



Boston Keratoprosthesis Type I complicated by exposure secondary to Grave’s Ophthalmopathy

Jordan Davidner O.D.¹, Amy Watts O.D., FAAO²

¹Massachusetts Eye & Ear Infirmary, ²New England College of Optometry, Boston, MA



Massachusetts
Eye and Ear

Harvard
Medical
School

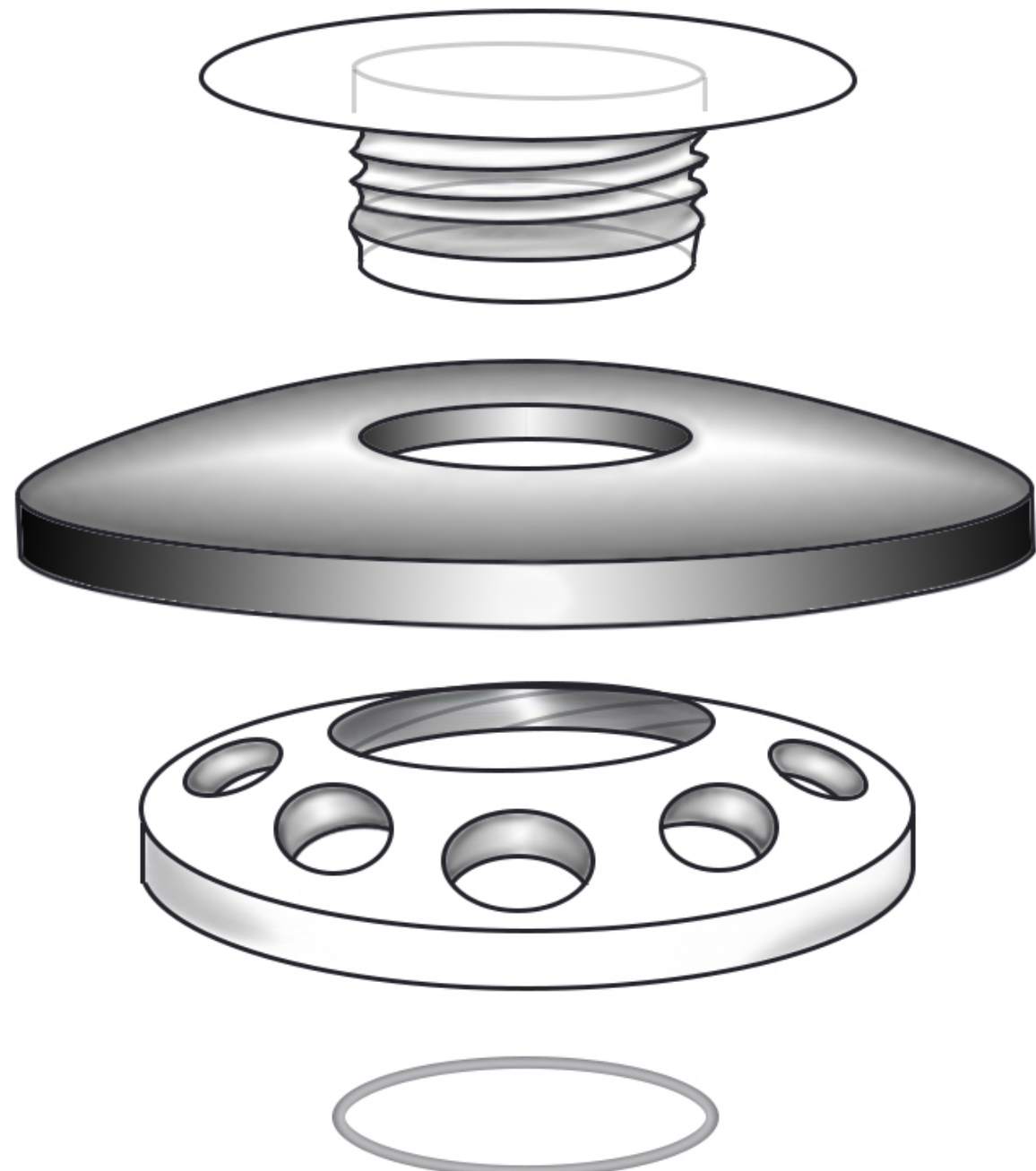


Introduction

The Boston Keratoprosthesis Type 1 was initially introduced in 1974 by Dohlman et al. Since its FDA approval in 1992, it has been used as a full thickness corneal transplant in patients with multiple failed PKP and severe ocular surface disease secondary to SJS, OCP, aniridia, or chemical injury. The design of KPro Type 1 consists of a central PMMA optic/front plate connecting to a back plate. In between lies the donor corneal graft. The entire device is locked together with a titanium ring. The total length of the device is 3.7 mm, allowing for 60 degrees of visual field and is sutured into the recipient eye, similar to a PKP. Due to the irregular shape and material of the device, the donor graft is susceptible to desiccation, epithelial defect, thinning, and infection. A high Dk soft contact is used as a bandage over the device. Patients are put on long-term prednisolone acetate and vancomycin drops to prevent rejection and endophthalmitis, respectively. All of these patients require frequent follow up due to severe complications from the procedure, including, retinal detachment, RPM, infection, extrusion, and glaucoma.

History

Demographics	73 yo Caucasian Female
Chief complaint	Progressively worsening vision OD beginning 5 days post-op for Boston Kpro I (7/28/17). Patient presented to the MEEI Cornea clinic on 9/11/17.
History of Present Illness	<p>This patient has a longstanding history of Graves ophthalmopathy with progressive proptosis and exposure keratopathy. She presents with lateral tarsorrhaphy OU. She is reports having difficulty keeping her bandage contact lens in her right eye.</p> <p>Previously, the patient had been in so much pain OD that she had presented to her local ophthalmologist two Saturdays in a row and was ultimately given Oxycodone.</p> <p>The patient is s/p KPRO I OD 7/28/17 performed in CT. She has a h/o CME OD. She denies ever having a previous PKP OD.</p> <p>Ocular Medications: Genteal OU QID Durezol OD QID Ofloxacin OD TID-QID Genteal gel OD qhs</p>
Patient Medical History	Hyperlipidemia, Grave’s Disease S/p RAI 1994 S/p thyroidectomy 1994
Social History	Former Smoker (quit in 2000), denies alcohol or drug use
Patient Ocular History	S/p orbital decompression OD 2014 S/p lateral tarsorrhaphy OU 2015 S/p CE/PCIOL OU 2016
Family Medical History	Unknown



Above: Boston Keratoprosthesis Type I design

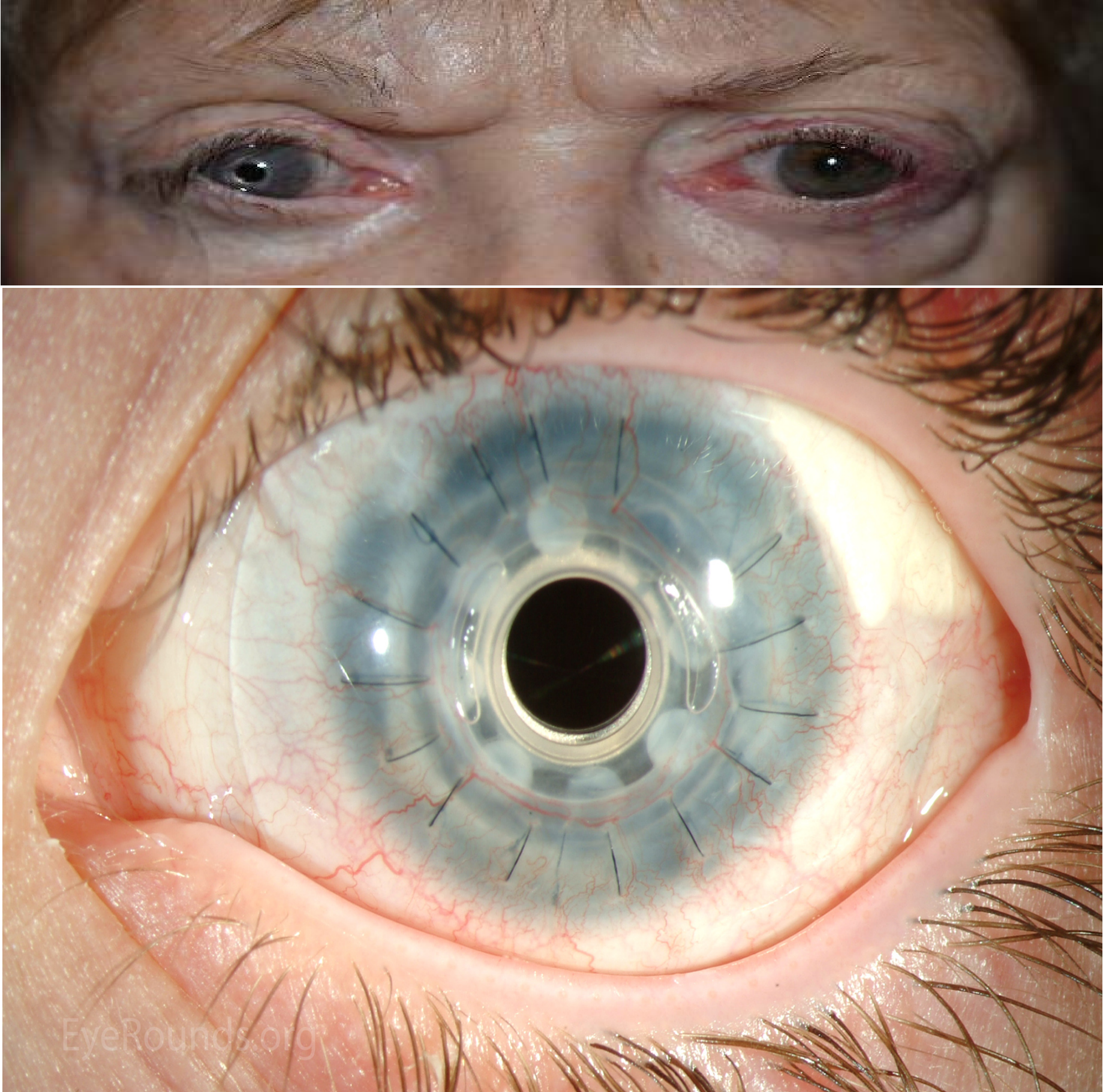
Exam

	OD	OS
Distance VA(sc)	20/500, PH 20/200	20/40, PH 20/20
Pupils	KPro	Reactive, (-)APD
EOMs	SAFE	SAFE
Visual Fields	FCF	FCF
IOP	10 (palpation)	11 (tonopen)
External evaluation	Proptosis	Proptosis
Anterior segment evaluation	Lateral tarsorrhaphy, 3 mm lagophthalmos nasal, trichiasis, Kpro I with 360 ring infiltrate, inflammatory membrane on posterior optic with additional membrans in AC, 1+ cell	Lateral tarsorrhaphy, 3 mm lagophthalmos nasal, trichiasis, large area of epitheliopathy and haze inferior ½ of cornea, PCIOL
Posterior segment evaluation	Hazy view with questionable blurred disc margins	Hazy view with normal disc margins

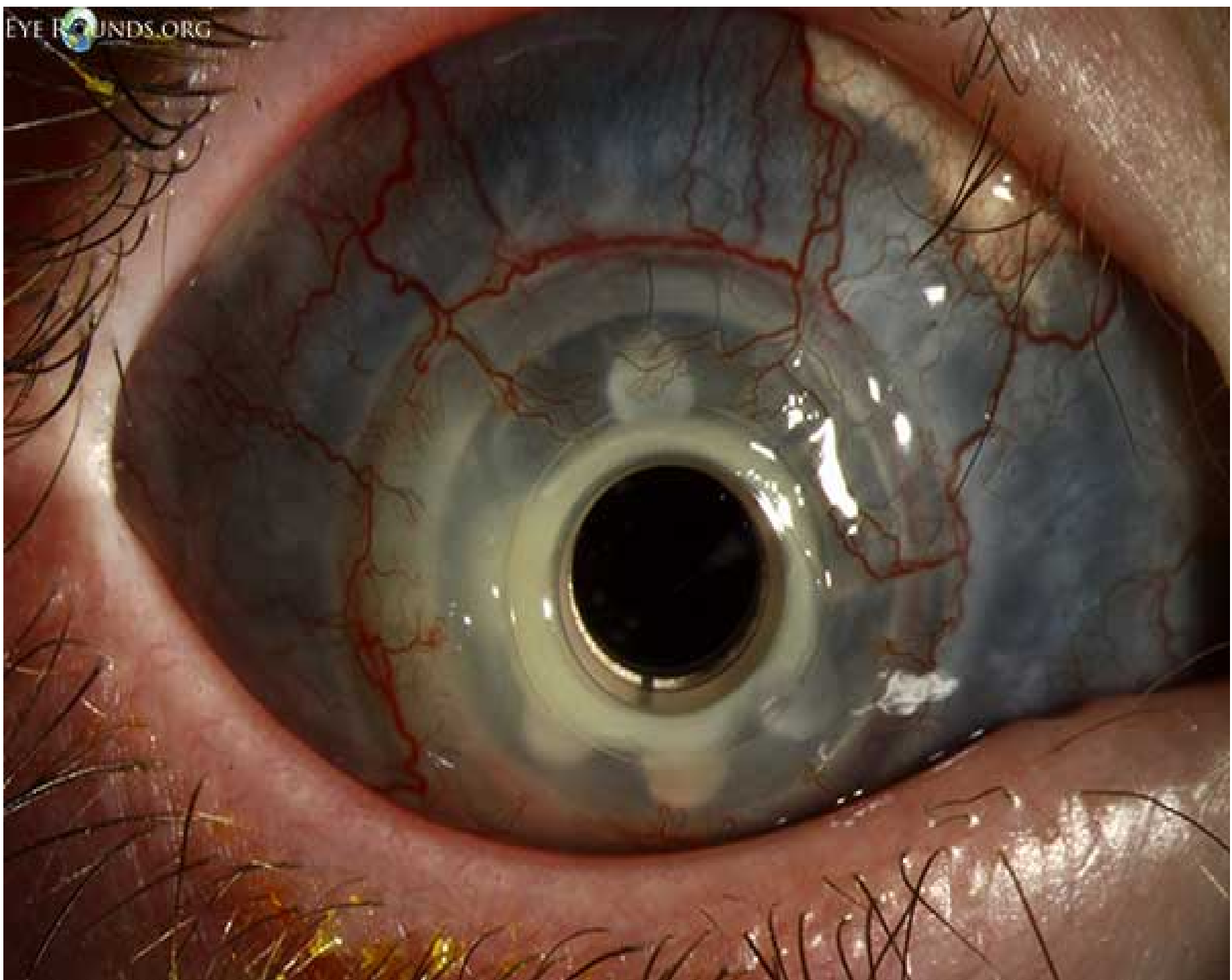
Differential Diagnoses

Bacterial keratitis
Fungal keratitis
Endophthalmitis
Retroprosthetic membrane

Below: External photograph of our patient demonstrating KPro I OD, lateral tarsorrhaphy OU, and trichiasis OU



Above: Photo of a normal post-operative Boston Kpro I

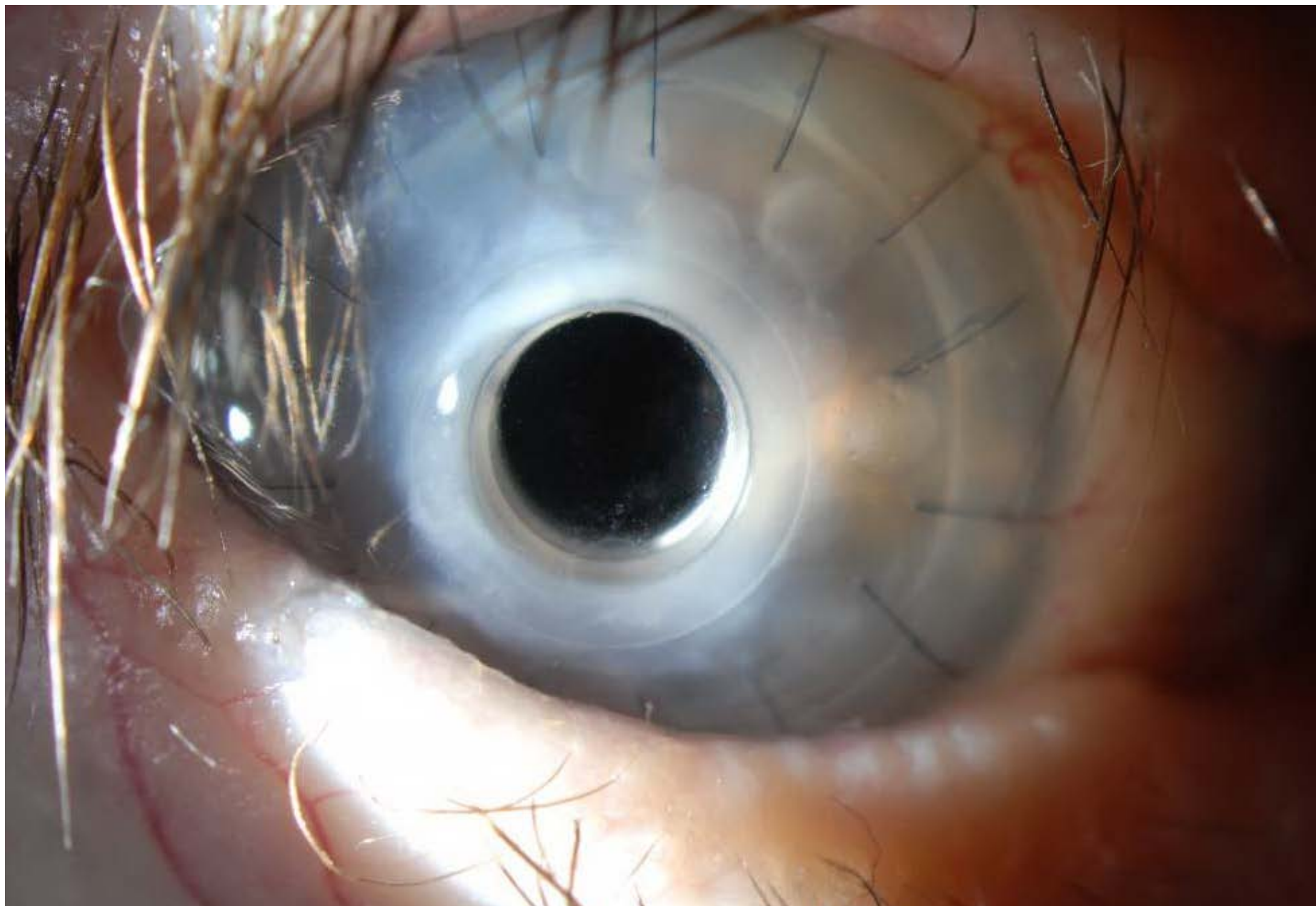


Above: Microbial infection with 360 degree ring infiltrate around stem

Additional Studies

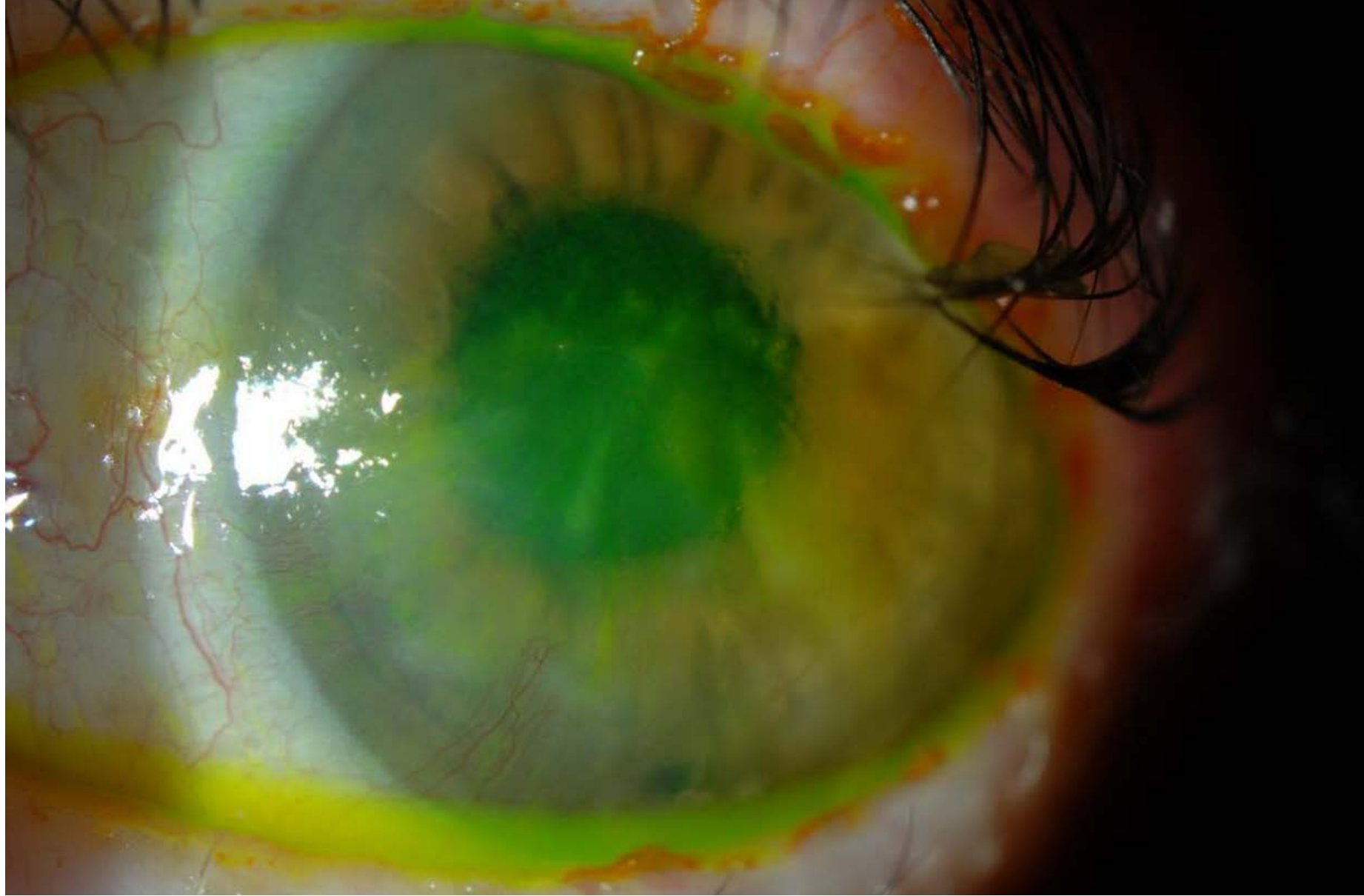
Cultures (9/11/17)	Positive for Methicillin Resistant Staph Aureus
CT Orbit	Status post partial resection of the medial wall and floor of the right orbit as well as a prior right lateral orbitotomy with left right-sided proptosis compared to the left. Low density in the inferior rectus muscle is also compatible with thyroid eye disease.
Last known TFTs (3/12/17)	TSH: .06 Free T3: 3.1

Below: Slit lamp photo of the right eye showing KPro with 360 degree ring infiltrate, lateral tarsorrhaphy, lid inflammation, trichiasis



Above: Coronal CT orbit demonstrating evidence of prior orbital decompression OD

Below: Slit lamp photo of the patient’s left eye demonstrating diffuse epitheliopathy secondary to trichiasis, exposure, and meibomian gland dysfunction



Assessment

OD: exposure keratopathy secondary to proptosis, lagophthalmos, and trichiasis; not corrected by lateral tarsorrhaphy. Inability to keep bandage CL is contributing to above findings.
KPro I with likely microbial infection at stem
OS: Exposure keratopathy secondary to proptosis, lagophthalmos and trichiasis; not corrected by lateral tarsorrhaphy



Above: External photograph showing significant lagophthalmos OU. This photo further illustrates the importance of bandage contact lens in the setting of KPro in patient at risk for exposure

Treatment

Cultures obtained in office
Refer to Oculoplastics for tarsorrhaphy revision and electroepilation
Fortified Vancomycin q1h
Fortified Tobramycin q1h
Consider fortified antifungals pending cultures

Conclusion

This case demonstrates a patient with a complex ocular history who was treated with a Boston Keratoprosthesis Type I for an unconventional diagnosis. Typically this procedure is designated as a last resort effort to restore/maintain vision in patients with multiple failed PKP or severe ocular surface disease from SJS, OCP, chemical injury, or aniridia. This patient had a history of several ocular findings that predispose her to complications with a KPro. It is not common practice to treat exposure keratopathy from uncontrolled exophthalmos with a KPro. It is unusual that the patient’s underlying proptosis was not managed as the primary cause of her corneal disease. The patient’s previous history of lateral tarsorrhaphy presented an issue with keeping the bandage CL in place. This is a significant problem with KPro I as the graft is nearly guaranteed to have complications due to desiccation and exposure. The cultures that were attained on initial presentation came back positive for Methicillin Resistant Staph Aureus. The patient was continued on fortified antibiotics until follow up. She was also seen by oculoplastics and is scheduled to have LLL and LUL recession with posterior spacer graft from the upper lid tarsus. There are several factors contributing to this complicated clinical picture, which highlight the necessity for a multi disciplinary treatment approach. The Boston Keratoprosthesis Type 1 can be an effective way to preserve vision in complex corneal disease when appropriately indicated.