

Prosthetic Rehabilitation of Maxillo-mandibular defects: Case Series

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Abstract

Maxillary and mandibular defects due to congenital abnormalities like clefts, acquired --following surgical intervention of neoplasms (either benign or malignant), or due to traumatic injuries. All such defects require prosthetic rehabilitation, either permanent or interim, to reestablish patient's self-esteem to the society maintaining esthetic profile and minimize the difficulties in chewing, swallowing, breathing, and speaking as well.

Keywords: Maxillary, Congenital, Neoplasm, Self-esteem, Esthetic

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Introduction

Maxillofacial prostheses is the branch of Prosthodontics concerned with the restoration and / or replacement of the stomatognathic and craniofacial structures with prostheses that may or may not be removed on a regular or elective basis¹. The resultant maxillary and / or soft palatal defect create oronasal and/ or oroantral communication, with consequent difficulties in eating, speaking and breathing^{2,3}. Many a times, the maxillary defects involving both hard and soft palate, extends towards or include the velopharyngeal region. Maxillofacial defects result in facial disfigurement, thus leading to psychological problems. This in turn creates great difficulty in facing and accepting the social consequences⁴. Because maxillectomy patients are missing a portion of the hard palate, speech is hypernasal, and swallow results in nasal regurgitation. If the soft palate is involved, fluid or a food bolus cannot be properly propelled into the esophagus, swallow is difficult, if not possible and speech is hypernasal⁵.

Therefore, the restoration and / or replacement of lost stomatognathic apparatus and associate facial structures by appropriate artificial substitutes is advocated, especially for large maxillary defects secondary to tumor resection⁶.

In case of mandible, if a large lesion is enucleated or as in the cases treated by marginal mandibulectomies, the lower border becomes weakened, which may lead to fracture. However, interim prostheses till regeneration of bone may act as

single unit which resists fracture and improves esthetic of the patient.

These four case reports describe successful prosthetic rehabilitation of the patients having acquired faciomaxillary defects, out of which, one case describes the rehabilitation of the patient following surgical enucleation of cystic ameloblastoma using obturator, with the aim of preventing the recently operated area from contamination thus providing uneventful healing, subsequently allowing closure of the defect by secondary healing through granulation tissue maturation and associated bone fill⁷. Other cases describe the rehabilitation of maxillary defects, which include one immediate post-surgical obturator.

Case Reports

All cases reported to the department of Prosthetic Dentistry, Dr R Ahmed Dental College & Hospital, Kolkata, after surgical intervention by facio-maxillary surgeon and otorhinolaryngologist.

1st Case report: A male patient aged 30 years, who had undergone subtotal maxillectomy for mucoepidermoid carcinoma on the left side of the maxilla. The defect extended from right central incisor, crossing the midline involving all the teeth, a portion of the pre-maxilla and hard palate of left quadrant. (Fig. 1.1, 1.2, 1.3, 1.4)



Fig. 1.1: Photograph of the defect



Fig. 1.2: Obturator with lid (occlusal view)



Fig. 1.3: Obturator (fitting surface)



Fig. 1.4: After rehabilitation

2nd Case report: A 56 year old male patient reported with limited maxillectomy of right side of the maxilla. History revealed that patient was operated for central giant cell granuloma. The resultant defect extended from maxillary right lateral incisor to the 2nd molar tooth of the same side, involving the maxilla and a portion of the hard palate of the right quadrant.(Fig. 2.1, 2.2, 2.3, 2.4)



Fig. 2.1: Mirror image of the defect



Fig. 2.2: Prosthesis



Fig. 2.3: Prosthesis



Fig. 2.4: Mirror image after Rehabilitation

3rd Case report: A 52 year old male patient reported for prosthetic rehabilitation after subtotal maxillectomy of right side of maxilla, which was done for mucoepidermoid carcinoma, involving almost whole of the right maxilla, a portion of palatal bone of that side. Canine, premolars and molar teeth were extracted during surgery.

In this case, immediate post-surgical obturator was fabricated and that's why extension into the defect and tight occlusion were purposely omitted to avoid any trauma and irritation to the surgical site. Prosthesis was provided to cover the defect and facilitate feeding. (Fig. 3.1,3.2,3.3)

In these three case reports, patients' complaints were compromised esthetics and function, problem in deglutition, inability of having food, inability to speak, inability to breathe properly, problems due to orofacial communication.



Fig. 3.1: Photograph after Surgery



Fig. 3.2 a



Fig. 3.2 b: Prosthesis



Fig. 3.3: Prosthesis (Immediate Post-surgical obturator) fitted for rehabilitation

4th Case report: A 26 year old male patient was reported after surgical enucleation of cystic ameloblastoma of the mandible, for replacement of missing teeth and associated structures, which were lost following operating procedure. A saucer shaped defect was found in the body of the mandible, crossing the midline, extending to the both side. From 1st molar tooth of right side to 1st premolar tooth of left side were absent. (Fig. 4.1, 4.2, 4.3, 4.4)



Fig. 4.1: Photograph showing the defect



Fig. 4.2: Hollow bulb obturator and Lid



Fig. 4.3: Hollow bulb obturator and Lid



Fig. 4.4: After rehabilitation

Technique

- A. The technique for fabrication of obturator and missing portion as well to rehabilitate 1st, 2nd and 3rd cases are same, which includes
1. The communication and undercuts in the maxillary defect were blocked using gauge piece lubricated in white petroleum jelly to prevent flow of impression material into the defect.
 2. The primary impression of upper jaw was made by mixing the high fusing (green stick compound) and low fusing (impression compound) material,
 3. Diagnostic cast from above impression was fabricated in dental stone and special tray was prepared with self-cure acrylic resin.
 4. Final impression of upper jaw with this special tray and simultaneously impression of lower jaw were taken using irreversible hydrocolloid. Communications were again blocked with lubricated gauge piece.
 5. Final positive replica of both the jaws were fabricated in dental stone.
 6. In case of upper jaw, undercuts near the midline area in the cast were blocked using plaster of Paris & the undercuts situated laterally were not blocked purposely, which were utilized to increase retention. Temporary base plate prepared with self cure acrylic resin and occlusal rim was fabricated with base plate wax, jaw relation then achieved in usual manner, the missing teeth were arranged accordingly.
 7. After try in, flasking was done by investing waxed-up cast along with the teeth in a special maxillofacial flask.
 8. De-waxing and acrylisation using heat cure acrylic resin were done by conventional technique. After deflasking the prostheses, primary finishing was done, then a lid was prepared with self cure acrylic resin to make a hollow bulb covering the defect. It was done mainly to decrease the weight of the obturator prostheses and thus preventing the dislodgement due to gravity.
 9. Prostheses was delivered to the patient after finishing, polishing and post insertion instructions.
- B. The technique for fabrication of mandibular obturator (4th case)
1. The custom tray was modified and extended by adding impression compound along the border of it, to include the defect area, then primary impression was taken in usual manner using irreversible hydrocolloid and cast was prepared with dental stone.
 2. A special tray was prepared over the cast using self cure acrylic resin.
 3. The final impression was made using regular body rubber base impression material.

4. Positive replica was made with dental stone, after adapting the temporary base plate, the primary prostheses as well as occlusal rim was fabricated with the wax and jaw relation achieved in usual manner, after that, the missing teeth were arranged accordingly. Then tri in and flasking done in conventional method.
5. After dewaxing, Prostheses was fabricated with heat cure acrylic resin and hollow bulb was prepared in finished prostheses by covering the defect with a lid prepared from self-cure acrylic resin.
6. Prostheses was delivered after final finishing, adjustment and post insertion instructions to the patient.

Discussion

In our four cases, we have successfully tried to rehabilitate the patients after surgical excision of neoplasm of maxilla and surgical enucleation in case of mandibular lesion. Curtis et al categorically reported that prosthetic rehabilitation is the treatment of choice for patients with large maxillary defects following surgical resection of tumors.⁶ Most of patients with acquired surgical defects can be restored close to normal function and appearance.^{8,9} Sykes et al reported that the success and failure of the prostheses may be influenced by the degree of malignancy; the propensity of recurrence; the level of resection; and other associated complications.¹⁰ Adisman and Rieger et al also concluded that the prostheses may be needed for various reasons, namely as a support for surgery, as a vehicle for radiotherapy, or for protection from radiation and an adjunct to rehabilitation medicine for training and stimulation of the defective neuromuscular palatopharyngeal structures.^{11,12}

We have tried to fabricate light weight hollow bulb obturator with a lid for all the cases. The obturator, if made of solid acrylic, possesses undesirable weight to the prostheses that hampers the retention, stability, and support of it and results in patient's dissatisfaction.¹³ Phankosol et al had shown how a closed hollow obturator prevents collection of fluid and air space.¹⁴

Out of our four cases, in case of central giant cell granuloma, the immediate post-surgical obturator and in case of mandibular cystic ameloblastoma, the interim obturator were constructed to prevent contamination of the wound and to allow organization and healing of the wound associated bone fill. Riio B et al and Medford HM advised that the obturator should be relined periodically for better adaptation as the healing progress.^{15,16} Minsley GE et al had shown that obturator provides a barrier between the surgical dressing and oral cavity, so that patient does not feel the extent of the defect or dressing with his or her tongue during the initial healing period.¹⁷

During fabrication of our maxillary obturator, the undercuts lateral to the defects were utilized for better

retention. Singh M et al reported that the height of the lateral wall of defect can be utilized for indirect retention.¹⁸ Murat S et al used extra coronal resilient precision attachments with an obturator for better retention.¹⁹

Latest developments

Kocacikli M et al had reported that obturator can be constructed using visible light-cured (VLC) resin in comparatively less time, which provides the patients with light, comfortable and tolerable prostheses.²⁰ Iramaneerat W et al advocated "Gas injection technique" for the fabrication of the hollow bulb obturator, where the prostheses can be fabricated in one step and it does not require the resin seal.²¹

Conclusion

Considering the physical and psychological status of the patients after surgical intervention, maxillofacial prostheses is a very challenging job to Prosthodontists. To reestablish the patient's self-esteem, esthetics is the primary concern and the prostheses in the unfavorable oral environment in absence of normal hard & soft tissues, should be light and easy to wear, by which patient's functional deficiencies may also be corrected as maximum as possible.

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