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Case Report

Prosthetic management of hemimandibulectomy patient by use of acrylic guide flange prosthesis and removable partial denture

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INTRODUCTION

Odontogenic tumours of epithelial origin are usually seen in the posterior mandible and are often treated with surgical excision. The sequelae that follow the mandibular discontinuity due to hemi-mandibulectomy leads to deviation of mandible to the resected side and other dysfunctions such as difficulty in mastication, swallowing, speech, mandibular movements, and even respiration.[1] Mandibulectomy with radical neck dissection increases the probability of this deviation. The degree of deviation is dependent on several factors such as the location and extent of osseous and soft tissue resection, the method of surgical site closure, degree of impaired tongue function, the presence and condition of the remaining natural teeth, the degree to which nerve innervations has been involved, and the use of adjunctive procedures such as radiation therapy and the timing of prosthodontic treatment.[2]

In a segmental mandibulectomy, masticatory function is compromised because of muscular imbalance resulting from unilateral muscle removal, altered maxillomandibular relationship, and decreased tooth-to-tooth contacts. This leads to facial disfigurement, loss of occlusal contact, loss of lip competency for saliva control and to initiate the swallowing process in many cases. Mandibular discontinuity defects present a major challenge to the rehabilitation team.[3] During the initial healing period prosthodontic intervention is required for preventing the mandibular deviation.

Literature shows techniques to correct mandibular deviation that can vary from intermaxillary fixation with elastics to palatal or mandibular guiding flange prosthesis anchored on natural teeth or the denture flange. The guide flange prosthesis is probably the simplest and most useful aid in maintaining the position of the remaining jaw.In a mandibular-based guidance prosthesis, the guide flange is attached to a mandibular removable partial denture (RPD) or may be fabricated as a separate prosthesis on the non-resected side. The flange is extended into the maxillary buccal fold, to guide the remaining segment of the mandible superiorly and laterally to the proper jaw relationship. “The flange mechanically maintains the residual mandible in the proper position for the vertical chewing stroke, with little or no lateral movement.” This extension may be processed in acrylic resin, casted with RPD alloy, or a heavy wire loop may be used.[3]

This case report describes an early prosthodontic management of a patient who has undergone hemimandibulectomy and was rehabilitated using acrylic guide flange prosthesis as a separate prosthesis with removable partial denture to restore occlusion in order to fulfil patient’s needs and requirements.

CLASSIFICATION

As a general rule, the resection of a portion of a mandible without loss of mandibular continuity is not as debilitating as a resection that compromises the mandibular continuity.[2]

Cantor & Curtis provided a hemimandibulectomy classification for edentulous patient that can also be applied in partially edentulous arches.

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 area.
Class III: Resection defect involves loss up to the mandibular midline region.
Class IV: Resection defect involves the lateral aspect of the mandible, but are augmented to maintain pseudo articulation of bone and soft tissues 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.[4,5]

CASE REPORT

A 65-year-old, male patient was referred to the Department of Prosthodontics from the Department of oral and maxillofacial surgery (Himachal Pradesh Government Dental College and Hospital) for correction of deviated mandible and deranged occlusion one month post-operatively. Upon eliciting the history, the patient had undergone hemimandibulectomy for squamous cell carcinoma of left side of the mandible, distal to the lateral incisor up to left condyle and hence was classified under Cantor and Curtis classification-II. Clinical evaluation revealed restricted mouth opening of almost 20 mm, with gross asymmetry of the left side of face. There was a deviation of 15 mm of the mandible toward the left side from the midline. The region starting from the left lower bicuspid up to the left condyle was excised. Remaining dentition was sound with a total of 21 teeth present with deranged occlusion. Oral hygiene was poor with inflamed gingiva and the left buccal mucosa showed a satisfactory healing.Associated problems included difficulty in speech, swallowing and mastication, disfigurement of face.

TREATMENT PROCEDURE

1. The extraoral picture of the patient shows the deviation of the mandible to the left side, the resected side (figure 1).
2. In the first appointment, impressions of the upper and lower arches were made using irreversible hydrocolloid impression material (alginate) and the casts were poured in type III gypsum material (figure2,3 and 4).
3. After the finishing of the casts, the temporary denture base (self-cure acrylic resin, DPI) was fabricated and the occlusal rim was made using modelling wax (DPI, India) and the patient was called for the second appointment to record the bite.

Figure1: Mandible deviated to the left side
Figure2: Lower alginate impression

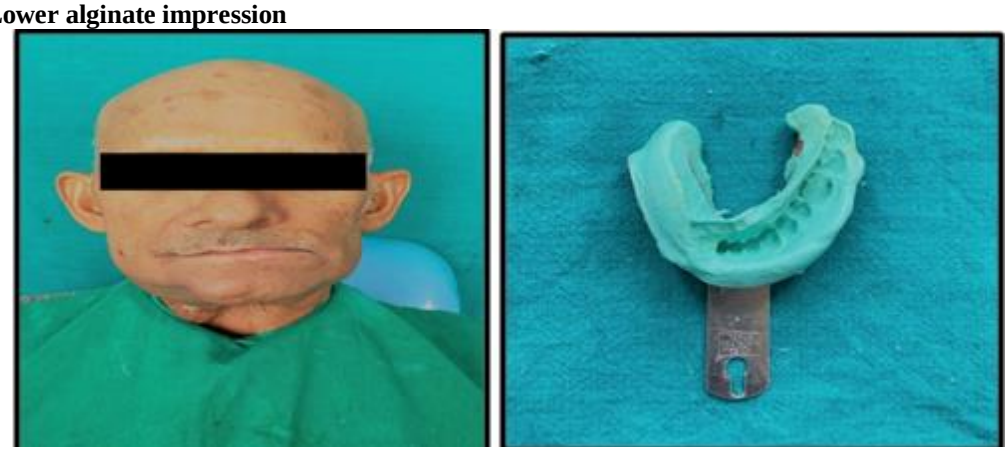
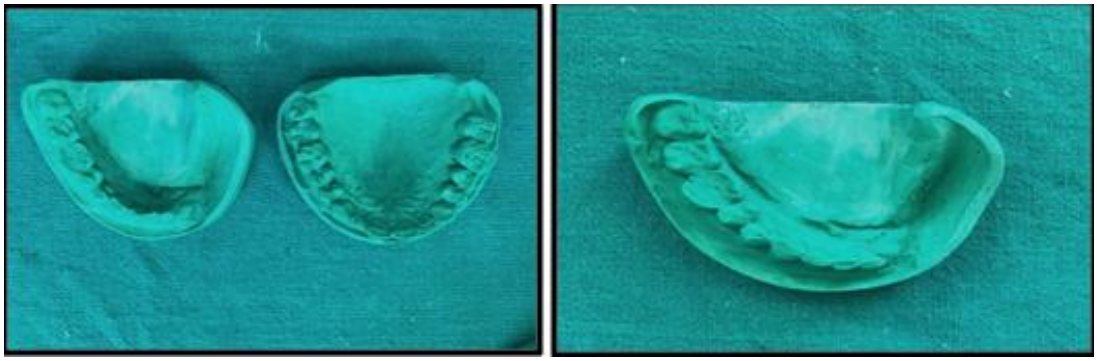
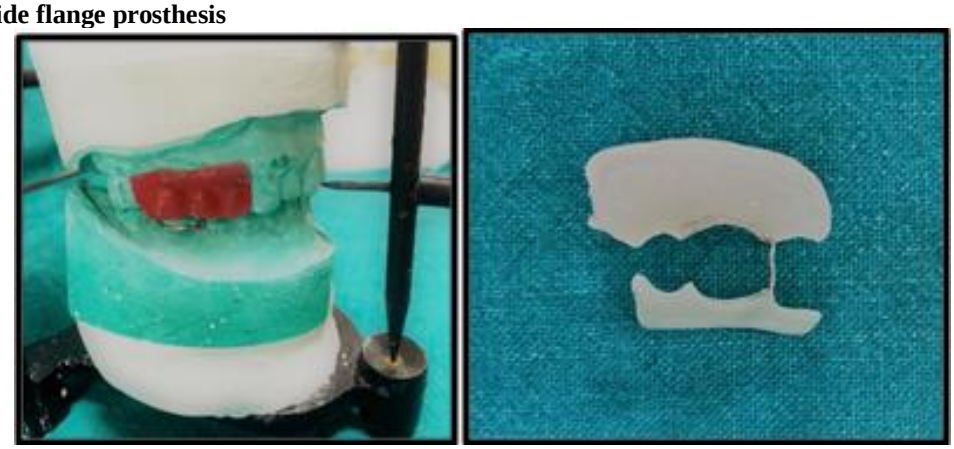


Figure3: Upper and lower casts
Figure4: Lower finished cast



4. The bite registration was done and the patient was asked to close in maximum intercuspation in order to record the existing occlusion.
5. The casts were sealed and mounted on an articulator.
6. A 19-gauge stainless steel wire was adapted extending from the mesial surface of 46 and passing interdentally between 46 and 47 and terminatelingually forming a c- shaped loop. This wire was used in fabrication of guiding flange whereas additional clasps were fabricated for the RPD.
7. Block out of the buccal surfaces of the maxillary teeth (44,45,46) was done by using modelling wax in order to relieve the undercuts (figure 5).
8. A layer of separating medium was applied on the surface of the cast followed by addition of auto-polymerizing resin (DPI clear; Dental Products of India, Mumbai) of sufficient thickness on the right maxillary buccal and mandibular lingual region. Care was taken to ensure that the material did not extend over the occlusal surfaces and that the articulator was closed with the casts in occlusion during the setting of the material.
9. Once the material was set, the prosthesis was removed, finished and polished before evaluating its fit in the patient's mouth (figure 6).

Figure5: Block out of the buccal surfaces of maxillary teeth
Figure6: Guide flange prosthesis



10. The patient was then trained to insert the mandibular portion of the prosthesis and to slowly close as the extension of the prosthesis into the maxillary buccal region or the buccal flange guides the mandible into maxillary buccal region or the buccal flange guides the mandible in to complete occlusion (figure 7,8).
11. Patient was instructed to wear the prosthesis for eight hours a day, removing it only while having food and during sleep.
12. In a follow-up visit, two months post insertion, the patient was able to effectively close her mandible into maximum intercuspation without the use of the guide flange and there was appreciable correction of the deviation of mandible extraorally (figure9).

Figure7: Intraoral view ofguide flange prosthesis while patient closes the mouth
Figure8: Guide flange prosthesis guiding the mandible to close in maximum intercuspation
Figure9: Extraoral view depicting correction of the deviation of mandible

13. Later on, a removable partial denture was also fabricated as a separate prosthesis (by using heat cure acrylic resin) to aid in mastication (Figure 10,11,12).

Figure10: The guide flange prosthesis in clear acrylic and RPD to restore occlusion
Figure11: Removable Partial Denture with the retentive clasp assembly
Figure12: Tissue surface of the Removable Partial Denture

DISCUSSION

Loss of mandibular continuity causes deviation of remaining mandibular segment(s) toward the defect and rotation of the mandibular occlusal plane inferiorly. The usual result of the mandibular resection with disarticulation is a shift of the residual fragment to the resected side. This mandibular shift is due to the uncompensated influence of the contra-lateral musculature, particularly the internal pterygoid muscle. If this influence is left uncompensated, the contraction of the cicatricial tissue on the operated side will fix the residual fragment in its deviated position. This situation leads to facial deformity and functional loss.[1,2]

Guide flange prostheses are used in patients with mandibular discontinuity to correct the resulting deviation of the mandible and achieve acceptable occlusal function. Though fabrication of definitve prosthesis is the final solution for replacing the missing teeth for reconstructed mandibulectomy patients, the clinicians must wait for extensive period of time for completion of healing and acceptance of the osseous graft. During this initial healing period early prosthodontic intervention by mandibular guide flange and maxillary stabilization prosthesis serve the purpose of reducing the mandibular deviation, preventing extrusion of the maxillary teeth and improving the masticatory efficiency. Our principal aim was to maintain his aesthetics during mandibular movements. Hence the guide flange prosthesis was fabricated in clear acrylic resin and the retentive wire components were kept distal to the mandibular canine to minimize the prosthesis display. A vertical extension from the buccal aspect of a mandibular prosthesis extends to contact the buccal surface of the opposing maxillary teeth. This extension maintains the mandible in the proper mediolateral position for vertical chewing.

This clinical report illustrates the prosthetic management of a patient who underwent mandibular resection due to surgery for squamous cell carcinoma. Although there are previous reports that show the osseointegrated implants are the more recent and advanced treatment modality for craniofacial reconstruction[6], yet 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.

The cast metal guidance prostheses are also effective in managing the mandibular deviation.[7]But such appliances are complex, technique-sensitive and costly and they require a number of patient visits. The acrylic guide flange prosthesis which is presented here is a simple and cost-effective method for managing the mandibular deviation. The number of patient visits is also less as compared to the cast metal guidance prosthesis. The other advantage is its ease of adjustability.

The success of mandibular guidance therapy depends on the early intervention and the nature of the surgical defect. Mandibular guidance therapy begins when the immediate postsurgical sequelae have subsided, usually within 2 to 3 weeks after surgery. This sort of therapy is most successful in patients whose resection involves only bone structures and minimally the tongue, the floor of the mouth and contiguous soft tissues. The presence of the teeth in both the arches is important for the effective guidance and the reprogramming of the mandibular movements.

The patient in this clinical report had retained all his teeth, except those on the defect site. Therefore, the patient had a better proprioceptive sense and was able to achieve the functional position after the insertion of the prosthesis.

The main purpose is to re-educate the mandibular muscles to re-establish an acceptable occlusal relationship (physiotherapeutic function) for the residual hemimandible, so that the patient can control the opening and closing of the mandibular movements adequately and repeatedly. This is the beginning of an accomplished prosthetic rehabilitation by using a removable prosthesis, by which artificial teeth could warrant a stable occlusion. For better results, the prosthetic management can be combined with an exercise program that can be started as early as two weeks

after the surgery. The clinician can instruct the patient that on opening completely, the mandible can be displaced by hand as forcefully as possible towards the nonsurgical side. These movements tend to lessen scar contracture, reduce trismus, and improve maxillomandibular relationships.

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. This clinical report describes the fabrication of acrylic guidance prostheses with supporting flanges for a patient following a segmental mandibulectomy. Organized mandibular exercises were suggested for eliminating mandibular deviation and uncoordinated muscle movements. The patient was able to achieve a functional intercuspal position after insertion of the prostheses.

REFERENCES

1. Doni A, Manvi S, Rajeshwari CL et al. Guiding mandible back home: prosthetic rehabilitation: case report. World J advanced Healthcare Res. 2020;4(1): 78-81.
2. Babu S, Manjunath S, Vajawat M. Definitive guiding flange prosthesis: A definitive approach in segmental mandibulectomy defect. Dent Res J. 2016 May-Jun; 13(3): 292–295.
3. Sahu SK. Mandibular guide flange prosthesis following mandibular resection: a clinical report. J ClinDiagn Res 2010; 4: 3266–3270.
4. Ahuja A, Jagadeesh HG, Choudhary A, Vikram J, Hasti A. Prosthetic Management of Hemimandibulectomy Patient - A Case Report. IOSR J Dent and Med Sci. 2015 March; 14(3) ver. 1
5. Cantor, R., and Curtis, T. A.: Prosthetic Management of Edentulous MandibulectomyPatients.Part I. Anatomic, Physiologic, and Psychologic Considerations, J. Prosthet. Dent.25: 446-457, 1971.
6. Adell, Ragnar&Svensson, Börje&Bågenholm, Torun. Dental rehabilitation in 101 primarily reconstructed jaws after segmental resections – Possibilities and problems. An 18-year study. Journal of cranio-maxillo-facial surgery: official publication of the European Association for CranioMaxillo- Facial Surgery, 2008; 36: 395-402.
7. Sahin N, Hekimoglu C, Aslan Y. The fabrication of cast metal guidance flange prostheses for a patient with segmental mandibulectomy: A clinical report. J Prosthet Dent. 2005; 93:217–20.
8. BeumerJ, CurtisT, FirtellD, editors. Maxillofacial rehabilitation.St Louis: Mosby, 1979; 90-169.
9. Taylor TD. Diagnostic considerations for prosthodontic rehabilitation of the mandibulectomy patient. In: Taylor TD, editor. Clinical maxillofacial prosthetics. Chicago: Quintessence Publishing, 2000; 155–170.
10. Robinson JE, Rubright WC. Use of a guide plane for maintaining the residual fragment in partial or hemimandibulectomy. J Prosthet Dent. 1964; 14:992–9.
11. Patil PG, Patil SP. Guide flange prosthesis for early management of reconstructed hemimandibulectomy: A case report. J AdvProsthodont. 2011; 3:172–6.