

Rigid and resilient investing materials - Expected movement of teeth In fabrication of complete dentures: An invitro study

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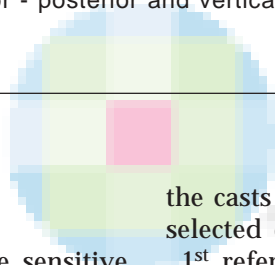
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Dentistry is going through a series of radical and important changes. So, has the field of Prosthodontics seen an introduction of numerous techniques being offered for the processing of dentures with acrylic resin according to their investing method. The investing could be done by Compression Molding Technique or Fluid Resin Technique.

Compression Molding Technique normally requires gypsum mould which is rigid. The newer investing material silicone, when used for investing waxed up dentures reproduces finer details and better polish surface of acrylic resin dentures. Silicone being resilient movement of teeth during processing could be expected.

The purpose of this study was to compare silicone and gypsum as a coring material for flasking. Also the movement of teeth in 3 directions i.e. medio-lateral, anterior - posterior and vertical directions were investigated and evaluated.

Key words: Coring, Movement of Teeth



INTRODUCTION

Processing of resin dentures is technique sensitive and indeed a challenging experience for dentist and technicians due to changes occurring during processing of dentures.^[1] There is definite movement of teeth during and after processing of complete dentures which has been proved time and again by various studies^[2] carried out as early as in 1960's till recent years. The movement of teeth could be in any direction and this would disturb the occlusal scheme achieved at the try - in stage.

An attempt has always been made to minimize the changes occurring during processing of dentures. Movement of teeth that occurs during fabrication of denture has been the objective of speculation which can be attributed to nature of material and processing techniques.

The purpose of the study was to compare movement of teeth taking place during processing of the denture using various coring material for investing.

MATERIALS AND METHODS

Ideal arrangement was done on 18 maxillary cast with even thickness of wax. Midline was marked on

the casts bisecting it and three reference points were selected on the cast.^[3]

1st reference point - Center of palate on bisecting line.

2nd and 3rd reference point - Marked just behind maxillary tuberosities on both sides. [Figure 1]

These points were transferred on the waxed up denture.

Stainless steel pins of 42 gauge diameter and 10 mm length were embedded at these reference points through the wax into the cast and pins were embedded in acrylic resin artificial teeth at the Mesial aspect of the central groove of the 1st molar, Mesially on the center groove of the 1st premolar [Bicuspid] and upright on cingulum of both central incisors.^[4] [Figure 2]

Digital caliper capable of registering changes as small as 0.01 mm was used to measure the distance between reference pins.^[5] The antero - posterior distance was measured from the pin on the central incisors to reference point 1 and from reference points 2 and 3 to cusps pins on the molars. The horizontal distance was measured from center reference point 1 to cusp pins of molars [Figure 3]. The vertical distance was measured from base of cast to height of pin embedded on the central incisor, pre-molar and molar.

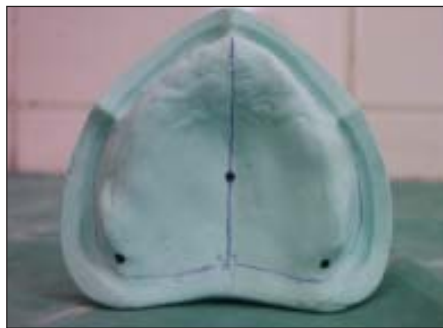


Figure 1: Maxillary cast with reference points and lines



Figure 2: Stainless steel pins in position



Figure 3: Measurement of distance between reference points by vernier caliper

The following precautions were necessary during Investing and Processing:

1. Cellophane strips were used on the base of casts for easy deflasking.
2. Excessive use of separating medium avoided during packing
3. Metal to metal contact between base and counter of flask, ensured
4. Double trial closure was done
5. Excessive pressure during closure was avoided.

Base flasking of waxed up denture of all groups was done using dental plaster in varsity flask. Standard Water: Powder ratio for dental plaster mix 0 : 5 was used. Once the base flasking was completed and dental plaster set the surface was smoothed and Vaseline was applied for separation.

The flasks were divided into 3 groups of 6 each. Counter flasking was done following one of the following methods:

Group I - Conventional flasking with dental plaster.

Group II - A layer of coring with dental stone + dental plaster

Group III - A layer of coring with silicone material^[6] + dental plaster. [Figure 4]

Flasks were placed under a clamp and plaster was

allowed to set.

Dewaxing was done after 1 hour in boiling water for 7 minutes (standardized). The casts and denture mould were allowed to cool till room temperature. Separating medium was applied while the dewaxed moulds were warm to get a thin layer of separating medium. Later the flasks were allowed to cool for 1 hour.

Packing was done with Heat Cure Acrylic Resin following standardized procedure using 9 ml of monomer and 25 ml of polymer which was mixed in a mixing jar and packed in the mould in dough stage.

Trial closure was done to ensure complete closure of the flasks. The flasks were bench cured for 2 hours before placing in the acrylizer, a short curing cycle of acrylic resin was followed for processing.

The dentures were de-invested following the sectional method to avoid distortion of the acrylic resin. To visualize the movement in the teeth position in the processed dentures [Figure 5] measurements were taken at the same points specified and marked at the waxed up denture stage. These readings were tabulated. The reading of the processed dentures were compared with the reading of the waxed up denture to note the movement occurring during processing



Figure 4: Coring the denture with different materials



Figure 5: Marking of processed dentures to visualise smooth movement

Table 1: Comparison of the three groups

Direction	Group I (Dental Plaster)	Group II (Dental Stone)	Group III (Silicone Material)
Medio-Lateral	±1.15	±0.68	±0.37
Antero- Posterior	±0.54	±0.43	±0.96
Vertical	±0.68	±0.55	±0.98

*Note Mean Value

as shown in Table 1.

RESULTS AND DISCUSSION

From the results [Table 1] it is noticed that tooth movement occurred in all 3 directions in all the 3 groups.

Movement of teeth is expected to take place during the processing of a denture. These movements should be minimum to be able to maintain occlusion planned for the patient and verified at the try in stage. There should be no change in occlusion of the processed dentures. However movement of teeth do take place during the fabrication of the complete denture.

When dentures were flaked in only dental plaster maximum movement of the teeth was observed in the study especially in the medio lateral direction.

Flasking done in silicone material gave smooth surface of the processed dentures, it was easy to deflask but showed maximum movement of teeth in the antero-posterior and vertical direction. This could be attributed to the resiliency of the silicone material.

Dental stone when used as the coring material over the teeth and polished surface of denture along with dental plaster showed the least movement of teeth during processing both in the vertical and antero-posterior direction. This is so because dental stone due to it's rigidity binds the teeth together and pre-

vents them from moving.

CONCLUSION

Nothing has changed over years its a proved fact by the results that processed acrylic denture brought about teeth movement that were significantly influenced by coring materials. Dental stone showed least tooth movement compared to silicone material. The silicone material has become very popular because of it's capacity to give smooth surface of the processed dentures but showing greater tooth movement. A simple procedure of coring with dental stone would reduce the tooth movements and give better occlusion in the processed dentures. It is recommended to carry out coring in dental stone when flasking complete dentures to reduce processing errors.

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