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# AN INNOVATIVE TECHNIQUE TO DUPLICATE DENTURE WITH INTACT FITTING SURFACES AND RESTORING LOST VERTICAL DIMENSIONS: A CASE REPORT

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**ABSTRACT**

Many prosthodontic situations demand an additional set of complete dentures. In such cases, the additional set can be made by duplicating the existing ones. Sometimes it is desirable to make a few changes when making new complete dentures for a patient who has been wearing old dentures for a long time and is satisfied with them. Replica dentures can be made for these patients, and success with the new dentures can be assured. A procedure is presented for duplication of the old dentures with intact intaglio but attrided occluding surface.



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# INTRODUCTION

A complete denture represents a one-piece prosthesis in which prefabricated denture teeth are integrated into the denture base and has been utilized for decades [(1)]. Construction of the removable complete denture prosthesis is completed in a series of well accepted clinical and laboratory steps [(2),(3),(4)] . But, duplication of the existing complete dentures can be helpful in many circumstances. They can serve as an impression tray, [(5)] a spare or temporary denture and replacement during the fabrication of reline or rebased denture. Copying the polished surface of the existing denture by duplication helps the patients with impaired neuromuscular coordination such as Parkinson's disease while fabricating a new denture. Duplicate dentures also play an important role in imaging as well as in serving as surgical guide [(6)] in implant-retained overdenture.

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One of the advantages of the copy denture approach is the reduced number of clinical procedures involved, since it eliminates the soft tissue impression and dento facial evaluation. Over the years, a variety of techniques have been developed with use of various materials for denture duplication. [(7-20)] all these techniques require intact occluding surfaces of teeth of previous dentures as well as the intaglio surface, so they cannot be applied for replicating dentures with attrided teeth surfaces. Some clinical situations demand for duplication of previous dentures' intaglio surface with replacement of occluding surfaces of teeth so as to restore the lost vertical dimensions of the previous denture. Such situations may include bed ridden patients who cannot walk into the dental clinics for fabrication of new set of dentures. Also the patients with medical conditions like Parkinson's disease, dementia, gastro oesophageal reflux disorder (GERD), epilepsy, night terrors, sleep-related disorders such as sleep apnoea, and attention-deficit/hyperactivity disorder (ADHD) show increased amount

of denture teeth attrition due to the associated Para-functional habits. In such cases the intaglio surfaces are usually intact but vertical dimensions are lost in very short amount of time.

**Case presentation**

- An old denture of a 92 years old patient (Fig 1 (a)) was presented in the department of prosthodontics, crown and bridge, with chief complaint of inability to chew food into small pieces.(Fig. 1 (b))
- The intaglio surfaces of denture were intact with acceptable retention and stability as approved by the patient.(Fig. 2) (Fig. 3)
- In the same appointment with dentures placed intraorally centric relation of patient recorded with bite registration material (Fig 4). Also the thickness of bite registration material was kept such that it compensates for the lost vertical dimension at occlusion. Casts were poured in the denture directly.
- The whole assembly was mounted on mean value articulator following the occlusal plane (Fig 5). Fig 6 shows interocclusal dimension lost due to attrition of teeth over years.
- The original set of denture was given back to the patient in the same appointment.
- The occlusal wax rims were fabricated replicating the plane of occlusion as given by the previous denture. Teeth arrangement was done using monoplane teeth. The group function occlusion was established.(Fig 7,8)
- The denture was then flasked and processed conventionally with heat cure acrylic resin (PMMA) material.
- In the next appointment the new set of denture with duplicated tissue surface and new set of teeth restoring the lost vertical dimension at occlusion was delivered (Fig 9, 10).
- Fig 11 shows post-operative view of patient with denture placed intraorally.

**Fig 1 a. Pre-operative profile photograph**

# DISCUSSION

Various techniques described in literature for denture duplication have been divided in two parts which includes denture duplication using autopolymerising acrylic resin and denture duplication using heat cure acrylic resin. Methods using autoplymerising acrylic resin includes modified flask method using silicone impression material (Manoli 1969)[12] ,

**Fig 1 b. Previous denture of the patient showing attrition of occlusal surfaces**

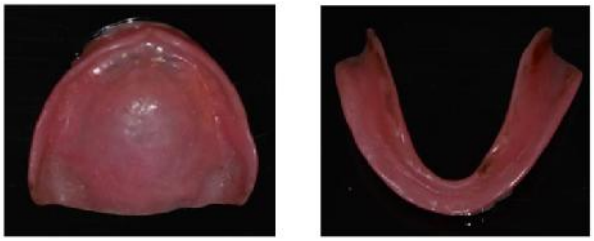
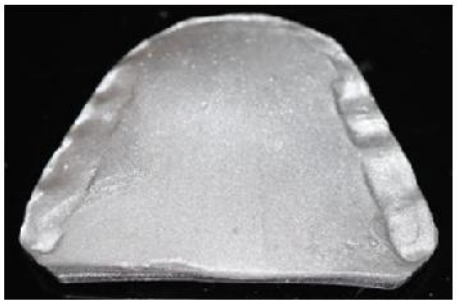


**Fig 2. Previous denture of the patient showing intact fitting surfaces**


**Fig 3. Previous denture of the patient in occlusion a.Front view, b. Right side, c. Left side**



4.a

4.b

**Fig. 4. Interocclusal centric relation record obtained from patient at vertical dimension of occlusion with previous denture in place a. maxillary side, b. Mandibular side The thickness of interocclusal record material suggests the lost vertical dimension of previous denture due to attrition of teeth**

pour resin flask method (boos and carpenter 1974)[13],modified flask method (brewer & morrow 1975 , nassif 1984)[14],cup flask method (wagner 1970, singer 1975)[9,15], two tray method (cooper and watkinson 1976 , lindquist 1997)[16,7]. Technicques using heat cure acrylic resin for denture duplication uses, flask method (azanther p & azarmehr hy 1970)[17], technique by izharul haque ansari (1994)[8],duplication procedure for complete dentures by cad/cam (kawahata n et al 1997)[18],technique by lindquist tj and ettinger rl (1999)[7],sectional mould technique (mohamed tj and faraj sa 2001)[19]. Manoli and griffin in 1969 explained modified flak method using silicone impression material for denture duplication (12).

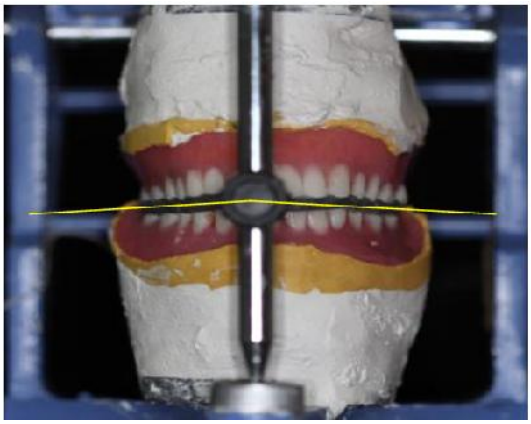


**Fig.5. Stone casts poured in denture itself and mounting done on mean value articulator following the occlusal plane (yellow line) and with the interocclusal record in place, so as to restore the vertical dimension of occlusion of a patienta. Front, b. Right, c. left**

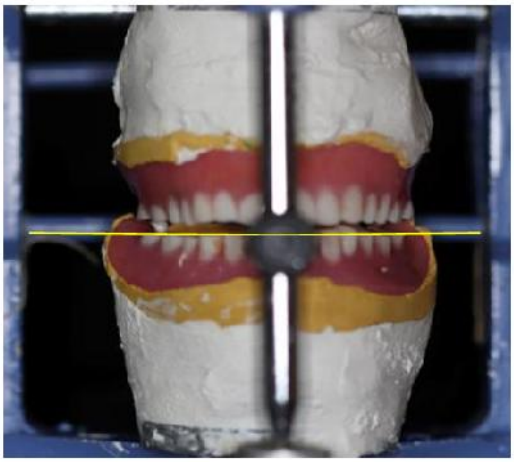


**Fig 6. Interocclusal space created after removal of record suggestive of amount of lost vertical dimension at occlusion of a patient a. Front, b. Right, c. Left**

Silicone rubber was painted on the tissue surface of the denture and reinforced with dental stone. The denture with the silicone rubber lining and stone cast was invested in the lower half of a flask. A uniform layer of silicone rubber approximately 3-4 mm thick was applied to the polished surfaces of the denture and to the teeth. The upper half of the flask was placed in position on the lower half and the flask was filled with plaster. After half an hour, the denture was removed from the flask and the teeth of the same shade and mould were placed. The mould was filled with a 'pour-in' type of auto polymerizing resin and the flask was closed and held under pressure until the resin set. The duplicate denture was removed, trimmed and polished. Boos and carpenter [13] designed a special flask to be used with reversible hydrocolloid for making the mould.

**Fig 7. Monoplane teeth selected and teeth arrangement completed**

**Fig. 8. Teeth arrangement in place and the group function occlusal scheme given. Occlusal plane and the vertical dimension of occlusion restored a. Front, b. Right, c. Left**

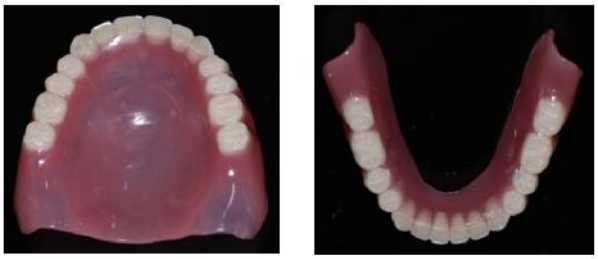


**Fig 9. Final denture fabricated with conventional procedure.**

**10.a** **10.b**

**10.c**

**Fig 10. Final denture in occlusion a. Right, b. Left, c.Front**

**Fig. 11. Post-operative profile photograph**

Tooth shade autopolymerising was painted into the tooth indentations with a brush and pour type of autopolymerising resin was used to form the duplicate denture in the mould. The disadvantages involved were the requirement of a special flask and the equipment and formation of voids in the denture. Wagner (1987) has described a method of duplicating complete dentures by using reversible or irreversible hydrocolloid and a cup as a flask [(9)]. Singer (1975) has modified the method by introducing a particularly convienient zipper technique that uses dental floss to section an alginate irreversible hydrocolloid mould poured in a 12-ounce ceramic cup. Pour type of resin and tooth coloured autopolymerising resins were used to fabricate the duplicate dentures[(15)]

Brewer and morrow [(14)] in their technique modified the denture flask by removing a rectangular section from the upper part to provide access for the sprues. Sprues made of utility wax with a diameter of 15 mm were attached to the lingual surface of the heels of mandibular dentures and to the palatal surface of the tuberosity region of maxillary dentures. Alginate was mixed and placed into the interior of the denture with a fingeror a brush, taking care to avoid the entrapment of air and resultant voids. The remainder of the alginate mix is placed in lower part of the flask. Alginate filled denture was settled into the mix, as during the routine flasking procedure. After the alginate had set upper part of the flask was placed in position, and the wax sprues were adapted to seal the rectangular opening. Alginate was mixed and poured into the flask slowly. A finger or brush was used to wipe alginate onto the tooth of the denture to minimize voids. The second pour would not stick to the first one. After the alginate has set, the flask was opened and denture and sprues were removed. Autopolymerising tooth colored resin of the proper shade was added to the teeth indentations by the sprinkle-on or paint-on method. Pour type resin was mixed and poured into one sprue until the resin filled the mould and extruded through the other sprue. The denture was cured at 20 psi for 30 minutes.

A modification in the above technique was given bynassif j and jumbie r. [(14)] the change was in the fabrication of the teeth before going ahead with the flasking procedure. Cooper and watkinson introduced a technique in which they used two impression trays along with the impression material and the sprued denture to be duplicated to create a mould. [(16)]

This technique was later modified by terry lindquist wherein he used a layer of putty consistency polyvinyl siloxane impression material to create a mould space. [(7)] Soo and cheng have also discussed a technique wherein they used selective pressure technique and zinc oxide eugenol impression paste to make secondary impressions in clear acrylic copies of existing dentures of the patient. [(20)] Advantages of the above explained technique of denture duplication:

- All the above explained techniques demand for an existing denture with intact occluding and fitting surfaces. Hence the technique explained in present article is more authentic in terms of making minor changes with respect to the lost vertical dimensions of an existing denture.
- Reduced number of patient appointments, especially of value in case of bed ridden or paralysed patients.
- Time and cost effective technique.

## CONCLUSION

Many bed ridden or systemically ill patients are unable to approach the dental office repeatedly to undergo a new denture fabrication procedure; hence, suffer due to ill fitting or insufficient existing dentures. This traumatizes the patient emotionally and also hugely affects the nutritional status of the patient. The confidence and social interaction of such geriatric patients also gets affected. With the technique explained above, a prosthodontist can simply duplicate the denture in less number of appointments and can also make minor corrections in the dimensions according to the patients needs. Additionally putty indices can also be recorded to duplicate the soft tissue contours. The unchanged tissue surface aids in comfort and rapid adaptability of a patient to the new denture. And, the restored vertical dimensions help the patient in better function of mastication and to some extent in speech also. Hence, it improves the overall quality of life of debilitated patients.

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