Prosthodontic Management of Acquired Maxillary Defects - A Review Article

By Dr. Avanti Merchant

Abstract- Acquired defects of the maxilla are highly debilitating and incapacitating conditions. Most of these defects are caused due to neoplasms of the oral cavity. These malignancies have a tendency to spread rapidly and cause impairment in functions such as speech, swallowing, mastication and, esthetics. Presently the thrust in cancer care is not only on survival but on rehabilitation, which aims to ameliorate multiple impairments. Early prostodontic intervention can tremendously aid in improving the loss of function and improve the overall quality of life of such patients.

Keywords: surgical stents, obturators, palatal lift prosthesis.

GJMR-J Classification: NLMC Code: WU 500
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I. Introduction

Neoplasms of the head and neck region are severely debilitating conditions. They often leave the patients impaired in many aspects leading to the eventual deterioration of the patient’s overall quality of life gravely. Post-surgical maxillary defects predispose the patient to hyper nasal speech, fluid leakage through the nose, including the possibility of aspiration and impaired masticatory function (Keyf, 2001). In the last few decades, with the advent of different available treatment modalities, the focus of treatment has shifted from just cancer and metastatic control but also on conservative, restorative, supportive, palliative, and preventive patient care. Having a multidisciplinary approach in the management of these patients has a prime role to play to provide comprehensive care and optimal treatment outcomes.

II. Role of a Maxillofacial Prosthodontist

Maxillofacial prosthodontics is the field of dentistry dealing with the art and science of anatomic, functional, or cosmetic reconstruction using nonliving substitutes of those regions in the maxilla, mandible, and face that are missing or defective because of surgical intervention, trauma, pathology, or developmental or congenital malformations. The primary objective of rehabilitation is to preserve and restore the function of speech and swallow and to replace missing oral and facial structures that prelude to image restoration and boost the confidence of the patients so they can return to society. A maxillofacial prosthodontist plays a critical role in the surgical planning, fabrication of surgical stents, and in the preparation of both an interim as well as a definitive prosthesis for the patient. Maxillofacial prosthodontics provides a nonsurgical treatment for patients who are not good candidates for plastic surgery intervention because of advanced age, poor health, very large deformities, or poor blood supply due to radiation (Sneha et al., 2012). Rehabilitation goals are focused on the restorative, supportive, palliative, and preventive aspects of treatment (Moser et al., 2003). Moreover, prosthetic treatment is indicated when anatomical structures of the head and neck are not replaceable by living tissue, when recurrence is likely, when radiotherapy is administered or when fragments of fractured bones are severely displaced. (Chalian et al., 1972).

III. Maxillary Defects

These are defects that either caused by neoplasms of the head and neck or due to traumatic injury of oral structures. The defect may be in the form of a small opening resulting in a communication from the oral cavity into the maxillary sinus, or it may include a portion of the hard and soft palate, alveolar ridge, and the floor of the nasal cavity (Chalian 1971). In some instances, the defects might include more than one oral structure resulting in large palatal openings which might have an oro-antral, oro-nasal, oro-nasal-orbital communication.
For the ease of the operator and to provide some standardization for the management of maxillary defects, Armany has classified these defects into six categories, and this classification system is one of the most commonly used. The most common treatment modality used in the correction of maxillary defects is obturators. An obturator (Latin; Obturare, to stop up) is a disc or plate used to close an unnatural opening or defect. The placement of an obturator restores oronasal separation to allow an increase in intraoral pressure and a decrease in nasal airflow rate (Yoshida H., et al. 2000). To further increase the retention and the stability of the appliance, it might be supported with the aid of endosseous implants, attachments, or metallic frameworks.

<table>
<thead>
<tr>
<th>CLASS</th>
<th>Description</th>
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<tbody>
<tr>
<td>CLASS I</td>
<td>Midline Defect With Teeth Remaining on One Side</td>
</tr>
<tr>
<td>CLASS II</td>
<td>Unilateral Defect with Anterior Teeth Remaining of the Contralateral Side</td>
</tr>
<tr>
<td>CLASS III</td>
<td>Defect in the Central Portion of the Palate</td>
</tr>
<tr>
<td>CLASS IV</td>
<td>Defect Crosses the Midline and Involves Teeth in the Contralateral Side</td>
</tr>
<tr>
<td>CLASS V</td>
<td>Maxillary Defect Posterior to the Remaining Abutment Teeth</td>
</tr>
<tr>
<td>CLASS VI</td>
<td>Maxillary Defect Anterior to the Remaining Abutment Teeth</td>
</tr>
</tbody>
</table>

Figure 1: Acquired Defect of Maxilla due to Squamous Cell Carcinoma

Figure 1: Armanys Classification of Acquired Maxillary Defects
IV. PRE SURGICAL PROSTHODONTIC INTERVENTION

To optimize our treat outcome, a pre-surgical evaluation of the patient is very critical. Pre-surgical diagnostic casts, profile photographs, radiographs CT scans, as well as jaw relations and tooth analysis must be carried out.

Factors influencing the prognosis of prosthetic rehabilitation are the size of the defect, availability of hard and soft tissues in the defect area to provide support for the prosthesis, proximity of vital structures, patient’s attitude, temperament, systemic conditions, and the patient’s ability to adapt to the prosthesis. (Desjardins, 1978, Brown, 1970). Before advancing with the treatment, the patient must be educated on the outcome of the procedure, the probable hard and soft tissue changes that might take place and the possibility of a long-term follow up that might be required following the completion of the treatment.

V. SURGICAL STENT

The inception of the role of the prosthodontist starts with the surgical planning of tumor removal in coherence with the oral surgeon to spare as many vital structures as practically possible. Before the surgery, all the available diagnostic data must be collected which includes diagnostic casts, radiographs of the defect sites, and consent forms from the acting surgeons and radiation oncologists. With the aid of this information, the most conservative surgical approach can be planned and mock surgery can be conducted on the models of the patient. As far as possible maximum number of teeth and other hard and soft tissues should be conserved, which in turn would improve the overall prognosis of the eventual definitive prosthesis. Prior to the actual surgery, a surgical template and radiographic guide in heat cure acrylic resin can be fabricated and transferred to the patient’s mouth during the actual surgery.

Figure 2: Mock Surgery and Surgical Template Fabrication
VI. INTERIM PROSTHESIS

An interim prosthesis is a temporary prosthesis that is used immediately post-surgery. The surgical template that is fabricated can be used as an interim prosthesis by relining chairside either on the day of the surgery or post 48 hours. This interim prosthesis helps to block any opening or communication created at the time of surgery. It also acts as a surgical pack keeping the surgical site clean, preventing any foci of infection from developing and aiding in the early wound healing and closure of the defect site. This prosthesis also gives impetus to the patient and contributes to the overall comfort of the patient post-surgery.

Figure 2: Relined Interim Obturator

VII. DEFINITIVE PROSTHESIS

A definitive obturator is a more permanent treatment option. 6-12 months post-surgery, when wound healing has been completed the protocol to create this prosthesis can be taken up. Precise impressions of the defect site should be taken. It must be taken into account that all the masticatory forces must be distributed over as large a surface area as possible. Before the fabrication of this prosthesis, any adjunctive therapy that might be required such as periodontal, endodontic treatment must be carried out and the patient’s oral cavity must be brought to a condition of optimal health. Depending on the amount of hard and soft tissues that remain a definitive treatment plan either including implant therapy or cast partial dentures is planned. In the case of implant therapy, additional surgical procedures such as sinus augmentation or bone grafting might be required in conjunction with the primary removal of the tumor site. In the case of cast partial dentures, the required mouth preparations should be carried out systematically before initiation of the treatment to provide the patient with the ideal prosthesis. To improve the retention and stability of the obturator, the prosthesis must be made as light and hollow as possible which aids in patient acceptance and comfort.

Figure 3: An Implant Supported Definitive Obturator
VIII. Soft Palatal Defects

The greatest consequence of defects of the soft palate is the hyper nasality of the voice and regurgitation of food and liquids due to an oro-nasal or oro-pharyngeal communication. For the treatment of such defects, a prosthetic appliance known as a palatal lift prosthesis is used. This prosthesis aids in causing velopharyngeal closure by elevating the soft palate to contact the posterior pharyngeal walls of the nasopharynx. When a patient attempts to speak or swallow, this prosthesis acts by closing this passage with either a heat-cured acrylic denture extension or a silicone mold. To maximize the results and voice quality of such patients, they must be treated in conjunction with a speech pathologist.

![Figure 4: Palatal Lift Prosthesis](image)

IX. Conclusion

Rehabilitation of patients with maxillary defects has always posed as a dilemma for prosthodontists.

The job of a maxillofacial prosthodontist becomes even more challenging due to uncertainty and recurrence of neoplasm, and hence emphasis must be placed on the timely detection and treatment of such conditions. Today more than ever due to the growing number of cases, there is a need for enthusiastic specialists to come forward and serve patients who have already been incapacitated by the conditions. The role of a multidisciplinary team cannot be overemphasized and the expertise of various fields must be incorporated into the treatment plan at every step. The goal of rehabilitation must aim to not only improve the functionality of the patient but to improve the overall quality of life of these patients, to boost their social morale and help them once again to feel like they are an integral part of society and not outsiders. With integrated knowledge and practical implementation of these concepts, we can bring hope for these patients who have suffered from the ravages of disfigurement and in turn help to improve their long-term survival outcomes.

References Références Referencias

