

## C A S E R E P O R T

# A hybrid technique for management of post-traumatic aniridia and aphakia.

*Vincenzo Marchese<sup>1</sup>, Viviana Randazzo<sup>2</sup>*

<sup>1</sup>Département of Ophthalmology, S. Antonio Abate Hospital Trapani, Italy; <sup>2</sup>Département of Ophthalmology, A.O.O.R. Villa Sofia-Cervello, Palermo, Italy

## Abstract.

We report a case of a 35-year-old woman who suffered blunt ocular injury, causing total aniridia and aphakia associated with rhegmatogenous retinal detachment (RRD). RRD was treated with pars plana vitrectomy, a suture net with 10-0 Nylon (Ethilon 10-0, Ethicon) to prevent the silicone oil (SO) to enter the anterior chamber and SO tamponade. Implantation of a foldable prosthetic iris (Ophtec Model C) was fixed to the sclera with a hybrid technique, the Hoffmann corneoscleral pocket technique associated with Canabrava's double flanged technique to address both pathologies of aniridia and secondary aphakia. Cosmetic result was satisfactory, patient's visual acuity increased and no complications were observed during the follow-up. Canabrava technique simplifies and improves the fixation of the iris-intraocular lens complex to the sclera and the corneoscleral pocket technique is a safe option that does not require scleral flaps or knots, avoiding further conjunctival trauma and ensuring good stability of the implant. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** ocular trauma, aniridia, aphakia, vitrectomy

## Introduction

Ocular trauma can result in severe complications such as rhegmatogenous retinal detachment (RRD), iris defects and aphakia (1, 2). Eyes with mydriasis, aniridia and aphakia secondary to trauma can be provided with an iris prosthesis and an IOL prosthesis (3). Many techniques have been developed for scleral fixation (4-5) and different models of artificial iris are specially designed according to the particular iris color and the condition of the patient's lens [6-7].

The iris prosthesis Ophtec Model-C1 is a foldable artificial refractive iris manufactured from

hydrophobic acrylic material which provides it with outstanding biostability and biocompatibility, it has 13mm overall diameter and can be selected to have a 3,5mm built-in lens to provide optical correction. Surgeons can select one of 300 existing designs to match the patient's fellow eye. It can be implanted with an injection system or through a tunnel incision of 5,5 mm.

In case of the complete absence of the capsular or iris support, the traditional implantation technique requires the lens to be implanted by means of a suture (10-0 polypropylene) fixation to the sclera after preliminary formation of three scleral pockets in the

meridians matching the location of the lens supporting elements (8-9).

Among the various scleral fixation techniques Hoffmann et al. described a corneoscleral pocket technique without conjunctival dissection that offers several advantages over traditional methods, including the absence of conjunctival dissection and scleral cauterization (10).

Canabrava et al. were the first to propose the 4-flanged technique for scleral fixation IOL, improving and simplifying the existing intrascleral fixation techniques (11-12). Recently published a case report in which an iris-intraocular lens complex (Reper<sup>®</sup>) was fixed to the sclera with Canabrava's double-flanged technique without the use of flaps or knots (13).

This case report demonstrates implantation of the iris prosthesis Ophtec Model-C1 using a hybrid technique between Canabrava double-flanged technique and the corneoscleral pocket technique. The scleral fixation of this artificial iris-IOL complex using the Canabrava technique associated with corneoscleral pocket technique can be a valid and effective alternative hybrid technique which provides such advantages as low costs, gradual learning curve, and no need for scleral flaps or knots, in the patient with aphakia and concurrent aniridia.

## Case presentation

A 35-year-old woman who was wounded in her face after getting punched as a victim of domestic violence. CT scan was done and showed no brain damage, no skull fracture and no foreign bodies in the orbit. It showed a deformed left globe and pronounced damage to the soft tissue of the face.

She had healthy eyes before the injury and her sight was 1.0 in both eyes (Decimal visual acuity scales).

The patient was admitted to us for emergency surgery. The preoperative assessment showed a scleral cleft with haemophthalmos and marked hypotonus. Visual acuity was light perception in left eye. The eye were first operated with suturing of the scleral wound, vitrectomy and SO tamponade. A suture net with polypropylene 10-0 and a straight needle was applied

to prevent a prolapse of the SO into the anterior chamber. In the last follow-up, the left eye has transparent cornea, flat retina and intraocular pressure was normal. Visual acuity was 0.6 with pinhole. Five months after the trauma, the SO and suture net were removed due to the appearance of emulsion in the anterior chamber. In the post-operative period, strict control of the intraocular pressure (IOP) and intraocular inflammation have been carried out. Eight months after the first surgery finally, an implantation of a IOL prosthesis (Ophtec Model-C1) due to aphakia and traumatic mydriasis was performed.

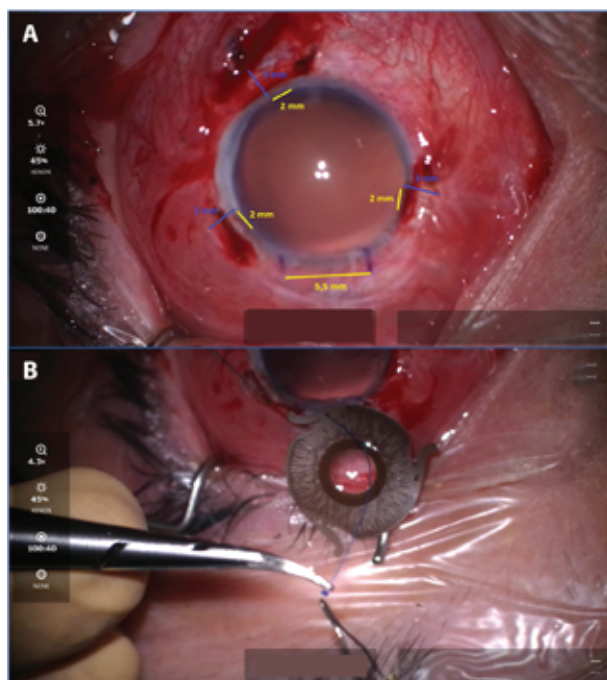
## Surgical technique

Peribulbar anesthesia was performed using 10 mL of lidocaine. An infusion cannula was inserted at 3.5mm from the limbus in the temporal quadrant with no irrigation (the irrigation was performed only when the eye was in hypotony during the procedure). Three scleral pockets (at 2, 5 and 8 o'clock) were dissected posteriorly from three peripheral clear corneal incisions using a diamond crescent knife or a metal crescent blade. The pockets were extended approximately 3 mm posteriorly from the clear corneal incisions. To fixate this foldable iris-IOL complex we needed to perform a 5.0-mm anterior (or posterior) limbal incision using a crescent knife [Figure 1A].

The 6-0 polypropylene suture end was passed through the first eyelet of the iris-IOL prosthesis complex and heated by the thermocautery to create the first flange [Figure 1B].

This was repeated for the other 2 eyelets. Then, as an external guide, a 27-gauge hypodermic needle was used to perform transconjunctival sclerectomy in the area of the scleral pockets and tunnel 2.0 mm posterior to the limbus. This needle entered the anterior chamber and by the help of forceps the other part of the suture was pushed into the inner cavity of the needle. This maneuver was repeated at the 5 and 8 o'clock position to create the second and third fixation points [Figure 2A-2B-2C-2D].

Using a forceps, the folded iris prosthesis was inserted into the anterior chamber through the 5,0 mm corneal incision [Figure 3A]. Once the prosthesis was



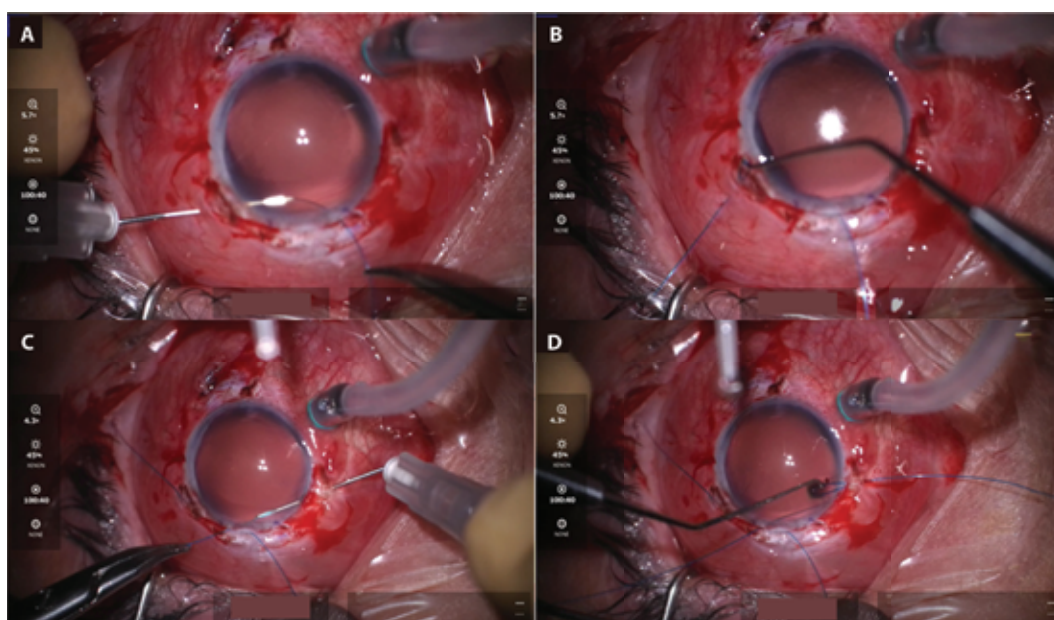
**Figure 1** In the subpart A of the figure is show the localization and extension of the corneoscleral pockets (2x3 mm) and the 5 mm corneal incision. Subpart B shows the 6-0 polypropylene suture end passed through the first eyelet of the iris-IOL prosthesis complex and heated by the thermocautery to create the first flange.

positioned centrally, the sutures were cut about 2 mm and the flanges were created by thermocautery. At this point, the surgeon was able to adjust the position of the prosthesis in the eye by pulling the third ends of the monofilament. When the position was satisfactory, the third suture was cut about 2 mm from its bases, the third flanges was created with thermocautery [Figure 3B-3C-3D] and then the three flanges placed in the intrascleral space [Figure 4A-4B]. The prosthesis was in place [Figure 4C].

Visual acuity in the last follow-up was 0.4 in the left eye with an astigmatism of -2.0 D at 180°. The intraocular pressure was stable to postoperatively 18 mmHg. The specular microscopy went from preoperatively 2135 cells/mm<sup>3</sup> to postoperatively 1790 cells/mm<sup>3</sup>. The aesthetic result was acceptable [Figure 4D].

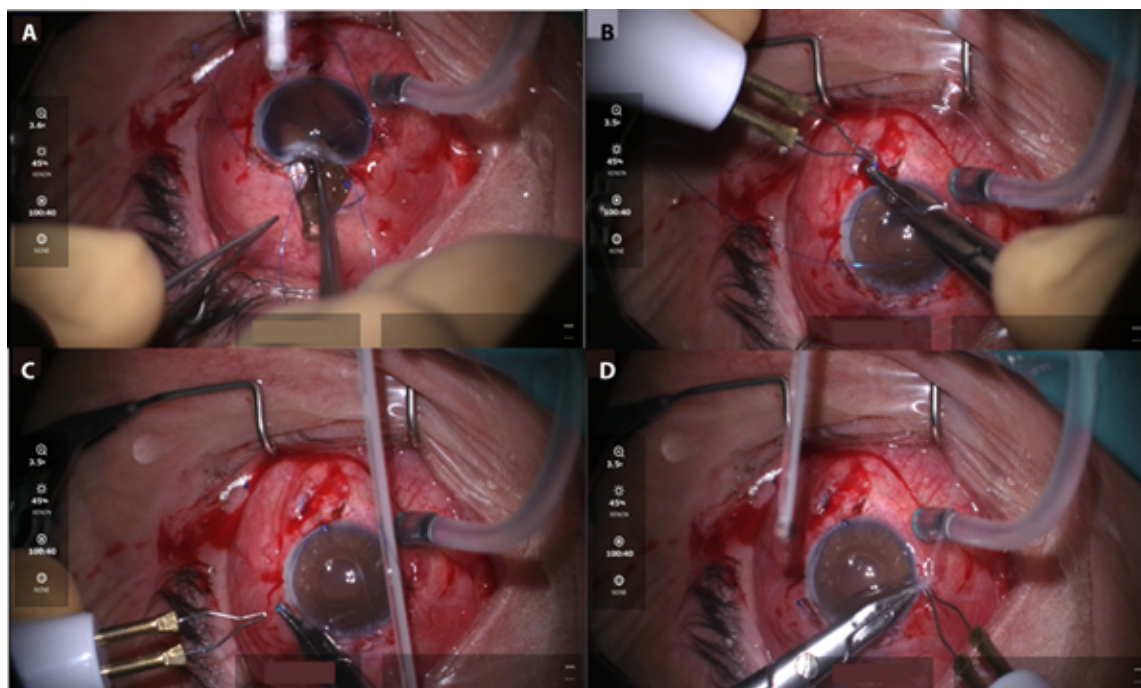
## Discussion

Our patient was concerned about the functional and cosmetic issues caused by the total aniridia. The patient's expectations included a comprehensive and long-lasting solution. Therefore, the implantation of a

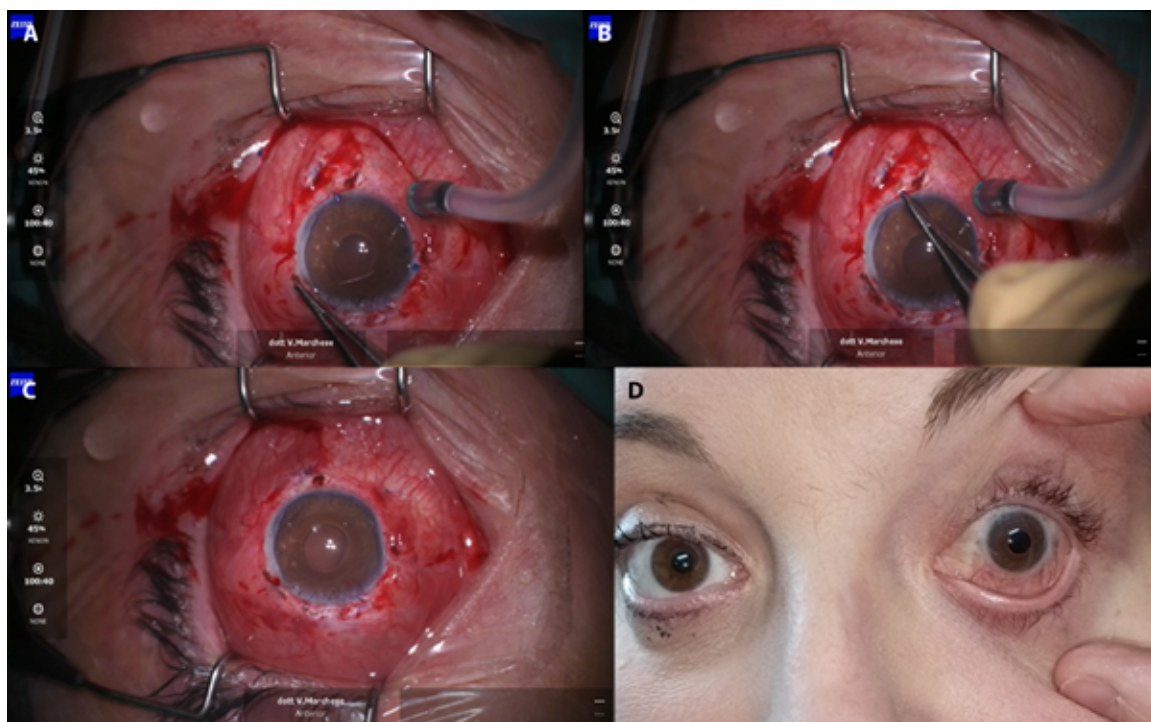


**Figure 2** In A and C subpart is show the passage of the first and second sutures (2 and 8 o'clock) through the sclera. In B and D subpart is show the externalization with hook of sutures. This maneuver was repeated at the 5 o'clock position to create three fixation points.





**Figure 3** In the subpart A of figure the folded iris prosthesis was inserted into the anterior chamber through the 5,0 mm corneal incision. In B, C and D subparts the sutures were cut about 2 mm and the flanges were created by thermocautery



**Figure 4.** The A and B subparts of figure shows the 2 and 5 o'clock flanges placed in the intrascleral space (this maneuver was repeated at the 8 o'clock position). Subpart C shows the prosthesis was in place and subpart D the aesthetic result at the control after 3 months from the implantation of the prosthesis.

foldable artificial iris, which requires a small incision and offers a customised colour design, was considered by the surgical team as the most feasible surgical approach. In this case, the Ophtec Model C1 artificial iris was chosen. This model is a foldable acrylic artificial implant available in 3 different models and 300 different colour designs. The option of tailor-made customised iris pattern constitutes a significant advantage of the implant. The model C has 3 haptics for better centration and stabilization. Different techniques for scleral fixation have been described. Many of these techniques require flaps, knots, haptic or conjunctival manipulations. The Canabrava technique is a flapless and sutureless scleral fixation technique.

Complications have been reported, conjunctival hyperemia and damage around the flange, endophthalmitis following exposure of the sutures. The Hoffmann corneoscleral pocket technique eliminates the need for conjunctival dissection and scleral cauterization.

To prevent and reduce these complications and take the advantages of both techniques, we show a hybrid technique, 3-flanged fixation with insertion of the flanged 6-0 polypropylene suture into the sclera instead of direct subconjunctival burying.

The goal is to maximize the experience collected with other techniques and combine the benefits of flanged methods with the simplicity of corneoscleral pocket technique.

**Author Contributions Statement:** Both authors contributed to the conception, design of the study and acquisition of the images; they drafted the article approving the final version. Surgery was performed by Dr. Vincenzo Marchese.

**Conflict of Interest:** The authors declares that they have no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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**Correspondence:**

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Viviana Randazzo,

A.O.O.R. Villa Sofia- Cervello Palermo,

Via Cataldo Parisio n° 79

Palermo, 90145 Italy

Phone: +393490996496

E-mail: vivianarandazzo86@gmail.com