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(CASE REPORT)

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Custom made orbital prosthesis using digital approach: A case report

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Abstract

Factors that affect a person's quality of life can be influenced by aesthetics. In the case of involving orbits, it is a big problem in aesthetic factors and must be done immediately so as not to affect the quality of life of a person. A 76-year-old male patient came to the prosthodontic dental and oral hospital on a referral from an ophthalmologist to have an eye prosthesis because he wanted to improve his appearance. The patient wants to have an eye prosthesis immediately because of embarrassment. The creation of an eye prosthesis by printing with extraoral scans and orbital contour design is the treatment plan given to the patient. After that, the first visit to the orbital socket is scanned, the color of the eye is selected and the patient can go home. The contour of the orbit of the eye can be designed with 3D software and 3D printed for the working model, as well as the search for a suitable stock eye for the patient. The next visit can be done by selecting colors and trying them out. This speeds up visits, prosthetic comfort and aesthetics.

Keywords: Maxillofacial Prosthesis; Orbital Prosthesis; Extraoral Scanner; 3D Printed; Eye Prosthesis

1. Introduction

In the case of maxillofacial, it can be said to be an emergency if treatment is not carried out immediately. If this is left unchecked, it can cause a decrease in the quality of life, social life, and mental health of a person (1). According to Nightingale, CR et al., 2020, a treatment's efficacy is related with its ability to replicate the patient's original anatomy and physiological positive effects (2).

The important procedure for making orbital prothesis, is how to do anatomical impression and result of working models. This step can affect the final result. To get the ideal facial impression, it is able to cover all forms of defects, including structures, undercuts with minimal distortion, and prevent soft tissue deformities due to impression materials (2) Impression can be done using digital techniques (scanner) or conventional (alginate) (2,3). Nowadays many people use digital technique. This technique has numerous benefits. By replacing conventional manual difficult procedures, it can improve patient precision, quality of life, and treatment outcomes all while improving health services (2).

The treatment procedure for maxillofacial prosthesis must be discussed with the patient thoroughly. Starts with what the patient's expectations and what we can give to the patient. The retention from this prosthesis was adopted using accessories such as glasess as well as additional retention using additives for silicone prostheses that can be applied around the base of the silicone prosthesis so it can facilitate the patient's daily activities and provide comfort to the patient.

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2. Case Report

The 76-year-old male patient came to the Unair Dental and Oral Hospital Prosthodontics section on a referral from an ophthalmologist to immediately make an eye prosthesis and want to improve his appearance. The patient had a history of taking the right eye with a diagnosis of Od Conjuctiva Melanoma approximately 7 months ago. The patient does not have systemic diseases.

Figure 1 Patient Clinical Photo

After the external examination, the anatomy of the orbit was taken digitally, using scanner (EinScan pro) and working model printed using 3D printing (Resin) (figure 2).

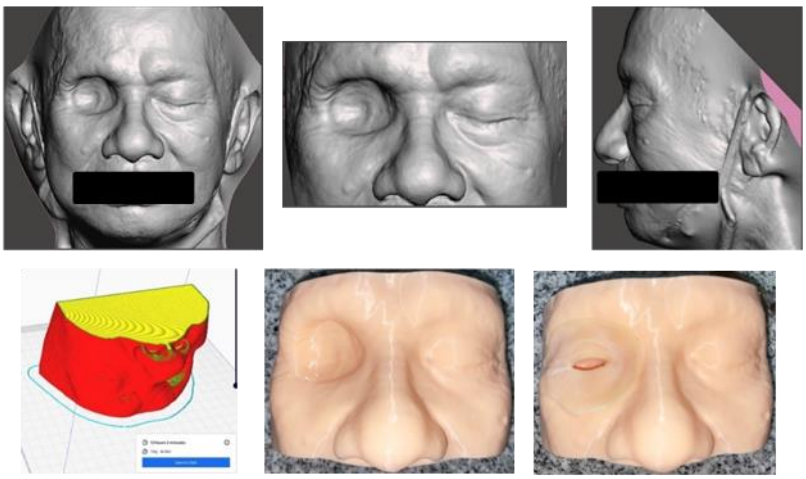

Figure 2 Results of soft file anatomical retrieval with extraoral scanners and 3D printing models

After anatomical impression, the stock eye is selected according to the same color as the antagonist's eye and the same position as the antagonist's eyepiece (Figure 3), and fixation can be carried out on the acrylic plate as the basis of the orbital prosthesis (Figure 4).

Figure 3 Selection of Suitable Stock Eye and Measurement Stock Eye Position with Patient Ocular

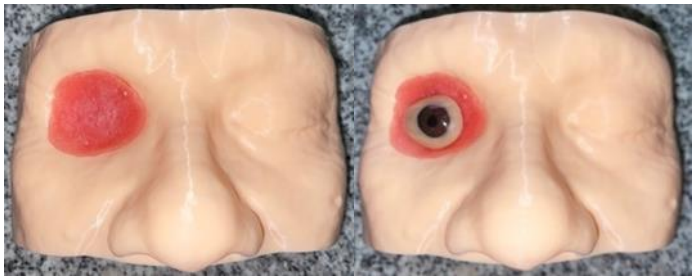

Figure 4 Acrylic Base and Stock Eye Fixation

The design of orbital contouring is carried out digitally by mirroring with the antagonist orbit and printed in 3D (Figure 5). After that, the orbital contours on the 3D model can to duplicated and impression contour 3D model with putty and moulded with red wax, after which it is glued with an acrylic base fixed with a stock eye (Figure 4). The contouring orbital with the red wax material can be try in with the patient, and it is seen whether it matches the anatomy of the antagonist orbit (Figure 6).

Figure 5 3D printing with orbital contours

Figure 6 Wax try in

Selection of silicone colour by matching the patient's skin colour before silicone packing processing. After that, we process flasked and dewaxed on the cuvette, and for the preparation of silicone filling. Preparation of the silicone process by stirring M511 platinum silicone part A and part B with thixotropic agent (ratio of 1 drop per 10 grams of silicone), and the colour of the silicone is adjusted to the colour that has been tried previously. The silicone that has been stirred and the colour has been adjusted, before being poured into the cuvette, a thin layer of glaze is applied to the surface of the orbital contour, after which it is compressed first to reduce the porous result. After that, the silicone is poured evenly on the cuvet and pressed tightly. Silicone is waited for 24 hours to set. After 24 hours the cuvette is opened gradually. After the cuvet process, a silicone ocular prosthesis is tried in with the patient and we evaluating the colour and form of the prothesis are the same as the patient's ocular antagonist (Figure 7).

If the silicone ocular prosthesis is good and suitable, trimming and polishing can be done. In ocular prostheses, eyelashes are installed with synthetic bristles that are equated with antagonist orbits (Figure 9). After completion, insertion can be carried out and the use of glasses for camouflage can be added (Figure 10), as well as additional retention using additives for silicone prostheses that can be applied around the base of the silicone prosthesis. The patient feels comfortable, aesthetically pleasing and painless, and the patient is taught to put on and take off the prosthesis. Patients are instructed to clean the prosthesis with a cloth and warm water regularly (every night). The prothesis can take it off before to sleep. To clean the additives, you can clean them with warm water and clean the rest of the materials on the

skin, or you can clean them with a cleanser or additive remover. Control can be done once every 3 – 6 months in the beginning and after that can control once of a year.

Figure 7 Prosthesis Try In

Figure 8 Eyelash Installation

Figure 10 Insertion

3. Results and discussion

Surgeons and prosthodontists have an important role in reconstructing or treating maxillofacial cases in terms of function and aesthetics. If treatment can resemble the aesthetics of the patient's original anatomy, it can improve the patient's physical and mental health. Deformities caused by trauma and congenital abnormalities that cause facial and orbital deformities require prostheses for rehabilitation (2). One of the important aspects in performing maxillofacial treatment is the selection of the impression technique, because this can affect the results of the prosthesis later. Impression can be done using digital techniques, using scans on all facial surfaces, or conventional ones that use irreversible hydrocolloid (alginate) materials using facial moulage which is done with a custom tray (box) that is adjusted to orbital defects and antagonist orbits. To obtain an ideal facial impression, it is able to cover all forms of defects, including structures, undercuts with minimal distortion, and prevents soft tissue deformation due to the impression material (3). Nowadays many people use digital techniques. There are many advantages of this technique. This technique can improve healthcare, the ability to improve patient specificity, quality of life and treatment outcomes by replacing archaic manual intensive procedures. Digital utilization has the ability to record and can quickly translate the surface anatomy of various treatments, and can do it as cheaply and efficiently as possible. In progress, this digital technique can be used to perform facial impressions, especially in maxillo-facial cases (2).

In this particular case, the patient underwent OD Socket Exenteration in the right eye to treat an orbital defect brought on by OD Conjuctiva Melanoma, many methods for removing components of the eye, namely Evisceration, enucleation, or exenteration (3). Exenteration is an operation aimed at destruction. This is done for orbital malignancies in an effort to achieve cure with tumor free margins (4).

An orbital prosthesis was chosen for this particular case. The solution that can enhance the patient's feelings and appearance while safeguarding the eye socket is an orbital prosthesis. This prosthesis needs to be lightweight, affordable, retentive, durable, and attractive on the exterior. The type of lifestyle, financial situation, number and severity of abnormalities, and esthetic needs of the patient all influence the materials used for manufacturing. Polysiloxane, RTV silicone, HTV silicone, sylphenylene, polyvinyl chloride, chlorinated polyethylene, and polyurethane are the materials used in fabrication nowadays. RTV silicone is the substance that is most frequently used. Mechanics, or undercuts and implants, can be used for attachment (5). Using a glasses and spectacle frames is another attachment method, which is also the most widely used conventional way (6).

The benefits of this material (silicone), including as better marginal adaptability and a natural-looking appearance. Flexibility, biocompatibility, acceptance of both inherent and extrinsic coloring, chemical and physical inertness, and formability are among the material attributes of silicone. Compared to acrylic prostheses, orbital prostheses made of silicone material have a number of advantages, such as being lighter and more aesthetically pleasing with a more natural appearance. Additionally, because silicone blends in with the skin and adapts well, it appears natural (6).

4. Conclusion

In making an orbital prosthesis, there are important things to do, namely the impression technique like using digital. This technique is often used nowadays because it has the ability to record anatomical shapes quickly and this makes the work time faster, the patient more comfortable. if the results of the anatomical impression are good, this can improve the quality of the final prosthesis.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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