CASE REPORT

Microstomia: entry made easy in no entry (with sectional tray and sectional denture)

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SUMMARY

Reduced mouth opening or microstomia is a frequently encountered condition in the field of prosthodontics. Microstomia is a challenge for prosthodontics right from impression making till the insertion of the prosthesis. Making impressions in patients with microstomia is often cumbersome for both patient and operator. Standard impression procedures are not of any help due to limited mouth opening, so the modification of standard impression procedure is often necessary while treating such patients. Modification in denture prosthesis in the form of split denture, flexible denture, hinged denture, spring denture etc is needed to fulfil patients' demands. The present case displays the treatment of a patient with microstomia using modified impression tray design and maxillary split denture.

INVESTIGATIONS

Stage	Relevance
CLINICAL STAGING	
S1	Stomatitis and/or blanching of oral mucosa
S2	Presence of palpable fibrous band in buccal mucosa and/or oropharynx with/without stomatitis
S3	Presence of palpable fibrous band in buccal mucosa and/or oropharynx, and in any other part of oral cavity with/without stomatitis
S4 a	Any of the above stage along with other potentially malignant disorder, for example, oral leukoplakia, oral erythroplakia etc.
S4 b	Any of the above stage with oral carcinoma
FUNCTIONAL STAGING	
M1	Interincisal mouth opening up to or greater than 35 mm
M2	Interincisal mouth opening between 25 and 35 mm
M3	Interincisal mouth opening between 15 and 25 mm
M4	Interincisal mouth opening less than 15 mm

BACKGROUND

An abnormally small oral orifice is called microstomia.¹ Microstomia may be caused by the surgical treatment of orofacial neoplasms, maxillofacial trauma, burns, plummervinson syndrome, trismus, temporomandibular joint disorders, cleft lips, radiotherapy, oral sub mucousfibrosis, any damage to the oral musculature or scleroderma.² Microstomia due to any aetiological factor presents difficulties to the prosthodontist right from the primary impression making till the insertion of prosthesis.³

Various techniques and modifications have been proposed for the treatment of patients with microstomia. This case presents an easy and handy technique for the fabrication of custom tray and split maxillary complete denture.

CASE PRESENTATION

A 63-year-old woman reported to the Department of Prosthodontics with difficulty in chewing because of loss of her teeth and wanted a replacement of the missing teeth by means of a complete denture. The patient was completely edentulous with limited mouth opening because of submucous fibrosis. Severity of oral submucous fibrosis (OSMF) was classified as S3 M3 according to OSMF classification based on clinical features and functional staging.⁴ Treatment plan included final impression making with sectional custom trays and fabrication of maxillary sectional denture.

TREATMENT

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 were made using zero size perforated edentulous metallic stock tray with alginate; after disinfection procedure with iodophore, impressions were poured with type-II dental plaster and primary casts were retrieved (figure 1).

On primary casts, custom trays were fabricated using self-cure acrylic resin tray material. On maxillary custom tray, four needle hubs were placed, two in canine-premolar region and two in second molar regions bilaterally. On the needle hubs, needle caps were placed in such a way that there is 3–4 mm excess height available after covering the hubs. Maxillary custom tray was then sectioned in the midline into two halves. The anterior tooth card was attached in cross direction between two needle caps with cyanoacrylate (canine needle hub to molar needle hub). Two remaining hubs with caps were also joined with previously fixed tooth card. The hubcaps were joined with tooth card in such a fashion that they all can be removed and reinserted together to orient two halves of the custom tray (figure 2 A–C).

Border moulding and final impression were made separately with each half of the tray and they were assembled extraorally by inserting tooth card and caps on needle hubs. Final impressions were poured to get final casts. On final casts, record

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Figure 1 Maxillary and mandibular primary impressions and primary casts.

bases were fabricated. Maxillary record base was sectioned in midline. Snap fastener (press buttons) was used to join two sections of record base as shown in figure 3. On sectional record bases, the occlusal rim was made. Jaw relation was recorded and teeth arrangement was performed and approved by patient.

One half of the wax try in was sealed with final cast as done in conventional wax up procedure. In midline area, in antero-posterior direction, grooving was performed to receive press buttons at three future locations. This part was cured in heat-cured acrylic resin.

Figure 2 (A) Fabrication of maxillary custom tray and hubs attached, (B) sectioning of custom tray in midline, each section with two hubs attached, (C) attached tooth card with hubs in cross pattern to reorient the tray, (D) sectional final impression and (E) reoriented maxillary final impression.

Figure 3 Various views of record base with push button (snap fastener).

After curing, a section of the denture was not retrieved from the cast, but the whole assembly was duplicated using agar duplicating material (figure 4C). On duplicated assembly cast, the second half of the denture was placed and the female part

of press buttons were placed on duplicate male part, and wax up of the second part of the denture was performed in such a manner that it covers the first part as shown in figure 5A. Curing was performed on the second part. Both halves were

Figure 4 (A) Wax up of one section of denture, (B) flasking of sectional denture, (C) duplication of sectional denture with agar duplicating material and (D) duplicate denture cast.

Figure 5 (A) Sectional denture on cast, (B) impression surface and snap fastener, (C) impression surface and snap fastener and (D) blissful patient after insertion.

finished and polished (figure 5), and denture insertion was performed.

During denture-insertion appointment, the patient was educated about the sequence of wearing and removing sectional denture.

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. Initially, the patient felt difficulty in insertion and removal of denture, but with time she became used to it. The patient was called for follow-up after 6 months and her response towards the denture was satisfactory.

DISCUSSION

In the literature, several techniques have been mentioned for the management of microstomia. In some cases, surgical intervention is useful, but not in all cases; thus, for such cases in which surgical intervention is not useful, a modified impression technique and a modified prosthesis are the ultimate choices. Several modifications in the form of split denture, spring denture, hinged denture etc are reported in the literature. Oral augmentation exercises to increase vertical opening placing a small bundle of tongue depressor between occlusal surfaces of opposite dentition of dentures were attempted to treat microstomia of a patient with scleroderma.⁵ In 1989, Mccord *et al*⁶ fabricated the complete sectional denture in which both the halves were joined by stainless steel posts. Mandibular denture was

fabricated by Wahle *et al*⁷ using a swing lock mechanism. Suzuki *et al*⁸ used telescopic system to fabricate sectional denture to treat a patient with microstomia. Mandibular sectional dentures were fabricated using dovetail mechanism⁹ and magnets.¹⁰ Yenisy *et al*¹¹ in 2005 gave a new technique to fabricate mandibular sectional collapsed denture using midline lingual hinge. Collapsed maxillary hinged and mandibular sectional and hinged complete denture with removable partial denture was made by Sharma *et al*¹² in 2011.

In the present case, maxillary sectional tray fabrication technique with needle hubs and their caps with tooth card is described. The needle hubs and tooth cards are cheaper and are readily available materials in any dental office which aid in the fabrication of prosthesis in patients with limited mouth opening without using any complicated device for reorientation of sectional trays.

The denture was fabricated using snap fastener. Snap fasteners are readily available and easy to use and maintain. Sectional denture with snap fastener is easy to use for a patient as there is a simple mechanism for locking them and most of the patients are aware of its use. This technique can be accomplished in any dental office or laboratory without using any complicated machinery or parts for sectioning and attaching sectional dentures.

This technique also has some disadvantages in the term of longer chair time, additional lab time and labour and material which are common for any technique used for the fabrication of sectional dentures.

The technique described here is easy in terms of material availability, use of material, patient adaptability and maintenance which is helpful for a patient with microstomia for a better function, aesthetic look, health and overall comfort.

Learning points

- ▶ A patient with limited mouth opening can be treated using sectional trays and sectional dentures.
- ▶ Needle hubs and cap tooth cards are readily available economical parts which can be used for the reorientation of sectional trays.
- ▶ Snap fasteners are readily available which can be employed for the fabrication of sectional denture.
- ▶ Snap fasteners are easy to use, maintain mechanism and are known to the patient
- ▶ It is a simple technique of sectional tray and denture fabrication without using any complicated mechanism.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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