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Case Report

Sculpting the eye: Prosthetic rehabilitation following orbital exenteration

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ABSTRACT

Background: Face is the index of the mind, through which we express our various emotions. Defect of eyes can be congenital or acquired, due to carcinoma or trauma, which can lead to severe facial asymmetry and disfigurement. It results in several functional, esthetic and psychological disturbances to the patient. Restoring form and function in such patients is a very challenging task and requires an individualized design and technique for each patient.

Case Report : This case report showcases rehabilitation of a patient who was diagnosed with exenterated left eye secondary to squamous cell carcinoma and maxillary sinus. Various steps for fabrication of a custom silicone orbital prosthesis have been elaborated in this article which improved the patient's psychological, social and emotional well-being.

Conclusion: The customized silicone orbital prosthesis does not only provide a life like-appearance but also has the advantage of being light in weight. Apart from being comfortable, economical and non-invasive use of the orbital prosthesis for a disfigured face undoubtedly improves the quality of life and the overall well-being of the patient.

1. Introduction

Eye is a vital organ not only for vision but also being a momentous component of the facial expression. Loss or absence of a part of the face especially the eye can lead to severe physical and emotional trauma to the patient. Most tumor that affect the eye, ocular cavity, or the orbit are Basal Cell Carcinoma, squamous cell Carcinoma, rhabdomyosarcoma, Retinoblastoma and malignant melanoma that requires orbital exenteration, which involves removal of the contents of the orbit.[1,2]

Peyman, Saunders and Goldberg classified surgical procedures for the removal of an eye into three general categories: Enucleation, evisceration and exenteration.[3] Restoring these defects can prove to be very challenging, however, when appositely made it can provide a patient who feels socially secluded and emotionally traumatised a boost in morale and confidence.[4,5] The French surgeon Ambroise Pare was apparently the first to report on orbital and ocular prostheses used as cosmetic replacements for the missing organ.[6]

This case report presents a method of fabricating the silicone orbital prosthesis in a patient with a history of orbital exenteration due to squamous cell carcinoma of maxilla with involvement of maxillary sinus and orbit left side. A silicone orbital prosthesis presents a feasible, economical and practical alternative when esthetic and functional demands are beyond the capacity of local reconstructive efforts, and resulted in the restoration of facial esthetics and overall well-being of the patient.

2. Case Report

A 60-year-old patient reported for prosthetic rehabilitation of facial disfigurement due to loss of the left eye. A history of operated case of carcinoma maxilla with involvement

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of maxillary sinus and orbit left side was elicited which led to an orbital defect due to exenteration of orbit about one year back. The patient was concerned with her facial disfigurement and desired for an acceptable solution. Extraoral examination elicited facial asymmetry and a large orbital defect site of size 3cm X 3.5cm X 4 cm left side. A completely healed socket and tissue bed lined with skin graft was observed with no pathological signs or symptoms [Figure 1].

Treatment plan for the fabrication of silicone orbital prosthesis was formulated. Various modes of retention for the prosthesis, which can range from being spectacle retained, adhesive retained to implant retained, were considered for this case. Due to pertinent factors of age, health and immunocompromised condition of the patient the fabrication of adhesive retained orbital prosthesis was planned.

2.1. Making of facial moulage

Impression of the face and the defect site was made using irreversible hydrocolloid as it is easy to manipulate, readily available, fast setting, elastic with reasonable dimensional accuracy and gives a detail reproduction of the area [Figure 2]. The patient was made to sit in an upright position with right eye passively closed and vaseline was applied on the eyebrows to prevent sticking of the irreversible hydrocolloid. After the preparation of the patient, the peripheral area was boxed with modelling wax (The Hindustan Dental products, Hyderabad, India) and irreversible hydrocolloid (Zelgan, Dentsply India Ltd.) was mixed and painted gently into the defect area and over the closed right eye. The entire boxed area was filled with irreversible hydrocolloid and while doing so care was taken to maintain the thickness of the impression material to a minimum for avoiding tissue compression. Wet gauze was placed over the hydrocolloid before it had completely set and Plaster of Paris was applied over the gauze to stabilize the impression during the cast pouring procedure. To maintain patent airway throughout the entire procedure of impression making, hollow plastic tubes were inserted through the nostrils of the patient. On setting the impression was retrieved and poured with type II dental stone to fabricate the facial moulage which was used as the working model.

2.2. Mode of retention

In the present case, naturally occurring undercuts were evident in the superolateral and inferolateral portions of the orbital rim. Mechanical by engaging the undercuts and medical grade adhesive modes of retention were planned for retaining the said prosthesis.

2.3. Orientation of the stock eye shell and wax pattern fabrication

A wax strip was adapted at the defect site on which the selected stock eye shell, matching with the iris of contralateral side was placed. A paramount precondition for acceptable aesthetics is the precise orientation of the artificial eye and prosthesis making it inconspicuous to the observer. For the orientation of the stock eye shell facial measurements were made while maintaining the right eye in the conversational gaze. For mesio-distal orientation of the shell a vertical line was drawn through the centre of the face (A) on the either side of which equidistant vertical lines were drawn (B-B', C-C' & D-D'). The line B-B' was passing through the medial canthus of the eye, C-C' through centre of pupil and D-D' through the lateral canthus of the eye. These vertical lines aided in correct orientation of the stock eye shell. These facial measurements were then transferred to the working model for the fabrication of wax pattern [Figure 3]. After the correct orientation was achieved layers of wax strip were added to build and mimic the anatomy of the contralateral eye which aids in giving the prosthesis a natural appearance. Carving the anatomic replica of contiguous soft tissues in an orbital prosthesis is a complex and detailed procedure. Tissue contours the upper and lower eye lids, interlid space and wrinkles of the contralateral side were accurately mimicked and sculpted.

2.4. Wax pattern trial

The prepared wax pattern was then tried on the patient assessing the eye shell position, lid aperture and overall adaptation of the orbital prosthesis. The position of eye shell was verified to be in accurate anteroposterior, mediolateral and superoinferior planes in accordance with the contralateral eye using transparent graph grid method [Figure 4].

2.5. Processing of the pattern with silicone

After the wax trial, wax pattern was returned to working cast and sealed before investing. Flasking and dewaxing was done carefully so that the ocular shell could be retrieved without damage [Figure 5]. Color matching was done with skin color adjacent to defect area of the patient skin with high temperature vulcanising (HTV) silicone (Technovent, United Kingdom) which was mixed as per the manufacturer instructions. Intrinsic stains were mixed to achieve shade matching. Packing of silicone was done in layers and cured as per the manufacturer instructions. It was followed by deflasking to retrieve the final prosthesis. The characterisation of the prosthesis was done by placing the upper and lower eyelashes using patient's natural hair giving it a more natural and life like appearance. This was followed by finishing of the prosthesis by placing an extrinsic sealant [Figure 6].

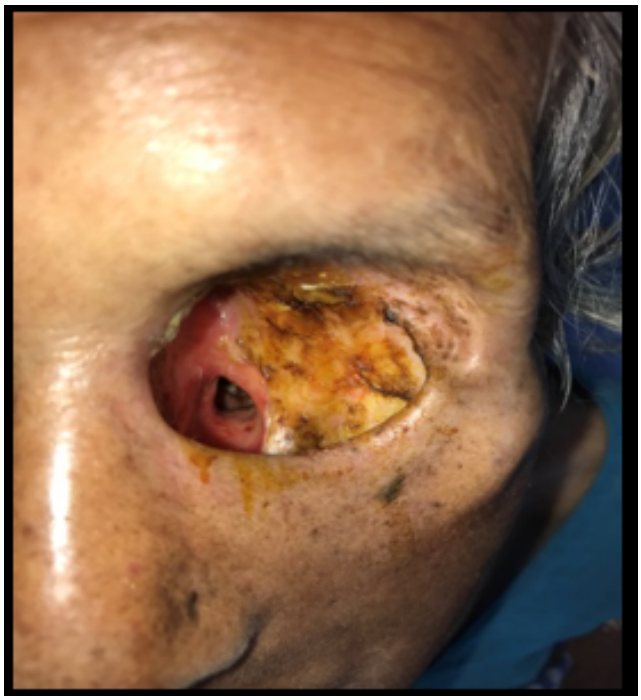

Fig. 1: Pre-OP

Fig. 3: Orientation of wax pattern on facial moulage

Fig. 2: Impression for facial moulage

Fig. 4: Wax – trial confirmed with graph grid method

Fig. 5: Dewaxing

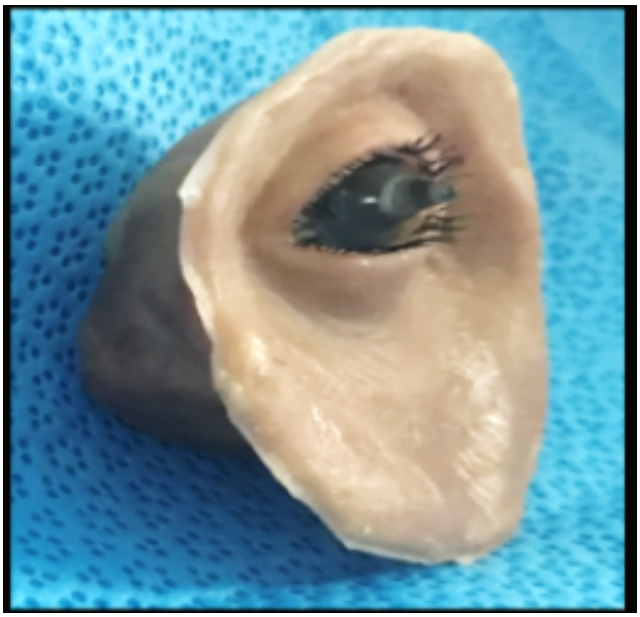

Fig. 6: Retrieved prosthesis

2.6. Prosthesis Insertion

The prosthesis was placed in situ [Figure 7] and the patient was taught how to insert the prosthesis by first engaging into the undercut region and then seating the orbital prosthesis in place. The prosthesis was retentive and was up to patient's utmost satisfaction. Instructions were given to the patient for the maintenance of the prosthesis and regular follow-up was done.

Fig. 7: Pre-OP & Post-OP

3. Discussion

Retention modes for maxillofacial prostheses range from simpler options like using spectacles, magnets, engaging tissue undercuts, adhesives to extensive options like using osseointegrated implants.[7–11] The use of osseointegrated implants is a popular approach since it offers an improved retention compared to the existing alternatives.[4,5,7] Various factors including age and immunocompromised condition of the patient the use of osseointegrated implants was not possible. For this case rehabilitation has been done using a silicone orbital prosthesis, wherein retention has been achieved by both anatomic undercuts and adhesives. Present case came with an urge for cosmetic as well a social concern which was successfully treated by silicone orbital prosthesis that has desirable properties of flexibility, biocompatibility and ability to accept intrinsic and extrinsic colorants, mouldability, cost-effective and better marginal adaptation by merging with adjacent skin giving it a lifelike appearance.[12] However, color instability is a serious disadvantage of silicones and requires the remake of the prosthesis every 2 years.[13] Recent advances in rehabilitation of orbital defects is underway to have a bionic eye with colored and accurate vision which shall make patients unrealistic expectations into a reality.

4. Conclusion

Loss of an eye due to exenteration of the orbital contents with an ablative surgery is a very traumatic experience for an individual.Rehabilitation of such patients is a challenging task. Pertinent considerations in executing all the steps from the impressions making to sculpturing and processing are emphasized ensuring an esthetically acceptable prosthetic replacement. The techniques employed greatly helped to meet the physiologic, anatomic, functional and cosmetic requirements of the patient so as to improves the quality of life and the overall well being of the patient.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Heckmann M, Zogelmeier F, Konz B. Frequency of facial basal cell carcinoma does not correlate with site-specific UV almol exposure. *Arch Dermatolol*. 2002;138:1494–7.
2. Zucker JM, Desjardins L, Stoppa-Lyonnet D, Doz F. Rétinoblastome. *Orphanet J Rare Dis*. 2006;1(1):1–11.
3. Peyman GA, Sanders DR, Goldberg MF. Principles and Practice of. vol. 3. Philadelphia : Saunders; 1987.
4. Beumer J. Maxillofacial Rehabilitation: Prosthodontic and Surgical Considerations Hardcover – Import. Portland: MDMI, Inc; 1996.
5. Taylor TD, Mericske-Stern R, Belser C. Prosthetic management of the partially dentate patient with fixed implant restorations. vol. 11 of S1. Chicago: Quintessence Publishing Company; 2000. p. 126–45.
6. Gibson T. The prosthesis of ambroise pare. *Br J Plast Surg*. 1955;8:3–8.
7. Dholam KP, Pusalkar HA, Yadav P, Bhirangi PP. Implant-retained orbital prosthesis. *J Indian Prosthodont Soc*. 2008;8(1):55–8.
8. Driscoll CF, Hughes B, Ostrowski JS. Naturally occurring undercuts in the retention of an interim oculofacial prosthesis. *J Prosth Dent*. 1992;68(4):652–4.
9. Cheng AC, Morrison D, Maxymiw WG, Archibaldb D. Lip prosthesis retained with resin-bonded retentive elements as an option for the restoration of labial defects: A clinical report. *J Prosth Dent*. 1998;80(2):143–7.
10. Fredrickson EJ. Mechanical stabilization of difficult maxillofacial appliances. *J Prosth Dent*. 1958;8(6):1035–8.
11. Nusinov NS, McCartney JW, Mitchell DL. Inverted anatomic tracing: A guide to establishing orbital tissue contours for the oculofacial prosthesis. *J Prosth Dent*. 1988;60(4):483–5.
12. Jani RM, Schaaf NG. An evaluation of facial prostheses. *J Prosth Dent*. 1978;39(5):546–50.
13. Kulkarni RS, Nagda SJ. Colour stability of maxillofacial silicone elastomers: A review of the literature. *Eur J Prosthodont Restor Dent*. 2014;22:108–15.

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