

Case Report

A technique utilising cobalt-chromium framework as a key in master cast preparation for removable prosthesis in microstomia patients: A case report

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Abstract Prosthodontic rehabilitation and management of microstomia patient presents challenges at all stages during prosthesis fabrication; from making primary impressions to the prostheses insertion. These patients have reduced mouth opening, and hence it can be extremely challenging to make impressions and to fabricate dentures using the conventional methods. The present case report describes prosthodontic management of a partially dentate patient with microstomia that developed secondary to surgical resection and radiation therapy of head and neck cancer. A simplified novel approach has been advocated using the patient's existing metal removable partial denture as a key in master cast preparation.

Keywords: Impression, limited mouth opening, microstomia, prosthetic rehabilitation.

Introduction

Microstomia or limited mouth opening is one of the most difficult and challenging situation that a prosthodontist experience during rehabilitation. Due to limited mouth opening, all stages of prosthesis fabrication starting from impression making to prosthesis insertion may become a daunting task (Geckili *et al.*, 2006). Making an accurate dental impression is one of the crucial step, and it requires adequate mouth opening for impression tray insertion and orientation (Geckili *et al.*, 2006). In microstomia associated cases, the conventional impression procedure may not be helpful, as although stock tray comes in different sizes, insertion of the tray may not be possible (Geckili *et al.*, 2006; Cura *et al.*, 2003). To overcome such problem, several impression techniques, tray designs and several means to assemble the sectional impression trays have been advocated in the literature; orthodontic screws (Mirfazaelian, 2000), metal pins and acrylic

resin block (Cura *et al.*, 2003), locking levers (Baker *et al.*, 2000), plastic trays with building blocks (Luebke, 1984), using impression compound (Suzuki *et al.*, 2000), using cross pins and slots (Prasad *et al.*, 2008), using magnets (Kumar *et al.*, 2013), and interlocking tray segments (Winkler *et al.*, 1984). Most of the mentioned techniques involved modifying the actual custom tray to obtain sectional final impressions. However, reassembling these sectioned impressions intraorally or extra-orally to produce an accurate master cast was always challenging. The present paper describes an alternative method of assembling two-halves of the master cast extra-orally, for patients with microstomia, using patient's existing cobalt chromium removable partial denture (Co-Cr RPD) as a key.

The technique

A 72-year-old man was referred from the Oral and Maxillofacial Surgery Department for rehabilitation of his facial defect. He had undergone total rhinectomy with local

flap reconstruction in August 2009. He was diagnosed with recurrent basoloid squamous cell carcinoma at the nasomaxillary region. The patient also underwent radiation therapy. On examination, the defect area involved complete nasal resection with right subtotal maxillectomy resulting in an orocutaneous fistula (Fig. 1). Prosthetic management began with fabrication of new obturator, to restore Armani Class VI intra-oral defect (Aramany, 1978). Since the patient's current prosthesis was broken, it was decided to fabricate new obturator prosthesis and utilize it for retention of the extra-oral prosthesis. However, limited mouth opening affected the design of the obturator prosthesis and its fabrication procedure.



Fig. 1 Frontal view of the orofacial defect

Steps:

(1) At the impression-taking stage, a stock tray was adjusted by cutting it into two separate halves (sectioned tray) to overcome the limitation of the mouth opening issue. This was done to get the maxillary arch primary impression in two separated halves (right and left). Two special trays (right and left) were constructed on the resultant primary stone casts and were used to make secondary maxillary impressions.

(2) The impressions of both the right and left sides of the maxillary arch were made separately without following the conventional technique in such situations, in which the sectioned impressions being assembled

together intra-orally. The resultant impressions, were then poured into dental stone to produce two halves of the master cast.

(3) The poured halves of the maxillary master cast have been re-assembled extra-orally using the current cobalt–chromium removable partial denture (RPD) as a key. Then, the assembled master cast halves were boxed and poured to fill the gap in between with stone material (Fig. 2 & Fig. 3).

(4) To confirm the accuracy of the assembling procedure, a trial acrylic base was fabricated on the master cast and tried in the patient's mouth to ensure that the master two halves were correctly assembled (Fig. 4 & Fig. 5).

(5) After confirming the accuracy of the master cast, new Co-Cr RPD was constructed and issued to the patient (Fig. 6).

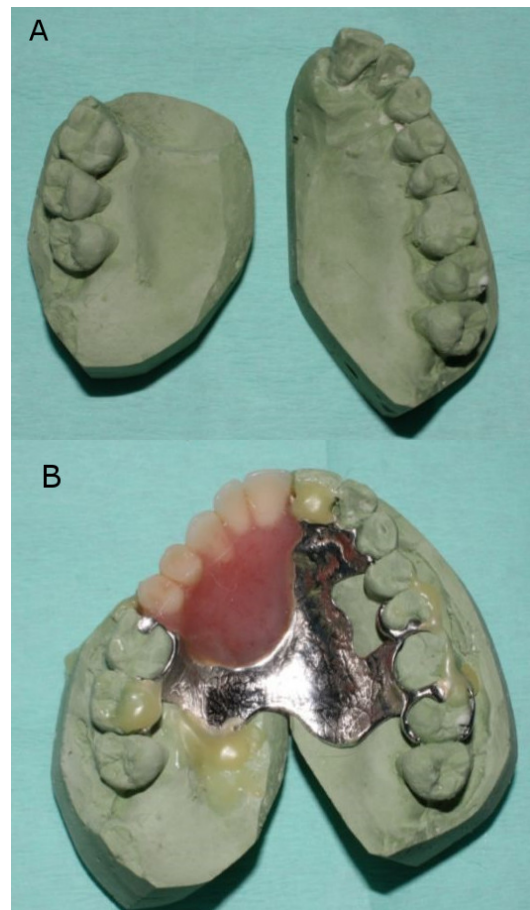


Fig. 2 Master cast right and left halves of the upper arch (A), The current prosthesis was used as a key to connect the right and left halves together (B).



Fig. 3 The finished master cast.



Fig. 4 Trial acrylic plate.



Fig. 5 Trial acrylic plate inserted intra-orally and fit precisely.



Fig. 6 The definitive Co-Cr RPD obturator in place.

Discussion

This article describes a technique to make an accurate master cast in cases of microstomia. In the dental literature many techniques have been advocated for preparing sectional trays using various types of keyways and pins as locking mechanism of sectional impression trays (Luebke, 1984; Suzuki *et al.*, 2000; Prasad *et al.*, 2008). Most of the mentioned techniques focus on assembling the sectional impression intraorally, which are technique sensitive and might result in error, however, in this technique, the impression was made in two separate sections and the patient's current prosthesis was utilized as a key to assemble both halves of the master cast extra-orally.

It was possible to use this novel technique for this case, as there was no beading line in the previous Co-Cr RPD design. If there was a beading line in the prosthesis that might have interfered with the prosthesis complete setting on the cast.

This technique can be used only in partially dentate patient who has already made a removable partial denture. Another limitation is that the RPD key must fit precisely intraorally too.

Before making the definitive Co-Cr RPD for the patient, the accuracy of the assembled master cast should be confirmed, hence a trial acrylic plate was fabricated and tried intraorally to ensure complete seating and fitness, which would reflect the master cast accuracy.

Conclusion

For patients with microstomia, the clinical steps for prostheses fabrication are demanding and challenging. Numerous techniques have been described in the literature to obtain an impression for such patients. A technique using the patient's current Co-Cr RPD as a key to assemble the master casts halves is described. Accuracy of the orientation is further

ensured with the help of the trial acrylic plate. This simple technique can be used efficiently in microstomia patients. However, the selection of a suitable technique should be based on the case need, available facilities and the clinician's skills.

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