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PROSTHODONTIC REHABILITATIVE THERAPY THROUGH SURGICAL OBTURATOR FOR MAXILLECTOMY PATIENTS: A REVIEW

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ABSTRACT

The maxillofacial patient experiences a unique alteration in the normal oral/craniofacial environment and functions, which are the results of congenital, traumatic or surgical insults. Maxillofacial Prosthetics aimed to attain the optimal functions, such as speech and swallowing, and normalcy of surrounding structure. The provision of surgical obturator is one step in achieving normalcy, as it allows covering the deficiencies/defects to regain optimal/suboptimal functions immediately after surgical resection. This paper provides an overview on the designing principles, goals and role of surgical obturator in rehabilitating maxillectomy cases.

Keywords: Interim obturator, Maxillectomy, Surgical obturator.

1. INTRODUCTION

Head and neck cancer is the sixth most common cancer in the world. 90% of all head and neck cancer are squamous cell carcinoma. [1, 2] Estimates of prevalence of oral potentially malignant disorder are 1-5%, although higher prevalence was reported from South East Asia, usually with male preponderance. Head and Neck squamous cell carcinoma is the most common type of cancer type in India, accounting for 40% of all malignancies. [3, 4] The constantly increasing number of HNSCC and successful surgical treatment render cases for definitive restorations to re-established Quality of life.

Maxillofacial prosthetics is the art and science of anatomic, functional or aesthetic reconstruction by nonliving substitutes to those regions in the maxilla, mandible and face that are defective or missing because of surgery, trauma, pathology or developmental or congenital

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malformation. Maxillofacial defects results in the functional deficiencies such as mastication, swallowing and speech, leading to considerable psychological morbidity. [5, 6]

Modern reconstructive microvascular techniques for orofacial reconstruction can results in favourable aesthetic and functions; however normalcy still most sought after. Quality of life assessment has shown that both psychosocial and overall health status is lowest at diagnosis and during the immediate post-treatment period, but the score tend to return towards normalcy by 1 year. Schliephake and Jamil [7]

A large group of population continues to experience trouble in Quality of Life domain such as chewing, chewing related functions such as dry mouth, sticky ropy saliva and trouble eating. During and following rehabilitative procedure, patient's prime concern shift from survival to enhancement in Quality of Life scale. Hence, postoperative reconstruction and establishment of aesthetics, functions in term of mastication, swallowing and speech can be accomplished by maxillofacial prosthetics. Hence, provision of prosthetic aid such as obturator as prosthodontic rehabilitative therapy for maxillectomy cases is an essential aspect of overall functional rehabilitation that aid in restoration of form and functions and addresses the quality of life scale. [8, 9].

This review addresses the designing principles, goals and role of surgical obturator in rehabilitating maxillectomy cases. [10, 11]

1.1. Rationale of Obturator in Maxillectomy Cases

The rationale for surgical obturators is to provide a support for the surgical dressing placed in the defect. The obturator separates the maxillary surgical site from the contents of the oral cavity. This aids in speaking and swallowing more normally upon awakening from anaesthesia. The obturator prosthesis restores the patient's self-image by reproducing the contours of the lost oral structures and allowing the patient to function in a social environment. [12-14]

1.2. Classification of Intraoral Defects

Aramany M. A. has classified partially edentulous maxillectomy dental arches into six groups. [15, 16]

Class I: Here, the midline resection of the maxilla has been performed and teeth are maintained on one side of the arch.

Class II: Here, defect is unilateral, while retaining the anterior teeth on contra lateral side

Class III: The central portion of the hard palate has defect and may involve soft palate. Here, dentition is preserved.

Class IV: Here, defect crosses the midline and involves both half of the maxilla. Only, few teeth remain.

Class V: This is a bilateral surgical defect lies posterior to the remaining abutment teeth.

Class VI: Rare situation where maxillary defect lie anterior to the remaining abutment teeth. Seen mostly in trauma or congenital defects rather than in planned surgical intervention.

1.3. Preoperative Guidelines

A healthy interdisciplinary working relationship with the surgeon will permit ample time for patient evaluation and treatment. A thorough patient evaluation includes several important components [17, 18] such as medical history, should be completed and a history of the present illness as well as a past medical history will provide clues to potential problems in future care, dental history, can be obtained separately or in conjunction with intraoral/extraoral examination. The patient's oral hygiene status and previous prosthesis experience should be noted.

This also involves a comprehensive clinical and radiographic examination that will confirm or deny the patient's dental history and provide information useful in planning the patient's prosthetic rehabilitation. This includes:

- Diagnostic casts: Here, an impression is made in irreversible hydrocolloid to provide both diagnostic and working casts. Interocclusal records and mounting of casts in a suitable adjustable articulator with facebow transfer are required for proper analysis.
- Photographic records: Photographs are excellent source of preoperative conditions.

A surgical consultation is required once diagnostic casts and photographs are obtained. The duplication of diagnostic casts done and the outline the resection can be planned.

1.4. Prosthetic Rehabilitation for Total and Partial Maxillectomy

The goals of prosthetic rehabilitation are [18, 19]

- Obturation of oro-nasal communication to allow optimal/suboptimal deglutition and articulation.
- Preventing enophthalmos and diplopia by supporting the orbital contents.
- Restoring the midfacial contour by supporting the soft tissue.
- Establishing an acceptable aesthetic.

Most of acquired palatal defects are created by surgical resection of neoplasm of the palate and paranasal sinuses. The extent of defect depends on the location, size, and potential behaviour of the tumour. Prosthetic reconstruction of patients with acquired surgical defects of maxilla can be divided into three phases of treatment with each phase having different objectives surgical obturator, temporary/interim obturator, definitive obturator.

1.5. The Surgical Obturator

It is a base plate type appliance which is fabricated from the pre-operative impression cast and inserted at the time of surgery of the maxilla in the operating room. The advantages of surgical obturation are as follows

- It provides a matrix/base on which the surgical packing can be placed.
- It maintains the surgical pack thus ensuring close adaptation of the skin graft to the raw surface of the cheek flap when grafting is done.
- It also aids in reducing oral contamination of the wound during the immediate post-surgical period and may thus decrease the incidence of local infection.
- Maintains normal speech of the patient by reproducing normal palatal contours and by covering the defect.
- Permits deglutition, thus limits the period of use of nasogastric tube.
- The obturator decreases the psychological impact of surgery and the patient is reassured that rehabilitation has begun.
- The obturator may limit the period of hospitalization.
- Esthetics can be improved by adding teeth in the obturator thereby mental well being of the patient is boosted.

1.6. Interdisciplinary Approach and Prosthetic Prognosis

For a successful prosthetic design to restore function, the remaining palate and dentition is of utmost importance to maximize the support, stability, and retention of an obturator. An unfavourable scenario occurs due to large size palatal defect that overwhelms the remaining structures and results in instability of obturator, air and fluid leakage through the nasal cavity and compromises function. Surgical procedures therefore should be carefully performed for successful prosthetic rehabilitation.

However, the various surgical and grafting procedures such as split-thickness skin graft placement improve the supporting surface of the defect and contribute to scar band formation along the lateral and posterolateral margins of the resulting cavity. Supporting surface within the defect is improved by preservation of the palatal mucosa at the medial border of the defect and its rotation onto the vomer. An osteotomy cut through an extraction site adjacent to the defect helps preserve the alveolus for the proximate abutment tooth. Coordination and interdisciplinary approach of surgical and prosthetic considerations for rehabilitation of maxillary defects improves the prosthetic prognosis and functional outcome. [20]

Advancements in microvascular surgical techniques relates to the new Prosthodontic Guidelines of surgical reconstruction of the maxilla. Microvascular free flap surgery allows the transfer of muscle, connective tissue, skin, and bone to recipient sites. A vascular supply to the graft can be provided after donor blood vessels are re-anastomosed to recipient vessels of the head

and neck region. Free flaps like fasciocutaneous and osteomyocutaneous provide closure of the oral cavity for acquired maxillary defects. One of the major factors in the prosthodontic rehabilitation decision making process include whether a maxillectomy defect should be reconstructed; if so, what type of free flap should be suitable; and how the chosen free flap will restore the patient's oral function. Moreover soft tissue free flaps can provide closure of the oral cavity in smaller defects but are unsupported and may not provide a firm palatal base for a removable prosthesis and therefore if a removable prosthesis is planned with surgical closure provided by a fasciocutaneous flap, the remaining palate and dentition will provide the stable base. For larger defects, the use of (VBCFF) vascularized bone-containing free flaps for maxillary reconstruction can be employed for the restoration of a stable palatal base. [20, 21]

1.7. Principles of Designing of Surgical Obturator [17, 20]

- *Extent:* Obturator should terminate short of the skin graft-mucosal junction.
- *Design:* Simple, lightweight and inexpensive.
- *Function:* Palatal contours should be duplicated to facilitate post-operative speech and deglutition.
- *Occlusion:* Establishment of posterior occlusion should not be considered on the defect side until the surgical wound is well organized.
- *Old prosthesis:* In some patients, the existing complete or partial prosthesis may be adapted for use as an immediate surgical obturator.
- *Dentate cases:* Obturator may be perforated at the interproximal extensions with a small dental bur to allow to be wired to the teeth at the time of surgery.
- *Edentulous cases:* The existing prosthesis should be carefully inspected using it as to obturate the surgical defect. If necessary, the extension of the prosthesis can be adjusted with autopolymerizing acrylic resin. After adjustment, the prosthesis can be relined with an intermediate reline material. It can also wired or pinned to the alveolar ridge or zygomatic arches and/or anterior nasal spine and sometimes circumzygomatic and frontal wiring is employed to support the affected side. Clear autopolymerizing acrylic resin is suggested as the extensions and pressure applying areas can be easily visualized during the surgery. Davison, et al. [22]
- The surgical obturator must not be removed for 7-10 days post-surgically.

A definitive obturator is not indicated until the surgical site is healed and dimensionally stable and the patient is prepared physically and emotionally for the restorative care that may be necessary.

Hence, every effort should be made to redirect a favourable distribution of force to achieve stabilization of an obturator during mastication and speech.

2. CONCLUSION

The provision of surgical obturator allows re-establishing swallowing, phonetics and patency of the nasal cavity. In addition, the obturator decreases the psychological impact of surgery and reassured the patient that rehabilitation procedure has begun. With such management strategy, the major deficiencies/defects addressed promptly. Thus, at initial focus only, improvement in swallowing, speech can be achieved and this helps to boost the rehabilitation process significantly and effectively.

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