

# Grand Rounds

## Introduction: Jose de la Cruz, MD (*Attending*)



This Grand Rounds issue presents several interesting cases encountered by the cornea service.

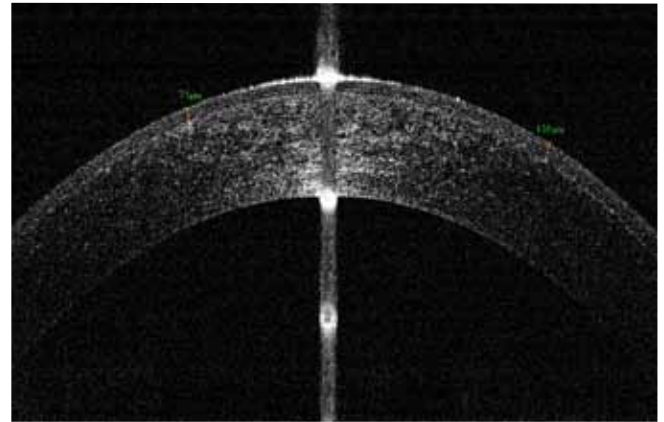
Edited by Rohan Shah, MD and Elizabeth Grace, MD. Photos by Mark Janowicz (unless otherwise noted). All photos are property of UIC. © Copyright 2012 by the Department of Ophthalmology, University of Illinois College of Medicine. All rights reserved. Cases presented in this issue are from UI Ophthalmology Grand Rounds on 09.28.11.

## Incomplete LASIK Flap: Erica Oltra, MD (*Resident*)



A 34 year old male with no past medical history presented for laser vision correction. His vision, refraction, pachymetry, and keratometry readings are listed in Table 1. His slit lamp and dilated fundus exam were unremarkable. His preoperative Pentacam revealed regular astigmatism in both eyes. After evaluation, the plan was for Intralase Custom LASIK flap OU and customized excimer laser treatment to correct myopic refractive error and spherical aberrations. Intraoperatively, the flap in the right eye was found to be incomplete

and could not be lifted inferiorly so the procedure was aborted. The decision was made to proceed with LASIK OS and this was completed without complication. The current plan is to use anterior segment OCT to monitor for flap resolution and to complete surface treatment PRK at a later date. Figure 1 displays the postoperative anterior segment OCT.



**FIGURE 1**  
 Anterior segment OCT taken 15 days post-op horizontal to the pupillary axis. The epithelial thickness is marked at 71µm and the flap thickness is marked at 110µm.

**Table 1**

	OD	OS
VA sc	CF	20/400
MRx	-5.00 sph (20/20)	-3.00 +0.50 x170 (20/20)
Keratometry	46.00 x178 / 47.00 x088	46.25 x171/ 47.00 x081
Pachymetry	575 um	588 um

## Incomplete LASIK Flap: *(Continued)*

**DISCUSSION** There are two ways to create the LASIK Flap. A mechanical microkeratome creates a shear force with an oscillating blade to create the flap at a preset depth. The second method is a femtosecond laser (Intralase) which uses infrared light to produce microcavitation bubbles at a preset depth, which was the method used in our case. Incomplete flap formation is a potential complication of Intralase. A 2009 study by Haft et al. found an incidence of flap complications to be 0.92%, though no eyes had a loss of best corrected vision due to flap complications.

When faced with an incomplete flap, it is important to stop the ablation and replace the flap to its original position. Excimer laser should not be performed. A bandage contact lens should be placed and one should wait 3-6 months before proceeding with further treatment. Further treatment options include PRK surface treatment or cutting a deeper flap (about 20-60um deeper).

## Boston K Pro Melt: Adam Prickett, MD *(Resident)*



In August of 2009, a 39 year old African American man presented to clinic after being referred by his primary doctor for evaluation for a keratoprosthesis. He had suffered chemical burns to both eyes in 1985, and had a perforated cornea in 2004 of the right eye. Past ocular history was also notable for dry eyes and floppy eyelids. His past medical history was notable for hypertension, diabetes, obesity, COPD, and obstructive sleep apnea.

On examination, he was found to have hand motion vision OD and was able to count fingers at 3 ft OS. Motility was normal, and intra-ocular pressures were 23.5 OD and 22 OS. Shirmer's test was within normal. His anterior examination was notable for conjunctivalization of both corneas. He was without symblepharon.

He was diagnosed at this time as having bilateral alkali burns with corneal conjunctivalization and limbal stem cell deficiency, and a Boston keratoprosthesis (K Pro) implantation was planned for the left eye. In September of 2009 he underwent placement of the K Pro along with lensectomy without complication, and a bandage contact lens was placed. He was started on Pred Forte QID, Zymar QID, and Vancomycin QID OS.

On follow up visits, his vision was found to improve to the 20/30 level. On a number of visits, he was found to have lost the bandage contact lens, which would frequently fall off of the left eye. In January of 2010, he underwent a YAG OS for a retroprosthetic membrane which had developed. By March of 2010, there was noted to be corneal melting around the K Pro at approximately the 2 o'clock position in the midperiphery.

In May of 2010, a left upper lid full thickness resection and reconstruction was performed in an attempt to tighten the upper lid to prevent the bandage lens from falling off of the eye. In June, corneal melting was noted again, along with a second retroprosthetic membrane. Unfortunately, the left upper lid was still floppy, and the contact lens continued to fall out. In July, a second YAG was performed for the retroprosthetic membrane. On follow up visits, there was noted to be a persistent area of melting around the K Pro with retraction of the corneal edge from the 10 to 4 o'clock position. Visante anterior segment ocular coherence tomography (OCT) was used to visualize this process and monitor the degree of melting at subsequent visits.

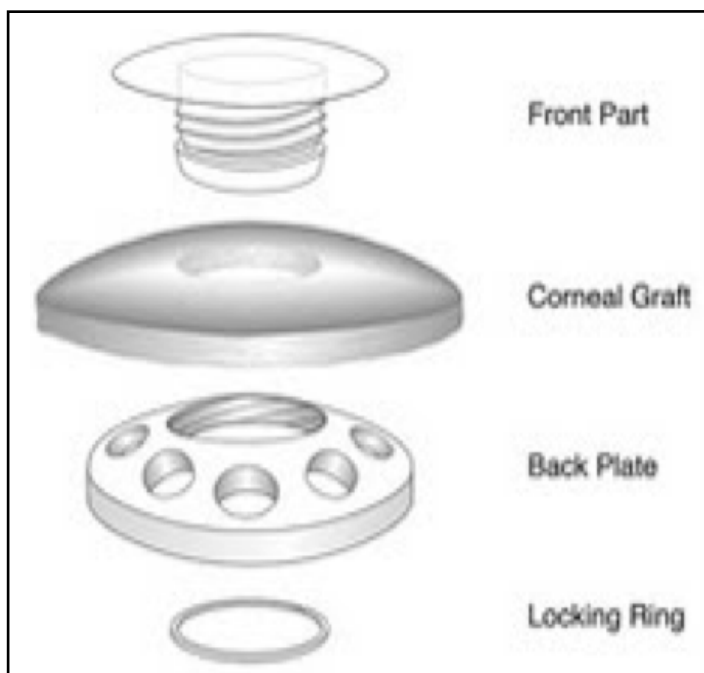


FIGURE 1 Boston KPro

## Boston K Pro Melt: (Continued)

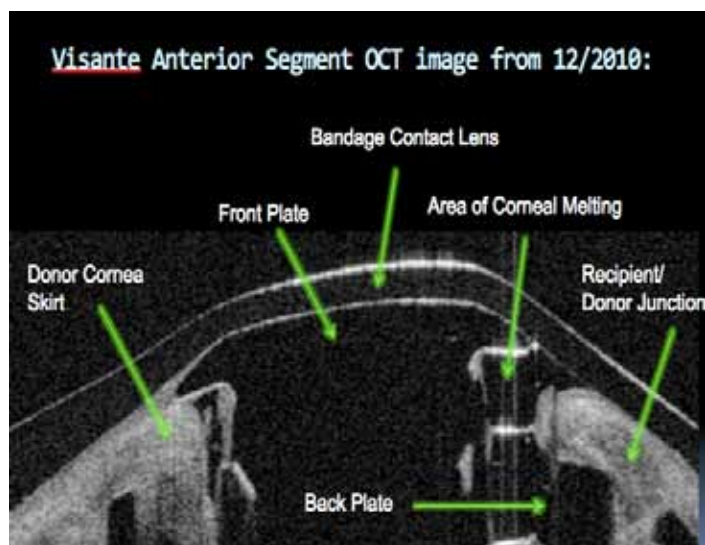


FIGURE 2

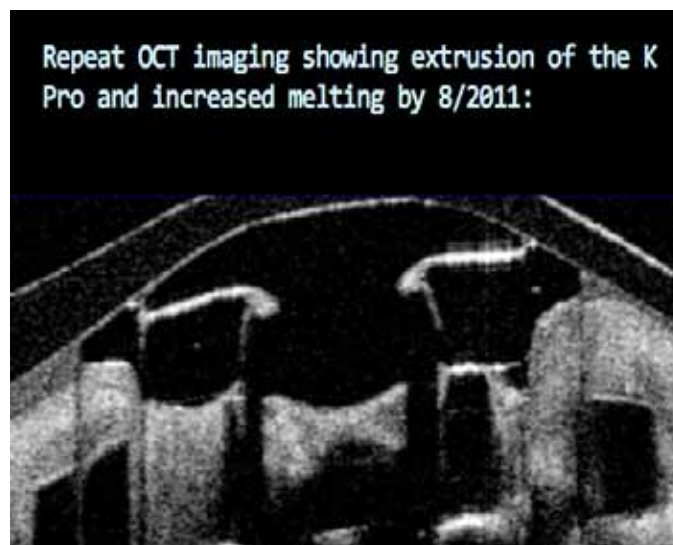


FIGURE 3

By July of 2011, the patient's visual acuity was still at the 20/40 level. For increased intraocular pressure, he was started on Xalatan. At this time, there was noted to be conjunctival ingrowth at the area of melting, and the K Pro was found to be slowly extruding from the cornea. He was recommended to have a second K Pro, and underwent a second penetrating keratoplasty with placement of a new K Pro in August of 2011. For elevated pressure post operatively, he was then scheduled for a tube implant with pars plana vitrectomy.

**DISCUSSION** One notable element in this case is that the patient had difficulty with keeping bandage contact lenses in place in the left eye. This was likely due to his floppy eyelid syndrome and use of CPAP at night that likely contributed to dry eyes. Issues with contact lenses have been shown to markedly increase risk for corneal melting.<sup>2</sup> This case is also notable for the development of multiple retro-prosthetic membranes (often by epithelial downgrowth), which contributes to corneal melting by impeding the nutrition and contact of the aqueous humor with the posterior surface of the corneal graft. The reduction in nutrients leads to stromal degradation and ultimately can lead to corneal melting. In this case, anterior segment OCT imaging was used to monitor the progression of melting. This is a non-contact imaging modality, which can be done with the contact lens in place, which provided information about corneal thinning at the edge of the K Pro, thus indicating the presence of stromal tissue degradation (melting).

### References:

1. Thomas, J. "Advanced surgical techniques enhance use of keratoprosthesis", Ocular Surgery News U.S. Edition, 9/26/2011. <http://www.osnsupersite.com/view.aspx?rid=26287>
2. Trucian Ostheimer, Joelle A. Hallak, Jose de la Cruz, M. Soledad Cortina, "Corneal Graft Thinning in Boston Type 1 Keratoprosthesis Patients". University of Illinois Eye and Ear Infirmary, Chicago, IL
3. Caporossi A, Mazzotta C, Balestrazzi A, Occhini R, Toti P, Traversi C. Histopathology of explanted AlphaCor due to keratoprosthesis extrusion. Clin Experiment Ophthalmol. 2006 Jul;34(5):457-9.
4. Greiner MA, Li JY, Mannis MJ. Longer-term vision outcomes and complications with the Boston type 1 keratoprosthesis at the University of California, Davis. Ophthalmology. 2011 Aug;118(8):1543-50.
5. Kirkham SM, Dangel ME. The keratoprosthesis: improved biocompatibility through design and surface modification. Ophthalmic Surg. 1991 Aug;22(8):455-61.

## Iris capture within Boston K-Pro: Sara Huh, MD (Resident)



Patient RM, an African American male who sustained bilateral alkali burn injury in 1992, who had undergone kerato-limbal allograft and penetrating keratoplasty in the right eye in 1994, with subsequent rejection, presented to the Illinois Eye and Ear Infirmary in November of 2004. He then underwent Boston keratoprosthesis I of the right eye in December 2006 and multiple lid surgeries including bilateral lid repair in June of 2008. His past ocular history includes steroid response, aphakia in the right eye, pseudophakia in the left eye, blepharitis, and dry eyes. He was on prednisolone acetate, zymar, vancomycin, artificial tears in the right eye and oral doxycycline. His past medical history includes hypertension and stroke.

He underwent Boston Keratoprosthesis I in the left eye in September of 2009 with his visual acuity improving to 20/40 6 days after surgery. Patient was doing well post-operatively until he was noted to have iris obstructing the K-Pro optic in December 2009.

This is the anterior segment OCT of the right eye performed in February 2011. As labeled in Figure 1, the bandage contact lens is seen superiorly, and then the cornea with the K-pro front plate, the back plate, optic and iris. The anterior chamber depth is measured at 2mm and the space between the iris and the back plate is measured at 0.85 mm. In a normal adult emmetropic eye, the anterior chamber is approximately 3mm deep at its center. This aphakic eye has an anterior chamber depth of 2mm indicating a shallower than normal chamber.

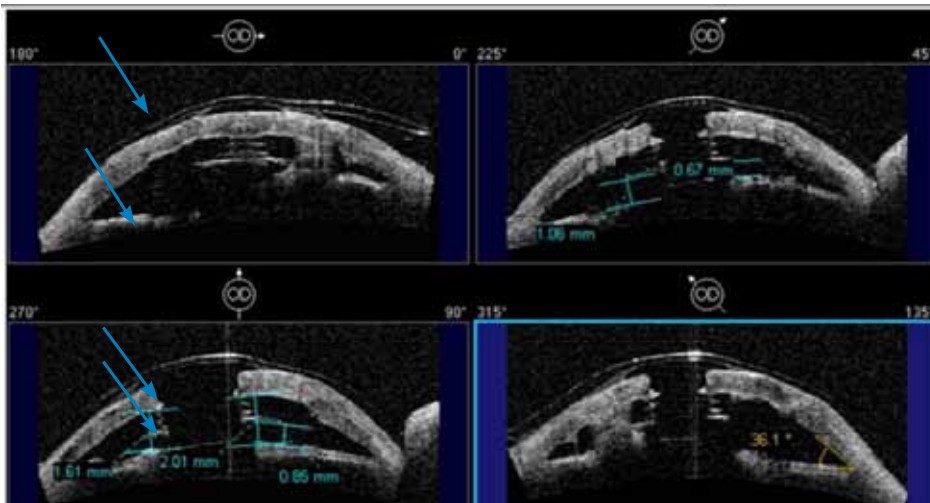


FIGURE 1 Anterior segment OCT of the right eye.

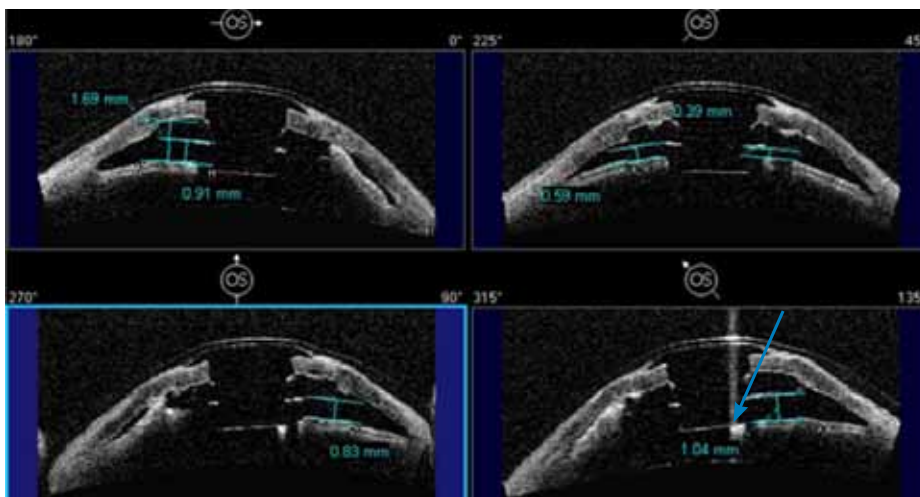


FIGURE 2 Anterior segment OCT of the left eye revealing iris adherent to the K-pro back plate.

The anterior segment OCT of the left eye (Figure 2) shows similarly a shallow chamber of 1.69mm with the space between the back plate and iris at less than a millimeter. The iris is attached to the back plate and also extends beyond the titanium ring into the optic.

## Iris capture within Boston K-Pro: (continued)

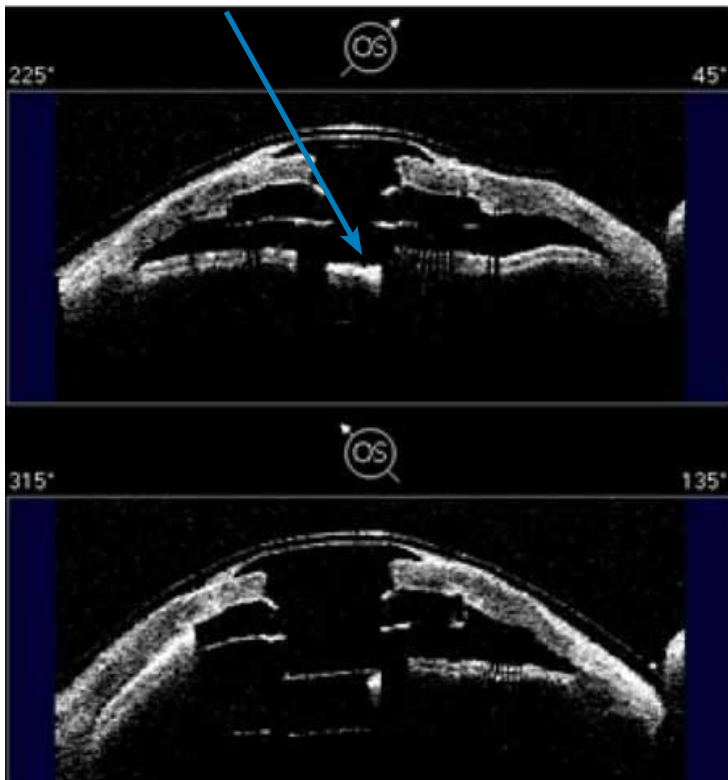
Patient was seen in September and was found to have iris enstroaching on the visual axis in the left eye and the patient was referred the Glaucoma Service, who performed argon laser iridoplasty.



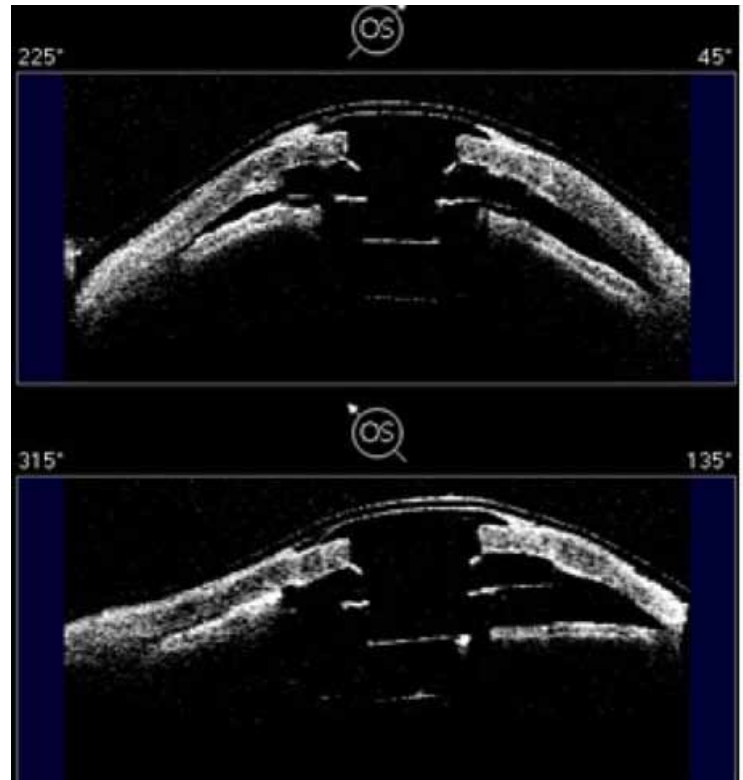
**FIGURE 3**  
Pre-operative photo showing perforation of second corneal patch graft in April, just prior to third cornea patch graft placement



**FIGURE 4**  
Slit lamp photo after iridoplasty



**FIGURE 5**  
Anterior segment OCT before iridoplasty revealing iris obscuring the visual axis (arrow).



**FIGURE 6**  
Anterior segment OCT after iridoplasty with clearance of iris tissue from the optic.

## UPCOMING CME COURSES

March 17-23, 2012	5th Annual Illinois Eye Review
March 30, 2012	Retina Symposium
May 16, 2012	2012 Glaucoma Symposium
June 29, 2012	36th Annual Alumni Resident Day
September 14, 2012	2012 Oculoplastics Symposium

## Upcoming Grand Rounds

Illinois Eye and Ear Infirmary Ophthalmology Grand Rounds are held Wednesdays at 5:00 pm on the UIC campus at 909 S. Wolcott in the College of Medicine Research Building. For a complete schedule go to [www.uic.edu/com/eye](http://www.uic.edu/com/eye) and click on Grand Rounds under the Education drop down menu. Or, call 312-996-6590.