The Future of Cataract Surgery

Paul Ajamian, O.D.
Center Director
Omni Eye Services
Orlando 2016
Where are We?

• Cataract Surgery is now refractive
• Patients deserve to know about the newest technologies
• Doctors of Optometry should be the authority, not just the referrer
The Changing Face of Cataract Surgery

The Baby Boomer Generation

• Large, rapidly growing demographic

• Educated, financially secure

• Increased life expectancy

• Longer working careers

• Demand high quality vision (reading, distance, night vision)

• New requirement for near vision (computers)

• Unwilling to compromise active lifestyles
Femtosecond Laser Assisted Cataract Surgery (FLACS)

Are you going to do the surgery with the laser??

THE FUTURE OF CATARACT SURGERY AVAILABLE NOW!
Do We Need FLACS?

- Cataract surgery already a “good” procedure?
- Only helps less experienced surgeons?
- Wait for technology to improve?
- Several lasers...wait to see which one is best?
- Laser too expensive to justify?
- Don’t believe the hype?
Incisions
Reproducible Primary and Secondary Incisions

Computer programmed incisions
  • % depth, length & position
  • Visualization of placement

Real time Corneal thickness

Customizable “planed” incisions
  (up to 3)
Laser Arcuate Incision

- Square edge
- Uniform depth (no ripples)
- Precise, reproducible

Steinert RF, Application of the Femtosecond Laser in Cataract Surgery for the Creation of Multi-Planar, Self-Sealing Incisions, ASCRS 2010, Boston
Manual Arcuate Incisions

• Manually executed by “tracing” corneal marks with handheld diamond knife

• Inconsistent depth control

• Unpredictable effect due to imprecise wound architecture and depth

• No image-guided surgical planning or visualization
Laser Corneal Incisions- Astigmatism Management

- Precise incisions made in the O.R.
- Ability to titrate amount of correction
- May be opened intraoperatively
- May be opened postoperatively
Opening an Incision In-Office
Capsulotomy
Why Is Capsulotomy Size Important?

- Effective lens position (ELP) more predictable
- Refractive outcome more predictable
- Less frequent PCO
- Less chance for anterior capsule phimosis
Impact of ELP on IOL Predictability

If IOL is 0.5 mm posterior to the assumed plane, a 21 D lens will produce only 20 D of correction.

If IOL is 0.5 mm anterior to the assumed plane, a 21 D lens will produce 22 D of correction.

Hyperopic

Myopic

Fragmentation
Benefits of Lowering CDE (Cumulative Dispensed Energy)

• Less ultrasound energy (CDE)
• Short term
  * decreased k edema 1 day post-op
  * faster visual recovery
  * decreases complications intra-op
• Long term
  * decreased rate of endothelial cell loss
  * pseudophakic bullous keratopathy less likely
How to Present to Patients?

• Laser makes more precise, accurate incisions
• 3D OCT Image guided surgery vs manual procedure
• Customized for the patient’s eye
• Less energy/less inflammation
• Manage low to moderate astigmatism
• Potentially safer
Laser Cataract Surgery:
Who is a candidate?

- Premium lens patients
- Astigmatism less than 1 diopter
- Guttata/Fuch’s /Mature/Traumatic cataracts
Important to Explain

What’s covered

- Cataract removal
- Monofocal lens resulting in good distance vision if no astigmatism
- Will need readers

What’s not covered

- Astigmatism Tx with laser
- Toric lenses
- Multifocal lenses
- Additional testing
- Interoperative Aberrometry

- Subconjunctival heme ("ring around limbus")
- Less AC reaction
- Decreased astigmatism
- Early "wow" factor
- BUT....due to arcuate incisions, there may be temporary corneal surface irregularities
Femtosecond Laser in Summary

• A new category has emerged in private pay cataract surgery
• Precision of femtosecond laser technology will drive innovation for future
• And to make outcomes even better.....
And to Make Something Good Even Better....The Cataract Refractive Suite

• Minimize opportunities for error
• Multiple technology integration
  1. A scan
  2. Topography
  3. Femtosecond cataract laser
  4. Operating microscope
• Preoperative and intraoperative
• Better multifocal centration/toric alignment
• Improve outcomes
Cataract Refractive Suites

• Verion (Alcon)
  1. Only fully integrated system available (LenSx)
  2. Intraoperative aberrometry (Ora) soon

• Callisto (Zeiss)
  1. No FSL compatibility, (?Optimedica in future)
  2. No intraoperative aberrometry

• Cassini/TrueVision 3D
  1. Collaboration with LensAR
  2. Not commercially available

• Cirle 3-D/ Spectria
  1. Collaboration with Victus (B&L)
  2. Not commercially available
Identifying Sources of Variability in our Current Process

Pre-Op

- Biometry
- Astigmatism Planning
- Transcription

Intra-Op

- Manual Marking
- Cyclorotation
- SIA
- Capsulorhexis Construction

Post-Op

- IOL Positioning
- Optimizing
Intraoperative Aberrometry

• ORA® with VerifEye®
  1. Part of Alcon® Cataract Refractive Suite
  2. May be used independently
• Holos IntraOp™ Wavefront Aberrometer
  1. Independent use only
  2. Not compatible with FSL systems
The ORA™ System with VerifEye® Technology

- The ORA™ System uses wavefront aberrometry data in the measurement and analysis of the refractive power of the eye (i.e. sphere, cylinder, and axis measurements)
- Real-time, intraoperative refractometer
- Measures anterior and posterior corneal astigmatism
- Minimizes post-op refractive surprises
Custom Cataract Surgery w/ Advanced Technology IOL’s
What’s New and What’s Coming?
ReSTOR +2.5: Who is this lens for?

- Aspheric Monofocal AcrySof® IQ IOL
- Aspheric Apodized Diffractive Multifocal ReSTOR® +2.5 D IOL
- Aspheric Apodized Diffractive Multifocal ReSTOR® +3 D IOL

The ReSTOR® +2.5 Patient
- Patient w/ active lifestyle that wants good interm. and dist. Va
- Not willing to compromise distance for a full range
- Desires more opportunity for a range of vision vs monofocal
- Desires spectacle independence at 21 inches and beyond
- May need +1.00 reader for 16-20 inches
Optic Design Differences: ReSTOR® +2.5 vs. ReSTOR® +3.0

Reduced the add power from 3.0D to 2.5D by:

- Reducing diffractive rings from 9 to 7 and increasing spacing

Altered the light distribution by:

- Increasing the distance energy of the center zone from 40% to 100%
- Reducing apodized diffractive area by 18%
- Increasing the outer distance area by 6%
Alcon Acrysof Restor

+2.50 add
dominant eye

+3.00 add
non-dominant eye
RESTOR TORIC

• FDA has delayed approval yet again++
• 1st multifocal toric
• +3.0 add
• 1D-3.0D corneal astigmatism

++?late 2016
OD’s Role IS Crucial in IOL Decision

• Be involved in decision making PREOP
• It all starts with patient goals and topography
• Monovision
• Eliminate distance Rx
• Eliminate Rx totally
Patients Want *YOUR* advice

- Easier conversion, better experience
- Embarrassing if they hear it for first time from surgeon
- Prepare them regarding out-of-pocket costs
Selecting The Right Surgeon

• Closest not always the best
• Very skilled/consistent results
• Communicates well with patient & OD
• Understands comanagement/history of supporting optometry/makes you look good
• Welcomes OR observation
• Organized/efficient practice
Post-Op Care

• Don’t abdicate it to someone else
• Post-Op management of premium IOL’s and LACS fairly straightforward
• Be positive on Day 1: its early, results won’t always be perfect
Why not do post op care?

• I’m not on Medicare
• “I’m not set up for it”
• Takes too much time for the $120 I get from Medicare
• Just not interested in doing this, let the surgeon do it even though he is an hour away!
Once you drill it down....

- Medications are the real time suck on post op care!
- Alternatives: CatarActiv3
  - Designer Drugs Chattanooga 888-935-2930
- Trimoxi
Imprimis Dropless Therapy™

The modality of “Dropless” therapy involves the injection of an eye-compatible compound at the end of the cataract case as prophylaxis against inflammation and infection.

Currently, there are 2 combinations available only from Imprimis:

- **Tri-Moxi**: triamcinolone acetonide and moxifloxacin hydrochloride
- **Tri-Moxi-Vanc**: triamcinolone acetonide, moxifloxacin hydrochloride and vancomycin
Dropless Therapy™ Patient Benefits

- Physically/mentally challenged patients
- Eliminate compliance challenges of drops
- Lift burden from family members/caregivers
- Put patients with “Eye Drop Phobia” at ease
- Avoid pharmacy issues: refills, generics
- Help patients in nursing facilities
- Aid patients without insurance, money or access to sample drops

- Osteoarthritis
- Rheumatoid Arthritis
- Scoliosis
- Parkinson’s
- Kyphosis
- Alzheimer’s
- Dementia

- Drop Therapy with branded medications can cost over $400
MIGS – Micro-Invasive Glaucoma Surgery

- Ab-interno approach
- Clear corneal micro-incision (<2.0mm)
- Conjunctival sparing
- Minimally traumatic
- Negligible disruption of normal anatomy/physiology
- Excellent biocompatibility
- Efficacious
- Extremely high safety profile
- Rapid recovery

<table>
<thead>
<tr>
<th>Micro-invasive glaucoma surgery: current perspectives and future directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hady Saeedi* and Iqbal K. Ahmed**</td>
</tr>
</tbody>
</table>

Purpose of review
There is an increasing interest and availability of micro-invasive glaucoma surgery (MIGS) procedures. It is important that this increase is supported by sound, peer-reviewed evidence. This article will define MIGS, review relevant publications in the period of annual review and discuss future directions.

Recent findings
The results of the pivotal trial comparing a trabecular micro-bypass stent (iStent, Glaukos Corporation, Laguna Hills, CA, USA) combined with phacoemulsification to phacoemulsification alone showed a significantly higher percentage of patients with unmedicated intraocular pressure (IOP) ≤21 mmHg, and a comparable safety profile. Initial results are published reporting a second-generation micro-bypass stent (iStent inject, Glaukos Corporation, Laguna Hills, CA, USA), a cannula scaffold (HydraStent Inc., Irvine, CA, USA) and an ab interno superficial scleral cyclotome (CyPass, Transcend Medical, Alameda Park, CA, USA), showing a decrease in mean postoperative IOP. Phaco trabeculostomy (ab interno trabeculostomy Trabectome, NeoMedics Inc., Tucson, CA, USA) was compared to phaco trabeculostomy and showed less IOP reduction, less postoperative complications, and a similar success rate. Similar success rates were found with the comparison of excimer laser trabeculotomy (GLT, ACOM, Ultrasite AG, Nurnberg, Germany) and selective laser trabeculoplasty. A number of publications review the importance of the location of implantable devices, intraoperative gonioscopy, cost-effectiveness and quality-of-life studies, and randomized clinical trials.

Summary
MIGS procedures offer reduction in IOP, decrease in dependence on glaucoma medications and an excellent safety profile. Their role within our glaucoma treatment algorithm continues to be clarified and differs from the role of more invasive glaucoma surgeries such as trabeculectomy or glaucoma drainage devices.

Keywords
Ab-interno glaucoma surgery, micro-invasive glaucoma surgery, novel glaucoma procedures

Curr Opin Ophthalmol 2012, 23:96 - 104
iStent® Specifications

**iStent is the smallest medical device known to be implanted in the human body and weighs just 60 µg**

- iStent dimensions are customized for a natural fit within the 270 µm canal space
- Made of surgical-grade nonferromagnetic titanium
- Heparin-coated to promote self-priming
iStent® Therapeutic Objectives

iStent® is designed to be used in conjunction with cataract surgery to safely and effectively reduce IOP

- Lowers IOP and may reduce or eliminate medication burden\(^1\)
- Decrease risk of IOP fluctuations associated with non-adherence to prescription medication regimens
- Avoid serious complications associated with end-stage filtration and shunt procedures
- Spare the conjunctiva and safely preserve future treatment options
- Minimizes risks of hypotony and bleb related complications

\(^1\) Elimination of medication following iStent implantation is at the discretion of the physician.
A Little Stent with that Cataract?

- 64 WM Brother in Law of a referring OD
- On Lumigan OU qhs for moderate glaucoma
- Uses it once a week according to “inside sources”

- Comes in for cataract evaluation. Moderate cupping IOP of 22 OU
- s/p IOL OS with iStent, IOP 1 day 16 IOP 1 week 14 IOP 1 month 13
- d/c Lumigan and IOP has remained in 12-14 range
MIGS Study Group

• Prospective study, 119 iStent® patients followed for 18 months
• Patients did not undergo cataract surgery (non-FDA approved)
• All patients on 1-3 glaucoma meds
• Compared IOP after 1, 2, and 3 iStents placed (without Phaco/IOL)
  • IOP = 19.8, 20.1, and 20.4 respectively, before washout
  • IOP = 25.0, 25.0, and 24.9 respectively, after washout
  • IOP = 15.6, 13.9, and 12.3 respectively, 18 months post-op
Future MIGS Devices
What else in the Pipeline?

• Studies to put stents into phakic and already pseudophakic eyes
• Studies to put two in at once
iStent® Summary

• Effective in lowering IOP for many glaucoma patients
•Ideal for COAG patient having cataract surgery
• Decreases or eliminates need for glaucoma meds
• Well tolerated, good safety profile
• Minimally invasive
Take Home Points

• Work with leading surgeons who are on cutting edge of technology
• Go visit their office and OR and see for yourself what patients will see
• Be involved in post op care: we earned it
• Compliance with glaucoma and post op meds a nightmare...now we have some answers!