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## Rehabilitation of a Hemimandibulectomy Patient with a Guiding Flange Prosthesis - A Clinical Case Report

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### **Abstract:**

*Mandible, the lower jaw creates peripheral boundaries of floor of the oral cavity and most common site for intraoral tumors which often requires the resection of large portions of it. Loss of the continuity of the mandible destroys the balance and the symmetry of mandibular function, leading to altered mandibular movements and deviation of the residual fragment towards the surgical side.*

*In the following case an acrylic Guiding Flange Prosthesis was given to a patient who underwent a hemi section of the mandible, for the treatment for Ameloblastoma. The prosthesis helped the patient moving the mandible normally without deviation during functions like speech and mastication.*

**Keywords:** Ameloblastoma, Hemimandibulectomy, Deviation of the mandible, Guiding Flange Prosthesis, Rehabilitation.

### **1. Introduction**

The management of tumors associated with the tongue, mandible, and adjacent structures becomes a difficult challenge for a surgeon, radiologist to control the primary disease, and to the Prosthodontist for rehabilitation following treatment.<sup>i</sup>

Mandible is the most common site for intraoral tumors, which often requires the resection of large portions of the mandible. Disabilities resulting from such resections include impaired speech, difficulty in swallowing and deviation of mandible during functional movements and severe cosmetic disfigurement. Surgical reconstruction of mandibular discontinuity defects involves placing autogenous graft, allogeneic graft, xenograft, or alloplastic implants such as plastics, silicone, stainless steel, vitallium, and titanium.<sup>ii</sup>

Management of discontinuity defects aims in restoration of mastication within the unique movement capabilities of the residual function in the mandible. The literature shows the varying designs of Guiding Flange Prostheses that can be mandibular based or palatal based, it may be anchored to natural teeth or the denture flange.<sup>i-iii</sup> These have been employed to reduce or minimize mandibular deviation.

Robinson et al.<sup>iv</sup> in 1964 stated that fabrication of a provisional Guiding Flange Prosthesis facilitates the fabrication of a definitive restoration. The design of framework of Guiding Flange Prosthesis should be decided by basic prosthodontic design.

The following case report presents one such case of hemimandibulectomy which has been rehabilitated using a mandibular Guiding Flange Prosthesis.

### **2. Case Report**

A 64 year old female patient who underwent hemi-mandibulectomy due to Ameloblastoma 1 year back reported to Govt Dental College & Hospital, Aurangabad, for prosthetic rehabilitation. The patient had undergone hemi-mandibulectomy involving the left condyle to the left parasymphiseal region. Clinical examination revealed severe deviation of the mandible towards the resected site

with lack of proper contact between maxillary and mandibular teeth. The intraoral examination showed thick, freely movable soft tissues with scar formation, loss of alveolar ridge and obliteration of buccal and lingual sulci in the left half of mandibular region. Deviation of mandible was observed towards the side of defect which was about 10 - 12mm from midline on 40 mm of mouth opening due to the action of the right mandibular depressor muscles which were normal [Fig 1].



Figure 1: Deviation of the residual mandible towards surgical defect upon closing

The patient was not able to achieve an appropriate mediolateral position of the mandible and was unable to repeat this position consistently for adequate mastication. On the basis of clinical and radiographic examination the patient was classified as Class III Mandibular defect according to Cantor and Curtis's classification of mandibular defects. Based on the clinical situation, a palatal based guiding prosthesis was planned.

Two sets of the maxillary and mandibular preliminary impressions were recorded using stainless steel stock trays with irreversible hydrocolloid impression material (Dentalgin; Prime dental products, Mumbai, India). The mandibular stock tray was modified by trimming the buccal flanges to make the mandibular impression. The impressions were poured with Type III gypsum material (Kalstone; Kalabhai Karson, Mumbai, India) and casts were retrieved.

The maxillomandibular relations were recorded, using wax bite to measure the deviation of the mandible accurately. The maxillomandibular relations were transferred on to the articulator. Another set of casts were mounted on articulator with maximum intercuspation between the Maxillary and Mandibular teeth. A single thickness modeling wax (Modeling wax; Deepti Dental Products, Ratnagiri, India) was adapted on the maxillary cast covering the entire hard palate up to the occlusal surfaces of the right posterior teeth and subsequently acrylized using heat-polymerized clear acrylic (DPI Heat cure clear; Dental products of India, Mumbai, India) resin to make the maxillary stabilization plate [Fig 2].



Figure 2: Maxillary stabilization plate.

The palatal flange was waxed-up with modeling wax around the wire substructure and subsequently acrylized with clear heat-polymerized acrylic resin to make the Guiding Flange Prosthesis. The Guiding Flange Prosthesis and the maxillary stabilization plate were finished using No. 120 grits and paper and polished with lathe buff [Fig 3].



Figure 3: Guide flange on acrylic framework with retentive wrought wires (C clasp and Adam's clasp).

The Guiding Flange Prosthesis was tried in the patient's mouth and the initial stability and retention was checked. The inclination of the guide-flange was adjusted by selectively trimming the teeth-contacting surface & adding the auto-polymerizing clear acrylic resin (DPI Cold cure clear; Dental products of India, Mumbai, India) wherever required. Thus the smooth gliding flange surface was developed intraorally to guide the mandible into a definite closing point in occlusion [Fig4&5].



Figure 4



Figure 5

Guide flange prosthesis guiding residual mandible to occlusion.(Fig 4.& Fig 5.)

The flange height was adjusted in such a way that it guided the mandible from large opening position to the maximum intercuspation in a smooth path [Fig 6].



Figure 6: Residual mandible in occlusion by guide flange prosthesis.

After modifying the prosthesis the patient was trained to use the prosthesis. The patient was pleased with the overall performance of the prosthesis and successfully speaks and masticates without clinically significant deviation.[Fig 7]



Figure 7: Successful repositioning of residual mandible

Post-insertion instructions were given to the patient, and was followed up at the regular interval of two months for next one year.

### 3. Discussion

This clinical report illustrates the prosthetic management of a patient who underwent hemimandibulectomy for Ameloblastoma. Since a considerable period of time had elapsed after the surgical procedure, guidance procedure was much more difficult for the patient. Mandibular deviation toward the defect side occurs primarily because of the loss of tissue involved in the surgical resection.<sup>vi</sup> Successful rehabilitation of edentulous mandibulectomy patients is more difficult than that of a dentulous patient. Sharry<sup>7</sup> described the difficulties encountered as: i. Limited coverage and retention ii. Grossly impaired relation of the mandible to the maxilla iii. Limited movement of the mandible iv. Loss of facial structures, sensory and motor.

The literature shows various types of cast metal guidance prostheses which are effective in managing the mandibular deviation. But such appliances are complex, the technique is sensitive and expensive and they require a greater number of patient visits. The acrylic guide flange prosthesis which is presented here is a simple and cost effective method for managing the mandibular deviation. The number of patient visits is also less as compared to the cast metal guidance prosthesis. The other advantage is its ease of adjustability. The earlier the mandibular guidance therapy is initiated in the course of treatment the more successful the patient's definitive occlusal relationship restoration. Within 3 weeks, the mandible is guided to the correct occlusal position.<sup>viii</sup> If the patient can successfully repeat the mediolateral position, the use of the prosthesis can often be discontinued.<sup>ix</sup> A guidance plane with a palatal acrylic flange of sufficient size and shape was useful in guiding the mandible to a correct occlusal position.

The patient in this clinical report retained all his teeth, except those on the defect site. The retentive components were modified and incorporated into the prosthesis as a wire substructure. Because of amount of force which can be generated by the flange against the maxillary teeth, the maxillary stabilizing plate was provided to resist their palatal orthodontic movement. The retentive components of the maxillary stabilization plate were also kept distal to the canines to minimize the display during functions<sup>x</sup>.

The main purpose is to re-educate the mandibular muscles to re-establish an acceptable occlusal relationship for the residual hemimandible, so that the patient can control the opening and closing of the mandibular movements adequately and repeatedly.<sup>xii</sup> The palatal flange can be extended as long as possible to improve the stability of the appliance aesthetically and comfort permits. The presence of teeth in both the arches is important for effective guidance and reprogramming of mandibular movements.<sup>xii</sup>

### 4. Conclusion

A hemimandibulectomy patient was successfully rehabilitated by the use of palatal guiding flange prosthesis bringing the residual mandible in proper mediolateral position i.e. in maximum intercuspation. This is the beginning of an accomplished prosthetic rehabilitation by using a removable prosthesis, by which a stable occlusion can be achieved.

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