OD Crossfire: Postoperative Management

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• Dr. Mangan has received consulting fees, honorarium or research funding from:
  – Allergan
  – Alcon
  – Alcon Surgical
  – Ista Pharmaceuticals
  – Biotissue

Professional Disclosures

• Dr. Whitley has received consulting fees, honorarium or research funding from:
  Alcon, Allergan, Bausch and Lomb,
  Biotissue, Beaver-Visitec, Nicox, Science Based Health, TearLab, Tearscience,
  Valeant Ophthalmics
Rules for OD Crossfire

• 1st RULE: You do not talk about OD Crossfire.
• 2nd RULE: You DO NOT talk about OD Crossfire.
• 3rd RULE: If someone says "stop" or goes limp, taps out the topic is over.
• 4th RULE: Only two guys to a topic.
• 5th RULE: One topic at a time.
• 6th RULE: No shirts, no shoes.
• 7th RULE: Topics will go on as long as they have to.
• 8th RULE: If this is your first time at OD Crossfire, you have to participate in the polls.

FEMTO VS. STANDARD

Today’s Optometrists

“To be on the cutting edge of optometry, you need to be on the cutting edge of science and technology.”
Laser Refractive Cataract Surgery

Will the femtosecond laser:

- Incite new interest among patients for an elective refractive cataract surgery procedure?
- Improve patient outcomes and safety?
- Increase the VALUE of Refractive Cataract Surgery?

High Patient Expectations in Cataract Refractive Surgery

- Patient expectations are at an all-time high for refractive surgery
- Positive experiences with LASIK have produced high expectations, at a minimum achieving:
  - 92.6% of LASIK patients with vision of 20/40 or better*
  - 95.4% of patients satisfied with their outcome after LASIK surgery**
- Cataract surgery outcomes may not be meeting the target of ±0.5D that is considered the standard

Improved Refractive Cataract Surgery

IOL Position Predictability
- Uniform Shape and Size Capsulotomy

Corneal Astigmatism
- Reproducible Corneal Entry and Arcuate Incisions

Early Wow Factor
- Reduced Phaco Power and Corneal Edema
### Who Is a Good Candidate for Femto/Phaco?
- >0.50 D of astigmatism
- Advanced technology IOL candidates
- Pupil considerations
- Previous refractive surgery
- Ocular pathology considerations

### Future Applications of Femtosecond Technology
- Presbyopia correction
- Corneal crosslinking
- Myopia correction
- Bleaching of crystalline lens

### PREMIUM IOLS – ARE THEY WORTH THE COST?
Advanced Technology: The Players

"The Pipeline": Future IOLs

• Akkommodative 1CU (Human Optics)
• Tetraflex IOL (Lenstar)
• Sarfarazi Elliptical IOL (B&L)
• Synchrony (Vistagen)
• FlexOptic Lens (Quest Vision Technologies)
• NuLens (NuLens)
• FluidVision IOL (PowerVision)
• LiquiLens (Vision Solutions)
• SmartIOL (Medenium)
• Light Adjustable Lens (Calhoun Vision)

Why Become Involved?

• 3 million cataract surgeries each year¹

• By 2020 the U.S. population over 65 will double from current levels — 12.9% of total population

• CMS allows ODs/MDs to bill for non-covered services

• Tangible vs. Intangible benefits

¹. http://www.allaboutvision.com/conditions/cataracts.htm
Basic Marketing Concepts

• Needs / Wants / Demands are underlying concepts of marketing
  – Needs are basic requirements of human beings
  – Wants are the form human needs take as they are shaped by culture and individual personality
  – Demand is want backed by buying power

• Patients need to see, want freedom from glasses, and have the means to invest in technology

The Baby Boomers

• Baby Boomers represent the generation with the greatest buying power in the history of our country

• Account for a dramatic 40% of total consumer demand – even in a recession

• Find a way to appeal to us through our desire to stay young, act young, think young and feel young

• Have more discretionary income than any other age group

• Watch TV / read newspapers more than any other age group

Vision After Cataract or Refractive Surgery in the Presbyopic Patient

• Improve the quality of life of our cataract patients by increasing their spectacle freedom through providing a quality range of vision
  1. Monofocal at distance (near glasses)
  2. Monofocal at near (distance glasses)
  3. Monovision (successful with contacts)
  4. Astigmatic Correcting IOL
  5. Presbyopia Correcting IOL
Who Are Good Multifocal Candidates?

- Visual and functional need for cataract surgery
- Motivated not to wear glasses
- Younger or Young at Heart patients
- Active lifestyle
- Qualify for bilateral implants
- Realistic expectations

Realistic Expectations

Who Are Good Multifocal Candidates?

Careful Consideration

- Previous refractive surgery
- Previous cataract surgery with a monofocal IOL
- Patients with >2.00D of astigmatism
Refractive Surgery Considerations

• Up to 15% may need refinement
  – Overcorrection
  – Undercorrection
  – Astigmatism
• What options are available?
  – LASIK
  – PRK
  – LRI
• Would they qualify?
  – Topography
  – Pachymetry

Who Are NOT Good Candidates for Multifocal IOLs?

• Those who want to wear glasses
• Poor “general alertness”
• Occupational night drivers
• High astigmatism*
• Poor candidates for refinement
• Unrealistic expectations
• Ocular pathology

* Relative Contraindications

Multifocal IOLs are Not for Everyone!

• When a measurement is taken, not only the auto-refraction, keratometry, pupillometry, corneal topography and wavefront aberrometry are taken.
• There is a wonderful piece of critical data we must not overlook for our multifocal patients…
  – The Angle Kappa!
• Why is it important?
Pupil Considerations

- **Small**
  - ReSTOR
  - ReZoom

- **Medium**
  - Most IOLs fine

- **Large**
  - ReZoom - greater halos
  - ReSTOR - minimizes halos at night

- **Pupil Independent**
  - Tecnis MF
  - Crystalens

Ocular Pathology

IOL Choices in Glaucoma

“Yes – I would like to be free from glasses!”

STANDARD

TORIC

MULTIFOCAL
Dry Eye Prevalence in Patients Scheduled for Cataract Surgery

- Study Design: Prospective, multicenter, observational, pilot study (N=143) of which 136 met the inclusion criteria at 9 sites across the United States to determine the incidence and severity of Dry Eye Disease in consecutive patients 55 and older scheduled for cataract surgery (68 male and 68 female patients)

- Study Visit: Screening prior to cataract surgery

- Primary outcome measure: Incidence of Dry Eye as evaluated by grade on International Task Force (ITF) level

- Secondary outcome measures: TBUT, corneal staining with fluorescein, and conjunctival staining with lissamine


Patient Selection Pearls

- Motivated

- Healthy ocular system

- Realistic expectations
  - Multifocals do not fix crazy patients
  - If you suggest a multifocal for a perfectionist, don’t be surprised when they demand perfection

Monovision vs. Multifocal IOL's

Poll the audience

What provides more satisfactory glasses-free vision after cataract surgery?

A. Multifocal IOLs
B. Monovision
How Do These Compare?

Multifocal

Efficacy
- Multifocal IOLs provide better near vision (20/19 vs 20/20)
  - Statistically significant but not clinically significant!
- Higher rates of spectacle independence (71.8% vs 25.8%)
- Better stereo acuity (58.88 vs 97.72 seconds of arc)

Multifocal

Preop cataract patient...
happy with monovision in contacts
- Should you “rock the boat”?
  - NO!
- “If it is not broken, don’t fix it” applies here
- BUT...
- Monovision contact lens wearers can be successfully switched to multifocal contact lenses.
- Does this apply to Multifocal IOLs??
Monovision

• 212 bilateral cataract surgery patients randomly assigned:
  • Monovision with the Akreos monofocal aspheric IOL (B&L) with the near eye targeted to -1.25
  • of–
  • Tecnis ZM900 3-piece multifocal

Monovision

• 4 month post-op assessment:
  – Spectacle independence
  – Subjective dysphotopsias
  – Unaided binocular visual acuity at:
    • Distance
    • Intermediate
    • Near
  – Contrast sensitivity
  – Stereoacuity
  – Light scatter
  – Higher Order Aberrations

<table>
<thead>
<tr>
<th></th>
<th>Monovision</th>
<th>Multifocal</th>
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<tbody>
<tr>
<td>Spectacle Independence</td>
<td>36%</td>
<td>71%</td>
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<tr>
<td>Binocular Unaided Distance VA</td>
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<td>Same</td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near</td>
<td></td>
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<tr>
<td>Contrast Sensitivity</td>
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<td>Stereoacuity</td>
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<tr>
<td>Forward Light Scatter and HOAs</td>
<td>Same</td>
<td>Same</td>
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<tr>
<td>Dysphotopsias</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Patient Satisfaction</td>
<td>85%</td>
<td>81%</td>
</tr>
</tbody>
</table>
**Monovision**

- Subjective dysphotopsia questioning revealed that multifocal patients reported far more "annoying" or "debilitating" glare or dazzle than monovision patients (43% vs 18%).
- IOL exchange (ie, multifocal out, monofocal in) was performed in 6 multifocal patients but no monofocal patients.
- The reason for IOL exchange was dissatisfaction with image quality in 5 of the 6 exchanged multifocal patients.

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**Poll the audience**

*What provides more satisfactory glasses-free vision after cataract surgery?*

A. Multifocal IOLs  
B. Monovision

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**Consensus**

- Monovision may attain better:
  - Intermediate UCVA  
  (depending on refractive goals)
- Contrast sensitivity
- Multifocal IOLs may attain better:
  - Spectacle independence
  - Stereoacuity
BRAND VS. GENERIC DROPS

Topical Drug Delivery Considerations


Strategies to Improve Topical Ocular Drug Delivery

1. Minimize precorneal drug loss (increasing contact/residence time)

<table>
<thead>
<tr>
<th>Increase Effective Dose</th>
<th>Molecular Design</th>
<th>Formulation Science</th>
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<tbody>
<tr>
<td>Concentration</td>
<td>Lipophilicity</td>
<td>Viscosity</td>
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<tr>
<td>Frequency of administration</td>
<td>Solubility</td>
<td>Corneal penetration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Residence time</td>
</tr>
</tbody>
</table>

Limitations of Current Suspension Therapies

- Dose-uniformity
  - Flocculation, caking, sedimentation
  - Poor re-dispersibility
  - Improper handling by patients
- Bioavailability
  - Particle size
  - Restriction due to cornea (most do not penetrate cornea well)
  - Rapid removal of drug from absorption site

Formulation of advanced emulsion and gels address these limitations

FDA Requirements

Tight for new branded drugs

- R & D
- Clinical Trials
- FDA Application & Defense
- Sales & Marketing
- Samples

Branded

Less purity in generics

- The inactive (EXCIPIENT) components don’t have to be the same as branded
  - Excipient components => Preservatives, Buffers, pH Adjustors, Antioxidants, Thickening agents, and Tonicity adjusters.
  - May affect tolerability
- Canadian study found differences in drop volume, viscosity, surface tension, and bottle tip opening between Timold maleate & generic versions.

Branded

Less purity in generics

- Suspensions are harder to reproduce!
  - Generic bottle shaken 5X achieved ~10% of the maximum concentration, compared to 47% with the branded version
  - Latanoprost manufactured in India to Xalatan.
  - Active ingredients in generic not as stable when exposed to heat
  - Contaminants found in all imported bottles, including microscopic filaments.

Oversight of manufacturing at non-US-based companies is not equivalent to US regulation.
**GENERIC**

*Some generics are equal*

- European Study – Latanoprost was comparable to ALL assessed time points as Xalatan.
- Some generic medications are manufactured in the same facilities, under the same conditions as branded.

**GENERIC**

*Insurances make branded a hassle*

- John Vukich, MD & Partners switched to generics around cataract surgery. Why?
- Patient complaints about medication expenses
- Insurance companies requiring written justification
- Pharmacy calls to “challenge” brand order:
- Exhausting and time consuming

**GENERIC**

*Vukich et al.*

- Vukich & Partners switched to ofloxacin, prednisolone acetate, and ketorolac.
- They compared the 32 months (Jan 2011 to Aug 2013) of only using these generics with the previous 32 months (Mar 2008 to Dec 2010) of using only branded.
### Generic

**Vukich et al.**

<table>
<thead>
<tr>
<th>Branded</th>
<th>Generic</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 6068 cataract surgeries</td>
<td>- 5,899 cataract surgeries</td>
</tr>
<tr>
<td>- Zero cases of culture positive endophthalmitis</td>
<td>- One case of culture positive endophthalmitis (S. Aureus)</td>
</tr>
<tr>
<td>- Three sterile endophthalmitis cases</td>
<td>- Two sterile endophthalmitis cases</td>
</tr>
</tbody>
</table>

*Cost savings to patient per procedure = $301*

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### Generic

**Cost comparison: branded vs generic**

- 78% of Rx in US are for Generics
- Accounts for 25% of total Rx spending
- Cost of generic generally 80-85% lower than branded
- Can result in $8-10 billion in consumer savings per CBO

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### Generic

**Cost comparison: branded vs generic**

- Insurance Companies
- Tiered formularies
- Lack of access to formularies
- Constant change
- Higher Co-pays
- Deducibles
- Donut holes
Surgical Prophylaxis

- **Antibiotics**
  - One day prior to surgery
  - Fluoroquinolones - gatifloxacin, moxifloxacin, levofloxacin, besifloxacin
- **NSAIDs**
  - One day prior to surgery
  - In high risk patients, 1 week prior to surgery
  - Ketorolac, nepafenac, diclofenac, bromfenac
- **5% Povidone-Iodine**
- **Dilating Agent**
  - Atropine or Tropicamide
Endophthalmitis

- 3-5 days after surgery
- 4+ cell and hypopyon
- Pain
- Eyelid edema
- Decreased vision
- Must see the patient
- Surgical emergency: hours (not days) make a difference

Cystoid Macular Edema

- CME is the most frequent cause of visual decline following uncomplicated cataract surgery
- Late on-set (4 to 6 weeks post-operatively) ¹
- Estimated to occur in 12% of low-risk cataract cases²
- CME development is due in part to prostaglandin-mediated breach of blood-retinal barrier³

Chronic Inflammation

- 77 yowf
- S/P Phaco OS 2 months prior
- VA: 20/30
- IOP: 12 mmHg
- SLE: tr cells

Dropless Cataract Surgery:

OR

“Intracameral Injection Studied to Replace Post-Op Eye Drops” awarded best paper at 2005 ASCRS

- Paul Koch, MD (Warwick, RI)
- First 250 => No Endophthalmitis, 4 CME
- After 1100 => No Infections & No CME

Why a need for “No Drop” Cataract Surgery?

- Compliance
- Compliance
- Compliance
“Drugs don’t work in patients who don’t take them.” C. Everett Koop, MD

Johns Hopkins University Study

- “Compliance is poorer for asymptomatic conditions than those that trigger symptoms”
- “Compliance is worse for chronic diseases than

Istanbul Study on Post-Cataract Drop Compliance (Dunyagoz Clinic)

- N=20; (Mean age 62.9) 1 gt 5X / Day X 2wks (Combo Drug)
- EM Device
- 50% took less than ½ of the Rx’d dose
- 20% took less that ¼ of the Rx’d dose
Kidney Transplant Study on Compliance (Belgium)

- N = 146 (Avg. Age = 47)
- Relatively Asymptomatic
- 78% with support system in place.
- 22.6% were non-compliant with their anti-rejection medication.

TRIMOX

- 15 mg / mL Triamcinolone Acetate (Kenalog)
- 1 mg / mL Moxifloxacin
- 0.12 mL is injected into the eye.
- Delivery via blunt cannula through zonules into inferior pre-hyaloid space of the vitreous.

General Risks of Trimox

- Antibiotic Clearance
  - AB clearance in AC = 4 hrs
  - AB clearance in VH = 12 Hrs
  - Lyer & Colleagues
- Retinal Ocular Toxicity
  - Concentration well tolerated, but must be formulated properly
- Standard of Care
Intra-operative Risks of Trimox

- Zonular Damage
- Bleeding
- Capsular Rupture
- Vitreous Manipulation

Post-operative Concerns

- Pharmacological Floaters
- Intraocular Pressure Spikes
  - 8-10% have short-term spike
- Steroid Responders
  - Trimox offers 1/3 the standard dose of Triamcinolone
- Pseudohypopyon

TRIMOX Advantages

- Increased Compliance
- Should See Less PO CME
- Increased Patient Satisfaction Scores
  - Ease > Cost
- Increased Staff Satisfaction Scores
- Less confusion for co-managing physicians
Patient Selection

- **Aggressive Approach**
  - Everyone
  - Intra-operative management when needed
  - Manage post-op side-effects at day one
- **Conservative Approach**
  - Contraindicated in Glaucoma, Immuno-compromised.

Patient Education

- Large Black Floaters for the 1st week (Trimox)
- Vision more blurred for first few days than compared with drops.
- 10% end up requiring drops post-operatively.
- Not an FDA approved protocol.

Post-Operative Management

- IOP Spikes
- Pseudo-hypopion
- AC Bleed
- Corneal Edema / Folds
- F/U is same as drops
Clinical Results

- Number of Patients = 1593
- Patients requiring drops (10%)
- IOP Spikes (8%)
- AC Bleeds (< .005%)
- Infection / Endophthalmitis (< .005%)
- PO CME (<.001%)

In Summary

- TRIMOX in our hands has been safe and effective.
- Patient Satisfaction is overwhelming
- Proper post-operative management makes this drug available for everyone.
- Patient education is very important
- Need prospective clinical studies.

CORNEAL COLLAGE
CROSSLINKING: A VIA BLE ALTERNATIVE FOR OPTOMETRY
Common Corneal Procedures
• Penetrating keratoplasty
• Descemet's stripping endothelial keratoplasty
• Pterygium surgery
• Superficial keratectomy
• Corneal crosslinking***

Corneal Crosslinking
• CXL increases the rigidity of the cornea
• Indications:
  – Corneal ectatic disorders
  – Post-LASIK ectasia
  – Infectious keratitis
  – Advanced corneal edema

Corneal Biomechanics
• Keratoconic corneas
  ➪ rigidity & elasticity
• Corneal rigidity
  ➪ ↑ naturally with age* and in DM

*Daxe A, Invest Ophthalmo Vis Sc 1998; 39:644-648
Corneal Collagen Crosslinking + Riboflavin

- Topical anesthesia
- Debridement of the central 9mm of the cornea
- 1-5 gtts of Riboflavin 0.1%, applied every two to five minutes X 30 minutes
  - Check for AC penetration (AC yellow)
  - Topical antibiotics
  - Bandage soft contact lens

Corneal Crosslinking

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Patient Selection

- CCT ≥ 400 μ
  - Less than 400 μ, hypotonic riboflavin to induce swelling
- K’s ≤ 60.00 D
  - May not flatten enough for significant improvement
- POchx
  - HSV
  - Dry eye syndrome
Where's the Evidence?


Corneal Crosslinking Complications

- Treatment failure – 7.6%
  - Risk factors
    - 35 yrs or older
    - VA 20/25 or better
    - Ks >5.8D

- Postoperative infection/ulcer
- Stromal haze
- Increased IOP
What’s new in CXL?

- CXL and other corneal refractive treatments
  - Topo-guided PRK
  - Corneal ring segment
- Trans-epithelial treatments: “epithelium on”
- CXL for microbial keratitis
- CXL for corneal edema
- Other advances and applications

Crosslinking + Ring Segments

  - Better results with sequential of rings first, then CXL

Tran-epithelial treatment

- Standard tx with proparacaine 0.5% w/ BAK 0.005% (Koppen, et. al. JCRS 2012 June 38(6) 1000-5)
  - 53 eyes, 18 months f/u
  - BCDVA showed statistically significant improvement
  - No difference in sphere, cylinder and change in k values
  - Max K and thinnest pachy values progressed on Pentacam
Conclusions

- Improve UCVA, BCVA
- Improve contact lens fit/comfort
- Improve or stabilize cornea
- Decrease/stop progression
- Defer surgery
- Less cost and morbidity
- Potential for combination therapies

ROLE OF MIGS – INTEGRAL OR NOT

What do you get when you…

Great Candidate for a MIGS/Phaco
Which Comes First, The Chicken or the Egg?

- Glaucoma Evaluation First
  - Permanent loss of vision if not controlled

- Cataract Evaluation Second
  - Cataract surgery is an elective procedure and can wait

- Consider combined procedure

Cataract and Glaucoma

- How to position the cataract operation in the management scheme of the patient's glaucoma condition?

- Is it better to choose one sequence and type of surgery before the other, or to combine two procedures?

- STRESS the IMPORTANCE of visual fields PRIOR to cataract surgery

Glaucoma: Medications

- When COMPLIANCE with drops is low
- When MEDICAL THERAPY FAILS
- When the PROGRESSION continues to WORSEN

- Treatment options
  - Medications
  - Laser therapy
  - Surgical intervention
Glaucoma Surgical Options

- Laser Therapy
  - SLT
  - ALT
  - LPI
- Surgical Options
  - Trabeculectomy
  - Trabectome
  - Express shunt
  - Tube shunt
  - Laser trabeculoplasty
  - Canaloplasty

Glaucoma Clinical Trials

- Collaborative Normal Tension Glaucoma Study (NTGS)
- Advanced Glaucoma Intervention Study (AGIS)
- Collaborative Initial Glaucoma Treatment Study (CIGTS)
- Ocular Hypertensive Treatment Study (OHTS)
- Early Manifest Glaucoma Trial (EMGT)
- Glaucoma Laser Trial (GLT)

Laser Considerations for Optometry

- Laser therapy remains a viable option
- Can be used as primary or secondary treatment
- IOP lowering of 20 - 25%
- Glaucoma comanagement considerations
Selective Laser Trabeculoplasty

• Non-thermal treatment which uses short pulses of relatively low energy to target and irradiate only the melanin-rich cells in the TM
• Approx. 20-25% reduction in IOP

Trabectome

Candidates for Trabectome

• Progression despite MMT/Laser
• On 1-2 glaucoma medications
• Target pressure in mid teens
• Combined visually significant cataract and glaucoma
• Glaucoma in its early-to-moderate-stage
Advantages of Trabectome

- Non-penetrating/no disturbance of conjunctiva
- Requires no bleb
- Low patient risk
- Restores the eye’s natural fluid balance
- Simpler than traditional therapies
- Low complication rate
- Easily combines with cataract extraction
- Safe, economical and effective
- Reduction of glaucoma medications
- Good for contact lens wearers
- Fewer follow-up appointments

New Surgical Treatments

Trabectome – Disadvantages

- 20% had a post op iop spike
- Post op hyphema is typical
- Synechia formation around cleft
- Descemet’s injury
- Cost of equipment

To Stent  Not To Stent

Poll the audience

Do you think iStents are efficacious?

A. Yes
B. No
iStent, the “Ideal MIGS Surgery”?  
- Minimally Invasive / Low Risk  
- Minimal manipulation of tissue  
- Clear corneal incision  
- No blurry vision  
- Easy  
- Efficacious?

**Not To Stent**

**Mechanism**
- Bypasses site of highest resistance to aqueous outflow: juxtacanalicular trabecular meshwork

**Efficacy**
- “Replaces the need for one IOP med”

**Not To Stent**

**Negatives**
- iStent can’t compare to trabeculectomy or tube shunt for lowering IOP  
- Only useful as an adjunct to topical therapy  
- Rarely useful as a stand alone therapy  
- Only FDA approved for combination with cataract surgery  
- Hard to justify cost when later cataract surgery is needed
Table 1 Summary of molecular micro-hyphema clinical studies

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<thead>
<tr>
<th>Author</th>
<th>Design</th>
<th>Size</th>
<th>Glaucoma type</th>
<th>Procedure</th>
<th>Years</th>
<th>IOP reduction</th>
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<tr>
<td>Saitoh et al.²</td>
<td>RCT</td>
<td>USA</td>
<td>POAG, PACG, PG</td>
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<td>8 mmHg 12% 1.2</td>
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<td>Faria et al.⁹</td>
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<td>Bangladesh et al.¹⁰</td>
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</tbody>
</table>

Another RCT: IOP reduction: iStent & Phaco - 17.9 to 14.8 Phaco only - 17.3 to 15.7

Confounded by cataract surgery?

Prior studies have shown long term 1-6 mmHg reduction by cataract surgery alone.

Not To Stent
To Stent

Then again, leave the cataract surgery out...

...and see what happens.

---

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Site</th>
<th>n</th>
<th>Type</th>
<th>Procedure</th>
<th>Years</th>
<th>IOP reduction</th>
<th>Medication</th>
<th>Visual Endpoints</th>
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<tr>
<td>Levy et al.</td>
<td>RCT</td>
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<td>Rittler et al.</td>
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<td>Shimokawara et al.</td>
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<td>Dave et al.</td>
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<td>Jaffe et al.</td>
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<td>Lehnert et al.</td>
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<td>Boller et al.</td>
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<td>Phaco + phase</td>
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<td>30% IOP reduction</td>
<td>Yes</td>
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</table>

To Stent

Is there a reason that some iStents have more effect than others?
Watch trypan fill episcleral veins

Place amidst high concentration of radial veins? (Higher pigment / blood zones)

Consensus

- The data is muddled and inconsistent
- In some studies, it seems like iStent alone has tremendous effect
- Some studies make multiple iStents seem better than single iStents
- Other studies make iStent effect seem weak .... almost no better than cataract surgery alone
- Are certain epidemiological traits and / or surgical techniques more responsive with iStent?
Poll the audience
What is the best treatment for decompensating corneal endothelial disease?
A. Muro ointment
B. DSAEK
C. PK
D. DMEK
E. Scleral Contacts

PK vs. EK

NO CONTEST
Penetrating Keratoplasty
- Longer Recovery
- Risk of catastrophic bleed
- High astigmatism
- Neurotrophic cornea (ulcers, etc)
ABC’s of Corneal Transplants

- PK
- DALK
- PLK / DLEK
- DSEK / DSAEK
- DMEK / DMAEK

Penetrating Keratoplasty

Descemet’s Stripping Endothelial Keratoplasty (DSEK)

- Sutureless transplant of the posterior cornea
- Replaces diseased portion of cornea with donor graft
- Donor tissue obtained by
  - Manual dissection
  - Microkeratome dissection
  - Femtosecond laser

Indications for DSEK/DSAEK


Advantages of DSEK/DSAEK vs. PK

- Sutures
- Visual recovery
- Astigmatism / ametropia
- Epithelial complications
- Corneal allograft rejection
- Wound strength
- Globe stability
- Length of surgery
- Intraoperative complications
- Post op visits

DSEK/DSAEK Complications

- Caused by any of the following
  - Graft-recipient interface
  - Fragile graft tissue
  - Graft location
  - Glaucoma
  - Infection
  - CME
  - Retinal detachment

Miller, J. Accessed from http://www.renson.com/content/technotes/16179/
**Graft Rejection**

- Keratic precipitates (EK/PK)
- Stromal edema (EK/PK)
- Subepithelial infiltrates (PK)
- Gray epithelial line (PK)

---

**Graft Failure**

- Primary vs. iatrogenic (EK)
- Dehiscence (EK)
- Edematous cornea (EK/PK)
- Scarring (PK)
- Vascularization (PK)

---

**Case Example**

- 65 YOWF Referred for Cataract Sx
  - Blurred VA X 6 months Dist / Near
Stand-Alone vs. Combined Procedures

• Significance of the cataract

• Does the cornea need surgical intervention?

• Sequential versus triple procedure

• Convenience, cost, visual recovery

Advantages of DSAEK over DMEK

Better Vision

Faster Recovery

Less Rejection

Refractive Neutral (Toric Case)

Average Visual Acuity

20/20

DMEK

20/20

DSAEK

20/15

6 eyes

3 patients

6-eyes

POW6 & POY1

Best Vision

< 5%   (...more years later)
Average Visual Acuity

- 6 eyes, 3 patients (two & one)
- DMEK vs. DSAEK

Average Recovery Speed

- 20/10-20/15
- 20/25, 20/90
- 20/40, 20/90

(Cornea Cut-Off)

Average Recovery Speed

- 1 month
- 5 months
- 11 months

Full Thickness
Average Rejection Rate

<table>
<thead>
<tr>
<th>% with Rejection in 1st 2 years</th>
<th>Less steroids</th>
<th>Less side effects</th>
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</thead>
<tbody>
<tr>
<td>DMEK</td>
<td>5%</td>
<td>12%</td>
</tr>
<tr>
<td>DSAEK</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Full Thickness</td>
<td>&lt;1%</td>
<td></td>
</tr>
</tbody>
</table>

The effect can be profound.

**DSAEK contains stroma, DM, and endothelium**

**DMEK contains only DM and endothelium**
Advantages of DSAEK over DMEK

- In some cases, DSAEK is easier to do for anatomical reasons
- DSAEK only requires 1 day of laying flat (instead of 3-4)
- DSAEK gives you more stroma
  - In case a projectile strikes the eye, it is an extra layer of protection

DMEK vs DSAEK

Consensus

- DMEK is better across the board
- DSAEK is for the rare case where:
  - The anatomy prevents DMEK
  - The patient can’t lay flat more than 1 day

Crossfire Countdown

- Role of steroids in Glaucoma Management
- Intravitreal injections – Role of Ods or not ODS
- Any topics/issues from the audience?
Conclusions

- Many opportunities for optometric comanagement!

- Take an active role in both the vision and medical management of our patients!

- We are all judged by the visual outcomes our patients and quality of vision is the key!