

A Novel Approach for Prosthodontic Management of Patient with Palatal Defect

Goyal Shalini^{1*} Garg Meenu² Pawah Salil³ Sikri Arpit⁴ Khatri Mansi⁵

¹Post Graduate Student, Department of Prosthodontics, Sudha Rustagi College of Dental Science & Research, Haryana, India.

²Reader, Department of Prosthodontics, Sudha Rustagi College of Dental Science & Research, Haryana, India.

³Professor and Head, Department of Prosthodontics, Sudha Rustagi College of Dental Science & Research, Haryana, India.

⁴Senior Lecturer, Department of Prosthodontics, Sudha Rustagi College of Dental Science & Research, Haryana, India.

⁵Post Graduate Student, Department of Prosthodontics, Sudha Rustagi College of Dental Science & Research, Haryana, India.

ABSTRACT

Background: Malignant tumors of hard palate and upper gums account for 1-5% of malignant neoplasms of oral cavity. The procedures of choice for removal are total or partial alveolectomy, palatectomy and maxillectomy, since they are diagnosed when they have invaded the underlying bone. These surgical procedures results in maxillary defects leading to open communication between oral and nasal cavities. These large palatal or maxillary defects pose a challenge to prosthodontists, particularly when the use of an implant/surgery cannot be considered. Obturator prosthesis covers the defect and restores esthetics, separation between oral and nasal cavities, sufficient occlusion and also supports the soft facial tissues. It diminishes difficulties associated with mastication, swallowing and speech intelligibility. If the defect is large, than increased weight of prosthesis is often a concern in its retention. In such clinical situations, lightweight obturators are warranted. This article describes a novel technique of fabrication of hollow bulb obturatorfor prosthetic rehabilitation of a large post-maxillectomy defect.

Keywords: Maxillary defect, Maxillectomy, Obturator prosthesis, Malignant tumors, Partial palatectomy.

INTRODUCTION

Cancer of oral cavity comprises of approximately 5 % of all cancers.¹ Incidences of malignant tumors of hard palate and upper gums is about 1-5% and most common is squamous cell carcinoma (75%).^{2,3} Type of intervention required for a malignant tumor of maxilla is dependent on many factors such as - size, type, severity, etiology and location of the tumor. Surgical removal of affected area is the most common treatment modality, which results in large defect with oronasal/antral communication. Maxillectomy refers to partial or total removal of maxilla in a patient suffering from benign or malignant neoplasm.³ Aramony has classified maxillary defects into six classes based on relationship of the area of defect to

the remaining abutment teeth:

Class I: Most common type. Resection is performed along the midline of maxilla and the teeth are maintained on one side of the arch.

Class II: Defect is unilateral, anterior teeth on opposite side are retained. It is modification of classical maxillectomy and is more favored than it.

Class III: Defect is in the central portion of the hard palate and may involve a part of soft palate. Majority of the teeth can be saved in such cases and designing of prosthesis is less complicated.

Class IV: Defects involve both sides of maxilla and crosses the midline. The remaining teeth will be few in number and may create a unique design problem

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*Correspondence Dr. Goyal Shalini.

Department of Prosthodontics, Sudha Rustagi College of Dental Science & Research, Haryana, India.

Email: drssjain@rediffmail.com

similar to the unilateral design of conventional removable partial dentures.

Class V: Defect is bilateral and lies behind the remaining abutment teeth. Such defects require splinting of remaining abutment teeth.

Class VI: Rare type of defect and lies anterior to remaining teeth.⁴

Acquired palatal defects resulting from hemi-maxillectomy may cause facial disfigurement due to change in appearance owing to loss of tissue and underlying structure and patient also faces difficulties in speech, swallowing and mastication. These functional problems may affect the quality of life sometimes leading to emotional stress, depression, social phobia and anxiety.^{5, 6}

These acquired maxillary defects can be rehabilitated by using various type of micro-vascularised flap, implants or by prosthetic means. Surgical reconstructions are usually considered if the defect is small. When defect has a large extension then prosthetic rehabilitation seems to be a better alternative, because more risks are involved for survival of the graft.⁷ Goal of prosthodontic rehabilitation is to recreate an artificial barrier between the oral and nasal cavity and thus restoring the functional capabilities of speech, mastication, swallowing, and appearance etc.^{8, 9}

CASE REPORT

A female patient aged 56 years, who had undergone surgery for a maxillary tumor on the right side of maxilla 07 years ago, reported to Department of Prosthodontics for the re-fabrication of prosthesis and restoration of the palatal defect [Figure 1a]. The palatal defect showed complete healing and it extends from the buccal mucosa to the mid-palatine region medially and anteriorly from the incisor region to the posterior extent of the hard palate. The mandible was partially edentulous (Kennedy's class II) and the oral hygiene was fair. The patient had normal mouth opening and jaw movements. A mature maxillary Aramany Class I defect on the right side was present with the loss of all teeth from left upper second molars to right upper third molar (third molar is present on left side). [Figure 1b]

The defect had a communication with the nasal cavity and mild lateral undercuts were present. The previous obturator was an all acrylic ill fitting removable prosthesis. The support and retention was inadequate. The six years old acrylic denture base showed signs of disintegration such as foul smell, discoloration and staining. The patient presented with an obvious and typical nasal twang and was experiencing difficulty in speech and deglutition. After thorough evaluation new acrylic hollow bulb obturator prosthesis was advised for her. A cast partial framework and/or implant supported prosthesis were not selected because of financial constraints of the patient.

Method

- Her previous obturator was extended and was used as an impression tray for obtaining primary impression. [Figure 2a]. The primary impression was made using irreversible hydrocolloid material (Zelgan Plus, Dentsply, USA) after packing the defect with sterile gauze piece (to prevent entry of impression material in nasal cavity). [Figure 2b]
- The primary casts were obtained in dental stone (Kalstone, Kalabhai, India) and a custom tray was constructed on the primary cast with cold-cure acrylic resin (DPI-RR cold cure, India).
- Low fusing compound (DPI Pinnacle tracing sticks) was used for border molding. During border molding of surgical site patient was asked to perform exaggerated head movements turning right to left with the head level and then again with the neck flex and extended. Opening and closing movements of the mouth was performed and mandible was moved laterally. [Figure 3a]
- Final impression of the defect area was made in light body rubber base impression material to record maximum details of defect (Zetaplus, ZhermackSpA, Italy). [Figure 3b]
- This was poured with die stone (Kalrock, Kalabhai, India) to produce the secondary working cast. [Figure 4]

- Bite rim blocks were constructed and centric jaw relation record was obtained and the casts were mounted on an articulator.
- Acrylic denture teeth (Acry Rock, Ruthinium Dental Products Pvt. Ltd, Italy) were arranged and the prosthesis was tried to verify the occlusion with the mandibular teeth, esthetic appearance, and support for the underlying tissues. [Figure 5]
- The master cast was waxed up with retentive clasps on the third molar of left side. Extra bulk was given in upper right region to support oral musculature. After wax up of master cast, the prosthesis was invested in flask and dewaxing was done in usual manner.
- At the time of packing the tissue surface of defect is lined with a thin layer of heat activated polymethyl methacrylate (PMMA) resin. A tablespoon of salt was placed in it and from above again packed with PMMA and flask was closed. [Figure 6]
- After prosthesis is cured, a small hole was drilled over the bulb to allow the salt to escape under a stream of water. This helped in hollowing out the obturator and thus reducing its weight. The hole was then closed using autopolymerizing polymethyl methacrylate resin.
- Prosthesis was finished, and polished in the usual manner. [Figure 7a]
- At insertion, the pressure indicator paste (PIP) was used to inspect for any pressure area (s).
- The denture was inserted and post-insertion instructions were given to the patient in the care and use of the obturator. [Figure 7b]
- The patient was reviewed bimonthly for three months, then the visits were arranged to be every 3 months.



Fig 1: Pre-operative view.

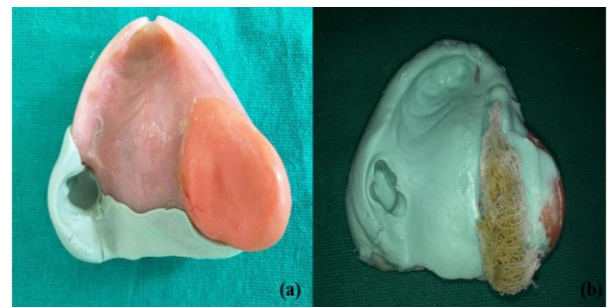


Fig 2: Preliminary impression.



Fig 3: Border molding and secondary impression.



Fig 4: Master cast.



Fig 5: Try in.



Fig 6: Incorporation of salt in bulb of obturator at packing.



Fig 7: Final Prosthesis.

DISCUSSION

Maxillary defects can be rehabilitated either by correction with surgery/implant or by obturator prosthesis. Results obtained with

surgery/implant are better as far as esthetic and function are concerned. But in many cases, surgery is contraindicated because of advanced age and poor general health of patient, very large defect, poor blood supply because of radiation therapy and financial constraints.⁴ Prosthetically, maxillary defects can be restored with a pressure resistance seal of an obturator bulb against the mucosal lining and skin graft covering the defect. The obturator is usually extended superiorly into the nasal cavity, resulting in a heavy prosthesis. Increased weight of prosthesis results in discomfort and reduced retention and stability. These problems can be minimized by fabricating hollow bulb obturator, advantages are:

1. Retention is increased and thus improvement in physiologic functions, such as deglutition, speech etc.
2. Patient's comfort and efficiency is improved.
3. Pressure on the surrounding tissues is decreased.
4. Tissue regeneration is good.
5. Chances of excessive atrophy and physiologic changes in muscle balance are reduced.
6. Increased selfconfidence and compliance of the patient.¹⁰

CONCLUSION

The management of the patient with maxillectomy requires a multidisciplinary approach. The contemporary materials and techniques for obturator prosthesis can provide solution for various clinical conditions. Depending on the case, the operator should select the best suitable material and technique for successful rehabilitation and thereby improving quality of life of the patient.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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