

## Case Report

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

Preethi Kusugal<sup>1</sup>, V. N. Kalaivani<sup>2</sup>, Abhishekha Patil<sup>3</sup>, Sushma Krishnamurthy<sup>1</sup>, Zarir Ruttonji<sup>1</sup>

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

Received: August 2018  
Accepted: December 2018

**Address for correspondence:**  
Dr. Preethi Kusugal,  
Department of  
Prosthodontics and Crown  
and Bridge, Maratha  
Mandal's Nathajirao  
G. Halgekar Institute  
of Dental Sciences  
and Research Centre,  
Belagaum, Karnataka, India.  
E-mail: preethikusugal@  
gmail.com

## 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.<sup>[1-7]</sup>

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.<sup>[8]</sup>

A number of treatment modalities are suggested which includes intermaxillary fixation,<sup>[9]</sup> maxillary retained palatal guidance prosthesis, mandibular retained guidance prosthesis,<sup>[10,11]</sup> implant supported mandibular prosthesis,<sup>[6,12,13]</sup> 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.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Kusugal P, Kalaivani VN, Patil A, Krishnamurthy S, Ruttonji Z. An innovative technique for the fabrication of fixed removable guide flange prosthesis for lateral mandibular resection. Dent Res J 2020;17:80-3.

Access this article online



Website: [www.drj.ir](http://www.drj.ir)  
[www.drjjournal.net](http://www.drjjournal.net)  
[www.ncbi.nlm.nih.gov/pmc/journals/1480](http://www.ncbi.nlm.nih.gov/pmc/journals/1480)

## 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 parasymphiseal 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.<sup>[14]</sup> 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-View 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



Figure 1: Pretreatment view.



Figure 2: Putty index and wax pattern of access post.



Figure 3: Wax pattern.

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.<sup>[5]</sup> After surgical resection, if the wound is closed primarily without reconstruction, the mandible retrudes and deviates more severely toward the defect side.<sup>[1,4,11]</sup> 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.<sup>[4]</sup> Comprehensive therapy includes muscle reprogramming exercises along with the guidance prosthesis.<sup>[11]</sup> Many authors have advocated the use of intermaxillary fixation immediate postoperatively. Aramany and Myers<sup>[9]</sup> have reported that intermaxillary fixation done during the first 6 postoperative weeks will reduce the degree of deviation. Sahin *et al.*<sup>[11]</sup> 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



**Figure 4:** Casted access post.



**Figures 5:** Dental stone model for the fabrication of guide flange.



**Figures 6:** Fabrication of guide flange using wax.



**Figure 7:** Guide flange placed on access post.

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.

### Financial support and sponsorship

Nil.

### 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.

## REFERENCES

1. Leong EW, Cheng AC, Tee-Khin N, Wee AG. Management of acquired mandibular defects – Prosthodontic considerations. Singapore Dent J 2006;28:22-33.
2. Cantor R, Curtis TA. Prosthetic management of edentulous mandibulectomy patients. I. Anatomic, physiologic, and psychologic considerations. J Prosthet Dent 1971;25:446-57.
3. Schrag C, Chang YM, Tsai CY, Wei FC. Complete rehabilitation of the mandible following segmental resection. J Surg Oncol 2006;94:538-45.
4. Beumer JI, Curtis TA, Marunick MT. Maxillofacial Rehabilitation: Prosthodontic and Surgical Consideration. St. Louis: Ishiyaku EuroAmerica; 1996. p. 113-24, 184-8.
5. Desjardins RP. Occlusal considerations for the partial mandibulectomy patient. J Prosthet Dent 1979;41:308-15.
6. Oelgiesser D, Levin L, Barak S, Schwartz-Arad D. Rehabilitation of an irradiated mandible after mandibular resection using implant/tooth-supported fixed prosthesis: A clinical report. J Prosthet Dent 2004;91:310-4.
7. Moore DJ, Mitchell DL. Rehabilitating dentulous hemimandibulectomy patients. J Prosthet Dent 1976;35:202-6.
8. Cantor R, Curtis TA. Prosthetic management of edentulous mandibulectomy patients. II. Clinical procedures. J Prosthet Dent 1971;25:546-55.
9. Aramany MA, Myers EN. Intermaxillary fixation following mandibular resection. J Prosthet Dent 1977;37:437-44.
10. Schneider RL, Taylor TD. Mandibular resection guidance prostheses: A literature review. J Prosthet Dent 1986;55:84-6.
11. Sahin N, Hekimoğlu C, Aslan Y. The fabrication of cast metal guidance flange prostheses for a patient with segmental mandibulectomy: A clinical report. J Prosthet Dent 2005;93:217-20.
12. Garrett N, Roumanas ED, Blackwell KE, Freymiller E, Abemayor E, Wong WK, *et al.* Efficacy of conventional and implant-supported mandibular resection prostheses: Study overview and treatment outcomes. J Prosthet Dent 2006;96:13-24.
13. Adell R, Svensson B, Bågenholm T. Dental rehabilitation in 101 primarily reconstructed jaws after segmental resections – Possibilities and problems. An 18-year study. J Craniomaxillofac Surg 2008;36:395-402.
14. Brown JS, Barry C, Ho M, Shaw R. A new classification for mandibular defects after oncological resection. Lancet Oncol 2016;17:e23-30.