

Role of Maxillofacial Prosthodontist as a Member of Interdisciplinary Oncology Team in Oral and Maxillofacial Rehabilitation: A Brief Review

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ABSTRACT

With advancements in the treatment protocol of oral cancer, the survival rate of these patients has dramatically increased. Rehabilitation for people with oral cancer extends beyond orofacial prosthesis reconstruction to include offering comprehensive care by combining specialties. In the diagnosis and treatment of patients, maxillofacial prosthodontists (MFPs) should be a part of the team of consultants. The MFP is an important member of the multidisciplinary team that coordinates the treatment. The prosthodontist must monitor the patient closely. Be conversant with the various hospital protocols and the patient's medical health. He is best qualified to assist the surgeon with prosthetics by making facial moulages and surgical stents to aid recuperation. To improve the prosthesis' retention, stability, and support, recommendations might be made to preserve tissues or reinforce existing anatomical features. Collaboration with a speech pathologist to learn about the mechanics and physiology of speech can help in the construction of a prosthesis that meets resonance, phonation, and articulation needs.

Keywords: Head and neck cancer, Maxillofacial prosthetics, Surgical oncology.

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INTRODUCTION

Maxillofacial defects more often lead to facial disfigurement that may arise due to congenital abnormalities, surgical resection of tumors, traumatic injuries, or may be due to a combination of both congenital and acquired causes.¹ The complete rehabilitation of head and neck deformities demands the involvement of individuals from interdisciplinary specialties such as general surgeons, plastic surgeons, onco-surgeons, medical oncologists, radiologists, MFPs, and speech therapists, among others.

Each of them has its importance and plays an important role in the interdisciplinary management of maxillofacial rehabilitation. The MFP as a team member is crucial in head and neck rehabilitation as they may help in preoperative treatment planning as well as postoperative rehabilitation of acquired or resulting defects due to head and neck surgery.² Maxillofacial prosthodontists help in differentiation of degree of deformity present and versatility of treatment required that may reestablish impaired function and outcome of the prosthesis.²

Significance of Referral of Patients to MFP

With the remarkable advancement in the field of surgical techniques, the need for prosthetic/artificial rehabilitation has often been eliminated but still, there are some conditions in orofacial defects due to trauma, tumors, or neoplastic diseases that may require the need of artificial replacement. The role of MFPs in the management of head and neck rehabilitation has been less explored. Preoperative planning in orofacial rehabilitation holds its prime importance. Preoperative referral to MFPs may help in deciding the extent of surgical resection and preservation of what can be used postoperatively and thus maintaining the potential tissues and adjacent teeth for support of postoperative prosthesis. Hence, early referral of patients to MFPs may add preoperative as well as postoperative benefits like a better outcome of the prosthesis

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as well as the quality of life in a patient requires management of head and neck rehabilitation. Planning of prosthesis always begins before undertaking any head and neck surgery, as well as in the interim phase between the surgical excision of cancer or other pathology and the start of reconstructive surgeries. Patients are often in discomfort following surgery due to incisions, postoperative edema, coating of dried mucosa, and more often they are unable to maintain adequate oral hygiene, making impression difficult. Hence, to accomplish these uneventful procedures effectively, the presence of a prosthodontist is necessary during initial planning and treatment and MFPs should make a preoperative impression.²

A Key Role of MFP in Maxillofacial Rehabilitation

In recent years, the combined team approach of many interdisciplinary specialties has made possible the correction of many orofacial deformities previously not amenable by surgical techniques, orthodontic techniques, or prosthetic rehabilitation alone. Maxillofacial prosthodontists can help in the

predetermination of the most stable occlusion attainable surgically and orthodontically. Maxillofacial prosthodontists can rehabilitate postsurgical defects in a patient undergoing chemotherapy or radiotherapy by fabricating radiation shielding devices and radiation therapy appliances that help in delivering the accurate delivery of radiation to a lesion.³

Role of Maxillofacial Prosthodontics in Decision or Suggestion Making in Surgical Planning

An oncologist is important and needs to know about the possibilities, limitations, and biomechanical working principles of the prosthesis in order to synchronize surgical techniques and prosthetic rehabilitation to follow. Maxillofacial prosthodontists should also have a sound understanding and knowledge of oral and perioral structure that may help in added retention of prosthesis fabrication. Having a piece of sound knowledge in diagnosis and treatment planning in maxillofacial rehabilitation, MFPs may help in preoperative decision-making along with onco-surgeon to decide what is to be left that may help in retention of the prosthesis or what is to be resected that may impair the retention and stability of the prosthesis.⁴ Certain anatomical areas exist near the tumor extension or near the pathology which if not affected may be retained during surgery and can be utilized postoperatively for retention of the prosthesis. To improve the prosthesis prognosis in patients

with mandibular and maxillary abnormalities, many changes in surgical procedures have been advocated.⁵ Tables 1 and 2 illustrate the areas to be retained and surgical alterations that may improve the prosthetic prognosis in maxillary and mandibular arches during rehabilitation.

Role of Prosthetic Conformer in Enucleation/Ocular Defect

The loss or absence of an eye can be caused by a variety of factors, including congenital abnormalities, tumors, and severe trauma, as well as any pathology. Based on severity, three types of surgical treatment have been advocated, that is, evisceration, enucleation, and exenteration. Following surgical removal of eye change in soft tissue and socket area takes place following healing period that may alter or hamper the prosthetic treatment in future. Hence, ocular rehabilitation following surgery requires the effort of both ophthalmologists and MFP. The changes in socket size and conformation are minimized if an eye conformer is placed following surgical removal of the eye. It also prevents scar tissue contractures, which can cause the socket bed to distort throughout the healing process. Thus, by working together, ophthalmologists and MFPs can prevent inadvertent tissue healing, which will ultimately improve the patient’s appearance and promote physical and mental well-being.^{12,13}

Table 1: The surgical alteration that may help in improving prosthesis prognosis in the mandibular arch

<i>Area</i>	<i>Problems encountered</i>	<i>Modifications in surgical techniques</i>
Oral orifice ⁶	If the opening of the oral aperture is going to be affected by surgical procedures and is too narrow, then a problem may arise in placement and removal of impression tray or prosthetic bases and dentures.	The surgeon should endeavor to regain or restore depth of labial vestibule, mobility, and neural sensation, as well as anatomic contour and intercommissural distance.
Tooth preservation ⁷	Patients with fewer remaining teeth have been reported to have worse prosthetic performance than those with a larger number of remaining teeth.	Hence, in cases where osseous reconstruction is needed, saving as many teeth as possible may help in better retention, stability, and support of dental prosthesis.
Coronoid process ⁸	If mandibular reconstruction is not performed at the time of tumor removal, the condyle and residual ascending ramus should be excised in an edentulous condition. This segment frequently retracts anteriorly and medially, approaching the maxillary tuberosity and inflaming the mucosa surrounding it. Furthermore, this component prevents a maxillary denture from extending into the buccal pouch area, which is critical for the prosthesis’ retention and stability.	Hence, in edentulous cases removal of condylar-coronoid as well as remaining ascending ramus is advocated.
Intraseptal bony cuts ⁹	If a cut has to be made for bony resection it should not be an interproximal cut. The interproximal bony cut may lead to loss of vitality of tooth as well as periodontal problems.	Intraseptal rather than interproximal cut will result in a higher bone level for the teeth adjacent to the defect, making them more appropriate for acting as an abutment for future partial denture prosthesis without jeopardizing the tooth’s vitality.
Vestibuloplasty and skin grafting ^{10,11}	Loss of the vestibule does not enable the prosthesis to retain properly. Moreover, the presence of scar tissue following resection that may be found between the alveolar ridge, lips, and tongue may also compromise the denture bearing area and may get irritated with the compressibility of the prosthesis.	Hence, in large defects where the absence of attached mucosa and loss of vestibule is there, vestibuloplasty along with skin grafting should be the choice of treatment. At resected sites, the split-thickness graft is better for tissue surface bearing the prosthesis. Advantages of this graft are hairless, its tight adherence to the mandible, and it is not affected by tongue or lips or floor of mouth or cheek movements.



Table 2: The surgical alteration that may help in improving prosthesis prognosis in the maxillary arch

<i>Area</i>	<i>Problems encountered</i>	<i>Modifications in surgical techniques</i>
Hard palate defects and retention ¹¹	Resection following hard palate may lead to deficiency in hard tissue of posterior part as well as the anterior part of maxilla that may offer excellent retention of the prosthesis.	The retention of the anterior maxilla improves the prosthesis' prognosis by improving support and stability, and the anterior maxilla is regarded the preferable site for implant placement, particularly in totally edentulous patients. As a result, if a large portion of this section is retained, additional implants can be put, resulting in improved retention and tolerance to masticatory stresses.
Transalveolar resection and maxillectomy ¹⁰	Tooth adjacent to defect more often offers prosthetic retention by utilizing the use of clasp and rest or acting as a retainer. Presence of minimal tissue or if there is a scarcity of hard and soft tissue around this tooth will limit this to act as a retentive component for the prosthesis and may complicate the prognosis.	Surgical incision near the tooth should be made in such a way that bone and mucosa are readily available near the tooth. Maxillectomy should be performed in such a way that bone is resected at the center of the alveolar socket of the adjacent, previously extracted tooth to obtain a good amount of hard tissue support and mucosa around the tooth near the defect area. As a result, the prognosis of the tooth close to the surgical site improves.
Access to the defects and role of surrounding structure in prosthesis prognosis ¹¹	Surrounding structures around the defects like nasal turbinates or the fibrous oral bands may prevent the prosthesis to cover or engage the defect area and ultimately affect the prosthesis functions.	The obturator can be extended to the lateral wall of defects for retention and stability, and the obturator can also be extended to the lateral nasal side of the orbital floor for support. In most cases if the defect is large, surgical excision of the turbinates is recommended. Resection of turbinates is not recommended if there is a small midline defect because the superior extension of the obturator is not so critical.
Palatal mucosa and its role in prosthesis bear	The palatal margin of the defect acts as a fulcrum in totally edentulous cases, allowing the prosthesis to rotate during functions.	In the resection area, surgeons should aim to save as much palatal mucosa as feasible. If a bony resection is necessary, the surgeon should reflect the tissue so that it can be used to fill the medial palatal bone margin later. When the prosthesis engages this tissue optimally, the lateral stability of the obturator is improved.
Soft palate defects and their impact on prosthesis prognosis	If only one-third of the posterior part of soft palate remains following palate resection, it may lead to problems like unseating of the posterior part of obturator because it is noninnervated and hence does not have the capacity of elevation and thus following healing these soft palate remnants contract superiorly and thus create problems in proper positioning of obturator prosthesis. Hence, it is advised that when only one-third of the posterior part of soft palate remnants remains, it should be completely resected.	In entirely edentulous instances, however, preserving this posterior band of tissue is helpful. In completely edentulous situations, retention of the obturator may be a problem. The extension of the obturator to the nasal side of the soft palate improves not just retention but also speech and leakage difficulties.

Surgical Procedures to Enhance the Prosthetic Outcome in Nasal Defect Cases

In some cases of nasal defects, interim intervention is required before the fabrication of final prosthesis delivery that not only delivers a better platform for the final prosthesis but also gives the patient hope to resume social interactions and more confidence during the healing period till the final prosthesis is given. Hence, these outcomes can be achieved with the teamwork of operating surgeons and maxillofacial prosthodontics that will ultimately enhance the patient's life.¹⁴ With the help of MFP and operating surgeon it is also possible to rehabilitate the larger defect that may not be done prosthetically or surgically alone. In these cases, surgical procedures will improve the supporting qualities that ultimately provide more suitable prosthetic rehabilitation.

These surgical procedures involve the use of split-thickness grafts at the surgical site followed by placement of osseointegrated implant and finally prosthetic components.¹⁵

Maxillofacial Prosthodontist and Preoperative Radiotherapy Consideration in Cancer Patients

Dental care before radiation therapy is of utmost importance. Cancer affects almost every part of the oral cavity. Hence, complete evaluation of the oral cavity of oral cancer patients is mandatory. Extraction of hopeless/questionable teeth in the area of cancer has been advocated. Preprosthetic surgery should be performed prior to radiotherapy to ensure that any existing possible sources of infection or anatomic interferences are removed in preparation for future prosthesis insertion.^{4,5} Radiation therapy, either alone or

in combination with chemotherapy, is now an important aspect of oncology in the treatment of head and neck cancer. Due to the anatomic limitation of the oral cavity certain area needs to be protected that may come in the line of beam radiation apart from the primary site. To protect these secondary sites from the source of radiation certain devices like radiotherapy-protected devices/stents can be fabricated by MFP. These devices are utilized to protect, displace, and prevent vital structures from being damaged. They also aid in beam placement and can act as a radiation shield.¹⁶

CONCLUSION

As a member of the anaplastological team, a maxillofacial prosthodontist can rehabilitate maxillofacial disfigurement with a more comfortable, durable, and lifelike prosthesis using the latest research, advancements, materials, and techniques in our field to give our patients confidence and a sense of well-being. Hence, input from MFP can significantly increase the postoperative surgical outcomes.

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