Pearls for Refractive IOLs

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I have no proprietary or financial interest in any of the products discussed.

Cataract Surgery is Refractive Surgery

Keys to Success

- Patient expectations
- Healthy Ocular Surface
- IOL Selection
- Accurate IOL calcs
- Astigmatism Management
- Complication Management

TRUST YOUR STAFF AND YOUR INSTINCTS!

Patient Expectations

- Are they already monovision?
  - Leave monovision as is!
- Have they had LASIK?
  - Warn about iol accuracy, enhancement!
- Are they hyperopic, Myopic,?
  - Hyperopes are easier to please
- Do they wear Hard Contact Lenses?
  - Never as good

Counseling Considerations

- Document what you tell the patient.
- Counsel the patient about visual disturbances
- Counsel the patient about the reading distance
- Tell them it takes time and bilateral lenses for full adaptation
- Don’t promise “you’ll never wear glasses again”
- Remember, out of pocket expenses may result in higher patient expectations

Patient Expectations

Am I a good candidate for a multifocal lens implant?

Good Candidates

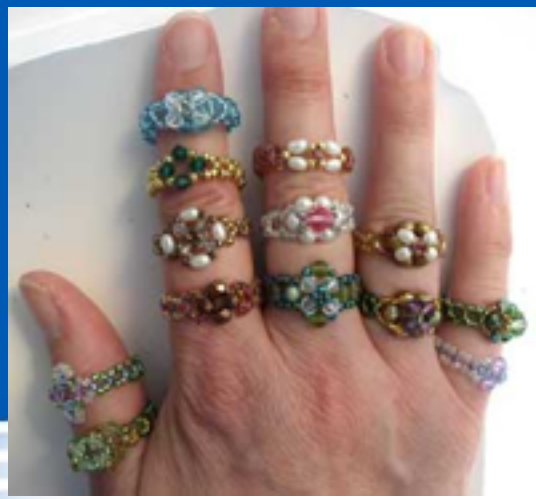
- ☐ I feel handicapped by my dependence on glasses.
- ☐ I think I look better without glasses.
- ☐ I worry about being incapacitated if I should ever lose my glasses.
- ☐ Having good vision without the hassle of glasses is more important to me than having perfect vision with glasses.
- ☐ I am not a perfectionist.
- ☐ I would be happy with my vision even if I needed to wear glasses occasionally.
- ☐ I envy people who do not wear glasses.
- ☐ I would be more self confident if I did not have to wear glasses.

Poor Candidates

- ☐ I like wearing glasses and would feel undressed without them.
- ☐ My work or hobbies consistently require attention to small details.
- ☐ I often drive at night.
- ☐ I do not easily adapt to change.
- ☐ I get stressed out when things don't seem to happen just the way I expected.
- ☐ I am a perfectionist and little irregularities bother me.
- ☐ I would be very disappointed if I did not end up with perfect vision.
- ☐ With these implants, I would expect to never wear glasses again.
- ☐ I am not a very patient person.

Patients to Avoid

- Angry, Unhappy, Depressed, Histrionic (8 rings)
- Bag of Glasses,Hated SCL vision, Needs HCL vision
- Inappropriate Patients
- Patients who NEVER want to wear glasses!
- Unable to consent
  - Intelligence
  - Bad Listeners
  - I'll take what she's having……
    - When Harry Met Sally



Patients to avoid

"Doctors and Lawyers"

versus

"Architects and Engineers"

Pre Operative Discussion

- Vocation and Avocation
- Informed Consent by you in person
- No Guarantees
- Perfect is the enemy of Good
- Discuss Near, Intermediate, Distance Vision
- Near Glasses NOT Readers, or reading glasses
- Need Bright Light for Best VISION.
- 85% of time no glasses, 15% of time may need Glasses
- Bilateral implantation, Improves over time

Healthy Ocular Surface

Surgery impacts Dry Eye

Cataract surgery increase one level of Severity
LASIK increases Two Levels of Severity

Severity Level	1	2	3	4
Symptoms	Mild-Mod	Mod-Severe	Severe	Extremely Severe
Conjunctlival Signs	Mild-Mod	Staining	Staining	Staining
Corneal Staining		Mild Punct staining	Marked Punctate Staining, Central staining, Filamentary Keratitis	Severe staining Corneal Erosions
Other Signs		Tear film: decreased vision(blurring)		

Treatment

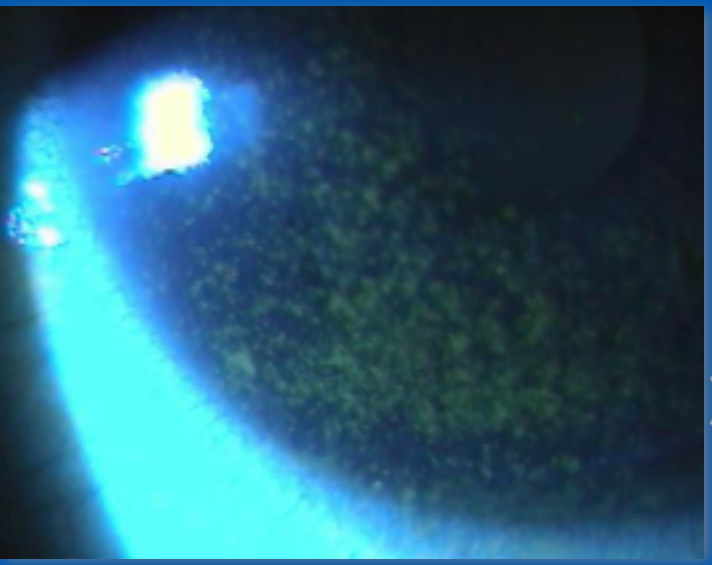
	Patient education Environmental modification Preserved Tears Control Allergy	Non preserved Tears Gels, Ointments Cyclosporine A Topical Steroids Sectretagogoues Nutritional Support	Oral Tetracyclines Punctal Plugs (once inflammation is controlled)	Systemic anti-inflammatory therapy Oral cyclosoprine Acetylcysteine Moisture goggles Punctal cautery
	If no improvement add level 2 treatments	If no improvement add level 3 treatments	If no improvement add level 4 treatments	

Blepharitis and Meibomian Gland Dysfunction

- Poor Lipid layer causes poor vision and ocular irritation disproportionate to the clinical findings
- You have to look for it by expressing the meibomian glands with pressure.

Associated Conditions?

- ROSACEA



»DRY EYES

~~Lid Hygiene~~ Eyelash Shampoo

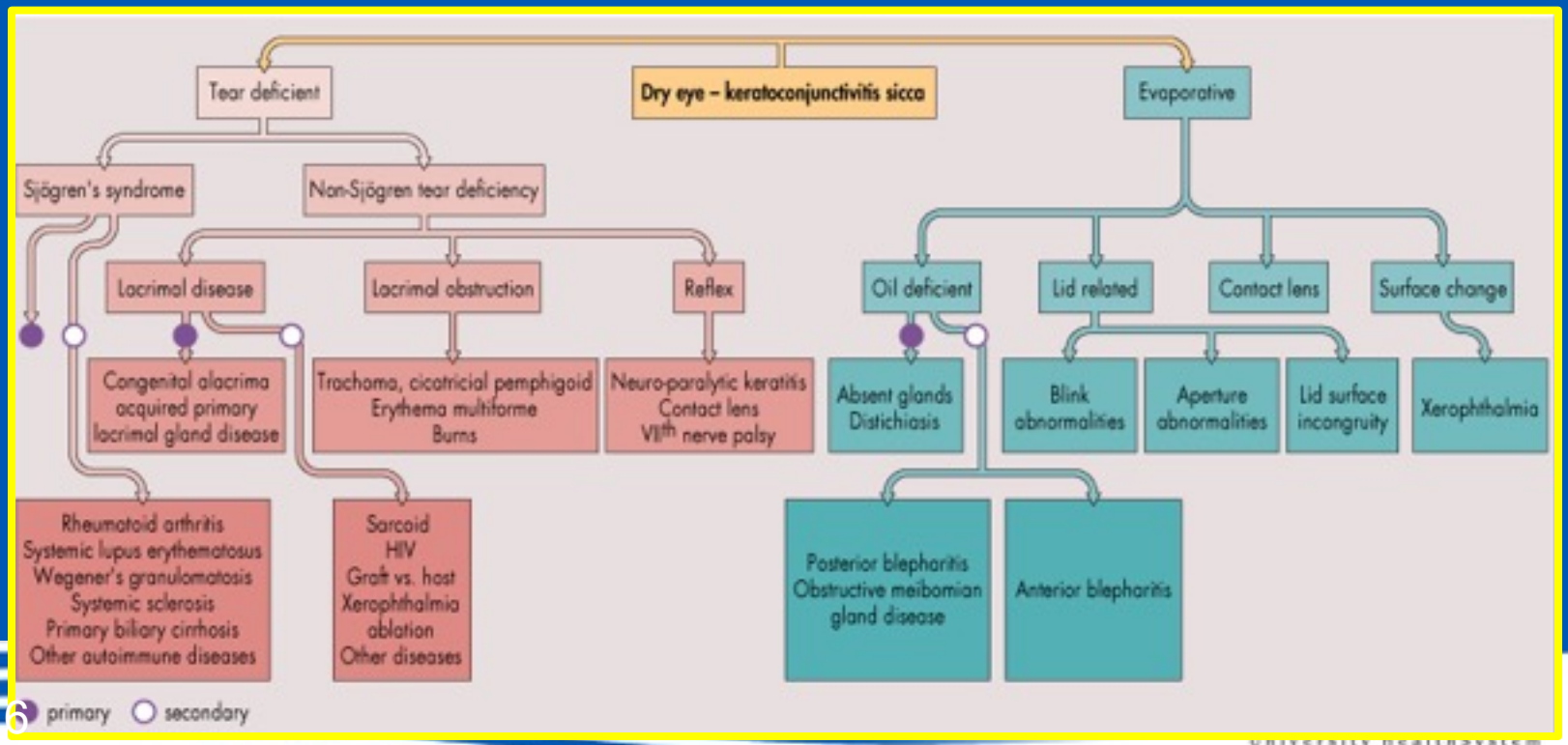
- Keep It Simple
- Dilute Detergent (Baby Shampoo)
- Perform in Shower (Daily)
- At end of Shower have patient shampoo lashes
- Rinse with eyes closed
- All Done!!
- Eyelash shampoo in the shower daily with initial use of Ointment at Bedtime----Tobradex or Azasite
-

Lacrimal Dysfunction

- Aqueous tear deficiency
- Tear quality and composition
- Ocular surface and lacrimal gland inflammation
- Systemic factors
  - Hormonal imbalances
  - Systemic immune/inflam

Dry Eye: Current Classification

- Aqueous deficient
- Evaporative

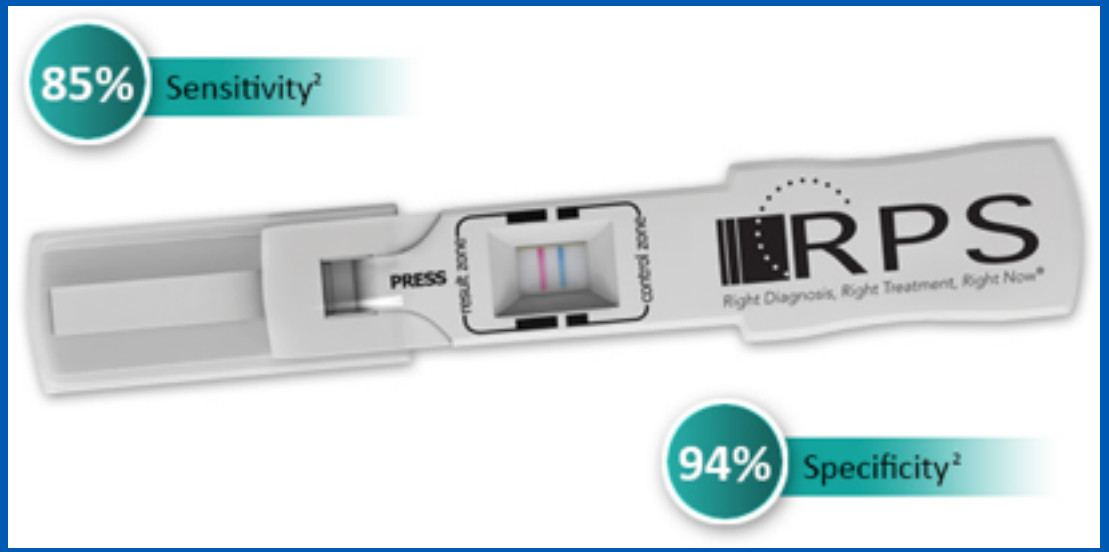


Dry Eye Clues

- Diurnal Fluctuation of Symptoms
- Exacerbation by environmental factors
  - Reading, watching TV, decrease blink rate
  - Drafts, smoky environments, airplane cabins
- Worsening of symptoms at night (aqueous tear production decreases at night)

Dry Eye Diagnosis

- Inflammadry
- in-office test that detects MMP-9, an inflammatory marker that is consistently elevated in the tears of patients with dry eye disease



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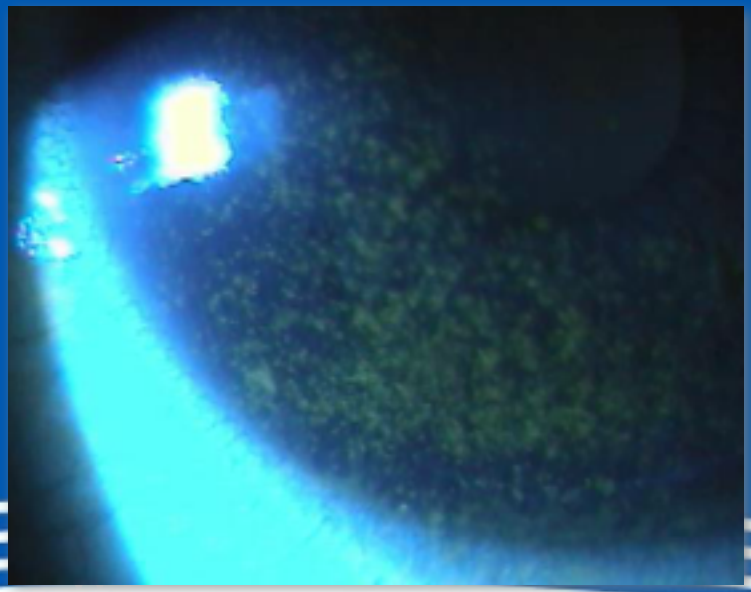
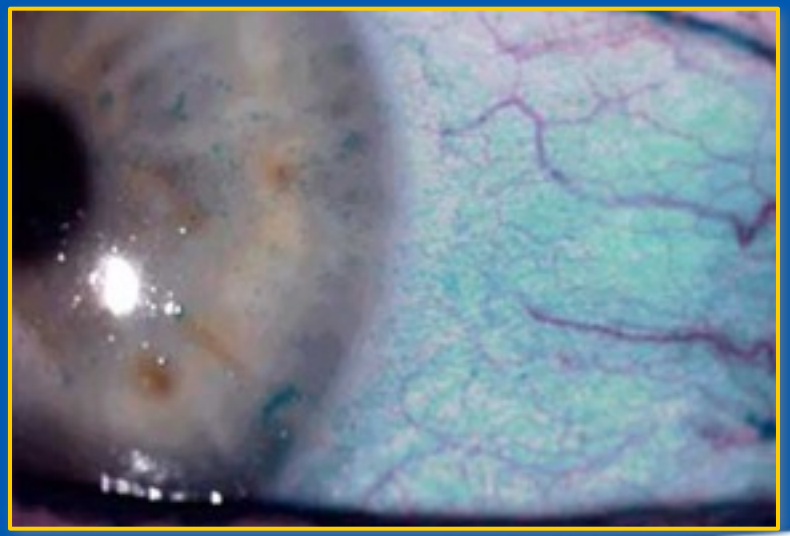
Ophthalmic Implications?

- Vision
- Infection
- Non healing epithelial defects
- Stem Cell Dysfunction
- Alter med effects?
- Retina, Peds, Glaucoma, Uveitis, Plastics, Neuro

Dry Eye: Therapy

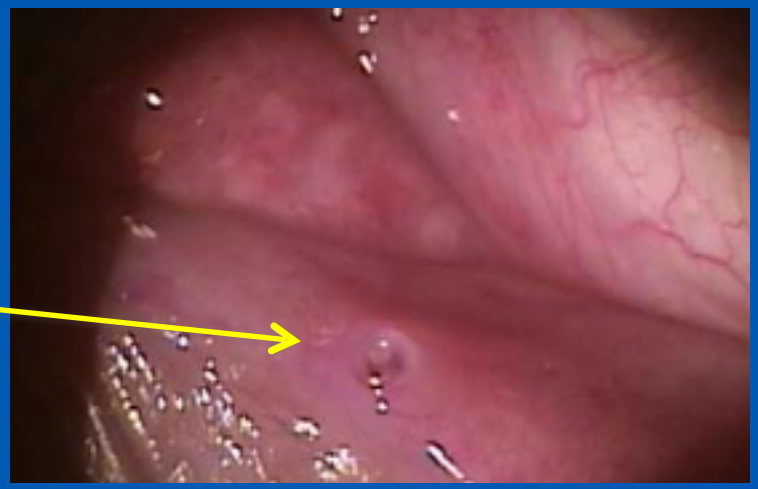
- Aqueous substitutes to normalize osmolarity
- Anti-inflammatory therapy
- ? Hormonal therapy





Palliative Treatment Options

- Lubrication
  - Artificial tears - Require frequent dosing
  - Ointments - Blur vision
  - Ocular inserts - Enough tears to melt rods?
  - Punctal Plugs



Punctal Occlusion

- Follows control of Inflammation
- Cautery Follows silicone trial
- Selected cohort
  - Age >75 years old
  - Female
  - Rheumatologic Disease
  - Schirmer's <5 mm
  - Sjogrens Disease

Treatment Strategy
Dry Eyes

- **Topical Cyclosporin Drops BID**
- In Stem Cell disease, keratitis, severe cases use topical loteprednalol or prednisolone
- Hold off on Punctal occlusion, unless RA, Melting, Severe disease.

Keraoconjunctivis Sicca: Induction therapy level 2 Patients

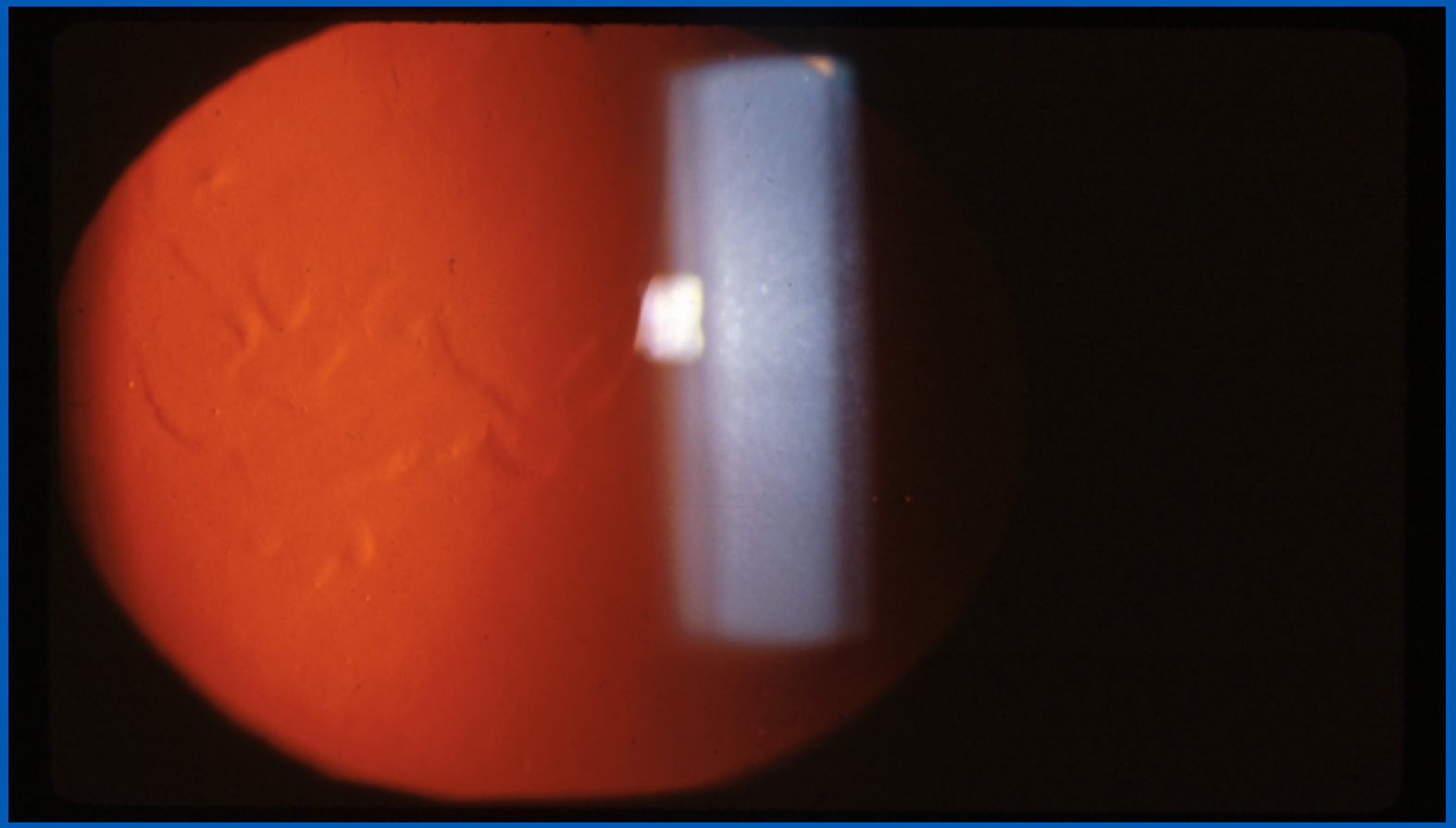
Day 1	Day 14	Day 60
Lotoprednolol QID	Lotoprenolol BID	Lotoprednolol if needed
	Cyclosporine BID	Cyclosporine BID
Artificial Tears	Artificial Tears	Artificial Tears

Cornea/External Disease Aesclepius Advisory Group Treatment Consensus
Sheppard, Donnenfeld, Holland Eye Contact Lens 2014 40(50)289-96

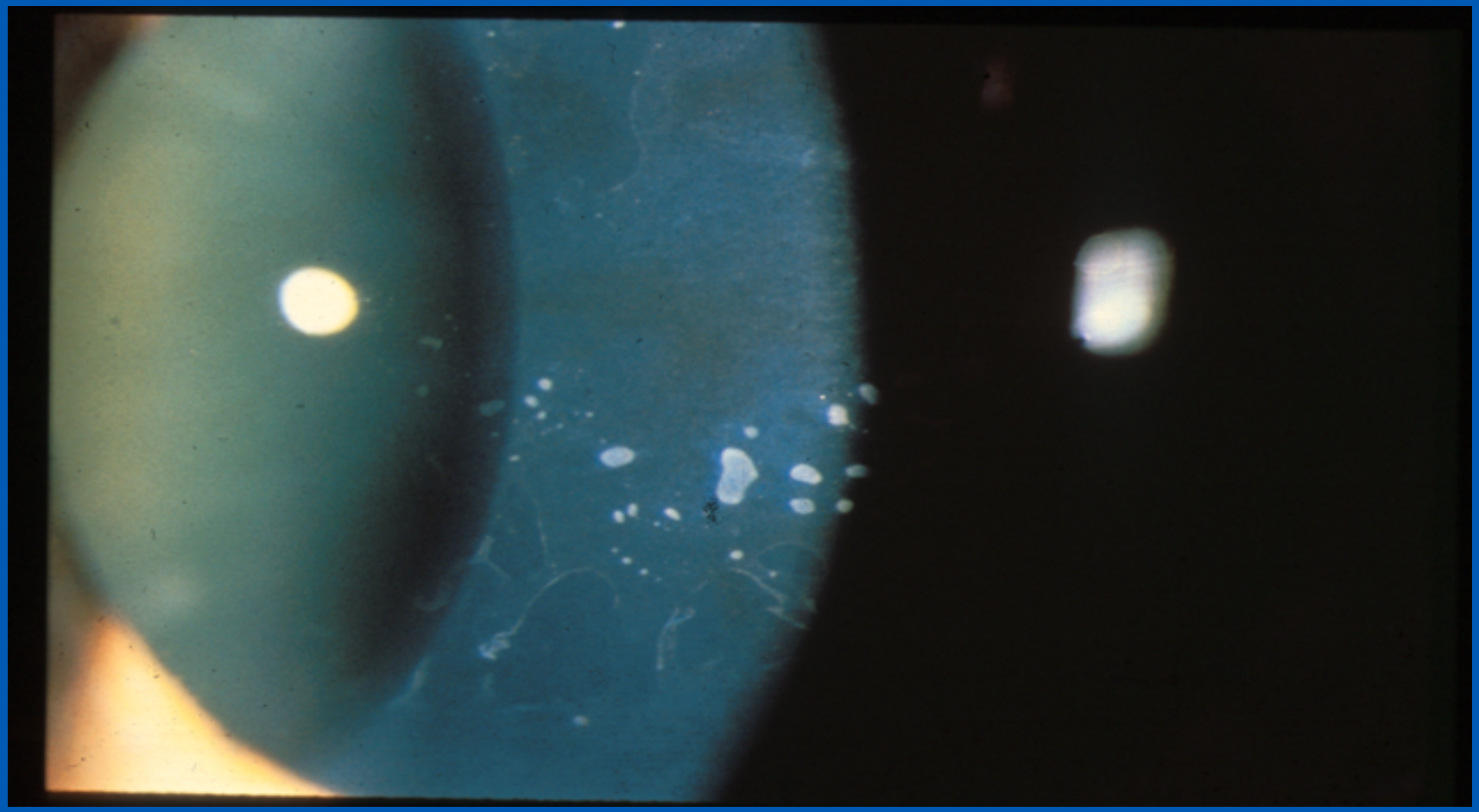
Patients to avoid

- Abnormal topography
- KCN, Pellucid, HSV, HZV,etc.
- Active Autoimmune Disease
- Ocular Surface Disease

EBMD



EBMD



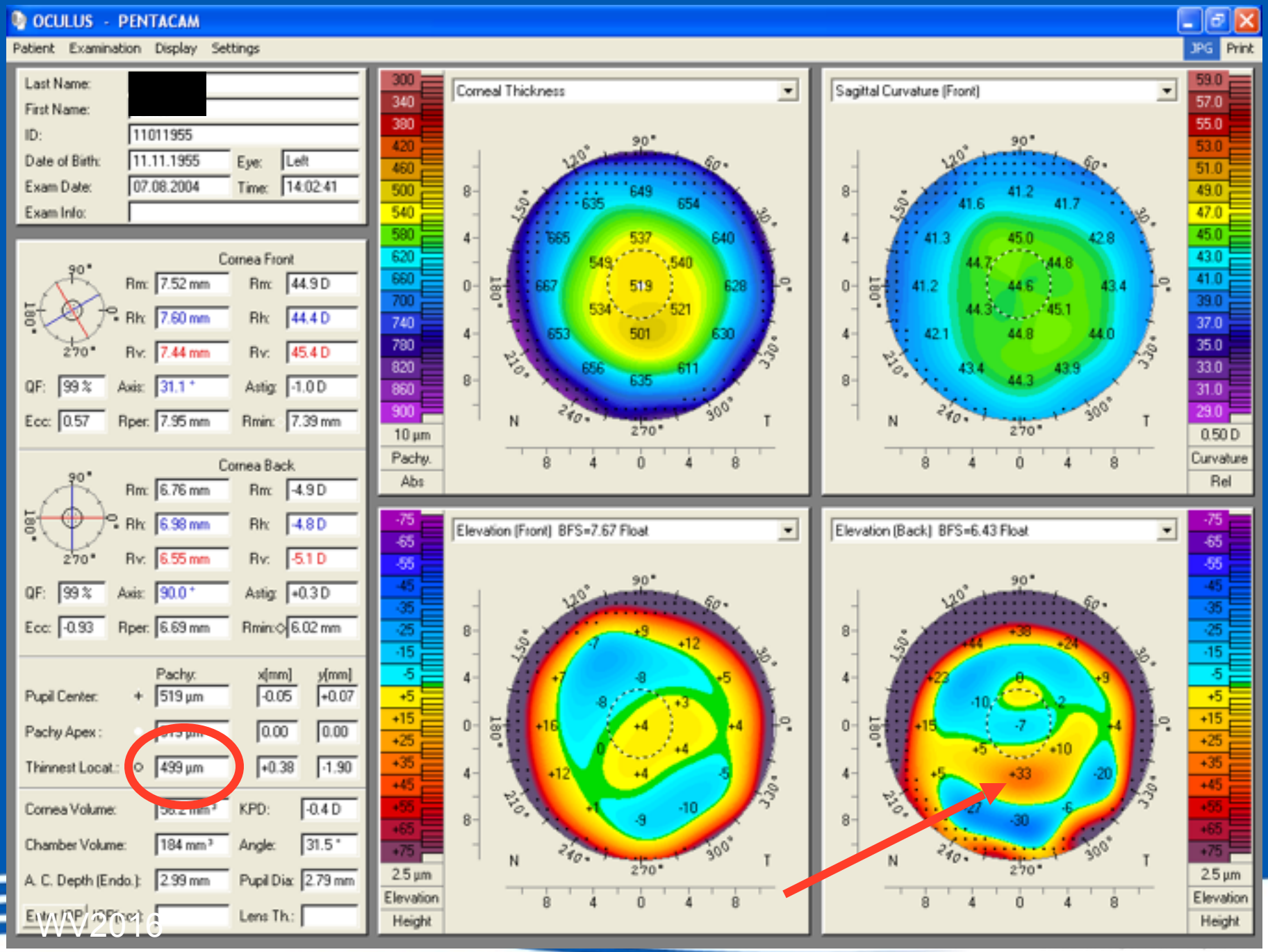
Beware Small or LARGE Pupils

- Small Won't Dilate
- Large Pupil may have glare
- Flomax
- Discuss post op night vision aberrations, haloes and glare, rings.

Keratoconus Screening

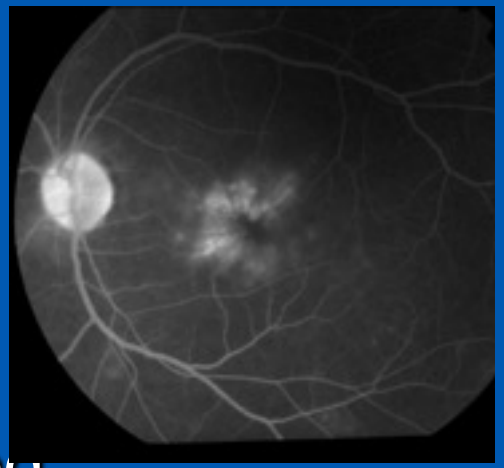
Is Screening Important?

- Identify patients with previously undiagnosed or "*form fruste*" Keratoconus for the same reason
- Assess Corneal Astigmatism!


OCULUS - PENTACAM
Patient Examination Display Settings
JPG Print
Last Name:
First Name:
ID: 11011955
Date of Birth: 11.11.1955 Eye: Left
Exam Date: 07.08.2004 Time: 14:02:41
Exam Info:
Cornea Front
Rm: 7.52 mm Rm: 44.9 D
Rh: 7.60 mm Rh: 44.4 D
Rv: 7.44 mm Rv: 45.4 D
QF: 99 % Axis: 31.1 ° Astig: -1.0 D
Ecc: 0.57 Rper: 7.95 mm Rmin: 7.39 mm
Cornea Back
Rm: 6.76 mm Rm: -4.9 D
Rh: 6.98 mm Rh: -4.8 D
Rv: 6.55 mm Rv: -5.1 D
QF: 99 % Axis: 90.0 ° Astig: +0.3 D
Ecc: -0.93 Rper: 6.69 mm Rmin: 6.02 mm
Pachy: x[mm] y[mm]
Pupil Center: 519 µm -0.05 +0.07
Pachy Apex: 0.00 0.00
Thinnest Locat.: 499 µm +0.38 -1.90
Cornea Volume: KPD: -0.4 D
Chamber Volume: 184 mm³ Angle: 31.5 °
A. C. Depth (Endo.): 2.99 mm Pupil Dia: 2.79 mm
Lens Th.:
Corneal Thickness
10 µm
Pachy.
Abs
Sagittal Curvature (Front)
0.50 D
Curvature
Rel
Elevation (Front) BFS=7.67 Float
2.5 µm
Elevation
Height
Elevation (Back) BFS=6.43 Float
2.5 µm
Elevation
Height

Prevention of CME

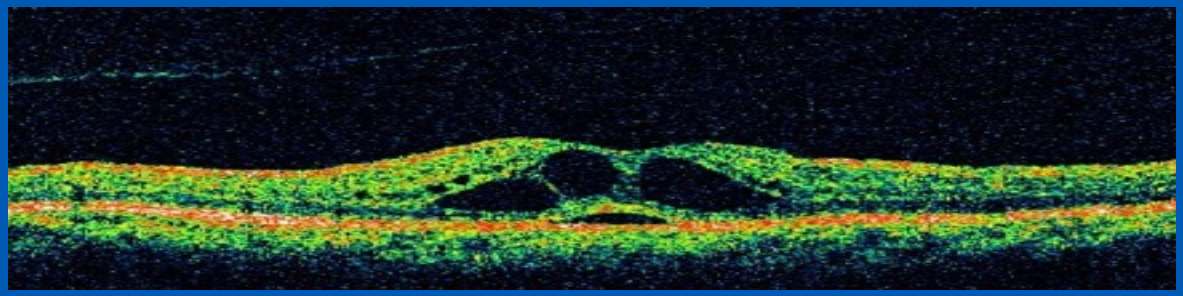
- CME is the most frequent cause of visual decline following uncomplicated cataract surgery
- Late onset (4 to 6 weeks)
- Estimated to occur in 12% of low-risk cataract cases[2]
- CME due to prostaglandin-mediated breach of blood-retinal barrier[3]



1. Samiy N, Foster CS. The role of nonsteroidal anti-inflammatory drugs in ocular inflammation. *Int Ophthalmol Clin*. 1996;36(1): 195-206. 2. McColgin AZ, Raizman MB. Efficacy of topical diclofenac in reducing the incidence of postoperative cystoid macular edema. *Invest Ophthmol Vis Sci*. 1999; 40 S289. 3. Mishima H, Masuda K, et al. The putative role of prostaglandins in cystoid macular edema. *Prog Clin Res* 1989;31:251-264.

Optical Coherence Tomography (OCT)

- Can measure even subtle postoperative retinal thickening
- Gaining popularity for diagnosis of CME



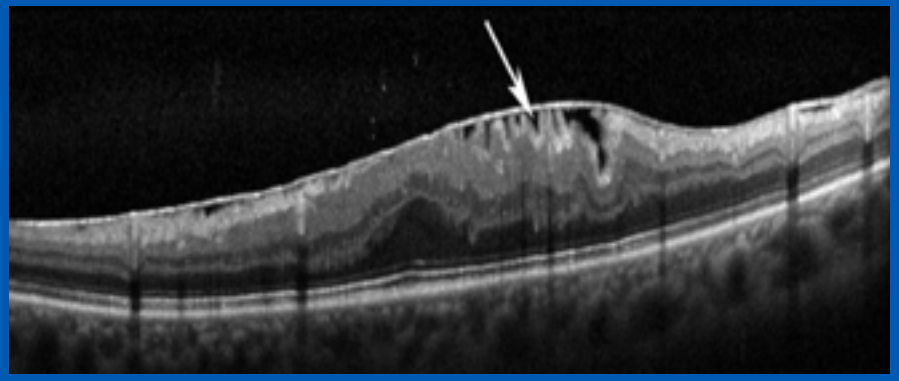
Heier, JS. Preventing post-cataract extraction CME: Early identification of patients at risk and prophylactic treatment may avert vision loss. *Ophthalmology Management* 2004;63-72.

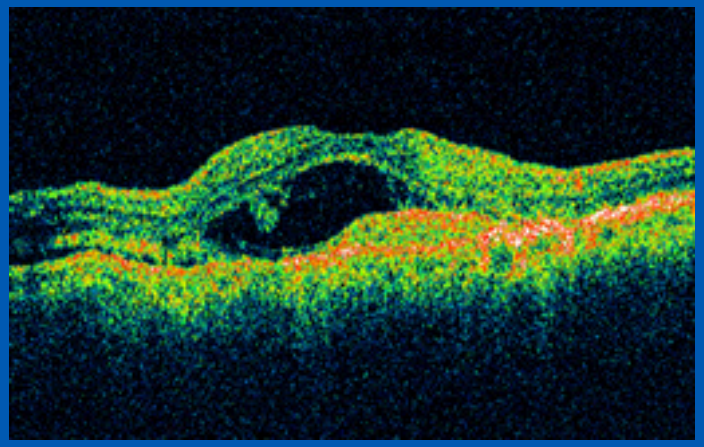
Risk Factors for CME

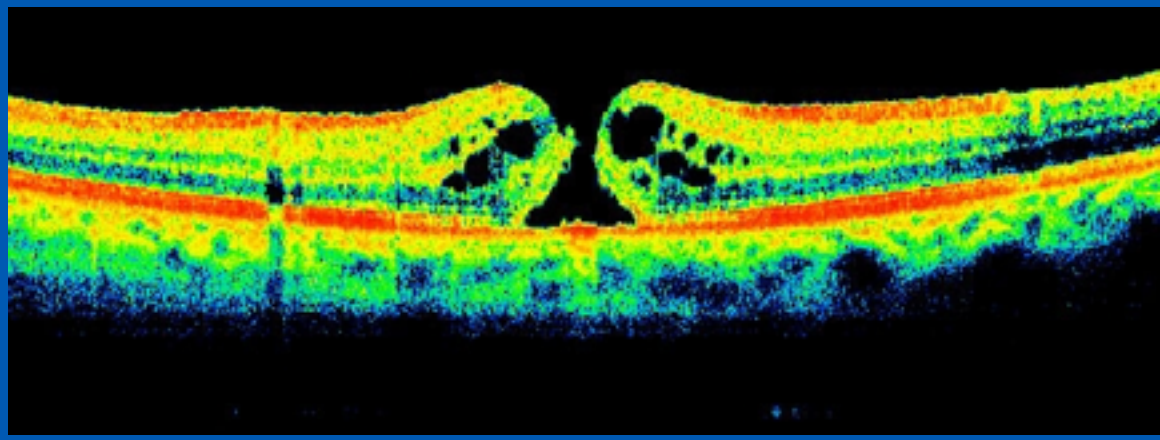
- Pre-existing ocular inflammation
- Epi-retinal or vitreo-retinal interface membrane problems
- Diabetic retinopathy
- Patients suffering from ocular vascular or cardiovascular disease
- Patients with history of retinitis pigmentosa
- Not candidates for Premium IOL's

Consider pre op OCT in refractive IOL Patients

- Epi-retinal membranes
- Macular Holes
- AMD / Drusen
- Macular Pathology







Cataract Patient IOL Selection

- Can't See at Distance
- Can't See at Near
- Astigmatism

- WE can fix 2 out of 3!! Or 3 out of 3!!

Check for COMA HOA

- High COMA aberrations cause unhappy patients with multifocal IOL implantation
- Cut off at 0.33, over equals unhappy post op patients.

IOL SELECTION

- Monofocal
- Monovision
- Toric IOL
- Multifocal IOL
- Limbal relaxing incisions

Accurate IOL Calcs

- When in doubt REPEAT
- Consider Immersion
- Manual K's, Topography
- Know the amount of astigmatism you induce (0.5D)
- Incision location (10 degrees)
- In Restore aim Hyperopic!!

Toric IOLs

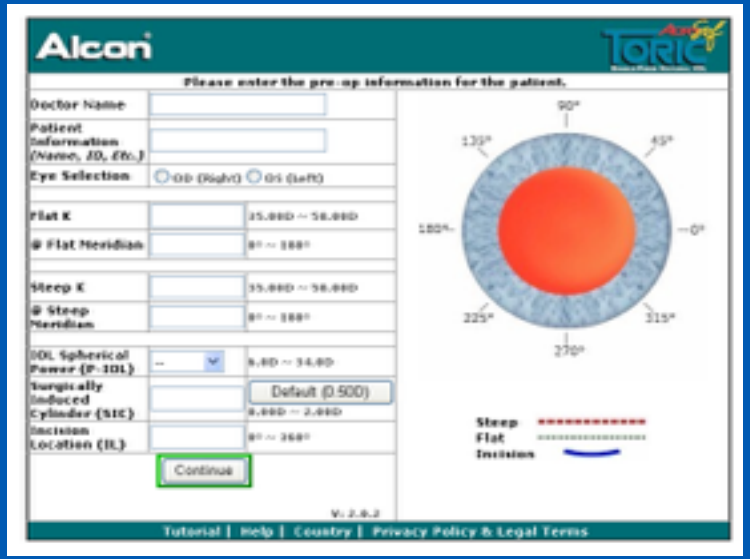
- Excellent Distance Visual Acuity
- Distance Vision Spectacle Independence
- Precise Astigmatic Correction
- Rotational Stability with the proven AcrySof® Single-Piece Platform

Toric IOL Procedural Considerations

- Standard cataract procedure from capsulorhexis through phacoemulsification
- capsulorexis overlay
- Toric IOL implantation requires special considerations in a few key areas:

1. IOL calculation
2. Marking of the eye
3. IOL alignment (on-axis)

Toric IOL
Step One – IOL Calculation



Step I:

- **Determine required spherical power using preferred method for SN/ SA60AT**

Step II:

Utilize AcToric IOL Calculator to determine the correct IOL model and optimal axis location of the IOL in the capsular bag

Toric IOL

Step Two – Marking of the Eye

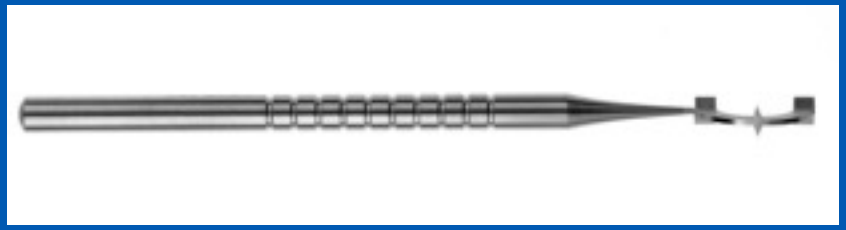
I. **Reference Marks (pre-op)**

- placed at limbus in three locations (0°, 90° and 180°)
- patient in sitting position (cyclotorsion)

II. **Axis Marks (intra-op)**

- Axis marks identify the optimal axis of IOL placement as determined by the Toric Calculator
- Axis marks are placed on the eye using pre-op reference marks for alignment of instrument

Toric IOL
Marking Instruments

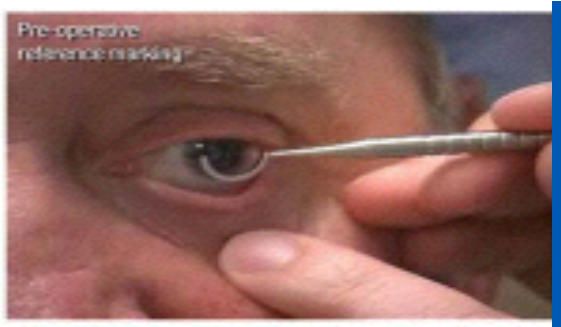


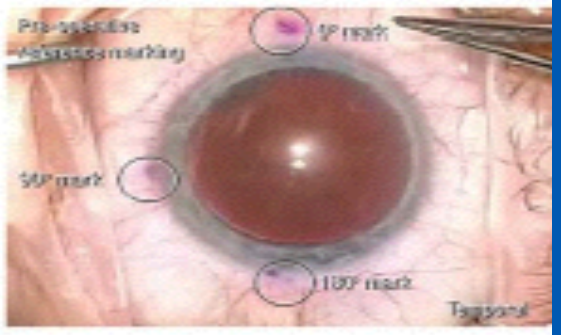
Toric Reference Marker
ASICO AE-2791

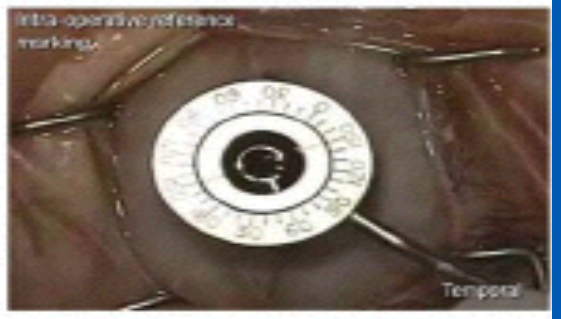
Toric Axis Marker
ASICO AE-2792

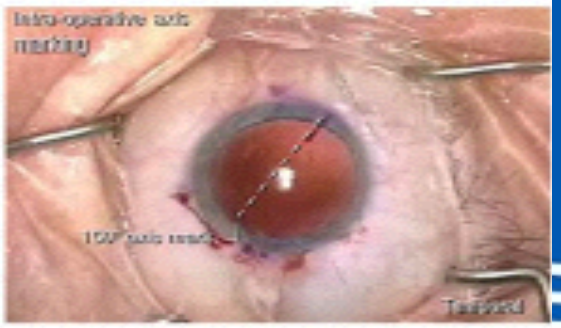
Reference Marks

Axis Marks









Toric Reference Marker
ASICO AE-2791

Toric Axis Marker
ASICO AE-2792

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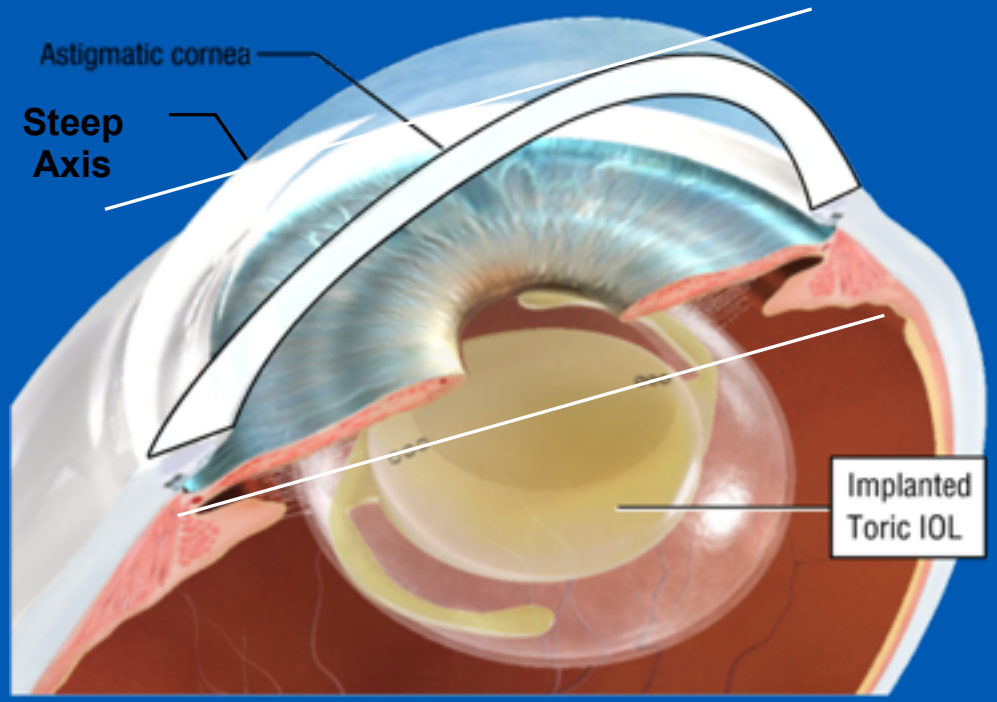
Toric IOL

Step Three – IOL Alignment

3 Step Procedure:

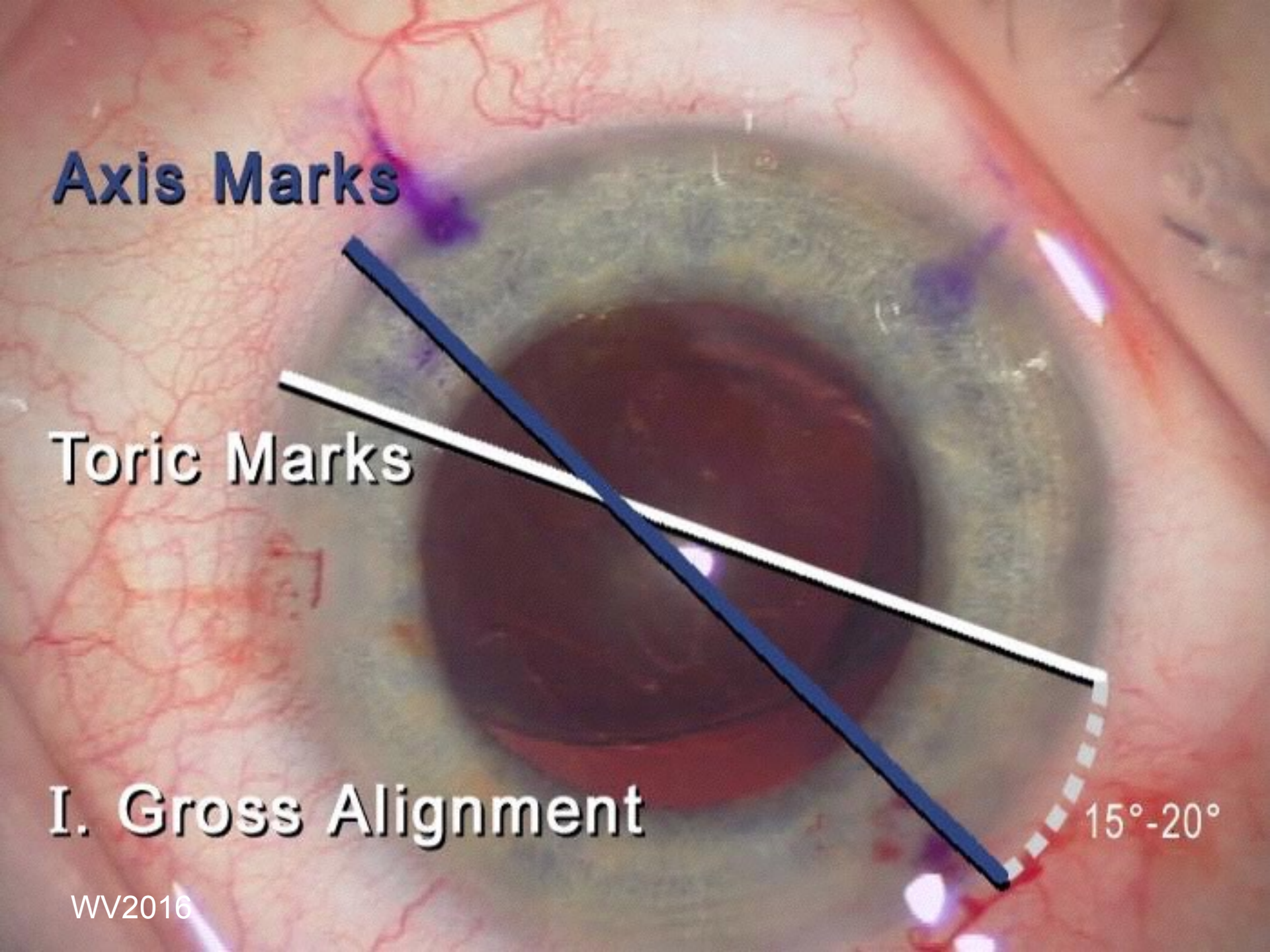
I. Gross alignment
II. Removal of Visco
III. Final alignment



Toric IOL

Step Three – IOL Alignment

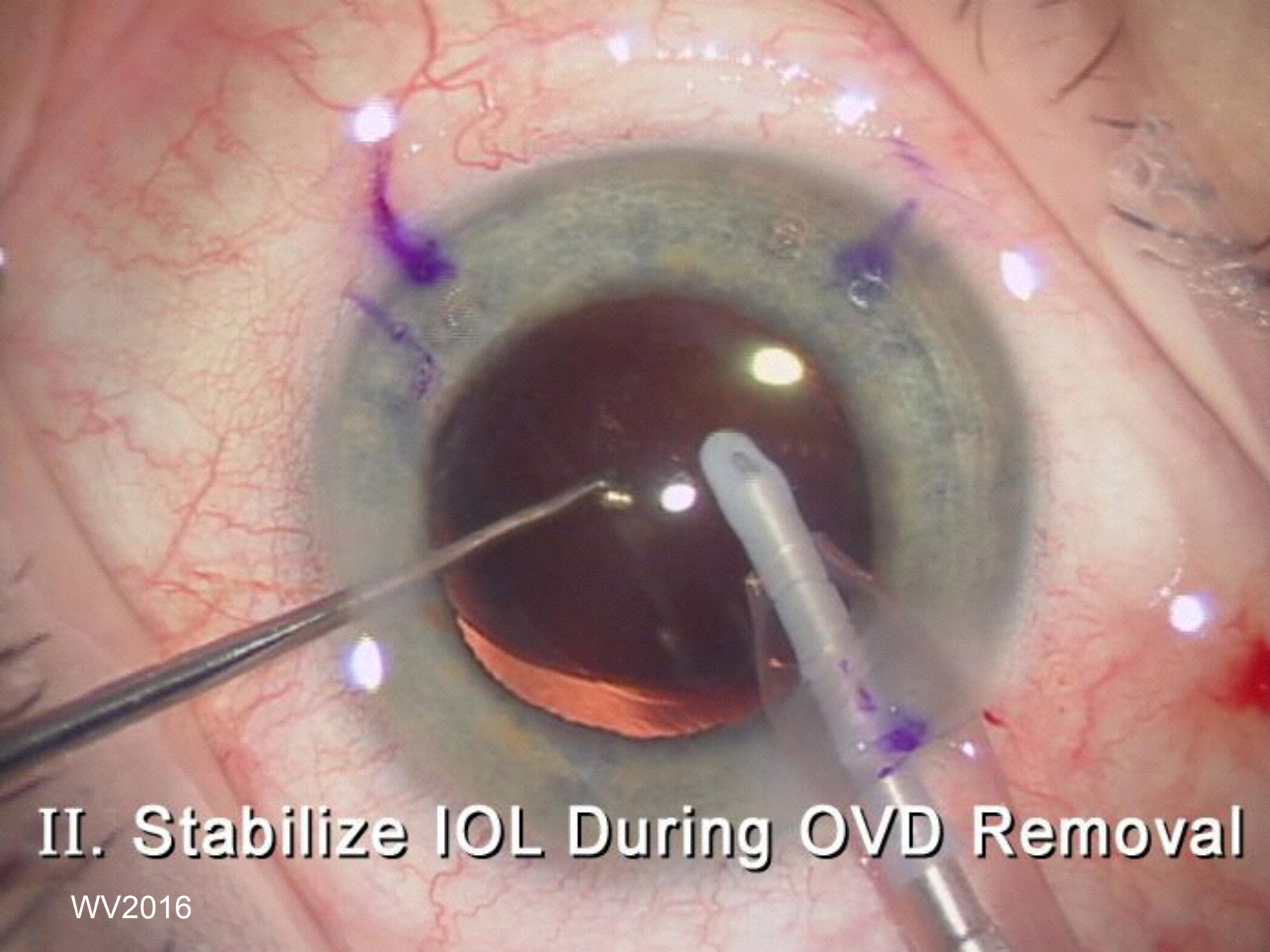
I. Gross Alignment
   - Rotate IOL clockwise to approximately 15° to 20° short of desired position
   - Completed while the IOL is unfolding in the capsular bag


Axis Marks
Toric Marks
I. Gross Alignment
15°-20°
WV2016

Toric IOL
Step Three – IOL Alignment

II. Stabilize IOL During OVD Removal

- Take care to prevent IOL from rotating past intended axis during OVD removal
  - 2nd instrument
  - Silicone I/A tip (If available)

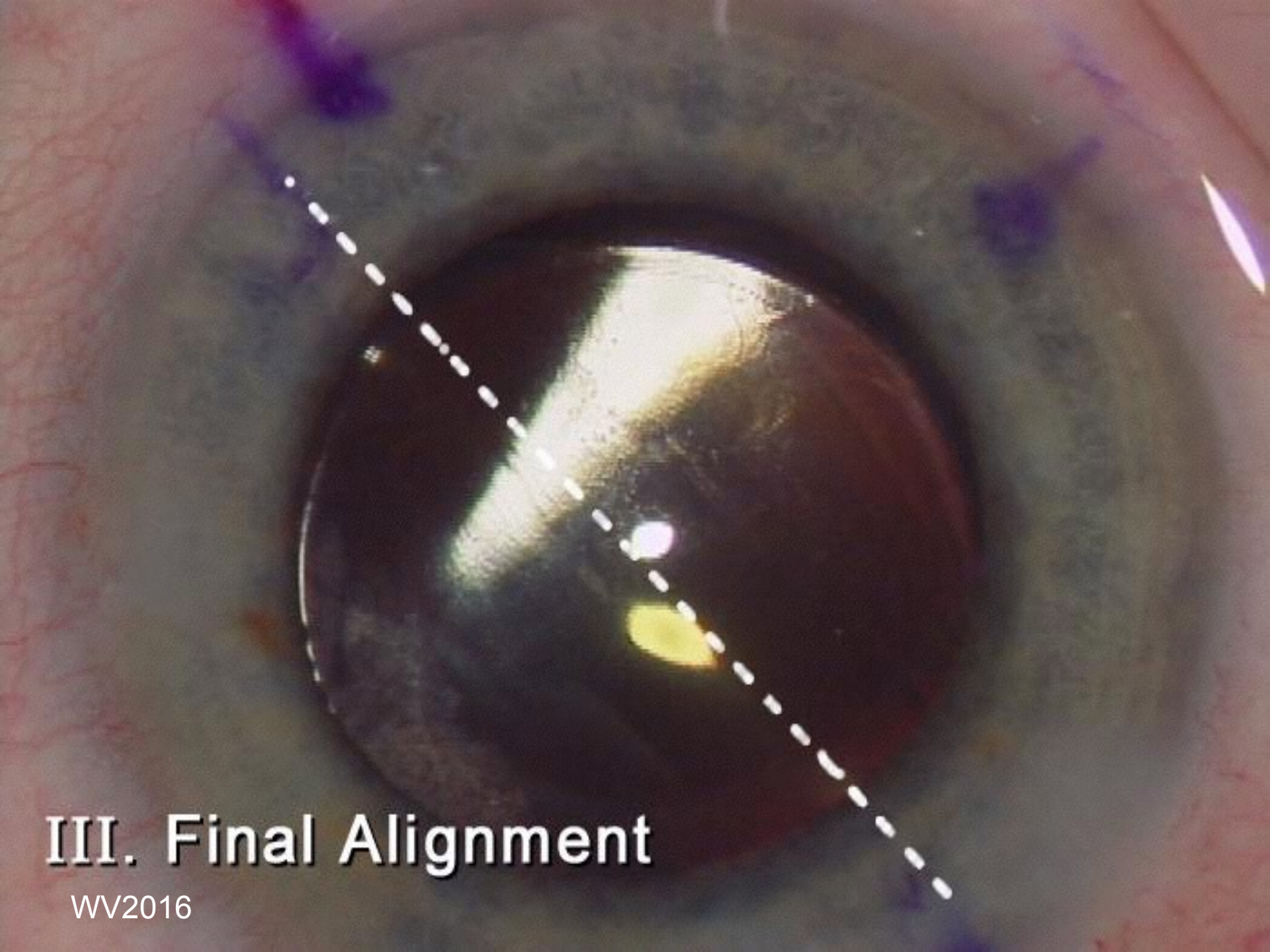

II. Stabilize IOL During OVD Removal
WV2016

Toric IOL

Step Three – IOL Alignment

III. Final Alignment

- Carefully rotate IOL clockwise precisely onto the intended axis of alignment
- Tap IOL down into capsular bag to seat lens in place


III. Final Alignment
WV2016

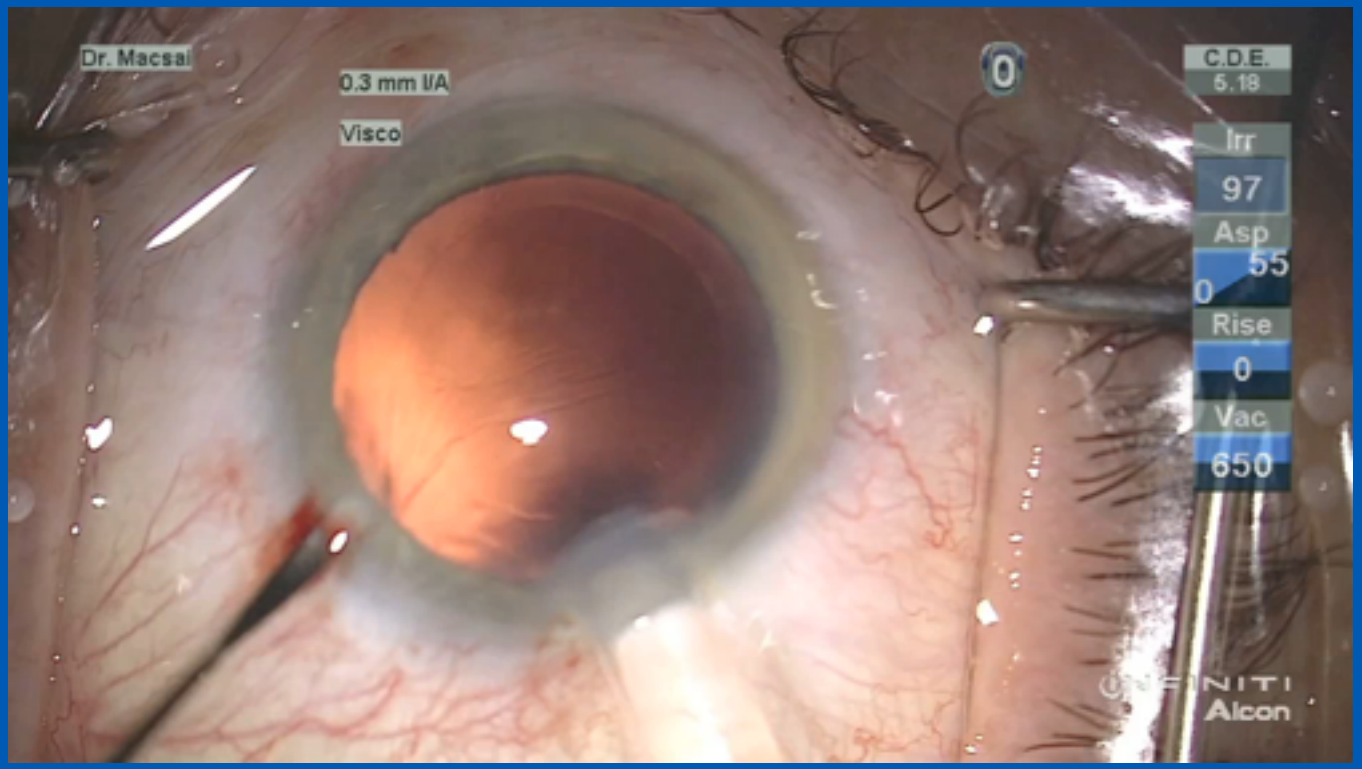
Intra-operative

- Exclusion during surgery
  - Significant vitreous loss (ORDER A 3 PIECE BACKUP)
  - Pupil trauma or manipulation to enlarge
  - Factors that impact long-term IOL stability
    - » Zonular damage
    - » Capsulorhexis tear/rupture
    - » Capsular rupture
  - Anterior chamber bleeding
  - Uncontrolled IOP increases

Centration

- Have patient look at the microscope light
- Haptics 6:00 and 12:00
- Pupil placement
- Visual axis
- Slightly nasal

RESTORE Centration



Manage Complication

Surgeon Requirements

- Manage Complications
- Manage Patient Expectations and Dissatisfaction
  - PT for their new eyes, encourage reading smaller and smaller print in good light

Postoperative

- Topical Frequency
  - Generic :QID
  - Brand: QD or BID
  - Preservative, Toxicity, compliance
- Surface Regression
  - Resume preoperative strategy
  - Operative Trauma
  - Preservative
- Dropless cataract Surgery

Dropless Cataract Surgery

- Intrevitreal Injections
  - Transzonular
  - Pars plana
- Medications
  - Triamcinolone + Moxifloxacin
  - Triamcinolone + Moxifloxacin + Vancomycin
- Lacking NSAID

Dropless Cataract Surgery

- Not FDA approved
- Compounding political issues
- Surgeon learning curve
- Patient education: floaters
- No endophthalmitis … to date
- Cost

Dropless Cataract Surgery

- Not FDA approved
- Alternative therapy
- Intracameral Moxifloxacin, and hydration of wounds with Moxifloxacin
- Subconjunctival Kenalog
- Meticulous cortical clean up

Refractive Surprises

- Piggy back IOL
- Corneal Incisional Surgery
- Laser Surgery
  - PRK and LASIK equally effective in monofocal IOL patients

Refractive Surprises

- Axial Length Measurement Errors
- Inaccurate Calculation of Corneal Power
- Inaccurate Calculation of Anterior Chamber depth or effective lens position
- Sulcus Lens Placement
- Incision Induced Astigmatism

Laser Complications/Concerns

- Keratoconjunctivitis sicca
- Wound healing issues
- Stem cell dysfunction
- Haloes and Night Vision disturbance

Corrective Surgery Timing

- Wait 6-12 weeks
- Wound Integrity
- Subclinical Corneal Edema
- Refractive Stability
- IOL Stability

What to Treat?

- Retinoscopy
- Manifest Refraction
- Cycloplegic Refraction
- Trial Frame or
- Contact Lens Trial prior to Ablation

LASIK ERRORS
Cataract Errors

- No Operation lives up to the “hype”
- Surgeons push techniques beyond their limits
- Know when to Stop and Start
- “WHEN WE ARE STUPID WE PAY!”
- Don’t Guarantee Anything!!
- Goal is to decrease dependency on glasses!

Where to start?

- Where to start?
  - High Hyperopes First
  - Mild Hyperopes Second
  - High Myopes Third
  - Mild Myopes and low hyperopes Fourth
  - Low myopes after extensive experience (25 patients)
  - Emmetropes at your own risk!!!

Keys to Success

- Patient expectations
- Healthy Ocular Surface
- Accurate IOL calcs
- IOL Selection
- Astigmatism Management
- Complication Management
- TRUST YOUR STAFF AND YOUR INSTINCTS!!

Thank you for your attention