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Case Report

Twin occlusion table prosthesis as a functional solution for hemimandibulectomy rehabilitation: A case report

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Abstract

Hemimandibulectomy produces extensive anatomical and functional disturbances such as mandibular deviation, impaired mastication, defective phonation, and altered esthetics. Rehabilitation of such cases remains a prosthodontic challenge due to compromised anatomy and entrenched neuromuscular imbalance. Conventional treatment modalities such as guide flange prostheses and palatal ramps have been employed to counteract mandibular deviation; however, their long-term success is limited due to reduced patient adaptability and interference with tongue function. The twin occlusion table prosthesis (TOT) represents a novel design in which a secondary palatal occlusal platform is constructed to harmonise with the altered mandibular trajectory, thus re-establishing bilateral occlusal contacts without demanding correction. This case report details the clinical rehabilitation of a completely edentulous hemimandibulectomy patient using a TOT, focusing on clinical findings, impression procedures, prosthesis design, and post-treatment functional outcomes.

Keywords: Hemimandibulectomy, Mandibular deviation, Prosthodontic rehabilitation, Twin occlusion table prosthesis, Mandibular resection prosthesis.

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1. Introduction

Hemimandibulectomy, commonly indicated for oral squamous cell carcinoma, osteosarcoma, and other malignancies, leads to discontinuity defects of the mandible. Such defects disrupt mandibular balance by eliminating posterior occlusal stops, destabilising muscular equilibrium, and permitting deviation of the residual mandibular segment towards the resected side. These biomechanical disturbances result in compromised mastication, speech difficulties, and disfigurement, thereby affecting nutrition, systemic health, and psychosocial well-being.[1,2]

Prosthodontic rehabilitation plays a pivotal role in restoring function and confidence in these patients. Conventional modalities such as guide flange prostheses and palatal ramps[3,5] are useful in early rehabilitation, when scar tissue is pliable and deviation is not fixed. However, in delayed presentations where neuromuscular imbalance is entrenched, these appliances often fail to achieve consistent intercuspation, besides being bulky and disruptive to speech and tongue space.[6,7]

The twin occlusion table prosthesis (TOT) provides an innovative solution by accepting, rather than correcting, the altered mandibular path of closure. By incorporating an auxiliary occlusal platform on the palatal aspect of maxillary posterior denture teeth, the TOT establishes stable occlusal contacts in habitual closure, thereby enhancing chewing efficiency and speech intelligibility without encroaching on tongue function.[8-10]

This case report presents the prosthodontic management of a completely edentulous hemimandibulectomy patient using a TOT, elaborating on diagnostic challenges, clinical procedures, laboratory techniques, and post-treatment outcomes.

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2. Case Report

A 55-year-old male reported to the Department of Prosthodontics with complaints of impaired chewing efficiency and unsatisfactory facial appearance following a left hemimandibulectomy carried out two years earlier for osteosarcoma. The patient had completed postoperative radiotherapy six months prior and was disease free at the time of examination.

Extraoral evaluation revealed marked deviation of the chin towards the resected side on closure, commissural canting, and collapse of soft tissues on the left lower third of the face (**Figure 1**).

Figure 1: Preoperative extraoral view

A well-healed cervicofacial scar was noted on the surgical side, and mouth opening was within functional limits although lateral excursion towards the non-resected side was limited. IIntraoral examination demonstrated complete edentulism in the mandibular arch, whereas the maxillary arch exhibited partial edentulism with the presence of tooth 13 and a retained root stump in relation to tooth 17, with the surgical bed covered in healthy mucosa and exhibiting adequate keratinisation (**Figure 2**). The mandibular segment deviated considerably towards the surgical side on closure, preventing stable bilateral intercuspation (**Figure 3**).

Figure 2: Preoperative OPG

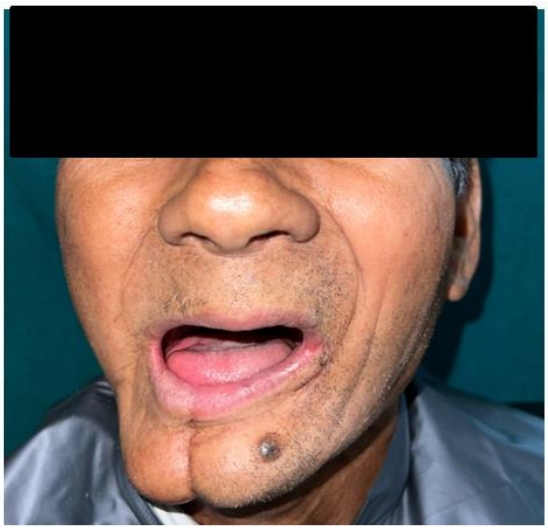

Figure 3: Extraoral view showing mandibular deviation

Speech was intelligible, though certain sounds, particularly fricatives, were distorted. Manual chin guidance could bring the mandible closer to an acceptable interarch relationship; however, the corrected position was not self-maintainable, indicating the necessity of a prosthesis that would accommodate the habitual closure path rather than attempt to forcibly correct it.[11]

Prior to initiating prosthesis fabrication, pre-prosthetic mouth preparation was carried out, and the patient was referred to the Department of Oral Surgery for extraction of teeth 13 and 17.

Preliminary impressions of both arches were made using irreversible hydrocolloid material and poured in dental stone to obtain diagnostic casts for assessment of deviation and planning of prosthetic design (**Figure 4**).

Figure 4: Primary impressions of maxilla & mandible

Custom trays were fabricated and border moulding was performed followed by secondary impressions with elastomeric material to record accurate details (**Figure 5**).

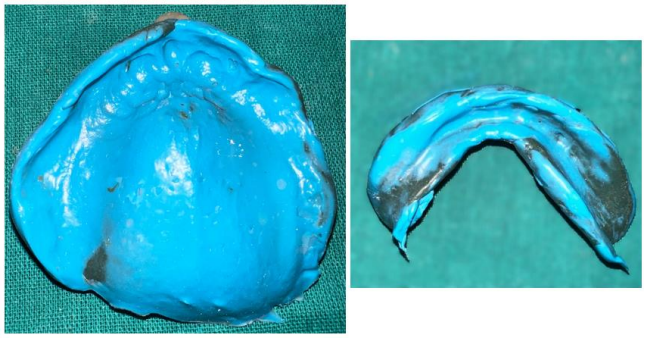

Figure 5: Seconary impressions of maxilla and mandible

Denture bases were constructed on the maxillary and mandibular master casts using self-cure resin, followed by fabrication of occlusal rims. The maxillary rim was evaluated for lip fullness and support, after which its visibility was assessed and adjusted to remain 2 mm below the upper lip. Using a Fox plane, the maxillary rim was oriented parallel to the Ala–Tragus line. The vertical dimension at rest was established through facial measurements, phonetic evaluation, and esthetic analysis of the lower facial third. A freeway space of 2–3 mm was confirmed. In view of the patient's history of radiotherapy and associated mucosal sensitivity, the vertical dimension was maintained without excessive alteration to prevent muscular strain. Since the patient was unable to consistently reproduce centric relation, the habitual path of closure was recorded at the functional swallowing position, the midline was marked, and the rims were sealed together.(**Figure 6**).

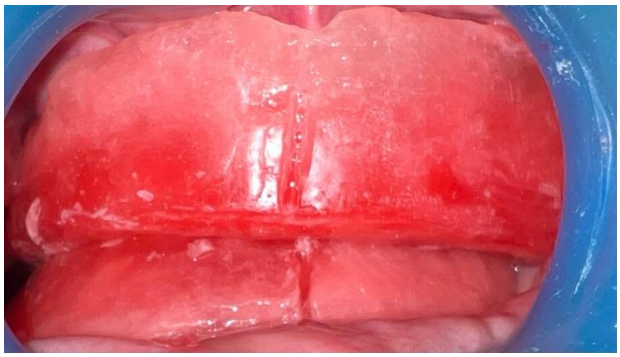

Figure 6: Maxillomandibular realtion

On the articulator, it was planned to create two functional occlusal platforms: the natural denture occlusion acting as the primary occlusion table and a secondary "twin occlusion table" constructed on the palatal aspect of the right maxillary premolars and molars. This auxiliary occlusal platform was designed using monoplane teeth, approximately 4–6 mm wide, to intercept the buccal cusps of the mandibular denture teeth during the terminal phase of habitual closure. The anterior portion of the platform was gently inclined to guide the mandible inward while the posterior end was flat to provide stable occlusion. Wax trial insertion confirmed consistent contact of the deviated mandible on the palatal table without premature interferences on the denture occlusion. Phonetics and tongue space were verified, and minor contouring of the palatal platform eliminated any lisping.[13,14]

The prosthesis was processed with heat-cured polymethyl methacrylate resin using a long curing cycle to minimise residual monomer and maintain dimensional accuracy. A putty index was employed to preserve the geometry of the twin occlusion table during processing. The palatal platform was finished with smooth transitions at its margins, highly polished surfaces to reduce plaque retention, and a lightly stippled occlusal contact zone to enhance proprioceptive feedback. The finished prosthesis is depicted in (**Figure 7**).

Figure 7: Final prosthesis

At insertion, pressure-indicating paste confirmed complete seating of the prosthesis without rocking, and occlusal adjustments with articulating paper established harmonious bilateral contacts between the primary and secondary occlusal tables. The patient was instructed in closure exercises and gradual dietary adaptation, beginning with soft food on the non-resected side, and was also advised on oral hygiene measures, the use of saliva substitutes, and periodic follow-up visits. (**Figure 8**)

Figure 8: Post insertion

At one week, the patient reported improved control in chewing and reduced cheek biting. By one month, speech clarity had improved and facial symmetry appeared more acceptable due to a more centred mandibular posture. At the three-month follow-up, the patient could consume most foods comfortably, experienced no discomfort, and expressed significant satisfaction with esthetics and overall quality of life. Post-treatment views demonstrated improved occlusion and symmetry.

3. Discussion

Hemimandibulectomy creates discontinuity defects that compromise mandibular biomechanics, occlusal stability, and neuromuscular coordination. The removal of one side of

the mandible eliminates posterior occlusal stops and produces an imbalance of muscular forces, causing the mandible to deviate towards the surgical side. This deviation becomes more pronounced with time due to scar contracture and progressive neuromuscular adaptation, making correction increasingly difficult.

Conventional prosthodontic options such as guide flange prostheses and palatal ramps are often advocated during the early postoperative period, as they can help retrain mandibular closure before deviation becomes fixed.[5,6] However, their usefulness is limited in delayed, edentulous cases where the deviation is long-standing. The bulkiness of guide flanges frequently interferes with tongue movements and speech, and patients often find them cumbersome for long-term use. Consequently, their clinical acceptability is low, particularly when the prosthodontist is confronted with established deviations and irradiated oral tissues that are less tolerant of prosthetic stress.

The twin occlusion table prosthesis provides an innovative alternative in such circumstances. Rather than attempting to forcefully correct the deviated mandibular path, the TOT accepts the habitual closure trajectory and provides an auxiliary occlusal surface to achieve stable bilateral contacts. By placing a secondary occlusion table on the palatal surface of the maxillary denture teeth, the prosthesis establishes a wider and more accommodating occlusal platform for the deviated mandibular segment. This design not only improves masticatory efficiency but also enhances proprioceptive feedback, allowing the patient to achieve consistent and repeatable closure without the discomfort of being guided away from the natural trajectory. The reduced bulk compared to traditional ramps also prevents interference with tongue movements and speech, thereby facilitating rapid adaptation and acceptance.[8,9,12]

Reports in the literature corroborate the effectiveness of such design modifications. Sharma and colleagues highlighted that guidance prostheses with altered occlusal surfaces significantly improve mastication in patients with mandibular resections.[6] Cantor et al. demonstrated that palatally positioned occlusal tables restored functional efficiency and improved nutritional intake in hemimandibulectomy patients.[13] Adil et al. presented TOT as a cost-effective solution in resource-limited settings,[12] while Koralakunte et al. emphasized that prostheses designed to adapt to deviation rather than correct it led to higher patient satisfaction and long-term compliance.[14]

The present case illustrates that TOT can achieve substantial improvements in chewing efficiency, phonetics, and esthetics even in a completely edentulous patient rehabilitated two years after surgery. The patient adapted rapidly to the prosthesis, and within three months was able to consume most foods comfortably, exhibited clearer speech, and expressed greater social confidence. The simplicity and economy of fabrication further enhance the appeal of TOT, particularly in patients for whom advanced reconstructive or implant-supported options are contraindicated due to medical, anatomical, or financial reasons.

Nevertheless, limitations remain. TOT requires adequate maxillary denture stability to support the palatal table, and wear of the acrylic surface over time may necessitate periodic adjustments or relining. In addition, the design does not restore mandibular symmetry but rather accommodates the defect. Despite these limitations, the TOT represents a practical and patient-centred approach that balances simplicity with effectiveness, and its incorporation into the prosthodontic armamentarium can be invaluable for hemimandibulectomy rehabilitation.

4. Conclusion

The twin occlusion table prosthesis is a simple yet innovative design that effectively rehabilitates completely edentulous hemimandibulectomy patients with established mandibular deviation. By harmonising with the patient's habitual closure path, it restores bilateral occlusion, improves mastication, enhances speech, and contributes to esthetics and psychological well-being. Owing to its cost-effectiveness and ease of fabrication, the TOT serves as a valuable option in cases where advanced surgical or implant-supported rehabilitation is not feasible.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Salinas TJ. Prosthetic rehabilitation of defects of the head and neck. *Semin Plast Surg*. 2010;24(3):299–308. https://doi.org/10.1055/s-0030-1263071.
2. Beumer J, Curtis TA, Marunick MT. *Maxillofacial rehabilitation: surgical and prosthodontic management of cancer-related, acquired, and congenital defects of the head and neck*. 3rd ed. Chicago: Quintessence Publishing; 2011.
3. Raut M, Kharat S, Shetty K, Gangde P, Gupta P, Devhade M. Prosthetic rehabilitation of a hemi-mandibulectomy patient with interim mandibular guide flange and maxillary twin occlusion: a case report. *J Pharm Bioallied Sci*. 2024;16(Suppl 3):S3009–11. https://doi.org/10.4103/jpbs.jpbs_521_24.
4. Keyf F. Obturator prostheses for hemimaxillectomy patients. *J Oral Rehabil*. 2001;28(9):821–9. https://doi.org/10.1046/j.1365-2842.2001.00754.x.
5. Schneider RL, Taylor TD. Mandibular resection guidance prostheses: a literature review. *J Prosthet Dent*. 1986;55(1):84–6. https://doi.org/10.1016/0022-3913(86)90080-6.
6. Patil PG, Patil SP. Guide flange prosthesis for early management of reconstructed hemimandibulectomy: a case report. *J Adv Prosthodont*. 2011;3(3):172–6. https://doi.org/10.4047/jap.2011.3.3.172.
7. Desjardins RP, Laney WR. Prosthetic rehabilitation after cancer resection in the head and neck. *Surg Clin North Am*. 1977;57(4):809–22. https://doi.org/10.1016/s0039-6109(16)41290-9.

8. 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(5):678–85. https://doi.org/10.1016/j.prosdent.2017.01.019.
9. Agarwal S, Praveen G, Agarwal SK, Sharma S. Twin occlusion: a solution to rehabilitate hemimandibulectomy patient—a case report. *J Indian Prosthodont Soc*. 2011;11(4):254–7. https://doi.org/10.1007/s13191-011-0091-8.
10. Shashidhara HS, Thippanna RK, Dang K, Hajira N, Sharma A. Modified occlusal table - an aid to enhance function of hemimandibulectomy patient: a case report. *J Clin Diagn Res*. 2015;9(9):ZD01–3. https://doi.org/10.7860/JCDR/2015/13267.6414.
11. Bhattacharya SR, Majumdar D, Singh DK, Islam MDR, Ray PK, Saha N. Maxillary palatal ramp prosthesis: a prosthodontic solution to manage mandibular deviation following surgery. *Contemp Clin Dent*. 2015;6(Suppl 1):S111–3. https://doi.org/10.4103/0976-237X.152961.
12. 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;11:2050313X231181976. https://doi.org/10.1177/2050313X231181976.
13. Cantor R, Curtis TA. Prosthetic management of edentulous mandibulectomy patients. I. Anatomic, physiologic, and psychologic considerations. *J Prosthet Dent*. 1971;25(4):446–57. https://doi.org/10.1016/0022-3913(71)90236-8.
14. Koralakunte PR, Shamnur SN, Iynalli RV, Shivmurthy S. Prosthetic management of hemimandibulectomy patient with guiding plane and twin occlusion prosthesis. *J Nat Sci Biol Med*. 2015;6(2):449–53. https://doi.org/10.4103/0976-9668.160036.

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