

## Case Report

# Definitive guiding flange prosthesis: A definitive approach in segmental mandibulectomy defect

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## ABSTRACT

Mandibular discontinuity defects following a segmental mandibulectomy defects present a major challenge to the rehabilitation team. With no immediate intervention to rehabilitate the patient, definitive mandibular guidance prostheses with a metal guiding flange and acrylic teeth on the resected side can be used successfully to stabilize the occlusion and correct the deviation. The present case report describes the prosthodontic rehabilitation of a patient with a segmental mandibulectomy using a mandibular prosthesis with a metal guide flange and a maxillary stabilizing metal framework.

**Key Words:** Ameloblastoma, case report, segmental mandibulectomy

## INTRODUCTION

Ameloblastoma is a highly aggressive odontogenic tumor of epithelial origin commonly found in posterior mandible and treated with the surgical excision.<sup>[1]</sup> The treatment of malignant tumors of the oral cavity often requires the resection of structures essential for mastication, deglutition, and speech. As a general rule, the resection of a portion of a mandible without loss of mandibular continuity is not as debilitating as a resection that compromises the mandibular continuity.<sup>[1,2]</sup> Loss of mandibular continuity causes deviation of remaining mandibular segment(s) toward the defect and rotation of the mandibular occlusal plane inferiorly. The degree of deviation is dependent on several factors such as the location and extent of osseous and soft tissue resection, the method of surgical site closure, degree of impaired tongue function, the

presence and condition of the remaining natural teeth, the degree to which nerve innervations has been involved, and the use of adjunctive procedures such as radiation therapy and the timing of prosthodontic treatment.<sup>[3-6]</sup> In a segmental mandibulectomy, masticatory function is compromised because of muscular imbalance resulting from unilateral muscle removal, altered maxillomandibular relationship, and decreased tooth-to-tooth contacts.<sup>[2]</sup> Mandibular discontinuity defects present a major challenge to the rehabilitation team.

Various designs of prostheses either mandibular-based or palatal-based, anchored on natural teeth or the denture flange have been employed to reestablish normal mandibular function.<sup>[5,6]</sup> This case report

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describes the prosthodontic rehabilitation of a patient with a segmental mandibulectomy using a mandibular prosthesis with a metal guide flange and a maxillary stabilizing metal framework.

## CASE REPORT

A 35-year-old female patient reported to the clinic complaining of deviation of mandible to the left when closing her mouth and inability to bite properly, following mandibular surgery 18 months ago. Preoperative history and examination revealed that the patient was diagnosed with a follicular ameloblastoma involving the left side of the mandible. The patient had undergone surgical removal of the left half of mandible, i.e., segmental resection of the sub condylar region sparing the condyle and coronoid process to the midline. Postsurgical radiographs revealed no grafts were placed to reconstruct the defect, but the discontinuity of the mandible was restored using bone plate [Figure 1].

Intraoral examination revealed thick freely movable soft tissue scar formation, loss of alveolar ridge, and obliteration of buccal and lingual sulci on the left side. On opening, the mandible showed about 8–9 mm of deviation from midline toward the resected side due to the effect of normal right mandibular depressor muscle [Figure 2]. The patient was unable to achieve normal medio-lateral position of the mandible and repeat this position consistently for adequate mastication. On the basis of clinical and radiographic examination, the patient was classified as Class III (substantially compromised) according to prosthodontic diagnostic index resources for partial edentulous patients described by McGarry *et al.*<sup>[5]</sup> No immediate treatment such as inter-maxillary fixation and/or physiotherapy program was provided to the patient.

Therefore, dual purpose definitive metal guidance prosthesis was fabricated to provide the patient with proper function and esthetics and to re-educate the mandibular muscles into an acceptable occlusal relationship.

### Designing of the prosthesis

A definitive cast partial denture with a metal guiding flange and acrylic teeth was planned. Fabrication began with the formation of suitable mandibular and maxillary casts. A wax interocclusal record was obtained by guiding the mandible into the best possible occlusal relationship. It was used to mount the diagnostic casts on a semi-adjustable articulator. The occlusal relationship of the casts was carefully

examined. The diagnostic casts were surveyed and undercuts were blocked. The design of the partial denture framework was outlined to prevent the movement of the individual teeth.

The definitive mandibular guidance removable partial denture framework consisted of modified major connector i.e., lingual plate for the remaining anterior teeth and lingual bar for the posterior teeth, two embrasure clasps on posterior teeth on the nondefect side, and saddle type of minor connector [Figure 3]. The guide flange was extended 7–10 mm laterally and superiorly on the buccal aspects of the bicusps and molars from the shoulder portion of the direct retainer on the nondefect side. This flange would engage the maxillary teeth during the mandibular closure, thereby directing the mandible into an appropriate intercuspal position.<sup>[6]</sup> The angulations of the guiding ramp were fabricated using wax records of the posterior teeth with approximately 3 mm



**Figure 1:** Postsurgical radiograph showing bone plate joining the discontinuity.



**Figure 2:** Intraoral view showing loss of alveolar ridge on left side with vestibular obliteration. Arrows showing thick freely movable tissues and note the deviation of the mandible.

separation and mandible deflected maximally toward the un-resected side.

It was necessary to design a maxillary framework to prevent the maxillary teeth and gingiva from trauma when the patient closed her mouth. It also resisted the forces of arch contracture and maintained the maxillary teeth on the nondefect side in proper alignment until appropriate intercuspal position was achieved. The maxillary framework consisted of anteroposterior palatal strap and two Akers clasps on right and left posterior teeth, respectively. After the designing, mouth preparation and final impression procedure, the partial denture framework was fabricated. The partial denture framework was verified in the mouth and adjusted using rouge and chloroform or disclosing wax [Figure 4].

After the metal framework try in, altered cast was made for the lower edentulous area. Following bite registration, casts were mounted onto a semi-adjustable articulator, and tooth set-up was carried out. Waxed

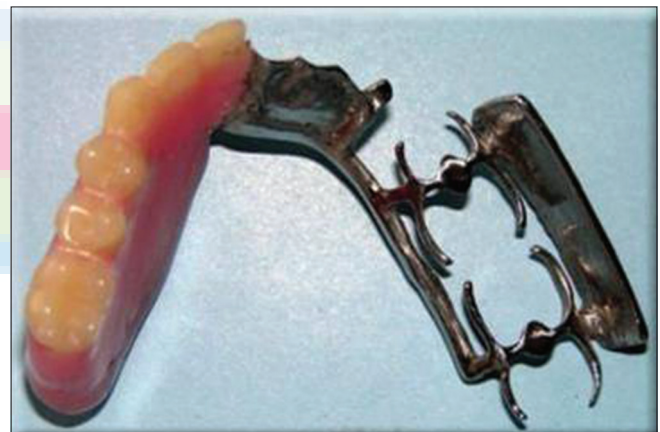
removable partial denture was tried in and checked for occlusion and comfort in the patient mouth. The removable partial denture was processed in heat-polymerized acrylic resin (Dental Products of India, Mumbai, India) [Figure 5] and checked for occlusion, the angle of the guiding flange and proper seating of the prostheses before the final insertion [Figure 6].

## DISCUSSION

Loss of mandibular continuity causes deviation of remaining mandibular segment(s) toward the defect and rotation of the mandibular occlusal plane inferiorly.<sup>[3-5]</sup> The usual result of the mandibular resection with disarticulation is a shift of the residual fragment to the resected side. This mandibular shift is due to the uncompensated influence of the contra-lateral musculature, particularly the internal pterygoid muscle.<sup>[7]</sup> If this influence is left uncompensated, the contraction of the cicatricial tissue on the operated side will fix the residual fragment in its deviated position. This situation leads to facial deformity and functional loss.<sup>[3]</sup>



**Figure 3:** Design of lower removable partial denture and guide flange.



**Figure 5:** Final prosthesis, note the absence of the second molar in the prosthesis to prevent unwanted leverage.



**Figure 4:** Mandibular guide flange framework try in.



**Figure 6:** Final prosthesis, intraoral view, and note the correction of the deviation and midline.

When a segment of the mandible is removed, immediate reconstruction is usually recommended to improve both facial symmetry and masticatory function.<sup>[8,9]</sup> The deviation caused by the surgical resection can be corrected or reduced by providing immediate treatments such as inter-maxillary fixation and exercise program to loosen scar contracture, reduce trismus, and improve maxillomandibular relationship.<sup>[6]</sup>

Mandibular guidance therapy begins after the postsurgical sequel has subsided. There are number of methods that will reduce mandibular deviation include inter-maxillary fixation and the use of mandibular and palatally-based guidance. The removable partial prosthesis is designed according to the patient's needs. For the best results, these methods and restorations should be combined with well-organized mandibular exercise regime.<sup>[3]</sup>

The success of the mandibular guidance rehabilitation depends on the nature of the surgical defect, patient co-operation, and prosthetic management with early physiotherapy program.<sup>[6]</sup> The factors of concern before treating the present case were that no immediate treatments such as inter-maxillary fixation or physiotherapy was given, the amount of time elapsed from surgery, delay in rehabilitation procedures, and loss of muscle co-ordination in the lower jaw, which prevented the patient normal functions. In spite of all the factors that were of concern for the success of guidance therapy, the factors that helped us to achieve the desired outcome were the patient motivation, remaining of tongue, floor of the mouth, and its contiguous soft tissues. The patient retained all her teeth, except those on the resected side that helped her to have better proprioceptive sense and achieve the functional position after the insertion of the prosthesis.

From the treatment modality opted for this particular patient, it could be argued that long-standing nontreated mandibulectomy cases are difficult but could be managed with success with mandibular guidance prosthesis with some modification in the design of the prosthesis. Definitive mandibular guidance therapy would help the patients in such cases to establish an acceptable occlusion by re-educating the mandibular muscles and undergo normal function and mastication.

Frequent follow-ups are mandatory and it should be noted whether continuous wear would help the patient to improve further in achieving proper centric occlusion without guiding flange and whether she would be able to retain that ability once the guiding flange is discontinued. If the patient can achieve

optimum occlusion and normal function without the help of the guide flange, it should be reduced in steps, and the prosthesis can be used as a cast partial denture.

## CONCLUSION

Rehabilitation of a long-standing segmental mandibulectomy case without any early intervention is a challenging task, especially due to the lack of bony support and loss of muscle co-ordination. Mandibular guidance prostheses are normally utilized on an interim basis. However, in a long-standing case, definitive mandibular guidance prosthesis with a metal guiding flange and acrylic teeth on the resected side to stabilize the occlusion can be used successfully to correct the deviation and achieve acceptable occlusion for normal mandibular function.

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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 non-financial in this article.

## REFERENCES

1. Taylor TD, editor. Diagnostic considerations for prosthodontic rehabilitation of the mandibulectomy patient. In: Clinical Maxillofacial Prosthetics. 1<sup>st</sup> ed. Chicago: Quintessence Publishing; 2000. p. 155-70.
2. Patil PG, Patil SP. Guide flange prosthesis for early management of reconstructed hemimandibulectomy: A case report. *J Adv Prosthodont* 2011;3:172-6.
3. Robinson JE, Rubright WC. Use of a guide plane for maintaining the residual fragment in partial or hemimandibulectomy. *J Prosthet Dent* 1964;14:992-9.
4. Sahin N, Hekimoglu 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.
5. McGarry TJ, Nimmo A, Skiba JF, Ahlstrom RH, Smith CR, Koumjian JH, *et al.* Classification system for partial edentulism. *J Prosthodont* 2002;11:181-93.
6. Sahu SK. Mandibular guide flange prosthesis following mandibular resection; a clinical report. *J Clin Diagn Res* 2010;4:3266-70.
7. Gupta SG, Sandhu D, Arora A, Pasam N. The use of mandibular guidance prosthesis to correct mandibular deviation following hemimandibulectomy – Case reports. *Indian J Dent Res Rev* 2012;2:71-3.
8. Aramany MA, Myers EN. Intermaxillary fixation following mandibular resection. *J Prosthet Dent* 1977;37:437-44.
9. Mathew A, Thomas S. Management of a hemi-mandibulectomy defect with a definitive guiding flange prosthesis. *Pushpagiri Med J* 2012;3:132-4.