

Prosthetic rehabilitation of the partially edentulous maxillectomy patient: A case report

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Abstract

Excision of carcinoma, tumour of maxillary regions is usually associated with significant cosmetic and functional sequelae. Expedient definitive therapy is needed to best correct these problems. Thus, most significant repair of acquired defect should be done by prosthodontic treatment presenting significant deformity. Most of patients with acquired surgical defects can be restored close to normal function and appearance through definitive prosthetic approach.

Key Words: Edentulous, esthetics, maxillectomy, occlusion, rehabilitation

Introduction

The patients with acquired maxillectomy defect differ from patient with congenital maxillectomy defect because of abrupt alteration in physiologic process associated with surgical resection of the maxillae¹. The maxilla represents the bridge between the cranial base superiorly and the dental occlusal plane inferiorly. Its intimate association with the oral cavity nasal cavity, and orbits and the multitude of structures contained within and adjacent to it make the maxilla a functionally and cosmetically important structure. The maxilla and the associated bones of the mid face are oriented to resist the vertical forces of mastication. They are also effective shock absorbers for a vertically oriented impact to the facial skeleton. An unfavorable situation for prosthetic rehabilitation occurs when the size of a defect is so large that it overwhelms the remaining structures that stabilize prosthesis over the defect. Successful prosthetic design for functional restoration of the maxillectomy defect utilizes the remaining palate and dentition to maximize the support, stability and retention².

Objective of rehabilitation-

- Restoration of esthetics or cosmetic appearance of the patient
- Restoration of function

- Protection of tissues
- Therapeutic or healing effect
- Psychological therapy

Design considerations:

For surgical reconstruction and Prosthodontic rehabilitation focused on 4 objectives:

- Closure of the oral cavity
- Provision of a stable base for the restoration of function
- Restoration of midface symmetry
- Support of orbital structures

Maxillectomy defect classification system:

Classifications enable surgeons and prosthodontists to use the characteristics of a particular defect to establish a functional prognosis.

Ohngren's classification system:

In 1933, served to describe the anatomic boundaries of the maxillectomy defect³.

Aramany's classification systems:

In 1978, proposed a six categories classification for obturator designing in partial edentulous arches addressing removable partial framework design and addressing removable partial framework design and prosthetic rehabilitation of the partially edentulous maxillectomy patient in six categories⁴.

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Spiro et al proposed a relatively simple classification system in 1997 that focuses on infrastructure defects; however, it does not specifically address the involvement of adjacent structures such as the orbit and zygoma. It was suggested that defects be termed as “limited” or “subtotal” on the basis of the number of maxillary “walls” involved in the resection⁵

Brown JS was the first to discuss a multidisciplinary (surgical and prosthodontic) approach to palatomaxillary reconstruction based on both the vertical and horizontal dimensions of a defect⁶

Okay et al proposed a classification to assess the functional outcome and patient satisfaction that surgical reconstruction can provide, a classification system of defects based on a selected patient population²

Class Ia

Defects that involved the hard palate but not the tooth-bearing alveolus were categorized as Class Ia.

Class Ib

Defects that involved any portion of the maxillary alveolus and dentition posterior to the canines or that involved the premaxilla were categorized as Class Ib .

Class II

Defects that involved any portion of tooth bearing maxillary alveolus but included only one canine (<50%) were categorized as Class II.

Class III

Defects that involved any portion of the tooth bearing maxillary alveolus but included only one canine, total palatotomy defects, and anterior transverse palatotomy that involve more than half of the palatal surface (>50%) were categorized as Class III.

Subclasses f and z

Defects that involved the inferior orbital rim were categorized as subclass f, whereas defects that involved the body of the zygoma were categorized as subclass z.

Case Report -

A 35 years old male patient with rural background came to the department of Prosthodontics with the history of resected premaxilla seven month back. The main complaint of the patient was his facial disfigurement and isolation from his friends and family.

Thorough history and clinical examination revealed

that patient was surgically operated because of a long standing mid face tumor (Adenomatoid odontogenic tumour) by surgeon without any previous prosthetic protocol at the time of surgery or later. Resected site healed without complications and established to withstand the masticatory function and muscle support. According the classification of Okay et al the defect was class III including more than half of the palatal surface and both the canines (Fig-1). Mandibular arch and dentition were well balanced and intact to support the antagonist arch (Fig-2).

Treatment Planning

Management of acquired maxillary defects warrants all facets of patient care from diagnosis and treatment planning to rehabilitation. Most of patients with acquired surgical defects can be restored close to normal function and appearance. On the other hand, if a patient has a protracted struggle with the prosthesis, it ultimately proves a failure. The success and the failure of the prostheses may be because of different reasons such as the degree of malignancy, the propensity of recurrence, the level of resection; and other associated complications. They however illustrate a primary factor that the prosthodontist should bear in mind is the acceptance and effectiveness of the prosthesis.

Keeping in mind patient's oral condition, age, shortened maxillary arch and dentition with proper centric stop a definite treatment planning in the form of cast metal partial denture with proper extension and support of the upper lip and corner of the mouth were planned.

Procedures

After through prophylaxis the preliminary impressions were taken to study the case as well as to check undercut and parallelism for surveying. After proper surveying mesial rest seat were made in 16 and combined rest in between 26 and 27. Impressions were taken with additional silicon heavy body material followed by light body as lining material (Vinyl poly siloxane, Putty and light body consistency, 3M ESPE AG, Italy, Germany). Cast was poured in high strength die material type IV (Kalabhai, Karson Pvt Ltd Mumbai, India). Proper relief of the soft tissue was done, any undesirable undercut were also blocked and refractory cast was made by duplication of master cast. RPD casting wax were used for the designing and fabrication of metal framework (Fig-3). By following the standard protocol of investing and casting metal framework

Legends for figures

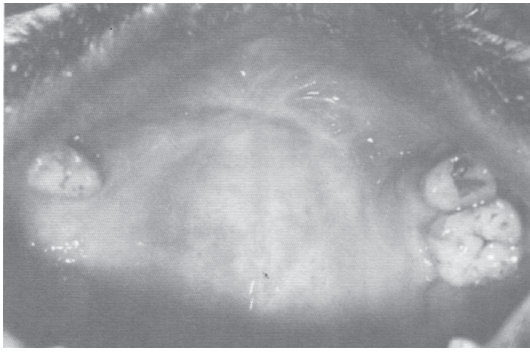


Fig 1: Intra Oral View of Effect

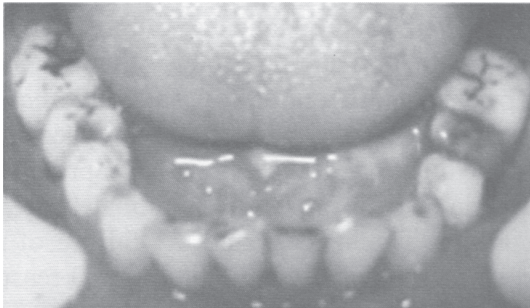


Fig 2: Mandibular Arch

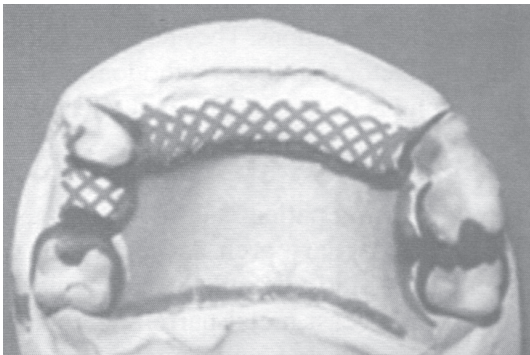


Fig 3: Wax Pattern for Cast Partial

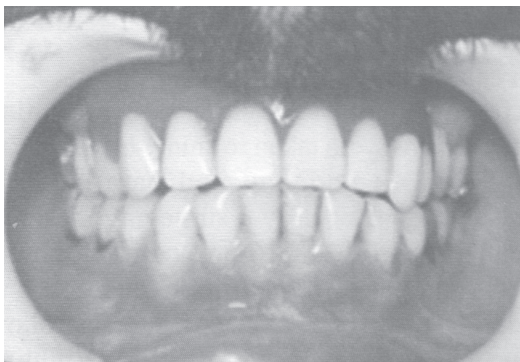


Fig 4: Try Infor Prosthesis

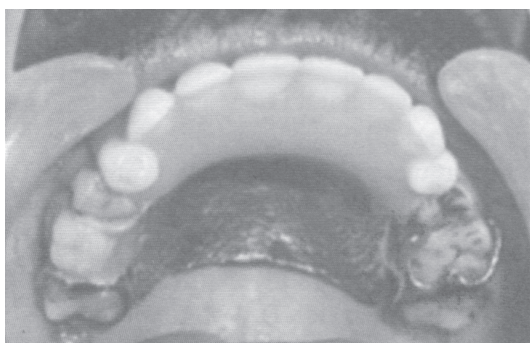


Fig 5: Prosthesis in Place

was prepared, finished and polished. Metal framework were checked for seating and proper retention in patient mouth. Wax try in was done to establish the proper extension, support and aesthetics of upper lip along with already existing centric occlusion. After proper verification of the jaw relation, mounting of the maxillary and mandibular cast was done for teeth try in (Fig-4).

Wax-up was completed before the processing of the denture into the heat cure resin. Finished and polished maxillary prosthesis was checked for proper occlusion and aesthetics and inserted in mouth (Fig-5). Patient was recalled for regular post insertion visit to check any troubleshooting related with denture wearing related to prosthesis.

Discussion

Every effort should be made to re-establish a favourable distribution of force to achieve stabilization of obturator prosthesis during mastication and function. The distribution of force derived from the metal framework and obturator bulb emulates the stable base that the native maxilla can provide for function². The engagement of structures within the defect diminishes the counterproductive lever forces placed on the obturator; contributes to the support, stability, and retention of the prosthesis, and may increase its success. Prosthetic rehabilitation of acquired maxillary defects can be achieved satisfactorily if all facets of treatment planning and design considerations are taken well into account prior to the rehabilitation process. In many cases effective obturation is achieved but in the relative majority the prosthesis is usually rejected by the patient and the outcome is a failure. Complications associated with maxillary defects limit the treatment protocols to a great extent. The prosthodontist has to identify these problem areas and suitably device feasible options and incorporate them in the design. Fixed implant prosthesis or implant supported prosthesis can be alternative option in this case but unfavorable bone quality over the resected site and the drooping maxillary lip over the labial flanges can cause failure to the prosthesis in long term wear. In this case report, class III defect was present in which cross-arch stabilization was most important and was derived through a system of cross-arch bars to provide wide distribution of support and retention from separated abutment teeth. Since premaxilla was resected in the patient there was no labial support which leads to the facial disfigurement and main concern to patient. Labial flange of increased thickness within the physiological limits was created

to support the upper lip which improved esthetics without any interference with function. Acquired defects of the maxilla also can be surgically reconstructed. A comprehensive treatment approach can provide a more conventional setting for prosthodontic rehabilitation. When both are successful function and cosmetics can be restored. This

has been demonstrated with microvascular free flap reconstruction⁷.

Conclusion

Thus in this case report patient was successfully rehabilitated both functionally as well as esthetically by the prosthodontic approach.

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