BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 21, Issue 5

DOI: 10.58240/1829006X-2025.5.21-84

CASE REPORT

RESTORING FUNCTION AND QUALITY OF LIFE: A CASE REPORT OF FIXED FUNCTIONAL GUIDE FLANGE PROSTHESIS IN HEMI MANDIBULECTOMY REHABILITATION

Hema Kanathila[1], Karuna S Patwardhan[2], Santosh Nelogi[3], Shetty Hardik Santosh [4], Rahul Bhandary[5], Akshata Okade[6], Suvidha Patil[7], Chitra Jhugroo[8]

1.Professor, Department of Prosthodontics and Crown & Bridge, KAHERs KLE VK Institute of Dental Sciences, Belagavi- 590010, India. Email ID: hemak_19@yahoo.com Ph -9986850892

2.Post graduate student, Department of Prosthodontics and Crown & Bridge, KAHERs KLE VK Institute of Dental Sciences, Belagavi 590010, India. Email ID: karunapat19@gmail.com.Ph – 9739554496

3. Professor, Department of Prosthodontics and Crown & Bridge, KAHERs KLE VK Institute of Dental Sciences, Belagavi 590010, India. Emil id - drsantoshnelogi@kledental-bgm.edu.in. Ph-9886968809

4. Associate Professor, Department of Oral and Maxillofacial Surgery, Sharavathi Dental College and Hospital, Shivamogga. Email id- drhardikshetty@gmail.com.Ph- 8431515843

5. Professor, Department of Periodontology, A B Shetty Memorial Institute of Dental Sciences, NITTE(Deemed to be University) Mangalore. Email id- drrahulbhandary@nitte.edu.in Ph -9845583085

6. Reader, Department of Oral Pathology, Sharavathi Dental College and Hospital, Shivamogga.Email id- akshata.okade@gmail.com, Ph- 9986003696

7. Lecturer, Department of Prosthodontics and Crown & Bridge, KAHERs KLE VK Institute of Dental Sciences, Belagavi 590010, India. Email ID: patilsuvidha29@gmail.com .Ph- 9538170978

8.Nano Dental and Medical Ltd, Solferino, Kistoo Lane, Vacoas, Mauritius. Email id- chitra.1809@yahoo.com. Ph -23058076769

***Corresponding Author:**Dr. Hema Kanathila, Professor, Department of Prosthodontics and Crown & Bridge, KAHER s KLE VK Institute of Dental Sciences, Belagavi- 590010, India.

Phone number: 9986850892 Email ID: hemak_19@yahoo.com

Received: *May 2. 2025;* ***Accepted:*** *May. 28, 2025;* ***Published:*** *Jun. 10,2025*

***Keywords*:** Hemimanibulectomy, Rehabilitation, Guide flange

ABSTRACT

Hemi mandibulectomy, as a surgical removal of one lateral half of the mandible, tends to result in patients with considerable esthetic and functional deficits such as mandibular deviation, masticatory disability, speech defect, and facial asymmetry. Prosthetic rehabilitation is required to restore function and quality of life for such individuals. The present case report illustrates prosthodontic rehabilitation of a 65-year-old man who had undergone right hemi mandibulectomy. A fixed guide flange prosthesis was designed and made for mandibular guidance and prevention of deviation on closure. The prosthesis harnessed the available dentition to stabilize it and provided a mechanical guide plane for optimal occlusion. The patient exhibited significant improvement in masticatory efficiency, mandibular control, and overall oral function. This case demonstrates the effectiveness of a fixed guide flange prosthesis in rehabilitation following post-hemi mandibulectomy and emphasizes the significance of early prosthodontic intervention.

INTRODUCTION

Oral cancer is the sixth most prevalent form of cancer worldwide. India bears the highest number of oral cancer incidences, accounting for one-third of the total global burden of this disease.[1,2.] Buccal mucosa cancer typically manifests along the occlusal plane and is distinguished by pain and ulceration, often accompanied by a buccal mass. Squamous cell carcinoma (SCC) affecting the buccal mucosa is infrequent, constituting approximately 10% of all oral cancers.[3,4.] It is widely accepted that patients with oral squamous cell carcinoma involving the mandible should undergo surgical treatment. In cases of significant mandibular invasion, a mandibular resection

is necessary.[5]

Following mandibulectomy, patients typically experience the loss of occlusion and the absence of muscle attachment to the mandible on the surgical side. This leads to inferior rotation of the mandible upon closure, causing deviation towards the side of the defect. Additionally, it results in facial deformity and difficulties in speech and mastication.[6] The treatment of a deviated mandible typically begins with early corrective mandibular movement therapy, which involves physiotherapeutic stretching exercises. Additionally, different designs of prostheses have been described to aid in guiding the mandible into centric occlusion.[7,8,9.] The literature describes a variety of methods for correcting mandibular deviation, including intermaxillary or palatal fixation with elastics or mandibular guiding flange prosthesis fixed to the natural teeth or dental flange. A removable guide flange prosthesis is difficult to be retained intraorally if a few teeth remain in the segmented mandible. Radiation and surgical scarring can further impair retention by limiting mouth opening and functional vestibule depth, making it impossible for the patient to secure and remove the guide flange prosthesis and causing more occlusal issues.[10] There are several approaches to rehabilitate a patient with a permanent or removable guide flange prosthesis.[11-16.]

This article aims to provide patients with oral carcinomas a prosthesis that is functional, affordable, rigid enough to resist masticatory forces, for patients who belong primarily from families with low incomes, for a disease which is a result of smoking and ingesting toxins. This case report describes a fixed dental guide flange prosthesis, a financially viable choice for individuals from lower socioeconomic strata, where reconstruction procedures and endosteal dental implants are not affordable.

CASE PRESENTATION:

A 65-year-old male patient presented to the Department of Prosthodontics with a chief complaint of difficulty in chewing meals. Upon recording the patient's complete medical history, it was revealed that he had experienced pain in his right jaw and teeth region six months prior. Subsequent diagnosis indicated carcinoma of the buccal mucosa, leading him to undergo hemi mandibulectomy along with resection of the right lateral border of the tongue, which was replaced with a PMMC flap. Due to post-surgical challenges in mastication and speech, the patient was referred for prosthetic rehabilitation.

During the extra-oral examination, a limited mouth opening of 20mm was noted, along with mandibular deviation to the affected side, resulting in facial asymmetry (Figure 1). Intraoral examination and OPG (Figure 2), revealed missing teeth with 15, 16 and 36, with root stumps remaining for 14 and 17. While considering various treatment options, including implants, the possibility of an implant-supported fixed prosthesis was ruled out due to the patient's history of radiation therapy. Given the absence of tooth 36 and the patient's preference for its replacement, it was decided to fabricate a fixed functional guide flange prosthesis, utilizing 35 and 37 as abutments.

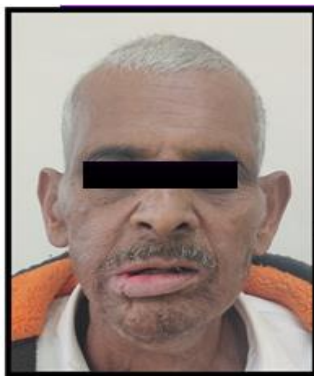

Figure 1. Mandibular deviation of the affected side.

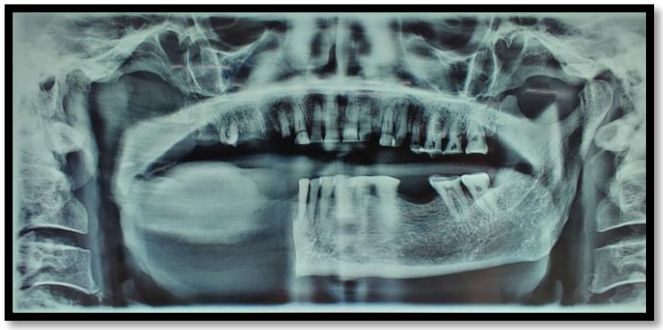

Figure 2. OPG

CLINICAL PROCEDURE:

- Impressions of maxillary and mandibular arches were made using irreversible hydrocolloid (Zhermac Tropicalgin) and poured with type III gypsum (dental stone) material. Deviated bite was recorded using jet bite material and mounted on a mean value articulator.
- Tooth preparation for receiving a metal FPD on the missing 36 tooth was performed followed by secondary impression recording after gingival tissue retraction using a 000 gingival retraction cord and two-stage putty light-body impression with addition silicone. Mandibular cast was poured using type IV gypsum (die stone) material. (Figure 3)
- Provisionalization of prepared teeth was carried out using Protemp 4 (3M ESPE).
- Facebow transfer and centric bite recording was completed using silicone material (Jet bite, Coltene), and the casts were mounted on a semi-adjustable articulator.

- The wax pattern was fabricated, and for the extension of the guide flange, 2mm sprue wax was bent at right angles, resembling a U-shape, from the buccal aspect of the abutment teeth wax
  pattern (Figure 4). This arrangement provided support for the clear acrylic resin. Self-cure clear acrylic material was adapted to the metal extension, extending from the buccal aspect, ensuring that there was no impingement on the maxillary gingiva during maximum intercuspation.
- Trial was conducted to assess mandibular guidance with the guide flange prosthesis, with the patient exhibiting ease in guiding the mandible into the centric position without discomfort.
- The functional prosthesis was cemented using type 1 Glass ionomer cement. (Figure 5- A and B). After cementation, the patient was given appointment for follow-up visit.

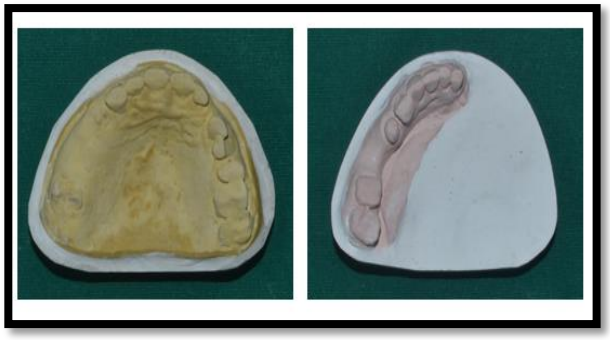

Figure 3. Maxillary and mandibular definitive casts.

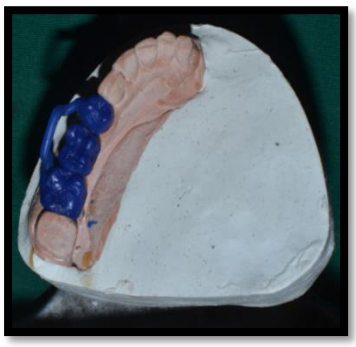

Figure 4. Wax pattern of the guide flange prosthesis.

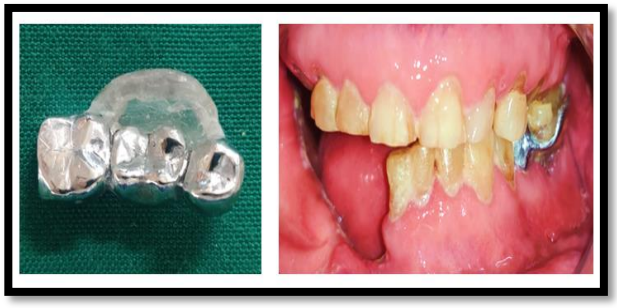

Figure 5. A. Final guide flange prosthesis with clear acrylic extension. B. Cementation of the prosthesis intraorally.

FOLLOW-UP:
The recall visit was scheduled 24 hours post the prosthesis cementation. Any issues arising from acrylic extension impingement were promptly addressed and rectified to ensure patient comfort. Notably, as the prosthesis was fixed, the inconvenience of removing and replacing the prosthesis was not an issue, addressing a significant limitation of removable prostheses. Subsequent to the initial visit, the patient was re-evaluated within a month's timeframe.

During this follow-up, the patient expressed satisfaction with improved mandibular closure facilitated by the fixed prosthesis, enhancing the patient's ability to masticate, improved phonetics, and reported an overall sense of psychological well-being.

Figure 6. Pre-operative photograph depicting mandibular deviation. B. Post-operative photograph with prosthesis in-situ.

DISCUSSION

Following oral cancer surgery, an undesirable anatomic and biomechanical state is frequently created, such as limited mouth opening due to scarring, reduced tongue function, loss of labiolingual sulcus, mandibular deviation, absence of underlying osseous support for facial characteristics, and insufficient soft tissue for speech and swallowing.[17]
Rehabilitating mandibular abnormalities is essential to regain oral function.[18] Therefore, the primary goal of this case report was to propose a fixed prosthesis for the patient, which would help with the process of restoring oral function.
This article discussed a case study of a patient who was diagnosed with squamous cell carcinoma of the buccal mucosa for which he underwent right hemi-mandibulectomy and had the lateral border of the tongue resected, then a PMMC flap used for the reconstruction. The patient had a history of chewing beetle nut for 20 years and had poor maintenance of oral hygiene.
To undergo prosthodontic rehabilitation, it is essential to comprehend the various classifications of mandibular defects given by authors like Jewer and Boyd, Urken,

Cantor and Curtis. [19-22] This article deals with Cantor and Curtis class II type of a mandibular defect, for which a fixed functional guide flange prosthesis in the form of a metal FPD was planned. There are different methods of rehabilitation using fixed or removable prosthesis for such defects. In some cases, scar contraction limits the mouth opening in a more extensive manner that the placement and removal of removable appliances become difficult. Therefore, a fixed guide flange prosthesis is designed in such cases, which would keep the muscles in a stressed condition, preventing scar contraction[13].

Nelogi et al. developed a fixed guide flange prosthesis by affixing an orthodontic band around a molar tooth. They then adapted a wrought wire into a U shape, with a tube 10mm in length positioned at the base of the U-shaped framework. This allowed for free rotation around the tube, facilitating the guidance of the mandible into centric position.[9] Since there was a possibility of an FPD owing to missing 36, it was decided to fabricate a buccal extension as a guide onto the metal FPD which would guide the mandible into centric. In this prosthesis, a wax pattern was fabricated onto 35-37 with a U-shaped extension onto the prepared wax pattern using sprue wax which extended buccally onto the maxillary molar. After fabrication of the metal FPD, clear acrylic was adapted onto the metal extension to act as a guide and was extended until the maxillary molar. This technique is suggested exclusively when the remaining teeth exhibit sufficient periodontal health to withstand the masticatory forces and muscular pull.

The proposed fixed guide flange prosthesis is not only functional but also easy to fabricate and repair, comfortable and esthetic. Moreover, it facilitates improved hygiene maintenance.

Following the cementation of the prosthesis, it is important to conduct regular evaluations of the patient. Initial assessments should occur at intervals of 24 hours and 72 hours to assess for muscle pain, discomfort around the temporomandibular joint (TMJ), or any potential impingement of the acrylic extension onto the maxillary buccal mucosa. Subsequently, evaluations should be conducted at monthly intervals to gauge the effectiveness of the guide flange prosthesis.

CONCLUSION

The suggested fixed guide flange prosthesis serves as an alternative to removable guide flange prostheses which is easy to fabricate and repair while improving the ability to masticate, enhance support, as forces are distributed along healthy abutment teeth. Along with these benefits, the prosthesis is cost-effective and beneficial for patients who belong to lower socio-economic status. Long-term studies are warranted to comprehensively evaluate both the effectiveness and potential drawbacks of employing fixed guide flange prostheses as a prosthetic rehabilitation option for hemimandibulectomy defects.

DECLARATIONS

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable.

Competing interests

The authors declare no conflict of interest.

Funding

This research received no external funding.

REFERENCES

1. Sarode G, Maniyar N, Sarode SC, Jafer M, Patil S, Awan KH. Epidemiologic aspects of oral cancer. Dis Mon. 2020 Dec;66(12):100988.
2. Borse V, Konwar AN, Buragohain P. Oral cancer diagnosis and perspectives in India. Sens Int. 2020;1:100046.
3. Vegers JW, Snow GB, van der Waal I.Squamous cell carcinoma of the buccal mucosa. A review of 85 cases. Arch Otolaryngol. 1979 Apr;105(4):192-5.
4. Kim IH, Myoung H. Squamous cell carcinoma of the buccal mucosa involving the masticator space: a case report. J Korean Assoc Oral Maxillofac Surg. 2017 Jun;43(3):191-196.
5. Yang W, Zhao S, Liu F, Sun M. Health-related quality of life after mandibular resection for oral cancer: reconstruction with free fibula flap. Med Oral Patol Oral Cir Bucal. 2014 Jul 1;19(4):e414-8.
6. Gupta, Nimmi & Srivastava, Vandita & Kumar, Aswin & Shukla, Neeteesh. Guide flange prosthesis for the management of deviation following hemimandibulectomy: A case report. International Journal of Medical and Dental Case Reports.2022;7.1-4.
7. Patil PG, Patil SP. Guide flange prosthesis for early management of reconstructed hemimandibulectomy: a case report. J Adv Prosthodont. 2011 Sep;3(3):172-6.
8. 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 Mar;93(3):217-20.
9. Nelogi S, Chowdhary R, Ambi M, Kothari P. A fixed guide flange appliance for patients after a hemimandibulectomy. J Prosthet Dent. 2013 Nov;110(5):429-32.

10. Schneider RL, Taylor TD. Mandibular resection guidance prostheses: a literature review. J Prosthet Dent. 1986 Jan;55(1):84-6.
11. Lingeshwar D, Appadurai R, Sswedheni U, Padmaja C. Prosthodontic management of hemimandibulectomy patients to restore form and function - A case series. World J Clin Cases. 2017 Oct 16;5(10):384-389.
12. Nag PVR, Bhagwatkar T. Prosthetic management of a hemimandibulectomy patient using tilted implant protocol with 3-year follow-up. J Indian Prosthodont Soc. 2020;20(3):326-330.
13. Adil H, Ahmed N, Heboyan A. Prosthetic rehabilitation of a patient with hemimandibulectomy by a double occlusal table prosthesis. SAGE Open Med Case Rep.2023 Jun 16;11:2050313X231181976.
14. Sohmat P, Jurel SK, Singh RD, Chand P, Solanki N. Prosthetic management of a postsquamous cell carcinoma patient with maxillomandibular resection including lip. J Cancer Res Ther. 2022 Apr-Jun;18(3):834-836.
15. Watson RM, Welfare RD, Islami A. The difficulties of prosthetic management of edentulous cases with hemi-mandibulectomy following cancer treatment. J Oral Rehabil. 1984 May;11(3):201-14.
16. Curtis DA, Plesh O, Miller AJ, Curtis TA, Sharma A, Schweitzer R, Hilsinger RL, Schour L, Singer M. A comparison of masticatory function in patients with or without reconstruction of the mandible. Head Neck. 1997 Jul;19(4):287-96.
17. Singh A, Bhatnagar A, Bansal R, Singh BP. Oral rehabilitation of segmental mandibulectomy patient with osseointegrated dental implant. Contemp Clin Dent. 2014 Apr;5(2):209-12.
18. Fernandes N, van den Heever J, Hoek K, Booysen G. Customized reconstruction of an extensive mandibular defect: A clinical report. J Prosthet Dent. 2016 Dec;116(6):928-931.
19. Jewer DD, Boyd JB, Manktelow RT, et al. Orofacial and mandibular reconstruction with the iliac crest free flap: a review of 60 cases and a new method of classification. Plast Reconstr Surg 1989; 84(3): 391–403; discussion404.
20. Boyd BJ, Gullane PJ, Rotstein LE, et al. Classification of mandibular defects. Plastic Reconstruct Surg 1993; 92(7): 1266–1275.
21. Urken ML, Weinberg H, Vickery C, et al. Oromandibular reconstruction using microvascular composite free flaps: report of 71 cases and a new classification scheme for bony, soft-tissue, and neurologic defects. Arch Otolaryngol Head Neck Surg 1991; 117(7): 733–744.
22. Cantor R and Curtis TA. Prosthetic management of edentulous mandibulectomy patients. Part I. Anatomic, physiologic, an psychologic considerations. J Prosthet Dentis 1971; 25(4): 446–457.