

Fabrication of Sectional Denture in A Patient with Microstomia- A Clinical Report

Dr. Rupal J. Shah¹, Dr. Dipak J. Solanki², Dr. Fatema J. Diwan³

¹ (Head of Department of Prosthodontics, Government Dental College & Hospital, Ahmedabad/ Gujarat University, India)

^{2,3} (P.G.Student, Department of Prosthodontics, Government Dental College & Hospital, Ahmedabad/ Gujarat University, India)

Abstract: Restricted mouth opening is a definite prosthodontic hindrance to carry out treatment successfully. Various methods and attachments have been used to design sectional dentures for such patients. This clinical report describes a combination and modification of previous methods using three different attachments (dual die-pins, press-buttons & Nd-Fe-B magnets) for fabrication of sectional complete dentures in a patient with oral submucous fibrosis. The technique described is simple, cost-effective and does not require any special devices or complex locking joints.

Keywords: Microstomia, sectional denture, magnets, die-pin, press-button, oral submucous fibrosis

I. Introduction

Microstomia is abnormally small oral opening resulting from surgical treatment of orofacial carcinomas, cleft lip, trauma, burns, Plummer-Vinson syndrome and scleroderma^{1,2}. Patients with microstomia who must wear removable dental prostheses often complain of an inability to insert or remove the prosthesis because of the constricted opening of the oral cavity. Using conventional methods for making definitive dental impressions in such cases proves challenging. Several studies have described various techniques for making sectional custom trays¹⁻⁶. Bacchav and Aras⁶ described a simple method using dual die-pins for interlocking sectional impression trays. Many reports have been published describing the use of different mechanisms to hold sectional dentures such as clasps^{2,7}, stainless steel tubes⁸, hinges^{2,3}, swing lock attachments⁹ and magnets^{10,11}. Magnets have been used in dentistry for a variety of purposes. The new-generation rare earth magnets have improved corrosion resistance, smaller sizes and stronger attractive forces sufficient for clinical application¹². Neodymium-iron-boron (Nd-Fe-B) magnet offers the highest magnetic energy per unit volume and is the primary magnetic material currently in use¹².

This clinical report describes the use of different types of attachments such as die pins, press buttons, and magnets (Nd-Fe-B) for fabrication of sectional complete dentures in an edentulous patient with microstomia.

II. Clinical Report

A 55 year old female patient came to the Department of Prosthodontics, Government Dental College & Hospital Ahmedabad for prosthodontic treatment. Her past dental history revealed that she was treated with a nasolabial flap surgery before 3 years for oral submucous fibrosis. She had later been advised different mouth opening exercises.

On clinical examination, maxillary and mandibular arches were completely edentulous and maximal mouth-opening was 2.3cm (Fig 1). Mucosa appeared blanched with palpable heavy fibrotic bands on both buccal mucosae. A treatment plan for sectional denture was proposed and patient's consent was obtained.

The stock trays were trimmed to ease their placement and upper and lower primary impressions were made using irreversible hydrocolloid (Imprint, Dental Products of India) and impression compound (Y-DENTS[®], MDM Corporation) respectively. (Fig 2).

For final impressions, sectional custom trays were fabricated. A dual die-pin and sleeve (M.R.™ Dual Pin and sleeves, Select Dental) were used to connect both sections of the custom tray (Fig 3). The die pin also served as a handle for the second half of the tray. Border moulding was done separately for each section using modelling plastic impression compound (DPI Pinnacle Tracing Sticks, Dental products of India). Sectional final impressions were made with zinc-oxide eugenol impression paste (DPI Impression paste, Dental products of India). After removing from mouth, the sectional impressions were aligned extraorally and arbitrary scraping was done to remove interferences (Fig 4). The final impressions were poured with type II dental stone (Gold Stone, Asian chemicals) and master cast was prepared.

Sectional maxillary temporary denture base was fabricated with self cure acrylic resin (Acralyn 'R', Asian Acrylates) and joined in midline using a press button (Geox Brand, Noble Enterprise). A press-button has two components- male & female. As shown in Fig 5, one of the two components was positioned in a section and the opposite component was secured in an acrylic extension that connected to the other sectional denture base.

An upper wax occlusal rim (Y-DENTS[®], MDM Corporation) was made and sectional maxillary denture bases were placed intra orally to determine the maxillary plane. It was difficult to record jaw relations by using both denture bases. For this reason, only maxillary sectional denture base was placed in mouth and a softened roll of impression compound placed on lower arch was used to record a tentative jaw relation record (Fig 6).

The tentative record was mounted on an articulator and a new set of denture bases were made fabricated taking care to make them as thin as possible. Upper wax occlusal rim was made with reference to previous upper sectional rim and lower rim was made according to the new upper rim. Teeth arrangement was completed using non anatomic teeth (Dentek[®] cross linked acrylic teeth, S P Dental). Dentures were fabricated in a conventional manner using heat cure acrylic resin (Acralyn 'H', Asian Acrylates.). Finished and polished dentures were sectioned from the midline using a thin carborandom disk.

Neodymium-fe-boron magnets (Ali magnets, New Delhi, India) were used to connect sectional dentures (Fig 7). In maxillary denture, two points were determined to place magnets- one at rugae and another 2 to 3 mm anterior to fovea palatina. In mandibular denture, two magnetic attachments were placed- one buccally and another lingually at midline.

At the time of insertion, only upper sectional denture was given to be worn for few days so as to improve patient's adaptability with dentures. After that, she was advised to use both upper and lower sectional dentures. Patient was educated about insertion and removal of dentures along with post insertion and home care instructions. At the follow up visit after 7 days, the patient was satisfied with the dentures (Fig. 8) and was able to place and remove the dentures easily due to the magnetic attachments. Periodic recall was done every month upto 6 months during which minor adjustments were required due to irritation by the denture. Apart from that, the dentures have been functioning well and an acceptable fit has been established.

III. Figures



Figure 1: The patient's mouth opening was restricted- approximately 23 mm.



Figure 2: Preliminary impressions taken in modified stock trays.

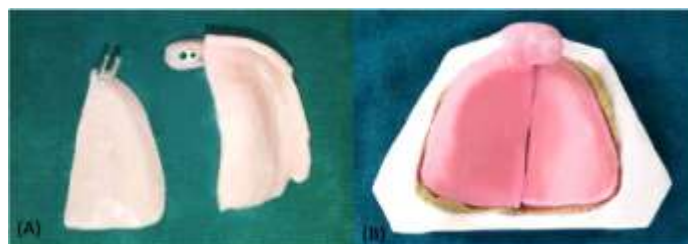


Figure 3: Sectional custom trays attached by means of a dual die pin and sleeve. A) Inside view B) Top view



Figure 4: Sectional final mandibular impression aligned extraorally using die-pin attachment.



Figure 5: Temporary maxillary denture bases sectioned and joined with the help of press buttons.



Figure 6: Jaw relation record using only the maxillary denture base and a roll of impression compound.



Figure 7: Sectional maxillary denture attached using two pairs of magnets.



Figure 8: Prostheses in place.

IV. Discussion

Prosthetic management of microstomia in patient is challenging. Various methods and attachments have been used¹⁻¹¹ to design a denture which the patient can easily use.

In the present report, we have discussed a combination and modification of previous methods for fabrication of sectional complete dentures. The use of 3 different attachments- dual die-pins, press-buttons & NdFeB magnets, has been discussed at various stages of denture fabrication.

The use of dual die-pin and sleeve for fabrication of sectional trays was based on the technique given by Bachhav and Aras⁶. Such a locking mechanism provides a greater degree of stability and a precise rigid union of the two sections without increase in bulk. The die-pin also serves as a handle for a section of the custom tray. Press buttons were used to attach the two sections while recording jaw relations. This is because the length of die pins would interfere in jaw relation and press button provides a precise union equivalent to die-pins.

Magnetic attachments make insertion and withdrawal of sectional dentures very convenient and function very well as reported by Watanabe et al¹¹. They used Fe-Pt magnetic attachment system applied to sectional collapsed complete dentures. We have used Nd-Fe-B magnets for joining two sections of the denture. As mentioned before, Nd-Fe-B are permanent magnets based on rare earth components and show improved corrosion resistance and special coating possibilities. They are also called super magnets because of powerful magnetic forces.

The techniques described here for fabricating sectional impression trays and dentures do not require any special devices or complex locking joints. The additional materials used are commercially available at minimum cost. However, the concern regarding loss of magnetic properties after a period of use remains. So as to determine the long-term success of this technique, periodic recall and maintenance are needed.

V. Conclusion

This clinical report describes a simple and cost effective method to fabricate a prosthesis for a patient with microstomia. The use of die-pins, press-buttons and NdFeB magnetic attachments for making successful sectional impressions and sectional dentures has been described.

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