

Case Report
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Prosthetic Rehabilitation of Partially Resected Edentulous Mandible Using Twin-Occlusion- A Case Report

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ABSTRACT

Mandibular defects arising as a result of trauma, infections or ablative tumor surgery usually cause significant facial deformity, functional disabilities, and psychological problems. Successful prosthetic rehabilitation of a patient with partially resected edentulous mandible can be an especially challenging task for a prosthodontist. Apart from the deviation of the remaining mandibular segment, other dysfunctions are observed in mastication, speech, swallowing, respiration, salivary control and mandibular movements which can severely compromise the prosthetic prognosis. Hence, it becomes imperative to judiciously apply the basic principles of denture construction in such cases to obtain optimum retention, stability, support, esthetics & function. The present case report describes the successful prosthetic rehabilitation of an edentulous mandibulectomy patient using two rows of non-anatomic teeth on the unresected side of the maxillary prosthesis. The inner (palatal) row helped in restoring the function while the outer (buccal) row improved the cheek support and esthetics. Non-anatomic teeth were used to minimize the lateral displacing forces and enhance the stability of the dentures. The incorporation of twin-occlusion in this case helped in achieving a satisfactory aesthetic and functional outcome of treatment.

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Introduction

Mandibular defects resulting from trauma, infections or ablative tumor surgery usually result in significant deformity in appearance & function [1]. Acquired mandibular defects are generally divided into continuity and discontinuity defects [2, 3]. Mandibular discontinuity defects result in more disability and disfigurement than continuity defects [4].

One of the most challenging areas of maxillofacial rehabilitation is the construction of functional complete dentures for a patient with partially resected edentulous mandible. Based on the extent of resection and prosthodontic concerns, Cantor and Curtis classified edentulous mandibulectomy patients into six classes [5]:

- Class I - Radical alveolectomy with preservation of mandibular continuity
- Class II - Lateral resection of the mandible distal to the canine area
- Class III - Resection of the mandible to the midline
- Class IV - Lateral resections surgically reconstructed with bone grafts
- Class V - Anterior mandibular defects with bone graft reconstruction
- Class VI - Anterior mandibular defects without surgical reconstruction

Loss of mandibular continuity in such cases leads to deviation towards the resected side, thus causing dislodgement of denture on that side [2]. The greater the loss of tissues, greater will be the deviation, thus compromising the prognosis of the prosthetic rehabilitation to a significant extent. Concomitant perioperative radiation therapy additionally gives rise to further limitations in the form of atrophic and fragile oral mucosa, predisposition to irritation and ulceration, impaired retention due to xerostomia & obliteration of posterior throat form [6, 7]. The normal integrated neuromuscular control that serves to stabilize complete mandibular denture is also compromised [8]. Hence, it becomes imperative to judiciously apply the basic principles of denture construction in such cases to obtain optimum retention, stability, support, aesthetics & function.

Case Report

A 70 year old female patient reported to the Department of Prosthodontics with a chief complaint of difficulty in mastication & speech since last six months. Her past history revealed that she was diagnosed with squamous cell carcinoma of the right side of the mandible, for which she had undergone extensive resection on the entire posterior region of the mandible four years back. An extra oral examination showed an asymmetrical face with deviation of the mandible to the resected side. On palpation, the mandibular ridge on the right side was found to be present only till premolar region. An orthopantomogram (OPG) revealed resection of mandible distal to the right first premolar involving

the ramus, coronoid process & condyle (Class II defect). On intra oral examination, the patient had completely edentulous maxillary and mandibular arches (Figure 1) with significant deviation of resected mandible to the right side.



Figure 1: Pre-operative intraoral view showing mandibular discontinuity defect

Clinical Procedure

Preliminary impressions using stock trays with maximum extension & tissue coverage were made using irreversible hydrocolloid impression material (Zelgan 2002: Dust free Alginate, Dentsply DeTrey GmbH, Konstanz, Germany). Primary casts were prepared (Figure 2) and acrylic resin impression trays were constructed. Border molding was done & final impressions were made with polyvinyl siloxane impression material (Reprosil; Dentsply India, Bangalore, India) using functional impression technique. Impressions were poured with type III dental stone (Kalrock; Kalabhai karson Pvt. Ltd, Mumbai, India) to obtain master casts (Figure 3). Stabilized denture bases were made with autopolymerising acrylic resin using the sprinkle-on technique. Maxillary wax rim was widened palatally on the unresected side to account for the mandibular deviation. Wax rims were adjusted and a tentative vertical dimension was established using phonetics & closed speaking space as guide. The position of the mandibular record base and occlusal rim was evaluated and modified in the mouth until stability during functional movements was achieved.



Figure 2: Primary casts



Figure 3: Master casts

The maxillary master cast was oriented to the semi-adjustable articulator (Girbach) using a face bow transfer (Figure 4). Tooth arrangement was done in the usual manner. Due to the abnormal jaw relationships and angular path of closure, non-anatomic posterior teeth were used to minimize the lateral stresses which may cause displacement of the mandibular denture. Two rows of maxillary posterior teeth were arranged on the unaffected side; the palatal row of teeth to obtain a favourable occlusal relationship and the buccal row of teeth to improve cheek support and aesthetics (Figure 5). Mastication was confined exclusively to the non-resected side with bilateral occlusal contacts serving as a stabilizing force. A wax set-up was tried in the mouth and checked for vertical height, aesthetics, phonetics and occlusion (Figure 6). The dentures were processed and remounted and the occlusion refined (Figure 7). They were evaluated intraorally for pressure points using pressure indicating spray and any interference in normal movements was corrected before final insertion. The patient was given routine post insertion instructions & simple opening and closing exercises were suggested to help her manipulate the lower denture into proper position. At 6 months follow up, she expressed satisfaction with the overall aesthetic & functional outcome of the prostheses (Figure 8).

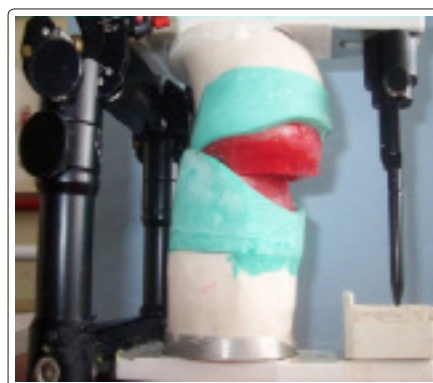


Figure 4: Casts mounted on the articulator



Figure 5: Teeth arrangement with twin-occlusion on the maxillary unaffected side



Figure 6: Wax set-up



Figure 7: Completed dentures



Figure 8: Post-operative extraoral view

Discussion

Successful rehabilitation of edentulous mandibulectomy patient can be a very challenging task for a prosthodontist. The most serious sequelae of acquired mandibular discontinuity are a retrusion and deviation of the remaining mandibular segment towards the surgical side. Additionally, other dysfunctions are observed in mastication, speech, swallowing, respiration, salivary control and mandibular movements which can severely compromise the prosthetic prognosis [9]. Surgical reconstruction with bone grafts &/or implants is the preferred treatment option but may not be feasible in every case. Prosthodontic rehabilitation is the only viable treatment alternative in such patients. Since lack of a bearing surface is a major limiting factor, it is important to record & utilize a broad denture base within the physiologic limits. The lingual flange on the resected side must be extended to gain maximum retention.

Patients with discontinuity defects usually present with abnormal maxillomandibular relationships, thus preventing ideal placement of denture teeth over residual supporting structures [2, 10]. The prime objective of occlusal scheme development in such defects is to achieve multiple occlusal contacts at an established vertical dimension.

In the present case, two rows of teeth arranged on the unresected side of the maxillary denture helped in providing a broader occlusal table [11]. Non-anatomic teeth were used to minimize lateral displacing forces and enhance stability of the dentures. The inner row helped in restoring the function while the outer row improved the cheek support and aesthetics. This also positioned the residual mandibular fragment into the correct sagittal relationship, thereby enhancing the stability of the dentures, improving the masticatory efficiency, as well as reducing the deviation of mandible to a certain extent.

Conclusion

Acquired mandibular defects present many changes to the extra- and intra-oral environment, which make it difficult to provide adequate retention, support, and stability for the prostheses. The

present case report describes the successful prosthetic rehabilitation of an edentulous mandibulectomy patient using two rows of non-anatomic teeth. The incorporation of twin-occlusion on the unresected side of the maxillary prosthesis helped in achieving a satisfactory aesthetic and functional outcome of treatment.

References

1. Haller JR, Sullivan MJ (1995) Contemporary techniques of mandibular reconstruction. *Am J Otolaryngol* 16: 19-23.
2. Beumer J III, Marunick MT, Curtis TA, Roumanas E (1996) Acquired defects of the mandible: etiology, treatment, and rehabilitation. *Maxillofacial Rehabilitation: Prosthodontics and Surgical Considerations*. St Louis: Ishiyaku EuroAmerica, 113-124
3. Desjardins RP (1979) Occlusal considerations for the partial mandibulectomy patient. *J Prosthet Dent* 41: 308-315.
4. Taylor TD (2000) Diagnostic considerations for prosthodontic rehabilitation of the mandibulectomy patient. *Clinical Maxillofacial Prosthetics*. Chicago: Quintessence 171-188.
5. Cantor R, Curtis TA (1971) Prosthetic management of edentulous mandibulectomy patients. Part I. Anatomic, physiologic, and psychologic considerations. *J Prosthet Dent* 25: 446-457.
6. Curtis TA, Griffith MR, Firtell DN (1976) Complete denture prosthodontics for the radiation patient. *J Prosthet Dent* 36: 66-76.
7. Moore MJ (1984) The effect of radiation on connective tissue. *Otolaryngol Clin N Am* 17: 389-399
8. Beumer J III, Nishimura R, Moy P (1995) Restoration of acquired head and neck defects with Osseo integrated implants. In: Fonseca RJ, Davis HW, eds. *Reconstructive Preprosthetic Oral and Maxillofacial Surgery*, 2nd edition. Philadelphia: WB Saunders.
9. Leong EW, Cheng AC, Tee-Khin N, Wee AG (2006) Management of acquired mandibular defects-prosthodontic considerations. *Singapore Dent J* 28: 22-33.
10. Curtis T, Taylor R, Rositano J (1975) Physical problems in obtaining records of the maxillofacial patient. *J Prosthet Dent* 34: 539-554.
11. Rosenthal LE (1964) The edentulous patient with jaw defects. *D Clin N Am* 8: 773-779.

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