

Prosthodontic Management of a Completely Edentulous Patient with Microstomia: A Case Report

Mulay Gauri · Dugal Ramandeep

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Abstract Patients with microstomia who need to wear removable dental prosthesis often face difficulty of being unable to insert or remove the prosthesis because of restricted opening of the oral cavity. Prosthetic rehabilitation of patients with microstomia presents difficulties in all the clinical steps. In such patients, it is difficult to make impressions and fabricate dentures using conventional method. This clinical report describes prosthodontic management of a completely edentulous patient with microstomia developed due to oral sub mucous fibrosis. Sectional maxillary denture was fabricated using a sectional impression tray technique. With the use of magnets and palatal midline press button attachment, the denture could be easily inserted and removed in two parts. Mandibular denture was fabricated by the conventional method.

Keywords Microstomia · Sub mucous fibrosis · Sectional tray · Sectional denture

Introduction

Microstomia is defined as an abnormally small oral orifice [1]. It may be caused by surgical treatment of orofacial neoplasms, maxillofacial trauma, burns, cleft lip, radiotherapy, scleroderma or oral submucous fibrosis. Oral

submucous fibrosis is a slowly progressive chronic disease confined to the oral cavity. Its exact etiology is unknown, but the main contributing factors are betel nut and tobacco chewing [2]. Submucous fibrosis is characterized by mucosal rigidity due to fibroelastic transformation of juxta epithelial layers leading to inability to open mouth and dehydration of tissues due to decreased salivary secretion. Treatment of microstomia presents particular challenges. One approach to the management of microstomia is the use of microstomia orthoses to expand the oral opening [3, 4]. The oral opening may also be increased by use of stretching exercises [5]. The use of an increasing number of tongue blades to stretch the facial tissues can also be advised [5]. If this is insufficient, a bilateral commissurotomy may be necessary [6]. As surgical enlargement can lead to scarring which may further reduce the oral opening, it must be considered carefully. It is difficult to perform prosthodontic treatment for patients with microstomia, especially when the mouth circumference is smaller than 160 mm [7]. In particular, fabrication of removable prostheses is further complicated by tongue rigidity and the constant adjustment required to accommodate the changing periphery [8]. Making the impression represents initial difficulty in prosthetic rehabilitation. Several techniques based on flexible, modified standard trays and sectional trays have been proposed [9, 10]. Sectional and collapsible dentures have been described for prosthodontic management [11, 12].

Clinical Case Report

A 75-year-old completely edentulous male patient (Fig. 1a), reported to the Department of Prosthodontics, M.A.Rangoonwala Dental College, Pune with a chief complaint of

M. Gauri (✉)
Department of Prosthodontics, Sinhgad Dental College
and Hospital, S.No. 44/1, Vadgaon (Bk), Off Sinhgad Road,
Pune, India
e-mail: gaurimulay@hotmail.com

D. Ramandeep
Department of Prosthodontics, M.A.Rangoonwala College
of Dental Sciences and Research Centre, Pune, India

difficulty in chewing and restricted mouth opening. Patient wanted a set of new complete dentures. He had a mouth opening of 27 mm (circumference was 110 mm, Fig. 1b).

Patient did not have any relevant medical history but gave the history of betel nut chewing since the age of 30. He was completely edentulous for the period of two years. Intra oral examination revealed lack of elasticity and compressibility of the mucosa and fibrosis of buccal mucosa indicative of sub mucous fibrosis. Both, maxillary and mandibular residual ridges were resorbed. Patient wore a set of ill fitting complete dentures with short flanges for easy insertion and removal since one and half years. He was able to insert the mandibular denture by rotating it in 90° but was having a great difficulty in insertion and removal of maxillary denture in spite of short flanges of the denture. Pre prosthetic phase of treatment was carried out in the form of local injections of dexamethasone and chymotrypsin for the period of six months. Patient was also trained for stretching exercises for increasing his mouth opening. After 6 months mouth opening was improved by 2 mm but patient still had difficulty in inserting maxillary denture. After thorough clinical examination, the decision to fabricate maxillary sectional denture was made.

Step by Step Procedure

Preliminary Impressions

- Preliminary impression for maxillary arch was obtained by sectioned plastic stock trays (Fig. 2a, b).
- The tray was cut anteroposteriorly in two sections with a disk following a line that bisected the tray into two halves with key ways for mechanical interlocking.
- The preliminary impression of maxillary arch was made in irreversible hydrocolloid (Kromopan 100, Lascod) by inserting one part of the tray in the mouth followed by another before material in the first part was set. Impression was removed in one piece to minimize error. Mandibular impression was made using medium

fusing impression compound in stock metal tray (Fig. 2b).

Final Impressions

- Sectional custom tray was fabricated using autopolymerizing acrylic resin.
- The tray was fabricated in two sections held together by locking segments (key–keyways) along the midline including the handle of the tray, to ensure interlocking of the two segments (Fig. 3a).
- Border molding was done separately for the two sections using low fusing compound. Final maxillary impression was made in polyether (Impregum Penta, 3 M, ESPE).
- While making the final impression, sections of the tray were inserted one after another before material in the first section was set in order to ensure merging of both the parts. Impression was removed in one piece. Mandibular impression was made in zinc oxide eugenol paste (DPI) after completing border molding with low fusing compound (Fig. 3b).

Laboratory Procedure

- Two master casts were obtained from the polyether impression. Modelling wax sheet was adapted on the right half of any one of the two master casts. Other cast was kept aside to be used for the final processing.
- Commercially available samarium magnet was incorporated in the wax sheet at right maxillary canine region, while male part of the press button attachment was fixed in the midline at the junction of anterior two-third and posterior one-third (Fig. 4a). This half was processed to fabricate the permanent heat cure sectional record base.
- By keeping the fabricated section of the record base on the cast, modeling wax sheet was then adapted on the remaining half of the cast. Antagonist magnet and the

Fig. 1 Patient with limited mouth opening of 27 mm

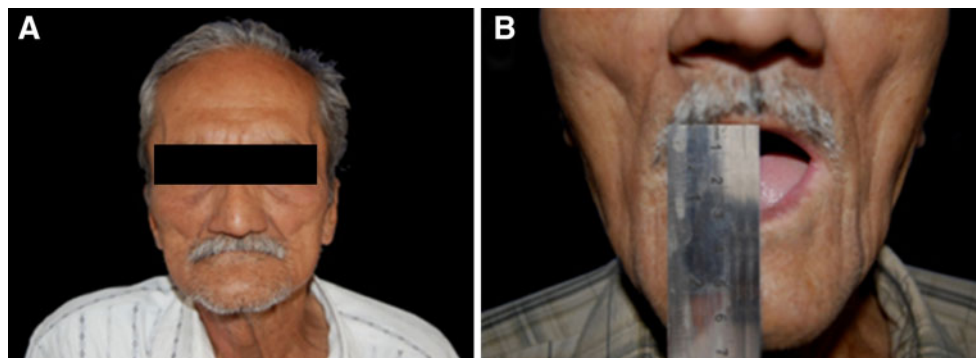


Fig. 2 Sectioned tray and preliminary impressions

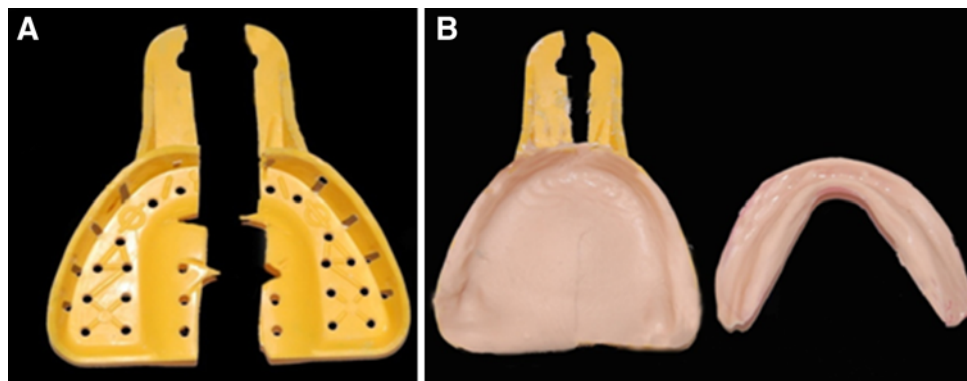


Fig. 3 Sectional custom tray and final impressions

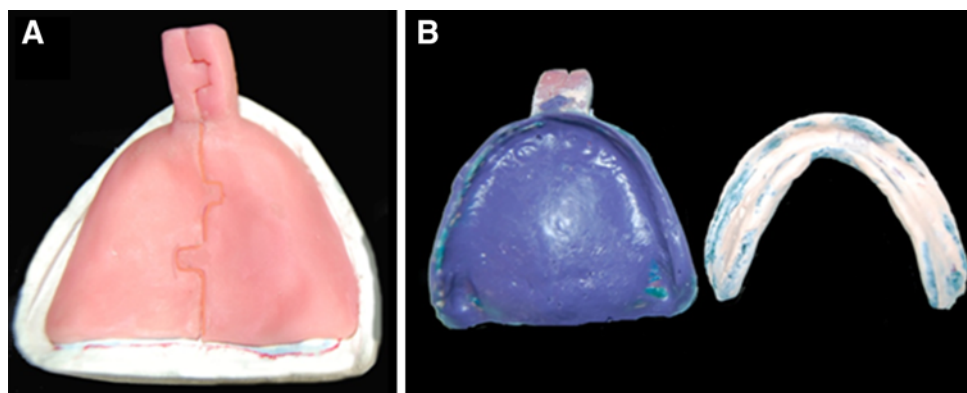
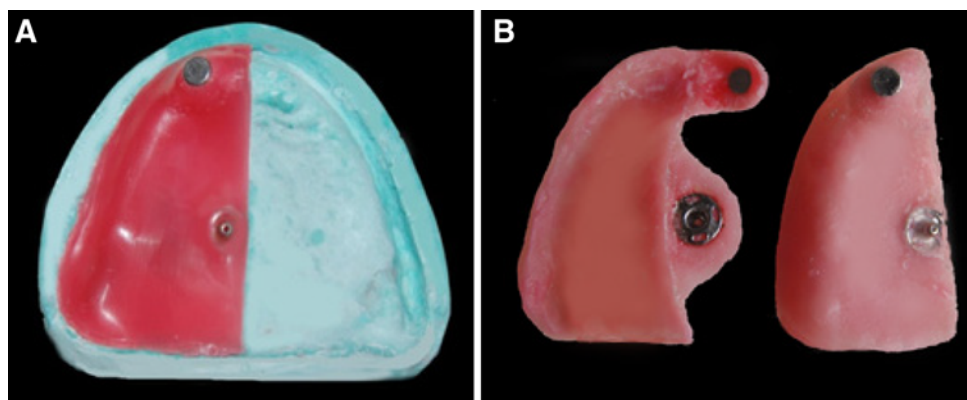


Fig. 4 Incorporation of magnets and press button attachment in permanent record base



female part of the press button attachment were incorporated in the wax sheet to fit precisely over their counter parts. This section of the record base was then fabricated in heat cure acrylic resin.

- Both the sections were processed separately to obtain the sectional permanent record base with attachments (Fig. 4b).

assembled in the mouth for recording maxillo-mandibular relation.

- Teeth arrangement was done using non anatomic teeth by the monoplane concept of occlusion.
- This was done to improve stability of the dentures since both the ridges were resorbed.

Jaw Relation and Teeth Arrangement

- Maxillary occlusal rim was fabricated in two parts on the permanent sectional record base. The rims were

Processing and Denture Insertion

- Processing to incorporate maxillary teeth was carried out in two separate flasks (Fig. 5). Curing cycle for the



Fig. 5 Separate flanking for each section

second processing was of longer duration at lower temperature.

- The sectional maxillary denture and conventional mandibular denture was delivered to the patient after finishing and polishing (Figs. 6, 7).
- Cuspal pattern was evaluated and occlusal interferences were removed using articulating paper.
- Stability of the maxillary denture was evaluated using a disclosing paste (fit checker, GC). Paste was applied in the midline. Denture was inserted in the mouth and alternate digital pressure was exerted. After the material was set, both the sections were evaluated in the midline for pressure spots. Minor corrections were done. Disclosing paste was applied again and stability was evaluated during various functional movements. Slight discrepancy was found in the midline which was corrected. This was done to ensure there was no rocking in the midline during function.
- Disclosing paste was also used on the intaglio surface of the maxillary denture to rule out any soft tissue compression in the midline.



Fig. 6 Sectional maxillary denture



Fig. 7 Final dentures

- Patient was trained to place maxillary denture in two parts (Fig. 8).
- Subsequently patient has been followed up for the last two years and he is comfortably using the prostheses. During follow up appointments, it was observed that there was no untoward compression of the soft tissues in the midline.

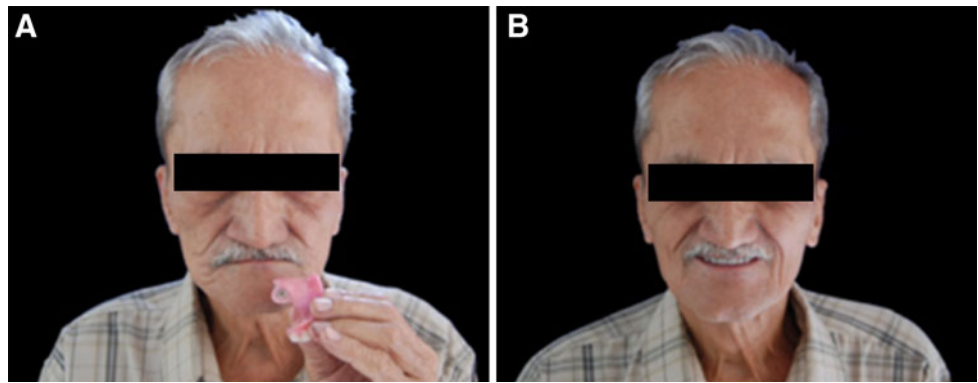
Discussion

In patients with microstomia, because of the insertion and removal problems, there is a necessity of fabricating complete dentures that are different from conventional ones. Suzuki et al. constructed a sectional and collapsible denture for a partially edentulous patient with microstomia [7]. Some authors have described the method of fabricating only collapsible denture [8] and some have described only sectional [12].

In the dental literature, there are limited articles describing the method of making impressions for sectional dentures. Various snaps and keyways [7, 12], pins [13] have been used for the locking mechanism of sectional impression trays. Initially in this case preliminary impression of the maxillary arch was tried with putty and flexible trays but the result was not satisfactory. Since stock metal tray was difficult to insert in the patient's mouth, preliminary impression was made in sectioned stock plastic tray. Impression was removed in one piece by rotating in 90°. This was done to minimize error. But the same was not possible while inserting the loaded tray as the impression material was getting dragged. To obtain precise secondary impression sectional custom trays were fabricated as insertion of the conventional tray for border molding was difficult. Accurate locking between the right and left parts of the tray was ensured since wrong positioning of the first and second halves of the tray would have impaired accuracy of the impression. For this reason, key-keyway locking method as described by Dikbas et al. [5] was used.

Initially stud attachment by Bredent was tried but it made the record base bulky and hence the press button

Fig. 8 Insertion of the sectional denture



attachment was used. Samarium magnets were used for additional retention between the two sections. Samarium magnets have the advantage of better corrosion resistance.

Ease of insertion and removal, cost effectiveness and provision of maximal coverage for support, retention, and stability can be regarded as the advantages of this kind of sectional denture. Same technique can be incorporated for the fabrication of mandibular denture. But as in this case, patient was able to insert the mandibular denture by rotating in 90°, only the maxillary denture was fabricated in sections. This technique is an innovative, practical and economical solution for the patients with microstomia.

Conclusion

Following are the advantages of the sectional denture described in this clinical report:

- It is convenient to use due to ease of insertion and removal.
- It is a practical and economical option for the fabrication of sectional denture.
- Incorporation of magnets ensures good retention between the two sections without making the denture bulky.

Restricted tongue space and increased laboratory work can be considered as some of the limitations of this technique. Furthermore patient's co operation also plays a crucial role.

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