Contact Lens & Anterior Eye 38 (2015) 382–388

Contents lists available at ScienceDirect

Contact Lens & Anterior Eye

journal homepage: www.elsevier.com/locate/clae

Case Report

Contact lens management of irregular corneas after traumatic aphakia: A pediatric case series☆

Yin-Yin Aung[a,1], Andrew McLeod[b,*,2]

[a] New England College of Optometry, 424 Beacon Street, Boston, MA 02115 USA
[b] Boston University School of Medicine, Department of Ophthalmology, 85 East Concord Street, Boston, MA 02118 USA

ARTICLE INFO

Article history:
Received 8 September 2014
Received in revised form 11 March 2015
Accepted 28 March 2015

Keywords:
Irregular cornea
Ruptured globe
Ocular trauma
Pediatric
Aphakia
Gas-permeable contact lens
Hybrid contact lens
Soft multifocal contact lens
Amblyopia

ABSTRACT

Purpose: Pediatric patients account for 35% of all cases that present after ocular trauma and 20.9% of those result in a ruptured globe. When repairing the globe, the removal of the natural lens results in a significant change in refractive error and loss of accommodation. In addition, the eye can have scarring, irregular astigmatism, and changes to the ocular surface. Treatment and vision rehabilitation should be aggressive and done quickly to prevent amblyopia. Advanced lens designs are often needed to treat both the irregular ocular surface and the aphakia. Treatment options are often confounded with the usual issues of contact lens compliance, intolerance, and complications.

Case report: This case series follows three aphakic pediatric patients through the contact lens fitting process after sustaining a ruptured globe that left them aphakic with residual irregular astigmatism and corneal scarring. Patient 1 is a 3-year-old Hispanic male fit with a bitoric gas permeable contact lens with irregular astigmatism and an elevated central corneal scarring. Patient 2 is a 12-year-old Caucasian male with minimal residual astigmatism fit in a multifocal soft contact lens. Patient 3 is an 8-year-old African American male fit with a hybrid contact lens that was needed to vault the irregular astigmatism and central corneal scarring.

Conclusions: Treating patients with irregular corneas or aphakia can be challenging in their own right, but in combination are some of the most advanced specialty contact lens fittings. This case series followed three pediatric patients through the fitting process and demonstrated the options and challenges when fitting this unique patient population.

Pediatric patients under the age of 12 account for almost a quarter of all ocular injuries [1] and are at high risk for developing amblyopia. The incidence of ocular trauma is higher in males, by a ratio as high as 6:1 [1–4]. Twenty percent of traumatic cases involve a ruptured globe [5] and in most of these cases the natural lens is removed. The end result is a massive shift in refractive error and the loss of accommodative function. Typically this can be treated with high plus powered soft or gas permeable contact lenses in conjunction with glasses for reading. If penetration occurs near the limbus or through the cornea, scarring and irregular astigmatism can result. Traumatic pediatric aphakia is a challenge to manage both surgically and with contact lenses, especially when there is the potential for amblyopia.

Initial surgical management often includes vitrectomy, retinal detachment repair, lensectomy, and corneal or scleral suturing. One study suggests that positive prognostic indicators include good initial visual acuity, absence of hyphema, absence of posterior uveal prolapse, and <5 mm length of laceration [6]. Once the compromised ocular structures are surgically repaired and deemed stable, the task of restoring vision is time sensitive due to the risk of developing amblyopia. Options in the management of refractive error include spectacles, intra-ocular lens (IOL) implantation, or the use of contact lenses. All options have their own risks and benefits. If a contact lens fitting is pursued, the integrity of the cornea determines the initial type of contact lens fitting.

This case series will review the complicated management of traumatic pediatric aphakia in conjunction with irregular corneal surfaces and will discuss the use of different lens types including

☆ This paper was presented as a poster at the American Academy of Optometry 2012 meeting in Phoenix, Arizona, USA.

* Corresponding author. fax: +1 617 587 5562; mobile: +1 617 823 0307.
E-mail addresses: yinyin.aung@gmail.com (Y.-Y. Aung), mcleoda@neco.edu (A. McLeod).
[1] Current address: University of California Berkeley, School of Optometry, 200 Minor Hall, Berkeley, CA 94720, USA.
[2] Current address: New England College of Optometry, 424 Beacon Street, Boston, MA 02115, USA.

http://dx.doi.org/10.1016/j.clae.2015.03.015
1367-0484/

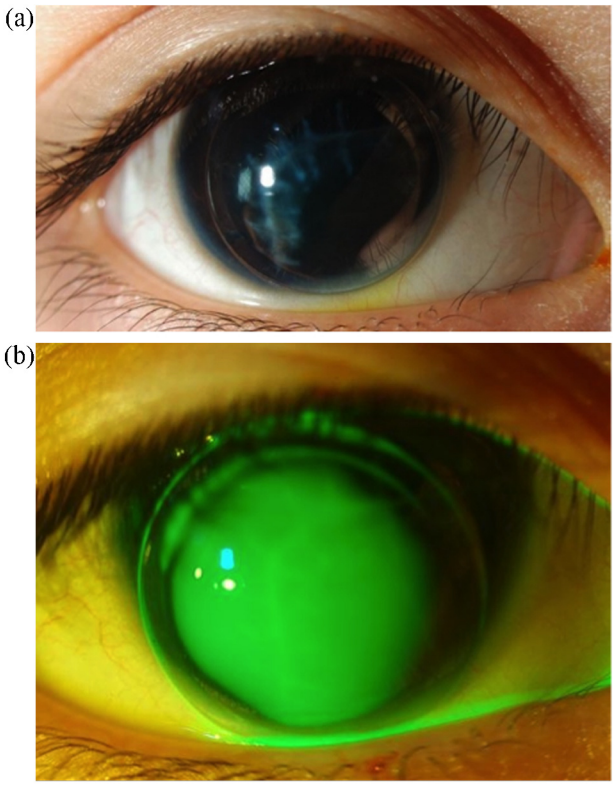

Fig. 1. (a) Bitoric gas permeable BostonXO_2 (Bausch & Lomb, Bridgewater, NJ, USA) fit over a slightly elevated central corneal scar. (b) Bitoric gas permeable Boston XO_2 (Bausch & Lomb, Bridgewater, NJ, USA) sodium fluorescein pattern showing purposely steep fit necessary to vault over the corneal scar. (*Photo: Winner of the 2012 American Optometric Association, Contact Lens and Cornea Section Resident Photo Contest. Reprinted with permission. Copyright American Optometric Association*).

corneal gas permeable, soft multifocal, and hybrid lenses. These cases will also review the option of surgical alternatives when contact lens management fails due to lack of compliance. Achieving the best potential vision depends on a host of factors including the fit of the contact lens, compliance with amblyopia treatment, and ocular sequelae from the initial trauma. Parental consent was given for publication of clinical data, topography reports, and photographs.

1. Case report

Patient 1 is a 3-year-old Hispanic male that presented to Boston Medical Center (Boston, MA, USA) after a corneal laceration repair and lensectomy in his right eye due to trauma 2 months prior. He sustained a full-thickness corneal laceration during an altercation with a dog and the initial repair was performed in Honduras. His mother reported that this included suturing of the corneal wound and removal of his natural lens, which was also damaged during the trauma. She also reported that he had no ocular problems and good vision prior to the trauma. Review of the hospital records showed that uncorrected visual acuity was hand motion OD and 20/20 OS. He presented with an intermittent right exotropia at distance only. The left eye had an intact response to light on direct and indirect measurement. The right pupil, however, was distorted by trauma and surgery. An afferent pupillary defect was excluded on reverse testing. Slit lamp examination showed intact corneal sutures and a large corneal scar measuring approximately 8 mm high × 9 mm at the widest point. The scarring was very close to, but marginally spared, the center of his visual axis (Fig. 1a). There were no cells or flare and intraocular pressure was soft and equal by palpation. Examination under anesthesia was performed by the Department of Ophthalmology. A dense pupillary membrane and poor visualization of the retina due to vitreous debris were noted. The patient underwent an anterior vitrectomy and removal of the pupillary membrane. B-scan confirmed an intact retina. Subsequent postoperative follow-ups within 1 month showed that the vision was stable at 20/100 at distance with a +12.00 diopter (D) loose lens. Dilated fundus examination OD and OS showed an intact retina OU, with no holes, tears or signs of retinal ocular sequelae from trauma. The cornea had healed enough for a contact lens fitting. He was then referred to the contact lens service to assess visual potential with a contact lens.

A corneal gas permeable (GP) contact lens was chosen due to presumed irregular astigmatism from the sutures and scars. A Boston ES (Bausch & Lomb, Bridgewater, NJ, USA) 7.67/+8.00/9.6 diagnostic lens was inserted and aligned apically but was unstable on the eye. The dioptric power was determined with retinoscopy over the diagnostic lens and adjusted for incorporating the presumed lacrimal lens. Retinoscopy over the lens was +7.00 D and yielded 20/80 vision. A larger diameter was used to stabilize the lens with the goal being a slightly steep fit to vault over the minimally raised corneal laceration. The initial spherical lens was ordered in 7.67/+15.75/10.0/Boston XO_2 material from Blanchard Laboratory (Manchester, NH, USA). Additionally, a spectacle prescription of plano OU with a +2.50 D add OD in polycarbonate material was released. Monocular precautions were discussed with the patient's mother at this time.

On follow-up 3 weeks later, the unaided visual acuity was counting fingers (CF) at 1.2 m OD and 20/50 OS with poor patient cooperation. Uncorrected cover test showed a 25-prism diopter right exotropia at distance and near (the percentage of presence was not noted). Initial assessment of the 7.67/+15.75/10.0/Boston XO_2 lens was slightly steep but stable with an acceptable fit. Visual acuity with this lens was 20/60 in the right eye with isolated HOTV letters. Over-retinoscopy was approximately −0.75 D but was difficult to assess due to poor patient cooperation and a compromised retinoscopy reflex from the corneal scar. The patient's mother was instructed on insertion and removal and educated on the importance of full time wear during waking hours. She was also instructed to patch the left eye for 2–4 h a day during active visual activities, such as playing video games or television watching. A progress evaluation was scheduled in 2 weeks.

At the 2-week follow-up, the patient was not wearing the contact lens. His mother reported no problems with the contact lens and she inserted the lens for only 6 h a day. However, she reported that she did not patch the left eye while her son was wearing the lens in the right eye. Through the use of a Spanish translation service, she was again extensively educated on the importance of full time lens wear during waking hours, re-instructed on the appropriate patching regimen, and was scheduled for a follow-up in 1 week.

The patient and his mother were lost to follow-up but returned 5 months later complaining of a red, itchy right eye for the past 4 days. The mother reported that she had not been inserting the contact lens or patching the left eye due to fear of the lens displacing during wear. A review of records from another provider showed that his uncorrected visual acuity dropped to counting fingers (CF) at 0.3 m with a +20 D lens OD and his vision remained stable at 20/20 OS with no correction. Uncorrected cover test showed a 30-prism diopter constant right exotropia at distance and near, suggesting progression of a sensory exotropia. Slit lamp examination indicated a mild iritis caused by inflammation of the sutures and he was scheduled for a second examination under anesthesia for suture removal. Five corneal sutures were removed and autorefraction showed +20.75 −3.75 × 170 and +2.50 −0.50 × 180 OS. Auto-keratometry was 42.50/48.25@ 087 OD and 43.37/45.87@086 OS.