

Complete Denture for Microstomia, Limited Mouth Opening and Oral Submucous Fibrosis: A Case Report

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ABSTRACT

Background: Restoration of esthetics, speech and mastication in a microstomic patient with limited mouth opening is an uphill task for the dentist. Microstomia leads to several incapacitating sequelae such as inability to masticate, speech defects, impaired delivery of oral hygiene and psychological problems¹. A case report has been presented which describes the prosthodontic rehabilitation of an edentulous microstomic female patient with oral submucous fibrosis and a restricted mouth opening of 22 mm. A complete denture without sections was fabricated after modifying techniques of impression making using sectional tray which could be easily inserted and removed without compromising retention and esthetics.

Keywords: Microstomia, mouth opening, sectional tray, complete denture.

INTRODUCTION

Microstomia is a term used to describe a congenital or acquired reduction in the size of the oral aperture that is severe enough to compromise esthetics, nutrition, and quality of life². The commonly affected age group is 30-50 years of females.

The normal mouth opening among different populations has been shown to vary considerably with variation in race, age, gender, height, weight and habits as per the study conducted by Xiao Yan-Li et al³ and Syeda Arshiya Ara et al⁶ done on Chinese and Indian population respectively. The mean maximal mouth opening for Indian males is 51.3±8.3 mm and for females is 44.3±6.7 mm according to Nishant Khare et al (2012)⁸ who conducted a study on Adult Indian population. The mean mouth opening decreases with age and is less in females according to 'three finger index method'. Maximum mouth opening (MMO) <30mm was diagnosed as severe microstomia according to criteria provided by Naylor et al⁹.

In the case described below the cause of restricted mouth opening was indicative of Oral Submucous Fibrosis (OSMF) as there was epithelial atrophy, stiffness of mucosa and presence of palpable firoelastic bands with limited mouth opening. OSMF is an insidious chronic disease and a precancerous condition, affecting any part of the oral cavity and sometimes the pharynx and is caused by prolonged use of tobacco, arecanut, spices, etc⁸. It is one of the most prevalent premalignant condition in India which can be easily diagnosed but is incurable and irreversible. It is an epidemic in India (Gupta et al, 1998)⁷.

The patients with microstomia present a challenge in fabricating removable oral prosthesis as there is lack of clearance for the placement of impression tray with impression material in the mouth, making the most fundamental procedure of making removable prosthesis difficult¹⁰. Several techniques of impression making in microstomic patients have been reported including sectional trays using pins, swinglock attachments, stud attachments, telescopic systems, clasp retainers, and magnetic attachments.

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This clinical report describes the modification of the standard impression procedure using sectional tray and a complete denture is fabricated for the patient which is esthetic, efficient, cost effective, easy to maintain and less time consuming.

CASE REPORT

A female patient 48 years old from Faridabad, Haryana (India) with completely edentulous resorbed ridges, reported to the Department of Prosthodontics Crown and Bridge of Sudha Rustagi College of Dental Sciences and Research for prosthodontic rehabilitation. On clinical examination it was found that the patient has a mouth opening of 22mm (fig.1) alongwith Oral Submucous Fibrosis. Patient was a non – smoker but she gave a history of using abrasive red toothpowder since 30 years once daily for cleaning her teeth. On extraoral examination patient had a convex profile with microstomia. The skin appeared pale as the patient was anaemic. Patient wanted a denture to maintain her esthetics with a good masticatory efficiency. Patient was nutritionally undernourished and had gastroesophageal reflux disease.



Fig 1: Maximum mouth opening by three finger index method

On intraoral examination the mucous membrane was firm and thin. There were fibrous bands running from crest of maxillary ridge in canine region to the buccal mucosa leaving obliterated buccal vestibules bilaterally. The palate and tongue were smooth and atrophied. Rugae area was smooth. The saliva was thin and deficient. Both the ridges were resorbed and tapering in shape (fig.2 and 3). There was an undercut in the sublingual crescent area of the mandibular ridge. There were

white hyperkeratotic patches on the left and right buccal mucosa and right border of the tongue.



Fig 2: Resorbed maxillary ridge with obliterated buccal vestibules.



Fig 3: Resorbed mandibular ridge.

TREATMENT PLAN:

After discussing the various surgical and non surgical treatment modalities with the patient; she was not convinced for the surgical intervention and wanted an easy, comfortable, non invasive and cost effective treatment. The various non surgical treatment options were given to the patient for her present edentulism with restricted oral access like flexible denture, implants, sectional and collapsible denture¹¹ with all the pros and cons but she was convinced for a conventional denture which can be inserted and removed easily and also easy to maintain once in use. Therefore a conventional rigid denture was planned for the patient without sections and it was decided to modify the procedure of impression making which has minimum

distortion and is time saving and comfortable to the patient. Alongwith it the patient was motivated for performing various orofacial exercises to improve mouth opening though the results are not significant with home based programme.

CLINICAL PROCEDURE:

1) Primary impression using non perforated trays:

On first appointment a thorough dental and medical history of the patient was taken. Primary impression was made using medium fusing impression compound (MDM Corp., Lal Kuan, Delhi, India) using non perforated stainless steel stock trays of '0' number after customizing the tray according to the patient's ridge by trimming and moulding them. The impression was poured using Dental Plaster type II (Kaldent, Kalabhai Karson Pvt. Ltd., Mumbai, India). The primary casts were obtained(fig. 4)



Fig 4: Primary maxillary and mandibular casts.



Fig 5: Various sections of the maxillary sectional custom tray.

2) Fabrication of a maxillary sectional tray:

Then a maxillary sectional custom tray was fabricated using autopolymerising resin (DPI a div of Bombay Burmah Trading Corp Ltd. Mumbai,

India). It was sectioned into a zigzag pattern with a notch in the handle anteriorly with the help of Bard Parker's handle with blade no.20 such that the two fragments coincide with each other in close approximation (fig. 6). The metal tongue blades of desired length were used to stabilize the tray posteriorly. They were kept horizontally on the upper surface of the tray with each end on each section of the tray and autopolymerising resin was used to stabilize both the bent ends. Crevices were created at the bent ends of the blades which could be seen after removing the blades when the autopolymerizing resin polymerised. The tray could be reassembled outside mouth by placing the metal blades in their respective crevices.



Fig 6: Assembled parts of sectional tray on the primary casts.

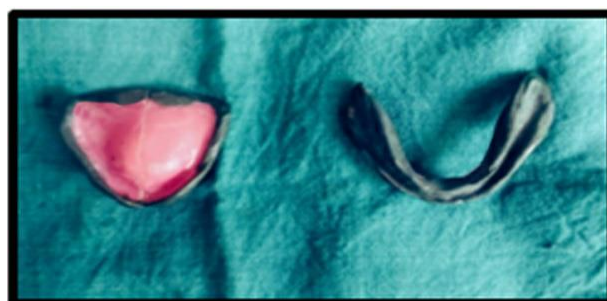


Fig 7: Border moulded maxillary and mandibular custom trays.



Fig 8: Zinc oxide eugenol secondary wash impressions made in sections.

3) Secondary impression:

With the help of the sectional trays border moulding of each section was done in the second appointment (fig. 7) using low fusing compound (DPI Pinnacle Tracing Green Sticks Mumbai, India) and the Zinc Oxide Eugenol paste (DPI a Bombay Burmah Trading Company, Mumbai, India) was used to make secondary impressions in sections (fig 8) after which the impressions were assembled outside the mouth, stabilised with the tongue blades and after beading and boxing were poured with dental stone (Gypstone Super hard Dental Stone Type III, DPI Bombay Burmah Trading Co., Mumbai, India) to obtain a master cast.

For mandibular impression no sectional tray was designed and an 'All Green technique' of impression making was used which enhances the stability and comfort of the denture; and a secondary impression was made using ZOE impression paste (DPI a Bombay Burmah Trading Co. Mumbai, India). Denture bases were fabricated with DPI autopolymerising resin on both the casts after pouring them with dental stone type III and definitive casts were obtained.

4) Recording Jaw relations:

Jaw relations were recorded on the wax rims made with modelling wax (Y-Dents MDM Corp. Lal Kuan, Delhi, India) on autopolymerising resin (DPI a Bombay Burmah Trading Corp. Ltd. Mumbai, India) denture bases.

5) Teeth arrangement:

Teeth size was assessed according to the intercanine width and interridge space and smallest teeth size with 33 degree cuspal inclination, cross linked acrylic teeth were used for teeth arrangement. First premolars were omitted in the teeth arrangement to reduce the vertical stresses and also there was insufficient arch length for the same. The denture was waxed up and acrylised after try-in.

6) Acrylisation of the denture:

Normal flasking procedures were adopted followed by packing of the denture with heat activated polymethylmethacrylate (DPI, Mumbai, India). Long curing cycle was used for acrylisation. Denture was

remounted on the articulator and selective grinding was performed. Denture was finished and polished (fig. 9) and inserted. Post insertion instructions were given to the patient with special emphasis on insertion, removal and hygiene of denture.

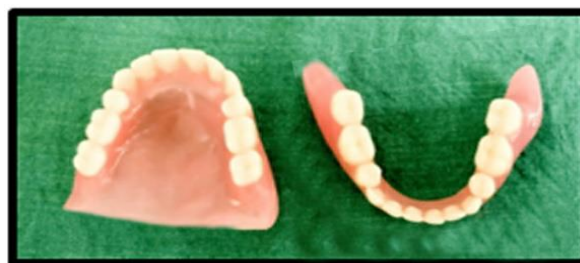


Fig 9: Occlusal surface of the maxillary and mandibular complete denture.



Fig 10: Showing preoperative view.



Fig 11: showing post- operative view.



Fig 12: Showing the occlusion on left side.

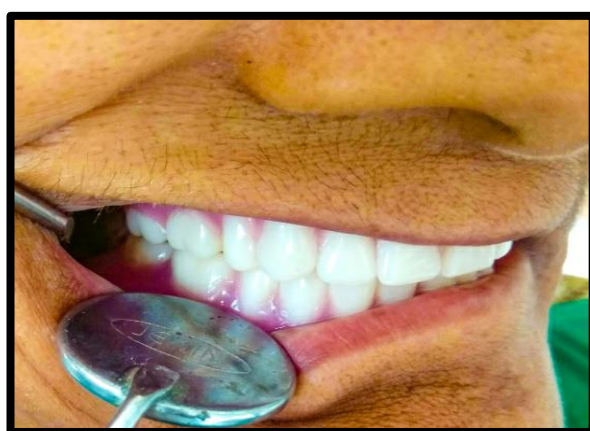


Fig 13: Showing the occlusion on right side.

7) Post insertion follow up:

Patient came for follow up visit after one week, four weeks and six weeks and was satisfied with the denture though oral hygiene was not properly maintained by the patient. There is improvement in muscle tonicity with enhanced natural esthetics of the patient (fig 10 and 11). The retention and occlusion of the denture was acceptable. In the third follow up visit mandibular denture was relined.

DISCUSSION

With the advent of technology and latest advances in the field of dentistry we are heading towards the future of Prosthodontics which lies in the new era of digitalisation. Though the latest techniques of digital impression making have simplified the work of dentists but such technology has limited access to majority of population due to high expenses involved in it. For majority of population conventional approach of denture fabrication in such special cases seems to be more rational.

Microstomia with limited mouth opening has inclined many authors in the literature. There are various systems and attachments described by them. After going deep into the literature it was found that the pre-requisites for making impression in such a case are firstly it should be stable anteriorly and posteriorly and could be reassembled extra orally; secondly it should have minimum distortion; thirdly it should be easy and accessible; finally it should not cause any discomfort or trauma to the patient.

The earlier systems include hinge-lock assembly by Wahle et al ¹³ used for the mandibular sectional denture. It was found that during function the assembly was not stable and structurally not durable. So more the fragments and attachments in the denture more will be the compromised durability, stability and also the oral hygiene. So the best treatment option should be the minimum fragments and minimum assemblies. Emphasis should be laid upon the technique of impression making with least distortion. The sectional tray used for this patient fulfil all these criterion as it was stable anteriorly as well as posteriorly; also, could be reassembled with least distortion and was easy to fabricate and cost effective so it was the technique.

The other aspects of the case include the condition of Oral Submucous Fibrosis. Schwartz(7) in 1952 described a condition of the oral mucosa which included the palate and pillars of the fauces, and called it "atrophia idiopathica (tropica) mucosae oris". It was later termed 'Oral Submucous Fibrosis'. Various synonyms are "diffuse oral submucous fibrosis" by Joshi in 1953, "idiopathic scleroderma of the mouth", "idiopathic palatal fibrosis", "sclerosing stomatitis" and "juxta-epithelial fibrosis". Oral submucous fibrosis is a precancerous lesion and is associated with squamous cell carcinoma and other oral cancers. The etiology of oral submucous fibrosis is multifactorial. Though it is strongly related to arecanut and tobacco chewing. Arshiya et al (2003)⁶ conducted a study on 80 patients 15-65 years of age having a habit of chewing arecanut, arecanut with tobacco containing products in different forms, tobacco, alcohol and found that the minimum mouth opening was 24.48 mm in the group and 44.25 mm in the control group. A functional staging of OSMF was done

according to which stage A is MMO of 20mm or more stage B is MMO of 11-19mm and stage C is MMO of 10mm or less. Haider et al (2000)¹⁴ gave a clinical staging of OSMF according to which stage I is presence of faucial bands only, stage II is faucial and buccal bands only, stage III is faucial, buccal and labial bands.

In this case there was no history of tobacco or betelnut chewing but patient gave a history of using red toothpowder since 30 years which is a form of smokeless tobacco.

Gupta et al reported malignant transformation in 2.3% of patients with Oral submucous fibrosis from a 10- year follow- up study in Ernakulam district, Kerala. Also the Ministry of Health, Government of India under National Tobacco Control Programme in 2016¹⁶ has stated that smokeless tobacco/chewing forms are the most prevalent forms of tobacco use with 206 million Indians using it. The use of smokeless tobacco (SLT) is associated with high prevalence of oral cancer in India and almost 90% of these oral cancers are linked to tobacco use. Out of all the products mentioned toothpowder was found to be one of the form of smokeless tobacco. The red toothpowder contains fine red tobacco powder, herbs and flavourings and additional plant related ingredients such as ginger, pepper, and camphor may be used. Nicotine found in tobacco is the main causative factor for the various tobacco linked diseases. The nicotine content found in toothpaste is around 4.47-5.09mg/g wet wt of toothpowder. The ph was found to be 5.75-6.71. Nicotine is a CNS stimulant which leads to dependence on its users.

Main geographic location of use is within South-East Asia region with prevalence of use from 2% to 49% of the the population across various regions of India including the children. The use is now seen prevalent in Europe and North America also.

Oral submucous fibrosis, now globally accepted as an Indian disease has one of the highest rates of malignant transformation into squamous cell carcinoma. Mucosa eventually becomes blanched and opaque and fibrotic bands appear involving buccal mucosa, soft palate, lips and tongue. Oral epithelium is usually atrophied with complete loss of rete pegs, hyalinisation of the connective tissue, homogenisation of collagen bundles and

obliteration of blood vessel. The fibrosis involves the lamina propria and the submucosa and may often extend into the underlying musculature resulting in the deposition of dense fibrous bands giving rise to the limited mouth opening which is the hallmark of this disorder.⁷

SUMMARY AND CONCLUSION

In the patient the etiopathogenesis of OSMF was found to be multifactorial but the use of smokeless tobacco in the form of toothpowder for thirty years alongwith poor nutrition seems to be the major determinants of the disease. Patient was educated about the disease and told to abstain from using toothpowder, modify diet, maintenance of oral hygiene was laid stress upon and was kept on follow up every two weeks.

Although patients with microstomia presenting for prosthetic rehabilitation pose a challenge to the clinician, the treatment can be conservatively managed by modifying clinical and laboratory procedures. The use of sectional impressions that can be recorded in two or more parts and then relocated outside the mouth is a useful technique to adapt for such patients. The construction of complete or partial dentures with limited oral opening has been studied by various authors. For the patient described, a complete denture was fabricated which could be inserted by the patient herself as there was no hand deformity. A denture adhesive was recommended to the patient. The patient was kept on follow-up in case relining of the denture is required. Patient was completely satisfied with the esthetics and the prosthesis gave her confidence in herself. Patient was motivated for surgical treatments but was apprehensive for the same. So a comfortable, cost effective treatment was offered to the patient and the patient is getting adapted to it slowly.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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