ORIGINAL ARTICLE

# COMPARISON OF BORDER MORPHOLOGY RECORDED USING TWO BORDER MOLDING MATERIALS

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**ABSTRACT:**
Aim: To analyze and compare the shape of maxillary vestibular impression recorded with low fusing impression compound and heavy-bodied addition silicone.
Material and method: In this study, two materials were used for the purpose of border molding and master casts were obtained. Six points were selected and marked on the cast, and measured with a calibrated attachment for depth and width. The differences were compared at each site.
Results and Conclusion: Based on the study, it is concluded that heavy-bodied addition silicone gives accurate borders to a denture
Keywords: Maxillary impression, Border molding, Master cast

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This article may be cited as: Gupta R, Luthra RP, Sirohi R. Comparison of Border Morphology Recorded Using Two Border Molding Materials. J Adv Med Dent Scie Res 2015;3(4):122-124.

## INTRODUCTION

The objectives of an impression are to provide support, retention, and stability for the denture. The impression should record all the denture-bearing surfaces available. However, the denture's retention is enhanced considerably if the denture extends peripherally to harness the resiliency of most of the surrounding limiting structures. An impression that records the depth of the sulcus, but not its width, will result in a denture that lacks adequate retention.[1]

For a successful impression, a physiological type of border molding procedure should be performed by the dentist or by the patient under the guidance of the dentist.[1] Border molding is the shaping of the border areas of an impression tray by functional or manual manipulation of the tissue adjacent to the borders to duplicate the contour and size of the vestibule. Terminating the denture borders on soft resilient tissue will allow the mucosa to move with the denture base during functional and thereby maintain peripheral seal.[2]

The original material used for this purpose was low fusing compound and is still effectively used today for this purpose by many dentists.[3]

However, border molding using low fusing impression compound usually requires separate applications of the material to different sections of the tray borders which can be quite messy.

The present study is focused to compare the border morphology obtained by using low fusing compound, and heavy bodied addition silicone.

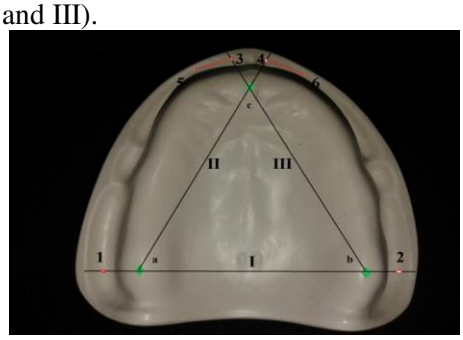
## MATERIAL AND METHOD

A total of 20 edentulous patients were selected in Department of Prosthodontics and Crown and Bridge in HP Government Dental College, Shimla. The patients were well-informed about the study, and ethical clearance was obtained.

- **Primary impression -** Primary impression of the maxillary arch was made with impression compound and cast was poured in dental stone
- **Modification and duplication of primary casts –** On primary cast, three reference points were made – one on incisive papilla (designated as point c) and other two in tuberosity area on each side (designated as points a and b). Two duplicated casts were obtained from the modified primary cast by using reversible hydrocolloid impression material.
- **Fabrication of special trays and border molding** - Custom trays were fabricated on duplicated casts using auto-polymerizing acrylic resin. The sectional/incremental method was used for border molding with low fusing

compound (green stick) using custom tray 1 and single-stage border molding was done with heavy bodied addition silicone (putty) using custom tray 2.

- **Measurements on master casts** - Vestibular dimensions (width and depth) of casts A and B of all subjects were measured with calibrated attachment of surveyor and measuring scale, with the help of three reference planes (plane I, II, and III).




The vestibular depth measurement for cast A ($D^A$) and cast B ($D^B$) was the vertical distance from points 1, 2, 3, 4, 5 and 6 to the reference planes I, II, and III. The width measurement for cast A ($W^A$) and cast B ($W^B$) was the horizontal distance from points on facial surface of vestibule ( marked with a paper scale 2 mm above the points 1, 2, 3, 4, 5, and 6) to the adjacent reference plane. Data collected were tabulated and subjected to statistical analysis.

## RESULTS

After compilations of the data, appropriate statistics were applied. The following descriptive statistical analyses were used in the analysis of the present study:

Independent (Unpaired) T test: The independent samples *t*-test is used when two separate sets of independent and identically distributed samples are obtained, one from each of the two populations being compared. It tests hypotheses about differences between two means; however, the means are for the same variable but for two different populations. The groups (or samples) are independent of one another, thus the name independent samples.

**Table I:** Mean vestibular depth (mm) and standard deviation of two groups

| | Group | No of subjects | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Depth** | **Low fusing impression compound** | 20 | 11.733335 | 1.2657215 | .2830239 |
| | **Heavy bodied addition silicone** | 20 | 12.312505 | 1.2974580 | .2901204 |

Table I shows that in low fusing impression compound group mean vestibular depth is 11.733335, standard deviation 1.2657215 and standard error 0.2830239. However, in heavy bodied addition silicone group mean vestibular depth is 12.312505, standard deviation 1.2974580 and standard error 0.2901204.

**Table II:** Mean vestibular width (mm) and standard deviation of two groups

| | Group | No of subjects | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Width** | **Low fusing impression compound** | 20 | 6.995845 | .8431414 | .1885321 |
| | **Heavy bodied addition silicone** | 20 | 6.437505 | .7584209 | .1695881 |

Table II shows that in low fusing impression compound group mean vestibular width is 6.995845, standard deviation 0.8431414 and standard error 0.1885321. However, in heavy bodied addition silicone group mean vestibular width is 6.437505, standard deviation 0.7584209 and standard error 0.1695881.

**Table III:** Test Statistics

| | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|
| | t | Df | Sig. (p-value) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | Lower | Upper |
| **Depth** | -1.429 | 38 | .161 | -.5791700 | .4053053 | -1.3996677 | .2413277 |
| **Width** | 2.202 | 38 | .034 | .5583400 | .2535833 | .0449875 | 1.0716925 |

Table III shows a non-significant difference in the vestibular depth of two groups with 'p value' of 0.161, t value of -1.429, mean difference -0.5791700, and standard error difference 0.4053053 . However, a significant difference is present in vestibular width with 'p value' of 0.034, t value of 2.202, mean difference 0.5583400, and standard error difference 0.2535833.

## DISCUSSION

Various methods and impression materials have been tried for successful shaping of the borders of a denture according to the morphological and functional conditions of an edentulous mouth. Recently, as an alternative to the conventional method where borders were molded with modeling compound, Appelbaum and Mehra recommended polyvinyl siloxane putty for border molding and light body impression material for the final impression. Smith et al. used polyether in a one step impression procedure. Moreover, tissue treatment materials and impression waxes were advocated by others.[4]

Results showed that vestibular depth recorded with addition silicone was non significantly deeper than that with low fusing impression compound. However, the vestibular width recorded with low fusing impression compound was significantly wider than that recorded with addition silicone.

This difference could be related to the manner in which the border molding was performed. When using low fusing impression compound for border molding, the peripheral tissue was pulled outward then downward and inward. The outward and downward manipulation would shorten the flanges and make the borders thicker. The subsequent inward pull would probably be less effective in reducing the thickness of the borders because of the short working time and high viscosity of the material.[5] On the contrary, heavy bodied addition silicone is slow setting and can be functionally molded. The molding procedures were accomplished by patient's own movement.[6]

## CONCLUSION

Within the limitations of the study the following conclusions were drawn:

- The borders of the vestibular impressions recorded using low fusing impression compound were wider and shorter than those recorded using the heavy bodied addition silicone
- Simultaneous border molding done with heavy bodied addition silicone was found to be viable and advantageous alternative to conventional border molding (sectional border molding), as it results in reduction of chair side time, less discomfort for the patient and less efforts for the dentist.

  Based on the study it is concluded that the heavy bodied addition silicone is a better material for border molding as compared to low fusing impression compound.

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Source of Support: Nil

Conflict of Interest: None declared