Post-Surgical Contact Lens Fitting and Management

Instructors
Rutvi Doshi, OD, FAAO
The University of Chicago | Department of Ophthalmology | Rdoshi@bsd.uchicago.edu

Ellen Shorter, OD, FAAO
The University of Illinois at Chicago | Department of Ophthalmology | Eshorter@uic.edu

Objectives
1. Update on current literature in the treatment and management of corneal disease.
2. How to select appropriate contact lens design options, fitting techniques and recommended follow-up schedule.

Outline
Corneal Collagen crosslinking
Intrastromal Corneal Ring Implants
Refractive Surgery
- LASIK
- RK
Keratoplasty
- PK
- DALK
- Boston Kpro type I
Cataract surgery
- Toric IOL
- Dislocated/tilted IOL
Trauma/Open Globe Repair

Corneal Collagen Crosslinking
FDA approved Medical procedure that combines the use of (UV) light and riboflavin (vitamin B2) drops
The absorption of UVA by riboflavin generates radical riboflavin and singlet oxygen to form cross-links
Cross-linking
- Results in a shortening and thickening of the collagen fibrils
- Leads to the stiffening of the cornea

Patient selection
- Progressive KCN and postoperative ectasia
  - Definition of progression: change in at least 2 of the following:
    - Steepening of the anterior corneal surface: >1D in Kmax or Kavg
    - Steepening of the posterior corneal surface
    - Thinning and/or an increase in the rate of the corneal thickness change from the periphery to the thinnest point
- Age 14 years or older
- None to minimal central scarring
- Pachymetry: Minimal stromal thickness of 400um

Contraindications
- Hx of Herpetic keratitis, significant corneal scarring, neurotrophic keratopathy, auto-immune disorders, pregnancy, and severe dry eyes

Manage expectations
Timing of CL evaluation
Case Report: Patient AP
**Intacs®/Intrastromal Corneal Ring Segments**

Originally indicated for myopia
made of polymethyl methacrylate (PMMA) implanted deep in corneal stromal to decrease corneal curvature
- Patient selection criteria
- Combined Intracorneal Ring Implantation and Corneal Collagen Cross-Linking in KC
- Meta-analysis of 17 studies assessed qualitatively

Patient LF h/o KC
CL fitting can be challenging
- Patient motivation- had surgery to decrease dependency on CL
- New corneal shape can make corneal gas permeable fit difficult
- Can consider scleral lenses

**Refractive Surgeries and co-management**

**Post-LASIK and Post-LASIK Ectasia**
Visual complaints after LASIK
Keratometric steepening with topographic asymmetric inferior corneal steepening
Can occur early or years later
Rare
Ectasia Risk Factors
ERSS (Ectasia Risk Score Score)
1. Abnormal pre-op topo
2. Residual stromal bed (RSB) thickness
3. Young age
4. Low pre-op corneal thickness
5. High myopia

Treatment
Post-LASIK fitting considerations
- Patient satisfaction
- Lens options- 8-12 weeks after
- Post-LASIK Higher Order Aberrations

**Radial keratotomy**
- Goal to flatten the cornea and reduce refractive error
- Optical zone size (3-4.5mm), depth of incisions, and number of incisions predict surgical results

Case 1: Patient JM

**Keratoconus: Penetrating keratoplasty vs DALK**

**PK: Penetrating Keratoplasty**
- Full-thickness corneal graft
- 18% of full-thickness grafts fail within 10 years due to endothelial rejection and chronic endothelial cell loss.

**DALK: Deep anterior lamellar keratoplasty**
- Procedure for removing the corneal stroma down to the Descemet’s membrane.
- Shorter healing time (4 months vs 12 months)
- Decreased risk of rejection/Decreased steroid risk of 2’ glaucoma
- Host endothelium is preserved
- Replacement of the anterior cornea to Descemet’s membrane. Keane et al. reports higher graft survival and visual outcome in DALK vs. PK

Refractive status after corneal transplantation depends on various factors, including recipient pathology, donor–recipient disparity, donor graft size, vitreous length, and suture tensions.
• DALK technique and complications

Complications:
- Tears and perforation of the Descemet’s membrane (10-30% of cases)
- Angle closure
- Urrets Zavalia syndrome: fixed dilated pupil ensures secondary to iris ischemia

Post PK Fitting
- Consider the diameter of the graft zone, the topographical relationship between the host cornea and donor cornea, the corneal (graft) toricity and the location of the graft.
- Start simple but consider special designs if needed
- Larger diameter corneal gas permeable lenses
- Reverse geometry lenses
- Piggyback systems
- Scleral lenses
- Maximize dK

Patient MR
Boston Keratoprosthesis Type 1
Long-term use of therapeutic soft CL protects ocular surface from evaporation
- Epithelial defects
- Stromal thinning
- Dellen formation
- Corneal melt

Avg. length of lens retention 4.7 months
Chronic inflammation increased risk of tissue necrosis, melting, leakage, and infection
39% lost lens between visits

Improving lens retention
- Increase sagittal depth
- Decrease BC
- Increase diameter
- Change brand/lens design
- Eyelid surgery
- Lateral tarsorrhaphy
- Combination medial/lateral tarsorrhaphy

Patient HW
Kpro- Fitting Pearls
• BCL loss is common
  – Refit steeper BC/larger OAD
• Secondary glaucoma is common
  – Watch for tube erosion
  – Pars plana insertion preferred
• Consider prosthetic options
  – Decrease glare
  – Improve cosmesis
• Don’t forget hybrids
  – Improve retention
  – Eliminate central deposits
Cataract Surgery - special considerations
Do not recommend toric IOL’s in patients with keratoconus or irregular corneal astigmatism
  – If residual astigmatism, avoid spherical corneal gas permeable CL
    • Soft toric
    • Front toric gas permeable lenses
    • Difficult refraction
      – Rule out dislocated/tilted IOL

History of trauma/open globe repair
Ocular trauma accounts for about 1/3 of all eye related ED visits each year.
3.8 per 100,000 Americans present for open globe injury annually
CL evaluation
  – Anisometropia
  – Aphakia
  – Aniridia
  – Corneal lacerations

Case LS
Post-trauma CL considerations
  • Aphakia
    – Larger diameter corneal gas permeable lenses
  • Piggyback systems
    – Can be used for corneal irregularity
    – RGP lenses can help mask large corneal irregularities
    – However, if patient discomfort or epithelial disruption with RGP, can piggyback RGP on top of soft contact lens
    – Potential concern for decreased oxygen transmissibility to cornea
  • Aniridia
    – Iris occlude lenses or hand-painted prosthetic lenses
  • Take photos in natural lighting
  • Options clear pupil vs black occluder for severely disfigured eyes
  • Easier to match with darker irides

Conclusion
Questions?
Thank you for your time!
References: provided on ppt or available upon request
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