

## Gonioscopy and Slit Lamp Exam for the Glaucoma Suspect



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## Disclosure

- Michael Chaglasian has the following disclosures:
  - » 1. Advisory Board: Alcon, Allergan, Bausch+Lomb, Carl Zeiss Meditec, Merck, Sucampo
  - » 2. Speakers Bureau: Alcon, Allergan, Carl Zeiss Meditec
- The content of this presentation is in no manner influenced by any of the aforementioned parties or companies

## GONIOSCOPY:

- A **MUST** to confirm diagnosis
- van Herrick is **NOT** accurate.
- For those with narrow angles identify lowest structure visible:  
CB > SS > TM > SL
- A steep-narrow approach may also be noted

## Gonioscopy Why??

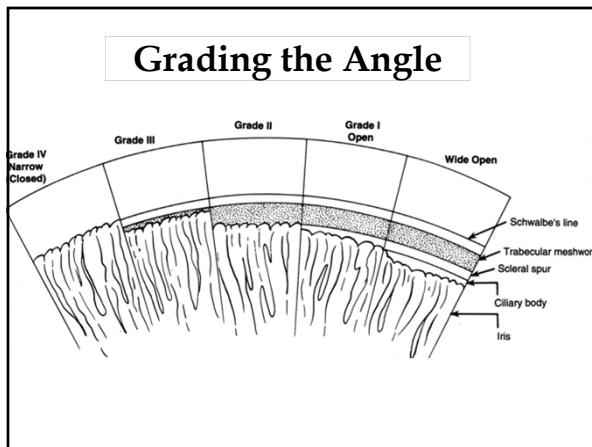
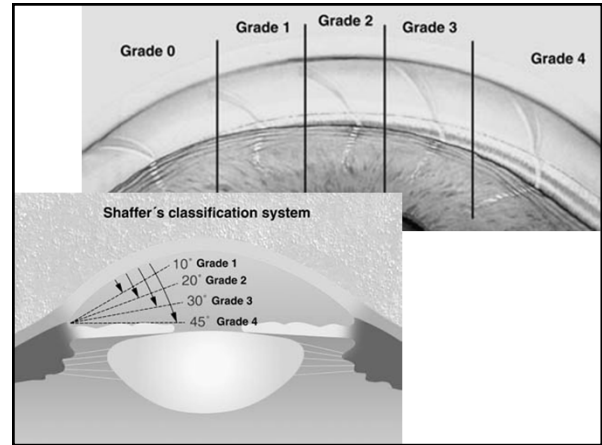
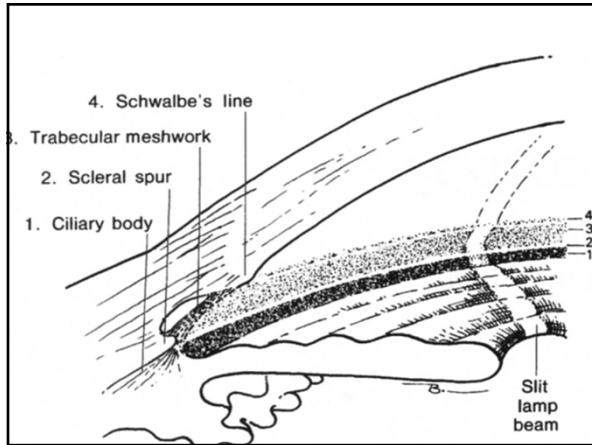
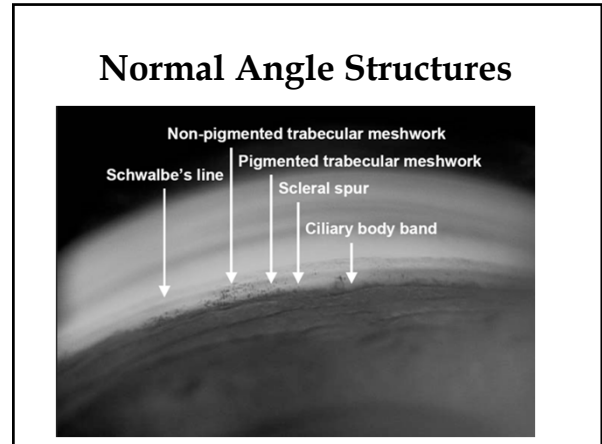
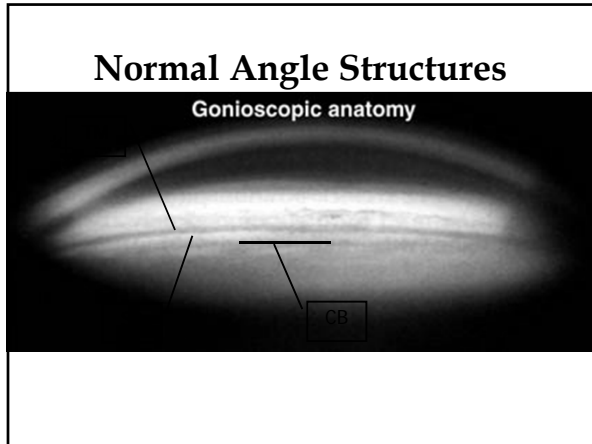
- Indications:
  - » **ALL** glaucoma suspects.
  - » can't diagnose "open" angle glaucoma without seeing that the angle is "open"!!!
  - » Angle abnormalities;
    - Pigmentation neovascularization
    - recession foreign bodies
  - » **appositional vs. synechial closure**

## GONIOSCOPY

- Look at peripheral iris
- Look for peripheral anterior synechia as evidence of past closure attacks
- Gonioscopy of both eyes to confirm a narrow angle approach (symmetry).

## What should I look for?

- Angle landmark structures
  - » Record the deepest structure that you see
  - » Estimate width (degrees) of angle opening
    - iris surface to corneal endothelium
  - » Peripheral Anterior Synechia (PAS)
  - » Amount of Trabecular Meshwork pigment
  - » Shape and profile of peripheral iris
    - » May show anterior "bowing" (bombe)



### Modified Shaffer Grading System

	Grade 0	Grade I	Grade II	Grade III	Grade IV
Shaffer	Closed	10°	20°	30°	40°
Modified Shaffer	Schwalbe's line not visible	Schwalbe's line visible	Anterior TM visible	Scleral spur visible	Ciliary band visible

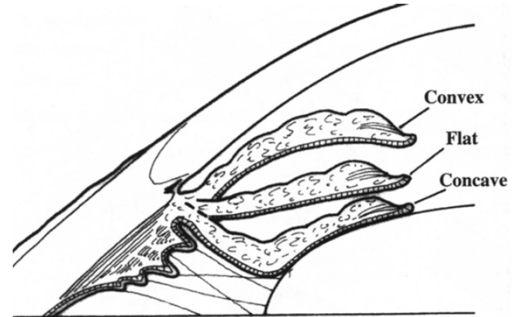
Red = higher risk  
Yellow = medium risk  
White = lower risk

SEAGIS, Asia Pacific Glaucoma Guidelines, 2003-2004.

### Schwalbes's Line vs. TM



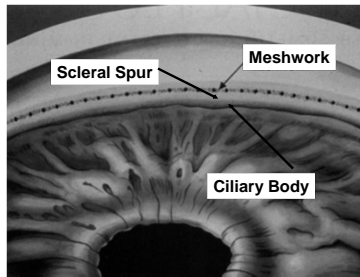
### Peripheral Iris Configurations



### GONIOSCOPY

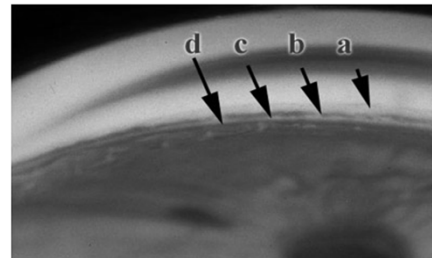


Three Mirror Lens



Angle Structures

### Key Structure: Scleral Spur (c)



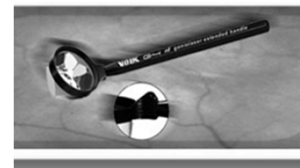
• If this is identified, future, short term angle closure is unlikely

### Four-Mirror Gonioscopy

- **Pro's:**
  - » **exam friendly**
    - no formal pt preparation required
    - quick → 360° assessment in 10-15 seconds
    - can view all 4 quadrants without moving lens
  - » **patient friendly**
    - no goniosol down pt cheek
    - no torquing of eye as rotate lens
    - no suction to break for lens removal
    - easier for pt's with small interpalpebral fissures
  - » **allows indentation gonio for PAS evaluation**
  - » **for all above reasons, you'll do it more often**

### Gonioscopy Lenses

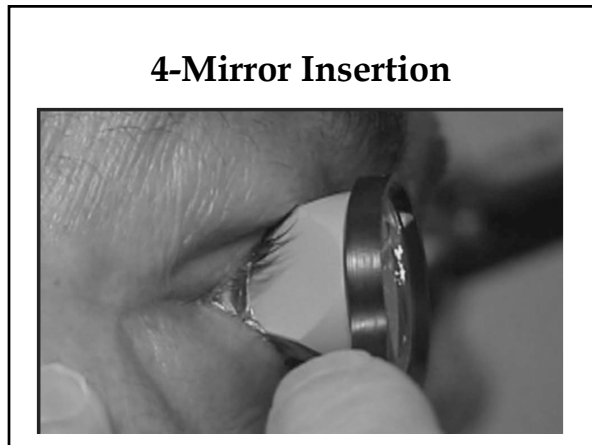
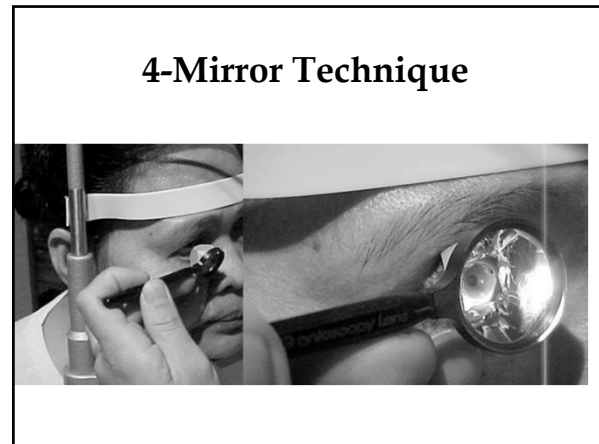
- Volk G-4 nf
- Volk G-4
  - » 2 in 1
  - » [www.volk.com](http://www.volk.com)



### Gonioscopy Lenses

- Posner 4 mirror
  - » Handle
- Sussman 4 mirror
  - » No handle
  - » [www.ocular-instruments.com](http://www.ocular-instruments.com)





### General Guidelines

- Do an external and slit lamp examination first.
- Perform Tonometry First.
  - » Gonio may lower IOP
- Use anesthesia.
- Gonio for both eyes.
- Keep lens centered.

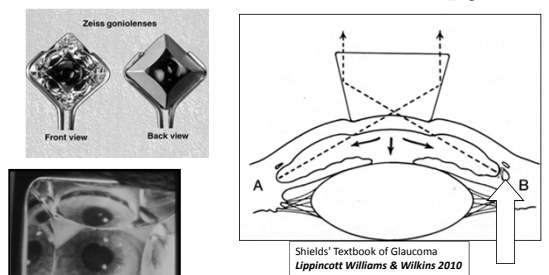
22

### General Guidelines

- Use Magnification of 10-25x
- Use short and narrow beam
  - » May rotate beam
- Use joystick to move beam across view
- "Tilt" lens on cornea to view over iris bowing
- Use a dark room
  - » constricted pupil in lighted room will appear more open


23

### Indentation Gonioscopy



Shields' Textbook of Glaucoma  
Lippincott Williams & Wilkins 2010

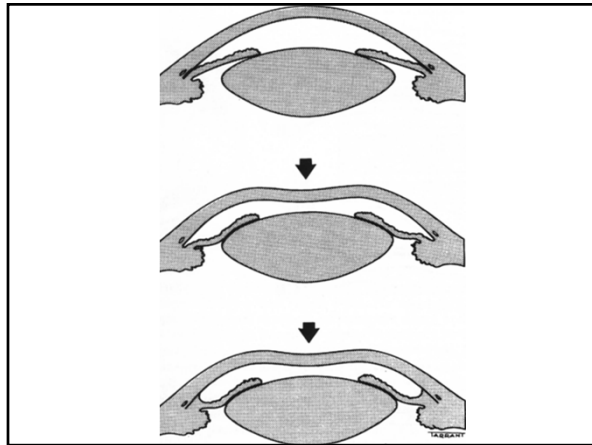
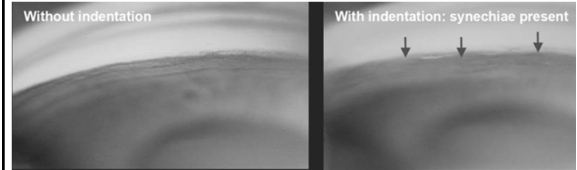
A. = Appositional angle closure  
B. = Synechial angle closure



### Indentation Gonioscopy

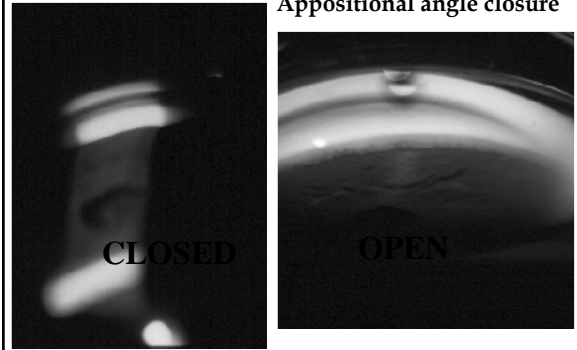
- Useful when iris surface is convex
  - » Done when it's difficult to recognize angle structures
  - » Deepening the angle "makes things clearer"
- Can/Should be done most of the time
  - » Identifies amount of PAS and extent of the angle closure.

### Indentation Gonioscopy

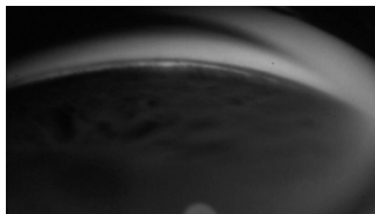


### Four-Mirror Gonio: Indentation

Appositional angle closure

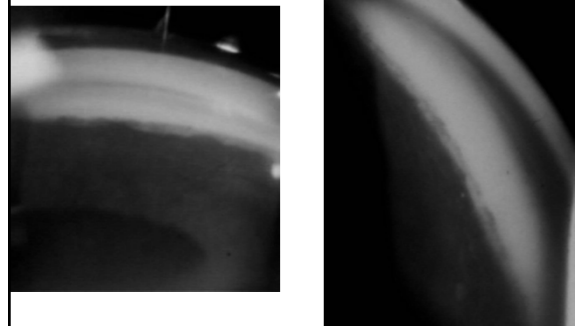


### Open Angle




29


### PAS



30

## Gonioscopy on the Web!



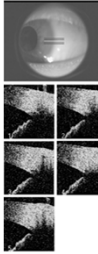
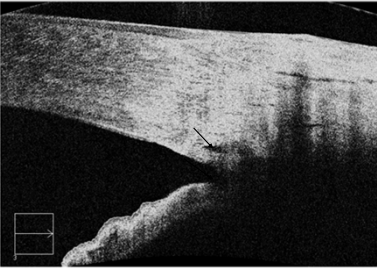
<p><b>Introduction</b></p> <p><b>History of Gonioscopy</b></p> <p><b>Basic Examination Techniques</b></p> <p><b>Techniques for Difficult Angles</b></p> <p><b>The Normal Angle</b></p> <p><b>Angle Grading</b></p> <p><b>Examples of Diagnoses (147)</b></p> <p><b>What's New? (22 Aug 08)</b></p>	<p>This site is dedicated to teaching gonioscopy through the use of videography. It covers the basic examination techniques and more advanced techniques, such as indentation and the corneal wedge. There are video examples of most glaucoma-related diseases.</p> <p>I hope that you find it to be educational.</p> <div style="text-align: center;">  <p><b>Wallace L.N. Alward, MD</b>              Frederick C. Bosh Chair in Ophthalmology              Director, Glaucoma Service              Department of Ophthalmology              and Visual Sciences              University of Iowa College of Medicine</p> </div> <p style="text-align: center;">Dedicated to L. Lee Allen 1919-2004</p> <p style="font-size: small;">Video Production &amp; Editing: Randall G. Verdick              Web Design: Jessica L. Bryant</p>	
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[www.gonioscopy.org](http://www.gonioscopy.org)

## Video

32

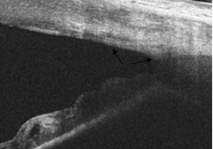
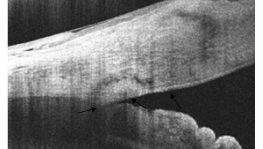
## OCT Anterior Segment Imaging

Cirrus HD-OCT image with a visible angle recess (blue arrow). Schlemm's canal is very well clearly seen (red arrow).

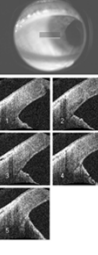
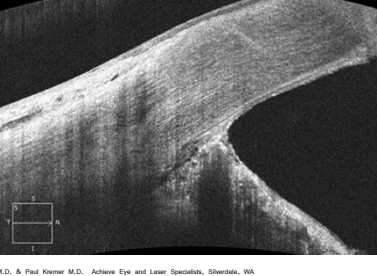
## Segment Imaging

Angle Structures

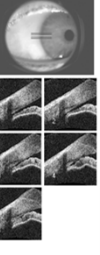
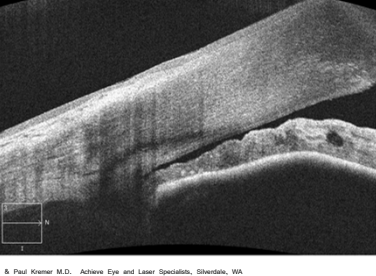
- Scleral spur (red arrow)
- Schlemm's canal (blue arrow)
- Schwalbe's line (green arrow)

## Cirrus HD-OCT Anterior Segment Imaging

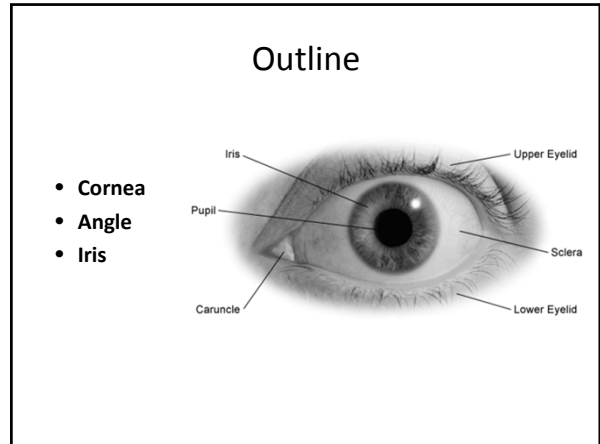
Images courtesy of Martha Lein, M.D. & Paul Krmer M.D., Achieve Eye and Laser Specialists, Silverdale, WA

## Cirrus HD-OCT Anterior Segment Imaging

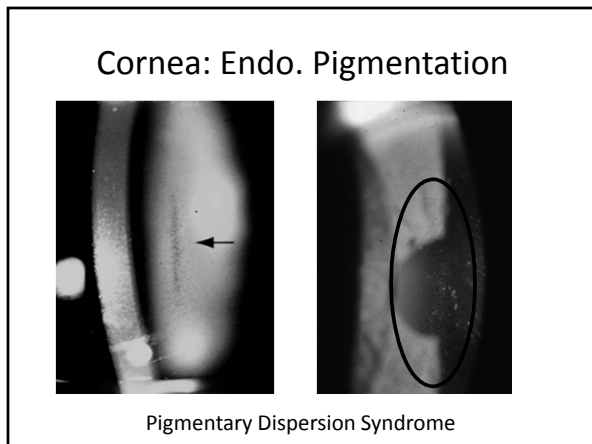
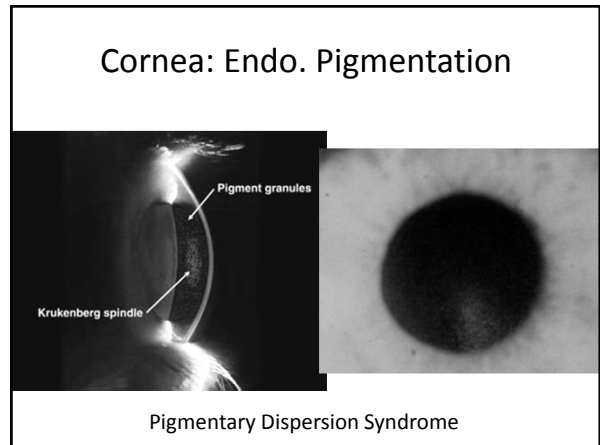
Images courtesy of Martha Lein, M.D. & Paul Krmer M.D., Achieve Eye and Laser Specialists, Silverdale, WA

**The Slit Lamp Exam of the Anterior Segment**  
**it's Appearance in Glaucoma:**  
 (Or: Things I should look at before the optic nerve)



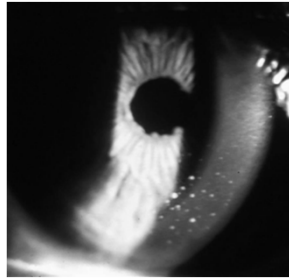
**Anterior Segment and Glaucoma:**

<u>PRIMARY GLAUCOMAS</u>	<u>SECONDARY GLAUCOMAS</u> (abbrev.)
<b>Open Angle Forms:</b> Primary Open Angle Normal Tension Glaucoma  <b>Closed Angle Forms</b> With pupillary block: Primary Angle Closure Acute Angle Closure Sub-acute Angle closure Chronic Angle Closure  Without pupillary block Plateau Iris Configuration Plateau Iris Syndrome	<b>Open Angle Forms:</b> Pigmentary Exfoliative Uveitic Traumatic Neovascular glaucoma Pot-Surgical  <b>Closed Angle Forms</b> Anterior pulling (traction on the iris) Contracture of membranes Neovascular glaucoma ICE syndrome Posterior polymorphous dystrophy Uveitis Aniridia



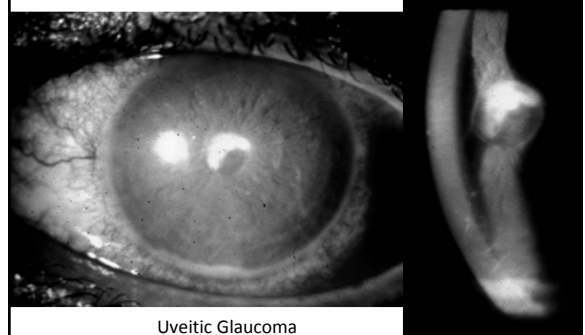
- Pigmentary Dispersion Syndrome**
- Triad:
    - Krukenberg spindle, Iris Transillumination Defects, Heavy Meshwork Pigmentation
  - Middle Age, Myopic, Males
  - High IOP fluctuation and spikes
  - Increased IOP following exercise
  - 10-40% go on to develop glaucoma
  - Follow PDS more frequently

Cornea: Keratic Precipitates (KPs)



Uveitic Glaucoma

Cornea: Keratic Precipitates (KPs)

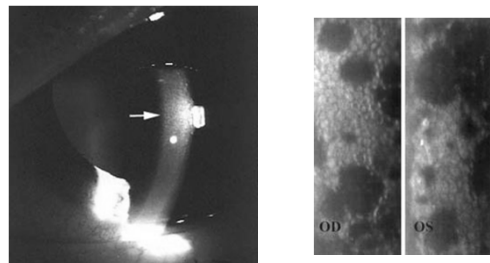


Uveitic Glaucoma

Uveitic Glaucoma

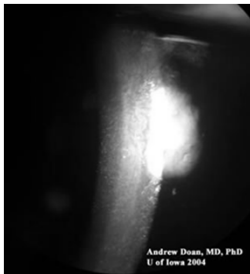
- Low IOP in early inflammatory phase
  - Decreased aqueous production
- Identify:
  - Peripheral Anterior Synechia (gonio.)
  - Posterior Synechia
- Steroids and Steroid Responders
- Prostaglandins not always contraindicated
- Chronicity and Recurrence

Cornea: Guttata

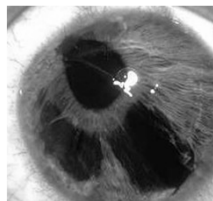


Fuch's Dystrophy

Iridocorneal Endothelial Syndrome



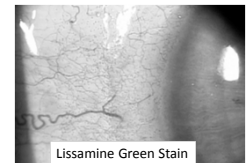
Andrew Doan, MD, PhD  
I of Iowa 2004



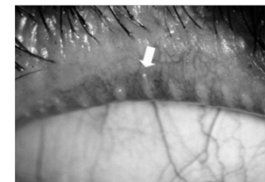
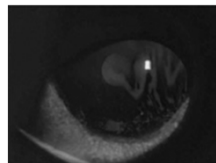
Chandler's Syndrome  
Progressive Iris Atrophy  
Cogan-Reese

Ocular Surface Disease

Therapeutic Topics  
**Glaucoma and Dry Eye: A Tough Combo**  
How chronic glaucoma treatment can give rise to ocular surface disease, and how you can treat them both.  
Mark E. Johnson, MD, PhD, FRCO, FRCO, and Andrew Cohen, Andrew, MD



Lissamine Green Stain





## OSD, Glaucoma and Quality of Life

Ocular Surface Disease and Quality of Life in Patients With Glaucoma

SIMON E. SHARKEY, IVAN GOLDBERG, AND PETER KELLERMEYER

**OBJECTIVE:** To investigate the relationship between ocular surface disease and glaucoma-related quality of life (QoL) in patients with OSD, and to determine if treatment of OSD with artificial tears improves QoL.

**DESIGN:** Cross-sectional study.

**SETTING:** Ocular Surface Disease Clinic, University of Iowa Eye and ENT Clinic, Iowa City, Iowa.

**PATIENTS:** 100 patients with OSD and 100 patients with glaucoma (OSD+ and OSD-).

**MEASUREMENTS AND MAIN RESULTS:** Mean OSDI score was significantly higher in OSD+ patients compared to OSD- patients. Mean QoL score was significantly lower in OSD+ patients compared to OSD- patients. Treatment of OSD with artificial tears significantly improved QoL scores in OSD+ patients.

**CONCLUSIONS:** Ocular surface disease is associated with lower QoL scores in patients with glaucoma. Treatment of OSD with artificial tears significantly improves QoL scores.

Am J Ophthalmol 2012;153:1-9.

## Cornea: OSD/Glaucoma Tx Options

## Traumatic Angle Recession

left eye showed very deep angle with significant exposure of ciliary body

51

## Exfoliation Syndrome

C = peripheral zone  
B = intermediate zone  
A = central disc

## Exfoliation Syndrome

Pseudoexfoliative material at pupil edge

## XFS: Gonioscopy

Ed Sung, MD & Lee Alward, U of Iowa 2004

