Case Report

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Rebasing a Half Hollow Maxillary Complete Denture to Rectify Processing Error – A Case Report

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Abstract

Presence of surface or subsurface voids in a denture that has been processed are often encountered due to errors during laboratory processing of dentures. Errors during proportioning of monomer and polymer, improper mixing technique, inadequate pressure and material during packing and monomer vaporization during curing cycle can result in porosities which are undesirable. Rebasing can provide a great economic option in some cases of newly processed porous denture base, thereby avoiding the long and several appointments required for the construction of a new denture. This clinical report describes a rebasing technique using flask method to correct extensive porosities in newly processed half hollow maxillary complete denture.

Keywords: Denture porosity; Processing error; Rebasing

Declarations

Ethics approval and consent to participate: Not applicable

Consent for publication: Informed consent was obtained from the patient for the publication of identifying features along with the manuscript.

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INTRODUCTION

Excessive ridge resorption results in a large restorative space between the upper and lower resorbed residual ridges [1]. Prosthetic rehabilitation in such case results in increased height and weight of the prosthesis, which may compromise its retention and stability and may also lead to overloading of the residual ridges [2]. The weight of the prosthesis can be reduced by creating a hollow space within it [1]. Most dentures are processed using compression molding technique with heat cured acrylic resin. The purpose of processing a denture is to duplicate the recording base into a hard polished material with no errors to the established esthetic and occlusal relationships of the trial denture. However, dental laboratory errors can occur during processing of final dentures [3].

Processing errors can occur during packing of acrylic resin causing porosity in the final denture [4]. Porosity compromises the physical properties, strength, and esthetics of denture [5]. If a newly processed denture exhibits porosity, rebasing may be required in the laboratory [4]. Rebasing is the laboratory process of replacing the entire denture base material on an existing prosthesis [6]. It is indicated when denture bases do not cover all of the denture-bearing tissues [7]. It is also indicated in case of fractured or discolored denture base [4,7].

Denture rebasing can be accomplished using a reline jig, articulator, or denture flask [4]. This case report describes rebasing of a half hollow complete maxillary denture using a single denture flask method as a practical solution for rectifying extensive porosities in newly processed denture.

CASE

A 65-years old male patient visited Department of Prosthodontics BPKIHS, Dharan for prosthetic rehabilitation of his missing teeth with a removable complete denture. On clinical examination, he had long upper lip (29 mm. measured from base of nose to vermillion border of upper lip) and left half of maxillary ridge was severely resorbed with increased inter-ridge distance on the left side. The lip length was classified based on the article by Patel et al [8]. The patient was planned to rehabilitate with half-hollow maxillary complete denture and mandibular conventional complete denture. Fabrication of half hollow denture was planned in this case to decrease the weight of the prosthesis as there was increased left inter-ridge distance, which would otherwise result in heavy denture, thereby, compromising the retention and stability of final prosthesis. The dentures were fabricated but extensive porosities were present on left flange of the maxillary denture **(Figure 1a)**. To rectify this processing error, laboratory rebasing of the upper denture was planned.

The voids were carefully sealed with modeling wax and a remount cast was poured. The denture was waxed up and sealed in the remount cast with modelling wax **(Figure 1b)**. The denture was then duplicated with irreversible hydrocolloid impression material (Plastalgin) and poured with Type III dental stone (Kalstone, Kalabhai) to obtain a cast for fabrication of a thermoplastic template. A transparent template (BIO-ART) of 1.5 mm thick was adapted over the duplicated cast with the help of pressure forming unit (Erkopress 300 TP) to obtain external contour of maxillary denture.

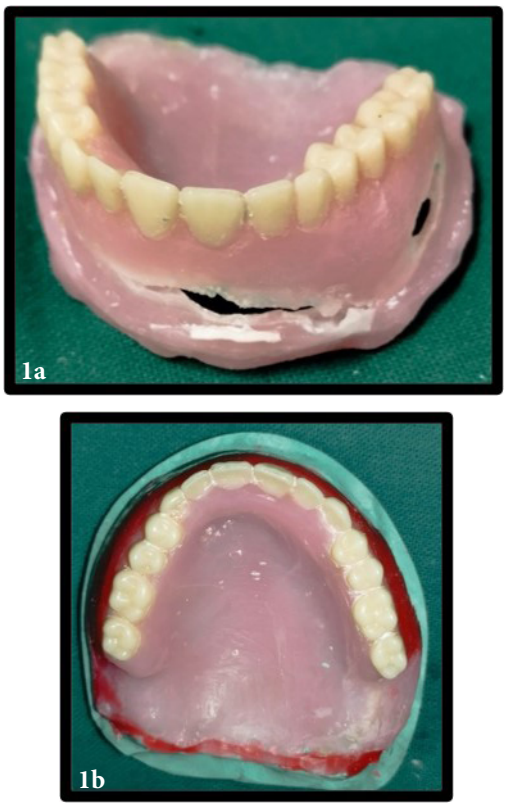

Figure 1a : Porosity in the denture
1b: Wax-up in the remount cast

An occlusal index of the denture teeth was made in putty to facilitate the denture removal and replacement after dewaxing procedure. The occlusal index was roughened to facilitate its retention on cope of the flask after investment (Figure 2a). The denture was then invested in denture flask and de-waxed in the conventional manner. After dewaxing, the denture was removed leaving behind the occlusal index in the cope of the invested flask **(Figure 2b)**. The denture was trimmed such that acrylic from the denture just held

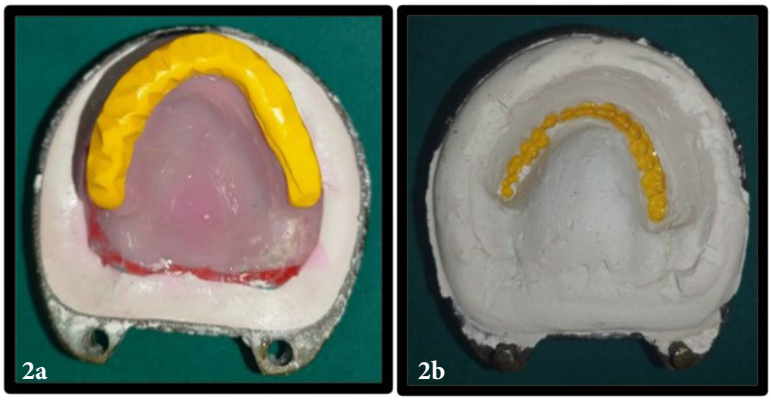

Figure 2a: Occlusal index with putty Replacement of trimmed denture in occlusal index, 2b Denture removal after dewaxing

the teeth as a single block. This teeth-acrylic block was then re-seated on the occlusal index **(Figure 3a)**.

A 2mm thick modelling wax was adapted over left half of the remount cast to form the tissue surface of hollow cavity in final denture **(Figure 3b)**. A temporary putty spacer was fabricated and adjusted for the approximate dimension of the planned hollow cavity **(Figure 3c)** using the thermoplastic template.

A glycerin soap (Pears) replica of the putty spacer was then hand carved using a Le Cron carver to make the final soap spacer **(Figure 3d)**. A trial closure was performed using the putty spacer. The flask was opened and the putty spacer was removed. The soap spacer was placed in the hollow space thus created **(Figure 4a)** and final closure of the flask was done. The denture was acrylized in the conventional manner.

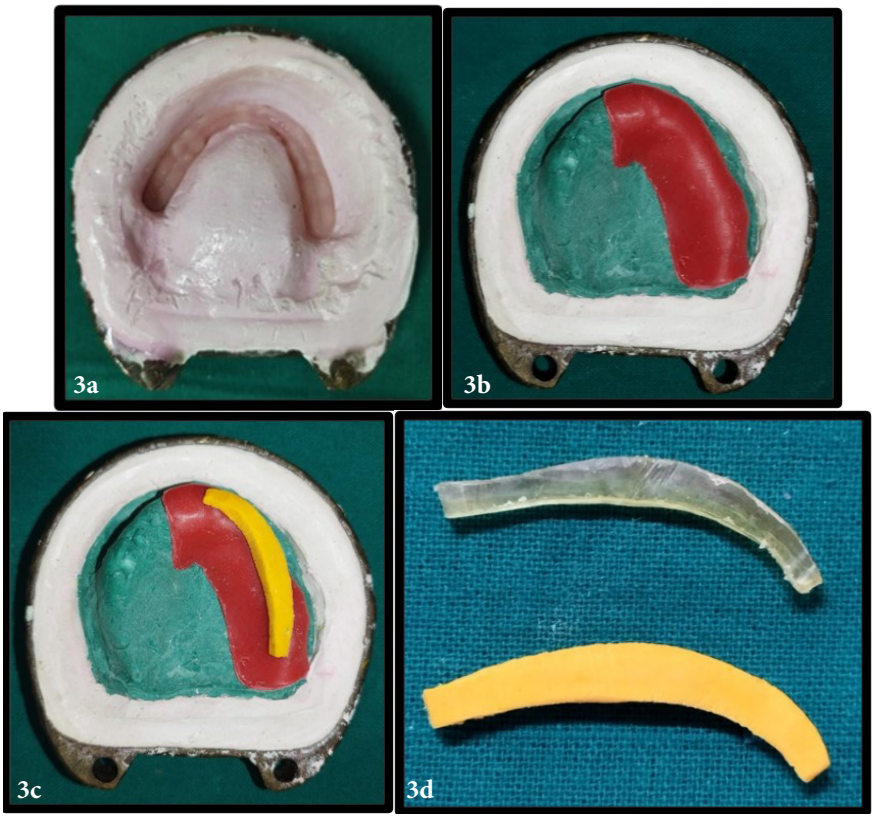

Figure 3a: Replacement of trimmed denture in occlusal index, 3b: Modelling wax placed over one half of dewaxed cast Figure 3c: Fabrication of putty spacer, 3d: Duplication of soap spacer

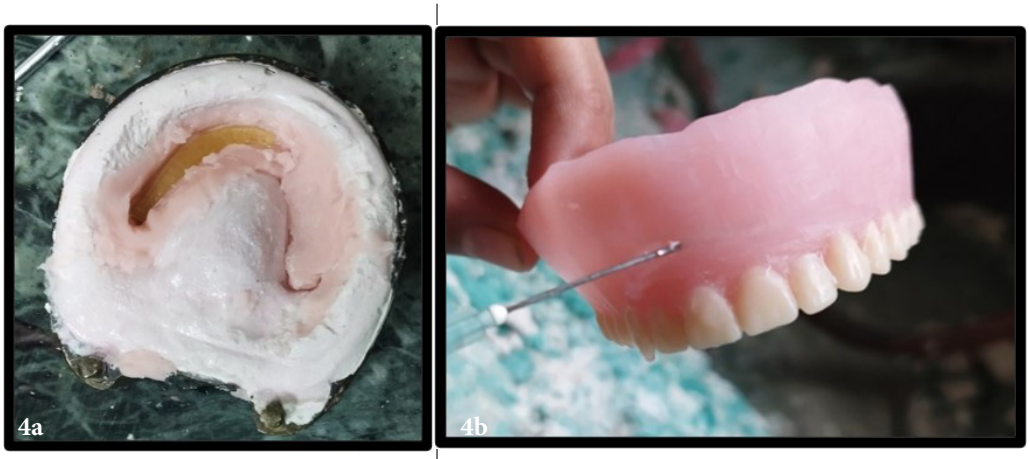

Figure 4a: Trial closure with soap spacer 4b: Soap removal after processing of denture

After retrieval of the processed denture, a small window was made in the cameo surface corresponding to the hollow cavity. Warm water was passed through the window with a syringe and soap spacer was removed **(Figure 4b)**. After drying, the window was sealed with autopolymerising acrylic resin and final finishing and polishing of the denture was achieved. In this way, the rebased half hollow maxillary complete denture was successfully delivered to the patient.

DISCUSSION

Porosity in the processed denture is the result of complex multifactorial phenomenon. Gaseous porosity occurs due to rapid heating of flask which causes evaporation of monomer and appears clinically as fine uniform subsurface spherical pores, localized more often in the thicker portions of the denture. Inadequate pressure during flask closure or insufficient amount of acrylic dough during packing of the mold results in voids that are large and irregular in shape and makes the denture appear lighter and opaque in color [4,5]. Inadequate mixing of powder/liquid components also may result in denture porosity. The areas that contain more monomer tend to shrink more than the adjacent areas resulting in large voids in the denture base. Denture porosities compromises strength and esthetics, increases the risk for staining and promotes adhesion of fungal and bacterial biofilms [5].

Rebasing is a simple, economical, time-saving and a predictable technique for correction of porosities in a newly processed denture. Rebasing may be necessary when the existing denture base is discolored or if the denture base resin is too light or dark in color for the patient. Denture rebasing in which all of the denture base is replaced can be accomplished using a reline jig, articulator, or denture flask. Principal problems associated with jig or articulator rebasing method are related to separating the denture from the cast without breaking either the cast or denture; shrinkage of wax when the denture teeth are waxed to the cast, producing errors in occlusion; and the usual problems associated with waxing, flasking, packing, and curing the complete denture [4].

Flask rebasing method may also be associated with the problems of incorporation of air inclusions in the silicone material resulting resin nodules on the rebased denture, the possibility of occlusal errors if the flasks do not fit together accurately; and the potential for dislodging a denture tooth from the flexible silicone mold when packing the resin [4]. In any rebasing technique, there will always be a possibility of occlusal discrepancy and change in vertical dimension [9]. Therefore, rebasing should be performed carefully.

Glycerin soap spacer was preferred for fabrication of hollow cavity because of its advantages like easy retrievability, ease of carving and non-adherence to acrylic resin [2,10]. The soap spacer, however, has some disadvantages. Its dimension might not be accurate since it is hand carved and may lead to deficiency of acrylic resin creating voids in the denture [10]. Errors encountered in the duplication of the soap spacer and its replacement in the hollow cavity during trial closure may lead to porosity in the processed denture. During trial closure, the closing force must be applied slowly allowing adequate time for acrylic resin dough to flow throughout the mold and to become well compressed for optimum density [3]. Any movement of the spacer during trial closure or the final closure of the flask and excessive pressure during flask closure might also displace the planned hollow cavity resulting in extensive voids in the surface of processed denture. Voids in denture base are the large empty spaces within it. Extensive porosity appears as extensive voids within the mass of polymerized acrylic. In this case, the cause of these extensive external porosity might be any one or combination of all of these

processing errors. Therefore, duplication of the soap spacer and trial closure must be done with utmost accuracy.

CONCLUSION

The clinical and laboratory steps in the fabrication of a complete denture are multiple and each step should be performed carefully and with precision. Porosities in the processed denture can be avoided when high technical standards are followed.The burden of additional time, cost and appointment associated with fabrication of new denture can be disheartening and demotivating for both clinician and patient. Alternatively, rebasing offers a simple, economical, time saving and practical solution for rectifying porosities in a newly processed denture.

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