Guide flange prosthesis for the management of deviation following hemimandibulectomy: A case report

Nimmi Gupta, Vandita Srivastava, Aswin Kumar, Neeteesh K. Shukla

1Division of Prosthodontics, Faculty of Dental Sciences, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India, 2Division of Orthodontics, Faculty of Dental Sciences, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

Correspondence: Neeteesh K. Shukla, Division of Orthodontics, Faculty of Dental Sciences, Institute of Medical Sciences, Banaras Hindu University, Varanasi - 221 005, Uttar Pradesh, India. Phone: +919532387089. E-mail: nksindian@gmail.com

Received 03 February 2020; Accepted 05 March 2020

doi: 10.15713/ins.ijmdcr.135

How to cite the article:
Gupta N, Srivastava V, Kumar A, Shukla NK. Guide flange prosthesis for the management of deviation following hemimandibulectomy: A case report. Int J Med Dent Case Rep 2020;7:1-4.

Abstract

The mandible is very important bone of human body but surgical resection of the mandible due to the presence of benign or malignant tumor causes mandibular deviation and loss of various functions. The clinician must wait for proper healing of the wound before giving any prosthesis. This case report presents a case of the removable type of guide flange prosthesis for hemimandibulectomy and hemimaxillectomy patient. This prosthesis helped the patient in preventing deviation and improved mastication and enhanced the overall quality of life of the patient.

Keywords: Guide flange prosthesis, hemimandibulectomy, mandibular deviation

Introduction

The mandible is one of the most important facial bones. It helps in performing most of the important functions such as mastication, swallowing, and speech by its various movements brought up by muscles attached to it. Oral cavity cancers and their surgical resections leave the patients in a jeopardized state. After mandibulectomy, patients experience the loss of occlusion and the absence of the muscle attachment to the mandible on the surgical side, resulting in inferior rotation of the mandible on closure, with the mandible deviation toward the defect side.\(^1,2\) It also brings facial deformity, difficulty in speech and mastication. Early treatment of the deviated mandible starts with corrective mandibular movement therapy, including physiotherapy.\(^3,4\) Various designs of the prosthesis have been used to guide the mandible into its position.\(^5,7\)

Removable guide flange prosthesis can be retained if only a few teeth remain in the oral cavity. It is a simpler technique and economical to the patient. Retention is further compromised by radiation and surgical scarring, which limits mouth opening and functional vestibule depth such that placement and removal of the guide flange prosthesis are impossible for the patient.\(^4\) A fixed prosthesis that would prevent scar contraction by keeping muscles in the stressed condition and at the same time provides corrective and masticatory functions is indicated but in the early treatment, the fixed prosthesis is not given as the muscles are not in a state of bearing much stress.\(^9,10\) Implant-supported prostheses have also been advocated for the correction of mandibular deviation.

Case Report

A 35-year-old male patient visited our unit of prosthodontics crown and bridge and implants (faculty of dental sciences Banaras Hindu University Varanasi) for prosthetic rehabilitation following hemimandibulectomy, reconstructed with pectoralis major flap [Figure 1]. After taking a detailed case history, it was found that the patient was diagnosed with squamous cell carcinoma of right buccal mucosa for which his maxilla was partially resected and hemimandibulectomy was done 3 months back [Figure 1]. According to Cantor and Curtis, classification type 3 defect was found in patient. 5–7 mm deviation was found on 25 mm of mouth opening [Figure 2]. A removable type of guide flange prosthesis was planned as an early treatment option for the patient. A signed informed consent was taken.

Procedure

Irreversible hydrocolloid was used to make impressions of the maxillary and mandibular arch, respectively [Figure 3]. Cast was
Figure 1: (a) Post-surgical extraoral photos of the patient showing reconstruction with pectoralis major graft for the management of carcinoma of the oral cavity. (b) Pre-surgical orthopantomogram (OPG) and (c) post-surgical OPG showing hemimandibulectomy and hemimaxillectomy

Figure 2: Mandibular deviation and maximum mouth opening
poured using type 4 gypsum product (die stone). Condensation Silicone material was used to take a centric relation record. Casts were mounted on the articulator and 21 gauge wire was used to retain maxillary buccal flange. First, a wax pattern was made with one flange extending into the lingual vestibule and other flange was extending to maxillary buccal vestibule with remaining teeth in centric occlusion. On wax trial in the mouth, it was found that mandible was properly positioned and deviation was stopped. The wax pattern was processed into a final prosthesis with the help of clear heat-cured acrylic resin [Figure 4]. On final insertion, the patient was trained to wear and remove the prosthesis.

Instruction to the patient was given not to chew food with the prosthesis. He was advised to come for regular follow-up. On follow-up of 3 months, a highly successful result was obtained as patient was content with treatment as patient was able to achieve a functional intercuspal position with the help of the prosthesis, also could chew food properly and deviation was limited to a maximum extent [Figure 5].

**Discussion**

Depending on the location and extent of the tumor in the mandible, various surgical correction modalities such as marginal, segmental, hemi, subtotal, or total mandibulectomy are performed. With the advancements in facial reconstructive surgery and dental implants, it is easier to provide a treatment modality that adequately rehabilitates oral cancer patients so that they can live a much better life. Sahin et al. and Chalian et al. stated the fabrication of a cast metal guidance prosthesis with supporting and retentive flanges. They claimed that the patient was able to achieve a functional intercuspal position with the help of the prosthesis but that mastication was limited to vertical movement only. Joshi et al. described the fabrication of a removable type of mandibular guide flange prosthesis as an alternative for most patients with mandibular defects, considering the poor prognosis. Osseointegrated implant rehabilitation although considered best also has some excluding factors such as extent of disease, amount of remaining dentition, post-operative radiation therapy, patient preference, and expense.

**Figure 3:** Clinical and lab procedures for the fabrication of removable guide flange prosthesis includes impression making, final working casts, wire bending for retention of prosthesis, and final wax model of prosthesis ready to dewaxing for the fabrication of guide flange prosthesis

**Figure 4:** Final prosthesis of clear heat cure acrylic
Prevention of mandibular deviation with guide flange prosthesis

Gupta, et al. Prevention of mandibular deviation with guide flange prosthesis

Conclusion

To restore function, disfigurement, and speech for a hemimandibulectomy patient, it is very challenging for any clinician. Even with various treatment options, complete satisfaction to both patient and prosthodontist is not possible. For a patient undergoing radiation therapy and minimum mouth opening, a removable type of guide flange prosthesis is a good option both economically and functionally, for the early management of deviation.

Clinical significance

Proper positioning of the mandible is of utmost importance for proper mastication, speech. Mandibulectomy leads to deviation of the jaw and thus hampering most of the functions. Hence, to guide the mandible in its position with the help of prosthesis acts as a boon to the patient. Removable prosthesis being simpler and economical is widely accepted by the patient. Guide flange prosthesis improves the quality of life by improving mastication and bringing functional intercuspation.

References

1. Beumer J 3rd, Curtis TA, Marunick MT. Maxillofacial rehabilitation. In: Prosthodontic and Surgical Consideration. St Louis: Ishiyaku; 1996. p. 113–24, 184–8.
2. Taylor TD. Clinical Maxillofacial Prosthetics. Chicago: Quintessence; 1997. p. 171–88.
3. Aramany MA, Myers EN. Inter maxillary fixation following mandibular resection. J Prosthet Dent 1977;37:437–44.
4. Schneider RL, Taylor TD. Mandibular resection guidance prostheses: A literature review. J Prosthet Dent 1986;55:84–6.
5. Patil PG, Patil SF. Guide flange prosthesis for early management of reconstructed hemimandibulectomy: A case report. J Adv Prosthodont 2011;3:172–6.
6. Nair SJ, Aparna IN, Dhanasekar B, Prabhu N. Prosthetic Rehabilitation of Hemimandibulectomy Defect with Removable Partial Denture Prosthesis Using an Attachment-Retained Guiding Flange. Contemp Clin Dent 2018;9:120–2.
7. Nelogi S, Chowdhary R, Ambi M, Kothari P. A fixed guide flange appliance for patients after a hemimandibulectomy. J Prosthet Dent 2013;110:429–32.
8. Schneider RL, Taylor TD. Mandibular resection guidance prostheses: A literature review. J Prosthet Dent 1986;55:84–6.
9. Olson ML, Shedd DP. Disability and rehabilitation in head and neck cancer patients after treatment. Head Neck Surg 1978;1:52–8.
10. Curtis DA, Plesh O, Miller AJ, Curtis TA, Sharma A, Schweitzer R, et al. A comparison of masticatory function in patients with or without reconstruction of the mandible. Head Neck 1997;19:287–96.
11. Taylor TD. Diagnostic considerations for prosthetic rehabilitation of the mandibulectomy patient. In. Taylor TD, editor. Clinical Maxillofacial Prosthetics. Chicago: Quintessence Publishing; 2000. p. 155–70.
12. Sahin N, Hekimoğlu 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.
13. Chalian VA, Drane JB, Standish SM. Maxillofacial Prosthetics Multidisciplinary Practice. Baltimore: Williams & Wilkins; 1972. p. 148.
14. Joshi PR, Saini GS, Shetty P, Bhat SG. Prosthetic rehabilitation following segmental mandibulectomy. J Ind Prosthodont Soc 2008;8:108–11.
15. Maroulakos G, Nagy WW, Ahmed A, Artopoulou II. Prosthetic rehabilitation following lateral resection of the mandible with a long cantilever implant-supported fixed prosthesis: A 3-year clinical report. J Prosthet Dent 2017;118:678–85.

Figure 5: Post-treatment condition of the patient showing functional intercuspation and corrected deviation with the help of a prosthesis