



Single-Step Syringe Border Moulding – A clinical technique

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Abstract

Border moulding is defined as the shaping of impression material along the border areas of an impression tray by functional or manual manipulation of the soft tissue adjacent to the borders to duplicate the contour and size of the vestibule. This further includes determining the extension of a prosthesis by using tissue function or manual manipulation of the tissues to shape the border areas of an impression material. Border moulding techniques include the sectional and the single-step. The sectional technique is not without drawbacks, despite being regularly taught in the dental schools in India and is used by many general dental practitioners. The time-consuming nature of the sectional technique and the difficulty in learning it due to the limited manipulation duration of the low-fusing impression compound are the common issues. The advantages of single-step border moulding, however, are the need for fewer tray insertions and the prevention of error propagation through the simultaneous development of all the borders. Moreover, it provides a more precise application of the green stick compound in the peripheral region. It is a simple approach to master and any necessary correction for certain locations can be easily redone. For the border moulding of complete denture impressions, a straightforward procedure using conventional low-fusing impression material has been developed thus making the border moulding procedure faster and simpler.

Keywords: Complete denture, Green stick compound, Impression, Low-fusing impression compound, Single-step border moulding, Syringe border moulding.

INTRODUCTION

While avoiding impingement on the mobile tissues during typical functional movement, the goal of impression-making is a maximum extension of overall tissue capable of supporting a denture.^[1] Making a custom tray and applying impression compound in parts around the borders of the tray is a standard technique for making complete denture impressions.^[2]

Border moulding is the process of shaping the impression material along the borders of an impression tray by manipulating the soft tissues to duplicate the contour and size of the vestibules.^[3] Sectional and single-step border moulding procedures are the two that have been described in the literature.^[4] In contrast to the single-step technique, which involves applying an elastomeric material to the entire border of the custom impression tray and manipulating the peripheral tissues until the material polymerizes, the sectional technique of border moulding entails tracing the borders of a custom tray using the low-fusing impression compound in small sections.^[5]

For patients and dental surgeons in practice, a well-fitting denture is one of the main considerations for enhancing the patient's oral masticatory and aesthetic function. Only by properly extending and reproducing peripheral tissues, can this be possible.^[6] Despite numerous recent developments, many institutions still choose the traditional way of making a

physiologic impression by utilizing a low-fusing compound. Using elastomers for a single border-moulding procedure saves a lot of time and enables the shaping of the borders to replicate the shape and size of the vestibules, thus reducing the errors of multiple impression tray placements.^[7]

However, since its invention by the Green brothers in 1907, the low-fusing compound has continued to be the preferred material for undergraduates and practitioners with limited financial resources due to the high cost of elastomers.^[8]

Impression compound is a modelling plastic and the stick forms are generally used for the border moulding procedures. The modelling compound is acceptably soft between 49°C (120°F) and 60°C (140°F) and has a very low thermal conductivity. For comprehensive softening during the conventional border moulding procedure, a direct flame is employed. While being moved over the flame, the compound sticks should not boil.^[9] The material is then heated in a hot water bath for 5 to 8 seconds after the compound has been put into the impression tray's flange area. Immersion in a hot water bath offers a sufficient but brief working period. It has been suggested that the border moulding using the modelling compound be finished in several reasonably small areas due to the short working time and challenging handling of the modelling compound.^[10]

According to a survey by Kakatkar VR, 83% of practitioners use green stick compound for border moulding.^[11] The conventional border moulding technique, put forward by Boucher, records the limiting structures and posterior palatal seal area in segments utilizing low-fusing impression compound.^[12]

Due to an increase in the number of insertions and patient discomfort that makes the procedure inaccurate over time, the segmental (sectional) border moulding approach has proven to be difficult. Additionally, the operator finds it unpleasant to soften the low-fusing compound over the flame to distribute in the specific tray borders. It would be ideal if the cost-effective low-fusing compound could be used to border mould the entire custom tray in a single insertion. This paper portrays a straightforward modified method for recording the entire periphery in a single step that easily employs a conventional thermoplastic material.

TECHNIQUE

The preliminary steps of complete denture fabrication remained the same.

Figure 1 shows the armamentarium for the single-step syringe border moulding procedure. Small pieces of green stick compound (Pinnacle Tracing Sticks, Dental Products of India, Mumbai, India) are broken up and inserted into the barrel of a 10 ml syringe with the plunger still open. The syringe without a needle is then placed inside the hot water bath for 5 to 6 minutes at a temperature of 60°C with the plunger then closed (Figure 2). The material is ready for use and can be placed directly, under controlled pressure, on the borders of the particular tray to record the peripheral extensions, as evidenced by the softened low-fusing compound running through the nozzle of the syringe (Figure 3). The completed border moulding procedure can be seen in Figure 4.

FIGURES

Figure_1: Armamentarium



Figure_2: Disposable syringe placed in hot water bath



Figure_3: Border moulding procedure



Figure_4: Complete border moulding – maxillary & mandibular



DISCUSSION

By changing or omitting the steps, attempts have been made to streamline the production of complete dentures. Typically, the elastomeric impression materials i.e. polysulfide, polyether, or polyvinyl siloxane impression materials are used for single-step border moulding. Such materials might not give enough time to shape and record the peripheral tissues of the denture-bearing area. Furthermore, these material's drawbacks include the putty-like viscosity of the polyvinyl siloxane, the odour and the stains associated with polysulfides, the insufficient working time of polyether, and the thick and excessively extended borders produced. Additionally, it might not be able to make up for the deficiencies by adding more material.^[13]

The sectional technique frequently has issues with being tedious and time-consuming as well as being challenging to learn due to the low-fusing impression compound's quick manipulation time. Additionally, a hot low-fusing impression compound may cause ulceration of the fragile intraoral tissues, especially for a less-experienced operator, and an error in one section may damage the border contours in another.^[14]

Drago^[15] examined the number of post-insertion corrections needed between the complete dentures created using border moulded definitive impressions from sectional technique and those made from single-step technique. The number of post-insertion visits in a year for dentures created using either approach did not differ significantly. Tan et al.^[16] compared the polyether impression material and low-fusing impression compound with vestibular impression shapes and individual and comparative operator variability. The authors noted that less operator variability was seen in impressions made with the polyether material and that the borders of the impressions made with low-fusing impression compound after sectional border moulding tended to be thicker and shorter than those made with polyether material using the single-step technique.

Because the entire vestibular sulcus and the posterior palatal seal area must be precisely recorded during a single insertion, single-step border moulding is more technique-sensitive. Therefore, the material utilized for this technique should offer the best working conditions and allow for the addition of more material to correct the border moulding. Due to the fewer tray insertions, single-step border moulding is significantly simpler than sectional border moulding. The current method, which offers an extended working period, uses the low-fusing impression material in a syringe for moulding the tray borders. For operators with less expertise, like dental school students, this is useful. Furthermore, the addition of new material allows for border moulding correction i.e. refining, and any other necessary modifications can be done in sections. No unique armamentarium is needed because this method only employs materials that are easily accessible and easy to work with less mess. Moreover, the procedure involves a controlled application of the low-fusing compound that has been softened in a single step. The use of disposable syringe improves infection control. It is even possible to use the current technique with the segmental border moulding techniques.

Due to the material's rigidity, a restriction of the procedure is that it may not be appropriate when there are severe tissue undercuts present. The retention of denture bases made using this and other border moulding procedures should be compared in further clinical investigations.

Henceforth, a single-step border moulding procedure using a low-fusing impression compound in a syringe is proposed. This method combines the benefits of sectional border moulding and single-step border moulding with the affordability of commonly available green stick impression compound.

CONCLUSION

In this article, a streamlined method for single-step border moulding is discussed employing the low-fusing impression compound in a syringe. The method is simple, economical, and easy to learn. It may be carried out using regularly used equipment and materials. Moreover, the technique provides comfort to both the patient as well as the dental surgeon.

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