepage, difficulty related to gauging the resin thickness and lack of removal of the spacer after polymerization are the major problems inherent in the previously documented techniques. Some have used silicone putty as a spacer for hollowing the prosthesis, which makes its retrieval difficult from the cavity due to its stiffness after complete polymerization of the prosthesis.

The problem encountered while using salt is its inability to sustain pressure produced during flask closure resulting in a failure to achieve a hollow cavity inside the prosthesis. Hence, no substantial difference in weight of the prosthesis can be achieved.

Many authors have processed the intaglio surface separately,

polished and occlusal surfaces separately and joined the processed halves using auto polymerizing acrylic resin[1,4]. The major drawback of is that a junction is formed between the two previously polymerized halves of the denture which may be at an increased risk of seepage of fluid into the denture cavity.

ADVANTAGES OF HOLLOW DENTURE ARE AS FOLLOWS:

(i) Reduces the weight of the prosthesis which in turn enhances denture retention.
(ii) Can be fabricated using commonly available and less expensive material.

DISADVANTAGES OF HOLLOW DENTURE ARE AS FOLLOWS:

(i) Time consuming procedure.
(ii) Hollow dentures are more prone to fracture.
(iii) Difficulty in removal of stiff spacer materials.
(iv) Seepage of fluids into the hollow cavity.

CONCLUSION

A simplified technique for fabricating a hollow maxillary denture is described. The use of wax as a spacer without compromising the denture strength can enhance the denture retention in patients with increased inter ridge distance.

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