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PROSTHETIC REHABILITATION OF DENTULOUS HEMIMANDIBULECTOMY PATIENT - A CLINICAL CASE REPORT

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Abstract

The deformity associated with maxillofacial defects causes more of a psychological imbalance than the actual structural and functional loss. Mandible is the only bone that supports the lower face and aids in performing oral functions. Maxillofacial defects that interrupt the continuity of the mandible results in mandibular deviation and rotation which are evident esthetically as well as occlusally. The prime aims of prosthetic rehabilitation are to restore the patient with improved esthetics and acceptable occlusion. These aims are related to the extent of the mandibular resection, the amount of soft tissue loss, and presence or absence of natural teeth. Mandibular discontinuity defects that are immediately restored with grafts have better prognosis as the continuity of mandible is retained. Maxillofacial prosthesis that can camouflage these defects to restore the facial symmetry, normal appearance and an acceptable occlusion, can not only boost the patient's morale and assist in bringing them back to the society but also aid in performing their functions more efficiently . This clinical case report describes the prosthetic rehabilitation with a cast partial denture for a patient who underwent a hemimandibulectomy and reconstruction with bone (rib) graft.

Key words: Hemimandibulectomy, Prosthetic rehabilitation, Amoeloblastoma, Cast Partial denture.

INTRODUCTION

An amelobastoma is a benign odontogenic tumor of epithelial origin and seen most commonly in posterior mandible.[1] These tumors are relatively slow growing, but locally invasive. Its peak incidence is in the 3rd to 4th decades of life and the male to female ratio is 1:1.The treatment of mandibular ameloblastoma is by surgical excision, with 1.0 to 1.5cm free margin. Surgical excision of benign tumors results in little soft tissue loss.[2] Hence, the disability is entirely related to the amount of mandible resected.

Discontinuity of the mandible after surgical excision disturbs the equilibrium and symmetry of mandibular functions, which leads to altered mandibular movements and deviation of the residual segment towards the defect side, resulting in loss of occlusion on the unresected side. The deviation of the mandible is secondary to muscle imbalance and compromised proprioception, and is easily resolved with mandibular guidance therapy.[2] Mandibular guidance therapy is very effective in discontinuity defects, which are corrected with bony reconstruction with either free graft or free flaps.[2] Surgical reconstruction with free bone grafts not only restores mandibular continuity but also yields excellent results and, in some instances, offer several advantages over micrvascular grafts.[2] Free bone grafts requires less extensive surgery, the procedure is less technique sensitive and the graft can be better shaped to attain the desired geometric goal as maintaining the periosteal blood supply and the viability of the bone graft is not a consideration..[2] Once the continuity of the mandible can be restored surgically, prosthodontic rehabilitation can be same as that for the continuity defect.

The patients with maxillofacial defects often face difficulties with social integration and their quality of life is altered too. They lose hope to get back to their normal state. Rehabilitation of these patients

with proper esthetics and/or function can boost the patient's morale and assist in bringing them back to the society. This clinical case report describes the prosthodontic rehabilitation with a cast partial denture for a patient who underwent a hemimandibulectomy and reconstruction with rib graft

CASE REPORT

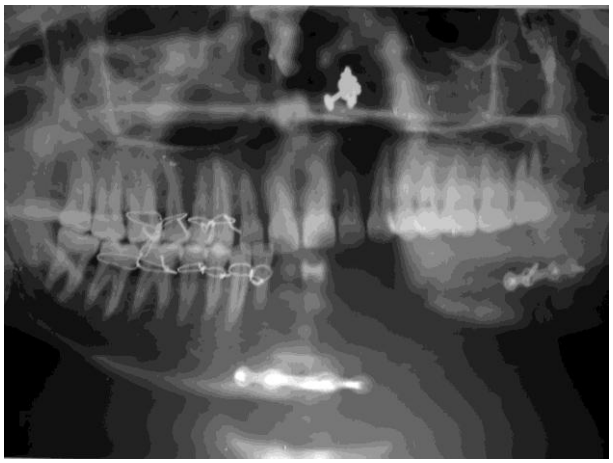
A thirty year old female patient was referred to the Department of Prosthodontics, Christian Dental College and Hospital, Ludhiana, Punjab, India, for the prosthetic rehabilitation following a hemimandibulectomy reconstructed with rib graft. A comprehensive case history revealed that the patient was diagnosed with the ameloblastoma of the left mandible a year ago. The patient had undergone hemimandibulectomy (from the left angle to the symphyseal region) and the resultant defect was immediately reconstructed with the free bone (rib) graft. A post-surgical panoramic radiograph revealed mini bone-plates, one in the anterior region joining the graft to the right half of the normal mandible and the other to the remaining ramus distally.(Fig.1A) Intraoral examination revealed freely movable soft tissues with scar formation, loss of alveolar ridge and obliteration of buccal and lingual sulci in the left half of mandibular region (distal to right central incisor).(Fig.1B) A slight deviation of mandible was observed towards the reconstructed side due to the action of the normal

right mandibular depressor muscles.(Fig.1C) The previous prosthodontic intervention involved a mandibular guidance appliance (palatal ramp) for the correction of deviation. The remaining dentition on the unaffected side and opposing arch was intact and in proper occlusion. On the basis of clinical and radiographic examination, the patient was classified as Cantor and Curtis Class IV i.e. resection of the lateral portion of the mandible with subsequent augmentation to restore form and function.

CLINICAL PROCEDURE

Preliminary impressions of maxillary and mandibular arches were made with irreversible hydrocolloid (Tropicalgin; Zhermack, Italy) using perforated stock trays. Impressions were poured using Type-III dental stone (Kalastone; Kalabhai Pvt Ltd, Mumbai, India). Mandibular primary cast was then surveyed and framework for cast partial denture planned. The cast partial denture was designed, keeping the principles of designing in mind; rigid major connector, multiple occlusal rests and guiding plane adjacent to natural teeth, to enhance stability and retention. Mouth preparation for remaining mandibular teeth included rest preparation; distally for first premolar and mesially for second premolar, distally for first molar and mesially for second molar to accept the embrasure clasp. Custom tray with spacer was fabricated on primary cast. The custom tray was border molded using polyvinysiloxane putty. Final impression was made with light body polyvinysiloxane.(Fig.2A) Master cast was poured in Type-IV die stone.(Fig.2B) Master cast was duplicated in sillicone and later prefabricated patterns for RPD were adapted on to cast. Sprues were attached to the pattern and the cast was invested for casting. Finished and polished metal framework was tried to check the accurate fit. (Fig.3) Wax occlusal rim was fabricated and adjusted for tentative jaw relations. Jaw relations were transferred to the articulator and articulation completed. The form of artificial teeth resembled the occlusal form of opposing dentition to minimize the occlusal modification for acceptable occlusion. Teeth arrangement was done to establish multiple occlusal contacts in centric occlusion and group function on working side and no contacts on non-working side in eccentric position.[4] This type of occlusal scheme would generate least stresses to the remaining and underlying structures. Wax try-in was done to ensure proper esthetics and occlusion. The denture was cured using heat cure acrylic resin (Trevalon, Dentsply) and finishing and polishing completed.

During insertion of cast partial denture correct border extension, proper adaptation and occlusion (Fig.4A, B&C) was ensured. Pressure points were checked using pressure indicating paste and were relieved. Patient was instructed about the limitation of the prosthesis and its maintenance. Patient was recalled after regular intervals to correct any problem associated with wearing of prosthesis.



(A)

(B)

(C)

Figure 1: A: Pre-Treatment Orthopantomogram (OPG) Depicting Resected Mandibular Segment Restored With Free Bone (Rib) Graft Secured With Mini Surgical Plates, **B:** Pre Treatment Intraoral View, **C:** Pre Treatment Mandibular Deviation

(A)

(B)

Figure 2: A: Final Impression made with Light body after Border Molding with Putty Polyvinylsiloxane **B:** Master Cast

Figure 3: Metal Try-in

(A)

(B)

(C)

(C)

Figure 4: A: Occlusion of Natural Dentition, **B:** Prosthetic Occlusion of Affected Side, **C:** Intraoral View of Prosthesis, D: Pre Treatment Mandibular Deviation

DISCUSSION

The location and extent of the tumor in the mandible decides the surgical treatment modality like marginal, segmental, hemi, subtotal or total mandibulectomy.[5] Benign odontogenic tumors like amoelolastoma requires primarily bone resection and results in little soft tissue loss. A free bone graft is considered a predictable reconstructive option for the patients with a well vascularized soft tissue recipient bed.[2] If a segment of the mandible is removed due to benign tumor, immediate reconstruction with free bone graft is usually advised to maintain the continuity and to improve both facial symmetry and masticatory function.[2] Once the continuity of the mandible can be restored by the surgical management, the prosthodontic approach is same as that for the continuity defect.

In this clinical case, the mandibular deviation and occlusal disparity was minimal as the discontinuity of the mandible was immediately managed at the time of surgery by reconstruction with the free bone (rib) graft and intermaxillary fixation. With the immediate reconstruction the final reconstructive outcome was improved because the scarring and tissue contraction did not adversely affect the recipient graft site. Intermaxillary fixation as advocated by Aramany and Meyers was used in the immediate postoperative period and very little muscle retraining was required postoperatively.[5] This type of fixation keeps the remaining mandibular segment in proper maxillomandibular relation and allow healing of the defect and the associated scar formation with the teeth in occlusion.[3] Mandibular guidance therapy with palatal ramp was initiated early to bring the maxilla and mandible in acceptable relationship. An ideal result was achieved, as the patient could repeatedly approximate the maxillary and mandibular teeth even without the use of the guidance prosthesis.[6] Once the retraining of the mandibular muscle was complete, there were two options available for prosthetic rehabilitation for definitive prosthesis; cast partial denture and implant retained prosthesis. But due to financial constraints cast partial denture was planned. The custom tray was border molded and final impression was made with light body polyvinysiloxane. Border molding ensures maximum soft tissue coverage and light body exerts

minimal pressure on to the soft tissues. The cast partial denture was designed keeping the basic prosthodontic principles of designing in mind. These include broad stress distribution, cross-arch stabilization with use of rigid major connector, stabilizing and retaining components well within the arch to reduce dislodging functional forces, prosthetic tooth positions that optimizes in prosthesis stability and functional needs.[7] A reasonable and practical occlusal scheme was provided to improve the masticatory efficiency that generates least forces to the remaining structure.

Though the definitive prosthesis improves the esthetics and functions, it is of utmost importance for Prosthodontist to ensure that the patient understands its limitations. Patients once aware about its limitation can cope better with the situation and tend to adjust well with the prosthesis.

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