CASE REPORT

A multidisciplinary approach for ocular rehabilitation following surgical treatment of retinoblastoma: One year follow-up

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ABSTRACT

Retinoblastoma is a highly malignant neoplasm. Most of the cases are usually advanced at the time of detection, requiring enucleation to salvage the child's life. Just treating the patient for cancer is not enough; the cosmetic rehabilitation of these patients is equally important and it should always be an integral part of their treatment, to help them re-integrate in the aesthetic conscious society. Rehabilitating such patients require a multidisciplinary approach involving the combined and timely efforts of an ophthalmologist, paediatric oncologist and a skilled maxillofacial prosthodontist. This paper presents a case of 3½-year-old girl who had enucleation of her right eye due to retinoblastoma along with chemotherapy and radiotherapy at the age of 3 years. The patient was recalled regularly for follow-up at 3 month intervals for ophthalmic examinations and she was rehabilitated cosmetically with customised ocular prosthesis during the various stages of her developmental growth.

Key words: Custom ocular prosthesis, enucleation, impression technique, ocular defect, retinoblastoma

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INTRODUCTION

Retinoblastoma is a highly malignant tumour of the eye that grows relentlessly and almost always has a fatal outcome, if untreated.[1] Most tumours occur before age of 2 years and are diagnosed before age of 5 years. It accounts for approximately 2.5-4% of all cancers diagnosed in children younger than 15 years.[2] Several studies have shown that the most common cause of enucleation in paediatric population is retinoblastoma.[3,4] Rehabilitating such patients require a multidisciplinary approach involving the combined and timely efforts of an ophthalmologist, paediatric oncologist and a skilled maxillofacial prosthodontist. The paediatric oncologist and the ophthalmologist are involved in the diagnosis and management of retinoblastoma and the prosthodontist is involved in the prosthetic rehabilitation of enucleation cases.

This paper presents a case of a 3½ years old girl with retinoblastoma, who has undergone enucleation of her right eye to get rid of the cancer. She was rehabilitated cosmetically by a customised ocular prosthesis and regularly monitored for any cancer reoccurrences.

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A 3½-year-old female patient reported with the complaint of unaesthetic facial appearance due to absence of right eye [Figure 1]. Her parents gave history of retinoblastoma which was diagnosed at the age of 2½ years for which enucleation was done at the age of 3 years. The patient also received chemotherapy and radiotherapy for treatment of her malignancy. Since then, the patient was not using any prosthesis or conformer for her right eye. She was referred to us from the department of paediatric oncology and ophthalmology after confirming through examination under anaesthesia, computer tomographic (CT) scan, magnetic resonance imaging (MRI), bone marrow test and lumber puncture, that there was no reoccurrence or any residual carcinomatous lesion in right eye and also that the patient's left eye was normal.

On careful examination of the defect area, it was found that the socket was properly healed and healthy. So, it was planned to fabricate a custom ocular prosthesis for the patient. The procedure including its maintenance and limitations were explained to the parents to gain their co-operation. Parents were given written as well as

verbal instructions regarding the insertion, removal and cleaning of the prosthesis. They were informed that the prosthesis adjustment will be required at regular intervals. Parents consent was taken for making photographic records.

The procedure was initiated by fabricating a custom impression tray using autopolymerising Poly (methyl methacrylate) (PMMA) (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India) in its dough stage and moulding it by adapting on the thumb pad to form an ocular shaped tray, similar to one described by Allen and Webster.[5] The impression [Figure 2a] of the socket was made with a thin mix of ophthalmic alginate (Ophthalmic moldite, Milton Roy Company, Sarasota Florida, USA), then a two-piece dental stone (Kalabhai Karson Pvt. Ltd., Mumbai, India) cast was obtained from the impression by double pour technique [Figure 2a]. On the sides of the cast, the four aspects that are superior, inferior, medial and lateral aspect were marked with permanent marker for orientation. The wax pattern was formed on the cast by using carving wax mixed with sticky wax. The two waxes were mixed to simulate the scleral colour of the contralateral eye. Then, the wax pattern tried in the patient's eye and checked for accuracy in the terms of retention, proper extension in all directions, scleral contour and finally positioning the iris, matching in size and colour of contralateral eye, obtained from stock eye. The final wax pattern with iris button [Figure 2b] was evaluated in the patient's socket and modified accordingly.

After making necessary modifications, the wax pattern was invested, flasked and de-waxing was done [Figure 2c]. For the purpose of reproducing scleral shade of the normal eye, shade tabs were prepared by mixing and matching different shades and proportions of tooth-coloured acrylic (SC 10, Pyrax, Roorkee, India) till the colour of sclera (contralateral eye) was replicated. To simulate the veins of the normal eye, red fibres were separated from the veined heat cured PMMA resin (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India) and incorporated in the dough of the determined acrylic shade; followed by

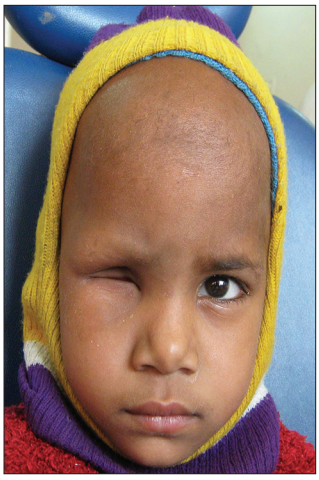

Figure 1: Pre-operative photograph showing enucleated socket of right eye

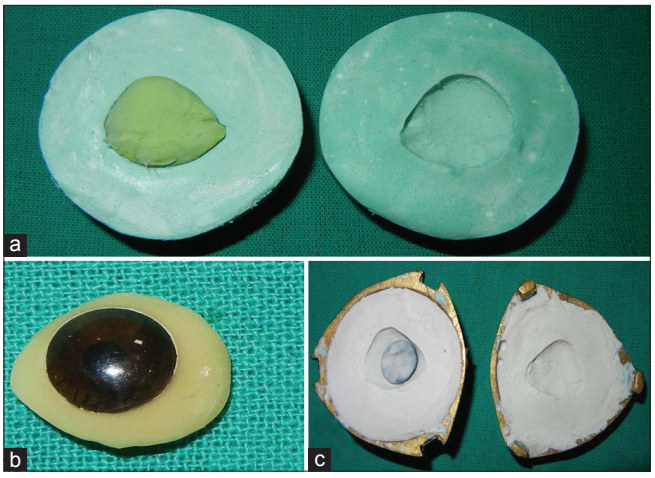

Figure 2: (a) Impression along with the cast obtained after double-pour technique, (b) Wax pattern with iris button, and (c) Dewaxed mould

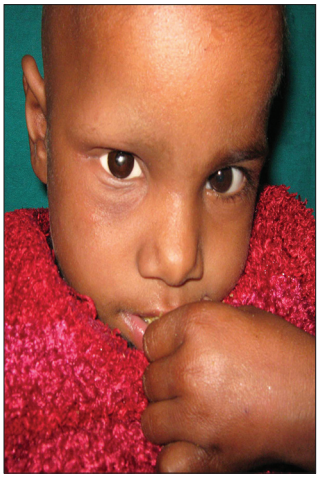

Figure 3: Prosthesis *in lieu* of enucleated eye

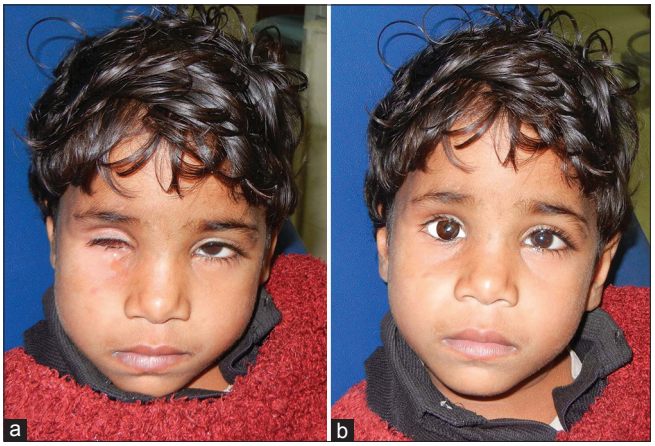

Figure 4: (a) Photograph at 9th month of recall and (b) New ocular prosthesis at 9th month

routine curing, finishing and polishing. Finally, a thin film of the sclera was removed and replaced by a clear film of transparent heat-cured PMMA to simulate corneal translucency.

Properly finished and polished prosthesis was inserted in the socket [Figure 3] after being disinfected with 0.5% chlorhexidine and 70% isopropyl alcohol for 5 minutes and lubricated with an ophthalmic lubricant (Ecotears, Intas Pharmaceuticals Limited, Ahmedabad, India) to maintain a tear film over the prosthesis and to improve eye movements. Minor adjustments were made at the time of delivery as per the patient's comfort and aesthetics. Instructions were given to the parent/patient regarding proper care and handling of the prosthesis as well as the maintenance of socket hygiene and the need for regular recall appointments was emphasised.

In the 3 month and 6 month recall appointments, all the routine medical investigations such as haemoglobin, haematocrit, platelets, white blood cells (WBC) count and ophthalmological examinations including slit-lamp examination, examination under anaesthesia, CT scan were performed and were found as normal. Parents reported that she was able to wear the ocular prosthesis without any discomfort. At this time, it was found that the prosthesis was in good shape and there was no need for any modifications except for polishing of the prosthesis. Again the patient was recalled after 3 months. During this 9th month recall appointment [Figure 4a], it was found that the right eye socket had increased in size and ocular prosthesis was not fitting properly in the socket with socket show-through in nasal and temporal canthi and an enophthalmic appearance. So, a new ocular prosthesis was fabricated [Figure 4b] and iris was trimmed carefully from the previous prosthesis. The patient was successfully rehabilitated by custom ocular prosthesis, which was adjusted or remade as and when required to keep in pace during the various stages of developmental growth of the child. At 12th month of recall appointment, patient was quite comfortable with the new ocular prosthesis.

DISCUSSION

Enucleation during infancy[6] or congenital anophthalmos or severe microphthalmos can lead to severely underdeveloped bony orbital growth, cosmetic deformity and facial asymmetry. Placement of prosthesis has been proven to play a definite role in stimulating the orbital growth. In the early childhood, orbital volume increases in a linear fashion[7,8] and a change of prosthesis is required between 18 months and 26 months following prosthesis placement in children.[9] The regular replacement or modification of prosthesis is important to give continuous stimulus for socket growth.[10]

The fundamental objective in restoring a congenital as well as acquired defect of eye with an ocular prosthesis is to enable the patient to cope better with the difficult process of rehabilitation after an enucleation or evisceration. The cosmetic rehabilitation of these patients is equally important and it should always be an integral part of their treatment, to help them re-integrate in the aesthetic conscious society. So, providing the patient with a cosmetically pleasing custom ocular prosthesis is a highly positive and non-invasive approach to improve not only the cosmetic appearance, but also the physical and psychological well-being of the patient. Custom ocular prosthesis not only fulfils the aesthetic and psychological demands but also stimulates bony orbital growth thereby, reaping long term benefits of restoring facial symmetry and aesthetics.

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