Hinged and sectional complete dentures for restricted mouth opening: A case report and review

Aditi Sharma, Pallak Arora1, Sartaj Singh Wazir2

Abstract

Restricted mouth opening is a definite prosthodontic hindrance to carry out treatment successfully. Restricted mouth opening can be due to many reasons such as microstomia, oral submucous fibrosis, some genetic disorder, and as a result of some surgical treatment. In the past, various techniques for prosthetic rehabilitation of limited oral opening have been tried such as surgeries, use of dynamic opening devices, magnetic devices, and modification of denture design. Here we present; a simplified technique and simple design for fabrication of maxillary hinged and mandibular hinged and sectional complete denture for a patient with restricted mouth opening due to oral submucous fibrosis.

Keywords: Hinge denture, mandibular molar tube, oral submucous fibrosis, restricted mouth opening, sectional denture

Introduction

In prosthodontic practice, limited mouth opening in patients is a common occurrence. Prosthetic rehabilitation of patient with restricted mouth opening due to any causative factors, presents difficulties at all stages, right from the preliminary impressions to the insertion of prosthesis.1

A maximal oral opening smaller than the size of a complete denture can make prosthetic treatment challenging. Limited oral opening itself is not a disease but manifest as a consequence of certain conditions namely surgical treatments of orofacial carcinoma, cleft lip, trauma, burns, Plummer Vinson Syndrome, scleroderma, trismus, rheumatism, temporomandibular joint dysfunction syndrome, oral submucous fibrosis, and any damage to masticatory muscles.2

Case Report

A 71-year-old male patient reported to the Department of Prosthodontics, Rama Dental College and Hospital Kanpur (UP), India, with the chief complaint of missing teeth and wanted replacement of the missing teeth by means of fabrication of complete denture.

On examination, it was found that patient had oral submucous fibrosis with heavy vertical fibrous bands and homogenous leukoplakia on both sides of buccal mucosa which lead to reduced mouth opening of 2.5 cm. Patient was also diagnosed with bilateral angular cheilitis which often bleed on opening mouth wide. Treatment plan included sectional maxillary and mandibular final impression procedures, followed by fabricating maxillary hinged and mandibular sectional and hinged complete denture.

Procedure

• Primary impression for maxillary arch was taken using smallest size edentulous stock tray with impression compound (Y Dents; MDM Corp.), and after proper disinfection (1:213 iodophore), primary cast was poured in type II dental plaster (Dentico; Neelkanth Mine Chem.).
• Two autopolymerizing acrylic resin special trays (Trevelon; Dentsply India Pvt. Ltd.) were fabricated on maxillary primary cast. Both trays were trimmed one side short of maxillary tuberosity.
• Border molding was done with each tray using low fusing compound (DPI; Pinnacle, India) and the final impression was made with light body polyvinyl siloxane addition silicon impression material (Examix NDS; GC company).
• One sectional impression tray was poured with dental stone (Denstone, Grade III). Over that cast second sectional impression tray was assembled and the remaining part of the cast was poured.
Sharma, et al.: Hinged and sectional complete dentures for restricted mouth opening

• Similarly, mandibular primary impression was taken using smallest size stock tray and after disinfection, primary cast was poured. A conventional special tray was fabricated over the primary cast and that was later sectioned from the midline into two halves. One hole was drilled in the center of the tray handle and a brass dowel pin was passed through it, from one end to the other end of the hole. This provides stability to the tray. Similarly, two holes were drilled over the premolar region on both sides of the tray and the two brass dowel pins were placed vertically in those holes and were connected by acrylic plate which was detachable.

• Border molding and final impression were made individually with the each half of the tray and the tray was joined extra-orally with the help of dowel pin and acrylic plate. The master cast was poured with dental stone.

• After obtaining maxillary and mandibular master casts, denture bases were fabricated and then were sectioned from the midline. After sectioning, the two ends of the denture bases were rejoined from the midline using press buttons (Snap fasteners; Needles Ind). Wax rims (Link, modeling wax, MDM Corp.) were prepared over the denture bases. The wax rim was not prepared in the mandibular anterior region because of the presence of the press buttons over the anterior segment of the ridge. Jaw relation was recorded.

• Then the teeth arrangement was done [Figure 1] (Lactodent; Pyrax enterprises). Teeth were not arranged in mandibular anterior segment. Patient was called for try-in.

• After try-in, the press buttons were removed from the maxillary denture base and the gap between the two parts of the denture base was closed by incorporating wax between them and the processing of denture was done in a conventional manner. Similarly, the press buttons were also removed from the anterior segment of the mandibular denture base and the anterior teeth were arranged. An index was made for the anterior teeth with the help of putty addition polyvinyl siloxane impression material (Exaflex, GC Company). The anterior teeth were then removed and placed back in putty index, rest of the denture was processed with heat cure acrylic resin (Trevlon, Dentsply), without anterior teeth in a conventional manner so that the hinge assembly can be placed later in the anterior teeth region.

• After processing, the dentures were retrieved, finished, and polished and then again sectioned from the midline with the help of thin disk bur.

• An orthodontic mandibular molar tube with 1-mm stainless steel wire was used to form a hinge assembly for the maxillary and mandibular sectional dentures so that the dentures can collapse at the midline.

• For maxillary denture, two mandibular molar tubes (Orthotecnho wire and Co.) were used with 1-mm stainless steel wire which was passing through the slot of the tube. The maxillary denture was placed back over the cast and these assemblies were incorporated between the two sections of the denture in the center of the palatal surface using self-cure acrylic resin and the rest of the gap created during sectioning of the maxillary denture was also filled with self-cure acrylic resin. Proper care was taken to avoid the entrapment of acrylic material inside the hinge, which can block the hinge movement of the dentures.

• For mandibular denture, one orthodontic mandibular molar tube with 1-mm stainless steel wire was used to form a hinge assembly so that the denture can collapse at the midline. This assembly was incorporated between the two sections of the denture using self-cure acrylic resin.

• The mandibular hinge denture was placed back over the master cast and the index of the mandibular denture was made with irreversible hydrocolloid (Alginate, Zelgan 2002, Dentsply) and the cast was poured with dental stone.

• Over that cast, mandibular anterior teeth were arranged back in their correct position with the help of previously made putty index. Two clasps were adapted over the adjacent teeth to retain the acrylic removable partial denture [Figure 2]. Wax-up was done and the acrylic removable partial denture was processed in a conventional acrylicization manner.

• Maxillary hinged denture and the mandibular sectional (separate anterior removable segment) and hinged denture [Figure 3] were placed in patient’s mouth.

• Patient was educated about the insertion and removal of dentures. Instructions were given to maintain the denture.

• Patient was recalled for the follow-up visits to check for the maintenance and patient’s adaptability with the dentures. First follow-up was done after 24 h of denture insertion followed by 1 week to check for the comfort and any tissue reaction. Initially, patient felt difficulty while placing and removal of the dentures from the oral cavity but with time patient got used to it. The patient was recalled after every 3 months for 1 year. Patient’s response toward the dentures was good and satisfactory.

Discussion

Several techniques have been described in the literature for the fabrication of sectional and hinged tray/complete dentures, utilizing various mechanisms for connecting each of the components. Pubmed database for the last two decades was reviewed using key words: Microstomia, hinged and sectional dentures and different techniques for patients with microstomia are found to be documented [Table 1].

Other management techniques described in the literature for patients with restricted mouth opening are surgery, use of dynamic opening devices, and modification of denture
Figure 1: (a) Maxillary and (b) mandibular sectional denture bases with occlusion rims and teeth arrangement

Figure 2: (a) Maxillary denture sectioned from the midline incorporating two hinge assemblies in the palatal region of the maxillary denture; (b) Mandibular acrylized denture with hinge assembly in anterior region. The index of the denture made and the cast obtained, anterior teeth arranged back in position with putty index to make anterior removable partial denture

Figure 3: (a) Collapsed maxillary hinged and (b) mandibular sectional and hinged complete denture with anterior removable partial denture
design. In cases where microstomia is not manageable by surgeries or dynamic opening devices, modified impression procedure and prosthesis design facilitate prosthetic rehabilitation. The denture aids for a better function, health, esthetics, and overall well-being of the patient and thus a rewarding service can be provided by the prosthodontist.

Conclusion

The reduction in maximal oral opening (microstomia) less than the normal (35-40 mm) hinders conventional prosthetic treatment of edentulous patients. It is often difficult to apply conventional clinical procedures to construct dentures for patients who demonstrate limited mouth opening. However, with careful treatment planning and prudent designing, the use of either sectional impression techniques and/or sectional dentures, many of the apparent clinical difficulties can be overcome. Here, the sectional impression procedures and the prosthesis designs are described which aid in fabrication of prosthesis for a patient with the limited mouth opening which aids for a better function, health, esthetics, and overall well-being of the patient. Simplified sectional tray design and ease of fabrication are the major advantages of this technique. This technique can be accomplished in any dental laboratory, without using complicated machinery or attachment devices for sectioning or assembling the trays/prosthesis together. The press buttons and mandibular molar bands are easily available and are easy to maintain. This technique shares disadvantages common to all sectional tray/prosthesis designs, such as additional time, labor, and materials. However, to determine the long-term success of this technique, periodic recall, maintenance, and further improvements in design are needed.

References

1. Prithviraj DR, Ramaswamy S, Romesh S. Prosthetic rehabilitation of patients with microstomia. Indian J Dent Res 2009;20:483-6.
2. Prasad R, Bhide SV, Gandhi PV, Divekar NS, Madhav VN. Prostodontic management of a patient with limited mouth opening: A Practical Approach. JIPS 2008;2:83-6.
3. McCord JF, Tyson KW, Blair IS. A sectional complete denture for a patient with microstomia. J Prosthet Dent 1989;61:645-7.
4. Naylor WP, Manor RC. Fabrication of a flexible prosthesis for the edentulous scleroderma patient with microstomia. J Prosthet Dent 1983;50:536-6.
5. Wahle JJ, Gardner LF, Fiebiger M. The mandibular swing-lock complete denture for patients with microstomia. J Prosthet Dent 1992;68:523-7.
6. Cheng AC, Wee AG, Morrison D, Maxymiw W. Hinged mandibular removable complete denture for post-mandibulectomy patients. J Prosthet Dent 1999;82:103-6.
7. Suzuki Y, Abe M, Hosoi T, Kurzt KS. Sectional collapsed denture for a partially edentulous patient with microstomia: A clinical report. J Prosthet Dent 2000;84:256-9.
8. Al-Hadi LA, Abbas H. Treatment of an edentulous patient with surgically induced microstomia: A clinical report. J Prosthet Dent 2002;87:423-6.
9. Watanabe I, Tanaka Y, Ohkubo C, Miller AW. Application of cast magnetic attachments to sectional complete dentures for a patient with microstomia: A clinical report. J Prosthet Dent 2002;88:573-7.
10. Yenisey M, Küllün T, Kurt S, Ural C. A prostodontic management alternative for scleroderma patients. J Oral Rehabil 2005;32:696-700.
11. Cheng AC, Kwok-Seng L, Wee AG, Tee-Khin N. Prosthetic management of edentulous patient with limited oral access using implant-supported prostheses: A clinical report. J Prosthet Dent 2006;96:1-6.
12. Jivanescu A, Bratu D, Negruțiu M. Prosthetic rehabilitation of a patient with scleroderma-induced microstomia. Int Poster J Dent Oral Med 2007;9:Poster382.

How to cite this article: Sharma A, Arora P, Wazir SS. Hinged and sectional complete dentures for restricted mouth opening: A case report and review. Contemp Clin Dent 2013;4:74-7.

Source of Support: Nil. Conflict of Interest: None declared.