

Assessment of Two Border Molding Techniques and Materials on Upper Complete Denture Retention

Rahul Anand Razdan^{1*} Neha Agarwal²

¹Senior Lecturer, Department of Prosthodontics, Index Institute of Dental Sciences, Indore, Madhya Pradesh, India.

²Tutor, Department of Dentistry, Sri Aurobindo College of Dental Sciences, Indore, Madhya Pradesh, India.

ABSTRACT

Background: The final impression obtained during a complete denture building involves capturing the vestibule along with the border molding technique and then obtaining an impression of the edentulous area. The present study was conducted with the aim to establish the retention force of different impressions made with two different techniques.

Materials and methods: The present study was conducted in the Department of Prosthodontics. The study enrolled a total of 8 subjects between the age of 50-60 years that had well-formed residual alveolar ridges. Custom made impression trays were obtained using acrylic resin. For each subject two trays were made, and the trays were kept short by 2-3 mm. Border molding of the first tray was done using sectional technique with the help of impression compound. All the information obtained was arranged in a tabular form and analyzed using SPSS software. Student t test was used as a test of significance. Probability value of less than 0.05 was regarded as significant.

Results: In case 8 the mean retentive force by single step technique was 9.91 and with sectional technique was 9.56. The overall mean retentive force in single step was 8.39 and in sectional step was 9.17.

Conclusion: According to our study, the sectional border molding procedure seemed to provide more retention than single step procedure.

Keywords: Edentulous, impression, secondary.

INTRODUCTION

In any prosthodontic treatment, the final impression plays an important role in the successful placement and failure of any complete denture prosthesis. The final impression obtained during a complete denture building involves capturing the vestibule along with the border molding technique and then obtaining an impression of the edentulous area.¹ It is a tedious and time-consuming technique that the tray should closely adapt to the vestibule for construction of complete dentures. Originally a low fusing impression compound were used to obtain the primary impression. It was familiarized by the Green brothers during the year 1907.² The

tray was molded in sections in order to obtain good stability. An ideal impression material should allow the simultaneous molding of all the borders so that frequency of insertions could be decreased and also there is reduction in errors with the simultaneous insertion of the trays. The low fusing impression compound enables for small manipulation time that allows for lesser time for vestibular tissues to mold the borders of the impression tray. Also, the chances of the operator to burn the vestibular tissues is reduced as heat is required for softening. Finally, elastomers that are now used as alternative to the low fusing impression compound do not require heating. They allow high end accuracy, ease of manipulation and adequate operating and setting

Received: June. 22, 2018; Accepted: Aug. 3, 2018

*Correspondence Dr. Rahul Anand Razdan.

Department of Prosthodontics, Index Institute of Dental Sciences, Indore, Madhya Pradesh, India.

Email: Not Disclosed

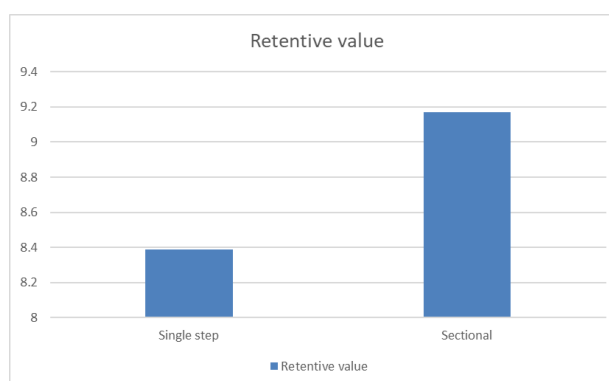
time. The materials that are now used are polysulfide,³ polyether,^{4,5,6} or vinyl polysiloxane putty.^{7,8} The major drawback with these materials is odor, staining and thick over extended borders⁹. As per the various recent studies^{10,11} with different materials and methods of border molding there was no difference in the retention of the dentures. The present study was conducted with the aim to establish the retention force of different impressions made with two different techniques.

MATERIALS AND METHODS

The present study was conducted in the Department of Prosthodontics. The study enrolled a total of 8 subjects between the age of 50-60 years that had well-formed residual alveolar ridges. The subjects with bony exostoses or undercuts, abnormal TMJ function or any systemic abnormality were excluded from the study. The study was approved by the institutional ethical board and all the subjects were informed about the study and a written consent was obtained in their vernacular language. The primary impression of the maxillary alveolar ridge was taken using irreversible hydrocolloid. The impressions were poured, and the undercuts were blocked. Custom made impression trays were obtained using acrylic resin. For each subject two trays were made and the trays were kept short by 2-3 mm. Border moulding of the first tray was done using sectional technique with the help of impression compound. Then a heavy viscosity siloxane was taken for secondary impression with second tray. Cast was poured after beading and boxing of the tray. Denture waxing was done and stainless-steel hooks was fixed in the anterior palate region. Regular flasking and dewaxing was performed followed by finishing of the denture bases. A digital force meter was used for recording of the retentive force. The subject in upright position with the head forward and upper arch parallel to the floor, the force was measured. The retention force of the denture base was obtained by the value of force that was observed on the force meter at the time the denture base got dislodged. Mean of three readings was obtained. All the information obtained was arranged in a tabular form and analyzed using SPSS software. Student t test was used as a test of significance. Probability value of less than 0.05 was regarded as significant.

Table 1: The mean retentive values for single step and sectional border molding techniques

Case number	Single step border molding	Sectional border molding	P value
1	5.65	6.26	
2	8.60	10.19	
3	10.19	9.95	
4	7.23	9.24	
5	9.86	9.89	
6	10.50	10.48	
7	7.65	7.48	
8	9.91	9.56	
Mean	8.39	9.17	<0.05



Graph 1: Showing the mean retentive values for single step and sectional border molding techniques.

RESULTS

The present study enrolled 8 subjects, out of these there were 4 males and 4 females. The mean age of the subjects was 58.65+/- 3.51 years. In case 1 the mean retentive force by single step technique was 5.65 and with sectional technique was 6.26. In case 2 the mean retentive force by single step technique was 8.60 and with sectional technique was 10.19. In case 3 the mean retentive force by single step technique was 10.19 and with sectional technique was 9.95. In case 4 the mean retentive force by single step technique was 7.23 and with sectional technique was 9.24. In case 5 the mean retentive force by single step technique was 9.86 and with sectional technique was 9.89. In case 6 the mean retentive force by single step technique was 10.50 and with sectional technique was 10.48. In case 7 the mean retentive force by single step technique was 7.65 and with sectional technique was 7.48. In case 8 the mean retentive force by single step

technique was 9.91 and with sectional technique was 9.56. The overall mean retentive force in single step was 8.39 and in sectional step was 9.17. (table 1, graph 1)

DISCUSSION

An exact impression will always provide good retention, stability, and patient's comfort. Scrupulous border molding provides for different measures to retain complete dentures. Two techniques recognized in the literature for border molding are the sectional and single-step procedure. Different studies^{10,11} have been performed to determine and compare the efficacies of these two procedures. However, the literature is still abstruse about the efficiency of these two techniques. Some drawbacks associated with elastomeric impression materials with putty consistency is thick and overextended borders⁹ and lesser manipulation time. Our study we picked injectable PVS because of it has adequate flow, dimensionally stable and sufficient working time.¹² Digital force meter as provided by Burns et al.¹³ was castoff for the objective assessment of retentive force. In our study, 8 subjects were enrolled, out of these there were 4 males and 4 females. The mean age of the subjects was 58.65+/- 3.51 years. In case 1 the mean retentive force by single step technique was 5.65 and with sectional technique was 6.26. In case 2 the mean retentive force by single step technique was 8.60 and with sectional technique was 10.19. In case 3 the mean retentive force by single step technique was 10.19 and with sectional technique was 9.95. In case 4 the mean retentive force by single step technique was 7.23 and with sectional technique was 9.24. In case 5 the mean retentive force by single step technique was 9.86 and with sectional technique was 9.89. As per the study by Woelfel et al.¹⁴ approximately 17 times insertions were needed by 7 dentists in the same subjects while by means of this impression compound. It was a tiring and time taking procedure. The vestibular sulcus must be in close contact with the material at the time of single insertion.⁴ As per the study by Rizk¹¹ higher retention was established with single-step border molding technique using putty rubber base material. In this study, in case 6 the mean retentive force by single step technique was 10.50 and with sectional technique was 10.48. In case 7 the mean

retentive force by single step technique was 7.65 and with sectional technique was 7.48. In case 8 the mean retentive force by single step technique was 9.91 and with sectional technique was 9.56. The overall mean retentive force in single step was 8.39 and in sectional step was 9.17. According to the study by Yaratpatineni et al.¹⁰ the retention gotten was comparable amongst the two techniques. The few limitations of our study were smaller sample size, a larger sample size is required to evaluate the mean force. The retention of final dentures was not compared and the patient satisfaction was not taken into consideration.

CONCLUSION

According to our study, the sectional border molding procedure seemed to provide more retention than single step procedure. The choice of border molding procedure varies with the condition of the alveolar ridge and the choice of the operator. Clinically both the techniques appeared to be comparable with each other.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Davis DM. Developing an analogue/substitute for the maxillary denture-bearing area. In: Boucher's Prosthodontic Treatment for Edentulous Patients. 11th ed. St. Louis, MO: Mosby; 1998. p. 141-61.
2. Green JW. Green Brothers' Clinical Course in Dental Prosthesis. 5th ed. Detroit: Detroit Dental Mfg. Co.; 1910. p. 1.
3. Firtell DN, Koumjian JH. Mandibular complete denture impressions with fluid wax or polysulfide rubber: A comparative study. J Prosthet Dent 1992;67:801-4.
4. Smith DE, Toolson LB, Bolender CL, Lord JL. One-step border molding of complete denture impressions using a polyether impression material. J Prosthet Dent 1979;41:347-51.

5. Felton DA, Cooper LF, Scurria MS. Predictable impression procedures for complete dentures. *Dent Clin North Am* 1996;40:39-51.
6. Tan HK, Hooper PM, Baergen CG. Variability in the shape of maxillary vestibular impressions recorded with modeling plastic and a polyether impression material. *Int J Prosthodont* 1996;9:282-9.
7. Appelbaum EM, Mehra RV. Clinical evaluation of polyvinylsiloxane for complete denture impressions. *J Prosthet Dent* 1984;52:537-9.
8. Solomon EG. Single stage silicone border molded closed mouth impression technique-part II. *J Indian Prosthodont Soc* 2011;11:183-8.
9. Patel JR, Sethuraman R, Chaudhari J. Comparative evaluation of border morphology produced by three different border molding materials. *Int J Contemp Dent* 2010;1:82-8.
10. Yarapatineni R, Vilekar A, Kumar JP, Kumar GA, Aravind P, Kumar PA. Comparative evaluation of border molding, using two different techniques in maxillary edentulous arches – An in vivo study. *J Int Oral Health* 2013;5:82-7.
11. Rizk FN. Effect of different border molding materials on complete denture retention. *Cairo Dent J* 2008;24:415-20.
12. Hayakawa I, Watanabe I. Impressions for complete dentures using new silicone impression materials. *Quintessence Int* 2003;34:177-80.
13. Burns DR, Unger JW, Elswick RK Jr., Beck DA. Prospective clinical evaluation of mandibular implant overdentures: Part I – Retention, stability, and tissue response. *J Prosthet Dent* 1995;73:354-63.
14. Woelfel JB, Hickey JC, Berg T Jr. Contour variations in one patient's impressions made by seven dentists. *J Am Dent Assoc* 1963;67:1-9.
- 15.