

# PROSTHETIC REHABILITATION OF MICROSTOMIA PATIENT WITH DETACHABLE DENTURE – An Innovative Approach

Vishal Mugal, C. Sabarigirinathan, Anjali Virkhare

## Abstract

Microstomia is a relatively uncommon complaint that can make the wearing of dentures very difficult and uncomfortable for affected individuals. Completely edentulous patients with constricted opening of oral cavity who must wear removable dental prostheses often face the difficulty of being unable to insert or remove the prosthesis. However, Insertion of food during eating is often cumbersome for microstomia patients. This clinical report describes an easy method for fabrication of a detachable mandibular complete denture using Rhein 83 attachments (Italy) for rehabilitation of microstomia patient suffering from oral submucous fibrosis.

## Key Words

Detachable denture, Microstomia, Oral submucous fibrosis, Rhein 83 attachment.

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## Vishal Mugal

Senior Lecturer, M.A. Rangoonwala College of Dental Sciences & Research Centre

Vishal.mugal@gmail.com

## C. Sabarigirinathan

Professor & Head, Department of Prosthodontics, Tamilnadu Government Dental college & Hospital Chennai

sabarigirinathandr@yahoo.co.in

## Anjali Virkhare

Senior Lecturer, S.M.B.T. Dental College, Sangamner

Anjali.virkhare@gmail.com

## Introduction

An abnormally small orifice is called *microstomia*.<sup>1</sup> microstomia may be the sequelae of orofacial burns, surgical resection of facial and oral neoplasms, cleft lip, postoperative head and neck trauma, Plummer Vinson's syndrome, natural ageing processes and scleroderma.<sup>2</sup> Prosthodontic treatment, particularly, is more complex due to the reduced oral opening. In particular, the fabrication of removable prostheses is further complicated by tongue rigidity and the constant adjustment required to accommodate the changing periphery.<sup>3</sup> Sectional and collapsible dentures have been described for these patients. A review of the literature shows that different mechanisms for connecting sectional dentures include cast Co-Cr hinges,<sup>4</sup> swing-lock attachments,<sup>5</sup> stud attachments,<sup>6</sup> orthodontic expansion screws,<sup>7</sup> pins,<sup>8</sup> bolts, telescope system, rods,<sup>9</sup> clasps,<sup>10,11</sup> cast locking recesses,<sup>11</sup> and magnets.<sup>12</sup> A maximal oral opening smaller than the size of a complete denture can make prosthetic rehabilitation challenging.

The purpose of this article is to describe the clinical management of an edentulous patient with microstomia induced by oral Sub-mucous fibrosis. This technique uses a simple, economical, and non-time-consuming design for construction of a detachable lower complete denture using Rhein 83 attachment system (Italy).

## Clinical report

A 62 year female patient with restricted mouth opening because of Oral submucous fibrosis was reported to the department of Prosthodontics, Tamil Nadu government dental college and hospital, Chennai with the chief complaint of difficulty in insertion of food with maxillary and mandibular denture in place. Patient already had a set of complete denture which was fabricated conventionally 4 months back. She was using her complete denture but unable to eat with the same because of limited oral aperture; eventually she was forced to remove the denture during eating which ultimately affects her systemic health.

Oral submucous fibrosis (OSMF) is a chronic, complex, irreversible, highly potent pre-cancerous condition characterized by juxta-epithelial inflammatory reaction and progressive fibrosis of the submucosal tissues (lamina propria and deeper connective tissues). With the progression of this condition, the jaws become rigid to the extent that the patient is unable to open his mouth. OSMF has potential to transform into malignancies and is strongly associated with areca nut chewing, the principle component of betel quid.

### Assessment of mouth opening

The assessment of mouth opening was done using standardized digital vernier caliper with 0.01mm accuracy (Fig 1, 2).

History revealed that patient was completely edentulous since past 5 years with complaint of restricted mouth opening for last 2 years because of

oral sub-mucous fibrosis. On intra-oral examination fibrous bands were palpable over labial mucosa bilaterally with extension of fibrosis up to vestibule and lip. The maxillary and mandibular ridges were well formed and normal in size. With effort, the patient could manipulate old mandibular and maxillary denture into her mouth. The severity of her microstomia led to a Class IV assessment using the Prosthodontic Diagnostic Index.<sup>13</sup> As patient was not willing for surgical intervention to treat her constricted mouth opening; pharmacological management of OSMF was started in association with department of Oral medicine, Tamil Nadu Government Dental College & Hospital Chennai. However, the prosthetic treatment plan included the fabrication of conventional maxillary and detachable mandibular complete denture in which anterior segment (canine to canine) can be separated manually. The detachable anterior mandibular segment can be rejoined with the help of Rhein 83 attachments incorporated into the denture.

## Procedure

1. Primary impression of maxillary arch was made using patients old denture and addition silicone elastomeric impression material (Aquasil, Densply) while mandibular arch impression was made using small sized stock tray and medium fusing impression compound. Both the impressions were poured with type I gypsum product and primary casts were obtained. (Fig 3)
2. Sectional custom impression trays were fabricated using autopolimerizing acrylic resin over the primary casts by incorporating die pins to facilitate impression making (Fig 4a, 4b) and borders of the trays were trimmed 2mm short of sulcus depth. Die pins were

incorporated to the handle of the trays for exact orientation during reassembling. Both custom trays were tried in patient's mouth and border extensions were verified.

3. Border molding was carried out for right and left halves separately using low fusing green stick impression compound and secondary impression was recorded with addition silicone light bodied elastomeric impression material and two halves of sectional trays were reassembled extra-orally (Fig 5a, 5b). Impressions were poured with type IV gypsum product to obtain maxillary and mandibular master casts.
4. Maxillomandibular relations were recorded using nick and notch method to facilitate the reorientation of recorded centric relation extra-orally. Maxillary and mandibular spit casts were prepared and occlusal rims were mounted on a mean value articulator and teeth setting were carried out using principles of teeth arrangement.<sup>14</sup> trial denture was checked in patients mouth to verify esthetic, phonetics and occlusion.

## Fabrication of mandibular detachable denture

5. Putty index of mandibular teeth setting was made for securing exact position for future rearrangement of teeth.
6. The position of Rhein 83 connectors was secured with pattern resin over the anterior portion of mandibular cast and two ball and stud components were placed parallel to each other over the connector using Rhein 83 parallelogram (Fig 6 a, b).
7. Whole assembly was then invested and casted to prepare metal framework which was then placed over the mandibular cast.

Posterior teeth were reset using putty index (Fig 7a) and processing of lower trial denture with only posterior teeth arranged was carried out using principles of Prosthodontic laboratory techniques.

After finishing the processed part of lower denture; Rhein 83 black positioners along with metal housing were placed over two casted ball and stud components of anterior metal framework of denture.

8. Then, anterior teeth setting was completed by securing the exact positions of teeth using putty index (Fig 7b). After placing the transfer pivots to the black positioners which was already secured into metal housing (Fig 8), processing was carried out separately for the anterior segment of lower denture assembly using principles of Prosthodontic laboratory techniques.

Anterior segment of lower denture was then finished and polished. The black positioners were replaced by soft pink retentive caps and this segment was fitted to the other part of denture (Fig 9).

9. Laboratory mounting of maxillary and mandibular denture was carried out for verifying the occlusion and necessary premature occlusal contacts were rectified and corrected (Fig 10).

At next scheduled appointment maxillary conventional and mandibular detachable denture was delivered to patient (Fig 11). The esthetic and functional parameters were checked along with phonetics and verification of occlusion was done. Patient was satisfied with the final denture.

Patient was trained regarding cleaning, insertion and removal of mandibular detachable denture and was

instructed to remove the anterior segment of lower denture during eating.

10. At scheduled 24 hours first recall visit patient was well adapted and satisfied with the denture. Further; at subsequent recall visits patient was very comfortable during eating food with detachable mandibular denture. Patient was recalled every month for a period of one year to evaluate the masticatory efficiency of denture.

## Discussion

Fabricating a sectional complete denture to rehabilitate the completely edentulous patients with constricted mouth opening require multidisciplinary clinical as well as technical considerations. In the literature; different authors have already discussed about the various techniques used for fabricating split dentures which includes use of swing-lock attachments, stud attachments, cast Co-Cr hinges orthodontic expansion screws, dowel pins and magnets. However; case report described in this article has unique feature of incorporating Rhein 83 attachment components for the fabrication of detachable mandibular denture.

As the chief complaint of patients was; difficulty in insertion of food bolus into the mouth because of restricted oral aperture with complete denture in place; taking this into consideration plan was made to fabricate the denture in which the anterior segment of lower complete denture can be removed by the patient easily during eating to provide adequate space to facilitate the entry of food into oral cavity.

Advantages of using die pins for the construction of sectional custom tray were

1. Ease of availability,
2. Economical
3. Simple laboratory technique.<sup>8,14</sup>

Sectional custom trays were used to record the functional impression that can be removed as two separate segments and reassembled extra orally with the help of die pins inspite of having difficulties associated with reduced mouth opening. The insertion and movement to interlock the tray segments should be tried several times in the mouth prior to the impression procedure.

For the patient, described in the case report, detachable mandibular denture was fabricated using Rhein 83 axial attachment system. The idea of using Rhein 83 attachment system was to provide excellent

aesthetics, good retention, axial transformation of masticatory forces and less traumatic influence on underlined mucosa.

### Summery and conclusion

Inspite of having difficulties in rehabilitation of completely edentulous microstomia patients they may managed conservatively by modifying the clinical and laboratory procedures. In the described clinical report fabrication of detachable mandibular denture serve the functional as well as aesthetic considerations of patients with constricted mouth opening.

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(Fig 1)



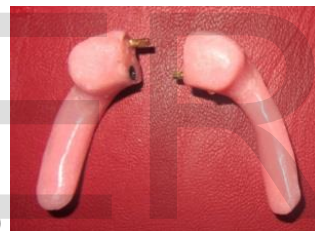
(Fig 2)



(Fig 3a)



(Fig 3b)



(Fig 4a)



(Fig 4b)







(Fig 5a)



(Fig 5b)



(Fig 6a)



(Fig 6b)



(Fig 7)



(Fig 8)



(Fig 9)



(Fig 10)