

Fabrication of a Custom Sectional Impression Tray for a Patient with Oral Submucous Fibrosis

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ABSTRACT

Gaining access into the oral cavity of patients with limited mouth opening is difficult and rehabilitation of such patients is a challenge. The loaded impression tray is a bulky item that needs to be placed intraorally. In patients with microstomia, obtaining accurate impression using conventional techniques is difficult due to limited mouth opening and thus alternate clinical procedures need to be developed. This case report describes an innovative technique for fabrication of custom maxillary sectional tray for a patient with oral submucous fibrosis utilizing components that are commonly available, enhancing the comfort of both operator and the patient.

Keywords: Microstomia, Limited mouth opening, Sectional trays.

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INTRODUCTION

Microstomia is defined as an abnormally small oral orifice.¹ It may result from surgical treatment of orofacial neoplasms, cleft lip, reflex spasm, microinvasion of the muscles of mastication, connective tissue disease, fibrosis of masticatory muscles, maxillofacial trauma, burns, radiotherapy, scleroderma or may be associated with aging.² The condition can also result from genetic disorders such as partial duplication of chromosome 6q, Hallopeau-Siemens type recessive dystrophic epidermolysis bullosa, Freeman-Sheldon syndrome, Burton skeletal dysplasia, and diseases such as Plummer-Vinson syndrome.³ The cause and severity of microstomia influences clinical approach to treatment.⁴

Prosthetic rehabilitation of patients with limited mouth opening presents difficulties at all stages right from the preliminary impressions to insertion of prostheses. Because such patients have small oral opening it may be extremely difficult to make impressions and fabricate dentures using conventional methods.³

In such patients, it is difficult to obtain a 'perfect' impression that captures all possible anatomic details. Wide mouth opening is required for proper tray insertion and alignment. Because this is not possible in patients with restricted opening ability, modification of the standard impression procedure is often necessary to accomplish this

fundamental step in the fabrication of a successful prosthesis.⁵

Literature describes various techniques for fabrication of sectional custom trays. Interlocking segments,⁶ lego blocks,^{7,8} orthodontic screws,⁹ stainless steel post inserted into tubing,¹⁰ and flexible trays fabricated using silicone putty¹¹ have been used in patients with limited mouth opening to make impression procedure convenient yet accurate.

This article describes a technique for fabrication of custom special tray for a patient with oral submucous fibrosis utilizing components that are commonly available, making the impression procedure more convenient for both the clinician and the patient.

CASE REPORT

A 48 years old male patient reported to the Department of Prosthodontics with a chief complaint of difficulty in eating due to loss of all teeth. History revealed that patient had lost his anterior teeth following trauma and posterior teeth were extracted due to carious involvement. The patient also gave history of tobacco chewing since 20 years and was a known case of oral submucous fibrosis, not under medication.

On examination, circumference of patient's mouth on opening was approximately 96 mm and intercommissural length was 30 mm (Fig. 1). On palpation, fibrotic bands were felt in the buccal mucosa a few of which extended to the mandibular residual ridge.



Fig. 1: Extraoral view showing limited mouth opening

Preliminary impressions were made using impression compound (Y-Dents impression compound). Maxillary impression was made by direct adaptation of softened impression compound onto the edentulous ridge. For mandibular impression edentulous stock tray (size 0) was used.

For making maxillary final impression, carrying the loaded custom tray intraorally would be inconvenient due to limited mouth opening and excessive stretching of the mucosa would cause pain and discomfort to the patient. Thus it was decided to fabricate a sectional maxillary custom tray. Mandibular impression tray was fabricated as one piece.

A 2 mm thick wax spacer was adapted on the maxillary primary cast and sectioned vertically along the midline into two halves. Maxillary custom impression tray was fabricated using autopolymerizing acrylic resin (DPI-RR cold cure clear) in two steps.

For the first segment, wax spacer was placed on the cast and autopolymerizing acrylic resin was adapted over it. A tapered brass die pin (8 mm long) was placed at an angle of 45° to the ridge crest anteriorly in the region of incisive papilla. This die pin served as tray handle for this half as well as one component of the anterior locking. Another pin (6 mm in length) was placed in the posterior area over the palatal shelf 1 cm away from the midline. This served as a component of posterior lock (Fig. 2A).

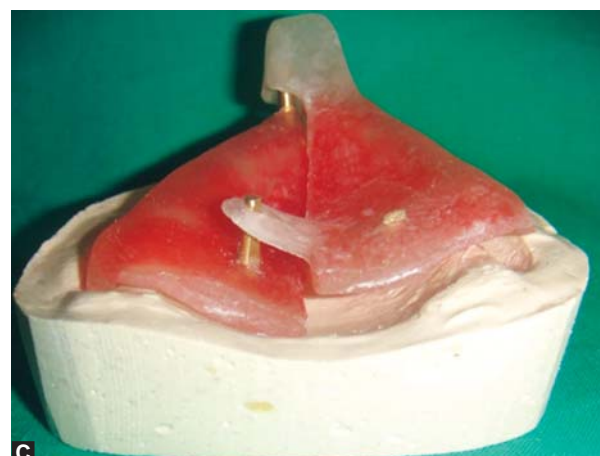
After complete polymerization of the first segment, petroleum jelly was applied over the die pins and also over the set acrylic to prevent fusion of the two segments. The second half of the wax spacer was placed on the cast and autopolymerizing acrylic resin was adapted over it to form the second segment.

Anterior lock was formed by direct adaptation of acrylic around the anterior brass die pin, forming the tray handle measuring 1.5 × 1 × 0.5 cm in dimension in second segment. In the posterior area, acrylic plate was extended 1.5 cm medially over the first segment so that it formed a posterior lock with posterior die pin (Figs 2B to D).

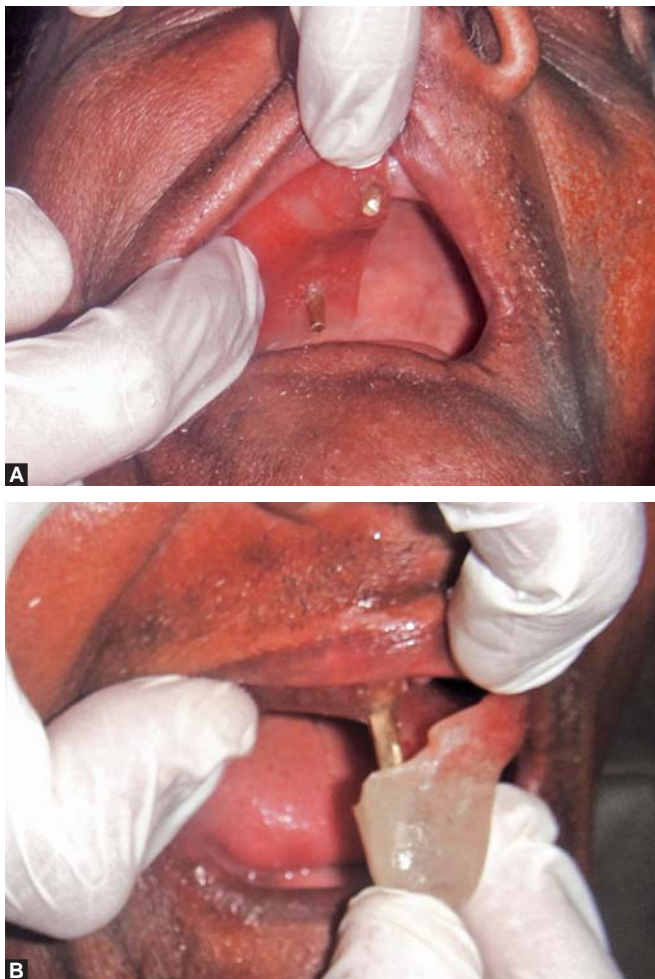
Clinical Steps

The tray was tried intraorally, fit and extensions were evaluated. Placement and removal of both the segments was practiced (Figs 3A and B). Sectional border molding of both the segments was carried out (Figs 4A to C) in conventional manner using low fusing impression compound (Aslate soft green tracing sticks).

Wax spacer was removed from the first segment and relief holes were made. The first segment was coated with tray adhesive (Caulk Tray Adhesive), loaded with medium body addition silicone impression material (Aquasil



Figs 2A to D: Laboratory steps in fabrication of sectional tray



Figs 3A and B: Assembly of the segments intraorally

Monophase) and placed intraorally. The second segment coated with petroleum jelly along the midline was placed over to complete tray assembly with anterior and posterior locks in place.

After setting of the impression material, the two halves of the tray were separated. Excess impression material along the midline was trimmed with sharp instrument and petroleum jelly was applied.

The second segment was prepared in a similar way as the first segment, loaded with impression material and reassembled intraorally with the first segment. On setting

of impression material, the tray was removed from the mouth in two sections (Fig. 5A) and reassembled extraorally (Fig. 5B).

Mandibular border molding was carried out and the impression was made using medium body addition silicone impression material.

Maxillary and mandibular complete dentures were fabricated in conventional manner and delivered to the patient.

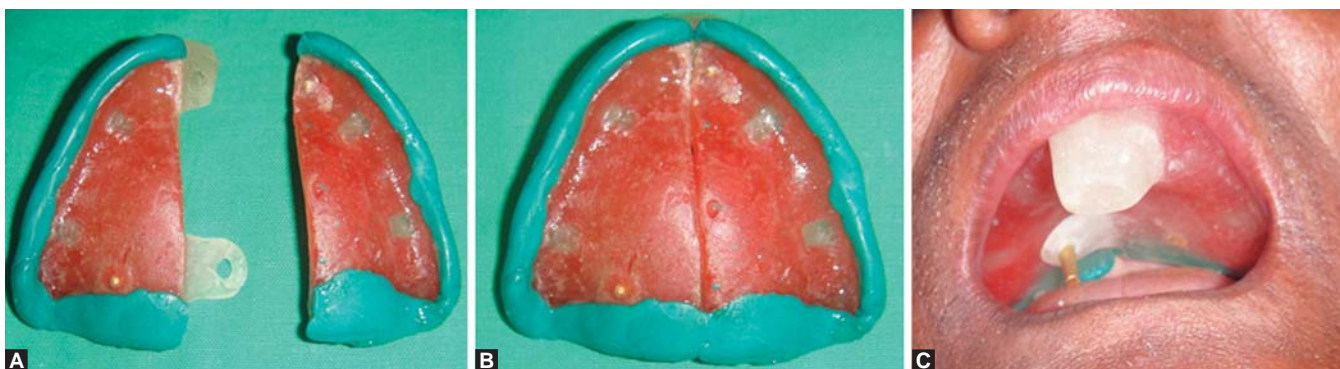
DISCUSSION

Loaded impression tray is the bulkiest item that is placed intraorally during prosthodontic treatment. In patients with microstomia, the overall bulk and the height of the impression trays makes recording of the impressions exceptionally difficult if not impossible.¹² It is more difficult to insert the impression tray than to remove it from the mouth. When the tray is placed in the mouth, the operator usually stretches one corner of the mouth, making the oral opening still smaller. During removal, the orbicularis oris can be stretched beyond the limit of the patient's normal function as in this situation, the muscle's sphincter shape allows the operator additional maneuverability.⁵

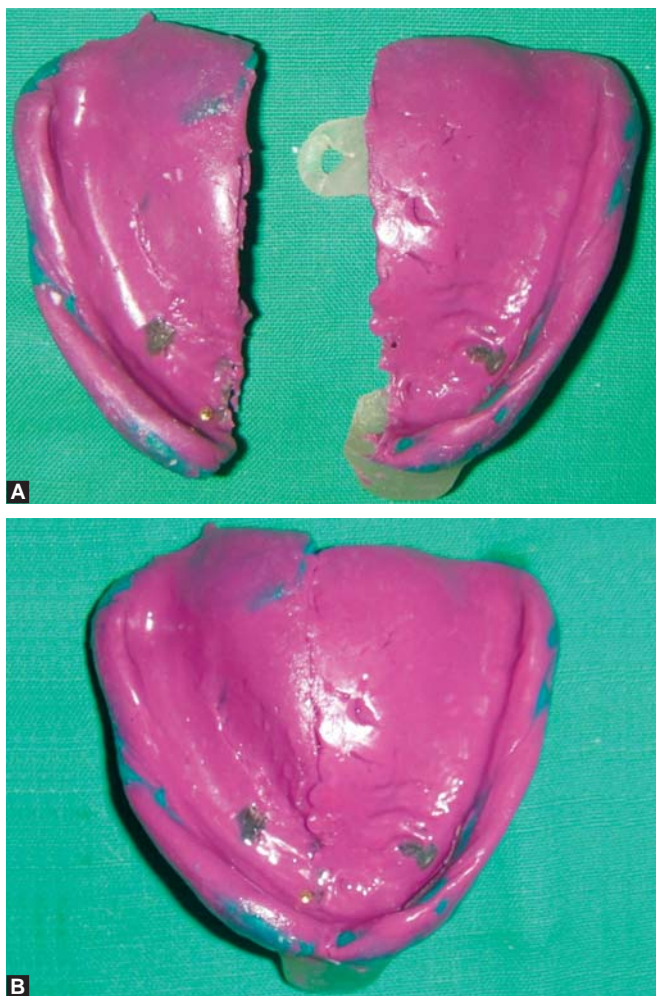
Management protocols for microstomia patients include plastic and reconstructive surgeries¹³ and conservative approach which comprises of use of dynamic expansion devices^{13,14} and modifications in impression techniques and denture design.

As the size of the mouth opening decreases, the difficulty in treatment procedures involved increases. Without surgery, it is very difficult to perform prosthodontic treatment for patients with microstomia, especially when the mouth circumference length is less than 160 mm. However, surgical enlargement of the orifice must be considered carefully because, if surgical operation is not adequate, a scar may result.⁸

In this case, as the patient was not willing to undergo surgery it was decided to use a nonsurgical treatment option of modifying the impression technique by using sectional



Figs 4A to C: Assembly of the border molded segments (A and B) extraorally and (C) intraorally



Figs 5A and B: Impression removed from the mouth in segments

custom tray. The two locking assemblies, one situated anteriorly and the other posteriorly, provided stability to both the sections of the tray. This allowed precise intraoral positioning of the two segments and accurate reassembly extraorally. The materials used in this technique were commonly available and economic. Fabrication of locking system did not involve complex procedures and equipments, making the laboratory steps involved simple and time saving. Moreover, use of sectional tray reduced patient discomfort and improved operator's efficiency.

In addition to prosthodontic rehabilitation, patient was counselled regarding cessation of tobacco chewing. Nutritional support in form of antioxidants and vitamin B complex was provided.

CONCLUSION

Restricted opening of the mouth is a common condition that has a variety of causes. When intraoral access is impeded, impression procedures are difficult to accomplish.

In such cases, techniques available for fabrication of sectional trays should be made use of to record anatomic details accurately and provide treatment satisfactorily.

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