

Rehabilitating a Hemimandibulectomy Defect with Palatal Ramp Guidance Appliance: A Case Report

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Abstract

Case Report

Surgical resection of mandible causing loss of continuity leads to deviation of the remaining segment along with malocclusion resulting in an altered muscle function and as well as facial asymmetry. Limiting these manifestations is of utmost importance to restore the quality of life. A corrective appliance known as 'palatal ramp prosthesis' can train the resected jaw and successfully guides the in closing the mandible towards the ideal position over a period of time, thus obtaining the optimum intercuspal position gradually. This clinical report reveals the rehabilitation of a patient who underwent hemisection of the mandible, subsequent to surgical resective treatment for a squamous cell carcinoma.

Keywords: Palatal ramp prosthesis. Hemimandibulectomy. Mandibular deviation.

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INTRODUCTION

Malignancies of maxillofacial region are most common etiology for the acquired defects of that region. Oral squamous cell carcinoma (SCC) is the most prevalent cancer in India, and its prevalence ranges around 45% of all cancers. Unfortunately, most of these lesions are diagnosed at a late stage and requires surgical resection along with adjacent anatomical structures. Surgical treatment modality for cancerous lesions of the oral cavity often requires resection which involves the mandible, floor of the mouth, tongue and sometimes the palate [1,2]. Mandibular resection following surgical treatment can lead to various complications. Some of the complications includes altered mandibular movements, facial disfigurement and asymmetry, difficulty during swallowing, impaired speech and articulation and mandibular deviation towards the resected site. It clinically results in facial asymmetry and malocclusion. The extent of deviation depends on the location and extent of resection along with the amount of soft tissue remaining and innervations involvement and the presence of remaining natural teeth. The residual mandible deviates medially and superiorly. The main treatment objective in hemimandibulectomy cases is to re-establish an optimum occlusal relationship for the remaining dentition which provides sufficient masticatory efficiency. Various prosthesis designs are

there either mandibular based or palatally based in order to re-establish the occlusion. These appliances should always accompany by self- corrective exercises by the patient like taking the mandible towards the unresected site. A corrective appliance known as 'palatal ramp appliance' limits the clinical manifestations. The guidance therapy should be initiated as early as possible in the course of treatment for the success of the patient's definitive occlusal relationship. Delays in the initiation due to postsurgical morbidities like tight wound closure or extensive tissue loss, may lead to inability to achieve normal maxilla-mandibular relationships. The present case report describes the rehabilitation of hemimandibulectomy patients with palatal ramp prosthesis to limit the deviation of mandible towards the surgical side and to improve masticatory function. The patient can use this device all the day except while eating.

CASE REPORT

A 41 year old male reported to the Department of Prosthodontics, KGMU with missing right part of the lower jaw and the chief complaint of deviation of the lower jaw towards the right side on closing the mouth. Patient gave a medical history of squamous cell carcinoma of the right alveolus and was treated by surgical resection of right body and ramus of mandible along with coronoid process (wide resection without

disarticulation) one and a half years back following which reconstruction was attempted with double barrel fibula graft.

The mandibular defect was seen to be Curtis and Cantor class IV defect (Lateral bone graft & surgical reconstruction) [3]. Deviation of mandible towards resected side was revealed during temporomandibular joint (TMJ) examination.

An extra oral examination showed asymmetry of the face and straight profile and approximately 14mm deviation of mandible towards the resected side was observed [Fig.1]. Evaluation of orthopantomogram of the patient revealed absence of mandible on the right side [Fig.2]. Attempt at reconstruction can be seen. Intraoral examination revealed partially edentulous maxillary arch with missing 16, 17. Mandibular dentition was intact on the unresected side. Mouth opening was also compromised in the patient approximately 10 mm.

The patient was asked to follow a series of mouth opening exercises using ice cream sticks along with heat fomentation to increase the mouth opening for carrying out the intra oral procedures. After the adequate mouth opening was achieved further treatment was planned. Due to the lack of motor control in the patient, he was not able to bring the mandible into centric occlusion and the mandible could not be manually manipulated into the centric occlusion with/without excessive force, therefore, a palatal ramp type of guidance appliance was planned for the patient. Therefore, a gradual shift towards the unresected side to obtain centric occlusion progressively was planned.

Definitive impressions were made using irreversible hydrocolloid (Zelgan, Dentsply India Pvt. Ltd., Delhi, India). The models were poured with Type-III gypsum product (Kalabhai Karson Pvt. Ltd., Mumbai, India). Over the maxillary cast a partial retainer type of appliance was made with pin head clasps and acrylic backing over the clasps for additional retention as only one side of the arch was being used due to missing maxillary molars on the right side [Fig. 3]. Adaptation of the retainer was checked in the oral cavity. Auto polymerizing acrylic resin was added to this retention plate and mandible was manipulated to the desired side when the dough stage was reached. The mandibular movements were repeated for several times and necessary manipulations were done to allow the mandibular teeth to glide over the lateral aspect of the ramp. The same movement was repeated several times. The resin was manipulated to extend 8-10 mm inferiorly towards the mandible.

Following this, the resin was allowed to polymerize after the removal of prosthesis from the mouth. The finished appliance was evaluated and adjusted intraorally. The prosthesis was removed from

the mouth, repolished and inserted. Instructions were given to wear the appliance at all times other than during meals. Stretching exercises were suggested for the patient to manipulate the mandible to the desired position.



Fig.1. Deviation of mandible towards resected site (approx. 14mm, measured by calculating the mesiodistal width of central and lateral incisor)



Fig.2. Orthopantomogram showing mandibular resection on right side and attempt at reconstruction



Fig.3. Maxillary partial retainer with pin head clasps and acrylic backing along with the palatal ramp.



Fig. 4. Deviation correction after palatal ramp appliance therapy

DISCUSSION

Oral malignancies especially squamous cell carcinoma has a high prevalence approximately 45 percent in India. Marginal, segmental, hemi, subtotal, total mandibulectomy are some of the treatment modalities depending upon the extent of tumor in cases of oral malignancies. The clinical outcomes of these surgical treatment modalities include facial disfigurement, loss of occlusion and deviation of the

jaw towards the affected side due to muscular incoordination.

These manifestations leads to impairment of basic functions such as speech, deglutition and mastication. Thus, rehabilitation of these defects is of utmost importance. In mandibulectomy cases, the prosthetic rehabilitation should be started as early as possible to limit the deviation and should be accompanied by stretching exercises by the holding the chin and moving the mandible away from the resected side. This can be started during the postoperative healing period 2 weeks after surgery [4]. Re-education of the mandibular musculature is the most important objective to re-establish an optimum occlusal relationship (physiotherapeutic function) for remaining hemimandible, so that there is an adequate patient control on repeated opening and closing mandibular movements [5].

To re-programme the mandibular movements, and effective guidance, adequate number of teeth should be present in both the arches [6]. The patient in this clinical report retained all his teeth on the

CONCLUSION

There is a guarded prognosis of any given prosthesis in hemimandibulectomy patients. In the present case report, the rehabilitation of the mandibulectomy patient was done using a palatal ramp type of guidance appliance. This appliance helped in limiting the mandibular deviation towards the resected site thus improving basic functions such as speech and mastication.

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unresected site which aided in retention of appliance and helped guidance. Proprioceptive response was better in this patient and he was able to gain the proper functional position gradually and progressively after insertion of prosthesis. In present case, the palatal ramp was fabricated such that the occlusal surface of lower teeth glides freely over the slope of the balancing ramp minimizing the amount of deviation during mandibular closure [Fig.4]. The principle objective of palatal ramp appliance is to re-educate the mandibular musculature in achieving the correct mediolateral relationship along with maintenance of function.

Various types of cast metal guidance prostheses are mentioned in the literature for managing the mandibular deviation effectively [5,6]. However, such appliances are technique sensitive, complex as well as costly and requires multiple patient visits. The acrylic palatal ramp prosthesis presented here is economical and simple method for managing the mandibular deviation with less patient visits with additional advantage being the ease of adjustability.

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