



CASE REPORT

REHABILITATION OF A RECONSTRUCTED PARTIAL MANDIBULECTOMY CASE USING A CAST PARTIAL DENTURE- A CASE REPORT

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ABSTRACT

Segmental resections of the mandible resulting in discontinuity defects, present with a number of complications that hinder an optimal prosthetic rehabilitation of such defects. Re-establishment of continuity using free tissue transfer can help one overcome many of these shortcomings. Restoration of the missing dentition in such cases must be in the way of a stable prosthesis to combat the limited denture bearing area and non-keratinised tissue bed. An implant supported prosthesis depends on the availability of adequate bone height, alignment of the grafted bone, crown height space, recurrence of the neoplasm, the requirement of or the passage of time since radiation therapy, physical condition of the patient and economic factors. An alternative is a stable cast partial denture designed to facilitate broad stress distribution to the unresected side, avoid damage to the graft and aid in function. This case report describes the prosthetic rehabilitation of a partially resected mandible secondary to ameloblastoma, reconstructed with a free fibula graft, using a cast partial denture.

INTRODUCTION

Rehabilitation of a resected mandible is one of the most challenging treatment modalities in Prosthodontics. Segmental resection of mandible presents with a number of complications that present difficulties in optimal prosthetic rehabilitation (Sharry, 1962). Deviation of the remaining mandibular segment towards the defect side was once an unavoidable sequel of lateral discontinuity defects, hampering mastication due to inability of the patient to get his/her remaining dentition into maximum intercuspation. These patients required either mandibular guidance prostheses or partial or complete removable prostheses with modifications in occlusal schemes or palatal ramps, along with physical exercises before the missing dentition could be restored (Schneider, 1986). However, advances in reconstructive surgery have reduced the incidence of post-surgical deviation to a great extent. The goal of reconstructive surgery in tissue loss is to repair the defect at the time of surgery so that the wound heals primarily, thus maintaining function and as unaltered an appearance as possible (Riaz, 2010). The preservation of the integrity of mandibular movements translates into maintenance of the maximum intercuspation relationship on the non-defect side.

However, in spite of such procedures to restore facial symmetry, arch alignment, and stable occlusion, masticatory function often remains compromised (Olson, 1978 and Curtis, 1997). Additionally, a number of limitations still persist such as obliteration of buccal and lingual vestibules and a non-keratinised mucosal surface that is not optimum for bearing masticatory stresses. Thus, a prosthesis that is stable, functional and as undamaging to the graft as well as the surrounding structures is required. The present case report describes the prosthetic rehabilitation post hemimandibulectomy with a free fibula graft reconstruction, using a cast partial denture.

Case Report

A 37 year old male reported to the Department of Prosthodontics, complaining of inefficient mastication since three years. The medical history revealed a diagnosis of ameloblastoma in the left mandibular region three years ago, which was managed by segmental resection of the left mandibular body, parasymphysis and a part of the ascending ramus. Further, a free fibula graft was used with a reconstruction plate to regain continuity. The patient presented with a fairly adequate mouth opening and almost no mandibular deviation. All teeth except the central incisor were missing in the third quadrant. The remaining maxillary and

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mandibular dentition was healthy except localised gingival recession with 31 but with no mobility (Fig. 1& Fig. 2).



Figure 1. Pre-operative Frontal View



Figure 2. Pre-operative intraoral View of Mandibular Arch

Owing to the limited availability of bone, based on the radiographic appearance of the graft with the reconstruction plate, a stable cast partial denture prosthesis was preferred over the option of an implant-supported fixed prosthesis (Fig. 3).

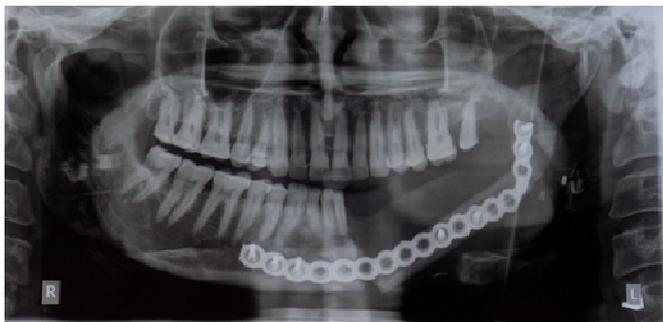


Figure 3. Orthopantomogram showing grafted bone with a reconstruction plate on the left mandibular side

Diagnostic impressions were made in irreversible hydrocolloid (Algin-Gum, Prime Dental, India) and casts poured.(Fig. 4) The mandibular diagnostic cast was surveyed, the available

undercuts assessed and the areas requiring preparation of teeth demarcated. A lingual plate major connector with embrasure clasps between 44, 45 and 46, 47 and an I bar on 31 were planned. Tooth preparations, in the form of guide planes, rest seats and enameloplasty to create adequately retentive undercuts were done. A Custom tray prepared over the diagnostic cast was used to record the final impression. The defect side was recorded in Admixed material, prepared using 7 parts of low fusing and 3 parts of medium fusing impression compound (Dental Products of India, Mumbai, India).(Fig. 5a) Attempts were made to obtain maximum extensions within functional limits to ensure as much denture bearing area as possible. Addition silicone in the light body consistency (Aquasil® LV Type III Light Bodied consistency, Dentsply®) was used to record the final impression.(Fig. 5b) The planned cast partial denture was fabricated and tried in the patient's mouth and interferences removed, (Fig.6).

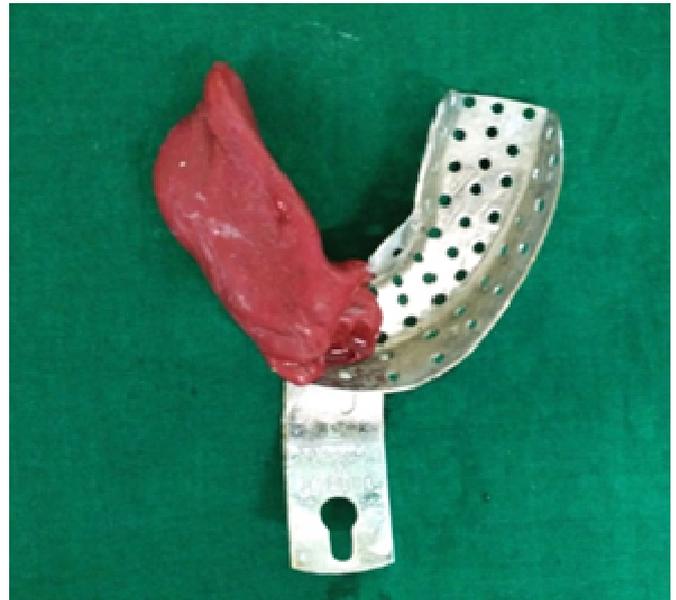


Figure 4.(a) Impression of defect side using impression compound followed by, (b) Maxillary and mandibular impressions in irreversible hydrocolloid

A facebow record (Spring Bow, Whip Mix Corporation) was used to mount the maxillary cast on a semi-adjustable articulator (Hanau Wide Vue, Whip Mix Corporation, USA), (Fig. 7a).



Figure 5a.



Figure 5b.

Figure 5. (a) Impression of defect side in a custom tray constructed over primary cast using Admixed impression material followed by, (b) Final impression in light body addition silicone



Figure 6a



Figure 6b

Figure 6. (a) Cast Partial Denture framework on master cast (b) Trial of framework intraorally and removal of interferences



Figure 7a



Figure 7b

Figure 7. (a) Facebow record followed by mounting on a semi-adjustable articulator and teeth arrangement (b) Jaw relation recorded on a wax block at maximum intercuspation



Figure 8a



Figure 8b

Figure 8. Try-in of the waxed-up denture (a) at Maximum Intercuspal Position (b) Occlusal view



Figure 9a



Figure 9b

Figure 9. Denture Insertion (a) Frontal view (b) Occlusal View

The bite registration was done at maximum intercuspation and the mandibular cast was mounted.(Fig 7b) Semi-anatomic posterior teeth were arranged with maximum intercuspation in centric occlusion and a try-in of the waxed-up denture was done.(Fig. 8) The patient was able to bring the trial denture into intercuspation without guidance or any extra effort. The denture was processed, finished, polished and delivered to the patient. (Fig. 9) The stability of the denture was ensured and the patient was trained on the seating and removal of the denture. The patient was advised regular recalls.

DISCUSSION

Management of mandibular defects has been a conundrum for the surgeon as well as the prosthodontist. Unless the tongue function is almost normal, the prognosis for a mandibular definitive prosthesis isn't nearly as good as a prosthesis for maxillary defects (John Beumer, and Nesrin Sxahin, 2005). Bulky pedicled flaps or reconstruction plates, which were commonly used methods of reconstruction provided a base that was not very conducive to the stresses of mastication.⁸ However, the advent of free tissue transfer to re-establish continuity has resulted in a base that affords greater stability to the removable prosthesis and opens up the avenue for implant supported prosthesis. While soft tissue defects could be reconstructed with fasciocutaneous or musculocutaneous flaps, composite defects, involving multiple tissue types, are better managed by a vascularised bone graft (Peled, 2005).

Justifiably, a free fibula flap is now the most popular method of mandibular reconstruction (Peled, 2005). A resected mandible reconstructed with a microvascularised flap such as a free fibula graft often presents with mucosa that is non-keratinised. Additionally, the supero-inferior width of the graft is lesser than that of the unresected mandible. Therefore, such a mandibular defect must be restored with a stable prosthesis to avoid damage to the graft. The ideal treatment, thus, would be an implant supported prosthesis. While insertion of implants simultaneously with the free flap reconstruction is now possible, it is difficult to accurately position and angulate the implants within the graft before plating it to the mandible.¹⁰ However, in the present case, the radiographic picture deemed the graft positioning and the available bone height unsuitable for implant placement. Thus, a cast partial denture was planned to rehabilitate the patient with as stable and functional a prosthesis as possible. Also, in the present case, due to the timely grafting and plating, a stable natural dentition was preserved with little to no deviation seen, eliminating the need for a guide flange prosthesis. The cast partial denture framework, in the present case, was designed to facilitate wide distribution of stabilising components, adequate bracing by way of a lingual plate major connector and retention using embraure clasps on the mandibular posterior teeth and an I bar on 31 (Mohamed, 2001). The restoration of acceptable occlusal function is largely dependent on the status of the remaining natural dentition (Taylor, 2000). Undue stresses to the remaining dentition are prevented by proper prosthesis design,

elimination of premature contacts and a functional occlusion (Ronald, 1979). The basic objective is to achieve an occlusal scheme which will have a multiple occlusal contacts in centric position (Ronald, 1979).

Conclusion

Prosthetic rehabilitation of a partial mandibulectomy defect that was reconstructed with a free fibula graft, using a cast partial denture was described. In the event that an implant supported prosthesis is not an option, a well adapted, stable cast partial denture may be utilised to restore the missing dentition. Wide stress distribution, adequate bracing, utilisation of direct retainers to obtain maximum retention, equilibration of occlusal interferences and multiple contacts in centric occlusion were ensured to obtain a stable and functional prosthesis.

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