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RESEARCH ARTICLE

PROSTHODONTIC REHABILITATION OF HEMIMANDIBULECTOMY WITH CAST PARTIAL DENTURE: A CASE REPORT

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ABSTRACT

Mandibulectomy is a procedure that is used to eradicate disease that involves the lower jaw or mandible. Surgical resection of mandible owing to benign, malignant neoplasm, and osteoradionecrosis is common. The resection can be total or segmental depending on the extend of the lesion. In the case of segmental resection or hemimandibulectomy which is removal of only one side of the mandible, loss of mandibular continuity causes deviation of remaining mandibular segment towards the resected side and rotation inferiorly due to muscle pull and scar contracture affecting mastication and esthetics. Surgical reconstruction may not be always possible. Prosthetic rehabilitation plays an important role in these patients. This case describes the prosthodontic management of hemimandibulectomy with regular cast partial denture. Guiding flange prosthesis was avoided in this case because there was no occlusal deviation. The deviation of the mandible towards the resected side was due to scar contracture only.

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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 single bone that creates peripheral boundaries of the floor of the mouth, facial form (lower third), speech, swallowing, mastication and respiration. Disruption of mandible due to trauma, surgical resection for benign and malignant neoplasm disrupts any of these functions. Mandibulectomy is a surgical procedure wherein the mandible (jaw), a crucial bone in the face that contributes significantly to mastication or chewing, is removed or resected. There are several kinds of mandibulectomy depending on the thickness and extent of resection required. Hemimandibulectomy is the type in which half of the mandible is removed.

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Loss of mandibular continuity causes deviation of the remaining mandibular segments towards the defect and rotation of the mandibular occlusal plane inferiorly due to muscle pull and scar contracture. Mandibulectomy with radical neck dissection increases this deviation. This results in facial disfigurement, loss of occlusal contact, in many cases, loss of lip competency for saliva control and to initiate the swallowing process. Literature shows techniques to correct mandibular deviation that can vary from intermaxillary fixation with elastics, palatal or mandibular guiding flange (GF) prosthesis 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 (Lingeshwar, 2017). This case report describes the prosthodontic management of hemimandibulectomy with cast partial denture without a guiding flange because there was no occlusal deviation observed. The mandible was deviated to the resected side due to scar contracture only.

Case Report: A 26year old female 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 hemimandibulectomy was performed 1 year back. Extra oral examination revealed facial asymmetry, deviated lower third of face towards the resected side, limited mouth opening. The patient could manually guide herself into occlusion (Figure 1). On Intraoral examination it revealed right mandibular defect distal to left lateral incisor, surgical skin graft seen on resected side; 34–37, 32–43, and 45–47 teeth are missing. Mandibular arches were partially edentulous, representing Kennedy's Class II. The ridges were not prominent, covered only by soft tissue without sufficient height and width for support. Orthopantomogram revealed the absence of the mandible distal the mandibular left incisor and graft with reconstruction plates seen on the resected side (Figure 2).

Figure 1. A 26-year-old patient with right hemimandibulectomy

Figure 2. Orthopantogram Showing graft and reconstruction plate in the resected side

The case was diagnosed as Cantor and Curtis Class IV mandibular defect. Treatment plan was decided and no mandibular guide flange prosthesis was given as there was no 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 and surveying was done. Cast partial denture designing and mock rest seats were prepared on the cast. On the second appointment rest seats were prepared on 34, 35, 36, and 37 in the patient's mouth. Secondary impression was made with elastomeric impression material. (Figure 3) and final cast was poured. Wax pattern fabrication was made on the final cast (Figure 4). The wax pattern was further invested and dewaxing was done and the cast partial denture framework was casted in cobalt chromium metal (Figure 5).

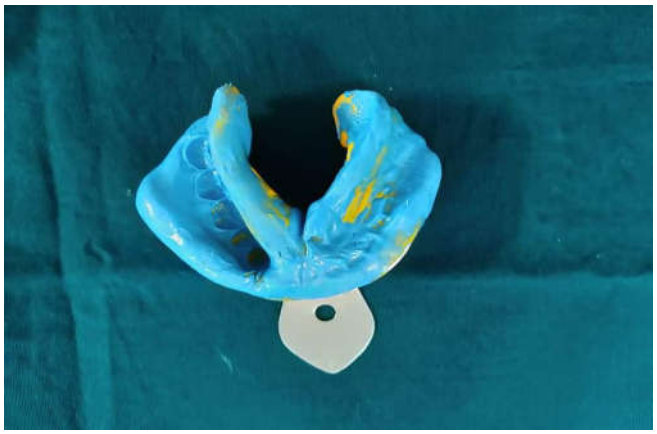

Figure 3. Final impression of the prepared teeth with elastomeric impression material

Figure 4. Wax pattern fabrication on the mandibular cast

Figure 5. Metal framework casted in cobalt chromium

The metal framework with the cast was further acrylized 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 6).

The acrylized prosthesis was further finished and polished and inserted in the patient's mouth. The deviation of the mandible was reduced to some extend by the cast partial denture Figure 7.

Figure 6. The final cast partial denture prosthesis

Figure 7. The deviation of the mandible was reduced to some extend by the cast partial denture as seen on the patient.

DISCUSSION

Segmental resection of mandible results in deviation of remaining segment towards the resected side due to uncompensated influence of contralateral musculature, particularly the internal pterygoid muscle. If this influence is uncompensated, the contraction of cicatricial tissue will fix the residual fragment in its deviated position (Lingeshwar, 2017 and Robinson, 1964). The rotation of residual mandible in an inferior direction is caused by the pull of suprahyoid musculature and gravity due to loss of anchorage of elevator muscles (Lingeshwar, 2017 and Taylor, 2000). The pathway of closure in a lateral resection of mandible starts from its medial, retruded position and closes in an upward diagonal manner into an occlusion which may or may not correspond with the patient's preoperative occlusion (Lingeshwar, 2017 and Curtis, 1974). The amount of deviation and downward rotation depends on the extent of tissue loss.

The more the mandible remaining, the better is the prosthetic prognosis. Retention of mandibular cuspids is especially beneficial (Lingeshwar, 2017 and Beumer, 1996). The basic objective in rehabilitation is retraining the remaining mandibular muscles to provide an acceptable maxillo-mandibular relationship of the remaining portion of the mandible (Lingeshwar, 2017 and Desjardins, 2016). This would permit occlusion of remaining natural teeth or control of residual edentulous segments to provide for the reasonable placement and acceptable occlusion of the artificial teeth (Lingeshwar et al., 2017 and Marathe et al. 2016).

There are four significant factors that affect rehabilitation: The location and extent of surgery, the effect of radiation therapy, the presence or absence of teeth and the psychological aspect. The right timely initiation and intervention of treatment is the key to success for restoring the form and function of the jaws. The deviation after hemimandibulectomy will be difficult to correct after the healing phase of 6 to 8 weeks due to scar contracture and the muscles adapting to this cicatricial tissue (Lingeshwar, 2017 and Taylor, 2000). Patients usually have trismus following the surgery which will be a challenge for making an impression. This article describes functional rehabilitation of hemimandibulectomy 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). 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 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).

The success in rehabilitating a patient with hemimandibulectomy 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). However in this case the patient reported after 1 year of surgical resection and on examination the patient doesn't have extreme limited mouth opening as well as there was no occlusal deviation, though mandible deviation was seen towards the resected side due to scar contracture only definitive treatment of fabrication of mandibular cast partial denture was designed for this particular case. A cast partial denture with occusal rest on 34,3,36, 37 and circumferential clasp with respect to 34, 35, 36 and 37 was designed. The teeth were evaluated during the periodic recalls and a healthy periodontal status was maintained. Considerable improvement in facial profile of the patient was observed post treatment and further improvement was seen during recall visit. Nowadays Implants mandibular implantsupported overdenture treatment has gained considerable acceptance. It has effectively replaced the toothborne version and has been recommended as the new

standard of care treatment when compared with conventional mandibular complete dentures. The implantretained overdenture provides better support, stability, and retention, especially in cases of hemimandibulectomy patients. However, they require extensive period for healing and acceptance of graft and are expensive. Thus, more immediate and economical means of prosthetic rehabilitation are preferred by most patients (Sahin, 2005 and Curtis, 2016).

Conclusion

The prognosis of the prosthesis in functional rehabilitation of hemimandibulectomy patient who has undergone resection without reconstruction is guarded. Guide flange prosthesis is most common treatment modality. Guiding flange can be given attached to a definitive prosthesis as well. However, in cases where sufficient numbers of abutment teeth are not present and where deviation is massive, providing twin occlusion rehabilitates the patient functionally. Surgical reconstruction by grafts and implants of various types is the ideal treatment when feasible. However, it is not always feasible in every patient, alternative prosthodontic approach has to be considered to restore the esthetics and function in such subject.

Declaration of Patient Consent: The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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