

Single step border molding and final impression with Silicone

Sania I¹, Nahar F², Nahar M³, Haque AKMA⁴

Abstract:

The history of complete denture impression procedures has been influenced largely by the development of impression materials from which new techniques and ideas arose. Border molding is the process by which the shape of the border of the an impression tray is made to conform accurately to the contours of the buccal and labial vestibules. It is an important step in fabrication of complete denture. It can be done in two methods, incremental or sectional, and single or one step. The objective of this study was to evaluate the retention and stability of complete denture fabricated by using addition silicone putty as single step border molding impression material and final impression with same material (light bodied silicone). Patients were selected from prosthodontic department of Dhaka Dental College and Hospital. Ten patients were studied, completely edentulous only in upper jaw, having well formed alveolar ridges. Dislodgement test of custom tray was accomplished after border molding. Clinical tests for retention were performed after fabrication of complete denture. All were satisfactory. Good result was obtained with less difficulty and less expenditure of time by an impression technique with one step border molding using addition silicone putty.

Key words: Border molding, addition silicone putty, thixotropicity, complete denture.

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Introduction:

Border molding is an important procedure in fabrication of complete denture. It promotes the development of border seal; maintain the contact of the denture border with the adjacent vestibular tissues during rest as well as in functional activity. Materials like light polymerized resin¹, cold cure resin², periopack³, tissue conditioner and elastomers⁴, are reported to be used for single step border molding. Low fusing compound impression material is commonly used border molding impression material. It requires separate applications of material to different sections of the tray borders, is a time consuming procedure. There is a risk of burn or scald of patient's mouth. Patient may become irritated for lengthy procedure.

Elastomeric impression materials are most commonly used as a substitute for low fusing compound as they meet all of the requirements. Heavy body putty silicone has been

used for border molding instead of low fusing compound. Light body silicone has been used as final impression material. It can be placed continuously along the entire border of an individual tray, and the border of the tray can be molded at a single stage. In addition, it also had high degree of accuracy, dimensional stability and ease of manipulation.

Materials and methods:

Patients were selected from prosthodontic department of Dhaka dental college and hospital. Ten patients completely edentulous only in upper jaw, having well formed alveolar ridges, including proper height and thickness, no severe undercuts or bony exostosis, firm mucosa of moderate thickness all over the denture bearing areas and with no signs of inflammation, ulceration or hyperplasia were selected.

In clinical procedure at first primary impression was taken with alginate impression material. Primary cast was poured. A custom tray was fabricated over the primary cast. Periphery of the tray was reduced 2mm short of the vestibular reflection. The posterior palatal border contained both hamular notches and extended approximately 2mm posterior to the vibrating line. Adhesive for silicone impression was painted on the borders of the tray 3mm inside and outside the borders. One scoop of silicone putty was thoroughly mixed by hands with its catalyst for 30-45 seconds then rolled and applied to all the borders of

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1. Dr. Iffat Sania, BDS, FCPS Trainee, Dept. of Prosthodontics, OSD, DGHS, Dhaka Dental College.
 2. Dr. Faruk Nahar, BDS, MS (Prosthodontics), Assistant Professor, Dept. of Prosthodontics, Dhaka Dental College.
 3. Dr. Mahtabun Nahar, BDS, MS (Prosthodontics), Assistant Professor, Dept. of Prosthodontics, Dhaka Dental College.
 4. Dr. AKM Azizul Haque, BDS, MPH, MS (Prosthodontics), Associate Professor and Head, Dept. of Prosthodontics, Dhaka Dental College and Hospital.

Address of Correspondence: Dr. Iffat Sania, BDS, FCPS Trainee, Dept. of Prosthodontics, OSD, DGHS, Dhaka Dental College.

the upper tray and across the post palatal seal area⁵. The tray was then inserted by a rotating motion in the patient's mouth, oriented in position and centered over the residual ridge by finger pressure applied bilaterally in the premolar region. Border molding was carried out. The tray was removed from the mouth when the impression material has set. After removal of the border molded impression tray, all peripheral borders were inspected to assure appropriate anatomic and functional detail and the rounded contours of the borders⁶. Any deficient sites were corrected with a small mix of material added to the appropriate area. Overextensions were readily detected because the tray was protrude through the putty material and adjusted with scalpel as necessary. Also excess material that has flowed onto the external portions of the tray was removed. The tray was then subjected to dislodgement tests⁷. The tray was inserted, and the buccal and labial mucosa was allowed to drape passively over the flanges of the impression tray. The operator, from behind and to the side of the patient, the tray seal was checked on the opposite side by rolling pressure of the index finger away from the side being checked. A finger was placed in a protective position just below the tray of side being tested. So further border molding was done until an effective seal was attained. When the tray resisted dislodgement, the same testing procedure was used on the opposite side. Retention tests of the trimmed tray were performed.⁸ The tray was refined then for final impression. Adhesive was once more painted on the tissue surface of the tray and equal amounts of base and catalyst light body silicone were mixed and placed on the tray to cover the basal surface of the tray and the borders. The loaded tray was then seated in the patient's mouth and molding was performed in the usual manner. The completed impression was removed from the patient's mouth and inspected for acceptability. The impression was poured into dental stone to obtain master casts on which heat cured acrylic trial denture bases were constructed. Clinical evaluation of retention of trial bases was done and the patients were requested to comment on the retention of each trial denture base. Over this base, denture was fabricated and inserted to the patient's mouth and clinical evaluation of retention was done. Retention of the denture was checked by seating the denture with a finger on the vault of the palate and the tissues of the cheek and lip was allowed to settle around the denture then attempting to remove the denture at right angles to the occlusal plane, gripping the buccal surface between the thumb and forefinger in the premolar region. Load was then applied upwards and outwards in canine region to check the retentive force in the

contra lateral corner of the denture, i.e. in the region of the tuberosity vestibular space and pterygomaxillary notch. Other side was tested in the same way.

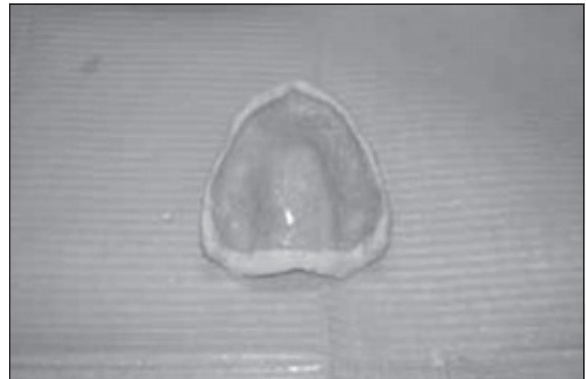


Fig.-1: *Border molded with silicone putty*



Fig.-2: *Final impression with light body silicone*

Result:

Putty silicone as border molding material and final impression with light body silicone showed acceptable retention. In dislodgement test of the tray resistance was felt. Clinical evaluation received by the denture base and completed denture was also satisfactory.

Discussion:

Construction of a retentive complete denture for various edentulous patients is one of the goals of the prosthodontists. An irretentive denture disturbs all other goals as speech, mastication and in turn affects patient's psychology. One of the limitations of using low fusing compound impression material for border molding is its short manipulation time. This is not truly possible with low fusing compound to have uniform consistency. It is difficult to complete border molding in one step. Woelfel et al.⁹ reported that seven prosthodontic instructors required an average of 17 placements to obtain a maxillary final impression on the same patient using modeling plastic

as border molding material. It also lacks thixotropicity, this material when unsupported for more than 2mm cannot maintain its height when bulk is added along the borders. During manipulation it is softened on an open flame, and later tempered in warm water before it is placed in patient's mouth. Inexperienced operator may burn the tissue, and patients had anxiety and fear of being burnt, so they cannot remain relaxed during molding process. The softening and hardening of low fusing compound varies from one portion of special tray to another depending on the application of external heat. Thus viscosity of softened low fusing compound may differ from one area to another. As a result, that part of the tray having compound of higher viscosity may offer greater resistance to displacement by the tissues that part having low viscosity material. Polyether is an elastic type of impression material useful as a border molding material. But it is not compatible with the addition silicone impression material. So cannot be used to border mold custom trays when the silicone impression materials are to be used as the final impression material. Setting and working time is shorter. Putty and light body silicone impression material showed desirable retention in clinical examination. This evaluation supports the findings of Appelbaun and Mehera¹⁰, Mitchener and Omori¹¹ and Massad and Cagna¹² who recommended the use of rubber base as a material for border molding and final wash impression.

The advantages of this approach are simplicity, ease of manipulation, decreased discomfort to the patient, short chair time and accurate reproduction of undercut areas. In the typical edentulous maxilla characterized as having average ridge dimensions, high viscosity silicone works well as a border molding material. The material has clinically acceptable tear strength and sufficient elasticity. When soft and hard tissue undercuts are encountered during impression making, the impression can be retrieved from the mouth with clinically acceptable elastic recovery. Sequential additions of new impression material to existing, cured material in the tray will effectively adhere when polymerized. This permits a layering or build up approach to impression making.¹² Thus it is clear that the recent advances in impression materials has resulted in simplified approaches to impression making in removable prosthodontics. Working time is 3-5 minutes, which can be easily modified with use of retarders and temperature control. No smell, no taste. Addition silicone impression material is available both hydrophilic and hydrophobic variety. The addition of nonionic surfactants produces hydrophilized addition silicone. These more hydrophilic

materials wet soft and hard tissue better, facilitate the gypsum products, and result in improved dental cast surface properties.¹³ They are most accurate of elastic impression material, less polymerization shrinkage, low distortion, fast recovery from deformation and moderately high tear strength and biocompatible.

Conclusion:

Within the limitation of this study, the following conclusion was drawn. Same type of material was used for border molding and final impression for better adhesion. Dentures made using putty silicone for border molding and light body final wash showed acceptable complete denture retention stability on clinical examination. The above material can be recommended in view of its ideal physical properties, improved hydrophilic, tray adhesives, disinfection, glove induced polymerization inhibition, simplicity, accuracy and convenience to the patient and clinician.

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