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Watercolor Painting Paper As Coloring Medium Of Ocular Prosthesis To Produce Stable Color On Iris After Curing

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Abstract:
Background*: Loss of the eye during childhood affects growth, development of the orbital area, esthetics and psychologic. Fabricating ocular prosthesis is necessary for children after losing eye. To achieve a good esthetic, coloring medium is one of the factors that determine the success of an ocular prosthesis. Inappropriate coloring medium can cause the discoloration of the ocular prosthesis.*
Objectives*: This case report explains the rehabilitation of eye socket after enucleation with an ocular prosthesis using watercolor painting paper as coloring medium*
Case report*:* F*emale patient, 2 years old came with her mother to Dental Hospital Universitas Sumatera Utara; she was referred by the ophthalmologist to make custom ocular prosthesis. The patient has retinoblastoma and her left eye was enucleated when she was one year old. In this case, ocular prosthesis was fabricated using watercolor painting paper as coloring medium. Watercolor painting paper was formed according to the diameter of iris then coloring was done with acrylic paint. It was used as a coloring medium and can produce stable color when being cured because it can resist up to 500-900^0 F so the iris color stays stable and there is no distortion after curing.*
Conclusion: *Watercolor painting paper as coloring medium of an ocular prosthesis can produce stable color that can provide esthetics and good psychological effects to patients.*
Key Word*: ocular prosthesis, enucleation, esthetic, eye coloring medium, psychological*

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I. Introduction

Loss of the eye can be caused by congenital factors or cases such as trauma, microphatalmos, endophthalmitis, cancer and suprachoroidal hemorrhage requiring surgical removal of the eye or enucleation.[1] Enucleation is defined as removal of the eye ball while preserving the remaining orbital tissue, including the extraocular muscles.[2,3] After enucleation, the goal is to achieve good esthetics by placing prosthesis which suitable with contralateral eye. Ocular prosthesis is indicated in post-enucleated eye sockets with the aim of improving the patient's quality of life, restoring esthetics, preventing eyelid deformation, protecting the anophthalmic cavity, directing lacrimal flux, and avoiding accumulation in the eye socket.[3,4]

There are two types of ocular prosthesis, stock and custom made ocular prosthesis. Stock ocular prosthesis is a factory-made ocular prosthesis made of polymethyl methacrylate with shapes and colors following certain standards. The disadvantage is this type of ocular prosthesis cannot resemble the original eyeball, is less comfortable and can be loose in the patient's eye socket.[3] In this case, a custom made ocular prosthesis is used because it can produce a shape, color and size that resembles the right eyeball so it is more comfortable and aesthetic during use.

The use of coloring medium in the fabrication of the ocular prosthesis affects iris color stability of ocular prosthesis after curing. Coloring medium that are not resistant to high temperature changes during curing can cause the color of the iris to fade and color changes. Watercolor painting paper is one of the papers that can be used as a coloring medium for ocular prosthesis where the color stability of the iris is maintained after curing.[3,4]

Eye loss during childhood caused by congenital, traumatic or pathological factors affects the growth and development of the orbital area, which can result in facial asymmetry, hypoplasia and esthetic and psychological imbalance. Eye prosthesis should be made as soon as possible to meet the psychological needs of pediatric patients and the parents. Fabrication of the ocular prosthesis can be performed if the surgical site of the eye socket has healed and its dimensions have stabilized. Before making an ocular prosthesis, it is necessary to have an adequate examination of the post-enucleation eye socket to ensure that the area is free of infection and has healed.[4] To

obtain a good esthetics, the coloring medium is one of the factors that play an important role in the success of the ocular prosthesis. Improper coloring medium can result in discoloration of the ocular prosthesis.[5]

This case report describes the procedure for making ocular prosthesis in a 2-year-old child after enucleation of the eye caused by retinoblastoma by using a modified coloring medium in the form of watercolor painting paper.

II. Case Report

A 2-year-old female patient and her mother came to Dental Hospital Universitas Sumatera Utara with the chief complaint of missing left eye and wanted an artificial eye to be made where the patient was referred by an ophthalmologist. When the patient was 1 month old, the patient's mother said that the left eye of her child was red and shiny like a cat's eye and was diagnosed as retinoblastoma and then the left eyeball was removed. After that, the ophthalmologist referred to the fabrication of ocular prosthesis at the Dental Hospital Universitas Sumatera Utara.

The patient came in good health but was afraid of treatment due to surgery and many hospital visits. Facial examination revealed adequate superior fornix, good inferior fornix with competent eyelids (Figure 1). Intraorbital examination (Figure 2) revealed a socket in the left eye after enucleation. From the results of the clinical examination, she was diagnosed with a post-enucleated sinistra anophthalmic socket.

Figure 1. Patient's facial profile

Figure 2. Condition of the left eye socket

III. Management

Anatomical impression was done using a tray made of self-polymerized acrylic resin (Self Curing Vertex®, Vertex-Dental B.V., Netherland) and irreversible hydrocolloid impression material (Aroma Fine Plus, GC, Europe) (Figure 3). After that, a mold (Figure 4) was obtained which would be poured with wax. Custom impression tray was made using a thermoplastic vacuum form.

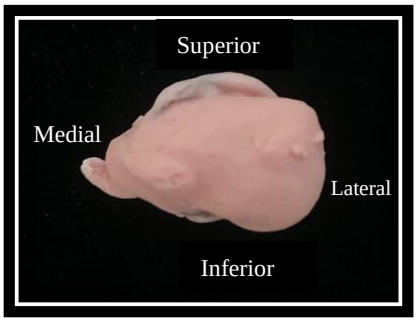

Figure 3. Anatomical impression

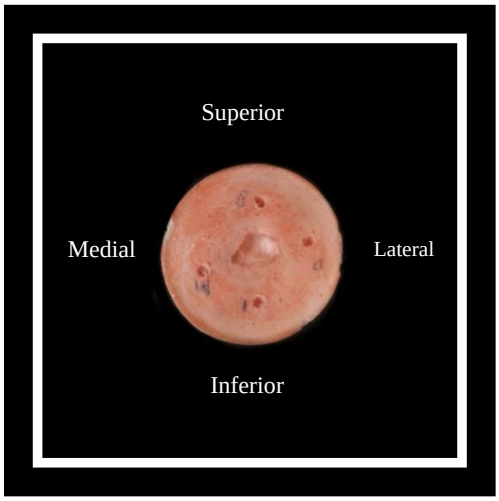

Figure 4. Mold impression model

Physiological impression was done using a light body polyvinyl siloxane (Light Body I-SiL vinyl poly siloxane impression material, Spident CO., LTD, Korea) (figure 5), Petroleum jelly was applied around the eyelids to prevent the impression material from sticking to the eyelashes. The impression tray is coated with adhesive tray. The impression material was applied into the eye socket and the impression tray. The impression tray was gently inserted into the eye socket to prevent forming bubbles in the mold. The patient was asked to close and move the eye up, down, left and right so that the impression material can flow to all parts of the eye socket. After the impression material set, massage was carried out around the impression material and the impression tray was released from the eye socket slowly. The results of the mold were evaluated and the excess was removed. Physiological model was made with type IV plaster cast and split cast technique.

Figure 5. Physiological impression

The next step is to make a sclera wax pattern and try in wax sclera. The mold was poured with wax after the impression tray was removed from the cast. The wax pattern was inserted into the patient's eye socket. This trial of the sclera wax pattern to evaluate size, comfort, superior and inferior palpebral support, and eye movement (Fig. 6).

Figure 6. Sclera wax try in

After try in of the sclera wax pattern, determining the color of the sclera using a shade guide and curing. Curing was carried out using heat cure acrylic (PMMA) (Acrylic Denture Materials, Tricodent, England). Sclera was try in on the patient by inserting the acrylic sclera into the eye socket and modifying its size and shape according to the patient until the palpebral fissure and anterior curvature of the eye were similar to the contralateral eye to evaluate color, size, comfort, superior and inferior palpebral support, and eye movement (Figure 7).

Figure 7. Acrylic sclera try in

Determination of the location of the iris using the pupillary distance ruler (Figure 8a). After try in sclera, instruct the patient to look forward assisted with a distraction technique. Positioning the instrument on the patient by placing the notch on the nose. Measure the orientation, pupillary distance, and medio-lateral dimensions of the original iris from a graded scale. Then take several readings until a consistent measurement was achieved. Then the measurement was transferred to the sclera pattern by marking it using a marker as the midpoint of the pupil which becomes the midpoint of the iris. Using a caliper, a circle size of the 12 mm was formed according to the circle in contralateral eye. The marked circles are darkened using a marker (Figure 8 b).

a. **b.**

Figure 8 (a). Determination of the location of the iris using the pupillary distance ruler (b). staining of the iris on the sclera using color paint.

Iris coloring uses watercolor printing paper as a coloring medium which has been formed in a circle with a diameter according to the patient's eye (Figure 9). The coloring was done with oil paint using a brush size of 0.00. Determination of the color of the iris using oil paint on watercolor painting paper coloring medium and then matched directly to the patient's right eye (Figure 10).

Figure 9. Watercolor painting paper

Figure 10. Iris color determination

After coloring was done, coating the iris with monopoly syrup to prevent air trapping during curing which causes color distortion of the iris. Clear acrylic coating above iris then flasking, curing and polishing were done.

Placement of the ocular prosthesis in the left eye socket (figure 11). Ocular prosthesis is similar to the right eye, there is no pain during use and does not come off while moving. Instructions to the mother of the patient regarding the insertion, removal and maintenance of the ocular prosthesis and that the patient is regularly monitored to evaluate the ocular prosthesis during growth and development.

Figure 11. The placement of ocular prosthesis

IV. DISCUSSION

Losing an eye at a young age due to a congenital abnormality, accident or cancer such as retinoblastoma causes the parents of the child to feel greater sense of loss than the child. This is because self-awareness in children does not appear until the age of 2 years. At that time, they will only start to see their movements in the mirror.[6] In this case, her mother who wanted to make an ocular prosthesis on the left eye socket of her child because she fear that the child would experience severe depression when she understand the meaning of losing an eye.

The use of coloring medium in ocular prosthesis fabrication needs to be considered because it has an important role in the success of ocular prosthesis fabrication. Watercolor painting paper as coloring medium is usually used by pyrographers to paint images with pyrographic units that have high temperatures. Pyrography is an art of decoration by making images from the results of combustion.[7] In this case, watercolor painting paper is used as a coloring medium for the ocular prosthesis to produce a stable color after curing because this paper can withstand temperatures of 500-900 F so that the color of the iris remains stable and there is no distortion after curing.

Replacement of the ocular prosthesis at the age of development of the patient needs to be considered. Shaikh, et al in their study stated that custom ocular prosthesis should be replaced until the age of 12 years based

on clinical evaluation and the presence of symptoms in coordination with facial growth.[8,9] Pascales in his study revealed that ocular prosthesis should be checked regularly every 6 months in terms of comfort, size and fit until the child is 8 years old.[9,10] In this case, the 2-year-old child has been wearing a custom ocular prosthesis, has been instructed to do regular check-ups every 6 months or when there are symptoms that interfere with the use of the ocular prosthesis.

V. CONCLUSION

Early management of eye loss is necessary, especially in children. Custom ocular prosthesis in children can help the eye sockets to grow and develop properly and increase the patient's psychological and social confidence.

The selection of coloring medium in the fabrication of the ocular prosthesis is important in order to produce a stable color so that it can meet the patient's needs in terms of aesthetics and psychology.

REFERENCES

[1]. Goiato MC, de Caxias FP, dos Santos DM. Quality of life living with ocular prosthesis. Expert Rev Ophthalmol [Internet]. 2018;13(4):171–3. Available from: https://doi.org/10.1080/17469899.2018.1503534
[2]. Chaugule S, Honavar SG, Finger PT. Surgical Ophthalmic Oncology: A Collaborative Open Access Reference. Springer International Publishing, Switzerland2019: 1-216. Surgical Ophthalmic Oncology. 2019. 131–139 p.
[3]. Pine KR, Jacobs RJ, Sloan BH. Clinical ocular prosthetics. Clinical Ocular Prosthetics. 2015. 1–313 p.
[4]. Amornvit P, Rokaya D, Shrestha B, Srithavaj T. Prosthetic rehabilitation of an ocular defect with post-enucleation socket syndrome: A case report. Saudi Dent J [Internet]. 2014;26(1):29–32. Available from: http://dx.doi.org/10.1016/j.sdentj.2013.12.006
[5]. Kulshrestha R, Rathod K, Umale V, Sharma V, Porwal A, Jhawar S. Ocular prosthesis in Dentistry - A Review. Int J Case Stud Clin Res. 2018;2(6):55–61.
[6]. Nalawade TM, Mallikarjuna RM, Anand BM, Anand M, Shashibhusan K. Prosthetic Rehabilitation of a Pediatric Patient with an Ocular Defect. Int J Clin Pediatr Dent. 2013;6(1):62–7.
[7]. Mc Cauley C. About Pyrography: tools & technique. https://www.catemcc.com/pyro.html
[8]. Jain S, Idris KIA, Al Omar NEM, Atiah AYM, Atiah AYM, Aggarwal A. Replacement time of custom ocular prosthesis in children: A review article. Int J Clin Pediatr Dent. 2021;14(4):558–61.
[9]. Shaikh SR, Gangurde AP, Shambharkar VI. Changing ocular prostheses in growing children: a 5-year follow-up clinical report. J Prosthet Dent 2014;111(4):346–348. DOI: 10.1016/j.prosdent.2013. 09.021.
[10]. Pascale S. Tips for fitting eye prostheses for the pediatric patient after enucleation. US Ophthal Rev 2016;9(1):49–52. DOI: 10.17925/USOR.2016.09.01.49.

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