Corneo-scleral lens fit on post-graft rejection eye  
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Abstract  
52 year old male with keratoconus in the right eye and penetrating keratoplasty (PK) in the left eye, wearing corneal and corneoscleral gas permeable lenses respectively presents with graft rejection midway through fitting process.

I. Case History  
Patient demographics:  
- 52 year old Caucasian male  
Chief complaint (CC): Mild blurry vision with current corneal (OD) and corneoscleral (OS) gas permeable (GP) lenses.  
Ocular history:  
- Keratoconus OD  
- PK OS (2003) secondary to keratoconus  
Contact lens history:  
- 2007-2009: Corneal GP OU  
- 2009-2011: Corneal GP OD, Piggyback system OS  
- 2011-present: Corneal GP OD, Corneoscleral GP (Perimeter) OS  
Medical history:  
- Hypertension, hypercholesterolemia  
Medications:  
- HCTZ, Simvastatin, Baby aspirin  
- Lotemax 1 gtt OS taken occasionally  
- Post-rejection (March 2014): PredForte 1 gtt OS daily to replace Lotemax  
Other salient information:  
- Patient has had two graft rejections in the past; the most recent one prior to comprehensive exam was in November 2008.  
- Patient’s last visit to his corneal surgeon was a “few years ago”

II. Pertinent findings  
Comprehensive examination (October 9, 2013):  
Corneal findings:  
OD: Fleishers ring, stromal thinning  
OS: Endothelial striae and stromal scarring superior and inferior to visual axis.  
Neovascularization at 1 o’clock, 6 o’clock, and 8 o’clock extending into graft (~0.5mm)  
-IOP: 14 mmHg OD, 16 mmHg OS  
-Posterior segment: Unremarkable OU  
Corneal GP (OD):  
Fit: Lid attached with mild central clearance, good peripheral alignment and movement  
Vision: 20/20-2  
No adjustments necessary  
Perimeter Lens (OS):  
Fit: Lens clears graft, but nasal and temporal bearing on host cornea  
Vision: 20/60+2  
Over-refraction: +1.50 DS, achieves 20/30-2  
Modification: Incorporate over refraction and steepen peripheral curves to reduce bearing
<table>
<thead>
<tr>
<th>Follow-up Date(s)</th>
<th>Chief Complaint</th>
<th>Assessment</th>
<th>Plan</th>
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<tbody>
<tr>
<td>10/16/13-1/28/14</td>
<td>OS: Corneoscleral GP follow-up</td>
<td>OS: Persistent bearing of lens on host cornea</td>
<td>Steepen peripheral curves to further improve vault</td>
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<td>2/11/14</td>
<td>OS: Pain and irritation</td>
<td>OS: -Dx: Recurrent corneal erosion -Persistent bearing of lens on host cornea</td>
<td>-Prescribed Muro 128 -Order new lens to increase vault</td>
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<td>3/4/14</td>
<td>OS: Patient reports he had a corneal graft rejection -Corneal specialist began Pred Forte q1hr and tapered -Currently taking Pred Forte daily</td>
<td>OS: Microcystic edema at 6 o’clock extending into graft</td>
<td>Dispensed new lens, encouraged patient to decrease wear time.</td>
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<td>3/11/14</td>
<td>OS: Patient notes decreased acuity with Perimeter lens</td>
<td>OS: -BCVA 20/80, previously correctable to 20/30 -Central corneal haze and edema extending into graft</td>
<td>Recommend decreasing lens wear and encouraged patient to return to corneal specialist to monitor corneal health</td>
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<td>7/1/14</td>
<td>OS: Corneoscleral GP follow-up -post graft rejection</td>
<td>OS: -Mild bearing on host cornea -VA: 20/60 -Over refraction: -1.00DS achieves 20/40+2</td>
<td>Incorporate over-refraction in Perimeter lens</td>
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<tr>
<td>7/14/14-8/18/14</td>
<td>OS: Corneoscleral GP follow up</td>
<td>OS: -Mild bearing on host cornea -Reduced VA correctable with over refraction</td>
<td>Multiple adjustments to lens power and finalized contact lens prescription</td>
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**III. Differential diagnosis**
- Increased IOP
- Endothelial decompensation
- Recurrent herpetic keratitis
- Uveitis
IV. Diagnosis and discussion

- Diagnosis of corneal graft rejection was supported by the presence of corneal edema and decreased acuity perpetuated by over wear of corneoscleral contact lens.
- In one study, found similar incidence of graft rejection in non-contact lens wearers and scleral lens wearers (~30%).

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<tr>
<th>Graft rejection (three types)</th>
<th>Signs:</th>
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<td>Epithelial</td>
<td>The eye is generally asymptomatic or mildly inflamed. Presence of an epithelial rejection line, which typically arises from a vascularized margin of the graft and stains with fluorescein or Rose Bengal. Average onset is 3 months after transplantation.</td>
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<tr>
<td>Subepithelial infiltrates</td>
<td>Diffusely distributed throughout the graft, sparing the host tissue. Average onset is 10 months after transplantation.</td>
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<td>Endothelial</td>
<td>Most symptomatic and devastating type of corneal graft rejection. Characterized by endothelial rejection line, conjunctival hyperemia, anterior chamber reaction, keratic precipitates, and graft edema.</td>
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-Graft rejection symptoms: redness, light sensitivity, decreased vision, pain

- Risk factors:
  - The primary risk factor is neovascularization in the host and/or donor cornea. Other risks include younger age of recipient, large graft diameter, and mismatch of ABO blood type.
  - Other donor factors such as death to preservation time, age of donor, or method of corneal storage has not been shown to have a significant effect on occurrence of a graft reaction.
  - High risk grafts: previous graft failure, previous keratitis, current keratitis, or vascularization into the recipient bed

- Dk/t value of at least 20 is the central cornea threshold and 33 for the peripheral cornea for alleviating hypoxia-induced swelling. Most scleral lenses (factoring in tear lens transmissibility) do not meet Dk/t requirements to prevent hypoxia-induced swelling.

V. Treatment

- Topical steroids
  - If severe, subconjunctival steroid injections or systemic steroids
- Topical or systemic Cyclosporine A
  - Suppresses cell-mediated immune response for severe cases
- Repeat PK in cases of graft failure
VI. Conclusion

Contact lens fitting considerations for PK patients:
- Hyper DK material (>100 Dk/t)- ie Boston XO2, Menicon Z
  - Keep in mind lens flexure with high Dk material
- Minimize contact lens and tear layer thicknesses
  - Recommended maximum contact lens central thickness: 250 μm
  - Recommended maximum tear layer thickness: 200 μm
  - Fit a smaller diameter lens
- Recommend a shorter wear time
- Requires more regular follow ups to monitor fit and corneal health

References

