

# Fabrication of Duplicate Denture With Metal Functional Cusps Using A Sectional Mold Technique

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## Abstract

This study describes a method of duplicating denture with metal functional cusps of the occlusal surfaces and heat activated acrylic resin for both teeth and denture base using a sectional mold technique.

**Key words:** Duplicate denture, sectional mold

An accurate duplication of the artificial teeth is an important step in the duplication procedure. For certain duplication the original teeth in the old denture were first used<sup>(1)</sup>. while in others an autopolymerized acrylic resin or ready-made artificial teeth were used<sup>(2-10)</sup>. Heat activated acrylic resin for duplicate the artificial teeth have also been used<sup>(11-12)</sup>.

Metal occlusal surfaces of artificial teeth have been used by many authors in constructing complete denture to patients having one arch with reconstructed gold occlusal surfaces or when there is excessive wearing of teeth surfaces due to heavy bite or bruxism; hence it will stabilize the vertical dimension of the patient<sup>(13)</sup>.

Procedure:

*In this work, we followed the same technique being used in our previous article concerning coloring the teeth for duplicate denture using a sectional mold technique.*<sup>(13)</sup>

1. Prepare a well cleaned old denture, then apply a beading wax around the posterior teeth leaving 1.5 mm of the teeth surfaces uncovered (fig.1).
2. Mix casting investing material (Bella vest, SH, Bego, Germany). Then paint carefully the exposed parts of the teeth surfaces and the beading wax giving a thickness of 4 mm (fig.2).



Fig. 1. Posterior teeth of original denture surrounded by beading wax.



Fig. 2. Application of investment material on the occlusal surfaces

3. Remove the investment from the denture after it has been set, then pour melting casting blue wax (crown wax, Bego, Germany) in one half of the index which represent the functional cusps (fig.3).
4. Apply adhesive material and retention pearls (retention-Perlen, Bego, Germany), on the surface of casting wax opposite to the occlusal surface to give retention for the acrylic resin.
5. Sprue the wax pattern by using old burs coated with wax to withstand the weight of the investment (fig.4).



Fig. 3. Casting wax in the investment mold.

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Fig. 4. Spruing the wax pattern.

6. Put the prepared investment with its wax pattern and sprues in a casting ring and fill with cool water for 5 minutes to moist the investment. Empty the water and pour the investment in the ring
7. After setting of the investment, burn out completely the wax and remove the burs to leave a way for the melted metal to go through.
8. Use melting casting alloy (Wiron 99, Bego, Germany) to construct the recommended occlusal surface.
9. Finish the metal cast. Certain attention should be applied not to remove a thick layer from the occlusal surface (fig.5).



Fig. 5. Functional cusps changed to metal.

10. Remove the beading wax which was applied to the old denture.

*The same procedure to construct a duplicate denture in our previously referred article was followed to the step no. 13 where the arch wax was prepared and ready for flasking.*

11. Flask the arch wax in another flask, and eliminate the wax, then pack the mold.
12. Apply the prepared metal occlusal surface and fix by adhesive in the stone index (fig.6).



Fig.6. Fixation of the prepared metal in the mold

13. Now pack with crown and bridge tooth colored heat activated acrylic resin.
14. Finish the prepared acrylic teeth supporting the metal occlusal surfaces in the stone mold cervical and interdental regions.
15. Place the acrylic teeth to the stone mold completing the process of denture construction, as referred to the step no. 23 and 24 in our previous article ( fig.7 and 8).



Fig.7 finishing and polishing for duplicate denture



Fig.8. Duplicate and original denture.

## Results

Retention, stability and vertical dimension for the duplicate denture shows positive results clinically compared with the original denture.

Table (1): Shows the retention obtained in the duplicate and the original denture compared where a comparative of significant exist through the use of Kolomogrov-Simernov"Non parametric" test- (KS) for the two sample which were concerned with a highly significant difference between the original and duplicate denture that shows a positive result for the duplicate denture.

**Table.1: Relation between retention in original and duplicate denture.**

Original			Duplicate			C.S.
Poor	Fair	Good	Poor	Fair	Good	
7	3	-	-	-	10	1.00 HS

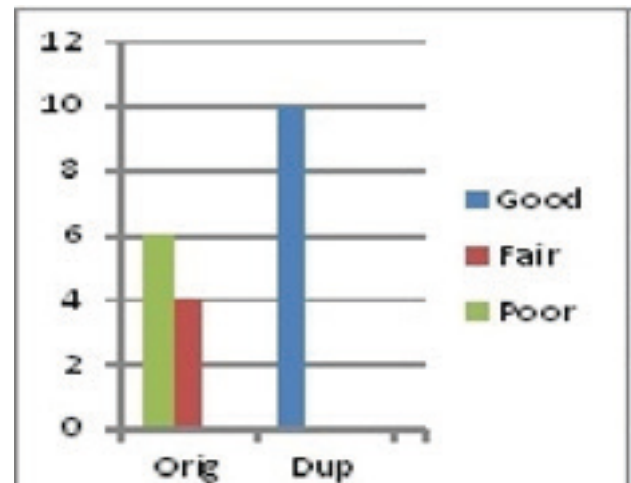


Fig.22: Stability frequencies distribution in original and duplicate denture.

Table (3) shows the difference between increasing the vertical dimension between the original and duplicate denture when zinc oxide eugenol wash impression was used. It shows a highly significant difference through the use of statistical test (t-test) at (i.e, p<0.05) level, the measurement ranging between (0.20-0.65) mm.

**Table.3: Increasing vertical dimension between duplicate and original denture.**

Case no.	Increase V.D.	Case no.	Increase V.D.
1-	0.30 mm	6-	0.62mm
2-	0.44mm	7-	0.65mm
3-	0.20mm	8-	0.35mm
4-	0.54mm	9-	0.47mm
5-	0.38mm	10-	0.28mm

**Discussion**

Retention and stability of duplicate denture shows better results due to the wash impression that made with the original denture.

The changes in vertical dimension of duplicate den-

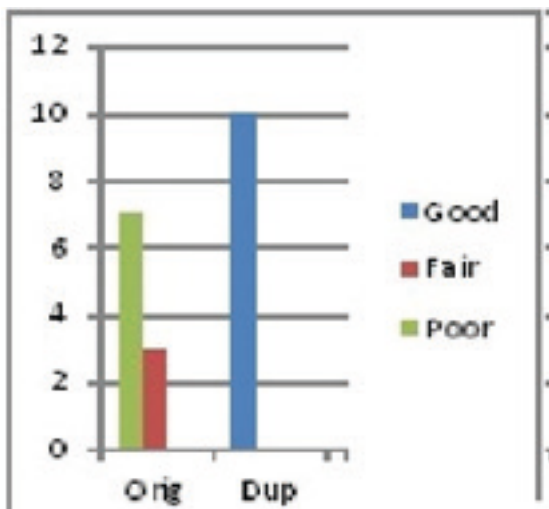


Fig.21: Retention frequencies distribution in original and duplicate denture.

Table (2): Shows the stability obtained in the duplicate denture compared to the original, where a comparative of significant through the use of statistical test (KS) which gives a highly significant difference between the original and duplicate denture which again shows a positive result toward the duplicate denture.

**Table.2: Relation between stability in original and duplicate denture.**

Original			Duplicate			C.S.
Poor	Fair	Good	Poor	Fair	Good	
6	4	-	-	-	10	1.00 HS

ture shows a highly significant difference, which will be a little clinical importance as the free- way space average 3 mm. therefore the increase that will compensate the reduction of vertical dimension of the original denture.

The wearing process of artificial teeth (special- ly acrylic type) can result in reduced vertical dimen- sion of face for completely edentulous patients and this may lead to esthetic ,mechanical ,and biolog- ical effects, such as T.M.J. problems, infection at the corners of the mouth and chin to nose reduced distance.

The construction of metal occlusal surface on arti- ficial teeth is of great advantages since this will give the artificial teeth occlusal strength and protection against wearing process allowing the teeth to work with high efficiency.

The disadvantages of this technique are the ad- ditional laboratory steps and the unusual color of the metal which form the occlusal surfaces of the artificial acrylic teeth.

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