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A NEOTERIC APPROACH IN REHABILITATION OF ORBITAL EXENTERATION DEFECT USING A SILICON ORBITAL PROSTHESIS – A CASE REPORT

Prosthodontics

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ABSTRACT

This article describes a case report of a patient with a history of unilateral orbital exenteration due to Rhabdomyosarcoma since 15 years. The patient had been already using an acrylic orbital prosthesis fastened to the spectacle frame for 15 years. The spectacle was broken and the patient had to get the prosthesis refabricated several times. To achieve a life-like appearance a silicone orbital prosthesis attached to the acrylic conformer was considered to be the best possible option in this case. **Discussion** Total orbital exenteration is an ablative surgical procedure that involves the complete removal of the contents of the orbital cavity including the periorbita. This procedure leads to a pronounced change in the facial appearance that can have a significant impact on the psychological well-being of the patient. To address these challenges effectively, a reasonable and durable maxillofacial prosthetic material and economically feasible retentive aid should be considered. The flexible and lifelike properties of silicone elastomers allows for the fabrication of prostheses that closely emulate the appearance of the natural eye, seamlessly blending with the surrounding facial features. **Conclusion** Silicone orbital prostheses have emerged as an invaluable solution in the field of maxillofacial prosthetics to rehabilitate patients who have undergone total orbital exenteration. These prostheses play a crucial role in helping patients regain their confidence and self-esteem, enabling them to face the world with a revitalized sense of normalcy and dignity.

KEYWORDS

Orbital Prosthesis, Silicone Prosthesis, Acrylic Conformer, Orbital Defect

INTRODUCTION

Total orbital exenteration is a radical surgical procedure which involves the removal of the entire contents of the orbit, including periorbita. Exenteration of orbital contents can result in severe disfigurement and functional impairments. [1]

Patients who have undergone exenteration often require psychological and emotional support to cope with the changes to their appearance and the potential constraints in functionality that may arise. An orbital prosthesis offers a favourable and feasible solution when the aesthetic and functional requirements exceed the capabilities of local reconstructive interventions.

The orbital prosthesis should be aesthetic, durable, lightweight, economical, and retentive.[2] The technique used for retaining maxillofacial prostheses plays an important role in the success of treatment. Literature reports various methods of auxiliary retention used for orbital prostheses which includes eye patches, prosthesis fastened to spectacle frame, anatomic retention using conformer, magnets , adhesives , Osseo integrated implants with attachments and stud attachments[3]. A well-retained, user-friendly, removable maxillofacial prosthesis plays a pivotal role in the overall success of prosthetic rehabilitation .The protection of the remaining soft and hard tissues should be the paramount feature of rehabilitation.

It allows patients to regain their physical appearance and functional abilities. It also enhances their overall quality of life. This clinical report describes the cosmetic rehabilitation of a patient with unilateral orbital exenteration. Silicone orbital prosthesis retained with acrylic conformer and adhesive was planned for this patient which was economical as well as user-friendly for the patient.

Case Report

A 75-year-old male patient had reported to the Department of Prosthodontics, Government Dental College, with a chief complaint of broken spectacle retained acrylic orbital prosthesis. The patient gave a history of diabetes and Rhabdomyosarcoma. Surgical exenteration of the right eye was done 20 years back followed by a protocol of maintenance chemotherapy and radiotherapy.

The orbital prosthesis was placed as a rehabilitative measure following surgical treatment. An extraoral examination of the patient showed a large orbital defect on the Right side. (figure: 1). Extra orally, tissue appears healthy. For complete prosthetic rehabilitation of the patient, a silicone orbital prosthesis attached to the acrylic conformer was planned.

Procedure

Recording The Impressions:

The patient was seated in a comfortable position in the dental chair for the impression procedure. The patient's eyebrows and eyelashes were lubricated with petroleum jelly in to facilitate easy removal of the impression material and minimize discomfort to the patient. The Impression of the orbital defect was made using irreversible hydrocolloid and cast was poured in dental stone for better preservation of surface details and strength. (Figure 2 &3)

Fabrication Of Acrylic Conformer:

The wax pattern of the conformer of the orbital defect was made on the cast. Then it was flasked, dewaxed and packed with heat cure acrylic resin (DPI heat cure, Dental Product of India, Mumbai, India) Pigments were added to the acrylic resin used for the packing of orbital defect to match the patient's skin colour (figure 4). Then the conformer was checked on the patient for adaptation (figure 5). Retentive holes were drilled on the acrylic conformer for potential mechanical adhesion of the Silicone to the conformer base of the Orbital Prosthesis. Then a prefabricated stock eye shell button was selected according to the colour and size of the pupil of the left eye. The eye shell button was embedded in the acrylic conformer and the orbital prosthesis was carved in the modelling wax . The wax pattern was then tried on the patient's face to check the orientation of the pupil and volume of the sclera visible as compared to the contralateral eye (figure 6). Once the trial was found satisfactory, flasking, dewaxing and packing were done as per Prosthodontic protocols and processed in room temperature vulcanized silicone material. (figures 7& 8). The silicone material was dispensed in the glass slab and silicone-specific intrinsic colour pigments were added and mixed with a spatula until it matched with the skin colour of the patients. Then the material was packed and flasked conventionally and the curing was done at room temperature for 24 hours as per the manufacturer's instructions .

Orbital prosthesis was then retrieved, characterization was done with extrinsic pigments and the prosthesis was delivered to the patient.(Figure 9 &10) The patient was instructed to use adhesive to improve the retention of orbital prosthesis.

Figure 1: Exenteration socket of the right eye

Figure 2: impression making with irreversible hydrocolloid impression material Boxing with modelling wax

Figure 3: Model

Figure 4: Acrylic conformer

Figure 5: Try-in of conformer

Figure 6: Conformer try-in of wax pattern

Figure 7: Investing of wax pattern

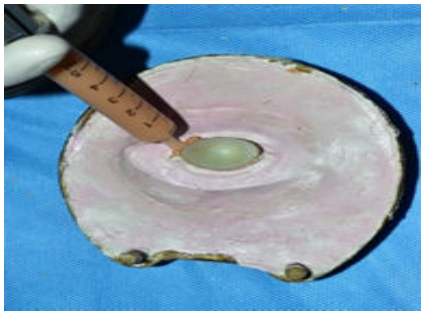

Figure 8: Packing of mould space with silicone elastomer

Figure 9: Silicone orbital prosthesis

Figure 10: Post-operative view

DISCUSSION

Removing the orbital structures can lead to significant changes in the appearance of the face, as well as impairment in vision, eye movement, and overall facial symmetry.

Rhabdomyosarcoma is a neoplasm that arises from the striated muscles. There is a bimodal age distribution of orbital rhabdomy osarcoma, with approximately 75% occurring within the first decade of life.[4] In the elderly it has been reported in a few cases. Orbital lesions represent approximately 10% of all rhabdomy osarcomas. Immunohistochemistry has now demonstrated that the tumour arises from the malignant transformation of pluripotent mesenchymal cells.[4]

Total orbital exenteration leads to a deep orbital deformity causing significant cosmetic and functional consequences which necessitates intricate and costly oculoplastic intervention to address these challenges effectively. For rehabilitating such patients, a reasonable and durable maxillofacial prosthetic material and economically feasible retentive aid should be considered. The patient had been already using an acrylic orbital prosthesis fastened to the spectacle since 15 years. The spectacle was broken and the patient had to refabricate the prosthesis several times. The main concern of the patient was the increased weight of the prosthesis, discomfort and the artificial appearance of the orbital prosthesis. To achieve a life-like appearance the patient was given silicone prosthesis.

There are various materials available for the fabrication of orbital prosthesis which includes Polymethyl methacrylate, Silicone elastomer, Polyurethane elastomer, or urethane-backed medical-grade silicone and fibre-reinforced composite elastomers.[5] The most commonly used material for the fabrication of orbital prosthesis is Polymethyl methacrylate and Silicone elastomer. Several techniques for retaining the orbital prosthesis include, medical grade adhesives, eye patches, prosthesis fastened to spectacle frame, anatomic retention using conformer, magnets, adhesives and make osseointegrated implants with attachments and stud attachments.[6]

The unique properties of the Silicone material such as better marginal adaptation (knife edge margins can be produced) and life-like appearance make it an excellent choice for the fabrication of orbital prosthesis .However, Silicone elastomers inability to form chemical/mechanical bonds with the eyeglass frame, poses a challenge to retain the prosthesis.

The use of implants is a popular approach since it offers improved retention compared to the existing alternatives. Various factors, including systemic conditions and financial constraints, limit the use of osseointegrated implants in few patients[7]. Hence the silicone orbital prosthesis was attached to the acrylic resin base conformer which was retained using the anatomic undercut and medical grade adhesive. Polymethyl methacrylate resin is a simple and economical base material for use in retaining the orbital prosthesis

After the delivery of the prosthesis, regular follow-up was done at 1st and 3rd month. The patient was satisfied with the overall appearance and comfort in using the prostheses.

CONCLUSION

Proficiency in artistic skills and meticulous treatment planning play a pivotal role in the rehabilitation of lost facial tissues. Exenteration of the orbital contents is an ablative surgery which results in a large orbital defect, and can have profound repercussions on an individual's function, appearance, and psychological well-being. In such cases, a well-retained, user-friendly, removable maxillofacial prosthesis is the cornerstone of successful prosthetic rehabilitation.

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