An Approach toward Successfully Restoring a Partially Resected Dentulous Mandible

Gagan Khanna, VTT Teja, S Pradeep, Lokendra Gupta

ABSTRACT

Oral rehabilitation of patients with mandibular resection present challenges to maxillofacial prosthodontist. Segmental resection is associated with postoperative facial disfigurement and disability. So, surgeons try to preserve the continuity of mandible, whenever feasible by marginal resection. As the surgical reconstruction (by implants and grafts) is not always feasible in every patient, prostodontic approach has to be considered to restore the esthetics and function. The manner in which the principles of removable partial denture are applied and interpreted must be modified because of altered anatomic and functional situation. This article describes the prosthetic management of a patient following partially resected dentulous mandible.

Clinical relevance: Treatment of maxillofacial patient involves preoperative evaluation, clinical and radiographic examinations, diagnostic casts, which allow the prosthodontist to plan the treatment. Definitive treatment in the form of tooth-borne cast metal partial denture can be advocated in patients who underwent mandibular resection.

Objectives: To appraise the reader about treatment plan, procedures involved in the design and fabrication of definitive prosthesis for rehabilitation of patients with resected mandible.

Keywords: Mandibular resection, Mandibular defects, Removable partial denture design.


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INTRODUCTION

Design of removable partial dentures for patients who have had mandibular surgical resections varies from partial denture design for patient with intact mandibles. The extent of surgical resection and the location and quality of remaining structures will dictate the need to alter some basic principles of partial denture design.1 Even though the application of basic principles may vary in mandibular resection patients, the basic concepts of support, retention, and stability should be fulfilled.

The presence or absence of natural teeth in a resected mandible often determines the approach to prosthetic rehabilitation. Cantor and Curtis (1971) classified edentulous mandibular resection patients by the amount of mandible that remains after resection and surgical reconstruction.2 Although the classification was suggested for edentulous patients, it is also applicable to partially edentulous patients (Firtell and Curtis, 2002).3

Cantor and Curtis Classification (Fig. 1)

Class I: Mandibular resection involving alveolar defect with preservation of mandibular continuity (Fig. 1A). The class I patient functions well with removable partial denture, though may have some anatomic or functional limitations.

Class II: Resection defects involve loss of mandibular continuity distal to the canine area (Fig. 1B). In this class there is associated loss of function of the attached muscle resulting in deviation of the remaining mandible toward the surgical defect. When compared to class I patient, they are more difficult to rehabilitate with prosthesis.

Class III: Resection defect involves loss up to the mandibular midline region (Fig. 1C). The patient in this class presents with increased problems with mandibular deviation, denture instability, saliva control, speech and deglutition.

Class IV: Resection defect involves the lateral aspect of the mandible, but are augmented to maintain pseudoarticulation of bone and soft tissues in the region of the ascending ramus (Fig. 1D). There is less mandibular deviation and more support for prosthesis.

Class V: Resection defect involves the symphysis and parasymphysis region only, augmented to preserve bilateral temporomandibular articulations (Fig. 1E).

Class VI: Similar to class V, except that the mandibular continuity is not restored. Because each lateral fragment moves individually, the prognosis for a removable prosthesis is poor.

GENERAL PROSTHESIS DESIGN CONSIDERATIONS

Principles of partial denture design should be followed when planning a removable partial denture for mandibular resection patient. Although the application of these principles in mandibular resection patients may vary due to the specific needs of each patient, some recommendations can be made.4,5

- Multiple rests are indicated to increase support and distribute stress
- Altered cast impression procedures are essential for distal extension edentulous or surgically reduced ridges
- Artificial teeth should be positioned to minimize occlusal forces on the resected side without compromising esthetics
Prosthodontic Management

1. Preliminary impression with alginate and diagnostic casts were then poured using dental stone.
2. Diagnostic cast is then surveyed for favourable removable partial denture design and the cast is then tripoded.
3. The design included embrasure clasp on 36 and 37, i-bar clasp assembly on 33, with auxiliary rest on mesial fossa of 34, simple circlet clasp design on 47. Lingual bar was selected as the major connector and longitudinal struts were used as the minor connector.
4. Mouth preparation was done according to design proposed (Fig. 3). Sufficient reduction was done with round diamond in rest seat areas to provide bulk for metal (no less than 1 mm metal in thinnest portion). Enameloplasty on the lingual surface of 47 was done and guiding planes were prepared on 47 and 33.
5. Elastomeric impression was taken using addition silicone impression material and master cast was made using die stone (Fig. 4). Master cast is then retipoded and design transferred to the master cast.
6. Wax block out was carried out and the cast was duplicated.
7. Wax pattern was made on the refractory cast, which was then casted and finally trimmed and polished.
8. Try in of metal framework was done (Fig. 5).
9. Teeth arrangement was done and trial insertion of the prosthesis was carried out. Wax bulk was placed on the buccal flange of the prosthesis to restore the defect area and improve facial appearance (Fig. 6).
10. Final prosthesis was delivered to patient after evaluation of the fit, comfort and esthetics (Fig. 7).
11. Postinsertion check-up was done on a regular basis until the patient was comfortable with the prosthesis.

DISCUSSION

Tumors and cysts of oral cavity may be treated by combination of surgery, radiotherapy and chemotherapy.

CASE REPORT

A 28-year-old female patient reported to the department of prosthodontics with the chief complaint of loose existing mandibular acrylic partial denture. There was history of surgical intervention 8 years back for the removal of odontogenic keratocyst in relation to right mandible. On intraoral examination partially resected, dentulous lower arch was found in relation to the right mandible. On intraoral examination partially resected, dentulous lower arch was found in relation to the right quadrant which crossed the midline. Teeth missing were 32, 31, 41, 42, 43, 44, 45 and 46 with absence of alveolus and obliteration of buccal sulcus in relation to the same. Radiographically the marginal resection of mandible was seen to extend from 32, 31, 41, 42, 43, 44, 45 and 46 (Fig. 2). Extraoral examination revealed no deviation of the mandible.

Treatment Planning

The present case according to Canter and Curtis (1977) is a type 1 resection of mandible with inferior border intact and normal movements can be expected to occur. Since the mandibular resection extends beyond the midline, the design is typical of Kennedy class IV design.
The extent of surgery and the effects of radiation and chemotherapy determine the amount of rehabilitation needed by a given patient.

Several authors have described the rationale for prosthetic management of mandibular guidance and the prosthetic rehabilitation of edentulous mandibular resection patients. Although the basic maxilla mandibular relationship in continuity defect is not altered, the missing teeth usually cannot be replaced into an occlusal position comparable to previously present. The teeth are often placed in lingual relationship posteriorly and in retrognathic relationship anteriorly.

This clinical report illustrates the design of removable prosthesis for a patient who underwent type 1 mandibular resection. There was less mandibular deviation because of minor soft tissue loss in the patient and proper intercuspation of remaining natural teeth. There was obliteration of vestibule but with loss of continuity between floor of mouth and vestibule. In class I mandibular resection patient, there is radical alveolar resection but the continuity of the mandible is preserved.

An implant supported fixed prosthesis or a removable cast partial denture are the two main treatment options to restore partially edentulous arches in patients who had undergone mandibular resection. Implant supported
The prosthesis was not considered due to lack of sufficient bone for placing implants and also due to economic constraints. The class I patient functions well with removable partial denture, though they may have some anatomic or functional limits. Design of prosthesis for mandibular resection of partial edentulous patient should follow the principles of partial denture design. These include broad stress distribution, cross arch stabilization using a rigid major connector stabilizing and retaining components at locations within the arch to minimize dislodgement and replacement of tooth position that optimize prosthesis. However, the application of these principles in mandibular resection patient may vary due to the specific need of each patient. The mucosa-borne acrylic denture was made as temporary measure which was later replaced by definitive tooth-borne cast partial denture. The denture provided gave support to the collapsed lip and cheek, restored function, improved the esthetics and was well tolerated by the patient.

CONCLUSION

The case report describes a simple and effective prosthodontic management for patients who have undergone mandibular resection for treatment of insidious lesions. This can be an alternative for patient who cannot afford for pricey treatment options such as implants.

REFERENCES


ABOUT THE AUTHORS

Gagan Khanna (Corresponding Author)
Reader, Department of Prosthodontics and Crown and Bridge, Manipal College of Dental Sciences, Manipal, Karnataka, India, Phone: (0820) 2922183, +919986515506, e-mail: gagan_khanna81@yahoo.co.in

VTT Teja
Postgraduate Student, Department of Prosthodontics and Crown and Bridge, Manipal College of Dental Sciences, Manipal, Karnataka, India

Pradeep S
Professor, Department of Prosthodontics and Crown and Bridge Manipal College of Dental Sciences, Manipal, Karnataka, India

Lokendra Gupta
Assistant Professor, Department of Prosthodontics and Crown and Bridge, Manipal College of Dental Sciences, Manipal, Karnataka, India