



## Case Report

# Use of mandibular guidance prosthesis with the buccal guide flange in hemimandibulectomy patient

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### ABSTRACT

Hemi-mandibulectomy causes the remaining segment of the mandible to deviate towards the resected side, this is due to the loss of soft and hard tissues on the resected side. Immediate surgical reconstruction will improve the prognosis of the rehabilitation procedures. This case report presents a patient with hemimandibulectomy defect on the left side was discussed. The patient was able to bring the mandible in proper occlusal relationship with the maxilla but was not able to maintain it for masticatory purposes. Therefore he was rehabilitated by a mandibular guide flange. Rehabilitation of the defect by mandibular guide flange will help in maintaining a proper occlusal relationship of the mandible for improved vertical stroke and chewing efficacy.

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## 1. Introduction

Odontogenic tumor-like ameloblastoma which is often aggressive, usually occurs in the posterior mandibular region which requires surgical resection of part or whole of the mandible.<sup>1</sup> Mandibular resection without continuity defect is less debilitating compared to mandibular resection with continuity defect i.e mandibular discontinuity.<sup>2</sup> Some of the problems associated with continuity defect of the mandible are deviation, retrusion, and rotation of the residual segment of the mandible. Deviation occurs toward the resected side, rotates inferiorly upon closure, and retruded in position.<sup>2-4</sup> Bone graft reconstruction or reconstruction using metal plates for mandibular continuity at the time of surgery can improve the rehabilitation of such patient.<sup>2,3</sup> However when left without treatment, there will be loss of occlusion due to deviation of the residual mandible and anterior open bite that can affect the patients' masticatory function and esthetics.<sup>2,3,5</sup> This is due to an imbalance in muscle function due to removal of the muscle

on one side, change in jaw relationship, and reduced tooth contacts. Even though immediate reconstruction aims at improving the arch relationship, facial symmetry, and occlusion, however, the function of the muscle often remains compromised.<sup>6,7</sup> Even though it is challenging task, such patient can be rehabilitated by using prosthesis which may be palatal or mandibular based guidance prosthesis.<sup>3</sup> In a mandibular guidance prosthesis, the buccal guide flange is attached to the mandibular removal prosthesis on the non-resected site which extends superiorly to the maxillary teeth and guide the mandible laterally and superiorly into the proper occlusion.<sup>5</sup> The flange maintains the mandible in proper position for vertical masticatory stroke and prevent its deviation.<sup>4,8-10</sup> The extension may be made in acrylic resin, heavy wire loop or cast in alloy.<sup>9-15</sup>

## 2. Case Report

A male patient of 47-years old had reported to the Department of Prosthodontics for the rehabilitation of the mandibular deviation following a Hemi-mandibulectomy on the left side of the jaw. The patient gave a history

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that he was diagnosed with the follicular ameloblastoma of the left mandible seven months back. The patient had undergone surgical removal of the tumor, during which hemi-mandibulectomy (from the left condyle to the 33 region) was done and reconstructed with pectoralis flap.

Intraoral examination showed, movable soft tissues and scar formation, absence of alveolar ridge, and obliteration of buccal and lingual sulci on the left side of the mandibular region (distal to 32) (Figure 1). There was a deviation on the mandible towards the resected side by about 7mm and the patient was able to achieve appropriate maxillomandibular relationship but was not able to maintain the position for mastication.

Primary impressions were made with irreversible hydrocolloid impression material by using stock tray and poured in Type III dental stone. For secondary impression custom-made tray was fabricated from auto-polymerizing acrylic resin on the primary cast. Secondary impressions were made from polyvinyl siloxane for definitive casts over which the cast frameworks would be designed. The definitive cast was then examined to evaluate the path of insertion, desirable and undesirable undercuts using a surveyor, after which the wax pattern of the frameworks was made on the refractory cast (Figure 2). U-shaped loop was waxed on the area buccal to the edentulous area over the 46 tooth region to retain the guiding flange.

Casting of the framework was done in base-metal alloy, the prosthesis was finished, polished, and evaluation was done intraorally. The RPD framework was evaluated intraorally for proper fit as shown in Figure 3, and centric occlusion was recorded in occlusal recording wax by guiding the mandible into the best possible occlusal relationship. The casts were mounted on a semi-adjustable articulator and tooth was arranged in the 46 regions. The RPD was processed in heat-activated acrylic resin. The RPD was seated intraorally, impression compound was softened and moulded on the serrated U-shaped loop for intraoral functional molding of the guiding flange that extended laterally and superiorly up to the maxillary buccal sulcus. Subsequently, the guiding flange was flaked and processed with heat-activated acrylic resin. The guiding flange extends superiorly from the buccal clasp on the mandibular 2<sup>nd</sup> premolar and 2<sup>nd</sup> molars along with the U-shaped loop (Figure 4).

### 3. Discussion

The extent and location of the tumor will determine the surgical treatment whether it can go for marginal resection, segmental resection, or total mandibular resection.<sup>2</sup> The mandibular continuity defect causes deviation and rotation of the residual segment of the mandible towards the resected side. This is due to the loss of both hard and soft tissues on the resected site.<sup>2</sup>



Fig. 1: Intraoral view of the patient.



Fig. 2: Wax pattern fabrication on the refractory cast.



Fig. 3: Intraoral fitting of metal framework



**Fig. 4:** Final prosthesis with guiding flange extending superiorly from the buccal clasp.

Immediately after resection, reconstruction should be done to bring about improvement in the rehabilitation treatment for symmetry of the face as well as function. Although with the advancement in surgical reconstructive techniques and prosthodontic rehabilitation, more than 50% of head and neck reconstruction patients with cancer still have difficulty in masticatory function.<sup>6,7</sup> Dental implants can be used for replacing the missing teeth in mandibulectomy patient who has been reconstructed by bone graft, waiting time is required for complete healing of the osseous graft, in such cases, the mandibular guide flange can be given to reduce the deviation, rotation as well as improve the masticatory function.<sup>16</sup>

In this present study, since the patient did not undergo any hard tissue reconstruction, therefore implant cannot be placed on the resected site. There was only movable soft tissue on the resected site, therefore replacement of the missing teeth cannot be done. The mandibular guide flange was fabricated only to prevent deviation and to maintain the position of the mandible in proper occlusal relationship with the maxilla, improve masticatory efficacy as well as replacement of missing tooth on the non- resected site.

The buccal flange which extends vertically from the mandibular guide prosthesis on its buccal side and contacts opposing maxillary teeth buccally helps in maintaining the mandible in proper occlusal relationship to the maxilla and also to improve the chewing efficiency.<sup>6,7</sup>

The patient was able to bring the teeth into proper occlusal relationship, but not able to maintain that position. Therefore, a mandibular guide flange was given together with denture, replacing the missing tooth on the non- resected side. This prosthesis prevents mandibular deviation and aids in proper mandibular movement. The flange extends from the 2<sup>nd</sup> premolar to 2<sup>nd</sup> molar and connected to the replaced tooth along the serrated U-shaped loop, for proper support and attachment of the guide flange.

Connection with replaced tooth prevents food impaction between the tooth and the flange, as well as it provides support for the flange. It was retained by two circumferential clasp on the abutment teeth adjacent to the edentulous area i.e., the 2<sup>nd</sup> premolar and 2<sup>nd</sup> molar, with mesial rest on 2<sup>nd</sup> molar and distal rest on 2<sup>nd</sup> premolar. A mesial rest was also provided over the 1<sup>st</sup> premolar to provide additional support and also to prevent flexing of the prosthesis. The reciprocating effect was provided by the lingual plate which extends along the lingual surface of the remaining mandibular teeth on the non resected site. The lingual plate besides providing reciprocating to the buccal clasp, also provides rigidity, maximum support from both the ridge and the teeth, and an increase in retention as well as maximum stabilization.

Thus mandibular guide flange acts as a training device which can be given in the second week after surgery for its maximum effectiveness, prevention of mandibular deviation as well as to maintain the proper mediolateral relationship of the mandible to maxilla for proper mastication.

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None.

#### 5. Conflict of Interest

None.

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