

On behalf of Vision Expo, we sincerely thank you for being with us this year.

Vision Expo Has Gone Green!

We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Conference Advisory Board considers content and speakers for future meetings to provide you with the best education possible.



Financial Interest Disclosure





Michael Gzik
FCLSA, ABO/NCLE, COTR

“My Eyes Always Water” Dry Eye Management: Contact Lenses and Spectacles



Dry Eye Prevalence

Ophthalmology Times

- **16 million Americans diagnosed with DED**
- **Some reports indicate that nearly half of all U.S. adults experience dry eye signs and symptoms**
- **33% of patients in eye care clinics present with complaints about dry eye**

The Neural and Vascular Supply

NERVES

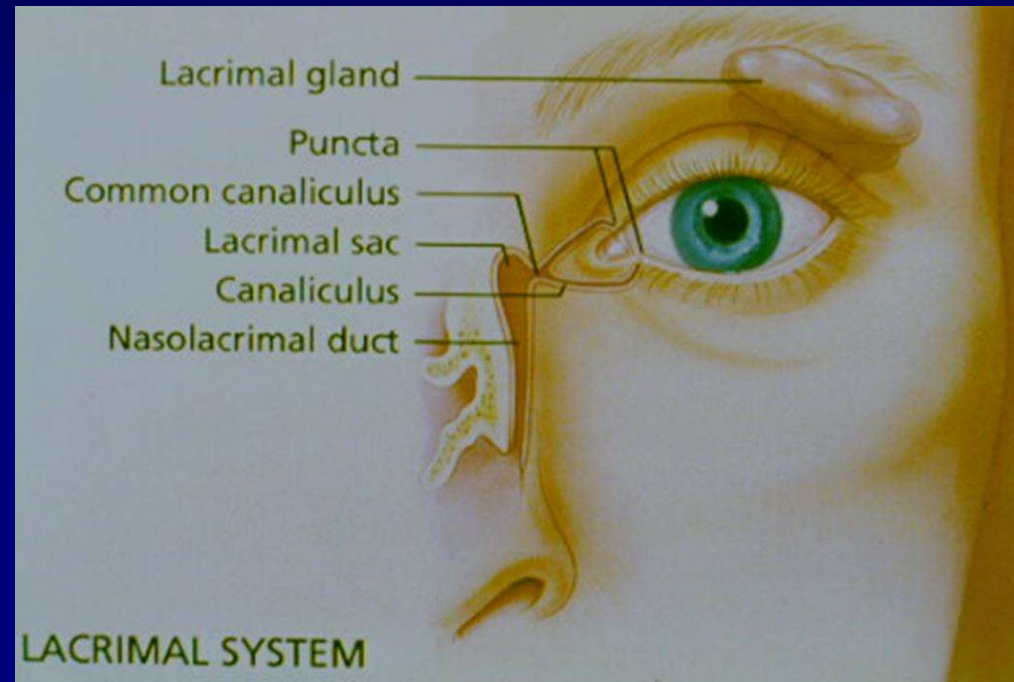
- optic nerve (II)
- oculomotor (III)
- trochlear (IV)
- trigeminal (V)
- abducens (VI)
- facial (VII)

VESSELS

- supraorbital a/v
- infraorbital a/v
- infratrochlear a/v
- supratrochlear a/v
- central retinal a/v

The Lacrimal Apparatus

- Tear drainage away from the ocular surface (lacrimal pump)
 - Lids coming together push the tears into the puncta (lacrimal lake)
 - Tears pass through the canaliculi
 - Canaliculi join together and go to the “lacrimal sac”
 - Lower portion of the sac forms the nasal lacrimal duct and on the nasal passage



The Eyelids

- Five anatomic layers
 - skin
 - muscular
 - glandular
 - tarsal (tarsal plate)
 - conjunctiva (palpebral)
- All tied together by connective tissue



- Greek “palpebral” Latin “blepharo”

- Palpebral fissure
- Blepharoplasty

Eyelids

- Functions

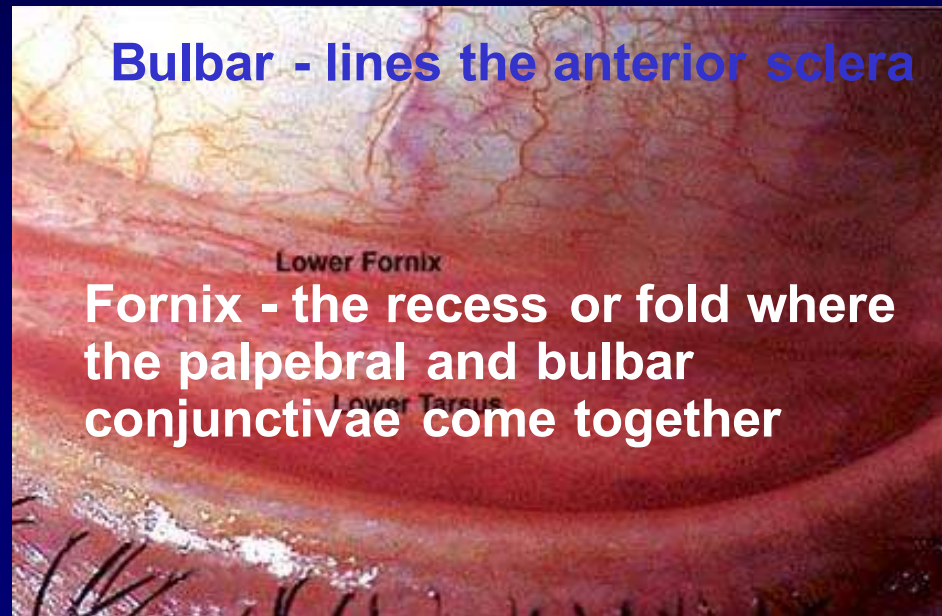
- Spread Tears
- Prevent tear evaporation
- Protection
- Control light



The Conjunctiva

Mucous membrane that lines the inside of the eyelids and anterior sclera up to the limbus

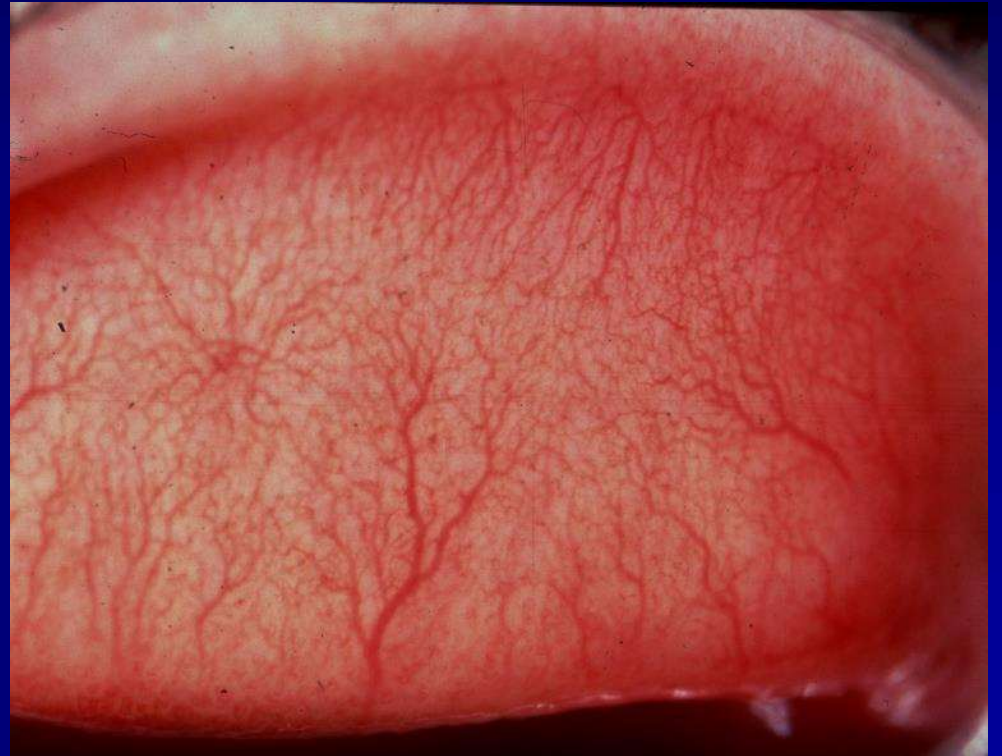
- Goblet cells - produce mucous component
- Accessory lacrimal glands - produce watery (aqueous) component



Palpebral - lines the inside of the eyelids

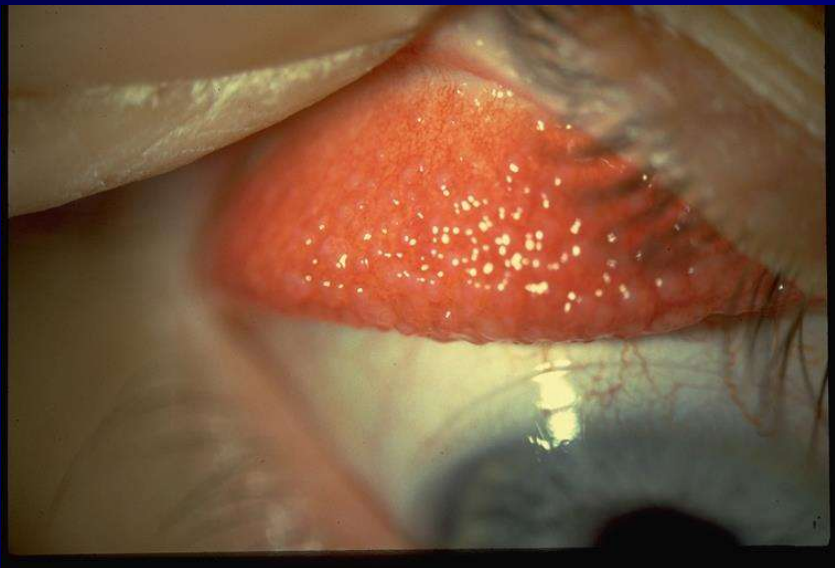
Meibomian Glands

- Oil glands along the edge of the eyelids
- Oil called meibum



The Conjunctiva

- Highly vascular
- Irritated or inflamed blood vessels become engorged and enlarged

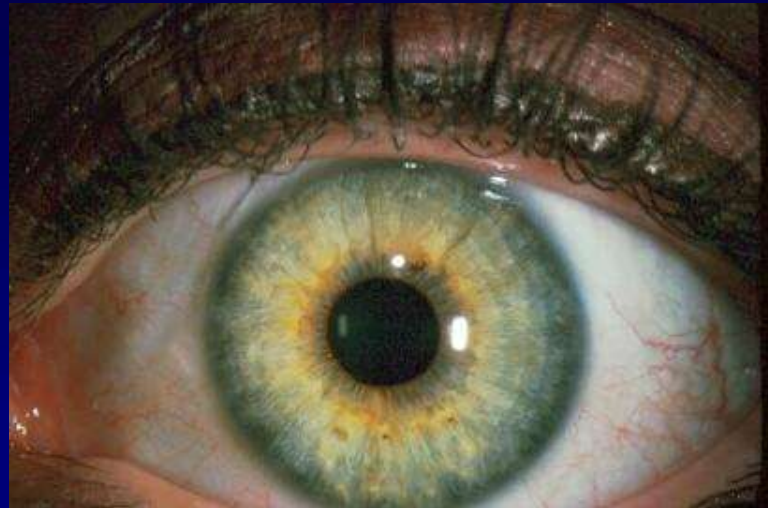
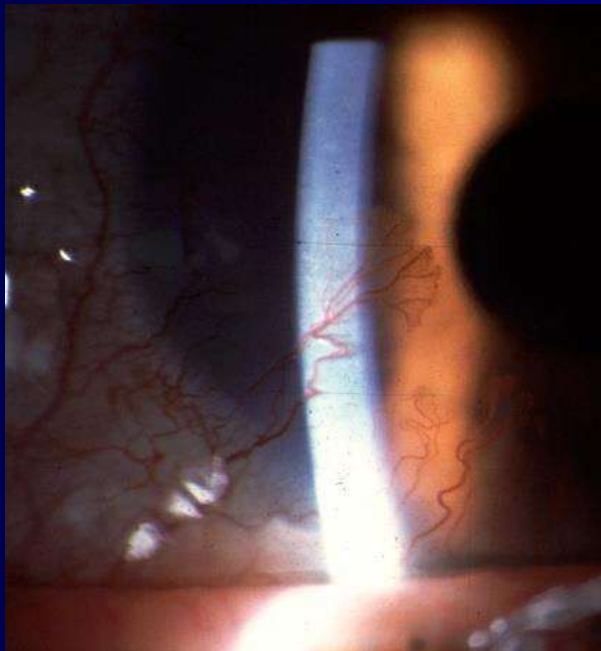


•Conjunctivitis

- Inflammation of the conjunctiva
- e.g., viral (pink eye), bacterial, allergic, toxic
- Giant Papillary conjunctivitis (GPC)
- Seasonal allergic conjunctivitis (SAC)
- Perennial allergic conjunctivitis (PAC)

The Conjunctiva Limbus

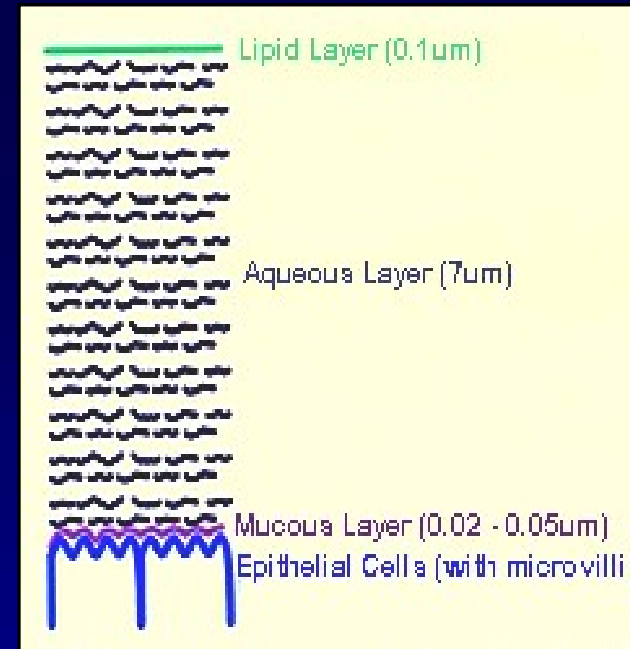
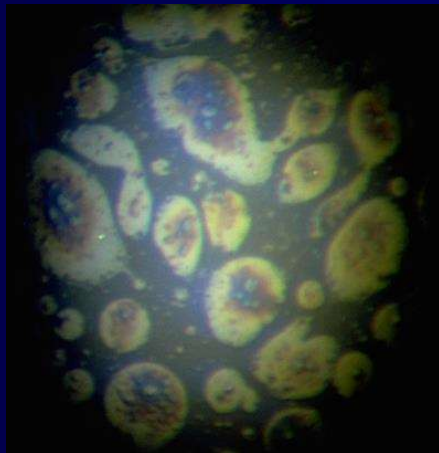
- 1mm wide transition zone, joining the cornea and sclera/conjunctiva
- Provides oxygen and nutrients to peripheral cornea



Blood vessels are stimulated to grow (neovascularization) into the cornea during periods of reduced oxygen (hypoxia), increase oxygen need (e.g., trauma)

The Tear Film

- Oily layer (lipid)
 - Sebaceous secretions from meibomian glands of the eyelids
- Aqueous layer (watery)
 - Watery secretions from main lacrimal glands of the orbit and accessory lacrimal glands of the conjunctiva



- Mucous layer
 - Mucous secretions from the goblet cells of the conjunctiva

Dry Eye Disease (DED).

- **An eye disease that occurs when the tears are not able to provide adequate lubrication for the eyes.**

Types of Tears

- Basal normal tears, continual lubrication to your eye
- Emotional, reaction to a upset or moved by a sensitive situation
- Reflex, reaction to flush a foreign object from the eye

Dry Eye Signs

- Stringy mucus in or around your eyes
- Sensitivity to light
- Eye redness
- Watery



Dry Eye Symptoms

- **Stinging, burning or scratchy sensation**
- **Sensitivity to light**
- **A foreign body sensation**
- **Difficulty wearing contact lenses**
- **Difficulty with nighttime driving**
- **Watery eyes**

Contributing Risk Factors

- Blood pressure medications
- Antidepressants
- Glaucoma medications
- Rheumatoid arthritis
- Lupus
- Diabetes

Contributing Risk Factors

- Environmental
- Use of air conditioning/fans
- Exposure to smoking
- Low humidity
- Dry climates
- Windy conditions

Contributing Factors

- **Graft-versus- host disease**
- **Post Lasik / refractive surgeries**
- **Contact lens wear**
- **Women more affected**

Dry Eye Disease (DED).

- **Sjogren syndrome**
Immune disorder two most common symptoms — dry eyes and a dry mouth.
- **Stevens-Johnson syndrome**
Affects the skin, mucous membrane, and eyes.

Types of Dry Eye

- Aqueous-deficient dry eye disease
- Evaporative dry eye disease

Aqueous-Deficient Dry Eye Disease (ADDE)

- **Tear underproduction**
- **Aqueous deficient disease (DED)**
- **Tear film lipid quality and quantity**

Evaporative Dry Eye Disease EDE

- **Abnormal meibomian gland physiology
(resulting in evaporative DED)**

Meibomian Gland Dysfunction (MGD)

- Conventional treatments
- Ocular lubricants
- Lid hygiene
- Warm compresses



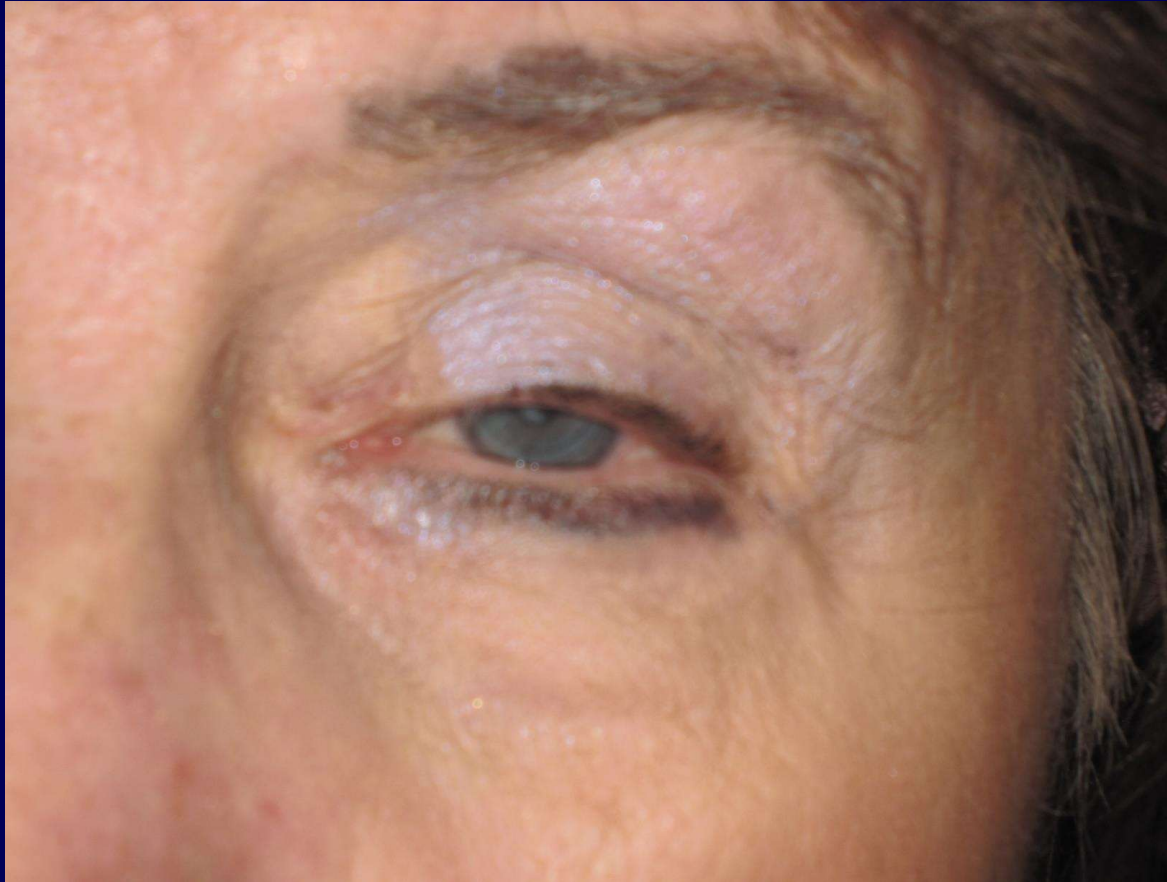
Blinking Abnormalities

Ocular Exposure

Graves Disease / Thyroid



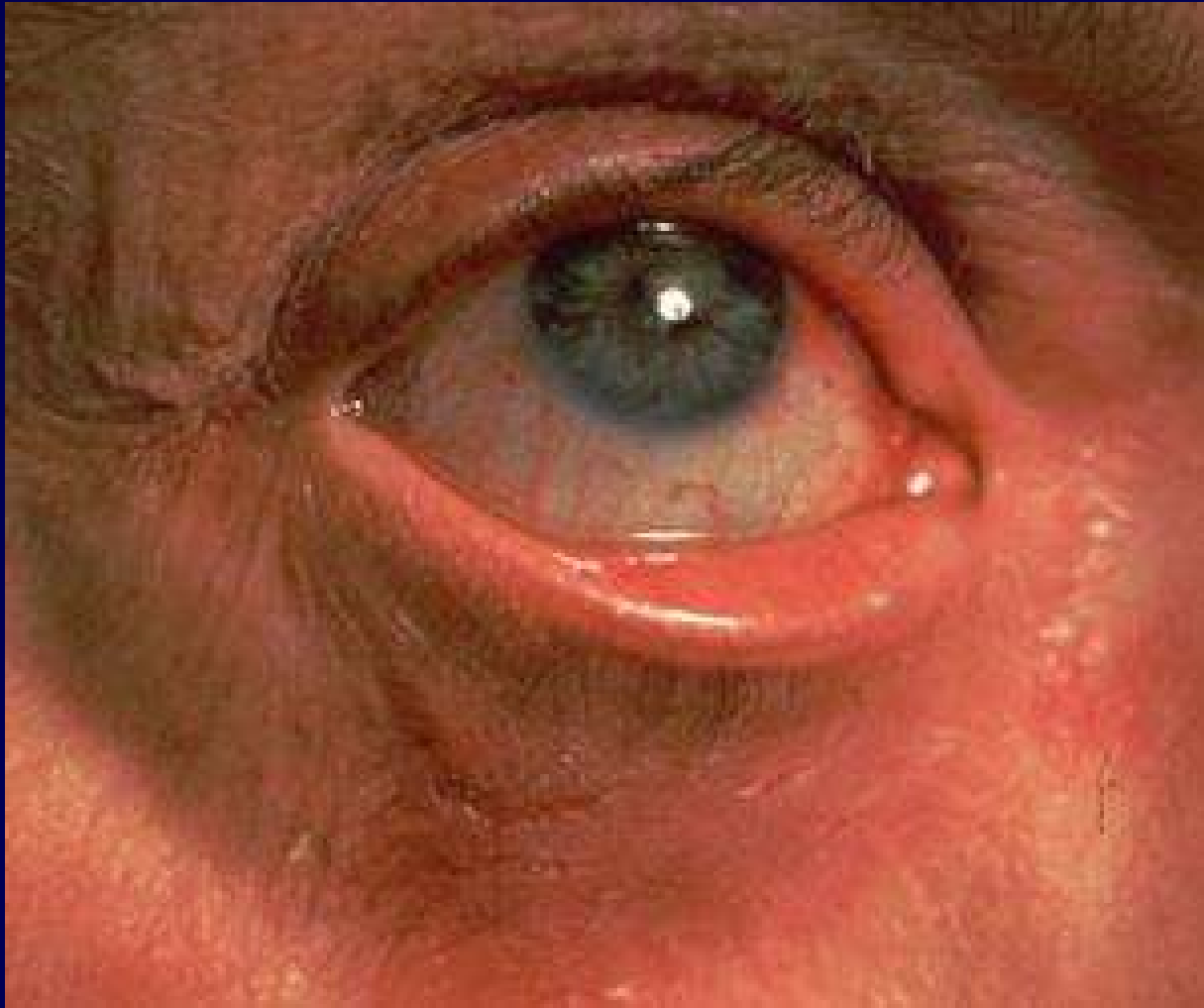
Ptosis



Bells Palsy



Ectropion



Entropion



LASIK

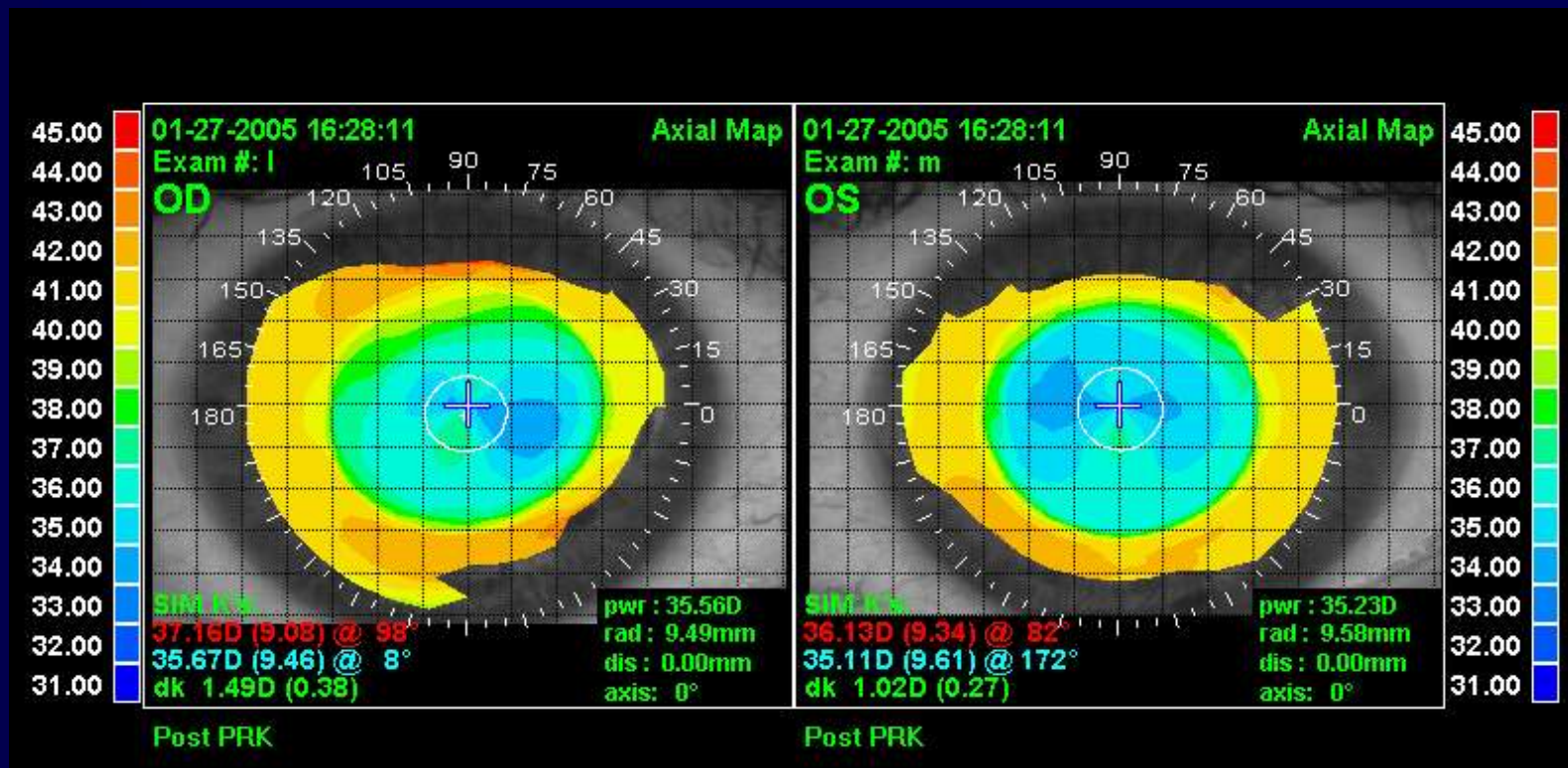
Laser-assisted in Situ Keratomileusis

- **A microkeratome is used to create a thin flap of tissue (approximately 130 to 180 microns thick)**
- **The flap is flipped**
- **An excimer laser is used for photoablation**
- **Similar to PRK ,to reshape the stromal tissue beneath the flap**

LASEK

- **LASEK treats the epithelium with alcohol to separate it from the stroma and it is then rolled back**
- **An excimer laser is used for photoablation**
- **Similar to PRK, reshapes the exposed stromal tissue**
- **Roll back the epithelium**

Post Refractive Surgery

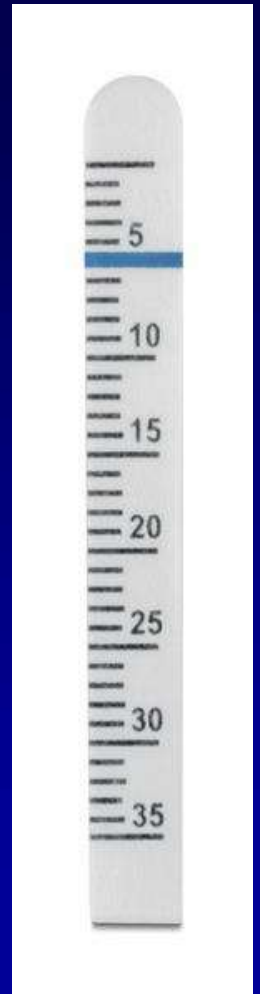


Testing the Effectiveness of Tearfilm

- The Schirmer's Test uses paper strips to indirectly measure the quantity of the aqueous layer of the tearfilm
- Tear Break-Up Time (TBUT) measures the speed in which tearfilm evaporates from the cornea (10-15 seconds is considered normal)

Schimer's Test

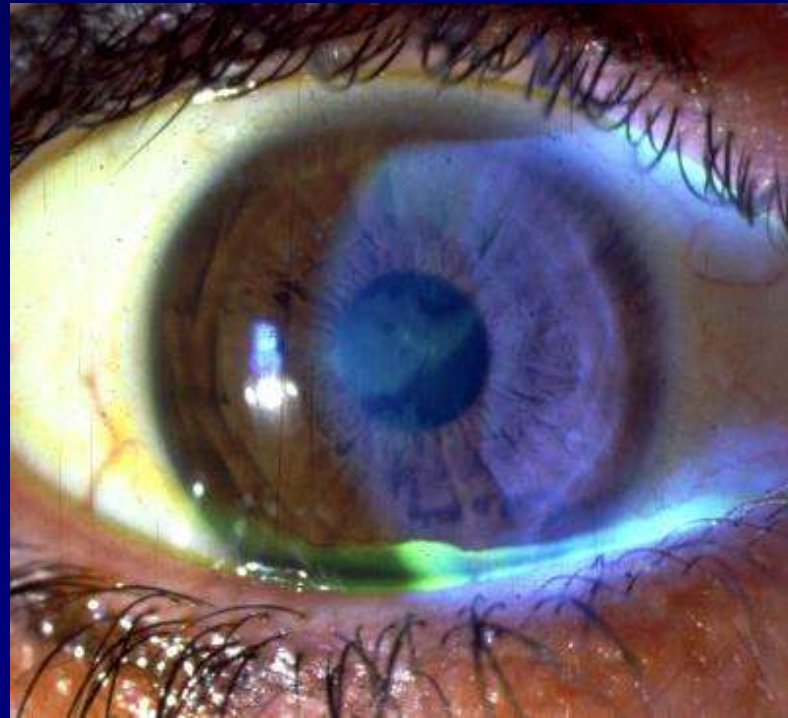
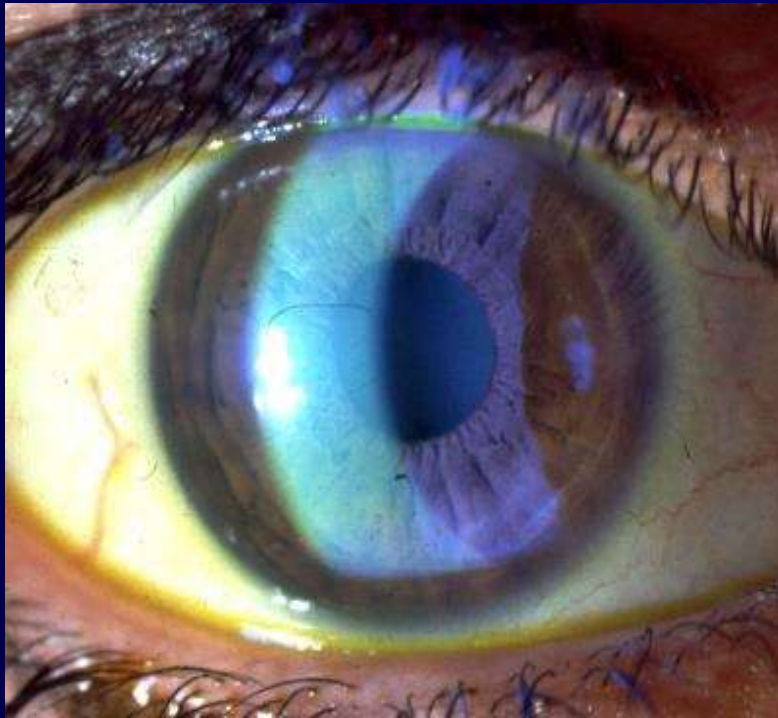
- 10 mm or more of moisture on the filter paper in 5 minutes test result is normal
- Less than 10mm is abnormal

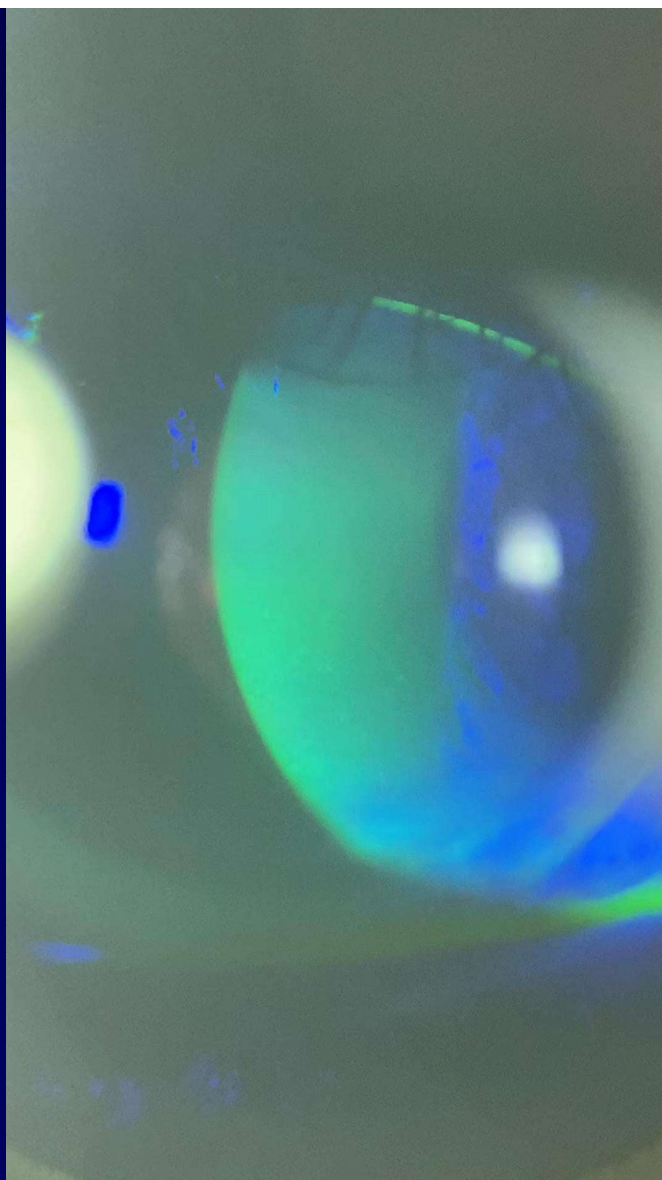


Tear Break-Up Time (TBUT)

- **Instill sodium fluorescein in the eye**
- **Use the slit lamp and cobalt blue filter**
- **Instruct the patient to blink normally**
- **Patient to keep eyes open as long as possible**
- **Count seconds**

Tear Break up Time



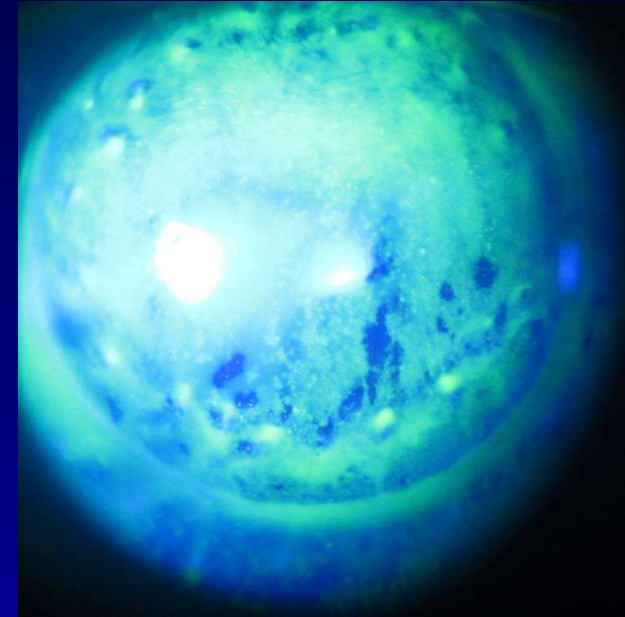


Tear Break up Time

Normal 10- 35 seconds

Less than 10 seconds abnormal

Assesses the stability of tear film



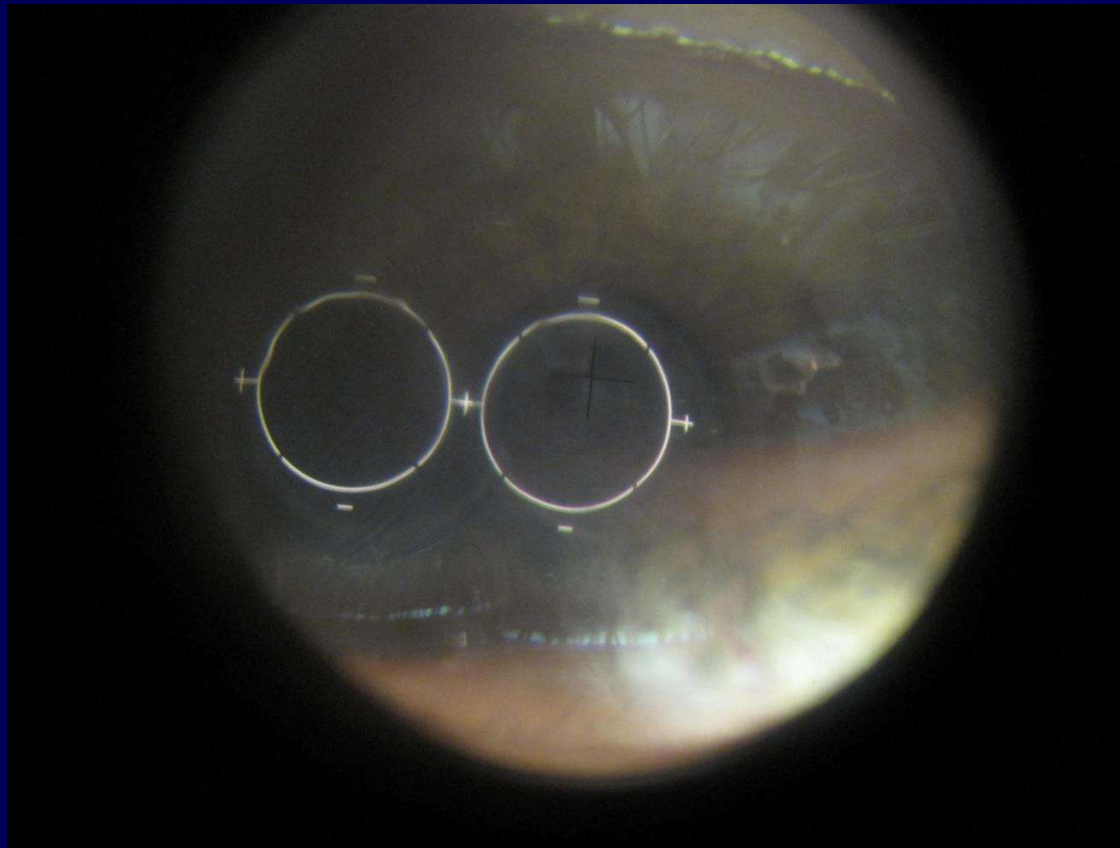
Tear Deficiencies

“Dry eyes”

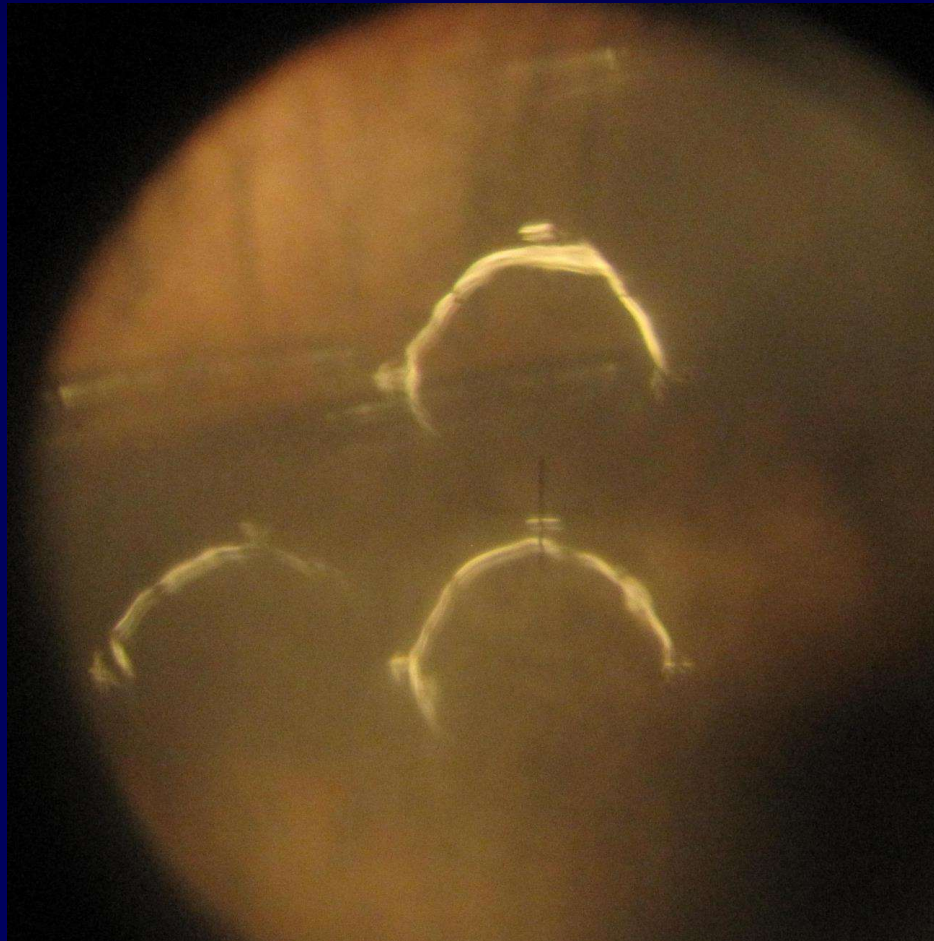
- Foreign body sensations
- Itchy / scratchy / dry
- Watery
- Photophobia
- Redness

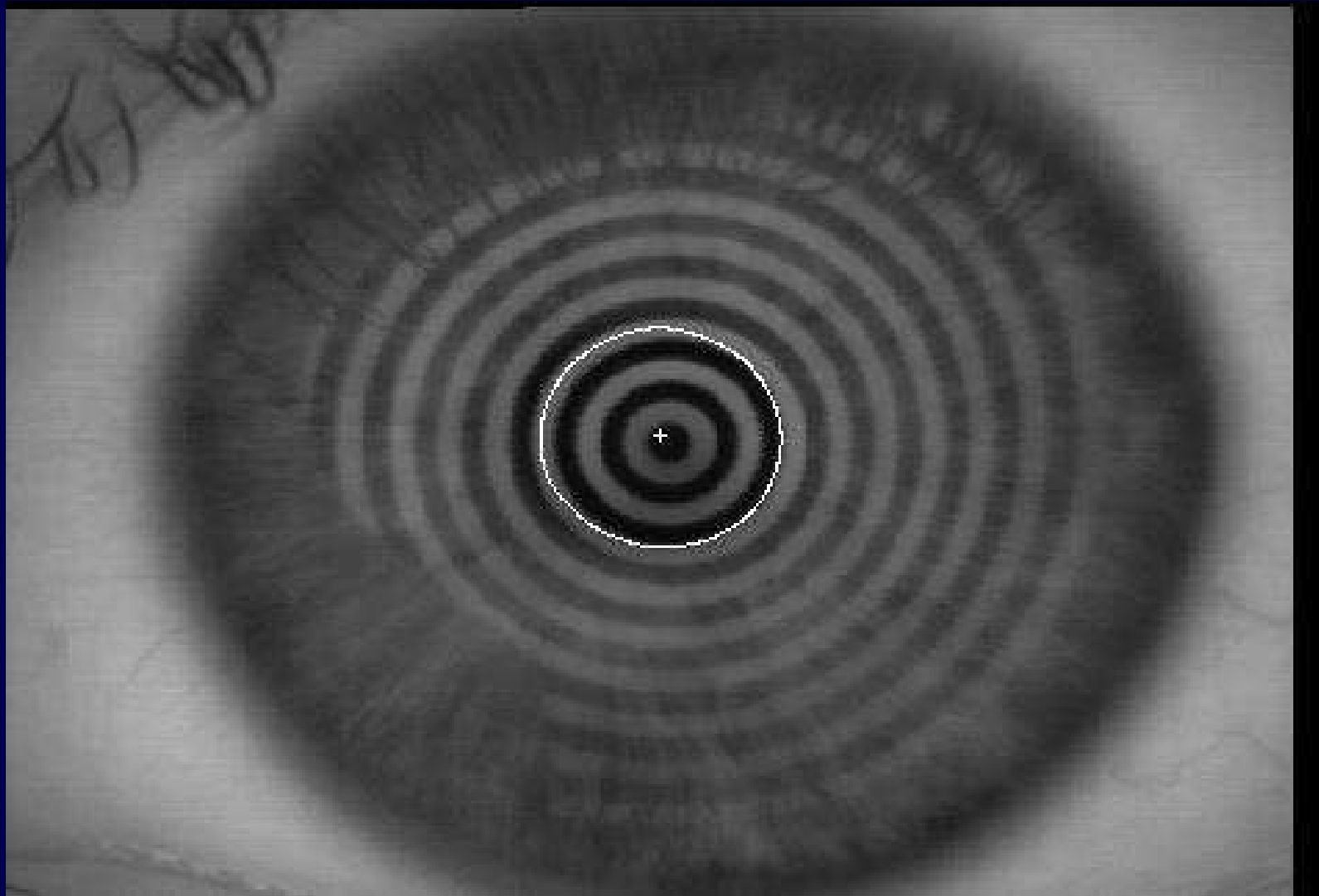


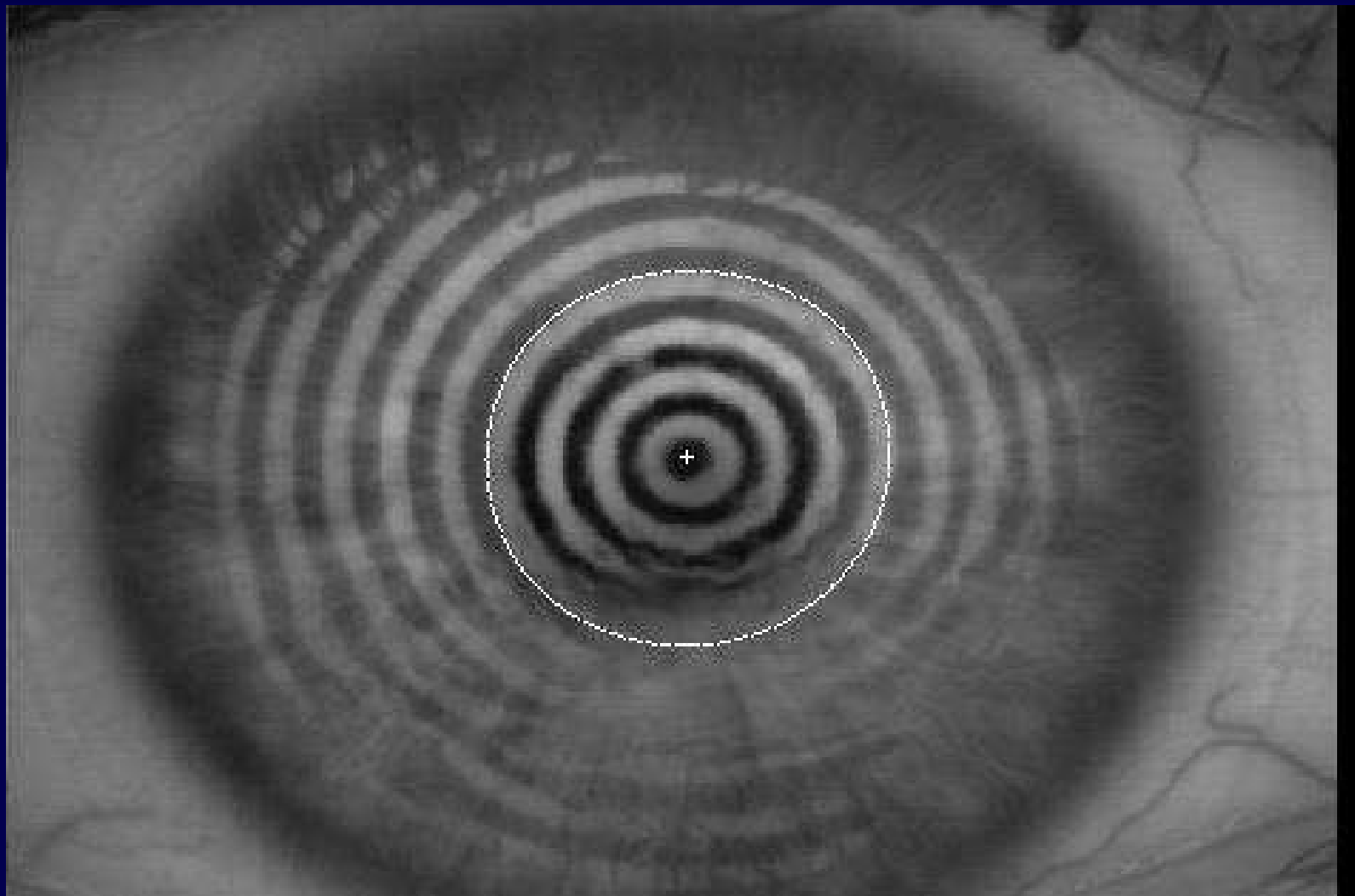
Normal Kerotometer Mires



Distorted Keratometer Mires



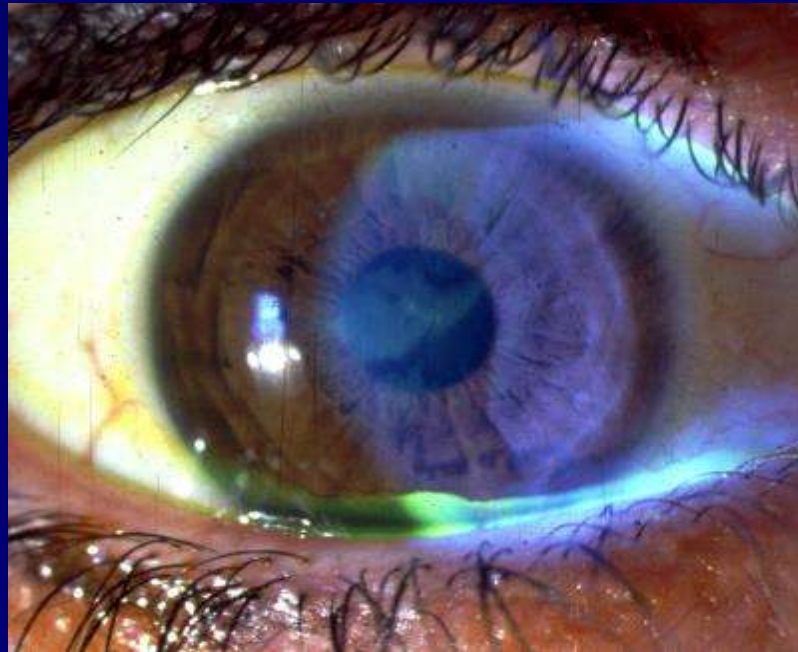




Tear Deficiencies

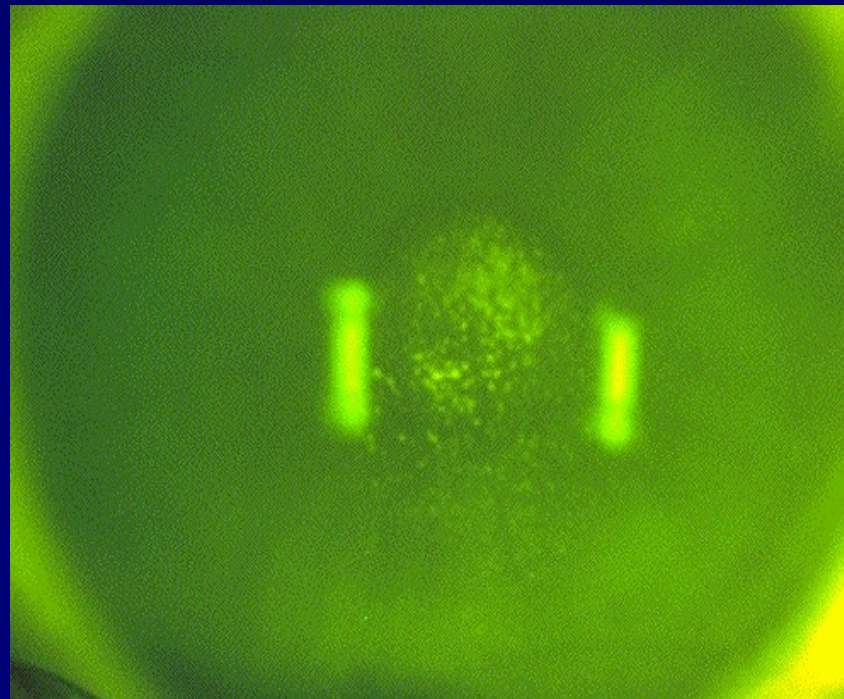
“Dry eyes”

- Foreign body sensations
- Itchy / scratchy / dry
- Watery
- Photophobia
- Redness

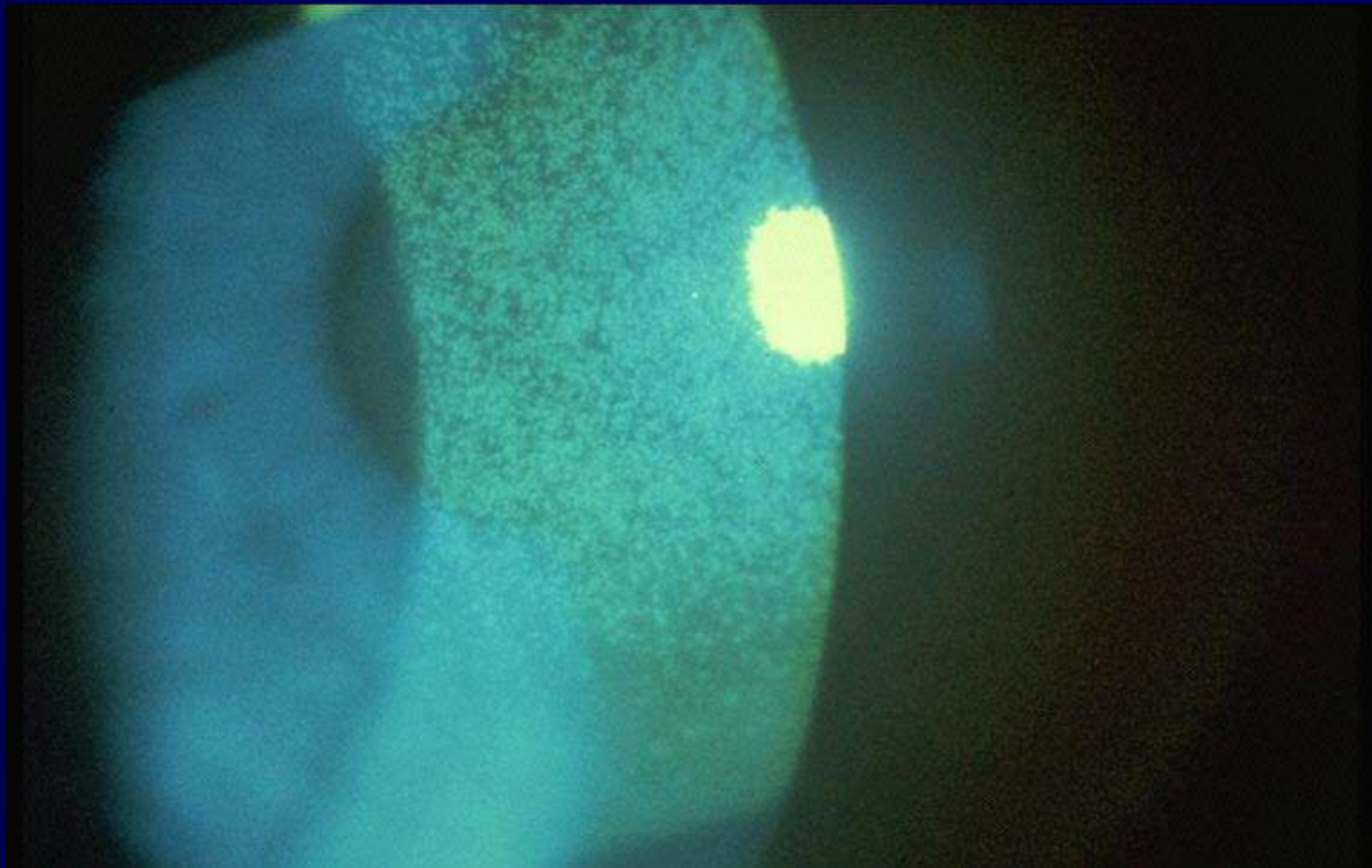


Corneal Staining

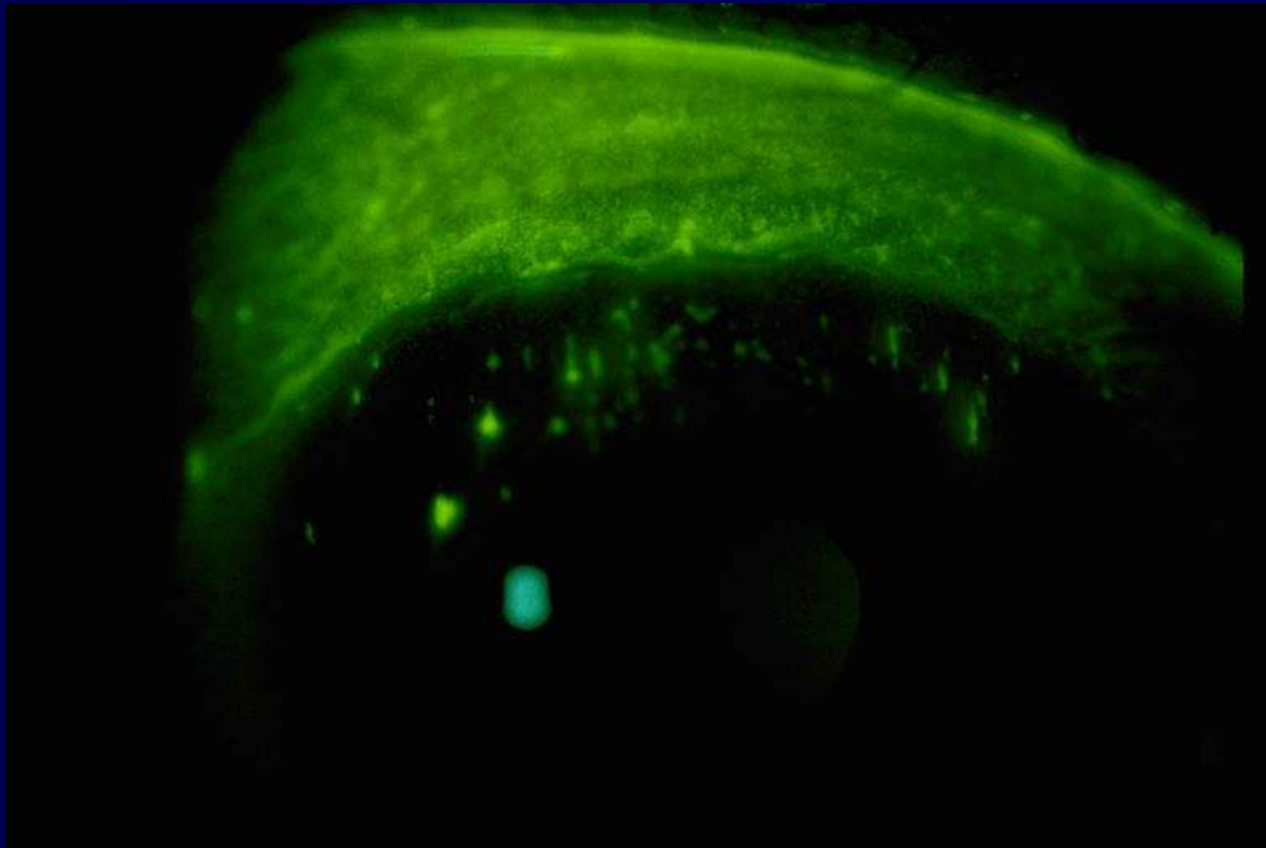
- Foreign bodies
- Debris attachment
- Solution reaction
- Mechanical erosions



Superficial Punctate Keratoopathy (SPK)



Filamentary Keritis



Adverse Response Causes

- **Improperly fit lenses**
- **Non-Compliance**
(overbear, replacement schedule)
- **Material/Design related**
- **Solution related**
- **Corneal compromise (trauma etc)**
- **Environmental issues**
- **Medications**
- **Systemic disease**

Management for Dry Eye

- Tear replacement
- Artificial tear substitutes
- Aqueous supplementation
- Viscosity-enhancing agents.

Management for Dry Eye

- Tear stimulation
- Over-the-counter (OTC) products “artificial tears”
- Replace and/or supplement the natural tear film
- Aqueous supplements
- Formulations vary in osmolarity, viscosity and pH,

Tear Deficiencies Treatment

Treatments for Dry Eye

- Oral secretagogues

Punctal Plug



Management for Dry Eye

- Punctal occlusion
- Punctal occlusion with plugs
- Absorbable
- Non-absorbable

Management for Dry Eye

Lid Hygiene

- **Lid Scrubs**
- **Baby shampoo**
- **Warm compress**

Lid Scrubs



Lid Scrubs

- **Hypochlorous acid (HOCl) solutions kill bacteria and fight inflammation available as sprays, gels, and premoistened pads**
- **Tea tree oil kills the mites that cause some eyelid inflammation cannot be used full strength**

Management for Dry Eye

- Artificial tears
- Gels
- Ointments.

Management for Dry Eye

- Eyedrops with preservatives
- Screw top bottles, preservatives
- Preservative-free eyedrops
- Single dose vials, good for application four times a day or more

Management for Dry Eye

- **Artificial tears add to the eyes, mimics natural tears**
- **Gel lubricating drops, more for lubrication aiding the lipid layer**
- **Redness relief, shrink the blood vessels**

Eye Drop Treatments

- **SYSTANE ULTRA (PRESERVATIVE FREE)**
- **SYSTANE COMPLETE**
- **REFRESH OPTIVE (PRESERVATIVE FREE)**
- **lubricates and hydrates**
- **SOOTHE XP**
- **Temporary relief from burning and itching
contributes to the lipid layer**

Management for Dry Eye



Gel Management

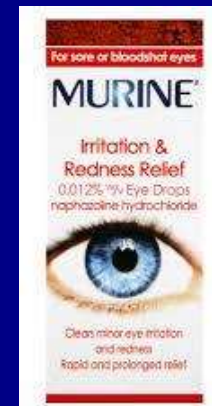
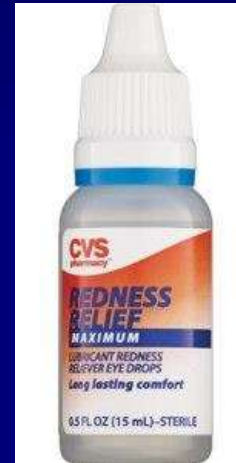
- GENTEAL TEARS LUBRICANT EYE GEL



Allergy Management for Dry Eye



Get the Red Out



Management for Dry Eye

- Moisture chambers spectacles
- Moisture goggles
- Night time eyeshields

Moisture Chamber Spectacles



Moisture Goggles



Night Time Eye Shields



FDA Classifications

- **“Daily Wear” less than 24 hour wear and no overnight usage**
- **“Disposable” single usage than thrown away or discarded.**
- **“Extended Wear” 7 days and 6 nights consecutive wear before removal.**
- **“Continuous Wear” 30 day and nights of continuous wear.**

Management for Dry Eye

- **Soft contact lenses hydrogel and silicone hydrogel**
- **Corneal lenses**
- **Scleral lenses**

Soft Contact Lenses

- **Therapeutic soft contact lenses (bandage lenses)**

New Terms

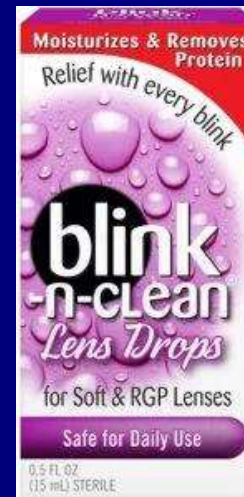
- **Lubricity** is the measure of the reduction in friction and or wear by a lubricant. The study of lubrication and wear mechanisms is called **tribology**
- **Homeostasis** In biology is the state of steady internal, physical, and chemical conditions maintained by living systems. This is the condition of optimal functioning for the organism and includes many variables, such as body temperature and fluid balance

Tear Deficiencies

Contact Lens Management

- **Drops**
- **Contact lens**
 - **Alter solutions**
 - **Change lens type**

Contact Lens Relief Dry Eye



Blinking

- Human adult eye blinks about 14,000 times per day
- Eyelid slides over the front of the cornea (and the contact lenses) roughly once every six seconds

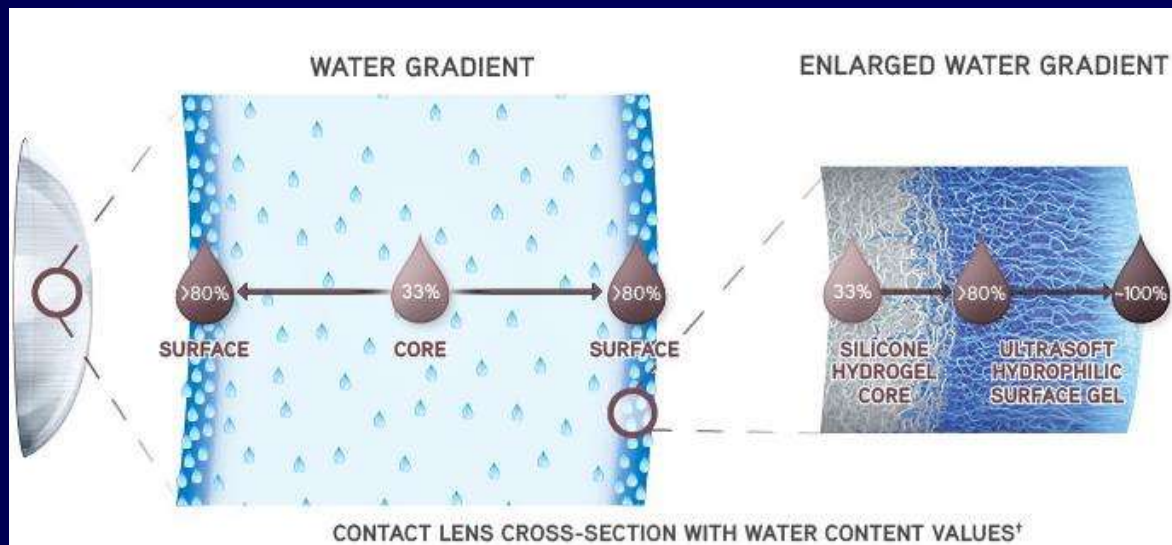
Alcon Soft Lens Options



DAILIES TOTAL①

- **First water gradient lenses**
- **Ultra-soft hydrophilic surface gel with reticular structure enables the lens surface that maintains nearly 80% water**
- **Water content at 33%**
- **Oxygen transmissibility at 156 Dk/t**

DAILIES TOTAL[®]1



CORE OPTIMIZATION:

- Silicone hydrogel material with low water content to deliver superior oxygen transmissibility[†]



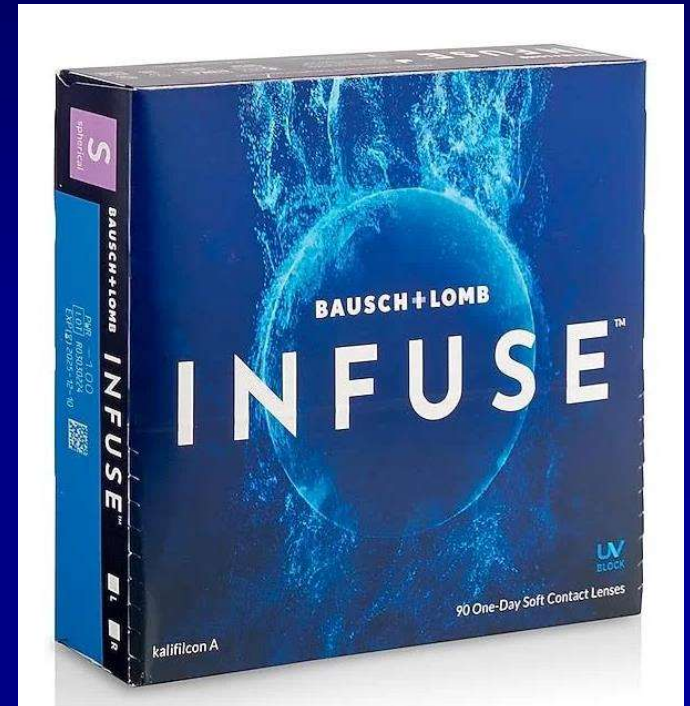
SURFACE OPTIMIZATION:



- Ultrasoft, hydrophilic surface gel designed to provide exceptional lubricity
- Approaching **100%** water at the outer surface³
- Essentially no silicone

B&L Soft Lens Options

- Daily disposable



INFUSE™

- **ProBalance Technology contains osmoprotectants (erythritol and glycerin) and electrolytes (potassium) that help maintain the balance of the front of the eye (ocular surface homeostasis)**
- **It also includes moisturizers (poloxamine 1107 and poloxamer 181) that help retain hydration and provide a smooth, wettable lens surface.**

B&L Infuse

- **Kalifilcon A, is a hydrophilic copolymer of 2-hydroxyethyl methacrylate and N-vinylpyrrolidone and is 55%**
- **Benzotriazole UV-absorbing monomer is incorporated into the manufacturing process to block Ultraviolet (UV) radiation**

B&L Infuse

- **Base curve 8.6**
- **Diameter 14.2**
- **Spherical aberration control, multifocal**
- **Modulus 0.5 MPa**
- **Refractive Index: 1.4011**
- **Water Content: 55%**
- **Oxygen Permeability 134 Dk/t†**

Biotrue ONEday

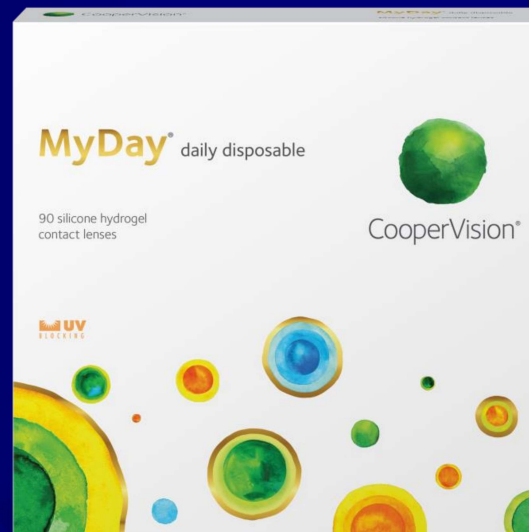
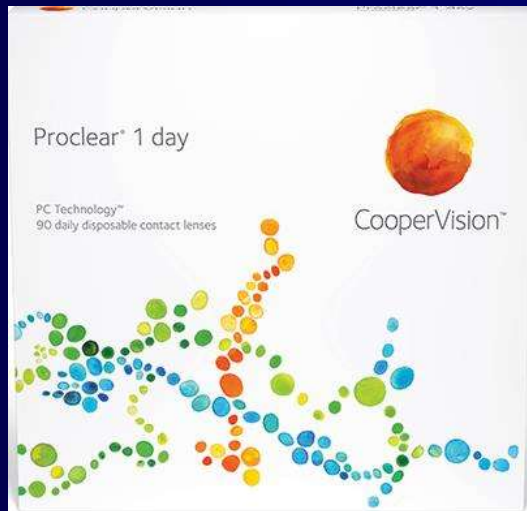
- **Material, HyperGel® (nesofilcon A) silicone hydrogel**
- **Water content 78%**
- **Base curve 8.6**
- **Diameter 14.2mm**
- **Refractive Index: 1.374**
- **Oxygen permeability 42 Dk/L**

Biotrue ONEday

- **Material, HyperGel® (nesofilcon A) silicone hydrogel**
- **Water content 78%**
- **Base curve 8.6**
- **Diameter 14.2mm**
- **Spherical aberration control, multifocal**
- **Refractive Index: 1.374**
- **Oxygen permeability 42 Dk/L**

Cooper Soft Lens Options

- Proclear 1 day
- MyDay daily disposable
- Clariti® 1 day



Proclear

- PC Technology™
- Oomafilcon A (Hydrogel)
- 60% water content
- DK/t 25
- Base curve 8.7
- Diameter 14.2
- Spherical power, multifocal

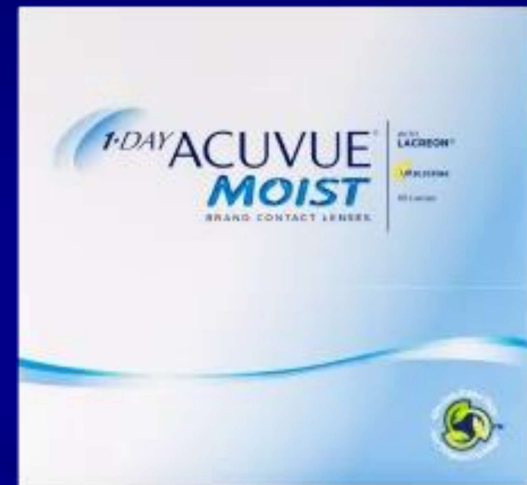
MyDay

- **Stenfilcon A Silicone hydrogel**
- **Water content 54%**
- **DK/t 100**
- **Base curve 8.4**
- **Diameter 14.2**
- **Aspherical optics, Multifocal, Toric**

Clariti 1 day

- **Somofilcon A silicone hydrogel**
- **56% water**
- **DK/t 86**
- **Base curve 8.6**
- **Diameter 14.1**
- **Spherical optics, Multifocal, Totic**

Johnson & Johnson Soft Lens Options



ACUVUE Oasys with HydraLuxe

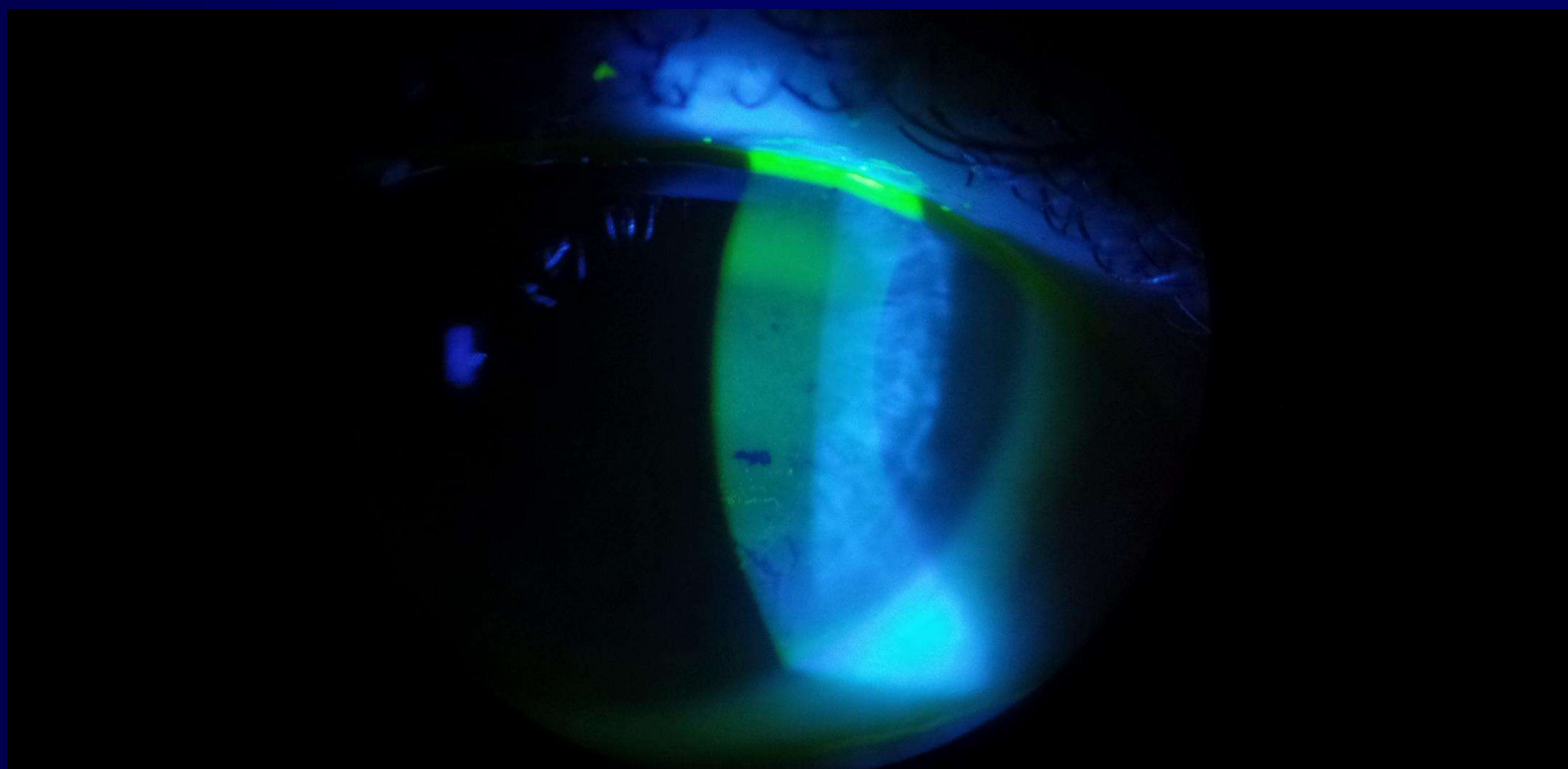
- **Material: senofilcon (Silicone Hydrogel)**
- **Visibility Tint: Yes**
- **Water Content: 38%**
- **DK: 103.0 (dk/t: 121.2)**
- **Base Curve: 8.5 and 9.0**
- **Diameter 14.3**

ACUVUE Oasys with HydraLuxe

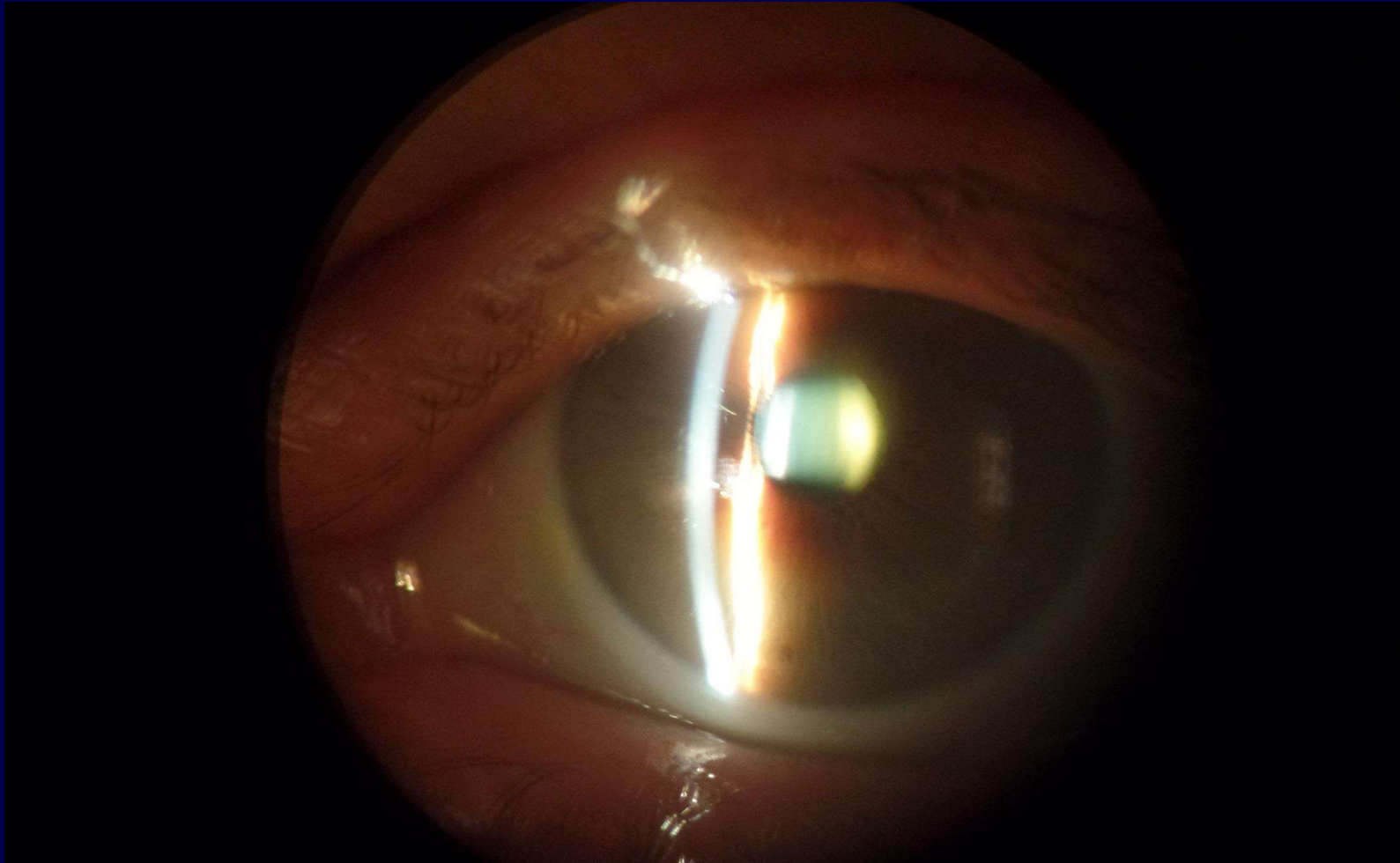
- **Enhanced network of tear-like molecules that lubricates the lens for effortless blinking and moisturizes the lens and allows uptake of key tear components**
- **Providing 96.1% UVA and >99.9% UVB protection, Acuvue Oasys 1-Day delivers one of the highest levels of UV protection available through a daily contact lens**

APPLICATIONS FOR SCLERALS

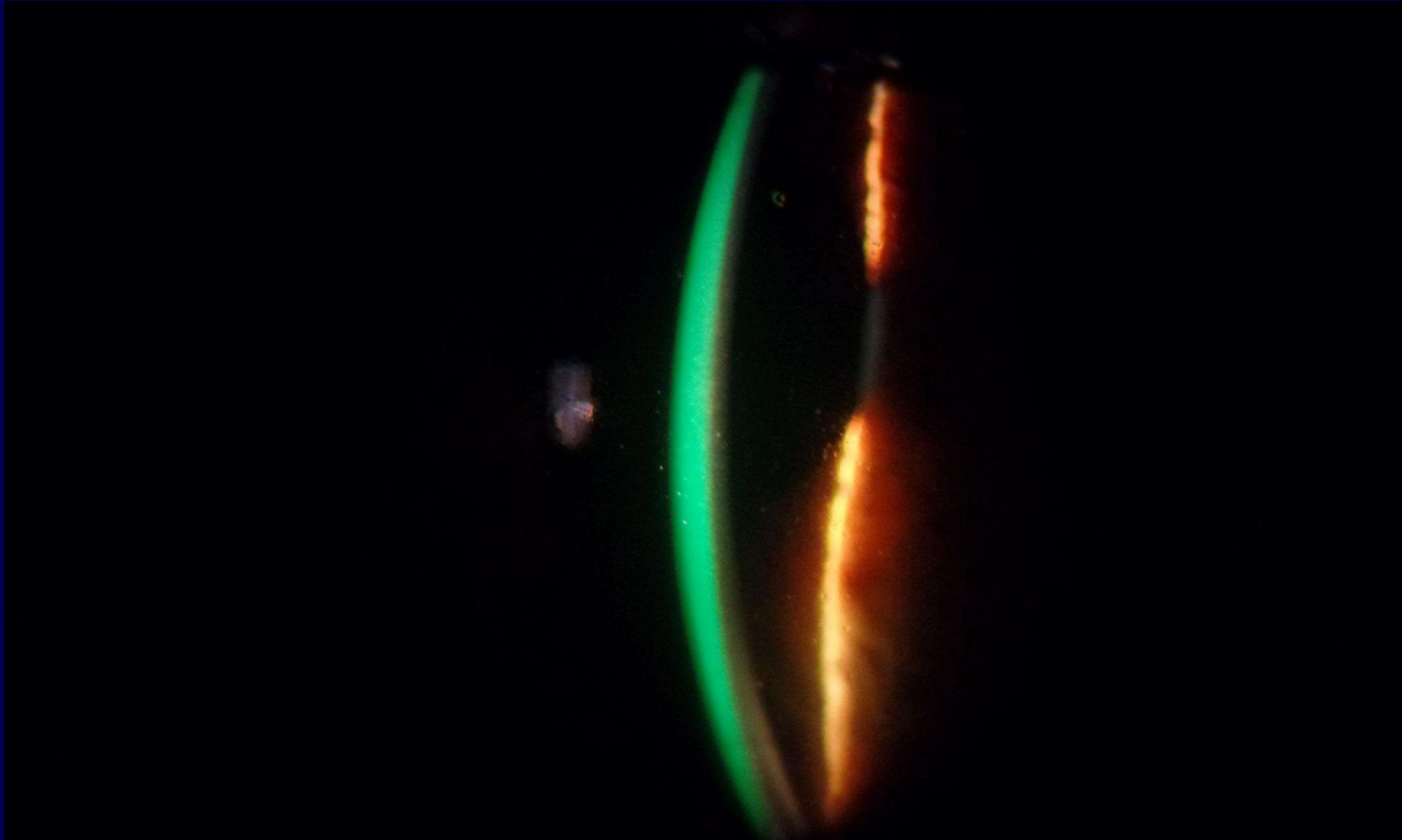
- **Keratoconus (oval, nipple) & Keratoglobus**
- **Pellucid marginal degeneration**
- **Post penetrating keratoplasty**
- **RK and lasik induced ectasia**
- **Any compromised and/or irregular cornea**
- **High degree of corneal toricity**
- **Post trauma, severe dry eye, or neurotrophic keratitis**
- **Normal corneas for comfort and stability**



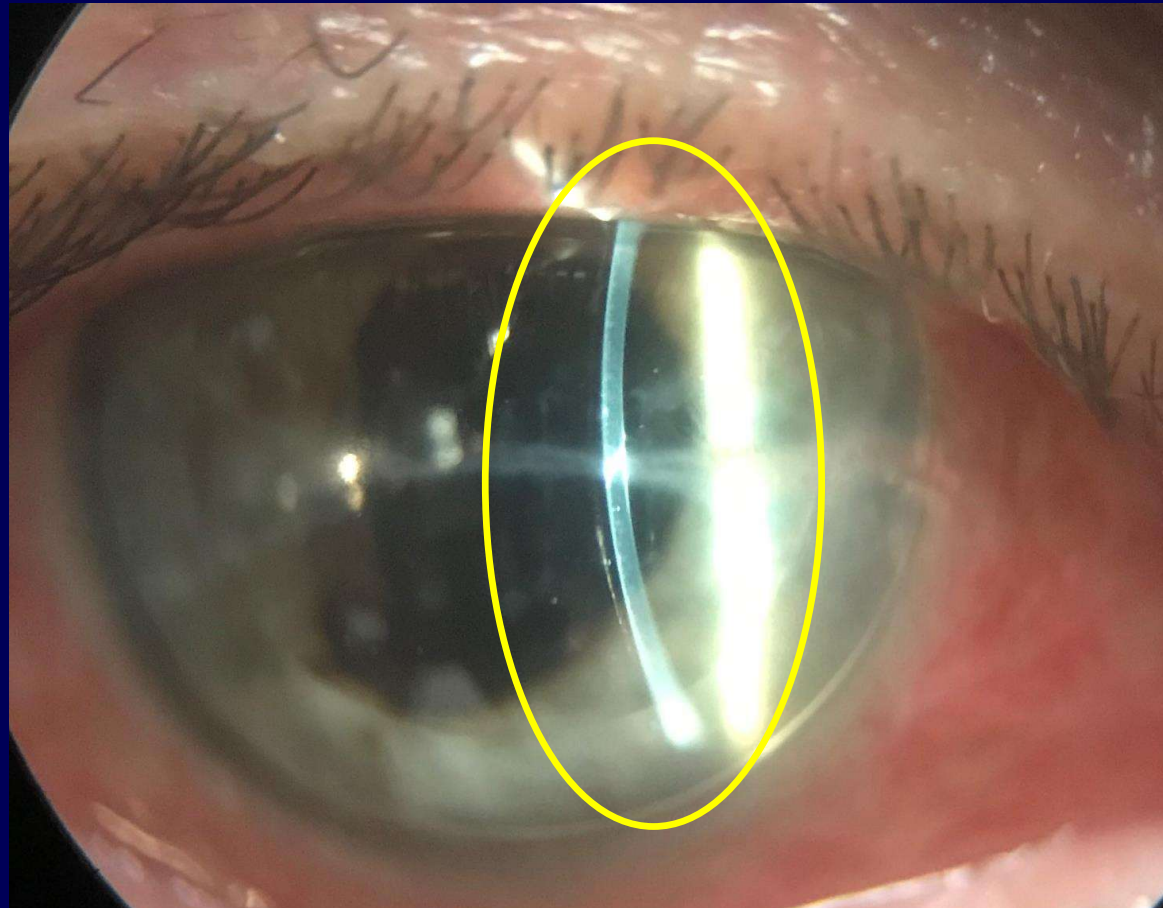
Scleral



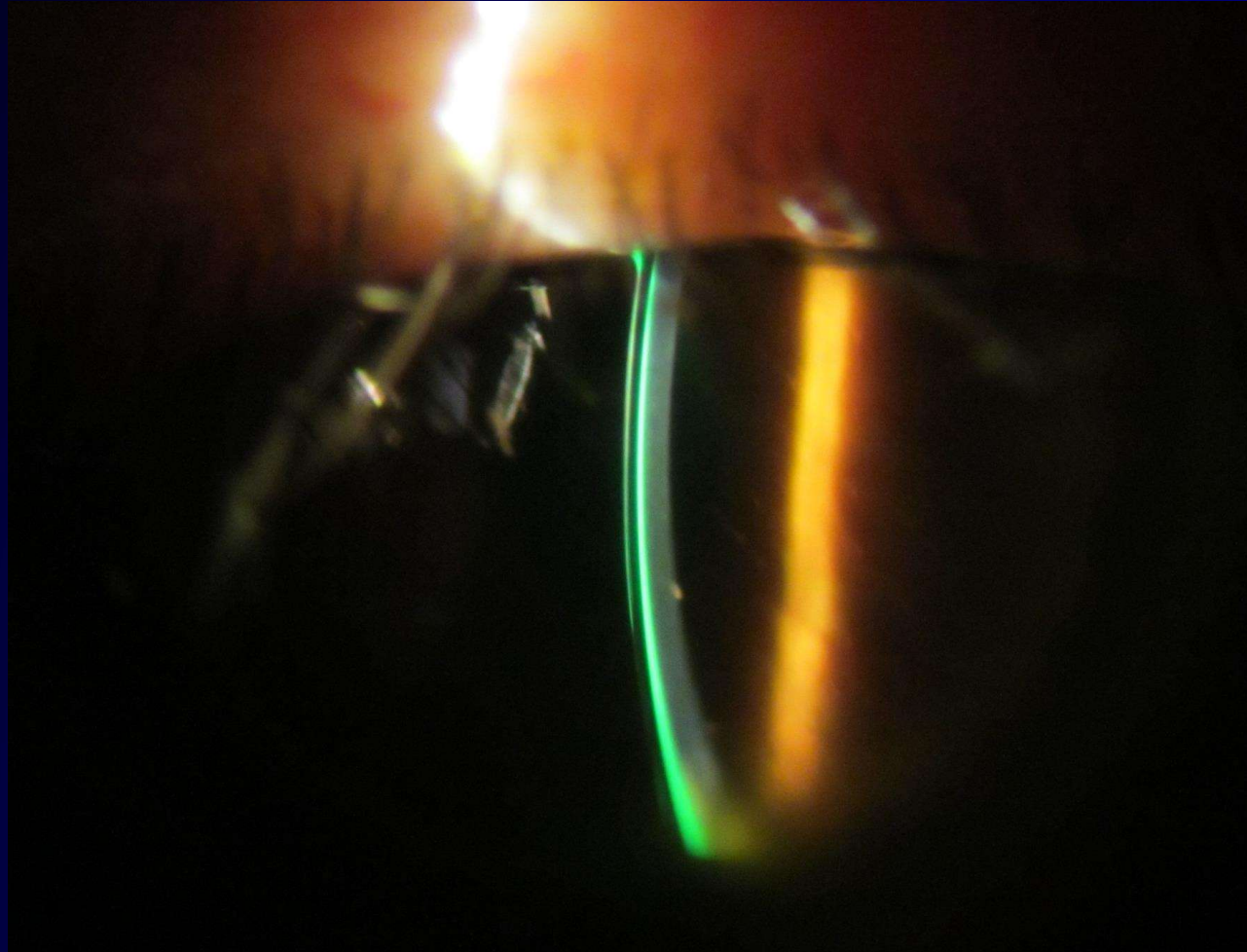
Scleral



Roberto



Scleral Lens Clearance



Management for Dry Eye

- Humidifier



Bibliography

- The Ocular Surface journal homepage:
www.theocularsurface.co
- TFOS DEWS II Management and Therapy Report
- Tear Film and Ocular Surface Society's Dry Eye Workshop II

TFOS DEWS II Management and Therapy Report

- Lyndon Jones, FCOptom, PhD a, 1, * , Laura E. Downie, BOptom, PhD b , Donald Korb, OD c , Jose M. Benitez-del-Castillo, MD, PhD d , Reza Dana, MD e , Sophie X. Deng, MD, PhD f , Pham N. Dong, MD g , Gerd Geerling, MD, FEBO h , Richard Yudi Hida, MD i , Yang Liu, MD j , Kyoung Yul Seo, MD, PhD k , Joseph Tauber, MD l , Tais H. Wakamatsu, MD, PhD m, Jianjiang Xu, MD, PhD n , James S. Wolffsohn, FCOptom, PhD o , Jennifer P. Craig, MCOptom, PhD

Management for Dry Eye

- Bacterial overcolonisation
- Topical antibiotics

Management for Dry Eye

- Soothe , Systane
- Tears Again
- Optrex ActiMist (AM), DryEyesMist (DEM), TearMist (TM)
- Tears Naturale II,
- Refresh Dry Eye

Topical Secretagogues Management for Dry Eye

- **Aqueous secretagogues**
- **Mucin secretagogues**
- **Lipid stimulation**

Treatments for Dry Eye

Treatments for Dry Eye

Treatments for Dry Eye

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