

A systematic approach in Prosthetic rehabilitation of Hemi-mandibulectomy: A case report

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Abstract: Surgical resection of the mandible due to presence of benign or malignant tumour is the most common. Depending upon the location and extent of the tumour in the mandible, various surgical treatment modalities like marginal, segmental, hemi, subtotal, or total mandibulectomy can be performed. The restoration of normal function and esthetics is often challenging in the prosthetic rehabilitation of patients with hemi-mandibulectomy defects due to unstable occlusion and mandibular deviation. Besides, there is difficulty in swallowing and impaired speech. This case report describes the systematic prosthodontic management of a patient that has undergone hemi-mandibulectomy with a provisional training Appliance i.e., flange prosthesis followed by an interim and definitive cast partial denture prosthesis.

Introduction: The mandible, located inferiorly in the facial skeleton, is the largest and strongest bone of the face. It forms the lower jaw and acts as a receptacle for the lower teeth. It also articulates on either side with the temporal bone, forming the temporomandibular joint. It is a significant structure in lower third of face constituting to function and esthetics. It is a single bone that creates peripheral boundaries of the floor of the mouth, facial form (lower third), speech, swallowing, mastication and respiration^[1]. One of the most challenging and demanding maxillofacial endeavours is the construction of functional dentures for a patient who has undergone a mandibular resection. Segmental resection of the mandible results in physiological and esthetic problems, of which the most significant difficulty encountered is mandibular deviation toward the defective side. Mandibular deviation due to unilateral mandibular discontinuity defects caused by surgery or trauma results in lack of occlusion and altered maxillomandibular relationships for optimum mastication and appearance. In the present case, marginal hemi-mandibulectomy was done, so the amount of deviation was much less^[2]. Furthermore, the deviation of the mandible towards the resected side was due to scar contracture only. Prosthodontic intervention is usually recommended

in the initial healing period of reconstructed mandible to prevent the rotation of the mandibular occlusal plane inferiorly and extrusion of the maxillary teeth and improve the masticatory efficiency. Literature shows techniques to correct mandibular deviation that can vary from intermaxillary fixation with elastics, palatal or mandibular guiding flange anchored on natural teeth or the dental flange. The guiding flange is probably the simplest and most useful in maintaining position of the remaining jaw. Cantor and Curtis provided a hemi-mandibulectomy classification for edentulous patients that can also be applied in partially edentulous arches^[4]. In patients where reconstruction is not done after resection of the mandible, scar tissue formation occurs over a period of time that stiffens the tissues and worsens prosthetic rehabilitation, leading to compromised treatment planning. The present case report describes the prosthodontic management of Hemi-mandibulectomy with cast partial denture with a guiding flange because there was occlusal deviation observed due scar tissue.

Case report: 38year old male reported to department of Prosthodontics with the chief complain of difficulty in eating due to deviation of jaw and missing teeth in right side and wants replacement of missing teeth.

The patient gave history of malignancy involving right buccal mucosa and mandibular alveolus and thus right side marginal hemi-mandibulectomy was performed 1.5 year back. Extra oral examination revealed facial symmetry but a slight deviated lower third of face towards the resected side, optimum mouth opening. The patient could manually guide himself into occlusion (Figure 1). On Intraoral examination it revealed right mandibular defect distal to right first premolar and surgical stiff scar seen on resected side; 45–47 teeth were missing. Mandibular arches were partially edentulous, representing Kennedy's Class II (Figure 2). The ridges were not prominent, covered only by stiff scar soft tissue without sufficient height and width for support. Orthopantomogram revealed the absence of the mandible alveolar bone with thin marginal bone intact distal to the mandibular right first premolar on the resected side (Figure 3).



Figure 1: A 26-year-old patient with right hemi-mandibulectomy



Figure:2,3,4-Intraoral scar tissue, deviated mandible towards resected side, OPG showing right mandibular alveolus resection

The case was diagnosed as Cantor and Curtis Class I mandibular defect. Treatment plan was decided and mandibular guide flange prosthesis was given as there was a little occlusal deviation. The application of endosseous implants in combination with bone graft for jaw reconstruction has allowed for improved result and could have been the ideal treatment but due to patient financial constraint only a definitive prosthesis of mandibular cast partial denture was designed to replace the missing teeth. The patient was recalled over a period of 1 year. Primary impression of both the maxillary and the mandibular arch was made with irreversible hydrocolloid (Zermack Hyrogum Alginate). Cast was poured with Type III dental stone. A maxillomandibular record was made by manually assisting the mandible into the centric occlusion. The maxillary and mandibular cast was mounted on a 3-point articulator (figure 4). The prosthesis was fabricated on the non-defect (left) side. The design included the guidance flange on the buccal side and the supporting flange on the lingual side. The retention was provided by the interdental clasp, engaging the canines and the molars (Figure 5). The guide flange extended superiorly and diagonally on the buccal surface of the molars and the premolars, allowing the normal horizontal and vertical overlap of the maxillary teeth (Figure 6). The guide flange was sufficiently blocked out, so that it would not traumatize the left maxillary teeth and the gingiva when the patient closed his mouth. Care should be taken to preserve the buccal-surface indentations of the opposing maxillary teeth which were guiding the mandible in a final definite closing point during mastication. The flange height was adjusted in such a way that it guided the mandible from large opening position (in practical limits of the height of the buccal vestibule) to the maximum intercuspatation in a smooth and unhindered path. The prosthesis was delivered and post-insertion instructions were given (Figure 7).



Figure 5 : Guiding flange appliance with retentive clasp



Figure 6 : Guiding flange appliance with retentive clasp

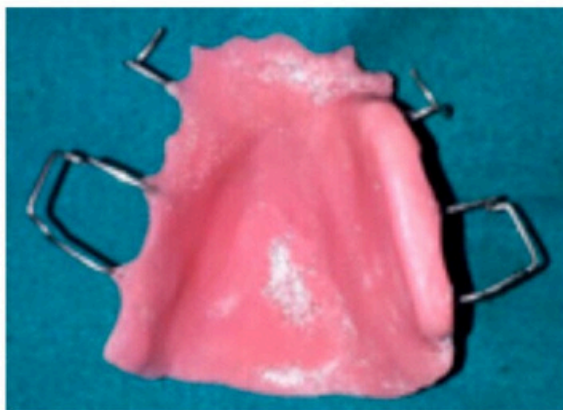


Figure 7 : Guiding flange appliance with retentive clasp

After a training period of 4 months normal occlusion was achieved with deviation and definitive cast partial denture prosthesis was planned (Figure 8).



Figure 8: Normal occlusion achieved

For the definitive prosthesis surveying was done (Figure 9). Cast partial denture designing and mock rest seats were prepared on the cast. As it was a distal extension case as stress breaker RPI(mesial rest, distal proximal plate, I bar) was planned but due to the surgical scar tissue present on defect side no buccal vestibule was available for I bar, so the modification of RPI was applied i.e., RPA clasp system(Mesial rest , distal proximal plate and Akers clasp). On the second appointment rest seats were prepared on 36, 37, 33, and 44 in the patient's mouth. Secondary impression was made with elastomeric impression material using a custom acrylic tray (Figure 10) and final cast was poured. Wax pattern fabrication was made on the final cast (Figure 11). The wax pattern was further invested and dewaxing was done and the cast partial denture framework was casted in cobalt chromium metal. Metal framework try in was carried out and functional impression was made with recording the jaw relation (Figure12,13). Altered cast was fabricated. Patient's facebow orientation was transferred to semi-adjustable articulator and teeth arrangement was carried out. (Figure14,15).



Figure 9, 10, 11: Surveying, final impression, wax pattern



Figure 12, 13: Metal try-in (RPA clasp assembly), jaw relation record, functional impression made



Figure 16: Intra oral post-operative photographs



Figure 14,15: Altered cast, facebow orientation, try-in

The metal framework with the cast was further acrylicized with heat cure denture base material (Trevalon Heat Cure Denture Base) so that the tissue supporting area of the prosthesis is in heat cure acrylic base material (Figure 16,17). The acrylicized prosthesis was further finished and polished and inserted in the patient's mouth. The deviation of the mandible reduced by guide flange is now maintained by the cast partial denture.



Figure 17: Pre-operative and post-operative photographs

Discussion: The success in rehabilitating a patient with hemi-mandibulectomy depends upon the nature and extent of surgical defect, treatment plan, type of prosthesis, and patient co-operation. The earlier the mandibular guidance therapy is initiated in the course of treatment, the more successful is the patient's definitive occlusal relationship (Desjardins, 1979 and Sahin, 2005)^[5]. This article describes functional rehabilitation of hemi-mandibulectomy patient who has undergone resection with reconstruction graft and plate. Guide flange prosthesis (GFP) is a mandibular conventional prosthesis designed for the patient who is able to achieve an appropriate mediolateral position of the mandible but is unable

to repeat this position consistently for adequate mastication (Patil, 2011 and Desjardins, 1979)^[6]. It helps to prevent deviation of the mandible, improve masticatory function and esthetics and to re-establish an acceptable occlusal relationship so that the patient can adequately control opening and closing mandibular movements. During the initial healing period following mandibular resection early prosthodontics intervention by mandibular guide flange and maxillary stabilization prosthesis serve the purpose of reducing mandibular deviation. The tissue in the surgical region is scarred, uneven, without support of the bone, and movable in various degrees. These features make the area unsuitable to be covered by an appliance or to receive loading. The frontal plane rotation occurs due to loss of proprioceptive sense of occlusion, which leads to uncoordinated and less precise movement of the mandible. In addition, due to attachment loss of muscles of mastication on the surgical side, there is significant rotation of the mandible upon forceful closure^[7]. The guide flange can be used for a period of 4 months until the patient experienced considerable decrease in deviation (improvement was observed after 4 weeks of insertion). Definitive treatment of these patients takes at least a year from the date of surgery as definitive treatment requires complete healing and no recurrence of cancer. Till then the acrylic GF prosthesis can be used as a training device for mandibular movements and to avoid further complications^[3].

Conclusions: The success of hemi-mandibulectomy rehabilitation depends on the nature of surgical defect, patient's cooperation and prosthetic management with early physiotherapy program. The presence of teeth in both the arches creates a better proprioceptive sense and the prosthesis which re-educates the mandibular muscles to re-establish an acceptable occlusal relationship will control the opening and closing of the mandibular movements adequately and repeatedly^[8].

References:

- 1 Dr Sounder Raj. K., Dr Vishwanath et al. Prosthodontic rehabilitation of hemi-mandibulectomy with cast partial denture. International Journal of Current Research, Vol. 11, Issue, 02, pp.1383-1386, February, 2019
- 2 Ritu Sharma, Akanksha Sharma, Bhanu Pratap Verma et al. Twin-Occlusion Prosthesis: A Glimmer of Hope for Hemi-mandibulectomy Patient. Indian Journal of Dental Sciences; Volume 11: Issue 1: January-March 2019
- 3 Deenadayalan Lingeshwar, Rajendran Appadurai, Ujjayanthi Sswedheni et al. Prosthodontic management of hemi-mandibulectomy Patients to restore form and function - A case series. World J Clin Cases 2017 October 16; 5(10): 384-389
- 4 Shweta Choudhary, Supratim Raml, Ajit Kumar². Prosthetic Management of a Hemi-Mandibulectomy Patient. Indian Journal of Dental Sciences: Volume 10 :Issue 2:April-June 2018
- 5 Raipure PE, Prasad P. Rehabilitation of a Hemi-mandibulectomy Patient with Interim Prosthesis. Int J Dent Med Res 2014;1(4):83-86.
- 6 Ashlesha Subhash Marathe, Prasad Shankarrao Kshirsagar¹. A systematic approach in rehabilitation of Hemi-mandibulectomy: A case report. The Journal of Indian Prosthodontic Society:Apr-Jun 2016:Vol 16:Issue 2.
- 7 Pravinkumar Gajanan Patil, Smita Pravinkumar Patil. Guideflange prosthesis for early management of Reconstructed hemi-mandibulectomy: a case report. J Adv. Prosthodont. 2011; 3:172-6
- 8 Nair SJ, Aparna IN, Dhanasekar B, Prabhu N. Prosthetic rehabilitation of Hemi-mandibulectomy defect with removable partial Denture prosthesis using an attachment-retained Guiding flange. Contemp. Clin Dent 2018; 9:120-2.
- 9 Pathak S et al. Occlusal guiding flange prosthesis for management of hemi-mandibulectomy- a case report. J Dent Specialities.2015;3(2):192-194

10 Marathe AS, Kshirsagar PS et al. A systematic approach in Rehabilitation of hemi-mandibulectomy: A case report. J Indian Prosthodont. Soc 2016 ;16:208-12.

11 Agarwal S, Praveen G, Agarwal SK, Sharma.S et al. Twin occlusion: A solution to rehabilitate hemi-mandibulectomy patient-a case Report. J Indian Prosthodont Soc 2011;11:254-7.

