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## RESEARCH ARTICLE

### HOLLOWING OF THE MAXILLARY COMPLETE DENTURE: AN INNOVATIVE TECHNIQUE TO REINVENT PRECISION

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#### ABSTRACT

Severely resorbed ridges, narrowing of arches and increased interarch distance engender difficulties for prosthodontics. The severely resorbed maxillary and mandibular edentulous arches that are narrow and constricted with increased interarch space provide decreased support, retention and stability. Increased inter-ridge distance often creates a clinical problem due to heavy-weighted maxillary prosthesis and solution for the same is hollow maxillary denture. To fabricate a hollow denture many materials are used ranging from sugar, salt, catheter and putty. The main disadvantage of all these techniques is that the opening has to be sealed with self-cure material which will be a potential site for microleakage and the junction between the auto polymerized and heat polymerized portions of the denture cause increases risk of seepage of fluid into the denture cavity. In this article a unique technique is used to fabricate a one-piece hollow maxillary denture which will abolish the main disadvantage of microleakage.

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## INTRODUCTION

The edentulous state represents a compromise in the integrity of the masticatory system. It is frequently accompanied by adverse functional and cosmetic consequences, which are varyingly perceived by the affected person. The treatment of edentulous patients presents a range of biomechanical problems that involve individual tolerances and perceptions. Prosthetic rehabilitation of severely atrophic ridges has always been an ordeal for the clinician due to decreased support, stability and retention. Severely atrophic maxillae with large interridge distance often pose a clinical challenge during fabrication of a successful maxillary complete denture. Reducing the weight of a maxillary prosthesis has been shown to be beneficial when constructing an obturator for the restoration of a large maxillofacial defect. There are several literatures to make the prosthesis hollow ranging from a solid 3-dimensional spacer, including dental stone, cellophane wrapped asbestos (Worley, 1983), silicone putty (Holt, 1981; Jhanji, 1991), or modelling clay and catheter (Deepti, 2016).

The primary disadvantage of such techniques is that the junction between the auto polymerized and heat polymerized portions of the denture cause increases risk of seepage of fluid into the denture cavity. Furthermore, this junction is a common site for post insertion adjustment increasing the risk of leakage. In this article a unique technique for fabrication of hollow denture was discussed which abolished the disadvantage of microleakage.

**Case History:** A 50-year-old male patient reported to the Department of Prosthodontics and Crown and Bridge with a chief complaint of missing teeth. Past medical history was not relevant. Intraoral examination revealed severely resorbed maxillary and mandibular edentulous ridges with increased interridge distance. No abnormality was seen in the labial, buccal mucosa, hard palate, soft palate and floor of the mouth. Hence, hollow maxillary complete denture to reduce the weight of the denture and a conventional mandibular denture was planned for this patient.

**Technique:** The maxillary denture was fabricated up to the trial denture stage in the conventional manner.

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Fig. 1. Template of wax up denture



Fig. 2. 1<sup>st</sup> Flasking of denture



Fig. 3. Split Flaskin



Fig. 4. Dewaxed 2<sup>nd</sup> flask



Fig. 5. Processed 2<sup>nd</sup> flask



Fig. 6. Checking the space with template



Fig. 7. Clay in between the template



Fig. 8. Clay template for packing



Fig. 9. Trial closure using clay template



Fig. 10. Light weight denture



Fig. 11. Hollow denture

**Step No- 01:** The wax up trial denture base was duplicated, cast was made with dental stone and thermoplastic template was made of the trial cast to see the space available for hollowing the denture (Fig. 1).

**Step No- 02:** Split flasking (The double-flask technique described by Chalian and Barnett) was used to process the denture.

**Step No- 03:** After dewaxing, 2mm of wax sheet was adapted onto the maxillary edentulous cast and fabrication of heat cure denture base was done (Fig. 3,4,5).

**Step No- 04:** On the maxillary edentulous cast the thermoplastic template fabricated previously was placed along with clay in between to check for hollow space (Fig. 6).

**Step No- 05:** The template was removed and another template for the clay was fabricated (Fig. 7 & 8).

**Step No-06:** Now to hollow the available space during 2<sup>nd</sup> packing the thermoplastic template of the clay was placed over the maxillary cast and trial closure was done along with clay to stabilize the template (Fig. 9).

**Step No- 07:** After trial closure the clay was removed from the template for final packing. The flask was pressed under hydraulic press, clamped and a conventional polymerization cycle was adopted. The processed denture was retrieved and polished.

## DISCUSSION

Extensive volume of the denture base material in the prosthesis provided to patients with severe residual ridge resorption causes poor denture bearing ability. Two techniques are commonly used to make the maxillary denture light weighted: A two-piece denture or a hollow maxillary denture. In a two-piece denture, the relocation and approximation of the detachable part is difficult for the patient. Another way to reduce the weight of the prosthesis has been tried by various authors by making the denture hollow. Hollow dentures not only help in reducing the weight of the denture but also reduce the extra loads on underlying tissues and remaining amount of bone. Previously, vinyl poly-siloxane putty was being used for the fabrication of hollow prosthesis.<sup>9</sup> However, removal of putty from within the cavity, especially from the anterior region was found to be very difficult. Methods have also described fabrication of dentures in two parts and fusing these segments using auto-polymerizing resin. The long-seated junction creates a site of potential leakage and discoloration over a period of time. The use of surgical catheter and orthodontic wires<sup>8</sup> for the fabrication of hollow cavity will create an area for repair using auto polymerized resins which in turns causes percolation of fluids. To overcome these disadvantages the technique used in this article gives the desirable outcome without any disadvantages. In this article one-piece hollow denture without retrievability of the material is discussed which will overcome the disadvantages of conventional hollow dentures. Thus, the success of prosthetic treatment is predicted not only on manual dexterity, but also on the ability of the dentist to relate to patients and to understand their needs.

## Conclusion

This technique describes the fabrication of a hollow denture, using modelling clay and thermoplastic sheet, which are easily available materials. The thermoplastic sheet incorporated within the denture base material during denture packing stage resulted in the fabrication of a one – piece hollow maxillary complete denture for a severely atrophic maxillary arch thus eliminating the biggest disadvantage of retrieval of material for hollowing.

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