

Prosthodontic rehabilitation of patient with marginal mandibular resection using attachment supported prostheses: A clinical report

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Abstract

Marginal mandibular resection to treat neoplasms leads to loss of alveolar bone and teeth at the affected side. Consequently patient suffers with poor masticatory performance and esthetic disfigurement, which we need to restore with the help of prosthodontic rehabilitation. The success of rehabilitation of these patients depends on strategic treatment planning and choice of most suitable treatment modality. In this article, case of a patient has been presented who underwent marginal mandibular resection and reported with many limiting factors like obliterated buccal and lingual sulci, attachment of lingual frenum and lower lip at the level of alveolar ridge and Macroglossia. Impression making and fabrication of a retentive prosthesis were the main challenges. Therefore, a modified impression technique was used to fabricate mandibular cast partial denture with extracoronary semi-precision attachments to enhance the retention of the prosthesis.

Keywords: Hemimandibulectomy, malignant tumors, mandibular deviation, semi-precision attachment

Introduction

Marginal mandibulectomies involve resection of the mandibular body with overlying soft-tissues while maintaining the inferior cortex of the mandible and its continuity.^[1] Problems associated with such defects depend on the size of the defect and its location in the arch. Anterior defects are more difficult to treat prosthodontically than posterior defects due to loss of key muscle attachments (genioglossus and geniohyoid) located in the anterior mandible that control tongue function and mobility. Limiting the normal tongue mobility may seriously compromise speech, swallowing, mastication and control of a food bolus and the ability to control a removable prosthesis.^[2]

The radical alveolectomy also presents with other challenges to rehabilitation like loss of vertical ridge height and vestibular depth. This can cause a reduction in stability of soft-tissue supported prostheses as well as the loss of load

bearing tissues available for support.^[2,3] Local and pedicle flaps are usually used for closing such defects, but they are poor prosthesis bearing surfaces due to their bulk and may impinge upon space needed for dentition. These flaps tend to displace the prosthesis as they are often sutured to movable structures such as the lips, cheeks and tongue.^[1] All these factors become detrimental to the successful rehabilitation of such patients.

This article describes rehabilitation of a patient who underwent marginal mandibular resection. Main challenges were impression making and fabrication of retentive and stable prosthesis because of inadequate denture bearing tissues, obliterated vestibules and macroglossia.

Case Report

The present case is about a 58-year-old male patient who reported to Department of Prosthodontics, All India Institute of Medical Sciences, New Delhi with the chief complaints of difficulty in chewing food, impairment of speech and unpleasing appearance of the face. Patient underwent marginal resection of mandible 4 years back from mandibular right first premolar region to that on the left side for treating well-differentiated squamous cell carcinoma of floor of the mouth. Patient's medical records did not show any history of radiotherapy or dental treatment after surgery.

Patient had asymmetrical face and decreased lip support in anterior mandibular region. Intraoral examination showed fully dentate maxillary arch. Only second and third molars were present on the both sides in the mandibular arch. Other post-resection findings were attachment of lingual frenum and lower lip at the level of the alveolar ridge, restricted tongue movement and reduced depth of labial and lingual vestibules in mandibular anterior region,

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thus, limiting the space available for the extension of the prosthesis [Figure 1a]. Macroglossia was another significant finding, as the tongue was spread to almost cover the occlusal surfaces of mandibular posterior teeth and the remaining residual ridge.

Orthopantomograph revealed marginal resection of mandible in the anterior region (Class I of Cantor and Curtis)^[4] with completely dentate maxillary arch and partially edentulous mandibular arch with only second and thirds molars remaining on both sides. Periodontal condition of remaining teeth was fair [Figure 1b].

Modified Impression Technique

Complete seating of stock impression tray was not possible for accurate recording of tissues due to obliterated sulci. Thus, it was managed by using right and left sectional stock trays which were loaded with silicone impression material (putty consistency, Aquasil, Dentsply Limited, Addlestone, UK) and were seated in mouth simultaneously. Then to take out as one piece impression, both trays were stabilized intra orally using impression compound (Y-Dents impression compound; MDM Corporation, New Delhi, India) [Figure 2a]. Diagnostic cast was obtained in type II gypsum (Kaldent; Kalabhai Karson Private Limited, Mumbai, India) [Figure 2b] and was later on used for the fabrication of a training denture base reinforced with wrought wire in the anterior midline region. Borders of the training denture were adjusted intra orally by visual examination and manipulation of tissues within physiological limits. Patient reported with tissue inflammation at follow-up visits. Denture was adjusted accordingly. Purpose of the training denture was to assess the labio-lingual space available for denture extensions in the mandibular anterior region. Maxillary impression was made with irreversible hydrocolloid (Zelgan, Dentsply limited, Addlestone, UK) and the cast was obtained.

Preparation of Abutments and Cementation of Full Metal Crowns

Mandibular right second molar and left second and third molars were prepared for full metal crowns. Right mandibular third molar was not taken as an abutment because of difficult access and high risk of injury to the adjacent soft-tissues due to large tongue. Impression of the prepared teeth was made with addition silicone material (Aquasil, limited, Addlestone, UK) in the custom tray (fabricated over diagnostic cast with proper extensions) using single step technique. Cast was poured in type IV gypsum product (Ultrarock; Kalabhai Karson Private limited, Mumbai, India). Patrix parts of the semi precision attachments (Ancora profile rod, BEGO, USA) were attached to the mesial side of wax patterns of both second molars and their parallelism was checked with the help of a dental surveyor. Full metal crowns were cemented using glass ionomer luting cement (Aquacem, Dentsply Limited, Addlestone, UK) [Figure 3a].

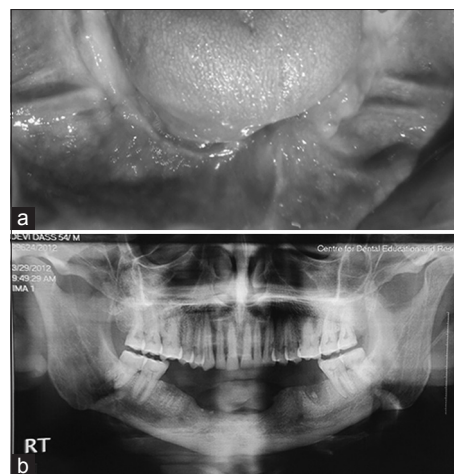


Figure 1: Obliterated anterior sulci (a), orthopantomograph showing marginal mandibular resection (b)

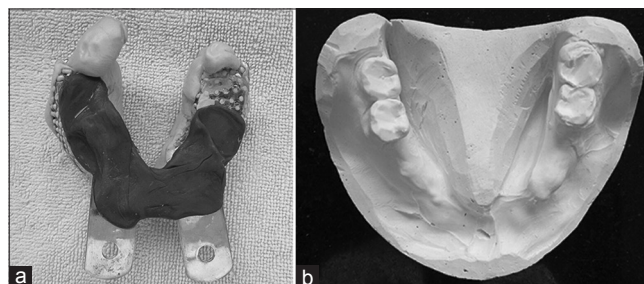


Figure 2: Joining of two sectional trays for diagnostic impression (a), diagnostic cast (b)

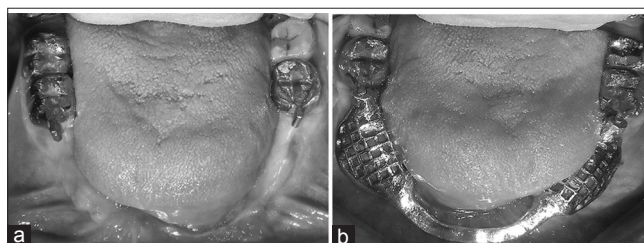


Figure 3: Metal crowns with patrix parts of attachments (a), try-in of metal framework (b)

Fabrication of Metal Framework

A custom tray was fabricated and its extensions were adjusted according to that of the training denture. Final impression for the fabrication of metal framework was made using addition silicone with a single step technique. (Aquasil, heavy body and light body, Dentsply limited, Addlestone, UK). Master cast was obtained in type III gypsum (Kalstone; Kalabhai Karson, Mumbai, India) and was duplicated to obtain the refractory cast (WiroFine, BEGO Herbst, GmbH, Germany).

Wax pattern was fabricated using bar type of major connector modified to adapt over the crest of the ridge instead of using it in the lingual vestibular region because

of the obliterated sulcus. Mesh type minor connector was adapted in the premolar and molar region and the matrix part of semi precision attachment was attached with the patrix part, followed by investing and casting procedure. The try-in of framework was carried out to verify its fit [Figure 3b]. Orientation relation record and centric relation record was used to mount the maxillary and mandibular casts. Teeth setting were carried out in bilaterally balanced occlusion to enhance the denture stability. Final try-in was carried out in the patient's mouth to evaluate denture stability, support, esthetics, occlusion and speech. Patient's consent was taken before acrylization of the trial denture. It was cured in heat cure acrylic resin (Travelon, Dentsply limited, Addlestone, UK), finished, polished and delivered to the patient [Figure 4a and b]. After the final insertion, routine hygiene instructions for the oral cavity and dentures were given.

Follow-up Visits

Patient was recalled after 24 h to reevaluate the tissues for any trauma and to check for any occlusal errors. Patient complained of slight discomfort in the anterior region that was adjusted. Patient was comfortable with the dentures at the next follow-up and was instructed to use dentures for eating regular food. Patient was satisfied with the esthetics and fit of the denture and is using the prosthesis comfortably for last 1 year.

Discussion

Major problems which a prosthodontist faces in rehabilitation of patients with mandibular defects are inadequate denture bearing area available for support, obliterated floor of mouth, lesser number of remaining teeth, poor periodontal condition of the abutments, history of radiation and associated psychological distress. Post-operative pain and long healing periods with residual defects make patients vulnerable and reduce their willingness for any further surgical options like pre-prosthetic surgery or placement of implants.^[5] All these factors compromise the design or retention and stability of the prosthesis. Under these circumstances, it becomes a daunting task to restore function and esthetics of such patients.

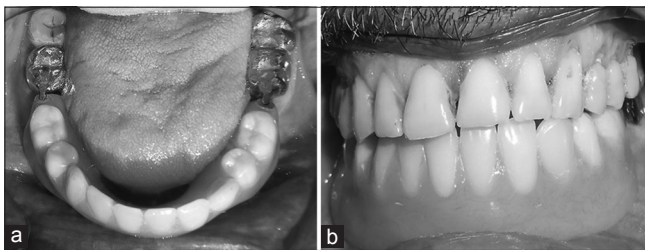


Figure 4: Intraoral view of final mandibular Prosthesis (a), post-treatment intra-oral frontal view (b)

Various treatment options which could be contemplated for treating this case were cast partial dentures, telescopic prosthesis, implant supported overdenture and implant supported fixed prosthesis.^[6,7] It was difficult to fabricate a retentive telescopic denture because of the insufficient depth of the labial and lingual vestibules. Tooth supported overdenture or use of intra radicular attachment was not opted as a treatment modality because they required intentional endodontic treatment of the remaining teeth. The patient did not give his consent for implant supported prosthesis as he was willing for non-surgical intervention only. Considering the chief complaints and expectations of the patient, treatment option that appeared most suitable to restore this case was mandibular cast partial denture with extracoronal semi precision attachments. Attachments used in the dentures enhanced the retention which was otherwise not possible without undertaking any vestibular extension procedures.

Fabrication of prosthesis with extracoronal semi precision attachments is a technique sensitive procedure as the attachments on both sides should be absolutely parallel to allow seating of the denture in the mouth. Duplication of master cast, fabrication and casting of the framework also require a lot of precision. However, it was an effort worthwhile because the final prosthesis was retentive and it helped the patient in mastication and improved his esthetics due to replacement of missing teeth and restoration of lip support in mandibular anterior region.

Conclusion

It is difficult to rehabilitate patients with mandibular defects because of various limiting factors. Choice of most suitable treatment modality can help in restoring function, esthetics and quality of life of these patients. In this article, attachments were used as a treatment modality because they enhance the retention of the removable dentures, are cost-effective and less invasive for the patient.

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