

CLINICAL REPORT

Prosthetic management of a Hemi-mandibulectomy patient with Definitive Removable Prosthesis - A case report

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ABSTRACT

The loss of continuity of the lower jaw following surgical excision of tumor results in deviation of remaining mandibular segment toward the resected side. Swallowing, speech, mastication, and mandibular movements are adversely affected by mandibular surgery. Prosthetic rehabilitation plays a major role in these patients, by fabricating the whole array of prostheses to meet specific patient needs. This case report describes about the patient diagnosed with squamous cell carcinoma of alveolus on the left side. The patient had undergone hemi mandibulectomy followed by soft tissue reconstruction. As a result, mandible deviated to the affected side with trismus due to scar contraction. Second surgery was planned to remove the scar tissue and to improve mouth opening. Few days following second surgery, guiding flange prosthesis was fabricated to reduce the deviation and to guide the mandible close to occlusion. After three months, a removable cast partial prosthesis was fabricated, for the defect side which was supported by a wing to compensate for lack of underlying structures. It is imperative to provide such patients with guiding flange prosthesis three to four weeks after surgical management to guide mandible to occlusion and minimize the mandibular deviation. Failure to do so will complicate the occlusion. Subsequently patient can be rehabilitated with removable prosthesis to restore the function.

Keywords: Carcinoma, Guidance Therapy, Mandibular Deviation, Removable Prosthesis

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INTRODUCTION

Squamous cell carcinoma (SCC) is the most common cancer of the oral cavity and accounts for up to 95% of all cancers in the mandible with lowest survival rate. SCC in mandible usually requires surgical removal of the lesion and extensive resection of the bone.¹ Most of the cases in mandible lead to mandibulectomy resulting in extensive loss of tissue and discontinuity in the mandible. This would often lead to mandibular deviation if not managed with hard tissue reconstruction in time. However, clinical situations like surgery involving the mucosal lining requires only a soft tissue reconstruction, due to muscle pull, it will ultimately result in deviation of the mandible.² Swallowing, speech, mandibular movements, mastication, control of saliva, respiration and psychic functions are adversely affected by mandibular surgery. These dysfunctions alter both sensory and motor innervations with limited coordinative abilities leading to altered prosthetic prognosis.² Success of the prosthetic rehabilitation is directly related to the amount of remaining bone and soft tissues. The presence or absence of natural teeth in a resected

mandible often determines the approach to prosthetic rehabilitation. The treatment for mandibular defect is enhanced by careful preoperative evaluation which gives degree of mandibular deviation that in turn affects occlusion of the prosthesis. The prosthetic rehabilitation of mandibulectomy patients and its role in improving the quality of life is more improved nowadays. Hence, the prosthodontist plays an active and crucial role in rehabilitating these patients, through the fabrication of a whole array of prostheses like palatal ramp, twin occlusion and guiding flange prosthesis to meet specific patient needs.² The guiding flange prosthesis helps to minimize mandibular deviation and should be followed by a definitive removable prosthesis to restore function. The present case report illustrates the rehabilitation of a patient with hemimandibulectomy using guiding flange prosthesis to guide the mandible close to occlusion. After three months, a removable cast partial prosthesis was fabricated for the defect side which was supported by a wing to compensate for lack of underlying structures.

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CASE REPORT

A 47-year-old male patient underwent extensive resection of the entire posterior region of the mandible for the management of carcinoma of alveolus, two years ago. After surgical excision of the carcinoma, the mandible deviated to the affected side and mouth opening was restricted. The patient was unable to consume food adequately. A second surgery was hence planned to remove the scar tissues, in order to restore adequate mouth opening. A Guiding flange prosthesis was fabricated immediately after surgery and inserted. The patient wore the guiding flange prosthesis for seven months to prevent deviation and restore mandibular function (*Fig-1*). In conventional treatment with existing occlusion, temporary partial denture was fabricated but, in this case, the main objective for giving a guiding flange prosthesis was to re-establish normal occlusion. After achieving proper mouth opening and adequate occlusion, a definitive removable prosthesis was planned.



Figure 1: Guiding flange prosthesis

On intra oral examination, the maxillary and mandibular arches were found to be partially edentulous (Kennedy's class-2) in second and third (defect side) quadrant respectively (*Fig-2*). The preliminary impressions were made with irreversible hydrocolloid material (Dentalgin; Prime dental products, Mumbai, Maharashtra, India) using stock trays and casts were poured with type III dental stone (Kalrock, Kalabhai Karson, Mumbai, Maharashtra, India).



Figure 2: Intraoral image of defect site.

The primary cast was surveyed and embrasure clasps were planned on 46-47 and reverse circlet clasp in relation to 44. Intraoral occlusal rest seat preparation was done on 44, 46 and on 47. Custom trays were fabricated on maxillary and mandibular casts with multiple relief holes. Border moulding was performed using low fusing modelling compound stick and vinyl polysiloxane was used for making final impressions (Aquasil, Dentsply, Milford, DE). Master cast was poured in die stone (*Fig-3*). This cast was again surveyed and wax pattern was made for fabrication of cast partial denture framework.



Figure 3: Master cast with design

Framework fit was verified intra-orally (*Fig-4*). The patient was advised to move the mandible as far as possible to the untreated side manually and then gently close the jaw into position to record a functional maxillomandibular relationship. Wax trial was then done after teeth arrangement using semi anatomic teeth (*Fig-5*). After acrylization, the prosthesis was finished and polished (*Fig-6*). Care was taken to highly polish the tissue side of the prosthesis to prevent any soft tissue lacerations. The completed mandibular cast partial denture was inserted and minor occlusal adjustments were made (*Fig-7*).

The patient was instructed on hygiene and maintenance of the prosthesis. Follow-up appointment was done after 24 hours, on the 7th day and after a month with minor corrections. During



Figure 4: Intra-oral try in of framework



Figure 5: Wax try in of the prosthesis

the treatment duration, there was no unwanted or anticipated events happened. After surgery, due to mandibular deviation to the affected side, patient had limited mouth opening and difficulties in swallowing, speech, and mastication. After prosthetic rehabilitation patient was able to perform normal function. On clinical evaluation mandible was brought close to occlusion and facial esthetics was maintained. While using the guiding flange prosthesis patient felt some difficulties but after continuous use patient was able to tolerate the prosthesis and perform masticatory function.

DISCUSSION

The Prosthetic rehabilitation of patients after hemimandibulectomy is a challenge for the prosthodontist and maxillo-facial prosthodontist. Loss of mandibular continuity results in deviation of remaining mandibular segment toward the resected side,³ primarily because of the loss of tissue involved. Kinoshita et al stated that good results are obtained with bone graft for mandibular reconstruction, when compared to soft tissue reconstruction which can lead to scarring. Greater the loss of tissue, greater will be the deviation of the mandible to the resected side, thus compromising the prognosis of the treatment. Guide flange prosthesis helps in such cases to prevent deviation of the mandible, improve masticatory function and aesthetics. The mandibular guidance therapy should be initiated at an early stage itself, to be able to achieve a more successful definitive occlusal relationship. Guiding appliance serves as a training appliance used for about seven months, till a cast partial denture can be fabricated for the patient.⁴ If the patient can close the mandible into proper occlusion, the appliance can be discontinued and changed to a definitive removable partial denture. The cast metal removable partial denture is used for patients who lacks motor skills to bring the mandible into occlusion. The restoration of acceptable occlusal function is interdependent on the location and extent of the mandibular resection, as well as the remaining natural teeth.^{5,6} The basic objective is to achieve an occlusal scheme which will have



Figure 6: Removable prosthesis



Figure 7: Extraoral view of the patient with prosthesis

multiple contacts in centric occlusion, wherein the contacts on the defect side will be passive.⁶

The rehabilitation of anterior mandibular region is difficult due to the curvature of the mandible. The realignment of mandible in dentate patient is achieved by remaining dentition.⁷ The occlusal force, activated during mastication and swallowing is reduced by occlusal rests and lateral force is minimized by the elimination of premature occlusal contacts and wide distribution of stabilizing components. Properly designed retainers reduce the stresses transmitted to the abutment teeth.⁸ The patient is able to achieve the maximum intercuspal position when the teeth of both the arches are effectively guided through reprogramming the mandibular movement. Though the masticatory performance on the affected side will be negligible due to the passive contact, the fabrication of this prosthesis is crucial in preventing further scar contraction and deviation. As a result of this, the patient will be able to perform normal function, maintain mouth opening and their psychological well-being will drastically improve. Patients should be monitored closely during the post-insertion period for necessary occlusal adjustment as required with usage. In addition, many patients would require continual support and encouragement. Along with the prosthetic rehabilitation, physiotherapy in the form of light exercises is essential as it helps in improving neuromuscular coordination, which ultimately improves mastication and phonetics. In this case impression making was challenging with restricted mouth opening and due to lack of underlying structures on affected side, the

masticatory performance was limited in affected side and only passive occlusal contact was achieved. Following prosthetic rehabilitation, the deviated mandible was brought close to occlusion. Additionally, the masticatory performance improved and facial deviation, lip incompetency was prevented. Patient was satisfied after prosthetic rehabilitation.

CONCLUSION

A multidisciplinary team comprises of plastic surgeon, ENT specialist, oral surgeon and prosthodontist who work as team to provide special care treatment to improve quality of life of the patient before and after hemimandibulectomy surgery. The early use of training appliance followed by a definitive removable prosthesis, aids in the long term maintenance of the mandibular position and mastication. A well fabricated prosthesis and an appropriate mandibular exercise regimen can go a long way in restoring the patient's physiological and psychological well-being.

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CONFLICT OF INTEREST

There is no conflict of interest

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