

Use of Sectional Tray Design in Recording Edentulous Impressions for Microstomia Patients: A Case Report

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Abstract

Prosthetic rehabilitation of patients with microstomia presents a major challenge to dentist as limited oral opening makes access to the oral cavity for any dental procedure difficult. The primary hurdle during the fabrication of dentures in such patient is making an impression. This article describes the treatment of a patient with microstomia where maxillary and mandibular custom sectional impression trays were used for making definitive impressions.

Key words: Custom sectional impression trays, Dental impression making, Microstomia.

Introduction

Microstomia is the term used to describe an abnormally small oral orifice.¹ Reduced mouth opening may be caused by surgical treatment of orofacial neoplasms, maxillofacial trauma, burns, Plummer Vinson syndrome, trismus, temporomandibular joint disorders, cleft lips, radiotherapy, oral sub mucous fibrosis, any damage to the oral musculature or scleroderma.^{2,3} According to the study done by Patil et al., 38.2% of the reported microstomia cases were due to postsurgical complications and 41.1% cases were due to systemic sclerosis.⁴

Conflict of Interest: None

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Limited mouth opening serves a challenge right from the impression making till the insertion of the prostheses. Since, standard impression procedures are not possible to carry out due to limited mouth opening, this procedure is often cumbersome for both the patient and the operator.^{5,6} This paper describes fabrication of sectional custom tray for the treatment of a microstomia patient requiring complete dentures.

Clinical report

A 78-year-old female edentulous patient presented to the Department of Prosthodontics and Crown-Bridge, College of Dental Surgery, BPKIHS with difficulty in chewing food because of loss of her teeth. She had a history of difficulty in wearing denture as her previous denture did not fit properly and had caused pain and discomfort. She had not worn any denture for about 10 years and though she wanted a replacement of the missing teeth by means of complete denture. On clinical examination,

the patient had the maximum mouth opening (distance between upper and lower lips was measured) of 29mm [Figure -1 A and B]. The cause for reduced mouth opening was Scleroderma. Treatment plan for this patient included final impression made with sectional custom trays and fabrication of maxillary and mandibular dentures.

Clinical and Lab Procedure

An informed consent was taken from the patient after informing about her oral conditions and treatment modalities.

Primary impressions of maxillary and mandibular edentulous arches (Figure 2 A and B) were made using non-perforated edentulous metallic stock tray with impression compound (DPI Pinnacle functional impression compound, Dental products of India). For impression of maxillary arch smallest stock tray was used. For impression of the mandibular arch, size 1 stock tray used. The impressions were poured with dental plaster (Kaldent, Kalabhai Karson, India) and primary casts were retrieved.

Custom trays were fabricated using self-cure acrylic resin material (RR, Densply India). On maxillary custom tray, four needle hubs were placed, 3-4mm in height to fit the acrylic resin block, two in canine-premolar region and two

in molar regions bilaterally. Maxillary custom tray was then sectioned in the midline into two halves. Two acrylic resin blocks made with self-cure acrylic resin (RR, Densply India) were placed anteriorly and posteriorly connecting the needle hubs. The needle hubs were joined with acrylic bars in such a fashion that they can be removed and reinserted together to orient two halves of the custom tray (figure 3 A and B).

Mandibular custom tray was sectioned into two halves slightly away from the midline. Two dowel pins were placed on the handle of one half of the tray and holes were made on the handle of the other half such that the two halves of custom tray fit together and functioned as one unit with no visible space or movement (figure 4 A and B).

Border moulding and final impression were made separately with each half of the tray and they were assembled extraorally (Figure 5 A and B). Final impressions were poured to get final casts. Record bases were fabricated on the master cast with autopolymerising resin and occlusal rims were made. Jaw relation was recorded and teeth arrangement was performed which was approved by the patient. (Figure 6 A and B). Dentures were then cured, finished and polished and denture insertion was performed (figure 7 A and B).



Figure 1: Patient with limited mouth opening

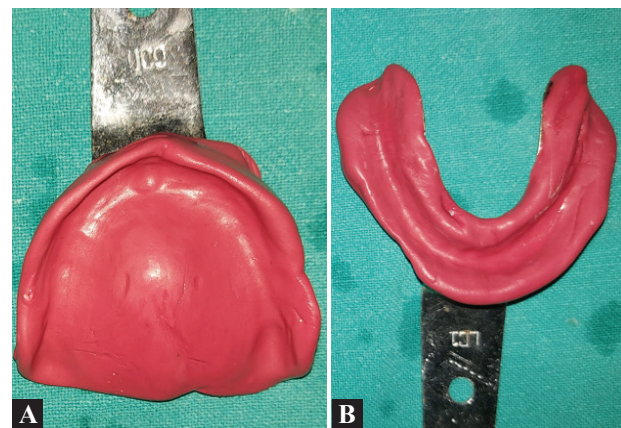


Figure 2: Primary Impression of maxillary (A) and mandibular (B) arch.

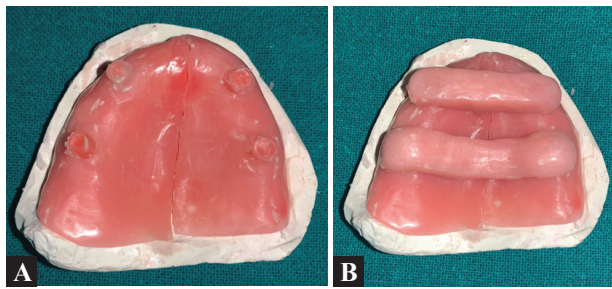


Figure 3: Sectional custom tray for maxillary arch. (A) Four needle hubs placed, two in canine-premolar region and two in molar regions bilaterally. (B) Two acrylic resin blocks connecting the needle hubs placed anteriorly and posteriorly.

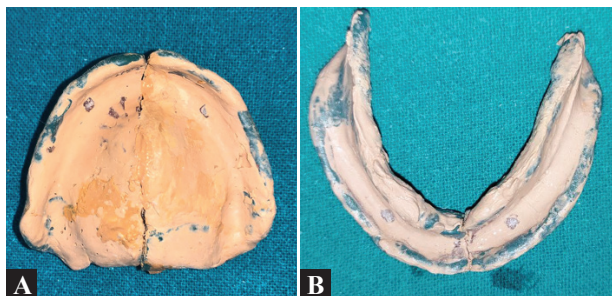


Figure 5: Border moulding and final Impression of Maxillary (A) and Mandibular (B) arch.



Figure 7: (A) Pre-treatment photograph. (B) Post-treatment photograph.

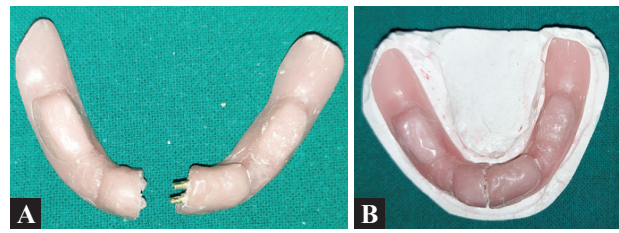


Figure 4: Sectional custom tray for mandibular arch. (A) Two dowel pins placed on the handle of one half of the custom tray and holes made on the handle of the other half of the custom tray. (B) Dowel pin connecting the two halves of custom tray.

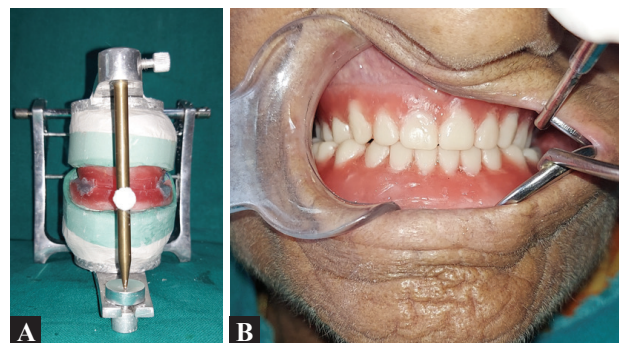


Figure 6: (A) Jaw relation recorded. (B) Try-in procedure

Outcome and Follow-up

The patient was recalled for follow-up visits to check for the maintenance and the patient’s adaptability with the prosthesis. The first follow-up was performed after 24 h of denture insertion followed by 1 week and 1 month to check the adaptability and any tissue response to the denture. The response of the patient towards the denture was satisfactory.

Table 1: Comparison of pre and post treatment OHIP-EDENT-N scores.

Domain	Scores in the first visit	Scores after 4 weeks of wearing new denture
Functional limitation	6	3
Physical Pain	7	5
Psychological Discomfort	8	4
Physical Disability	7	4
Psychological Disability	5	1
Social Disability	1	0
Handicap	0	0
Total Score	34	17

Discussion

The major challenge during the fabrication of complete denture in patients with microstomia is making an impression. In a patient with limited mouth opening, it is more difficult to insert the tray than to remove it from the mouth. This is because the oral opening gets further smaller as the operator stretches one corner of the mouth while placing the impression tray in the mouth. However, during removal of the tray, the orbicularis oris can be stretched beyond the limit of the patient's normal function.⁷

For preliminary impression, either a modified 1-piece stock tray can be used or the stock tray may be cut in half and the halves are approximated to form the preliminary cast.⁷ In the present case, for maxillary arch the smallest size tray was selected and for mandibular arch size one tray was selected. The flange length of the mandibular stock tray was reduced to facilitate the insertion of the tray.

Although identifying essential landmarks is necessary for the successful fabrication of a prosthesis, it is difficult to capture all possible anatomic details in patients with microstomia. When the impression material is introduced into the tray and impression is made, the flange length of the tray increases, making the insertion of the tray and obtaining the perfect impression more difficult. To overcome this problem, the 2-piece or sectional tray should be designed so that it fits precisely and separates easily in the mouth. It should also be considered that the locking mechanism for sectional tray be simple and not complicated.⁷

Various connecting mechanisms such as hinges, snap buttons, locking levers, plastic blocks, orthodontic expansion screws, magnet systems and parallel pins have been suggested for fabricating sectional trays.^{4,7} In the present case, sectional tray fabrication technique with needle hubs and acrylic resin block (for maxillary

sectional tray) and dowel pins (for mandibular sectional tray) is described. The needle hubs, acrylic resin block and dowel pins are cheaper and readily available materials in any dental office. In addition, the sectioned halves of the custom trays connected with the aid of above materials can be reoriented easily without any complication.

Significant improvement in the patient's quality of life was recorded when Oral Health Impact Profile in Edentulous Adults (OHIP-EDENT-N) scores of the patient (recorded in the first visit of the patient and after four weeks of wearing the new dentures) were compared. (Table1).

OHIP-EDENT-N consists of 19 questions with seven subscales viz. functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. The questionnaire gives a choice of five answers (4 = very often; 3 = often; 2 = fairly often; 1 = seldom; 0 = never). The total score ranges from 0 to 76. The lower the score, the higher the oral health related quality of life.⁸

The OHIP- EDENT-N scores obtained after wearing the denture for 4 weeks were 17 which are lesser compared to the scores obtained during the first visit of the patient (OHIP-EDENT-N score 34). Significant improvements were found under the "functional limitation", "psychological disability" and "psychological discomfort" domains. Since, the patient was convinced that she would not be able to wear denture due to limited mouth opening, making an impression with sectional custom trays and fabrication of denture might have led to the improvement of the scores in the psychological discomfort and disability domain.

Conclusion

Patients with limited mouth opening requiring prosthetic rehabilitation pose a challenge to the

clinician. Getting an accurate impression is the first and crucial step in denture fabrication. The technique explained in this article for fabrication of custom tray is a simple, time-saving, and cost-effective method for making definitive impressions in patients with microstomia which is essential for fabrication of complete denture.

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