complication of orbital emphysema has been presented. The immediate diagnosis and treatment of the orbital emphysema revealed to be the main success factors for the resolution of this complication.

Key Words: Fracture, head trauma, orbital emphysema

Orbital emphysema is a rare complication which can lead in a permanent visual loss.[1] This presence of air in the orbit can occlude the central retinal artery, for which early diagnosis and correct management are essential to preserve the patient's vision.[1] Clinically, orbital emphysema can cause orbital pain, decreased visual acuity, increased intraocular pressure, and arterial occlusion of the central retinal artery causing ischemic optic neuropathy.[2,3] Therefore, we present a case of a 27-year-old male patient who was referred to the "Hospital das Clinicas de Teresópolis" after a motorcycle accident.

The clinical and tomography examination confirmed the fractures Le fort I, orbital roof and floor, anterior and posterior walls of the frontal sinus, both on the right side. The patient was submitted to surgery under general anesthesia. The fractures of the orbital roof and orbital floor were reduced and fixed with titanium mesh of 2.0 mm system, Le fort I fractures were fixed with plates and screws of 2.0 mm system, and fractures of the wall frontal sinus were not necessary to manage. On the next day, the patient sneezed and pressured his nose, resulting in immediate emphysema in the upper eyelid after blowing nose, with ocular proptosis and decreased visual acuity of the right eye (Fig. 1A). The computed tomography revealed emphysema in the right orbit and frontal sinus (Fig. 1B). Clavulin 1 g (Eurofarma Laboratórios SA, São Paulo, Brazil) and dexamethasone 12 mg (Aché Laboratórios Farmacêuticos SA, Guarulhos, Brazil) were administered intravenously 3 times a day.

The orbital emphysema regressed gradually after 3 days, with recovery of visual acuity (Fig. 1 C-D). There were no signs of emphysema on the new computed tomography (Fig. 1E).

Postoperative airway pressure changes can cause orbital emphysema.[1] Immediate diagnosis is crucial to avoid ischemia of the central retinal artery and damage of the optic nerve with vision loss.[3] In physical examination, increased orbital volume and crepitus are typical signs to identify emphysema.[4] Antibiotic prophylaxis has also been shown to be essential for resolution of this complication, and in severe cases perforation or cantolysis may be necessary.[5] However, it is a rare postoperative complication, and it can cause definitive visual sequelae to the patient. Thus, the authors suggest the immediate diagnosis and treatment as the main success factors for the management of this complication.

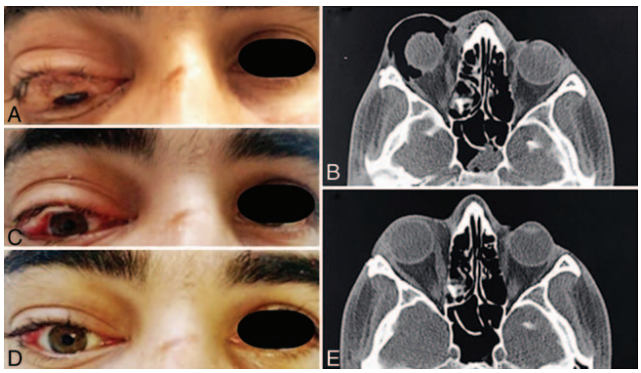

FIGURE 1. (A) Initial aspect of orbital emphysema, evidencing the proptosis of the right eyeball in addition to the reduced visual acuity. (B) Axial computed tomography showing large orbital emphysema in the right orbit region. (C) Second day and (D) third day emphysema fully regressed. (E) Axial computed tomography in which it is possible to note the presence of orbital emphysema in the right orbit fully regressed.

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Custom-Made Ocular Prosthesis for Atrophic Anophthalmic Cavity

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Abstract: The ocular prosthesis is a modality of facial prosthesis that acts on the repair of loss or deformity of the ocular globe. Prosthetic rehabilitations destined to anophthalmic cavities that suffered cicatricial retraction represent a challenge during fabrication since they often need to be reduced due to atrophic of the cavity and simultaneously need to have a good esthetic appearance regarding the contour and artificial iris. This clinical report describes the ocular prosthetic rehabilitation of a 77-year-old man with anophthalmic atrophic cavity due to herpes zoster-induced loss. The treatment focused on comfort and adaptation during use, on satisfactory retention and esthetic appearance, and on care to achieve total eye closure while wearing the ocular prosthesis. This article shows an unusual prosthetic rehabilitation of atrophic anophthalmic cavity with 6 months of follow-up.

Key Words: Custom-made ocular prosthesis, herpes virus infections, maxillofacial prostheses

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Herpes zoster (HZ) is a viral disease of still poorly understood etiopathogenesis. The incidence rate of this disease in the general population is between 3 and 5 per 1000 persons per year. The frequency of HZ increases with age, possibly affecting up to 50% of persons who live up to 85 years.[1] The trigeminus nerve can be affected in approximately 15% to 20% of patients, while the ophthalmic ramus is affected more frequently, with an increased risk of severe ocular infection.[1,2] Among the sequelae of HZ, ocular losses have been reported in the literature.[2] Within this context, ocular losses cause considerable morbidity, including permanent blindness, with prosthetic ocular rehabilitation most frequently being the complementary and definitive treatment.[3]

In patients with surgery for removal of the ocular globe, prosthetic rehabilitation should be performed as soon as possible[4] since the anophthalmic cavity with cicatricial retraction due to long-term absence of a muscular stimulus suffers a drastic reduction of its surface and of the support space for the insertion of the prosthesis. The fabrication of ocular prostheses for atrophic cavities is usually difficult due to the irregularities and reduced space of the anophthalmic cavity, requiring special care in order to be satisfactory.[5,6]

Therefore, the objective of the present report is to describe the steps of fabrication of a customized ocular prosthesis for a 77-year-old man with anophthalmic atrophic cavity due to HZ-induced loss.

CLINICAL REPORT

A 77-year-old male patient with right anophthalmic cavity due to HZ infection reported discomfort and difficulty in accepting his new appearance and was referred to fabrication of an ocular prosthesis. Anamnesis revealed etiology of ocular loss due to HZ virus and evisceration surgery of the ocular globe, with the patient having no prosthetic rehabilitation for a period of 2 years. Physical examination revealed the presence of an anophthalmic cavity with cicatricial retraction, of reduced space and circumscribed by the cul-de-sac or fornix, as well as impaired excursion of the muscle stump (Fig. 1A). The absence of secretion and/or local exudate was also observed. The proposed treatment was fabrication of a customized thin ocular prosthesis with esthetic and functional adaptation for the maintenance of a healthy anophthalmic cavity.

The anophthalmic cavity was molded with polysiloxane impression material (Optosil; Kulzer, Hanau, Germany) with the patient being instructed to move his orbital musculature during the process.[7] The ocular mold was evaluated in terms of its posterior portion corresponding to the bottom of the surgical cavity in order to reproduce the anatomic details of this region. The bottom of the palpebral fornix was also examined in order to determine whether it was sufficient to promote upper and lower retention (Fig. 1B). The ocular mold was inserted in a metal muffle (No 03; Mac Dental, Sao Paulo, Brazil) with gypsum stone (Tipo III; Asfer Indústria Química, Sao Paulo, Brazil) (Fig. 1C) and was later replaced with liquefied wax (wax for sculpture; Artigos Odontólogicos Clássico, Campo Limpo Paulista, Brazil) for sculpture in order to obtain the wax pattern. The portion referring to the surgical cavity in the wax pattern was smoothed and adjustments were sequentially performed by removing or adding wax to the anterior esthetic portion before the esthetic and functional test.

The adjusted wax pattern was tried on the patient and assessed for adaptation and retention so that the anatomy of the ocular globe would be closely similar to that of the contralateral eye while respecting the morphology of the cavity of the patient. The central position of the pupil was also located in the wax pattern. The artificial iris was painted with ceramic pigments (Mineral dyes; Triart Products, Sao Paulo, Brazil), blue and green for the stromas and black for the pupil, added to a monomer–polymer mixture on the flat surface of a colorless ocular button (Ocular cap with pin; Artigos Odontólogicos Clássico), considering the details of iris color and diameter of the contralateral eye of the patient. The ocular button was fixed on the wax pattern and the preparation was again placed in the anophthalmic cavity of the patient (Fig. 1D). At this time, the ensemble was observed in terms of harmony during full closure of the atrophic cavity with the wax pattern together with the artificial iris button, which represented the temporary format of the ocular prosthesis. At first, the patient was unable to fully close his eyes while wearing the temporary set. Thus, new adjustments were made in the wax pattern, especially in the anterior portion, and minimal interventions in contact with the area of the upper palpebral fornix. The objective was to achieve full harmonic eye closure as a protective factor,[8] considering retention and the esthetic contour of the artificial sclera in the shape of a shell (Fig. 1E).

The wax pattern was inserted in a new muffle, replaced with heat-activated white acrylic resin (Color N1; Artigos Odontólogicos Clássico) and polymerized. The artificial sclera was abraded by approximately 1 mm, pigmented in order to match the sclera of the contralateral eye, and later covered with heat-activated colorless resin (colorless for ocular prostheses; Artigos Odontólogicos Clássico), and polymerized. The artificial sclera was characterized with red wool yarn and with a yellow pencil (Watercolor pencil Art grip Aquarelle tin of 36; Faber-Castell, Stein, Germany), imitating veins and a slight jaundice present in the left eye. The ocular prosthesis was finished with polishing points (Maxicut; Edenta AG, Au, Switzerland) and polishing paste (Universal Polishing Paste; Kota, Cotia, Brazil) and then installed in the patient, with irrigation with 0.9% physiologic saline in the atrophic anophthalmic cavity in order to humidify the mucosa of the surgical cavity and to provide comfort (Fig. 2). The patient then received instructions about cleaning the cavity and about the hygiene/disinfection of the ocular prosthesis. At present, the patient has been followed up for 6 months.

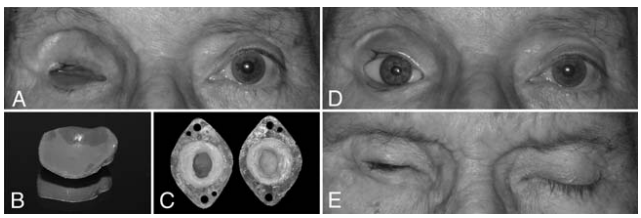

FIGURE 1. View of the patient and proof of wax modeling pattern (A) front view of the atrophic anophthalmic cavity (B) ocular mold (C) and insertion of mold with gypsum in a muffle (D) front view of the esthetic and functional adaptation of ocular wax on patient with open and (E) totally closed eyes.

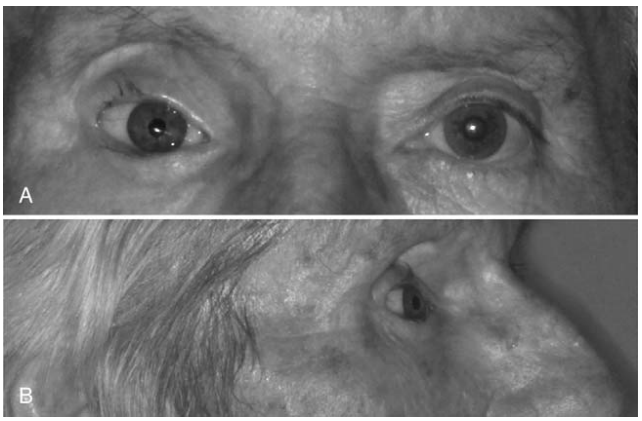

FIGURE 2. Views of the patient with installed ocular prosthesis (A) front and (B) right profile.

DISCUSSION

The usual procedure for patients with loss of vision due to diseases of the ocular surface and to viral infections with HZ, with atrophy of the ocular globe, reduction of the iris diameter and/or changes in the sclera and iris, is the fabrication of a prosthesis known as the Boston ocular surface prosthesis (BOSP),[2] which eliminates or delays the need for keratoplasty. The results achieved in these infrequently observed patients are excellent. Due to its convexity, the BOSP restores the normal diameter of the iris and reestablishes the palpebral contour lost to atrophy, with lateral, rotation, and vertical movements practically equal to those of the healthy eye.[2]

For patients with anophthalmic cavities due to surgical evisceration with cicatricial retraction or patients who never received a prosthesis, like the present patient, an ocular prosthesis fabricated from a mold of the cavity permits uniform adaptation to tissue structures, fulfilling the objectives of rehabilitation. The ocular moulage (Fig. 1B), when done correctly, permits the juxtaposition of the alloplasty over the entire remaining stump, thus facilitating the movements and closing of the eyes by the wearer of the ocular prosthesis (Fig. 1E).[7] The habitual movement of eye closure and/or blinking is an important factor for ocular protection[8] whose function is to direct the tears to their physiologic conduit through the cornea while promoting smoothness of the tissue surface. Therefore, the prosthetic treatment of the atrophic anophthalmic cavity of the present patient was carried out in such a way that the patient was able close his eyes without interfering with the retention or esthetic appearance of the rehabilitation, with reestablishment of facial harmony and the consequent maintenance of the functional and anatomic integrity of the cavity.

In addition, in atypical anophthalmic cavities, care in order to obtain absence of attrition and harmony during the use of the ocular prosthesis as well as palpebral sealing contributes to the maintenance of local humidity and homeostasis, preventing conjunctival dryness.[5] In the present patient, the thin shell-shaped ocular prosthesis properly covered the surgical cavity and had mobility, reproducing the movements of the atrophic and/or deformed ocular globe. Due to the low frequency of preparation of customized prostheses for atrophied cavities until recently, there are limited data about the efficacy of this device for treatment. However, strengthening of the palpebral muscles with the use of rehabilitation with an ocular prosthesis has been previously detected and reported.[9]

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