



## PROSTHODONTIC REHABILITATION OF MARGINAL MANDIBULECTOMY DEFECT USING CONVENTIONAL CAST PARTIAL DENTURE- A CASE REPORT

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**ABSTRACT** Marginal mandibulectomy leads to a dento-alveolar defect preserving mandibular continuity and covered by unusual soft tissue. Successful rehabilitation of these patients depends on strategic treatment planning and selection of most suitable treatment modality. Although various surgical and implant procedures have been suggested for the rehabilitation of these defects, but these complex procedures are not possible in all cases due to limiting factors. A conventional removable prosthesis is the most commonly used treatment option for such cases. This case report describes the management of a patient with right marginal mandibular resection rehabilitated with conventional cast partial dentures.

**KEYWORDS :** Rehabilitation; Mandibulectomy; Cast partial denture

### INTRODUCTION

Ameloblastoma is a slow-growing, locally aggressive tumor. Angle of mandible and body are commonly involved.<sup>1</sup> Location of the tumor and the degree of invasion into the bone are two significant elements which influence extent of resection from marginal/conservative to segmental/radical.<sup>2</sup> Mandibular resection causes difficulty in mastication, compromised speech, poor aesthetics, and psychological trauma to the patient depends upon extent of resection.<sup>3</sup>

Marginal mandibulectomy involve resection of the mandibular body while preserving the persistence of the inferior border of mandible. Although several surgical techniques have been proposed for restoring such defects like microvascular flap, bone graft, distraction osteogenesis, inferior alveolar nerve transposition etc. followed by implant supported/retained fixed or removable prosthesis. But these complex surgical procedures are not possible in all cases due to limiting factors such as lack of adequate clinical experience of the operator, patients fear for a further surgical procedure, long treatment duration, financial constraint.<sup>4</sup> So, a conventional removable prosthesis remains the treatment of choice in most of the cases but achieving maximum stability in partial dentures with such defects is big challenge.<sup>5</sup>

The aim of this paper is to describe the prosthetic rehabilitation of the patient who underwent marginal mandibular resection due to ameloblastoma with conventional cast partial denture.

### Case report

A 23-year-old female patient reported to Department of Prosthodontics, All India Institute of Medical Sciences, New Delhi with a chief complaint of difficulty in chewing food, impairment of speech and unaesthetic appearance due to missing lower right anterior and posterior teeth. The patient revealed a history of marginal mandibular resection of right mandible due to ameloblastoma in June 2017 with a two year follow up without recurrence.

On examination, there was no facial asymmetry and adequate mouth opening without any deviation (figure 1a). Intraoral examination showed a fully dentate maxillary arch with upper left central incisor in cross bite. In mandibular arch there was a dento-alveolar defect lined with a split thickness skin graft, extending from 42 to 46 with a shallow vestibular sulcus, increased interarch space due to marked loss of bony structure horizontally and vertically (figure 1b). There was also grade 2 mobility i.r.t. 41 and restored 37. Orthopantomograph showed marginal resection of mandible in right antero-posterior region (Cantor and Curtis class I)<sup>6</sup> with remaining inferior border of mandible, root canal treated 37 and periodontally compromised 41 (figure 1c). Extraction of 41 was advised to maintain healthy abutment near the line of resection. The patient was given different treatment options from conventional cast partial prosthesis to implant retained/supported removable or fixed prosthesis. Patient wants cost-effective conventional treatment initially due to financial constraints.

### Treatment procedure

Diagnostic impressions were made in irreversible hydrocolloid (Algiplast, DPI, Mumbai, India). A study cast was poured in type III gypsum material (Kalstone, Kalabhai Karlson Pvt. Ltd, India) and surveyed and subsequently designed. As this was a Kennedy class III case with long edentulous span and a high lingual frenum attachment so a linguo-plate type major connector was selected. I bar direct retainer i.r.t. 31, circumferential clasp i.r.t. 47 and embrasure clasp i.r.t. 36 & 37 along with full-contour metal crown i.r.t. 37. An impression of the prepared tooth was made with addition silicone material putty and light body consistency (Aquasil, Dentsply Limited, Addlestone, UK) in the custom tray (fabricated over diagnostic cast with proper extensions) using single-step technique. The cast was poured in type IV gypsum product (Ultrarock; Kalabhai Karson Private Limited, Mumbai, India). A wax pattern was fabricated with mesio-occlusal rest seat, mesial guiding plane and buccal and lingual height of contour to accommodate embrasure clasp between 36 and 37. Full metal crown was cemented using glass ionomer luting cement (Aquacem, Dentsply Limited, Addlestone, UK).

After that mouth preparation was done according to plan design (figure 2a) and final impression for was made using addition silicone (Aquasil, heavy body and light body, Dentsply limited, Addlestone, UK) with a single step technique using a custom tray. Master cast was poured in type IV gypsum product (Ultrarock; Kalabhai Karson Private limited, Mumbai, India) and surveyed. Block out was done and the cast was duplicated to obtain the refractory model (WiroFine, BEGO Herbst, GmbH, Germany). Wax framework was fabricated (figure 2b) and casted using standard lab procedure using cobalt-chrome-alloy (Vitalium 2000, Dentsply, USA). The finished framework was evaluated and adjusted intra-orally for fit, retention, and stability (figure 2c). Wax rims were adjusted to record the jaw relation. Casts were mounted in centric relation on a three point articulator (Jabbar & Company, UP, India). Artificial teeth (Acryrock, Italy) were selected according to size & shade of remaining dentition and final try-in was done to evaluate denture retention, stability, esthetics, occlusion and speech. It was cured in heat cure acrylic resin (Trevalon, Dentsply Limited, Addlestone, UK). After finishing & polishing cast partial removable prosthesis delivered to the patient (figure 3).

The patient was instructed for insertion and removal of prosthesis, routine hygiene instructions for the oral cavity and dentures. The patient was also instructed to take out the prosthesis before sleeping and store in water while not in use and avoid contact of prosthesis with bleaching agents. The patient was followed up after 24 hrs. Further appointments were scheduled after 7 days, 2 weeks, 1 month and 6 months. The patient was able to chew well and was satisfied with the results and she had no complaints till the 6th month of follow-up. Furthermore there was no recurrence of ameloblastoma on defect side.

### DISCUSSION

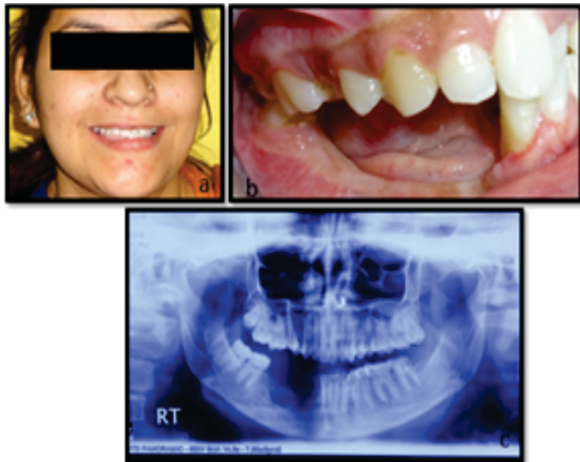
Management of ameloblastoma has been controversial because of the unique biological behaviour of the disease as a slow-growing, locally

invasive tumor with a high rate of recurrence. Recurrence rates of ameloblastoma are reported as 15-25% after radical treatment and 75-90% after conservative treatment. So wide resection of the jaw is usually recommended for ameloblastomas.<sup>7,8</sup> The extent of surgery could interrupt mandibular continuity and lead to facial disfigurement and mandibular function impairment, but maintaining continuity helps preserve normal muscle function and facial contours that leads to better rehabilitation with a prosthesis.<sup>3</sup>

Immediate reconstruction of the bone defect with free grafts or flaps, placement of dental implants and rehabilitation with implant-supported prostheses can improve jaw function and facial harmony of the patient markedly. But post-operative pain, long healing periods with residual defects, and financial constraint can make patients vulnerable and reduce their willingness for any further surgical options or placement of implants.<sup>4</sup> Fixed partial denture (FPD) also not suitable, as it would have resulted in overly long pontics compromising the biomechanics of the prosthesis. So a cast partial denture is the only option for rehabilitation of these defects, along with some modifications in basic prosthodontic design principles depending upon the residual tissue characteristics and mandibular movement dynamics. Duplication of master cast, fabrication & casting of the framework also require a lot of precision, but it gives the patient a well retentive and functional prosthesis. In this present case, the patient also wanted a conventional cost effective treatment first before switching towards implant supported prosthesis, so a cobalt chrome cast partial denture was fabricated for her. Conventional cast partial denture also had a good prognosis in presented case as this was a continuous defect with remaining inferior border of mandible and defect lined with a split thickness skin graft which served as a good denture bearing surface. Additionally, there was no deviation of the mandible during the opening or closing and the remaining dentition was periodontally sound to retain and support the removable prosthesis even with limited vestibular sulcus. The partial denture can also serve as a template for bone augmentation and for the placement of future implants.

**CONCLUSION**

It is difficult to rehabilitate patients with mandibular defects because of various limiting factors. Selection of most suitable treatment modality can help in restoring function, esthetics and quality of life of these patients. In this article, a cast partial removable denture was used which is cost effective and a less invasive treatment.



**Figure 1. Preoperative records- a) Extra oral profile b) Intra oral image c) Orthopantomograph**



**Figure 2. a) Final mouth preparation b) Wax pattern c) Cast framework trial**



**Figure 3. Final Prosthesis**

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