

Promising Prosthetic Rehabilitation Following Orbital Exenteration: A Case Report

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Abstract:- This case report outlines the successful prosthetic rehabilitation after orbital exenteration. Postsurgical exenteration by an ophthalmologist and maxillofacial prosthodontist led to a user-friendly customized ocular-orbital silicone prosthesis with spectacles providing an appropriate fit, restoring facial symmetry and aesthetics, and improving the patient's quality of life. This interdisciplinary approach highlights the significance of tailored prosthetic solutions in optimizing outcomes for such patients under the guidance of an ophthalmologist and maxillofacial prosthodontist.

Keywords:- Orbital Rehabilitation Prosthesis, Oculo-Orbital Prosthesis, Spectacle-Retained, Heat-Cured Silicone Prosthesis.

I. INTRODUCTION

Rhino-orbito-cerebral mucormycosis is the most commonly occurring mucormycosis as an opportunistic infection which leads to surgical debridement of orbit.^[1] Depending on the individual case of involvement, evisceration, enucleation, or exenteration is performed. Orbital exenteration, the surgical removal of the contents of the orbit, is a drastic yet necessary procedure employed in cases of advanced orbital tumours, infections or severe trauma.^[2] Despite its efficacy in disease control, patients often face substantial challenges in terms of facial aesthetics and functional deficits postoperatively. This profound impact on both physical appearance and psychological well-being underscores the critical need for effective rehabilitation strategies. Prosthetic rehabilitation emerges as a promising solution, offering a tailored approach to restore facial symmetry and enhance the overall quality of life for these individuals.^[3] In this report, we present a compelling case of successful prosthetic rehabilitation following orbital exenteration using spectacle-retained customized acrylic ocular and orbital silicone prostheses. This case exemplifies the potential of prosthetic interventions in restoring functionality and also underscores the importance of

interdisciplinary cooperation in optimizing outcomes post orbital exenteration.^[4]

II. CASE REPORT

A 45 years old, male patient with rhino-cerebro-orbital mucormycosis had undergone left orbital exenteration by ophthalmic surgeons and left infrastructural partial maxillectomy by ENT surgeons 6 months ago and was referred to the unit of maxillofacial prosthodontics of our institute, with the chief complaint of an unaesthetic face due to a cavity formed by the absence of the left eye and associated structures, food regurgitation via the nose, and difficulty in speech. On clinical examination patient gait and built was normal, extra-orally left side healed orbital cavity of elliptical shape and type I orbital exenteration^[5] extending superiorly involving middle 1/3rd of left eyebrow and inferiorly till inferior orbital rim was present of size 3.5 mm medio-laterally and 2.5 mm superior-inferiorly (Fig 1) with small opening communicating left sided palatal defect. Intraoral left-sided Armani class II defects were present in the first molar region of a 9 mm diameter opening with orbital communication. As the communication was too small thus separate oculo-orbital prostheses and obturator prostheses has been considered as a treatment plan.^[6] For oculo-orbital prosthesis, as per patient convenience, spectacle-retained prostheses have been planned instead of implant- or adhesive-retained prostheses.

III. MATERIAL AND METHOD

As per the anatomical landmarks, the pupil midlines, facial midline, and lateral borders were marked for impression making. Impression was recorded by placing a gauge piece inside the undercut of the left orbital cavity, and a border was made with impression compound (Pyrex polykem, Roorkee, India) covering the eyebrows of both sides superiorly and inferior orbital rim inferiorly and lateral borders laterally with alginate impression material (Zhermack Tropicalgin Dental Alginate, Delhi, India) covering the gauge piece and plaster of the paris (Fig 2). Later impression has been poured with type IV gypsum

(Ultrarock die stone Kalabhai) on which self-cure acrylic resin (Rapid Repair, Pyrax polymars, Roorkee, India) conformer has been adapted.^[7] Patient adjacent normal eye-iris colour and diameter of 12.89 mm, scleral diameter of 22 mm with digital caliper has been recorded for left ocular customisation. The iris color of red, ombre, and black was painted, and an acrylic button was made and flasked with a waxed-up scleral size (Fig 3a). Customized ocular prostheses were fabricated using heat-cured acrylic resin with acrylic pigments for sclera, and rayon fibrils were added to simulate blood vessels (Fig 3b). A wax (Cavex modelling set up wax, Vijay Dental Chennai, India) trial on the acrylic conformer was performed on the patient along with the level of ocular prostheses with adjacent eye has been checked (Fig 4a), simulation of anatomical creases as per adjacent eye via wax carving was performed (Fig 4b), and a bird eye view was used to check the merging of prostheses (Fig 4c), and a trial with spectacles was performed for the final prosthesis (Fig 4d). Skin color shade matching [8] for the silicone orbital prostheses has been performed using yellow, dark brown, red, blue, and white shade colors (Suvidha eye services coloring agents, New Delhi India) (Fig 5a,5b). After flasking and dewaxing, 300 g of weighed silicone base and 3 g of catalyst weighed (Fig 6a,6b) were mixed and three drops of thixotropic agent (Suvidha eye services, New Delhi, India) with the shade-matched pigments heat cure silicone (Suvidha eye services, New Delhi, India Part- A & B) was placed and cured for 2.5 hours (Fig 7a,7b,7c). The extra silicone flesh was trimmed out, and for missing eyebrows and eyelashes, the patient’s hair was stitched (Fig 8a,8b). Final prostheses have been extrinsically stained and attached to the spectacles using cyanoacrylate (Fig 9) and delivered to the patient which was having proper fit and enhanced the facial aesthetics (Fig 10a,10b,10c).

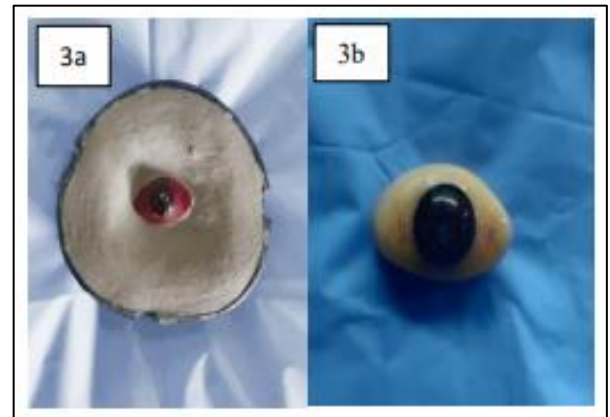


Fig 3a Flasking & 3b Final Ocular Prosthesis

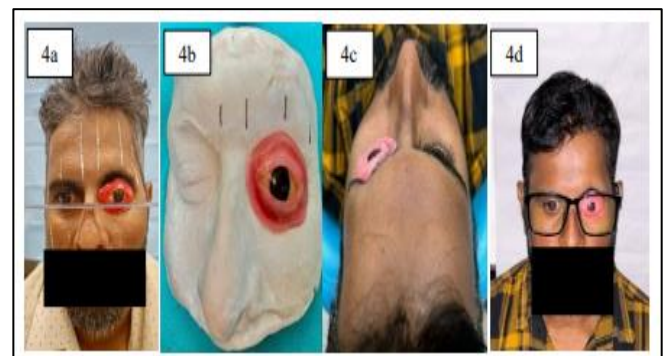


Fig 4a Wax-trial with Adjacent Eye & Anatomical Markings, 4b Cast Transfer, 4c Bird- Eye View & 4d Prosthesis with Spectacles



Fig 5a Intrinsic Colours with Silicone and 5b Shade Matching

IV. FIGURES



Fig 1 Elliptical Shape Left Orbit



Fig 2 Impression

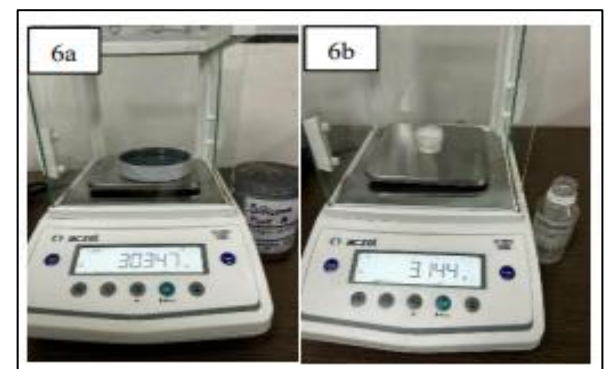


Fig 6a Weighing of Silicone base and 6b Catalyst

V. DISCUSSION

A patient's subjective experience and satisfaction are pivotal in evaluating the effectiveness of the intervention, as seen in this case's positive impact on facial symmetry and psychological well-being. However, limitations such as the prosthesis's long-term durability and the need for ongoing psychosocial support warrant consideration for future improvements.^[7] Interdisciplinary approach includes guidance by the ophthalmologist's post-exenteration for prosthetic rehabilitation to improve psychological stress and socialization with improved aesthetics and symmetry. As discussed with the ophthalmologist in this case flap closure has not done as to provide undercut for the proper fit of the prostheses and providing various prostheses options like buried integrated implant retained prostheses, adhesive retained prostheses but due to cost and limited durability along probability of allergic side effect of adhesives patient preferred use of spectacles.^[3] As per patient convenience spectacle retained, lightweight prostheses provided better aesthetics and functionality as speech air passed out through the small defect communicating with the left palatal defect even after wearing obturator prostheses. Overall, this case illustrates promising outcomes and underscores the importance of tailored prosthetic solutions and interdisciplinary collaboration in optimizing rehabilitation after orbital exenteration.

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Fig 7a Flasking, 7b Dewaxing and 7c: Heat-Cure Silicone Casting

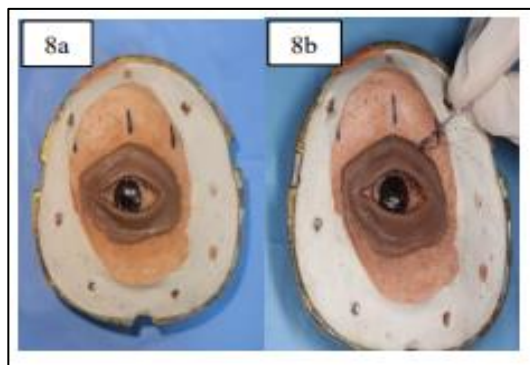


Fig 8a, 8b Final Prostheses with Extrinsic Stain, Eyelashes and Eyebrows Stitching



Fig 9 Spectacles Attached Prostheses

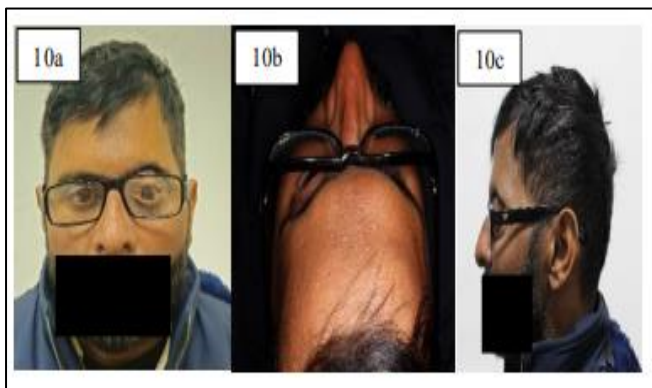


Fig 10a, 10b, 10c Final Prostheses: Front View, Bird-Eye View & Left Lateral View

PATIENT CONSENT FORM

PARTICIPANT INFORMED CONSENT FORM (PICF):

Participant identification number for this study: 006849

Title of project: Proximal Prosthetic Rehabilitation following Orsital Exostosis: A case Report.

Name of the participant: Harmesh Singh

Age: 42 years

Gender: Male

Address: Punjab.

1. I confirm that I have read and understand the parent information sheet of the above study and was given an opportunity to ask questions.
2. I understand that participation of my patient in this study is voluntary and that I am free to withdraw my patient from this study at any time, without giving any reason, without my patient's medical care or legal right being affected.
3. I understand that sections of any of my patient's medical notes may be looked at by responsible persons from All India Institute of Medical Sciences, Bathinda Independent Ethics Committee/Institutional Review Board and Regulatory authorities. I authorize these persons to directly avail my original medical records of my patient for the purpose verification of study procedures and / or data without violating my confidentiality.
4. I understand that the patient's investigators of this study, the ethics committee and the regulatory authority will not need my permission to look at my patient's health records both in respect of my current participation in the study and further prospective research that may be conducted in relation to it, even if I withdraw my patient from the study. However, I

understand that my patient's identity will not be revealed in any information given to third party or published.

5. I agree not to restrict the use of any data or result arising from this study provided such a use is only for scientific purpose(s).

6. I have been given adequate time to consider my decision and have been given a copy of the subject information sheet and a copy of the informed consent form.

7. I agree to have my Patient take part in this study.

Participant Name: Harmesh Singh

Signature/ Thumb impression: Jasjit Singh Date: 24/12/23

Parent/Guardian Name: Nil

Signature/ Thumb impression: — Date: —

Investigator's Name: Dr. M. Shelin

Signature: [Signature] Date: 24/12/23