Case Report

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2019;9:2:239-244.

Rehabilitation of a Radical Maxillectomy Patient with an Oro-Orbital Prosthesis: A Case Report

Parmeet Banga[1*] Asmita Lavate[2] Asmita Bhekare[3] R.D. Das[4]

[1]Associate Professor, Department of Prosthodontics, Yerala Medical Trust's Dental College and Hospital, Kharghar, Navi-Mumbai, India.
[2]Private Practice, Baroda, Gujarat, India.
[3]Lecturer, Department of Prosthodontics, Yerala Medical Trust's Dental College and Hospital, Kharghar, Navi-Mumbai, India.
[4]Private Practice, Mumbai, Maharashtra, India.

ABSTRACT

Background: The most daunting task for a prosthodontist is to rehabilitate a patient who has undergone radical maxillectomy. These maxillary defects are often connected to the orbital and the nasal cavities causing severe facial disfigurement affecting one's quality of life. Therefore, it is critical to fabricate the oro-orbital prosthesis such that they will restore the function of chewing and improve the extra-oral esthetics. The purpose of this case report is to illustrate rehabilitation of a patient with a combined maxillary and orbital defect.

Keywords: Maxillectomy, Combined Prosthesis, Obturator, Orbital prosthesis.

INTRODUCTION

The most complex and controversial area in head and neck reconstructive surgery is the management of maxillary, midface, and skull-base tumors—not only in terms of disease control or cure but in the best methods of oral and facial reconstruction and rehabilitation. Maxillary defects connecting the orbital and nasal cavities, created after extended tumor ablation, trauma or created by congenital malformation[1], may result in severe facial disfigurement and compromised function[2]. Lack of support, retention, and stability are common prosthodontic treatment problems for patients who have had a maxillectomy. And also, patients experience a loss of quality of life and feel isolated because of their appearance and functional deficits.

A closed, hollow obturator is frequently used to restore anatomic form after radical surgery for maxillary cancer[3]. This prosthesis is simple to construct, lightweight, and easy to clean; it has no direct junction between the oral, nasal, or antral environments and the interior of the obturator[4]. Fabrication of the facial prostheses depends on experience of the prosthodontist. A key factor of a successful facial prosthesis is the extent and location of the excision of the lesion and reconstruction of the resected fragment.at times there are scenario for patients having lesion involving orbital as well palatal communication leaving oro-orbital communication which not only hampers the patient's esthetics as well as the nutrition of the patient.

It is critical to fabricate the obturator and orbital prosthesis such that they will restore the function of chewing and improve the extra-oral esthetics. This article illustrates a case prosthetic rehabilitation of patient with combination of extra-oral and intra-oral defects.

CASE REPORT

A 48year-old male reported to the department of prosthodontics with a chief complaint of poor appearance, difficulty in speech and chewing. Extra-oral examination revealed that loss of right eye with orbital exenteration. Intra-oral examination revealed that there was a mid-palatal defect which had a communication with the orbital defect.

Received: Nov. 21, 2018: **Accepted**: Feb. 3, 2019
*Correspondence Dr. Parmeet Banga.
Department of Prosthodontics, Yerala Medical Trust's Dental College and Hospital, Kharghar, Navi-Mumbai, India.
Email: bangaparmeet@gmail.com

pISSN 2278-0076
eISSN 2321-9270

Fig 1: Frontal view showing right extra-oral defect with orbital exenteration.

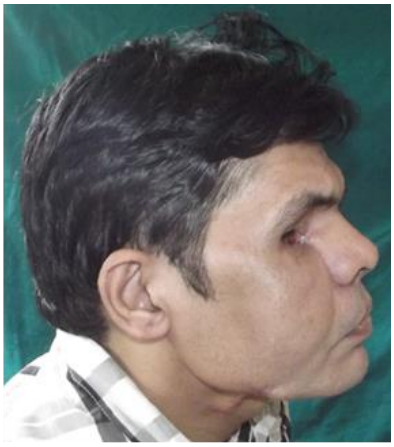

Fig 2: Left Lateral view showing right extra-oral defect with orbital exenteration.

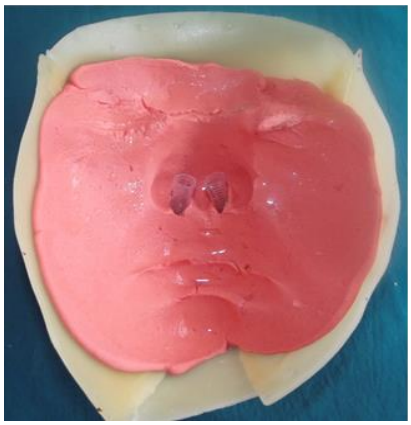

Fig 3: Facial moulage using irreversible hydrocolloid.

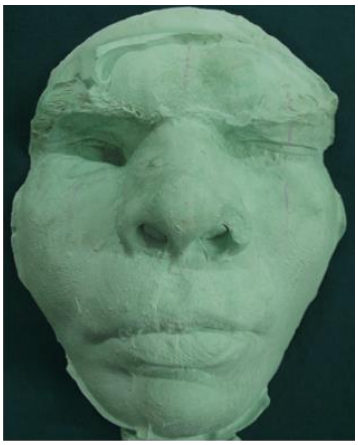

Fig 4: Working model poured in dental stone.

Fig 5: Acrylic shell fabricated for orbital prosthesis.

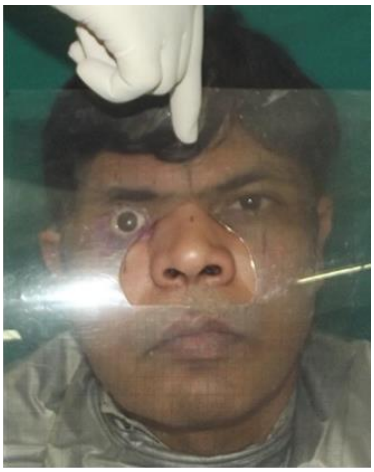

Fig 6: Try-in of orbital shell with the glass eye with graduated acetate sheet.

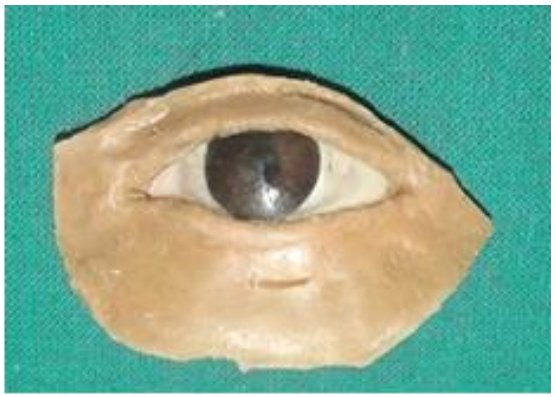

Fig 7: Orbital prosthesis fabricated in silicone with intrinsic staining.

Fig 8: Orbital prosthesis retained with the spectacle.

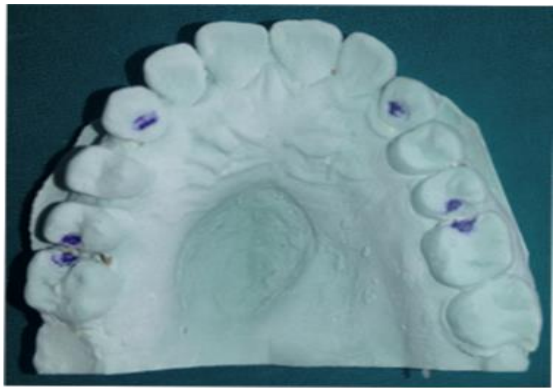

Fig 9: Primary maxillary cast showing the maxillary defect.

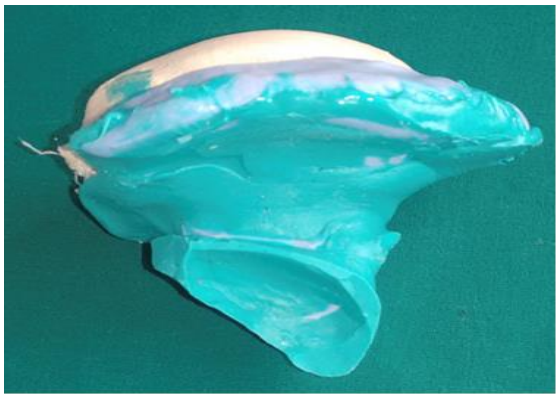

Fig 10: Addition silicone impression of the intra-oral defect communicating with orbital defect.

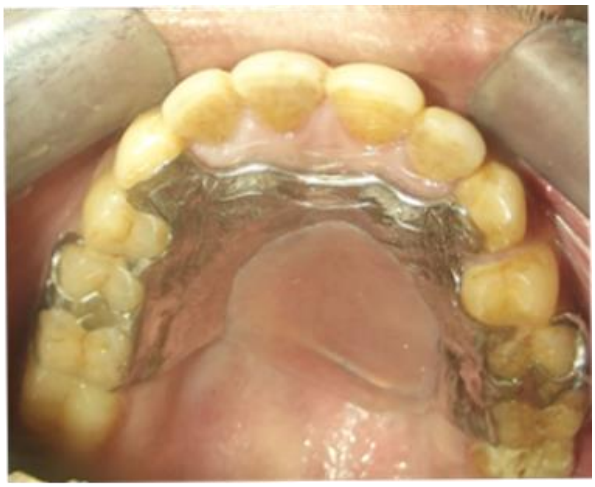

Fig 11: Intra-oral picture showing final prosthesis with hollow obturator in place.

Past Medical history

Patient suffered from an oral fistula which inhibited his speech. After thorough medical and oral examination and investigation revealed communication from oral cavity through the hard palate, CBCT investigations revealed cyst of maxillary palatal bone. Surgical excision was done, and post-surgery palatal splint was made. The patient experienced pain and discomfort after 4 months post excision in the left maxillary region. After complete inspection and investigation, CBCT scan confirmed destruction of palatal bone not involving the midline. A possible diagnosis of a benign maxillary tumor. A second surgical intervention was carried out where left maxillectomy was performed and post-surgery chemotherapy with radiotherapy was given. A maxillary solid obturator was made for

rehabilitation of lost maxilla and associated soft tissue.

Even after periodic recall and clinical evaluation of patient every 3months, patient again was complaining of severe pain and discomfort on the left orbital region. This time the orbital tissues were severely affected due to the residual of the previous lesion. After a planned multidisciplinary approach, the whole orbit and the lower rim of the orbital bone was enucleated.

After surgical excision, radiotherapy and chemotherapy was implemented with a routine follow-up for 3 months was done. After in depth examination and investigations, the surgeon and the oncologist confirmed that the patient was stable. Clinically, the maxillary defect was classified as Aramany class III.

Thus, an oro-orbital prosthesis was fabricated

MATERIAL AND METHOD

Fabrication of The Orbital Prosthesis

1. The area for the moulage was initially defined.
2. Facial hair within the defined area was protected by a light application of petroleum jelly.
3. The patient was seated in the physiological rest position, halfway between the upright and supine positions
4. The area of the orbital defect was blocked with sterile gauze dipped in petroleum jelly.
5. The nasal airway was kept patent by inserting two sterile syringes without the plungers in the nostrils.
6. A sheet of modelling wax was used to box the patient's face and to prevent alginate impression material from flowing down due to the gravity.
7. Alginate impression material was mixed with water to the desired consistency.
8. The patient was asked to shut his eye.
9. The alginate was loaded and allowed to set. The alginate was reinforced using gauze soaked in plaster.
10. The extra-oral impression was retrieved by asking the patient to wiggle his face to release the impression.
11. The impression was disinfected and poured in dental stone.
12. The working model was retrieved and trimmed.
13. The artificial glass eye was selected by matching the color of the iris of the patient's eye.
14. The first step in fabricating the wax-up of orbital prosthesis was creating an acrylic shell adapted on the site of the defect.
15. The artificial eye was arbitrarily positioned unto the acrylic shell by means of hard baseplate wax.
16. The sculpting of the prosthesis was done to match the contra-lateral eye.
17. The try-in of the waxed-up prosthesis was performed using a graduated acetate sheet.
18. The position and the gaze of the artificial eye was adjusted chairside.
19. The waxed prosthesis was then invested in plaster and dewaxing was performed.
20. The shade matching was done chairside before packing by adding pigments to medical grade silicone to obtain the exact shade,
21. The shade matched silicone was painted onto the mold and eventually packing was done by mixing silicone with customizing the shade according to the patient's skin color.
22. The packed prosthesis was cured as per manufacturer's recommendations.
23. After cooling, the prosthesis was deflasked and trimmed, finished and polished.
24. The try-in of the finished prosthesis was done and some extrinsic staining was done to adjust the shade to the patient's skin color.
25. After the patient was satisfied with the prosthesis, additional retention was provided by attaching the orbital prosthesis to a pair of spectacles.

Fabrication of Maxillary Hollow Bulb Obturator

1. The undercuts in the palatal defect were blocked using sterile gauze and petroleum jelly.
2. The preliminary impression was made using alginate.
3. Surveying of the cast was done. The design for framework was made.
4. Mouth preparation for rest seats was done intra-orally.
5. The definitive impression for the framework was made using addition Vinyl Poly siloxane (VPS) impression material.
6. The framework try-in was done.

7. A functional impression of the defect area was made.
8. The curing of the prosthesis was done. Bulb portion of the prosthesis was made hollow by sandwiching salt two layers of heat cure resin and curing was completed using short curing cycle. After processing, bulb portion was made hollow by drilling a hole and irrigating with distilled water to dissolve the salt.
9. Bulb portion was held *in situ* during adjustments with retentive clasps of cast partial framework and adjusted in the patient's mouth by disclosing paste.
10. Final prosthesis was adjusted in the patient's mouth and occlusal adjustments were done to make passive contacts on defect side. Prosthesis was functionally and esthetically pleasing.
11. The patient was recalled one week, one-month post insertion and subsequently every 6 months.

DISCUSSION

Ablative surgery of the midface involves a high level of psychological and physical trauma for a patient and their family. Although loss of an eye only affects binocular vision (patients can still read, watch television, and drive), the thought of losing an eye seems frightening and final. Extensive surgery involving orbital exenteration with partial maxillectomy is a challenge for prosthetic rehabilitation.

The critical aspect of orbital prosthesis fabrication is the esthetic element involved in the process, because even the slightest difference in the position of the eye and the color of the prosthesis will reflect on the social interaction of the patient. In a few patients, rather than creating a natural appearance, it may end up with the patient undergoing further psychological trauma over poor prostheses, particularly in orbital defect patients where itis difficult to mimic the exact contour and appearance of the normal eye. Hence, orbital prosthesis fabrication is a feasible alternative to the other local reconstructive treatments when esthetic and functional profiles are high[5]. In the current case report, the orbital prosthesis was fabricated with silicone as the material of choice. Silicone is preferred for the fabrication of orbital prostheses, since marginal adaptation and natural-looking qualities of material are superior[6]. Lack of chemical/mechanical bonding with the eyeglass frame, thus reducing retention, and frequently in curing allergies caused by the material render silicone as less usable material[7,8]. Flexible materials are significant in situations where the defect drifts beyond the orbital area and come across movable tissue beds. Implant treatment ranks better than silicone and acrylic materials; however, controversy regarding the placement of implants in the orbit has been documented. Studies show a higher failure rate result because of poor remodeling capacity of bone-implant surface and lack of stabilizing bone volume in proximity to the frontal sinus[9,10]. Orbital implants may appear “integrated” in high-density cortical bone, but these implants occasionally show “late failure.” It is recommended that orbital implants should only be placed in patients who are fully informed of the potential risk associated with late failure and the difficulty in maintaining proper implant hygiene[11].

Undercut areas influence the selection of material used for retention. The conventional material used is skin adhesive. On the other hand, in cases with complete loss of orbit and contracted skin without any possible undercuts, the eyeglass frame retention method may be beneficial because eye glass frames are easier to place in an accurate, reproducible prosthesis position. As plastic eyeglass frames were chosen to attach the prosthesis, the adherence was also made more firm, as acrylic material was used for the orbital prosthesis. The benefits of silicone or skin adhesive are nullified because of allergic reaction. This troublesome factor was lessened with the use of eyeglass frames. One of the limitations of eyeglass frames attached to a prosthesis is the sliding down of the frames during forward postures due to prosthesis heaviness. In this particular case, adhesive was used to improve the retention of the orbital prosthesis. The spectacles help the orbital prosthesis to remain in position and also masks the prosthesis matching it to the other eye.

The choice of intra-oral prosthesis for maxillectomy defects is open type or closed type obturator. As opposed to the open type of obturator, the hollow obturator aids in improving speech resonance, reduce the weight on the unsupported side, possibly to provide facial aesthetics and to act as a

foundation for a combination of extraoral prostheses in communication with the intraoral extension. Thus, hollow obturator was fabricated. The choice of material was flexible silicone as it provides better retention and less irritation than hard acrylic resin. Other advantages of silicone obturators are lightness of weight and ease of insertion and removal of the prostheses[12].

The retention of extra-oral prosthesis with the obturator is improved when cobalt samarium magnets are incorporated in the prosthesis. Other methods would be engaging the anatomic undercuts and fabricating the hollow obturator which is stable, retentive during mastication.

Thus, a hollow obturator engaging the undercuts and orbital prosthesis was made.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Keyf F. Obturator prostheses for hemimaxillectomy patients. J Oral Rehabil 2001;28:821-829.

2. Depprich RA, Handschel JG, Meyer U, Meissner G. Comparison of prevalence of microorganisms on titanium and silicone/polymethyl methacrylate obturators used for rehabilitation of maxillary defects. J Prosthet Dent 2008;99:400-405.

3. Nishigawa G, Maruo Y, Jin K, Oki K, Minagi S. A custom made sealing screw cap for a closed, hollow obturator. J Craniofac Surg 2007;18:1138-1141.

4. Asher ES, Psillakis JJ, Piro JD, Wright RF. Technique for quick conversion of an obturator into a hollow bulb. J Prosthet Dent 2001;85:419-420.

5. Konstantinidis L, Scolozzi P, Hamedani M: Rehabilitation of orbital cavity after total orbital exenteration using oculofacial prosthesis anchored by osseointegrated dental implants posed as a one step surgical procedure. Klin Monbl Augenheilkd 2006;223:400-404.

6. Rodrigues S, Shenoy VK, Shenoy K: Prosthetic rehabilitation ofa patient after partial rhinectomy: a clinical report. J Prosthet Dent 2005;93:125-128.

7. Amnuay SK, Khan Z, Goldsmith LJ: Effect of adhesive retention on maxillofacial prostheses. Part I: skin dressings and solvent removers. J Prosthet Dent 2000;84:335-340.

8. Guttal SS, Patil NP, Nadgir RK, et al: Use of acrylic resin base as an aid in retaining silicone orbital prosthses, J Indian Prosthodont Soc 2008;8:112-115.

9. Roumanas ED, Freymiller EG, Chang TL, et al: Implant-retained prostheses for facial defects: an up to 14-year follow-up report on the survival rates at UCLA. Int J Prosthodont 2002;15:325-332.

10. Toljanic JA, Eckert SE, Roumanas E, et al: Osseointegrated craniofacial implants in the rehabilitation of orbital defects. An update of a retrospective experience in the United States. J Prosthet Dent 2005;94(2):177-82.

11. Beumer J, III: A follow-up study of orbital prostheses supported by dental implants: discussion. J Oral Maxillofac Surg 2000;58:19-23.

12. Shimodaira K, Yoshida H, Mizukami M, Funakubo T. Obturator prosthesis conforming to movement of the soft palate: a clinical report. Journal of Prosthetic Dentistry. 1994 Jun 1;71(6):547-51.