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Navigating challenges through prosthodontic approaches in compromised hemimandibulectomy rehabilitation: A case series and treatment algorithm

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Abstract
Hemimandibulectomy, a surgical intervention often necessitated by neoplastic conditions or trauma, poses substantial challenges to both form and function within the oral cavity [1]. The resultant mandibular defect disrupts the intricate balance required for mastication, speech, and facial aesthetics [2]. This case series delves into the prosthodontic management of patients who underwent hemimandibulectomy, aiming to restore both form and function. The comprehensive approach involves three different prostheses restoring post hemimandibulectomy deficits for different patients presented at different time intervals. In that one case involving compromised condition of trismus, upper left hemimaxillectomy with lower right hemimandibulectomy. Through a detailed exploration of these three cases, this series showcases the diverse challenges encountered and the modified prosthetic interventions. These compilation aims to contribute valuable insights to the prosthodontic community, offering a roadmap for addressing the unique complexities associated with hemimandibulectomy prosthesis cases.

Keywords: Hemimandibulectomy, magnet attached prosthesis, guiding flange prosthesis, twin table prosthesis, flexible removable prosthesis

Introduction
This case series introduces a distinctive paradigm in the prosthodontic management of hemimandibulectomy patients. The integration of twin occlusion, twin table occlusion with flexible removable prostheses and guided flange prostheses represents an advancement and comprehensive solutions. Twin occlusion, with its dual articulation mechanism [3]. Complementing this, twin table occlusion with flexible removable prostheses is a nylon-based prostheses which is flexible and placed below tooth height of contour without wire clasps, providing better aesthetics as simulates gingival colour and easy to wear [4]. And guided flange prostheses contribute to the restoration of facial aesthetics and symmetry, crucial components often compromised after hemimandibulectomy [5, 6, 7].

Case report
A 58 years old male patient, who had undergone hemimandibulectomy a year back had been reported in the unit of prosthodontics, crown and bridge in our institute. With the chief complaint of difficulty in mastication and speech. On clinical examination, extra orally facial asymmetry with deviation of mandible on the left normal side, skin contracture causing limiting mouth opening of 25 mm was present (Fig 1a). Intra orally maxillary healthy ridge (Atwood class 3) and right sided hemimandibulectomy (Cantor and Curtis class III) with left side edentulous ridge was present (Fig 1b&1c). Treatment plan executed was lower partial characterised denture with upper characterised denture with twin table occlusion.
Primary impression for lower arch has been recorded with moulded impression compound (Pyrex polykem, Roorkee, India) placing over the ridge with alginate impression material (Zhermack Tropicalgin Dental Alginate, Delhi, India) and for upper arch with edentulous stock tray and alginate impression material. Sectional custom tray has been fabricated using cold cure acrylic resin (Rapid Repair, Pyrax polymars, Roorkee, India) on which border moulding with green stick wax (Pyrex polymars, Roorkee, India) has recorded asking patient to do

tongue movements, suckling, swallowing and whistling movements; and additional silicone light body (Aquasil, Dentsply, India) has been used for recording secondary impression repeating same movements. For upper arch secondary impression has been recorded as same like conventional technique with zinc oxide eugenol paste (denzomix, Mixodent, Delhi, India). Then, maxillomandibular relation has been recorded and teeth setting has been done on which first normal setting has been done on the upper base plate on the ridge and second row of teeth in the palatal region posteriorly has been done with lower sectional teeth setting on an articulator. Trial has been done and with the use of acrylic heat cure pigments customisation of both the dentures has been done while curing procedure (Fig 1d). After finishing and polishing the denture it has been delivered (Fig 1e,1f) and patient has called after a month and 6 months follow ups.

Case report

A 63 years old male patient, who had undergone right hemimandibulectomy surgery for ameloblastoma a month back had been reported in the unit of prosthodontics, crown and bridge in our institute. With the chief complaint of difficulty in mastication and speech and was undergoing physiotherapy. On clinical examination extra orally, mandible was deviated to the right side with the mouth opening of 30mm (Fig 2a). Intra orally upper dentate and lower (Cantor and Curtis class II) with 31,32,41,42,43,44,45,46 dentition was present (Fig 2b). For this patient modified guide flange prostheses has been fabricated. Sectional impression has been recorded with alginate impression material and upper full dentition impression has been recorded. After bite registration on an articulator tongue crib (19-gauge ss wire) were made placing at right lower buccal vestibule region extending crib ends till upper vestibular region. On the upper cast at the premolars (19-guage) ss wire has been adapted over which wax sheet has been adapted on which at the colliding surfaces magnets were placed and trial has been done. After, casting, finishing and polishing with clear heat cure acrylic resin (Heat cure, Pyrax polymars, Roorkee, India) modified guide flange prostheses (Fig 2c,2d) has been delivered to the patient guiding easy occlusion at the centric and patient (Fig 2e,2f) has been called for follow-up after a month, 3 month and 6 months interval.

Case report

A 54 years old female patient, who first underwent left maxillectomy (Armani class I) and later right hemimandibulectomy surgery for squamous cell carcinoma 8 months had been reported in the unit of prosthodontics, crown and bridge in our institute. With the chief complaint of difficulty of opening mouth, mastication and speech. On clinical examination extra orally with right side face contracture with mandibular deviation on right side and restricted mouth opening of 20 mm was present (Fig 3a). Intra orally upper left palatal defect with right side 11,12,21, 22 & 23 dentition and in lower normal right side (Cantor and Curtis class II) 31,32,33,41,42,43 teeth were present (Fig 3b,3c). Treatment for upper definitive split obturator with twin table occlusion and lower sectional flexible denture were planned for easy application of prostheses.

Primary impression for upper arch recorded with wax placed at stock tray on defect side with alginate impression material and lower arch with alginate placed on sectional tray. Secondary impression has been recorded on custom tray covering all anterior dentition with additional silicone putty and light body material. Upper sectional bite plates were made attaching tich buttons on either part to connect both the parts and bite registration has done. Extra palatal row posterior teeth have been arranged for providing twin table occlusion; and trial has been done. Upper sectional obturator with twin table occlusion and attached tich buttons are fabricated with heat cure acrylic resin (Fig 3d,3e). Lower sectional flexible denture has been fabricated by **Injection cast technique** using special flask for flasking, dewaxing, and injecting molten Flexite denture material (Fig 3f). After delivery patient (Fig 4,5) has been recalled after a month and 6 months for follow-up.

Figures:

Case 1

Fig 1a: (Pre) Extra-oral view

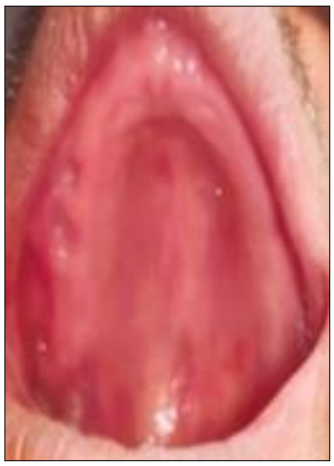

Fig 1b: Intra-oral upper arch

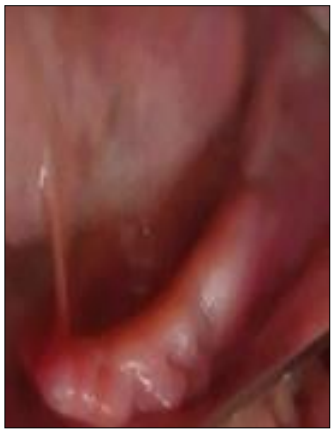

Fig 1c: Extra-oral left lower arch

Fig 1d: Characterised lower and upper twin-table dentures

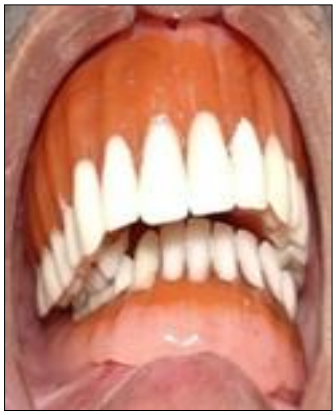

Fig 1e: Intra-oral twin-table occlusion

Fig 1f: (Post) Extra-oral view

Case 2

Fig 2a: (Pre) Extra-oral view

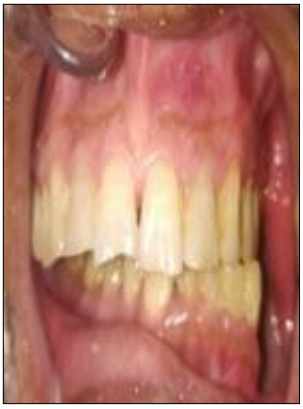

Fig 2b: Intra-oral view

Fig 2c: Guide-flange prostheses with attached cribs and Magnet

Fig 2d: Upper prostheses with attached magnet

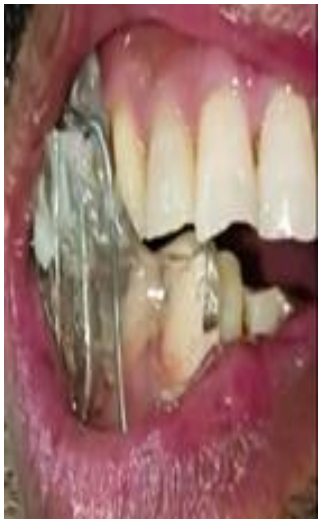

Fig 2e: Intra-oral guided occlusion with guided flange

Fig 2f: (Post) extra-oral view

Fig 3d: Split obturator with attached buttons & twin occlusion

Case-3

Fig 3a: (Pre) Extra-oral view

Fig 3e: Intaglio surface of split obturator

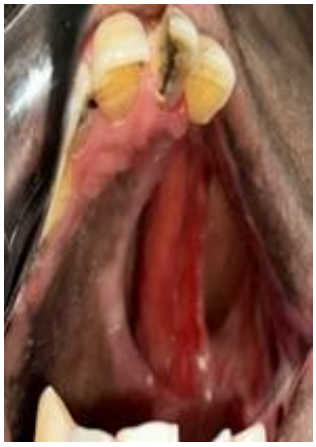

Fig 3b: Intra-oral upper left palatal defect

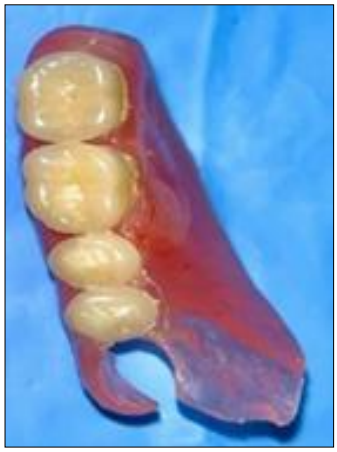

Fig 3f: Lower right flexible prostheses

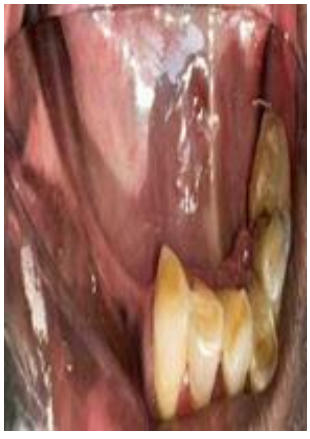

Fig 3c: Intra-oral lower right defect with left dentition

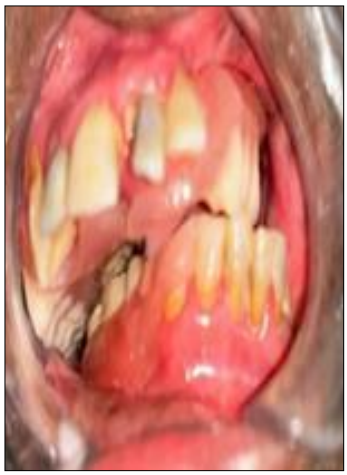

Fig 4: Intra-oral view with twin table occlusion

Fig 5: (Post) Extra-oral view

Discussion

The rehabilitation of hemimandibulectomy patients is a complex and multifaceted endeavour, requiring innovative prosthodontic approaches to address the functional and aesthetic sequelae of the surgical intervention [2, 8] The incorporation of twin occlusion introduces a dual articulation mechanism aimed at enhancing stability and function. By allowing a more intricate interplay of occlusal forces, twin occlusion proves beneficial in restoring masticatory efficiency and improving overall oral function [9]. Beyond functional aspects, the restoration of facial aesthetics is a pivotal goal in hemimandibulectomy rehabilitation. The implementation guided flange prostheses plays a crucial role in achieving facial symmetry and aesthetic harmony [7]. The guided flanges, strategically designed to support soft tissues, contribute to a more natural and balanced facial appearance [6, 10]. Flexible partial denture is unbreakable, esthetically acceptable simulates gums color, can be fabricated quite thin, and can form the denture base and clasps as well [4]. While the presented cases demonstrate promising outcomes, it is essential to acknowledge the inherent challenges and limitations associated with these advanced prosthodontic techniques.

Conclusion: This case series provides a comprehensive insight into the prosthodontic rehabilitation of hemimandibulectomy patients using twin occlusion, guided flange prostheses and twin table occlusion with flexible partial denture. The successful outcomes observed in the cases presented highlight the potential of these innovative approaches in addressing the functional and aesthetic complexities associated with hemimandibulectomy.

Conflict of Interest
Not available

Financial Support
Not available

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