Disclosures:

• Consultant/Speaker for:
  Alcon
  Allergan
  Abbott Medical Optics

• Research:
  Alcon
Co-Management of Premium IOL Patients: Pearls for Maximizing Patient Satisfaction and Surgical Outcomes

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Future of Cataract Surgery Market

- Most frequently performed surgery in US
- 22 million Americans age 40 and older have at least one cataract
- By 2020 more than 30 million Americans will have cataracts
- More cases of cataracts worldwide than there are of glaucoma, macular degeneration and DM retinopathy combined

Preventblindness.org
• 4 out of 5 patients diagnosed with a cataract are done so by an optometrist

• Optometrists are the “gatekeepers” to cataract referrals and IOL technology available

• Referring O.D.'s must discuss all IOL options and educate patients about cataract and treatment options
Why Is This Important For Optometry?
Utilization of Premium IOLs

Use of Premium IOLs – US Cataract Surgeons

Source: Market Scope Quarterly Survey of Cataract Surgeons, Q4-2011 n=335

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Current Trends

• IOL Survey Shares
  o Alcon: 55.8%
  o AMO: 24.9%
  o B+L: 11.7%

• IOL Survey Shares by Model
  • AcrySof ReSTOR, ReSTOR Aspheric: 3.5%
  • TECNIS Multifocal: 1.7%
  • Crystalens: 1.1%

Source: Market Scope Quarterly Survey of Cataract Surgeons, Q1-2013
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The Baby Boomer Population is Now Presbyopic


Patient expectations are very demanding

- Plano results are expected
- Distance, Intermediate and Near desired
- Spectacle independence
Premium IOLs: **5 Pearls ("P’s") for Success**

1. **P**lano Outcome
2. **P**roactive Tx of Ocular Surface Disease
3. **P**re Op Counseling — Setting Realistic Expectations
4. **P**roperly Screen Candidates
5. **P**ick the Right IOL

**Other:**
6. **P**ick the Right Surgeon
7. **P**osterior Capsular Opacification
8. **P**oor IOL Centration
Number One Problem: Residual Refractive Error!!!

• Can cause blurry vision, dysphotopsias, glare, halos and night vision complaints

• “Fix” the problem ASAP: LASIK, PRK, LRI

• Validate the patient’s complaints

• Work with surgeon who includes cost of enhancement in initial fee

Work up should include:

• Refracting the patient; finding residual refractive error

• Cycloplegic MR needed? (Crystalens)

• Performing corneal topography

• Assessing/evaluating ocular surface, tear film

• Once MR stable, planning for enhancement
Premium IOL Pearl #1: Plano Outcome

- Astigmatism: Treat when greater than 0.50 D
- Minimum goal:
  - < 0.50 D astigmatism
  - < 0.50 D spherical
- Treat once stable (2-3 months S/P Phaco)
- Educate patient early about Tx plan
- LRI vs. PRK/LASIK?
- Experienced **Cataract AND Refractive** Surgeon
Premium IOL Pearl #1: **Plano Outcome**

- Day 1 post-cataract surgery residual astigmatism
- Counsel and reassure patient
Case #1

- D.C., 69 year old male
- Co-managing OD prescribed SRx for near VA
- “I can’t see well at near, computer, or distance. I am here to talk about a refund. My optometrist says I need to wear reading glasses. I paid $5,000 to get rid of glasses”
Case #1 - Tecnis Multifocal IOL OU
Case #1

- sc Va @ D 20/80 OD, 20/50 OS
- 20/50 OU @near

- MRx:
  - OD: -0.25 -1.00 X 134 20/20-1
  - OS: -0.75 DS 20/20-2

- S/P Tecnis Multifocal OU 04/2013
- S/P Lasik OU IN 1999
- Wearing SRx for near:
  - OD: +0.75 -1.00 X 136
  - OS: +1.00 DS
Case #1

S/P PRK OU 8-13 (4 months of frustration)

Sc Va 20/20-2 OD,OS

Patient does not need any glasses at all. “Happy with vision at all distances.”
Premium IOL Pearl #2: **Proactive Treatment of Ocular Surface Disease**

Maximize Ocular Surface

- Treat and Evaluate:
  - Ocular Surface Disease
  - Perform Dry Eye Work Up
  - MGD/Blepharitis
  - Epi basement membrane dystrophy
2. (PHACO) Study: Prospective Health Assessment of Cataract Patients Ocular Surface

- Purpose: to determine the prevalence of dry eye in patients undergoing cataract surgery
- 136 patients, 272 eyes having cataract SX
- Avg. age 70
- Test used Shirmer’s, TBUT, corneal staining, and subjective questionnaire
- Results:
  - 171 eyes (62.9%) had a tear break-up time of less than 5 seconds
  - 209 eyes (76.8%) showed positive corneal staining
  - 136 eyes (50%) showed central corneal staining
  - Shirmer’s Scores: 132 eyes (48.5%) had a score of 10 or less, and 58 eyes (21.3%) scored less than 5

Trattler W, Goldberg D, Reilly C. Incidence of concomitant cataract and dry eye: prospective health assessment of cataract patients. Presented at: World Cornea Congress; April 8, 2010; Boston, MA.
Maximize Ocular Surface

- Diagnostics Used:
  - Fluorescein
  - Topography
  - Lissamine Green
  - Tear meniscus height
  - TBUT
  - Combination dyes
  - O.S.D.I.
  - TearLab
  - Shirmer’s
  - MMP-9 (RPS)
  - Slit lamp exam
Fluorescein Staining
Lissamine Green Staining
Topography Can Identify Dry Eye
Dry Eye Risk Factors

- Gender
- Hx of refractive Sx
- Environment - air conditioners, fans, heaters, airplanes
- Computer use
- Lifestyle - smoking, diet, work demands
- Systemic meds
  - Antihistamines, HRT, antidepressants, etc.
- Diet
  - Omega 3:6, alcohol, caffeine intake, water
Dry eye patients are easy to find:

- Diabetes
- Rheumatoid Arthritis (RA)
- Systemic Lupus Erythematosus (SLE)
- Sjogren's
- Thyroid Eye Disease
- Dermatological Conditions
  - Rosacea, Psoriasis
- Inflammatory Eye Diseases
  - Chrohn’s, IBS
Why is it important to identify and treat Dry eye and blepharitis Preop?

• Answer:
  – Because these conditions can impact:
    • IOL calculations
      – Inaccurate keratometry can lead to wrong IOL power
    • LRI or Toric IOL axis and/or magnitude
      – Inaccurate keratometry
      – Inaccurate topography
Dry Eye Treatments

- AT’s
- Ointments
- Restasis
- Corticosteroids
- NSAID’s
- Punctal Occlusion
- Lacrisert
- Autologous Serum
- Vitamin A drops
- Moisture goggles
- Topical Androgen
- Doxycyclines

- Tissue engineering
- Labial, parotid, submandibular gland transplantation
- Evoxac
- Omega 3:6 FA’s
- HRT
- Botox
- Accupuncture
- Herbal remedies
- Mucin replacement
Premium IOL Pearl #2: Proactive Treatment of Ocular Surface Disease

• The cataract patient is a dry eye patient!

• RTC for Dry eye/OSD work up

• Improved Outcomes
Treatment of Ocular Surface Disease

1. Luchs, et al. study looked at prevalence of blepharitis in patients having cataract surgery

- 100 patients (200) eyes, two site study
- 59% of patients had blepharitis

Luchs J, Buznego C, Trattler W. Prevalence of blepharitis in patients scheduled for routine cataract surgery. Poster presented at: ASCRS Symposium on Cataract, IOL and Refractive Surgery; April 11, 2010; Boston, MA.
MGD Prevalence

- MGD, also termed posterior blepharitis, is the most common form of lid margin disease (LMD)
- Nearly 40% of routine eye care patients
- 50% of contact lens wearers are affected
- Recent survey indicated that blepharitis might be present in 37% - 47% of all patients seen by eye care providers

Early or Mild MGD
Treatment of MGD

- Azithromycin
- Restasis
- Lid scrubs/foam
- Warm compresses
- Oral doxycycline
- Antibiotic/steroid combination drops/ointments
- Lid expression-Mastrota paddle
- IPL
- Omega 3 supplementation
- Meibomian gland probing
- LipiFlow Thermal Pulsation System
Meibomian Gland Duct Probing
Premium IOL Pearl #2: Proactive Treatment of Ocular Surface Disease

Why Is This Important?

• Poor tear film/ocular surface disease changes measured corneal curvature affecting pre op biometry
• Incorrect spherical and astigmatic pre op measures effecting surgical outcomes
• Goal to provide accurate biometric measurements to optimize postsurgical refractive outcomes
• As much as 1-2 D error can be made during IOL power calculations

Tu, Elmer, M.D. Cornea Day, ASCRS 2011.
Premium IOL Pearl #3: Preop Counseling - Setting Realistic Expectations

- Pre Op Questionnaire
- Discussion on various IOL options
- Discuss visual demands and goals
  - Lifestyle demands, job, habits, daily activities
- Personality traits
- Start the financial discussion
Premium IOL Pearl #3: Preop Counseling - Setting Realistic Expectations

• Clear expectations set **UP FRONT**
• Reinforce importance of visual cortical neural adaptation
• “This is a new optical system and the brain must adjust which takes time”
• Pre op discussion on side effects
  – Glare
  – Halos
  – Realistic expectations
Premium IOL Pearl #4: Properly Screen Ideal Candidates

Preop Exam

- Full evaluation from “front to back”
- Topography-corneal scar, astigmatism, pterygium
- Binocular vision, amblyopia, strabismus
- Corneal dystrophies evaluation, endo cell count, corneal edema/guttata
- Floppy Iris Syndrome, previous trauma, pseudo X, zonular weakness
- Retinal pathology, good visual potential?
Premium IOL Pearl #4: Properly Screen Ideal Candidates

• Candidate for bilateral implantation
• Good ocular health
• Potential for good visual acuity in each eye
  - Good binocularity
• Corneal astigmatism?
  - Plan for Toric IOL treatment, LRI, or PRK if at or over 0.75 D based on combined corneal astigmatism (preop kcyyl + SIA)
Premium IOL Candidate?
Premium IOL Pearl #4: Properly Screen Ideal Candidates

Pre/Post Op Retinal OCT

- Epi Retinal Membrane
- CME/CSME
- Retinal Health/assessment
- AMD
- Macular Scar
- Must do DFE
Premium IOL Pearl #4: Ideal Candidates
Premium IOL Pearl #5: Pick the Right IOL

- You know your patients better than the M.D.!
- Develop a refractive treatment plan and goal
- Options: 1. Distance only
  - Toric, traditional, LRI’s
  2. Distance and Intermediate
  3. Distance, Intermediate and Near
- Send written letter of surgical goal/plan to surgeon prior to pre op consult
Common Premium IOLs

Review of most utilized Premium IOLs in practice today:

AcrySof IQ Toric
STAAR Toric Single-piece
Tecnis Toric

Crystalens AO
AcrySof IQ ReSTOR +3
Tecnis Multifocal
## TORIC IOL Patient Selection

### Patient Selection
- Desires distance vision
- Okay with spectacles for near
- Absence of significant or unstable corneal disease affecting the ocular surface or shape
- More than 1.0D or greater of regular astigmatism by corneal topography

### Preoperative Testing
- K readings
- IOL Master
- Corneal topography
Alcon AcrySof IQ Toric IOL

• Biconvex toric aspheric optic
• UV and blue light filtering Acrylate/Methacrylate
• Index of Refraction: 1.55
• Optic diameter : 6.0 mm
• Overall length: 13.0 mm
• Haptic angle: 0°

Source: AcrySof IQ Toric IOL, Product Information
TECNIS® Toric IOL

- Wavefront-designed anterior toric aspheric surface
- +5.0 D to +34.0 D in 0.5 D
Who Is Not A Candidate For A Toric?
STAAR Toric Single-piece IOL

- First toric lens available in the U.S.
- Longer length 11.2 mm to prevent IOL rotation for larger myopic eyes
- Frosted haptics and larger fenestrations designed to promote greater bioadhesion for capsular bag stability
Toric IOL Study on Rotational Stability

• Study evaluated and compared the postoperative rotational stability of ACRYSOF TORIC vs. STAAR TORIC

• The mean IOL rotation from baseline to 3 months postoperatively was $4.23 \pm 4.28$ degrees in the ACRYSOF TORIC group and $9.42 \pm 7.80$ degrees in the STAAR TORIC group

• ACRYSOF TORIC had 73% rotated less than 5 degrees vs. 37% on the STAAR TORIC group
97% of patients would choose to have the TECNIS® Toric IOL again

1. TECNIS Toric 1-Piece IOL [package insert]. Santa Ana, Calif: Abbott Medical Optics Inc.
A loss of approximately 3.3% in cylindrical power occurs for every degree of rotation away from the toric IOL’s intended axis.\textsuperscript{1}
Toric IOL Alignment

- Need to dilate patient post op day: 1, 7, 21
- Use slit lamp retro-illumination to view axis of toric
- Generally, for every 1° of IOL rotation, 3.3% of lens cylinder power is lost.
- A complete loss of cylinder power can occur with a rotation of >30°.
Toric S/P PK?
Case #2

- 85 Year Old Caucasian Woman
- VA 20/40 OD and 20/30 OS
- IOP 18 OD and 10 OS ON Pilocarpine TID OD, Combigan BID OU, and Travatan QHS OU
- C/D 0.99 X 0.9 OD and 0.6 x 0.6 OS
- 2+ NSC, 1+ Cortical OD, OS
Case #2

- Treated GLC OD first: Trab with MMC OD
- S/P Trab VA 20/80 OD
- 3.5 D of induced astigmatism
- IOP 10 on no drops
- 6 months S/P Trab OD- 3+ NSC, 2+ Cortical OD
Case #2
Case #2

Power: 48.9D
Radius: 6.90mm

From vertex:
Distance: 0.00 mm
S-merid: 0°

From pupil:
Distance: 0.34 mm
S-merid: 265°

Simulated Keratometer:
48.62D (6.94 mm) @84
46.12D (7.32 mm) @174

Astigmatism: 2.50D

CIV: 2.34
Shape Factor: 0.31

Pupil Size: 2.68 mm

OD

6/23/11
12:36 PM
Case #2

Pre op: Patient Desired Spectacle Independence at Distance

Astigmatism Correction Options:
1. Toric Intraocular Lens
2. Limbal Relaxing Incisions
3. Post Cataract Surgery PRK
Case #2

- S/P Trab with MMC and CE/Toric IOL OD
  - Post op month #2
  - 20/25 OD uncorrected
CrystaLens AO: Newest CrystaLens Design

- Aspheric accommodating IOL
- Made of a 3rd generation silicone material called Biosil
- Modified plate-style implant with a 5 mm optic
- Changes in lens shape/position with ciliary muscle movement changes focal plane
- Range of vision unaffected by pupil size
- Transmits full spectrum visible light
- Spherical optic
- 1-piece design
When compared to multifocal IOLs:

• **CRYSTALENS** maintains one focusing zone (monofocal), just as conventional eyeglasses and contact lenses do in single vision lenses.

• Because of its design, **CRYSTALENS** is less likely to produce visual side effects such as night vision problems, including glare and halos.

• However, **CRYSTALENS** may not provide as much of a range of focus (near to far), and this might lead to the need for reading glasses.
Trulign Toric Accommodating IOL

- 5 mm optic, silicone
- Up to 2.75 D of corneal cyl
- First accommodative toric IOL
ReSTOR +3 Apodized Diffractive Multifocal IOL

- UV and blue light filtering Acrylate/Methacrylate Copolymer
- Index of Refraction: 1.55
- Optic diameter: 6.0 mm; Overall length: 13.0 mm
- Haptic angle: 0°
- Haptic color: Yellow
- Aspheric optic
- 1 piece design
ReSTOR +3 Apodized Diffractive Multifocal IOL

- Center of optic has diffraction grating
  - Splits light into distance and near (+3 add) foci
  - 18% of incoming light lost to retina
- Peripheral optic monofocal for distance
- Balance of light committed to near or distance foci is pupil dependent
- Yellow optic to block blue-violet light
- Has been associated with glistening formation*

TECNIS Multifocal Aspheric Diffractive

- Diffraction grating covers entire optic
  - Splits light into distance and near (+4 add) foci
  - 18% of incoming light lost to retina
- Balance of light committed to near or distance foci is pupil independent
- Transmits full spectrum visible light
- Aspheric optic
- 3-piece and 1-piece designs
## Nondirected responses to visual disturbances\(^1\)

<table>
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<tr>
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<th>4–6 months (N=333)</th>
<th>1 year (N=331)</th>
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<tbody>
<tr>
<td>Severe halos</td>
<td>9.0%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Severe night glare</td>
<td>3.6%</td>
<td>2.4%</td>
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The US clinical study showed a decrease in halos and night glare from 4–6 months to 1 year.\(^1\)
“The Pipeline” Future IOLs
Synchrony IOL

- Dual Optic accommodating IOL
- 2 optics connected by spring haptics
- Temporary myopia initially after post op
AcrySof IQ ReSTOR Multifocal Toric

- Can treat up to 3 D of astigmatism
- Aspheric design
- Diffractive multifocality
- UV and Blue light filter
Lenstec Tetraflex

- Hydrophilic
- 1.8 D of accommodation
- Distance and Intermediate
- No glare of halos
Light-adjustable Lens- LAL

- From Calhoun Vision
- Made of photosensitive silicone
- 380 nm light used to adjust all refractive errors
- 2 weeks after Sx, IOL power is “locked in” with UV light
THE OTHER Premium IOL “P’s” – Pearl # 6: Pick the Right Surgeon

• Cataract and Refractive Surgeon

• Experienced Lasik/PRK surgeon

• Experienced surgeon skilled to explant IOLs

• Co- management friendly
THE OTHER Premium IOL “P’s” – Pearl #7: PCO

Posterior capsular opacification
THE OTHER Premium IOL “P’s” – Pearl #7: PCO
THE OTHER Premium IOL “P’s” – Pearl #8: IOL Centration

• Diffractive Multifocal IOLs make centration very important
• IOL centered on Macula NOT PUPIL!
Femto Cataract Surgery

- The present
- The future
FEMTO CATARACT SURGERY

- **The Players**
  - **LenSx** –
    - Aug 2009 – Anterior Capsulotomy
    - Dec 2009 – Corneal Incisions
    - April 2010 – Lens Fragmentation
  - **LensAR** –
    - 3/21/11 Anterior Capsulotomy and Lens Fragmentation
    - Presbyopia licensing
  - **OptiMedica** –
    - Dec 22, 2011 FDA Approval
    - Proprietary OCT with Catalys
  - **Technolas PV Victus**
    - Both Refractive and Cataract
    - August 2012 – Anterior Capsulotomy and Corneal Incisions
Advantages

- less endophthalmitis?
- better vision?
- wound/lri better
- Effective lens position
- less phaco energy
- less inflammation
- less radial tears/capsule breaks?
- less complications beginning surgeons?
Manual vs. Catalys Cataract Surgery
1 month postop

Manual Surgery

Catalys Surgery
• Perfect centration
• Precision diameter: $< \pm 0.25 \text{ mm}$
• No radial tears
• Easy and complete removal of capsule
• No adverse events
Patient Experience

• **During procedure**
  – Docking: Slight pressure from vacuum pressure of interface (no pain or loss of vision)
  – During laser: A kaleidoscope of lights as the procedure occurs

• **Immediate to One-Day Post-op**
  – Same regimen as existing practices
  – Visual recovery may be faster because of reduced ultrasound energy
  – Patient may notice slight hemorrhaging on the conjunctiva
Patient Experience

- Clinical Workup
  - *No major changes to standard procedure*
  - *Things to note:*
    - How well patient dilates
    - Is patient able to keep still during procedure

- Post-Surgery Follow-up
  - *Same regimen as existing practices*
  - *Things to note:*
    - Visual recovery may be faster because of reduced ultrasound energy
    - Patient may notice slight hemorrhaging on the conjunctiva
Disadvantages

- cost
- new set of complications
- time delay
- IOP
Challenges

- Cost
- Patient adoption
- Optometry adoption
Surgical Systems

Catalys™ Precision Laser System - OptiMedica

LenSx® Laser

LensAR Laser System™

TECHNOLAS femtosecond Workstation
- Live Video
- OCT
- Procedure Templates

- Touch Screen
- Data Entry

- Ergonomic
- Space saving design
Next Generation Technology for Catalys - Laser Cataract Surgery
Image.  
Pre-op

Plan.  
Pre-op

Guide.  
Intra-op

VERION™ Image Guided System
VERION™ Image Guided System

- Designed to help you consistently achieve your refractive target
- The VERION™ Image Guided System is designed to add greater accuracy and efficiency during surgical planning and execution. Consisting of the VERION™ Reference Unit and the VERION™ Digital Marker, it will enhance the way you perform cataract surgery.
With a convenient desktop interface, the VERION™ Reference Unit:

- Measures keratometry, pupillometry and other key pre-op parameters
- Captures a high-resolution, diagnostic reference image of the patient’s eye
- Auto-detects scleral vessels, limbus, pupil and iris features
The VERION™ Reference Unit also enables surgeons to quickly and efficiently determine an optimized surgical plan:

- Multiple advanced formula IOL calculations, including lens and power selection
- Incision and implantation axis planning customized for each patient
To help optimize incision and IOL alignment, the VERION™ Digital Marker displays patient information and images from the VERION™ Reference Unit:

- Features a tracking overlay that enables surgeons to see all incisions and alignment in real time
- Automatically accounts for cyclorotation
- Eliminates the need for manual toric eye markings
- Automatically registers the patient for accurate centering and alignment of multifocal and toric IOLs
- Allows documentation of data to help optimize procedures over time
The VERION™ Digital Marker can be used with the LenSx® Laser as well as most surgical microscopes.

With LenSx® Laser:

With OR Microscope:
5 Pearl’s To Success

5 P’s TO SUCCESS

1. Plano Outcome
2. Proactive Tx of Ocular Surface Disease
3. Pre Op Counsel- Realistic Expectations
4. Properly Screen Candidates
5. Pick the Right IOL
• THANKS!

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