ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at: www.ijdsir.com
Volume – 4, Issue – 2, March - 2021, Page No. : 390 - 394

Custom made Eye prosthesis with permanent denture soft lining tissue surface: A Case Report

[1]Dr.Alok Sharma, Head and professor, Department of Prosthodontics, Crown & Bridge, NIMS Dental College, Jaipur, Rajathan, India

[2]Dr.Rajesh Saini, 3rd yr P.G Department of Prosthodontics, Crown & Bridge, NIMS Dental College, Jaipur, Rajasthan, India

[3]Dr. Paaras Kotwal, 2nd yr P.G Department of Prosthodontics, Crown & Bridge, NIMS Dental College, Jaipur, Rajasthan, India.

Corresponding Author: Dr.Rajesh Saini, 3rd yr P.G Department of Prosthodontics, Crown & Bridge, NIMS Dental College, Jaipur, Rajasthan, India

Citation of this Article: Dr. Alok Sharma, Dr. Rajesh Saini, Dr. Paaras Kotwal,“ Custom made Eye prosthesis with permanent denture soft lining tissue surface: A Case Report”, IJDSIR- March - 2021, Vol. – 4, Issue - 2, P. No. 390 – 394.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Eyes are organs of the visual system. An ocular prosthesis is a type of maxillofacial prosthesis that replaces an absent natural eye following a surgical removal like enucleation, evisceration or orbital exenteration. This study include resilient permanent soft denture lining material to improve the fit of an ocular prosthesis in a grossly resorbed orbital defect to restore the function and minimizes the trauma of atrophic tissue. Permanent soft denture lining material is a good alternative to fabricate of scleral part of ocular prosthesis during fabrication of custom made ocular prosthesis to improve patient comfort by acting as a shock absorber and stress distributor. This study is a novel way to fabricate ocular prosthesis with permanent soft liner to improve retention of prosthesis and minimize trauma to underlying supporting tissues.

Keywords: Ocular Prosthesis, Maxillofacial defect, Atrophic Tissue, Denture Soft Liner

Introduction

Ocular prosthesis is an artificial eye, which is implanted in patients who have lost their eye due to various causes such as trauma, surgery, cancer, or in patients with shrunken damaged eyes (phthisical eyes), congenital absence (anophthalmos) or abnormally small sized eyes (microphthalmos) with no visual potential. These conditions result in cosmetic disfigurement of the face which impacts the patients psychologically and acts as a social stigma

Surgical procedures for the removal of an eye can be broadly classified as Evisceration – removal of the iris, cornea, and internal eye contents, but with the sclera and attached extraocular muscles left behind. **Enucleation of the eye** - removal of the eyeball, but with

the eyelids and adjacent structures of the eye socket remaining. **Exenteration** – removal of the contents of the eye socket, including the eyeball, fat, muscles, and other adjacent structures of the eye like eyelid.

The rehabilitation of a patient who has experienced eye loss requires a prosthesis that will provide optimal esthetic and functional results. In such cases, collaboration between a maxillofacial prosthodontist and an ophthalmologist is necessary.

A prosthetic eye is improved the appearance of the affected eye socket. If the entire eye is removed, an ocular prosthesis prevent the tissues in the eye socket from growing to fill the empty space. A prosthetic eye cannot restore vision. Prosthetic eye is generally made of hard, plastic acrylic.

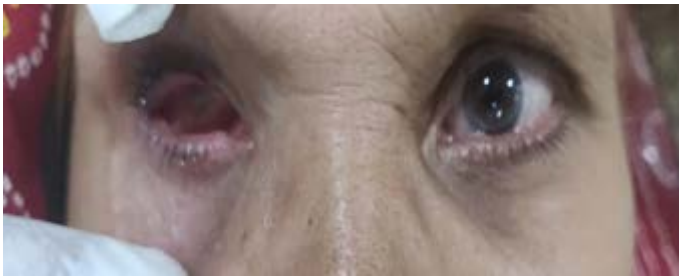
Today, the majority of patients are rehabilitated with an artificial eye made of acrylic, and conventional ocular prostheses fabricated by heat-cured acrylic resins are the most common type of eye prosthesis. Unfortunately, some patients are maladaptive in their ability to tolerate a conventional ocular prosthesis.

A permanent soft liner normally is used to minimize direct pressure to soft tissues and/or to compensate for an ill-fitting prosthesis, and it is important to recognize that a soft liner should be used only to improve a clinically acceptable prosthesis. Permanent soft relining materials are processed in a dental laboratory in a manner similar to heat-cured acrylic denture base material. The reciprocal of the elastic modulus of the soft relining materials is called compliance, which is a measure of the compressibility or flexibility of the material.

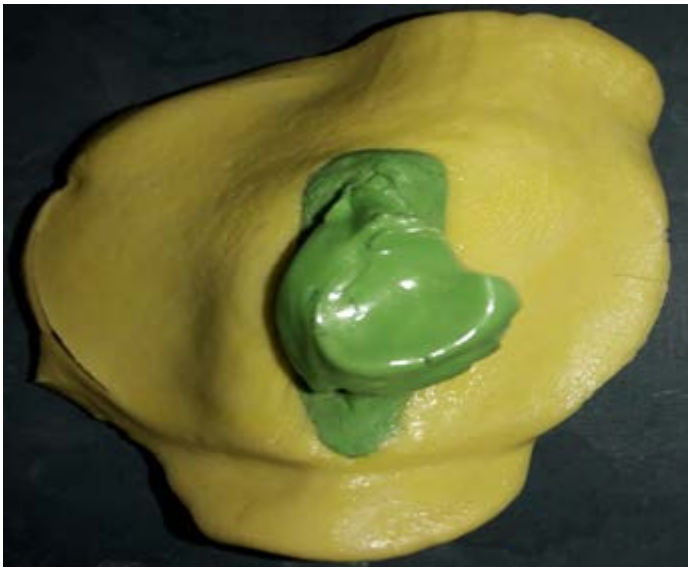
This study aimed to suggest an innovative technique to fabricate the scleral part of ocular prosthesis from permanent soft denture lining material to improve patient comfort and prosthesis softness for longer periods without hardening. Our null hypothesis is presented as follows: no difference is observed in the technique using soft denture lining material and conventional ocular prostheses fabricated by heat-cured acrylic resins

Case Report

A 56-year-old female patient reported to the Department of Prosthodontics crown & bridge and implantology, Nims University, for prosthetic rehabilitation of her lost right eye. Case history revealed that the patient had sustained a traumatic injury to her right eye. Clinical examination revealed a completely healed right eye socket with healthy conjunctival lining and absence of infection and healing. The treatment plan was to fabricate a custom-made ocular prosthesis with heat cure permanent soft liner and the steps and procedures in prosthesis fabrication along with the risks and benefits of treatment was explained to the patient.(Fig. 1)

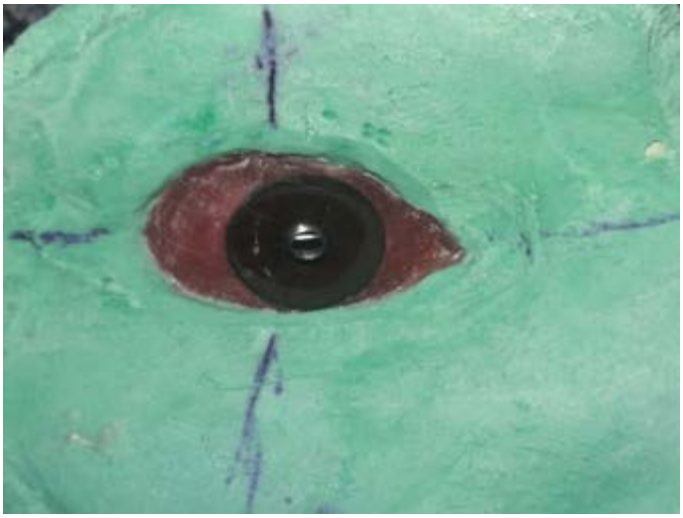


Method of fabrication of the ocular prosthesis Impression tray selection A stock acrylic ocular impression tray was selected to fit into the confines of the socket. Modifications were made to achieve the correct shape and contour of the eye reducing any overextensions. The margins were smoothened with the help of a finishing bur to prevent any irritation to the tissues inside the socket. The patient was made to look straight ahead and keep all facial muscles relaxed. Addition silicone elastomer light body was injected in the socket and impression was taken with heavy bodied Additional silicone(Ad-Sil Acura Prime Dental). Upon setting, the impression was gently removed from the socket, washed, and disinfected.(Fig.2)



Fabrication of the wax pattern was done with Additional silicone heavy body. Once polymerized, it was cut open and a melting red wax was flown through it. On hardening, the wax pattern was gently retrieved, cooled in cold water, and smoothed with the help of a carver and gauze.(Fig 3).

The wax pattern was then tried in the patient's eye for fit, comfort, size of the pattern and drape, and mobility of the eyelids. Attaching the iris the size of the iris of the natural eye was measured using a millimeter measurement gauge or an optical scale. Iris size should match the iris size of the adjacent eye and should replicate the normal gaze position. The patient was made to look slightly medial and downward at this stage. Fabrication of base sclera shell and finishing Flasking and pressing: The wax pattern was then flasked in a two-part flask using type-IV dental stone (Neelkhant) [Figure 4]



Once the stone had set, the wax pattern was removed. After dewaxing, investing was performed via the compression molding technique with acrylic based permanent soft lining material (Molloplast B Detax). The flask was pressed for 10–15min at 100 kPa under a hydraulic press to permit the acrylic resin to gain adequate stiffness to avoid deformation by the permanent soft liner material during pressing. Curing protocol: The flask was packed with white acrylicbased permanent soft lining material and placed in water at 95°C for 2h. Then, the flask was removed from its clamp and opened carefully. After curing: The final prosthesis was divested, and margins of the acrylic prosthesis were rounded off and the entire prosthesis smoothened out.(Fig
5)

The acrylic of the sclera was trimmed down approximately 1mm. The simulation of scleral vessels was

achieved by spreading artificial veins (red nylon fiber) over the sclera surface to give it a natural look. Later, a fine layer of clear heat-cured acrylic resin was applied upon the corneal prominence and sclera, thereby creating the illusion of depth and permitting exaggeration of the details of the iris and scleral vessels. Rough edges of the prosthesis were trimmed off, whereas mechanical polishing of permanent soft lining material prosthesis is not possible. At the borders along the junction of soft liner, the fine layer of clear heat-cured acrylic resin was polished, pumiced, and buffed to give the prosthesis a natural glossy finish before placement in the patient

The patient was taught how to place and remove the prosthesis. Instructions regarding manipulation, care, and hygiene for the prosthesis were given to the patient.

Discussion

In the present clinical situation, before application of a soft liner, the eye cavity must be evaluated as clinically acceptable. Insertion of permanent soft liner within an ocular prosthesis improves retention in shallow ocular cavities with inadequate depth through enhanced intimate contact of the prosthesis with underlying tissues act as sandwiching a liner layer and also by reducing traumatic impact to residual tissue through better load distribution of forces applied by orbicularis oculi muscles. In this study, fabrication of new ocular prosthesis with permanent soft liner; the difference was observed in the technique using acrylic resins for another patient; in uniform distribution of stress at the lining interface, distributing residual stresses during function and reduced the effect of traumatic impact on underlying tissues by sandwiching a resilient liner layer. Thus, the initial null hypothesis was rejected because difference was observed between the technique using conventional ocular prostheses fabricated by heat-cured acrylic resins for another patient and the new technique in this study. This result is in agreement with that of a previous study, in which the soft denture lining materials lead to a more uniform distribution of stress at the lining interface and have excellent shock absorber properties, which are directly related to the thickness of the layer of the liner. A permanent soft liner acts as a stress distributor by absorbing some of the load and distributing residual stresses during function so that ocular cavity tissues receive less impact force. Parker further reduced the effect of traumatic impact on underlying tissues by sandwiching a resilient liner layer within in acrylic base. Permanent soft liner viscoelasticity and softness are maintained for longer periods due to lack of plasticizer, and being elastic in character, it may stretch during insertion and removal of a prosthesis without traumatizing the tissues and then “spring” back into close contact with undercut areas, thereby improving retention. The intimate contact of the permanent soft liner with tissues improves retention, particularly in patients with very shallow ocular cavities and patients with dry eyes, in whom lachrymal flow, critical for lubrication and retention, is decreased. The proposed fabrication of the

ocular prosthesis with permanent soft liner method may improve the prognosis and minimize possible problems encountered when an ocular prosthesis fabricated with permanent soft liner is used. Hence, the results of this study provided information that could be used as a basis to simulate the clinical applications of these materials.

Conclusion

The fabrication of an ocular prosthesis with permanent soft liner is possible and suggested to improve the retention of the ocular prosthesis by maintaining intimate contact with the orbital cavity tissues.

References

1. Fernandes AU, Goiato MC, Batista MA, Santos DM. Color alteration of the paint used for iris painting in ocular prostheses. Braz Oral Res 2009;23:386-92.
2. Chiramana S, Anne G, Ravuri K, Bhoppana PP, Kumar S, Appana KC, et al. A time saving method to fabricate a custom ocular prosthesis. J Orofac Res 2013;3:42-5.
3. Nafij BJ, Theerathavaj S, Mohammad KA. A complete procedure of ocular prosthesis: A case report. Int Med J 2013;20:729-30.
4. Kaur A, Pavaiya A, Singh SV, Singh RD, Chand P. A simplified approach to fabrication of an ocular prosthesis: A case series. Indian J Dent Res 2010;21:615-7.
5. Doshi PJ, Aruna B. Prosthetic management of patient with ocular defect. J Ind Prosthodont Soc 2005;5:37-8.
6. The academy of prosthodontics. The glossary of prosthodontic terms. J Prosthet Dent 2005;94:10-92
7. Artopoulou II, Montgomery PC, Wesley PJ, Lemon JC. Digital imaging in the fabrication of ocular prostheses. J Prosthet Dent 2006;95:327-30.
8. Allen L, Kolder HE, Bulgarelli EM, Bulgarelli DM. Artificial eyes and tear measurements. Ophthalmology 1980;87:155-7.
9. Vasquez RJ, Linberg JV. The anophthalmic socket and the prosthetic eye. A clinical and bacteriologic study. Ophthalmic Plast Reconstr Surg 1989;5:277-80.
10. Shanmuganathan N, Padamanabhan TV, Subramaniam R, Madhankumar S. The compliance of temporary soft lining materials—An in vivo and vitro study. Int J Sci Res Publi 2012;2:1-7.
11. Braden M, Wright PS, Parker S. Soft lining materials—A review. Eur J Prosthodont Restor Dent 1995;3:163-74.
12. Kawano F, Kon M, Koran A, Matsumoto N. Shock-absorbing behavior of four processed soft denture liners. J Prosthet Dent 1994;72:599-605.
13. Mathew N, Jospeh S, Joseph AM, Koshy AT, George R. Rehabilitation of a craniofacial defect using extra-cranial prosthesis. J Int Oral Health 2016;8:813-16.
14. Swapna C, Hareesh MT, Renjith M, Ahmed A, Abraham IA, Gopinathan M. An evaluation of the effect of surface treatment on the bond strength of soft denture liners. J Int Oral Health 2016;8:922-6.
15. Parker HM. Impact reduction in complete and partial dentures, a pilot study. J Prosthet Dent 1966;16:227-45.