Dental Technique

An alternative technique for hollowing maxillary complete denture

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Abstract
Extreme resorption of edentulous maxilla may cause difficulty during fabrication of a maxillary complete denture. Increased inter-ridge distance often creates a clinical problem due to heavy-weighted maxillary prosthesis. This article elaborates an alternative approach for hollowing a maxillary complete denture. It utilizes a clear template of the trial denture facilitating the creation of a gelatin cavity form. This hollowing ensures the even thickness of both denture base resins for structural integrity and reduces the heaviness of the denture.

Key Words: Complete denture, hollow maxillary denture, resorption

INTRODUCTION
Severe resorption may lead to a narrow and constricted maxilla, reduced denture-supporting area, and an increased inter-ridge distance. These physiological changes may pose difficulty while fabricating a maxillary complete denture. An increased inter-ridge distance may lead to a heavy-weighted maxillary complete denture that again contributes in decreasing its retention and resistance. Hollowing maxillary denture has been reported to be beneficial similar to fabricating a hollow obturator for a large hemimaxillectomy defect. In the literature, several approaches toward hollowing maxillary or mandibular complete dentures have been documented by creating a solid three-dimensional spacer. This is achieved by including dental stone, cellophane wrapped asbestos or modeling clay. These methods are practiced during laboratory processing to exclude denture base material from the planned hollow cavity of the denture. Usually, different parts of the denture are assembled around a three-dimensional spacer and allowed for its polymerization. After complete polymerization, the solid spacer is discarded, and the separate parts of the denture are assembled using an autopolymerizing acrylic resin.

Several authors have proposed different methods of hollowing maxillary and/or mandibular dentures. However, the main disadvantage of such methods is that the junction between the two previously cured parts of the prosthesis displays at the borders. This long junction causes increased chances of seepage of fluid into the hollow cavity. Furthermore, this junction is...
a common site for postinsertion adjustment, which further increases the chances of fluid leakage. Furthermore, the correct thickness of resin cannot be gauged in the cope area while implementing such methods.

In another technique,\textsuperscript{[14-16]} silicone putty was used as a spacer for creating a hollow cavity within the denture base. However, practically its retrieval after complete processing of the assembled parts is quite difficult. The stiffness of putty material makes its retrieval little tougher, especially from the anterior part of the polymerized denture. Moreover, the openings made from the distal end of the processed denture had to be sufficiently large to retrieve the hard putty. This article describes an alternative approach for hollowing maxillary complete denture using a food grade gelatin to form a cavity within the denture base. Gelatin is easily available and cheaper compared to the previously used spacer material. It is mixed with water and heated until a viscous solution is formed. This solution can be filled in a disposable syringe and injected to form a spacer.

**TECHNIQUE**

- Complete the steps of conventional denture fabrication such as making a definitive maxillary impression and fabricating a trial denture
- Index the ledge of the master cast with the help of a conical bur (416/060; JOTA AG, Switzerland) and complete the sealing of the trial denture to the master cast
- Duplicate this denture using irreversible hydrocolloid (Vignette, Dentsply, India) and achieve the duplicated stone cast (Gold Stone, Asian Chemicals, India)
- Fabricate a clear template of duplicated cast using a 0.3 mm thermoplastic sheet (GB060, Easy-Vac Gasket, Korea)
- Invest the trial denture into flask (cope) and put the counter flask (first drag) in the standard or conventional manner and complete the dewaxing stage [Figure 1]\textsuperscript{[17]}
- Adapt the same temporary record base to the master cast (cope) and seal the borders adequately. This maintains the thickness of record base and provides more space for hollowing
- Take an another flask (second drag) to invest the record base and complete the wax elimination in a conventional manner\textsuperscript{[17]}
- Fill the cope and second drag with heat-polymerizing acrylic resin (Lucitone 199; Dentsply, York Division) and complete the curing step\textsuperscript{[17]}
- Deflask the cope from the second drag and keep the clear template on the master cast utilizing the indices in the ledge of the cast
- Pick an endodontic file with a rubber stop to check the available space between the template and the cured denture base [Figure 2]
- Mix a food grade gelatin (Gelatine, Eagle Products, Mumbai, India) with water and heat it. This will form a viscous solution which can be filled in a disposable syringe. Alternatively, a reversible hydrocolloid can also be used
- Inject the material through a hole created in the template leaving a 2–3 mm of gap between the injected material and the template [Figure 3]. Make sure that 1 mm of an additional space exists over the tooth portion of the denture
- Remove the template and cut the excess of injected material wherever required. A sharp scalpel blade or paper cutter can be used for this purpose [Figure 4]
- Place the original cope onto the first drag and make sure of its complete closure. Then, mix the heat-polymerizing acrylic resin (Lucitone 199; Dentsply, York Division) and pack it in the usual manner.\textsuperscript{[17]} At packing stage, the thickness of resin around the teeth can be gauged with the help of a periodontal probe [Figure 5]
- Complete the processing and retrieve the denture for its finishing and polishing\textsuperscript{[17]}

**Figure 1:** Flasking of trial maxillary denture sealed to indexed definitive cast

**Figure 2:** Clear template adapted to indexed definitive cast and an endodontic file used to estimate acrylic thickness
• Laboratory remounting can be performed and the occlusion is adjusted if required. Prepare two openings with a bur into the denture base distal to the posterior teeth [Figure 6].
• Remove the gelatin material with hot water filled in the disposable plastic syringe. Clean and disinfect the hollow cavity (Cidex OPA, Advanced Sterilization Products, Johnson and Johnson Medical, Skipton, UK) and pack the openings using an autopolymerizing acrylic resin (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India).
• Complete the denture polishing in the usual manner and check that the cavity is properly sealed by immersing the processed denture in water contained in a beaker. Confirm an adequate seal and deliver the denture to the patient [Figure 7].

**DISCUSSION**

The alternative approach described attributes various benefits over previously reported techniques for hollowing denture. Fluid seepage and difficulty related to gauging resin thickness are major problematic issues inherent in previously documented techniques. Some techniques 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 procedures elaborated in this technique overcome these inherent problems. The leakage at the junction of assembled parts of the prosthesis is reduced, which is the best advantage of this technique. The small openings created into the denture base distal to the posterior teeth facilitate retrieval of the spacer in an area that is not usually adjusted after denture placement. Even if a margin appears, it is too small to cause fluid leakage. The thickness of the resin is well controlled through the use of gelatin/reversible hydrocolloid and clear template. This ensures an even depth of resin material to prevent fluid seepage and prevent deformation during flask closure. A periodontal probe can also be used to verify resin thickness during packing stage. Gelatin/reversible hydrocolloid that is used as spacer can be recontoured easily during packing stage if required and can be retrieved easily with hot water sprayed through the opening using a disposable syringe.

![Figure 3: Gelatin mix injected through a hole into the clear template](image1)

![Figure 4: Gelatin mix shaped to estimate outline of hollow cavity of denture](image2)

![Figure 5: A periodontal probe used to gauge the resin thickness around the teeth](image3)

![Figure 6: Finished and polished maxillary denture with openings prepared to facilitate removal of gelatin mix](image4)
SUMMARY

An alternative approach for hollowing maxillary denture is described. The approach uses a clear template of the trial denture to facilitate insertion of gelatin that acts as a spacer. This ensures an even thickness of acrylic resin during packing stage and also resists deformation during flask closure. In addition, this technique prevents fluid seepage into the hollow cavity.

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Conflicts of interest
There are no conflicts of interest.

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