

Prosthodontic Management of Hemi-mandibulectomy Patient using Mandibular Guide Flange Prosthesis: A Case Report.

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Abstract:

Prosthetic management of surgical defects has always been challenging. Hemi-mandibulectomy patient presents with many debilitating problems because of mandibular jaw deviation towards affected side. This incapacitation depends upon the amount of hard and soft tissue resected, remaining dentition and tongue mobility for mastication and other oral functions. It is essential to restore the oral function like mastication in such patients to ensure for an ability to have healthy diet and overall general health. Thus the treatment option for such patients is restoration of resected part via prosthodontic intervention. This case report describes prosthodontic management of a patient who has undergone hemi-mandibulectomy.

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I. Introduction:

Malignancies, aggressive lesions of oral cavity are treated with surgical resections which often involves tongue, floor of the mouth, jaw, hard palate^{1,2}. Depending upon the location and extent of the tumor in the mandible, various surgical treatment modalities like marginal, segmental, hemi, subtotal, or total mandibulectomy may be performed. The clinicians must wait for extensive period of time for completion of healing and acceptance of the osseous graft before considering the definitive prosthesis. During this initial healing period prosthodontic intervention is required for preventing the mandibular deviation. As a general rule, the resection of a portion of the mandible without loss of mandibular continuity is usually not as debilitating as a resection that compromises mandibular continuity². Loss of mandibular continuity causes deviation of remaining mandibular segment towards the defect and rotation of the mandibular occlusal plane inferiorly. It also leads to altered muscle function. This results in asymmetry of the face and malocclusion³. This mandibular deviation is mainly due to uncompensated influence of contralateral musculature particularly the internal pterygoid muscle and pull from the contraction of cicatricial tissue on resected side^{4,5}. The treatment option for such patients should be directed towards dealing with dysfunctions like difficulty in swallowing, speech, mandibular movements, mastication and facial disfigurement.

Various prosthetic treatments are available and depending upon the clinical situation, appropriate option should be selected. According to Hiong's treatment plan for hemi-mandibulectomy patients, if the patient reports to a maxillofacial prosthodontist after surgery and the scar tissue has not been completely formed, the prosthodontist can guide the patient's mandible into a functional position with a prosthesis⁶. The success of prosthetic treatment depends upon the amount of remaining tissues because greater loss of tissues results in greater deviation of the mandible to the resected side. Swoop proposed a palatal ramp whereas Rosenthal suggested the use of two rows of maxillary posterior teeth on unresected side⁷. Mathew A and Thomas S

delivered a guiding flange prosthesis to a hemi-mandibulectomy patient. This article presents a case report of hemi-mandibulectomy patient wherein mandibular deviation was corrected using mandibular Guide Flange Prosthesis [GFP].

II. Case Report:

A 56 year old female reported with difficulty in chewing food and deviation of the lower jaw on left side since 3 months. The patient was operated for squamous cell carcinoma alveolus of mandible by hemi-mandibulectomy and alveolar resection maxilla on left side. Extra oral examination revealed ipsilateral deviation of the mandible by 12 mm, scarring of the neck on the left side due to scarring of tissues. Intraoral examination revealed missing teeth-23 to 27, 32 to 37, calculus and stains, stiffness of the buccal mucosa, reduced mouth opening upto 20 mm. The patient was able to achieve an appropriate correct mediolateral position of the mandible but was unable to repeat this position consistently for adequate mastication. On the basis of clinical and radiographic examination, the patient was classified as Class IV (severely compromised) according to Prosthodontic Diagnostic Index as described by McGarry et al. The defect was restored with Pectoralis major mucocutaneous flap. The treatment planned provisionally for patient was interim mandibular guide flange prosthesis for deviation correction followed by definitive one.

Technique:

A sectional tray was used for mandibular preliminary impression using irreversible hydrocolloid [Tropicalgin]. Maxillary impression was also made with irreversible hydrocolloid material. The impressions were poured with Type III gypsum material (Kalstone; Kalabhai Karson, Mumbai, India) and casts were retrieved. Casts were mounted using bite registration record in the reducible jaw position as mandible could be reduced in intercuspation on right side. A 19 gauge hard, round, stainless steel orthodontic wire was manipulated to fabricate Adams clasp on 45 and 46 for Guide flange prosthesis. The vestibular (buccal and lingual) flanges were waxed-up with modelling wax around the wire substructure by keeping a maxillary cast in occlusion and subsequently acrylized into the clear heat-polymerized acrylic resin (DPI Heat cure resin) to make the GFP shown in figure 3. The GFP was tried in patient's mouth and the initial stability and retention was checked. The inclination of the guide-flange was adjusted by keeping an adequate clearance in the extending bridge part of the Adams clasps over the buccal surface of the maxillary teeth and recording the buccal indentation of maxillary teeth in the wax. Final alterations were performed by selectively trimming the teeth-contacting surface or adding the auto-polymerizing clear acrylic resin. Care was 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 intercuspation in a smooth and unhindered path. The prosthesis was delivered and post-insertion instructions were given. The patient was followed up at the regular interval of two months. Patient was suffering from difficulty in chewing. With the prosthesis she was able to chew the food and had an improvement in type of food which she had. She could now have solid diet as compared to only liquid and semisolid diet which she had without the prosthesis. The facial esthetics was also improved to some extent due to limitation of deviation by the prosthesis.

III. Discussion:

According to Olson ML et al⁹ in 1978 and Curtis DA et al¹⁰ in 1997, resected part of mandible should be immediately reconstructed to recover both facial symmetry and masticatory function. The tissue in the surgical region is scar red, uneven, unsupported by bone and movable in various degrees. These features make the area unsuitable to be covered by an appliance or to receive loading⁸. Therefore, the proposed prosthesis design engages only the unresected site. Cantor and Curtis classification for Hemi-mandibulectomy: Class I: Mandibular resection involving alveolar defect with preservation of mandibular continuity. Class II: Resection defects involve loss of mandibular continuity distal to the canine. Class III: Resection defect involves loss up to the mandibular midline region. Class IV: Resection defect involves the lateral aspect of the mandible, that is augmented to maintain pseudo articulation of bone and soft tissue in the region of the ascending ramus. Class V: Resection defect involves the symphysis and parasymphysis region only, augmented to preserve bilateral temporomandibular articulations. Class VI: Similar to class V, except that the mandibular continuity is not restored. The presented report is a Class III hemi-mandibulectomy case. It is reported that even the recent developments in reconstructive surgery and prosthodontic rehabilitation have not been able to restore impaired masticatory function in 50% of head and neck cancer patients. Segmental mandibulectomy as surgical treatment for squamous cell carcinoma results in deviation of the remaining mandibular segment toward the defect and rotation of the mandibular occlusal plane inferiorly. Rotation is caused by the pull of the suprahyoid musculature on the residual mandibular fragment causing inferior displacement and rotation around the fulcrum of the remaining condyle. Gravity, loss of continuity, loss of anchorage, loss of temporomandibular ligaments

allows the mandible to fall vertically away from the normal position. The frontal plane rotation occurs due to loss of proprioceptive sense of occlusion, which leads to un-coordinated and less precise movement of the mandible. Also, because of the absence of attachment of the muscles of mastication on the surgical side, there is significant rotation of the mandible upon forceful closure. When the force of closure increases, the remaining mandible actually rotates through the frontal plane¹. The patient in this clinical report retained all her teeth, except those on the defect site. Therefore, the patient had a better proprioceptive sense and was able to achieve the functional position after insertion of prosthesis.

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Illustrations:



Figure 1: Extra –oral view



Figure 2: Mandibular Impressions.



Figure 3: Mandibular deviation towards affected side.

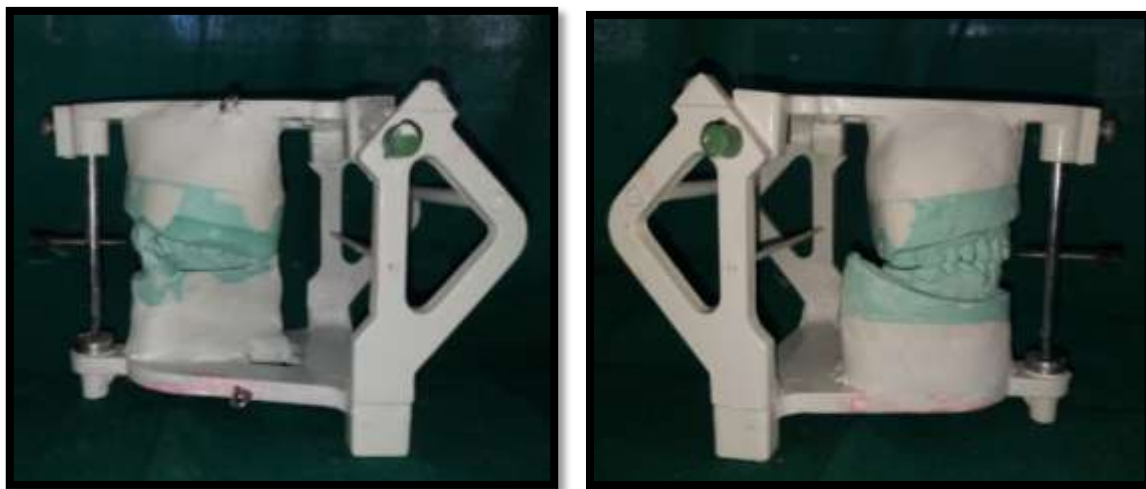


Figure 4: Casts mounted using bite record.



Figure 5: Guide flange Prosthesis in-situ



Figure 5:Guide flange Prosthesis in-vivo

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