The Future of Cataract Surgery

Paul C. Ajamian, OD

Finally some recognition that co-management is "ok"!

The most important factor that determines if a patient is ready for cataract surgery in the eyes of CMS is:

A. Visual acuity
B. Glare testing
C. Lifestyle complaint
D. Density of cataract

Vision and Refraction

• Visual Acuity (D & N)
• Pinhole should be part of vision
• Monocular diplopia or glare alleviated?
• Glare testing or BAT (medium setting), or "Ambient light" (room lights on)

For any patient who is 20/40 or better

If that doesn’t work, try this...

Ocular Health

• Slit Lamp
• Dilated Fundus Exam

BEFORE YOU REFER: STOP AND THINK!

What can affect the results of cataract surgery and premium IOL?

• Surface disease/MGD
• Chalazia
• Pterygium
• Corneal dystrophies and degenerations
• Undetected pre-op retinal conditions

You wouldn’t send this....

So why send this?

Could this be a problem?
Clean Up Crew

Bumpy Corneas could mean
Bumpy Post-Op Refraction

- 55 y/o f, c/o months of
  Binocular 180° sensations,
  photophobia, foreign body, tearing, and mild decrease in vision.

BEFORE AND AFTER:
BCL in place
NSAID and antibiotic

**Cataract Portal**

![Axial Map](image)
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

• Large, rapidly growing demographic
• Educated, financially secure
• Increased life expectancy
• Longer working careers
• Demand high quality vision
• New requirement for near vision
• Unwilling to compromise active lifestyles

The Baby Boomer Generation: 10,000/day reaching 65

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?

Surgical Systems

LenSx™ Alcon

• First commercially available FSL
• FDA approval for:
  1. Anterior capsulotomy
  2. Lens fragmentation
  3. All corneal incisions (cataract surgery)
  4. Astigmatic incisions for astigmatism
  5. First U.S. procedure in Feb 2010
  6. LASIK flap

OptiMedica Catalys™/AMO

• FDA clearance December 2011
  1. Anterior capsulotomy
  2. Lens fragmentation
  3. Corneal incisions
  4. Arcuate incisions for astigmatism
  5. Fixed bed
  6. 1st U.S. procedure-Feb 2012
Incisions

Reproducible Primary and Secondary Incisions

- Computer programmed incisions
- 100% 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
  - Arc shape
  - Arc length
  - Diameter

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
Laser Capsulotomy

**Precise and reproducible**
- Geometrically superior circle (vs. Manual Capsulorhexis)

**Automatic Centration and Size**
- Based on limbus and (dilated / undilated) pupil

**Capsular Edges**
- Closest to manual capsulorhexis in terms of edge uniformity*

* Bala C, Meades K. SEM of femtosecond laser capsulotomy edge: An inter-platform comparison. Accepted for publication in Journal of Cataract and Refractive Surgery

**Why Is Capsulotomy Size Important?**
- Effective lens position (ELP) more predictable
- Refractive outcome more predictable
- Less frequent PCO
- Less chance for anterior capsule phimosis

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**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

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**Fragmentation**

**Additional Lens Fragmentation for Versatility**
- Cylinder
- Chop
- Hybrid
- Hybrid

**Benefits of Lowering CDE (Cumulative Dispensed Energy)**
- Less ultrasound energy (CDE)
- Short term
  - Decreased IOL index 3-day postop
  - Faster visual recovery
  - Decreased complications intra-op
- Long term
  - Decreased rate of endothelial cell loss
  - Pseudophakic bullous keratopathy less likely

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**FLACS Video**

**FLACS Video- Narrow Angle**

**FLACS Video-OR**
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

- Aberration reduction
- Reduced lens making visual distance minus 3 diopters
- Reduced post-op issues
- Reduced astigmatism

What’s not covered

- Integration to axial length
- Post-operative manual marking
- Post-operative orientation
- Post-operative alignment


- 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 laser 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)
- Callisto (Zeiss)
  1. No FSL compatibility
  2. No intraoperative aberrometry
- Cassini/TrueVision 3D
  1. Collaboration with LensAR
- Cirle 3/D Spectra
  1. Collaboration with Victus (B&L)
- Identifying Sources of Variability in our Current Process

Pre-Op

- Biometry
- Astigmatism
- Planning
- Manual marking

Intra-Op

- Capsulorhexis
- Capsular tension
- SIA
- IOL positioning

Post-Op

- Optimizing
The Verion™ Image Guided System

Designed to help consistently achieve the cataract refractive target.

VERION™ Image Guided System

GUIDE

VERION™ Reference Unit

VERION™ Image Guided System

ACQUIRE IMAGE

VERION™ Image Guided System

TRANSFER TO PLANNER

Image Guided Technology

OR Video - Toric Alignment

Verion - Multifocal Centration

The ORA System® with VerifEye®:

Intraoperative Aberrometry

- ORA™ with VerifEye®
- Holos IntraOp™ Wavefront Aberrometer
- Not compatible with FSL systems
The ORA® System with VerifEye®:

- Provides streaming refractive information to determine power, cylindrical magnitude and axis, even for post-refractive procedure eyes
- Accounts for anterior and posterior corneal astigmatism
- Reduces risk of residual postoperative astigmatism

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 (sphere, cylinder, and axis measurements)
- Measures anterior and posterior corneal astigmatism
- Minimizes post-op refractive surprises

Improved astigmatic outcomes with VerifEye®

- Results are statistically significant based on McNemar's test (p = 0.006).
- This carefully controlled clinical study demonstrates that the ORA System® with VerifEye® provides for better astigmatic outcomes in cataract surgery.

Percent of Patients Within ≤ 0.50 D of Intended Target at One Month; n = 111 patients, p = .006
Custom Cataract Surgery w/ Advanced Technology IOL’s
What’s New and What’s Coming?

ReSTOR +2.5: Who is this lens for?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Standard&lt;br/&gt;(IOL shape)</th>
<th>AcrySof®&lt;br/&gt;IQ IOL</th>
<th>AcrySof®&lt;br/&gt;Apodized Diffractive Multifocal&lt;br/&gt;(IOL shape)</th>
<th>AcrySof®&lt;br/&gt;Restor +2.5 D IOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>Refractive Louis (IOL shape)</td>
<td>Aspheric Monofocal</td>
<td>Aspheric Apodized Diffractive Multifocal IOL</td>
<td>Aspheric Apodized Diffractive Multifocal</td>
</tr>
</tbody>
</table>

The ReSTOR® +2.5 Patient

- Patient of active lifestyle that wants good interim and distance vision
- Not willing to compromise distance for a full range of vision
- Desires more opportunity for a range of vision vs monofocal
- Desires spectacle independence at 21 inches and beyond
- May need +1.00 ASAO for 16-20 inches

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%

**Optic Design Differences: ReSTOR® +2.5 vs. ReSTOR® +3.0**

**Acrysof Restor +2.50 add dominant eye**

- +3.00 add non-dominant eye

**RESTOR TORIC: FINALLY APPROVED**

- +3.0 add APPROVED (DECEMBER)
- +2.5 add APPROVED (MARCH 23)

- 1D - 3.0D corneal astigmatism

**Acrysof Toric- Extended Power Range**

- SN6AT3 - 1.03D corneal plane
- SN6AT4 - 1.55D
- SN6AT5 - 2.06D
- SN6AT6 - 2.57D
- SN6AT7 - 3.08D
- SN6AT8 - 3.60D
- SN6AT9 - 4.11D

**Bausch & Lomb Trulign Toric**

- Only accommodative toric IOL approved in U.S.

**Tecnis Multifocal in +2.75/3.25**

**Tecnis Symfony lens**

- Corneal astigmatism
  1. ZCT150 - 1.03D
  2. ZCT225 - 1.54D
  3. ZCT300 - 2.06D
  4. ZCT400 - 2.74D

**STAY TUNED FOR THE FUTURE!**
Technis Symfony lens - Approved July 15, 2016!

The first toric presbyopic lens: up to 2.75 cylinder

Avoid this lens with:
- Myopes with large pupils
- Anyone who does a lot of night driving/activities at night

Problems with lens?

Play that Symphony!

OD’s Role IS Crucial in IOL Decision
- Be involved in decision making PREOP
- It all starts with patient goals and topography
- Pre-op measurement
- Eliminate distance Rx
- Eliminate Rx totally

Cassini Corneal Shape Analyzer
Selecting The Right Surgeon

- Closest not always the best
- Very skilled/consistent results
- Communicates well with patient & OD
- Understands comorbidity/history of supporting optometry/makes you feel good
- Welcomes OD observation
- Organized/efficient practice

Post-Op Care

- Don’t delegate it to someone else
- Post-Op management of premium IOLs and LACS fairly straightforward
- Be positive on Day 1: It’s 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”, muses therapy
- 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 drain 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.

STAY TUNED FOR THE FUTURE... HERE NOW!

Currently, there are 2 combinations available only from Imprimis:
- Trio-injection: vancomycin, moxifloxacin, triamcinolone acetonide
- Selecting: vancomycin, triamcinolone acetonide, moxifloxacin

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
PATIENT JOURNEY: DROP THERAPY

PATIENT JOURNEY: DROPLESS THERAPY

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
- Boost adherence, save with generics
- Help patients in nursing facilities
- Aid patients without insurance, money or access to sample drops

Tri-Moxi-Vanc Transzonular Injection

Just hanging around!

FOR COAG PATIENTS WITH CATARACTS......

STAY TUNED FOR THE FUTURE... HERE NOW!

The iStent: Trabecular Micro-bypass

Indicated for patients currently treated with ocular hypotensive medication

Tri-Moxi-Vanc Transzonular Injection

The complete procedure
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® is the smallest medical device known to be implanted in the human body and weighs just 60 µg.

Express the Benefits of iStent to Your Patients

- The data is an important tool to the patient’s decision about the iStent®—they trust you and want your guidance

Key Messages

- iStent is covered by Medicare and some private insurance companies
- The iStent is implanted at the same time as cataract surgery with an excellent overall safety profile
- Proven to reduce IOP and may reduce glaucoma medication usage

COMPELLING CLINICAL RESULTS

- Single surgery: Sodium IOP = 10 mm Hg, IOP 1 week 16 IOP 1 month 14
- iStent + Lumigan and IOP has remained in 12-14 range

A Little Stent with that Cataract?

- 64 WM Brother in Law of a referring OD
- On Lumigan QHS for moderate glaucoma
- Uses it once a week according to “inside sources”
- Comes in for cataract evaluation. Moderate cupping IOP of 22 OU
- LP EDOS w/ Stent, IOP 1 day 16 IOP 1 week 14 IOP 1 month 13
- d/c Lumigan and IOP has remained in 12-14 range

iStent® Insertion

- iStent® Insertion w/ Heme
- iStent® Insertion w/ Heme

iStent Postop Photos

- 1 day post-op
- 6 months post-op

- COMPELLING CLINICAL RESULTS

- Single surgery: Sodium IOP = 10 mm Hg, IOP 1 week 16 IOP 1 month 14
- iStent + Lumigan and IOP has remained in 12-14 range
MIGS Study Group

- Prospective study of 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

STAY TUNED FOR THE FUTURE... HERE NOW!

iStent inject®

- Two stents pre-loaded per injector
- US IDE Phase III Trial under way

Head (resides in Schlemm's Canal)
Neck (Trabecular Meshwork)
Flange (in Anterior Chamber)

Caution: Investigational device limited by Federal (U.S.) law to investigational use only.

iStent SUPRA®

Product Description

- Lumen Size: 0.165 mm
- Outer Diameter: 0.365 mm
- Length: 4 mm
- Length of Sleeve: 1.1 mm

US IDE Trial Under Way

Alcon CyPass Micro-Stent

Approved August 2, 2016

- Alcon acquired Transcend Medical in February 2016
- Approved for mild to moderate glaucoma with cataract

Xen Stent

- Crosslinked Porcine Gellan Tube
- 6 mm long
- 45 micron lumen

Alcon CyPass Micro-Stent

- US IDE Phase III Trial Under way

Xen Stent
Xen Stent

• De Gregorio (2017); 1 year results
  - Preoperative IOP 22.5 ± 3.7 mmHg → 13.1 ± 2.4 mmHg
  - Medication: 2.5 ± 0.9 → 0.4 ± 0.8 meds
• Galal et al. (2017); 1 year results
  - IOP dropped from 16 ± 4 mmHg → 12 ± 3 mmHg at 1 year
  - Medication: 1.9 ± 1 → 0.3 ± 0.49
  - One case of extrusion; Two cases of choroidal detachments

Surgical Video
(Xen)

• Mitomycin C
• Paracentesis
• Viscoelastic
• 1.8 mm main wound

Reimbursement Realities of MIGS

• Medicare YES
• Commercial insurance...VARIABLE but often NO
• Important to know if its covered before you promise it to patients

Take Home Points

• Work with leading surgeons who are on cutting edge of technology
• Go visit their office and ASC 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!