Case Report

An innovative technique for the fabrication of fixed removable guide flange prosthesis for lateral mandibular resection

Preethi Kusugal¹, V. N. Kalaivani², Abhishekha Patil³, Sushma Krishnamurthy¹, Zarir Ruttonji¹

¹Department of Prosthodontics and Crown and Bridge, Maratha Mandal’s Nathajirao G. Halgekar Institute of Dental Sciences and Research Centre, Belgaum, ²Private Practice, Prosthodontics and Implantology, Thennamanadu, Orathanadu Taluk, Thanjavur District, Tamilnadu, ³Senior Dental Health Officer, Government Taluka General Hospital, Deodurga, Raichur District, Karnataka, India

ABSTRACT

Rehabilitation of patients with a severe mandibular defect is challenging to prosthodontists. The esthetic and functional rehabilitation of patients with lateral mandibular resection is difficult due to the lack of supporting tissues for the prosthesis. The mandibular deviation furthermore results in facial asymmetry and unstable occlusion. This case report describes an innovative technique to rehabilitate a patient with lateral mandibular resection using customized access post attachment system to retain guide flange prosthesis for reducing mandibular deviation.

Key Words: Hemimandibulectomy, prosthesis, resection

INTRODUCTION

The surgical resection of the malignant tumors invading mandible often leads to complex clinical scenario. Disabilities resulting from the lateral resection lead to severe mandibular dysfunction than the radicular surgeries. Swallowing, speech, mandibular movements, mastication, control of saliva, respiration, and psychic functioning are adversely affected by mandibular resection.[1-7]

Rehabilitation of such patients requires meticulous treatment planning with fabrication of interim guide flange prosthesis to reduce mandibular deviation followed by a well designed definitive prosthesis. The clinical objectives for such patients includes (1) to record the teeth and myodynamics of remaining postsurgical tissues, (2) to reduce the deviation of the mandible and minimize the resistance from postsurgical tissue scarring, (3) to record the unilateral movements of the remaining mandible in relation to maxilla to establish occlusion.[8]

A number of treatment modalities are suggested which includes intermaxillary fixation,[9] maxillary retained palatal guidance prosthesis, mandibular retained guidance prosthesis,[10,11] implant supported mandibular prosthesis,[6,12,13] if there is sufficient available bone. However, if there is only soft tissue reconstruction, the prosthesis relies mainly on the remaining teeth for the support.
CASE REPORT

A male patient aged about 47 years was referred to the Department of Prosthodontics, Maratha Mandal’s NGH Institute of Dental Sciences and Research Centre, Belgaum with a chief complaint of deviation of the mandible. A thorough case history revealed that the patient had undergone segmental mandibular resection from the left condyle to the parasymphysial region affected by squamous cell carcinoma a year ago. Orthopantomogram revealed discontinuity in the left mandible with loss of left condylar and coronoid process, ramus, angle of the mandible, premolars, and molars. Intraoral examination revealed free fibula graft showing satisfactory healing with obliteration of buccal and lingual sulci. Anterior open-bite was observed because of the frontal rotation of the mandible. There was marked deviation of the mandible toward the defect side [Figure 1]. The patient was not able to hold the mandible in stable occlusal position. There was no history of inter-maxillary fixation. It was classified as Class II according to the recent classification given by Brown. The treatment plan for this patient was mainly aimed at reduction of mandibular deviation by giving guidance prosthesis with correction of open bite and to achieve stable occlusion.

Procedure

Maxillary and mandibular diagnostic impressions were made using irreversible hydrocolloid. Tentative maxillo mandibular relation was recorded. An inter-rim guide flange was fabricated with self cure clear acrylic resin (Dental Products of India, Mumbai, Maharashtra, India) to guide the deviated mandible. The guide flange had the functionally generated platform on the palatal side of maxillary right posterior teeth. After 3 months, the patient was able to move the mandible more easily toward right side into maximum intercuspation. Then, the mandibular teeth were prepared, and impressions were made using elastomeric impression material (Reprosil, Dentsply, USA). The master casts were poured using Type IV die stone (Pearl Stone, Asian chemicals, Gujarat, India). Vertical dimension at rest and occlusion was recorded, and casts were mounted on Hanau Wide-Vue articulator in centric relation using facebow. Wax patterns were made for all the teeth. On the other side, putty index of access post (Essential Dental Systems, USA) was made [Figure 2]. Wax patterns of access post were attached to the connector area on mesial and distal of the second mandibular premolar [Figure 3]. Metal copings were casted using lost wax technique. After checking the fit of the metal copings, the extent to which the patient can move the mandible laterally for maximum intercuspation was recorded with polyether bite registration material (Ramitec, 3M ESPE, USA). The ceramic build up was done. The occlusion was verified in bisque trial. The final crowns were cemented with casted access
post [Figure 4]. Modeling wax No. 2 (The Hindustan Dental Products, Hyderabad, India) was adapted over the cast to prepare guide flange [Figures 5 and 6]. A guide flange was fabricated with heat cure acrylic resin (Dental Products of India, Mumbai) which was retained by the customized access post attachments on the buccal aspect of the second premolar without any active contact on the teeth [Figure 7]. Nylon caps were secured over the attachments and picked up by the guide flange with the help of pattern resin.

**DISCUSSION**

Patients with mandibular resections shows excessive morbidity and such patients should be intervened at an early stage to achieve favorable prognosis. The success of prosthetic rehabilitation depends on size and extension of the defect, myodynamics of the soft tissue, proprioception of the patient, number of remaining teeth for the support, extent of mouth opening, and severity of mandibular deviation. After surgical resection, if the wound is closed primarily without reconstruction, the mandible retracts and deviates more severely toward the defect side. The mandibular resection closed by free grafts shows lesser mandibular deviation. The loss of muscles of mastication and neuromuscular reflex on the defect side results in frontal rotation of the remaining mandible and the entire envelop of motion is seen towards defect side which results in loss of occlusal contact. Comprehensive therapy includes muscle reprogramming exercises along with the guidance prosthesis. Many authors have advocated the use of intermaxillary fixation immediate postoperatively. Aramany and Myers have reported that intermaxillary fixation done during the first 6 postoperative weeks will reduce the degree of deviation. Sahin et al. advocated the fabrication of cast metal guidance prostheses with supporting flanges for reducing the mandibular deviation and maintaining the cheek and the tongue out of the path of closure in segmental resections. In this patient, as there was no bone reconstruction of the resected area, the support for any sort of removable prosthesis was poor and as the patient was more concerned about esthetics and mastication, a fixed prosthesis was planned on the mandibular teeth with the correction of open bite. The attachments were placed on the fixed partial denture of the mandibular teeth. The retention of the guide flange was much improved because of the attachments and patient was able to hold the mandible without any active contact.
in stable occlusion. The muscles were reprogrammed and the myotonicity of mandibular musculature was well considered. The patient was followed up for 2 years. Since the guide flange was made removable, the patient was more comfortable, and the flange could be removed as and when required without any inference during mastication.

CONCLUSION

A simple and innovative way of customizing the access postattachments to retain mandibular guide flange has been presented. It is cost-effective and can be easily fabricated. There is psychological benefit for the patient with enhanced retention of guide flange prosthesis. It also helps in reducing mandibular deviation effectively and achieving stable occlusion.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or nonfinancial in this article.

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