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A Simplified Method of Constructing an Open Hollow Bulb Using Tissue Conditioning Material for Maxillary Defect in Complete Edentulous Patient

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Authors' contributions

This work was carried out in collaboration between all authors. Author NBJ designed the study, wrote the protocol, and wrote the first draft of the manuscript. Authors JK and AMR managed the literature searches, and author MKA did the critical review. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Maxillary resection in completely edentulous arch gives a challenging condition for an obturator to achieve maximum seal and retention. But one of the major concerns of the prosthesis is it often get heavy and bulbous part could not reach at the greater extent of the defect. As a result functional outcome would be less. Various techniques are employed in fabrication of this complex prosthesis depending on configuration of the defect.
Dental Technique: To solve this issue in the current report we have outlined a reliable easy and fast technique to fabricate an open bulb from a finished denture with tissue conditioning material by functional impression technique.

Keywords: Maxillary defect; obturator; functional impression; bulb.

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1. INTRODUCTION

In fully edentulous scenario obturator prosthesis may present challenges to prosthodontist because of retention and proper seal of the defect, which are the two major key factors to consider when constructing an obturator in such condition [1,2]. Moreover in partial edentulous defect cases there will be improved retention, stability and function of the prosthesis since they are taking retention and support from the remaining teeth as abutment. Also drainage of fluids between the defect and prosthesis is vital for ensuring the perfect sealing for fully edentulous defect arch [3].

To overcome this, a functional impression technique using tissue conditioning material can be applied in palatal openings where there is considerable amount of tissue undercuts are present within the defect. Lack of abutment teeth due to fully edentulism reduces retention of the obturator affecting stability, comfort and deglutition. They also lose their resiliency due to reaction with oral fluids after sometime of usage. This necessitates for fabrication of a well-adapted obturator with maximum retention and seal. This article describes a technique of fabricating an open hollow obturator bulb using tissue conditioner which has been used on a maxillary denture.

2. PROCEDURE OF FABRICATION

A patient was diagnosed previously with squamous cell carcinoma had undergone right maxillectomy was reported at maxillofacial prosthetics unit, School of Dental Sciences, Universiti Sains Malaysia for rehabilitation (Figs. 1a and 1b).

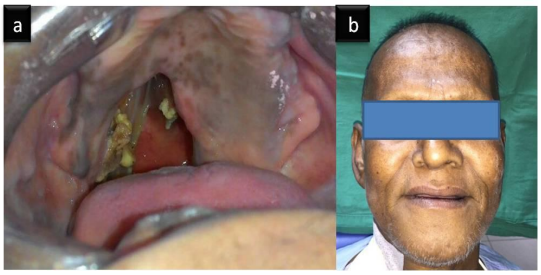

Fig. 1. (a) Intra oral view of defect (b) Extra oral view

1. Initial denture was fabricated using uni lateral group function occlusal scheme and try in was performed (Figs. 2a and 2b).

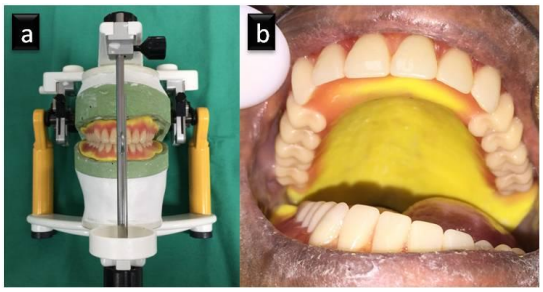

Fig. 2. (a) Artificial teeth setting (b) Try in teeth

2. A well-detailed impression of the soft palate defect was taken using coe comfort tissue conditioner (GC America) (Figs. 3a, 3b and 3c) on final denture.

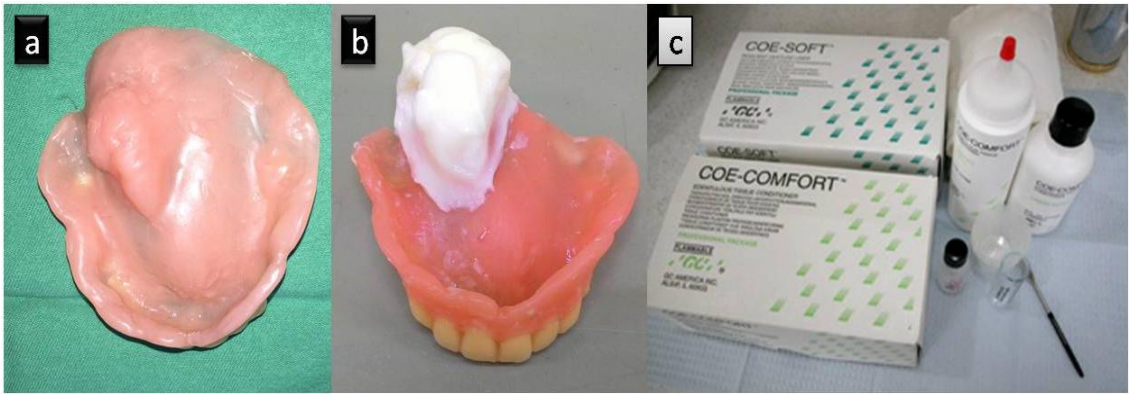

Fig. 3. (a) Final processed denture without bulb (b) Impression of defect by functional impression method using the denture (c) Functional impression material coe- comfort by GC America

3. After disinfecting the denture, the excess coe comfort material around the defect was removed. A mixture of green stone and plaster of paris was used to invest the polished surfaces and the teeth of the denture into a shallow flask (Fig. 4a).
4. The fitting surface of the denture was packed using hard lab putty (Speedex, coltene, USA). The lab putty was evenly kneaded at first and packed over the fitting surface of the denture, leaving the defect area exposed. Fingers were used to put indices on the lab putty before it hardened to create mechanical retention with the topping plaster (Fig. 4b).
5. Separating media was applied on the gypsum surfaces. The deeper flask was then assembled and topped using a mixture of type II dental stone (Dentsply, USA) and plaster of Paris (Dentsply, USA).
6. After the gypsum was set, the flask was opened and coe comfort lining material was cut out. The acrylic around the defect area was then reduced and roughened using acrylic bur (Figs. 4c and 4d). The defect area was then packed with clear heat cure acrylic resin (Pigeon dental, USA) after application of separating media. Curing was done by 100 degree centigrade boiling water for 2 hours (Fig. 5A).
7. Deflasking was done easily because of the use of lab putty on the fitting surfaces. This eliminated chances of fractures due to undercuts especially at the anterior region of the upper denture.
8. The excess acrylic of the defect was trimmed. Acrylic bur was used to drill through the acrylic bulb upto the palatal surface of the denture. The drilling was continued until a wall of the defect outline remained and reached the palatal surface of the denture to create an open hollow obturator from a closed one (Figs. 5b and 5c). After the open hollow obturator was created the inside of it was smoothened and polished using silicone polishing bur.
9. The prosthesis was delivered to the patient and minor adjustments were done to improve comfort of the patient.
10. In post insertion stage, the retention and stability of the prosthesis was found acceptable. Escape of fluid through the defect side was in evitable. The occlusion was equilibrium.

3. DISCUSSION

Several studies has discussed various technique of making open hollow and closed hollow bulbs [4-8]. The main objective of creating a hollow bulb is to produce a light prosthesis. To obtain this objective, grinding of outer aspect to inner aspect of the acrylic bulb and adding wax bolus technique have been described [9-14].

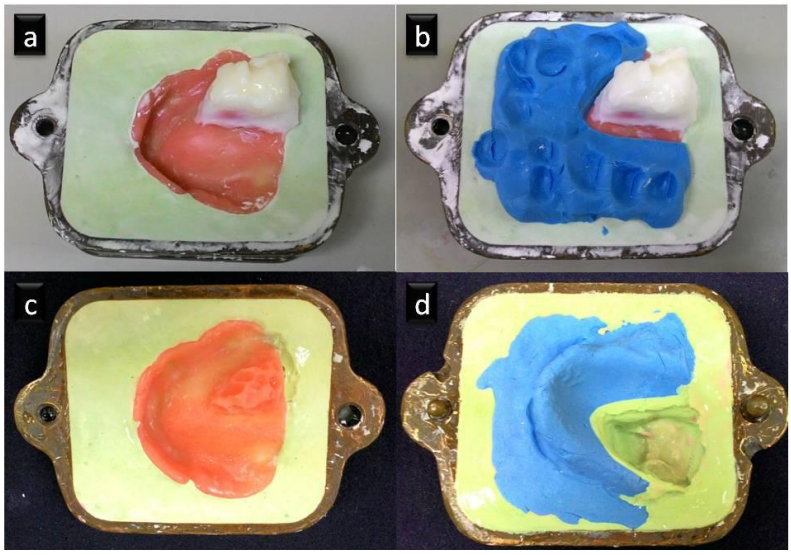

Fig. 4. (a) Half flasking of acrylic teeth and polished surfaces (b) Blocked the fitting surface by lab putty (c) Removal of the coe- comfort lining material at fitting surface of finished denture (d) Mold for the bulb; created at the fitting surface

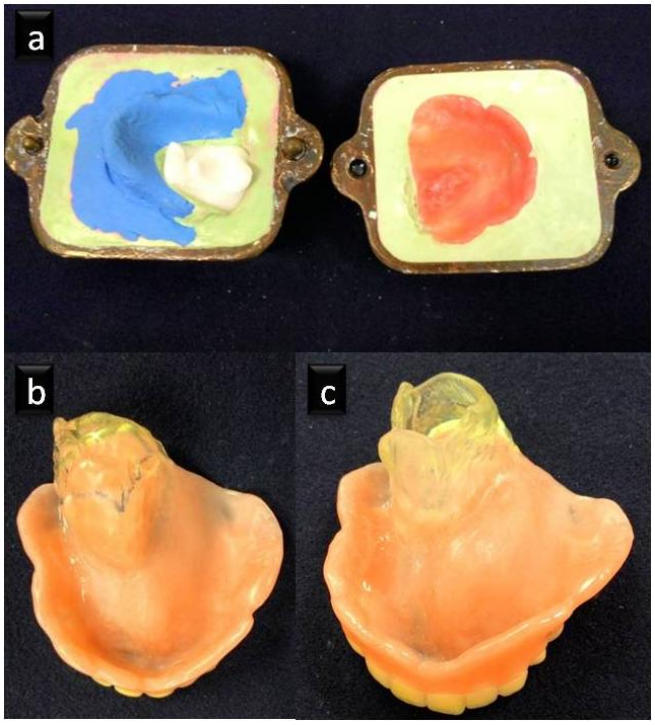

Fig. 5. (a) Packing heat cure acrylic resin (b) Final processed obturator with closed bulb (c) Final processed obturator with created open bulb

However, due to over grinding in order to reduce the weight and acrylic bulb adjustment prosthesis losses its perfect adaptation in to the defect side as a result, very often fluid leakage constantly occurs, thereby rendering failure for the objective.

Our proposed technique is relatively easier and can achieve complete functioning. Moreover, this method did not focus on the defective portion of the palate during primary impression. A tissue conditioning material (Coe comfort, GC America) was used along with the denture to obtain the functional impression. Advantageously, this method allows the materials to flow toward the corner of the defective side and form a proper seal in lateral tissue band located at the peripheral wall of defect. In addition this functional impression method helped acrylic bulb to achieve maximum undercut retention from the defect side.

Open hollow obturators, they are easy to clean since fluids are collected within the opening than the closed obturator where the fluids accumulate inside the bulb making it difficult for the patient to drain easily [15]. Open hollow bulb obturator is easier to fabricate and adjust; thus it is constructed more frequently than the closed hollow obturator. However, it is difficult to polish and clean the open hollow bulb obturator which may lead to accumulation of food and nasal secretions inside the hollow part [16]. This in turn leads to malodor, an increase in weight, and chances of infection.

Regarding occlusal scheme, unilateral group function scheme was chosen because there was a long distal extension base and lack of tissue support. During lateral excursion movement there was a chance of prosthesis dislodgment. In such condition unilateral group function occlusal scheme had maximum stability of the prosthesis on defect side.

4. CONCLUSION

This technique allows complete seal of the defect with maximum retention in fully edentulous arch which are essential for successful rehabilitation of a defect.

CONSENT

All authors declare that ‘written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images’.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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