



## **MEETING THE CHALLENGES WITH OCULAR BURN INJURY IN CHILD - A CASE REPORT.**

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<p><b>Article Info</b> <i>Received 05/01/2016</i> <i>Revised 17/02/2016</i> <i>Accepted 29/02/2016</i></p> <p><b>Key words:</b> Ocular prosthesis, Ocular burn injury, Ocular injury in child.</p>	<p><b>ABSTRACT</b> Children are particularly susceptible to injuries leading to irreparable trauma to the eye. Ocular burn injury is one of the causes for eye loss in children. The loss of an eye causes disfigurement of the face due to which the children become emotionally weak and conscious and avoid taking part in social events, which in turn causes anxiety, stress and psychological depression at an early age in life. So the components of planned treatment include future consideration for an artificial eye implant and a studded guidance by child psychotherapist, ophthalmologist and a maxillofacial prosthodontist along with tender loving care treatment to suffered child. The custom made ocular prosthesis is very comfortable and help child to improve his appearance, which in turn, encourages him to build up his self-confidence to return back to his social life. This article describes a new digital approach to fabricate a custom made ocular prosthesis with magnets and spectacle as retentive aids for a successful rehabilitation.</p>
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### **INTRODUCTION**

The naturally vibrant and dynamically variable region of the orbit poses innumerable challenges in making an indiscernible replica of the opposing eye. Simulation of nature through rehabilitation forms the primary goal for state of art restoration in these genres of maxillofacial prosthodontic modelling [1]. Anophthalmos is a condition in which no eyeball can be found in the orbit. Injury to the eye is a very common event in children and a common cause for removal of an eye [2]. A seemingly minor trauma can be serious if the eye penetration goes unnoticed. Non-accidental burn injury to eye (child abuse) is present in a higher proportion of families with a low socioeconomic status and low education level leading to psychological depression at an early age in life [3]. Eye loss in early childhood hinders normal growth process. To aid in the normal development of the lids and the soft tissue lining the orbital bone, the size of the prosthesis is gradually

increased over a period of years [4]. The soft tissues get stretched during this period of growth and thus enhance the development of the fornices which is necessary for good cosmetic result. Thus, to create the perfect esthetic illusion of normal eye in child poses multiple challenges as we are attempting to restore a moving organ with a static prosthesis.

### **CLINICAL REPORT**

A 9 year old boy from Bal Kalyan Vibhag , Melghat Region , reported to Department of Prosthodontics , VYWS Dental college & Hospital , Amravati (Maharashtra) with ocular defect of right eye. (Fig no.1). The history of trauma elicited forcible insertion of hot rod. The injured eye was then enucleated and solid silicone eye ball was attached to eye muscles in concerned with



ophthalmologist, leaving the defect which has resulted in disfigurement of the face.

## **PROSTHETIC MANAGEMENT OF OCULAR DEFECT:**

### **Impression Procedure:**

Impression of facial moulage was made in alginate (Iralgin Alginate) by allowing patient to breathe normally with open airways. The cast was obtained in a dental stone. (Fig no. 2, 3)

The impression of the socket was made with a light viscosity polyvinyl siloxane impression material, with an auto-mixing device (Contrast, Voco, Germany). Before making the impression, a thin layer of petroleum jelly was applied on the eyelashes and around the eye socket to prevent the impression material from sticking to the eyelashes. The material was then injected slowly into the socket and the patient was asked to perform various eye and eyelid movements to facilitate the flow of the impression material into all aspects of the socket. The impression was carefully removed from the socket once the material had set. (Fig no. 4)

### **Formation of the cast:**

The impression was poured in three sections. First the upper third of the impression was immersed. After the stone had set, keyholes were cut and boxing was done around the first layer using modelling wax after which separating medium (Cold mould seal, Dental Products of India Ltd.) was applied. Then a second layer was poured to cover the middle third of the impression. Again keyholes were cut and separating medium was applied. Then the final pour was made. After it had set, the three sections were separated and the middle layer was sawed and separated into two halves in order to remove the impression. (Fig no. 5)

### **Preparation of wax pattern:**

The second and the final layer of the cast were assembled and immersed in water for few minutes. Molten wax (Modelling wax, Hindustan Dental Products Ltd.) was then poured into the cast. Once the wax hardened, the mould was opened and the wax pattern was removed. Sharp ridges and undesirable irregularities were eliminated and the portion of the wax that represented the palpebral fissure was re-contoured to form a smooth convex surface.

### **Try in of the wax pattern:**

The wax pattern was inserted into the patients socket to check for proper contour and bulk. Necessary modifications were done, re-polished and again inserted into the patient's eye socket. This was done until the soft tissue contour and the palpebral tissue resembled the patient's natural eye.

### **Digital technique of iris fabrication:**

Digital photograph of patients normal iris was made using a digital camera (Canon EOS Digital rebel with macro lens EF 100mm f/2.8 USM and a ring flash) with a shutter speed 125 seconds, the aperture to F16, and the sensitivity to ISO640. In Graphic software (Photoshop 7.0) the image was adjusted for slight difference in color, brightness, contrast, hue, etc. The final iris image was obtained on 20lb white paper which is further coated with 3 layers of water resistant spray. (Workable fixative, Krylon). Monopoly syrup (J-305 monopoly syrup) was used to position the ocular button on iris and paint around edges to achieve maximum seal around edges. (Fig no. 6). The patient was then made to look straight ahead at a distant point and landmarks were marked on the wax pattern for the placement of the digitally fabricated iris button of appropriate size and similar shade. (Fig no. 7)

Then a space was created on the wax pattern and the prefabricated iris button was placed and the wax was again smoothed. The wax pattern was again placed in the socket and compared with the patient's natural eye. Once the soft tissue contour and the location of the iris were satisfactory, the pattern was removed and the shade for the scleral portion of the prosthesis was selected using tooth coloured acrylic shade guide. Wax pattern of silicone prosthesis was fabricated on facial moulage cast and checked on patients face.

### **Acrylization:**

Flasking and dewaxing was carried out in a usual manner taking care that the iris button was secured firmly to one compartment of the flask. (Fig no. 8) Heat polymerizing tooth coloured acrylic resin (Stellon, Dental Products of India Ltd.) of appropriate shade was used and after doing a trial closure, stains and veins were added to give a more natural appearance of the artificial eye. After the final closure, the processing was done by a slow curing cycle. After recovering the prosthesis it was polished to get a smooth and shiny surface. (Fig no. 9) Fabrication of silicone prosthesis was made with medical grade room temperature vulcanizing silicone. (Fig no.10, 11)

The retention of prosthesis was achieved with help of spectacles and medical grade magnets and silicone adhesives. The magnets was attached to inner component which was placed in eye socket and other part is attached to silicone prosthesis. This provides movement of eye ball. (Fig.no 12). On the final appointment the prosthesis was inserted into the patient's eye socket and follow up and instructions were given. We can visualize the difference between preoperative photograph and after prosthetic rehabilitation photograph. (Fig.no.13, 14) The replacement of the lost eye with a custom made ocular prosthesis should be carried out as early in life as possible [5]. The socket is fully developed at about twelve years of age, thus teenage patients should be treated as adults. The Digital technique is a simple,time saving and require minimal artistic skill [6].



**Figure 1. Ocular defect in right eye**



**Figure 2. Facial Moulage Impression with Alginate**



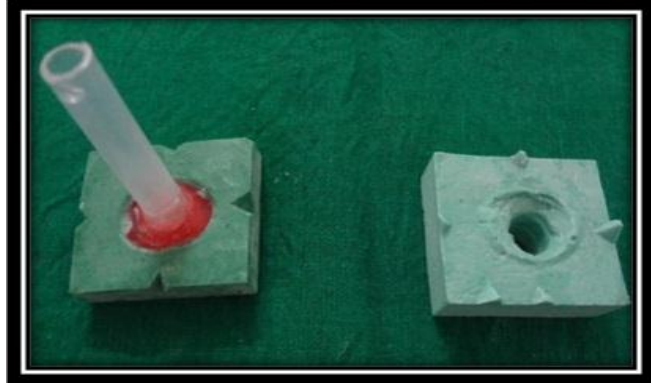
**Figure 3. Facial Impression Poured In Dental Stone**



**Figure 4. Impression of Ocular Defect with special tray & Light body elastomeric Impression**



**Figure 5. Master Cast, Three pour technique**



**Figure 6. Digital image of Iris**



**Figure 7. Try in of ocular wax pattern with digital iris**



**Figure 8. Wax pattern invested with acrylic handle**



**Figure 9. Finished ocular Prosthesis with Characterization**



**Figure 10. Wax pattern invested for silicone prosthesis**



**Figure 11. Finished characterized silicone and ocular prosthesis with button attachment for Spectacles**



**Figure 12. Medical grade magnet as a retentive aid attached to inner component of ocular prosthesis**



**Figure 13. Photograph showing before prosthetic rehabilitation**



**Figure 14. Photograph showing after prosthetic rehabilitation**



## CONCLUSION

A well-made properly planned and functionally molded custom made eye prosthesis maintains its orientation as patient performs various eye movements. Orbital sculpture with digital concept and motility implants is emerging rapidly on the hitech horizon. Hence, this field of dentistry knows no bounds; it crosses the realms of oral cavity, to the extraoral structure and ventures beyond the horizon to restore other facial structures including eyes creating the so-called healthy beauty. The spark in patients's eyes truly reflects his envisioned soul.

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**CONFLICT OF INTEREST:**

The authors declare that they have no conflict of interest.

## STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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