



Case Report

Prosthetic rehabilitation of a marginally resected mandible with complete denture: a case report

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Abstract

This case report highlights the prosthetic rehabilitation of a 45-year-old male patient who underwent a segmental mandibulectomy following squamous cell carcinoma of the left buccal mucosa. Post-surgical challenges included loss of alveolar ridge, obliteration of buccal and lingual sulci, extensive scar formation, and mandibular deviation, all of which compromised prosthetic retention and stability. Considering the patient's reluctance for further surgical intervention and financial limitations, a conventional complete denture was planned as a practical solution. Impressions were meticulously recorded using sectional border molding and the neutral zone technique to capture functional muscle dynamics and optimize denture stability.

Balanced occlusion was selectively established, with teeth arrangement limited to premolars on the resected side to minimise destabilising forces, while promoting efficient mastication on the intact side. Post-insertion follow-ups demonstrated improved comfort, esthetics, phonetics, and masticatory efficiency, with the patient adapting well to the prosthesis over regular recall visits. This case emphasizes the importance of careful impression techniques, proper border extension, and harmonious occlusion in managing mandibular resection patients, while also highlighting that conventional complete dentures remain a reliable, cost-effective, and predictable treatment option when reconstructive or implant-supported approaches are not feasible.

Keywords: Segmental mandibulectomy, Marginal resection of mandible, Mandibular resection prosthesis, complete denture, Neutral zone technique, Prosthetic rehabilitation.

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1. Introduction

Restoring or preserving the lower jaw (mandibular arch) is one of the most important steps in rebuilding the mouth after treatment for oral cancer. Surgery and other cancer treatments can sometimes leave patients facing difficulties with basic functions like speaking, chewing, and swallowing, as well as changes in facial appearance. These challenges can deeply affect quality of life. That's why timely rehabilitation—especially after procedures like partial (marginal) or complete (segmental) removal of part of the jaw—is so vital, not just for physical recovery, but also for restoring confidence and overall well-being.¹ Prosthetic rehabilitation is commonly accomplished using a mandibular resection prosthesis, and its effectiveness depends greatly on pretreatment planning and interdisciplinary management.²

Mandibular defects vary in presentation. Marginal mandibulectomy involves resection of a single cortical plate, whereas segmental mandibulectomy entails Excision of the complete mandibular segment encompassing both cortical plates and the medullary bone, and associated dentition.³ Smaller defects that preserve mandibular continuity are relatively straightforward to restore prosthetically.⁴ In contrast, larger defects extending into the floor of the mouth present significant challenges, even when mandibular continuity is maintained.⁵ Segmental resections further complicate rehabilitation due to compromised tongue function, loss of vestibular extension, and reduced tissue support.⁶

Reconstructive procedures and implant-assisted overdentures may enhance prosthetic prognosis, but radiotherapy-related complications, financial constraints, and patient reluctance to undergo additional surgeries often limit

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their feasibility.² In such situations, fabrication of a traditional complete denture provides a practical and predictable option for restoring function and improving quality of life.⁷

2. Case Report

- 1. *Patient history:* A 45-year-old male presented to the Department of Prosthodontics on referral for prosthetic rehabilitation following a segmental mandibulectomy. The patient’s medical history revealed a diagnosis of squamous cell carcinoma of the left buccal mucosa, for which He had been subjected to partial glossectomy and segmental mandibulectomy. (**Figure 1**)
- 2. *Intraoral findings:* Clinical examination revealed thick, mobile soft tissues with extensive scar formation, along with loss of the alveolar ridge and obliteration of both buccal and lingual sulci in the left mandibular region. The right side of the mandible demonstrated a completely edentulous alveolar ridge, and the maxillary arch was also completely edentulous. (**Figure 2**)
- 3. *Radiographic findings:* A panoramic radiograph showed a mandibular resection extending from the symphysis to the superior border of the body of the mandible. (**Figure 3**)
- 4. *Treatment planning:* Although an implant-supported prosthesis was considered, the patient declined further surgical intervention due to financial and treatment-related concerns. Vestibuloplasty in the left mandibular region, aimed at recreating buccal and lingual sulci for denture flange extension, was also ruled out for similar reasons. Hence, a conventional complete denture was planned as a noninvasive, economical, and practical treatment approach.



Figure 1: Preoperative extraoral Image

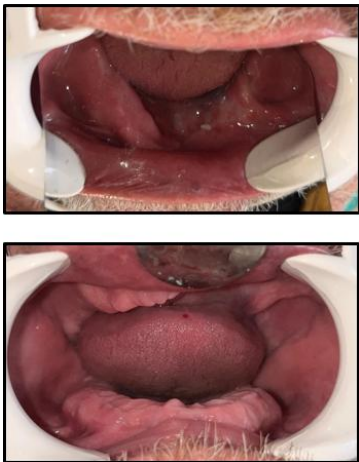


Figure 2: Postoperative intraoral Image

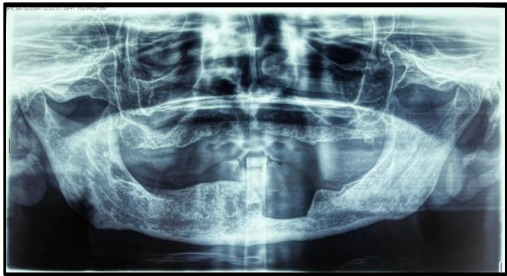


Figure 3: Panoramic radiograph

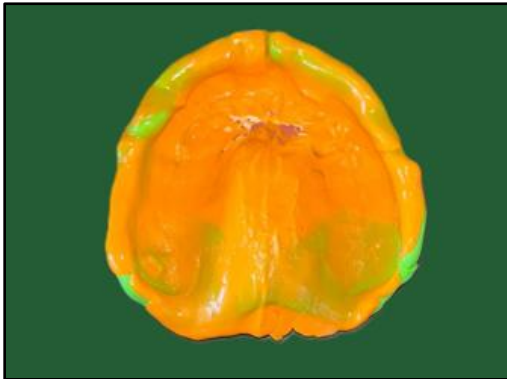


Figure 4: Final impression maxilla

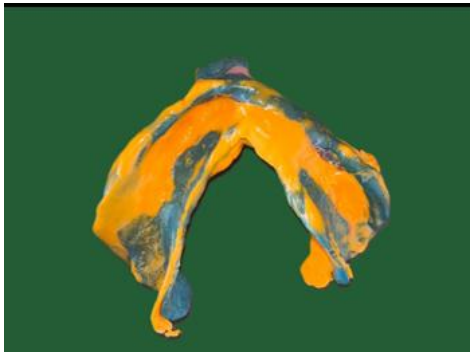


Figure 5: Final Impression Mandible



Figure 6: Neutral zone record

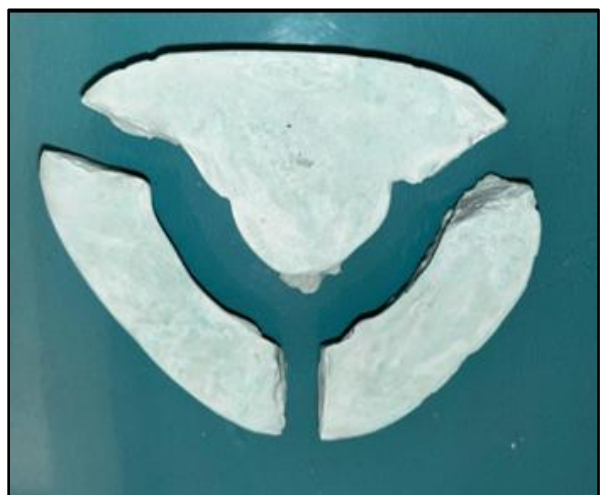


Figure 7: Neutral zone index

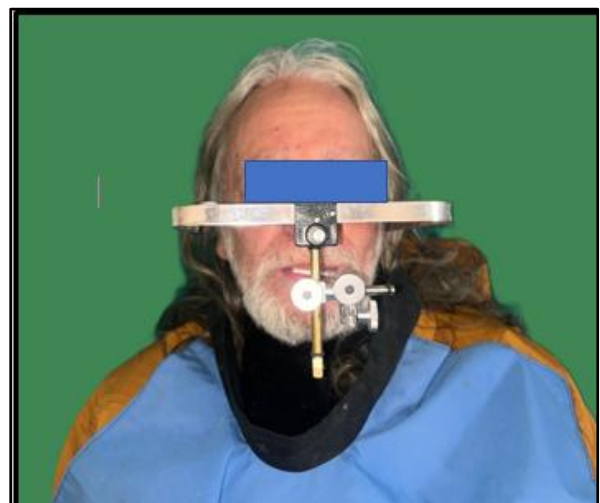


Figure 8: Orientation relation

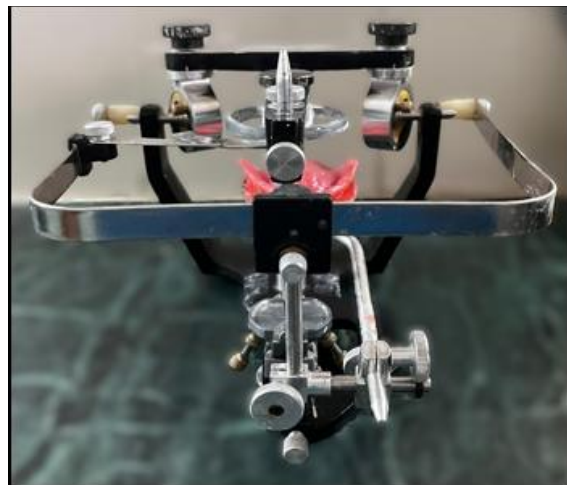


Figure 9: Orientation relation in hanau wide view articulator



Figure 10: Intaglio surface mandibular denture



Figure 11: Mandibular denture



Figure 12: Post-operative extraoral image



Figure 13: Post-operative intraoral image

2.1. Fabrication of complete denture prosthesis

Preliminary impressions were made using a plastic stock tray. To accommodate the surgical defect, the buccal flange of the left mandibular tray was trimmed, and further modifications were carried out using impression compound (DPI, New Delhi, India). The mandibular impression was recorded with irreversible hydrocolloid (Avue Hydrosol, BLV Healthcare Pvt. Ltd.). Impressions were poured in gypsum type III (Kalstone; Kalabhai Karson Pvt. Ltd.) and diagnostic casts were obtained.

Autopolymerizing acrylic resin (DPI Cold Cure) was used to fabricate the mandibular custom tray, incorporating a spacer over the right alveolar ridge. Sectional border molding was performed, first on the intact side and then on the defect side, where soft modeling compound (DPI Green Stick) was applied to the tray borders, tempered, and adapted intraorally. Dynamic tissue recording was achieved through tongue movements, swallowing, and mouth opening, repeated 3–4 times until adequate stability was obtained. Final wash impressions were made with light body addition silicone for

both arches, (**Figure 4-Figure 5**) and master casts were poured in type III gypsum.

Record bases were fabricated with autopolymerizing acrylic resin using the wax-template technique. Intraoral evaluation of the mandibular base for stability during functional movements was followed by wax rim adjustment according to the neutral zone technique. (**Figure 6-Figure 7**) Vertical and centric jaw relations were established. The maxillary cast was mounted on a semi-adjustable articulator (Hanau Wide View) using a facebow transfer, (**Figure 8-Figure 9**) followed by articulation of the mandibular cast. Mean condylar values (30° horizontal, 30° lateral) were programmed into the articulator to simulate mandibular movements and establish balanced occlusion.

Arrangement of anatomic acrylic resin teeth (Acryrock) was carried out. Owing to limited support on the left mandibular side, teeth arrangement was restricted to premolars, primarily to establish balancing side contacts. Balanced occlusion was established in protrusive and right lateral excursions, considering the predominance of mastication on the right side.

Trial dentures were waxed, carved, and intraoral evaluation was performed for esthetics, stability, phonetics, and occlusion in eccentric excursions. The dentures were subsequently processed by the conventional method using heat-polymerizing acrylic resin (Ivoclar Vivadent). (**Figure 10-Figure 11**)

2.2. Denture insertion and aftercare

Occlusion of the dentures in centric and eccentric positions was evaluated and adjusted intraorally. The dentures were delivered, and comprehensive post-insertion instructions were given. The patient was reviewed after 24 hours for necessary adjustments and was advised to initiate a soft diet on the right side 15 days after denture delivery. (**Figure 12-Figure 13**)

An assessment of patient satisfaction was conducted one month post-insertion. He expressed improved comfort, mastication, and esthetics with the prosthesis. To monitor adaptability and long-term function, regular follow-ups were scheduled every two months for the first year.

3. Discussion

Prosthetic rehabilitation of mandibular resection patients presents considerable challenges due to altered anatomy, loss of tissue support, and presence of scar tissue.⁸ In this case, resorption with loss of buccal and lingual vestibular depth and extensive scarring compromised denture retention and stability. Any scar tissue displacement caused by the denture base, or conversely, could have led to instability.⁹ Therefore, meticulous attention was directed toward border extensions, impression accuracy, polished surface contours, and the

development of harmonious occlusion to ensure functional stability.¹⁰

In such cases, the neutral zone technique plays a pivotal role in recording the functional contour of oral musculature.¹¹ This technique allows the prosthesis to harmonize with muscular forces during speaking, swallowing, and mastication, thereby enhancing stability.¹² The recorded contours influence tooth position, denture borders, and polished surfaces, ensuring that functional muscle activity contributes to stabilization rather than displacement.

Masticatory efficiency is often reduced in resection patients. To minimize instability, the patient was instructed to chew predominantly on the non-resected surgical side, a common recommendation in such cases. Although occlusal ramps or guiding platforms can be incorporated into the opposing prosthesis to re-establish a favorable mandibular position and provide broad occlusal contacts, they were unnecessary in this case because the patient demonstrated an acceptable maxillo-mandibular relationship.

Furthermore, bilateral balanced occlusion, often considered ideal in conventional complete dentures, may not be achievable or desirable in resection cases. Instead, selective occlusal contacts are established to provide stability during function.^{14,14} In this patient, the occlusal table on the surgically resected side was limited up to the 2nd premolar, which ensured balancing side contacts during right lateral excursions while minimizing destabilizing forces on the defect side.

Since tissue changes beneath maxillofacial prostheses tend to be more rapid compared to conventional complete dentures Regular recall appointments allowed continuous monitoring and timely corrections, thereby maintaining comfort, esthetics, and function.

4. Conclusion

Rehabilitation of mandibular resection patients poses significant functional and esthetic challenges due to loss of supporting tissues, scar contracture, and compromised neuromuscular control. In the present case, a conventional complete denture fabricated using the neutral zone technique provided satisfactory stability, retention, and comfort without the need for additional surgical interventions. The patient reported improved mastication, phonetics, and esthetics, demonstrating the value of careful impression making, proper border extension, and harmonious occlusion in such cases. Although implant-supported prostheses offer superior outcomes, conventional dentures remain a cost-effective, predictable, and practical treatment option in resource-limited or surgically restricted situations.

5. Source of Funding

None.

6. Conflict of Interest

None.

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