Optometric Education Consultants

Anterior and Posterior Segment Case Presentations

Enough Pearls to Make a Necklace

Greg Caldwell, OD, FAAO
November 13, 20/20

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Disclosures- Greg Caldwell, OD, FAAO

- Will mention many products, instruments and companies during our discussion
  - I don' t have any financial interest in any of these products, instruments or companies
- Pennsylvania Optometric Association –President 2010
  - POA Board of Directors 2006-2011
- American Optometric Association, Trustee 2013-2016
- I never used or will use my volunteer positions to further my lecturing career
- Lectured for: Alcon, Allergan, Aerie, BioTissue, Maculogix, Optovue
- Advisory Board: Allergan, Kala, Maculogix, Sun
- Envolve: PA Medical Director, Credential Committee
- HealthCare Registries: Consultant
- Optometric Education Consultants - Scottsdale, WDW, St. Paul, Quebec City, and Nashville, Owner

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Learning Objectives

- Emphasize clinical diagnosis of anterior and posterior segment disease.
- Strengthen clinical treatment of anterior and posterior segment disease.
- Heighten the clinician's comfort level when treating disease with topical and/or oral medications.
- Gain confidence in ordering and interpreting diagnostic and laboratory tests.
- Gain confidence in making a subspecialty referral

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Optometric Public Service Announcement
Pay Very Close Attention

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80-year-old man

- Reports a sudden loss of vision OD
- Vision is count fingers at 2 feet OD and 20/25 OS
- APD OD grade 4
- Fundus photos OU

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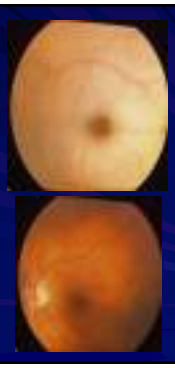
Photos OU



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CRAO Treatment/Work-Up/Follow-Up?

- Anterior cham… …acentesis (le… …24 hours)
- STAT blood wo…
  - 2-10% of all CRAO… …nbosis from Giant Cell Arteritis (GCA)
  - Sed-rate
  - C-reactive protein
    - Qualitative or quan…
  - CBC with diff
- Monitor for n… …ularization, e… …6 weeks

SOS

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CRAO, BRAO, TIA (amaurosis fugax)

- Acute Stroke Ready Hospital
  - Certification recognizes hospitals that meet standards to support better outcomes for stroke care as part of a stroke system of care
  - Developed in collaboration with the Joint Commission (TJC), eligibility standards include:
  - Dedicated stroke-focused program
  - Staffing by qualified medical professionals trained in stroke care
  - Relationship with local emergency management systems (EMS) that encourages training in field assessment tools and communication with the hospital prior to bringing a patient with a stroke to the emergency department
  - Access to stroke expertise 24 hours a day, 7 days a week (in person or via telemedicine) and transfer agreements with facilities that provide primary or comprehensive stroke services.
  - 24/7 ability to perform rapid diagnostic imaging and laboratory testing to facilitate the administration for IV thrombolytics in eligible patients
  - Streamlined flow of patient information while protecting patient rights, security and privacy
  - Use of data to asses and continually improve quality of care for stroke patients
- Warn hospital if suspicion for GCA
- 20% of stroke or heart attack within 3 years
- However of those who experienced CVA or MI
  - 80% were within 24-48 hours; those remaining
  - 50% occurred in 2 weeks
  - Majority within the next 90 days
- Not PCP, not retinologist, just the Acute Stroke Ready Hospital!

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Acute Stroke Ready Hospital

- Is the basic level stroke hospital, better than not certified
  - This was created in 2015
- If you have access to a: (Even Better)
  - Primary Stroke Center
  - Thrombectomy-Capable Stroke Center
  - Comprehensive Stroke Center even better

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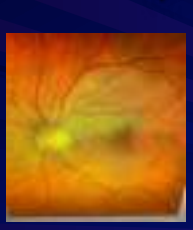
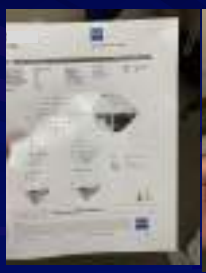
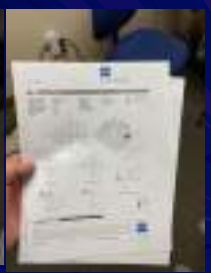
April 8, 2020 - COVID 19







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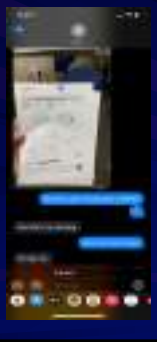
April 8, 2020 - COVID 19



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April 5, 2020 – COVID 19 Times

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Case 1

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25-year-old man

- Patient has been to 3 ophthalmologists and 1 optometrist in the past year
- Patient complains of a "ghost image" OS
- Has had 4 dilated exams in past year, and no diagnosis yet
- He is very passionate that his vision is clear OD and "ghosty"OS
  - He wants to know why

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"Ghost Image" OS

Va 20/20
cc 20/20

Current Correction
R -2.50-1.00 x 180
L -3.25-1.00 x 180

EOMS: full, unrestricted
CT: ortho D/N

PERRL (-)APD
CF: full by FC OU

- SLE-unremarkable
- Fundus-unremarkable
- Previous unremarkable tests
  - Topography
  - Fluorescein angiography
  - CAT scan
  - MRI

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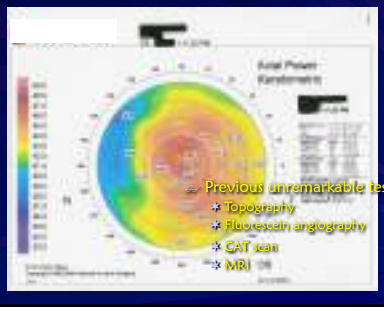
Any Thoughts About "Ghost Images"?



- Previous unremarkable tests
  - Topography
  - Fluorescein angiography
  - CAT scan
  - MRI

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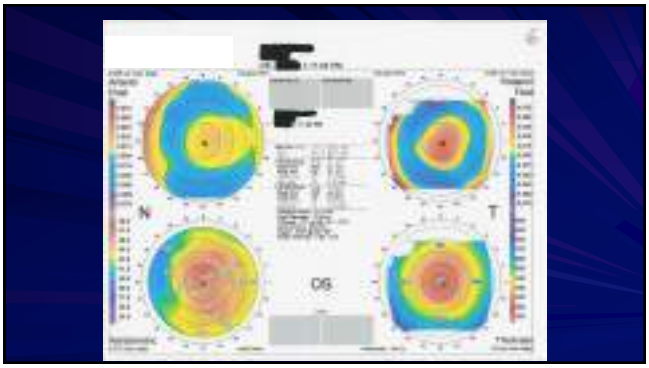

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How I felt when I finally realized keratoconus starts posteriorly

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Forme Fruste Keratoconus

- Treatment
- RGP lens in office and trial frame over refraction
  - Eliminated "ghost image"
- Patient currently only in spex
  - Not interested in RGP lens
- RTC 1 year, BVA and topographies

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Case 2

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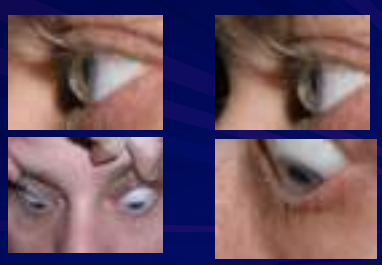
Advanced Keratoconus



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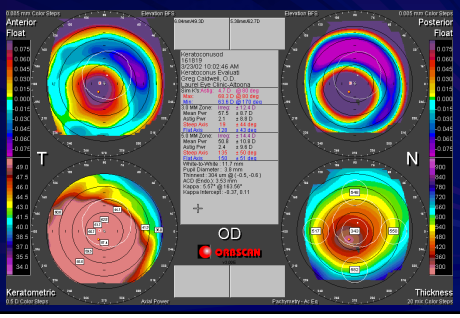
Topography OD



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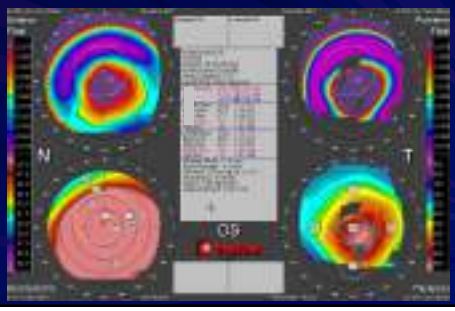
Topography OS



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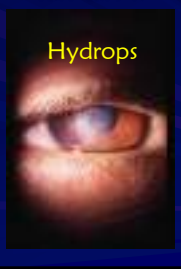
What happens when the posterior cone gets too steep and Descemet's membrane ruptures?



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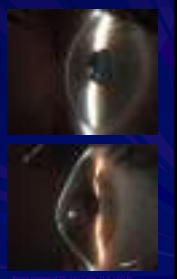
Keratoconus

- **Progressive corneal disease**
  - Focal thinning, steepening, bulging, and irregular shape
  - Loss of biomechanical strength
  - Bilateral, asymmetric, clinically non-inflammatory
- **Caused by a combination of genetic and environmental factors**
  - Allergies and eye rubbing
- **Onset in puberty**
  - Typically progressive to 4th decade of life
  - Previously estimated 1:2000 (1986 US), more recent estimate 1:375 (2017 Netherlands)



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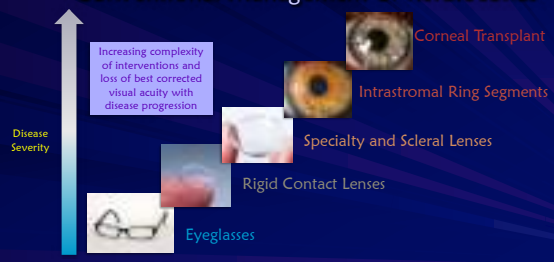
Conventional Management of Keratoconus



Vision management options do not stop disease progression

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Importance of Early Diagnosis in Keratoconus

- As keratoconus progresses, it becomes more challenging to manage
- Progressive keratoconus often results in:
  - Loss of visual acuity
  - Decreased tolerance to contact lens wear, caused by the ongoing changes in the cornea
- The earlier progressive keratoconus is diagnosed, the sooner treatment can be provided that may slow the progression of the disease.[1]
- **Important to diagnose and educate patients before visual function is lost**
- CXL is an early intervention intended to slow or halt the progression of keratoconus

1. Gelles, J. D., OD, FIAO, FCLSA. (2017, April). The Optometrist's Role in Keratoconus Management. Advanced Ocular Care.

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LOOK OUT FOR KC!

- **Look out** for warning signs in medical history
  - History of eye rubbing
  - Family & genetic predispositions
- **Look out** for visual complaints
  - Blurred vision
  - Distortion of images
- **Look out** for refractive anomalies
  - Distortion of mires on keratometry
  - Error messages on autorefractors
  - Unsatisfactory attempts at vision correction & progressive loss of UCVA & BCVA
  - Increasing astigmatism

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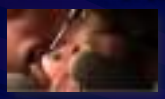
Cross-linking Procedure Summary



1. Remove epithelium

2. Soak cornea Photrexa® Viscous (riboflavin 5'-phosphate in 20% dextran ophthalmic solution) for 30 minutes

3. Check for flare

4. Once flare is observed, measure corneal thickness

If corneal thickness is less than 400 um, instill 2 drops of Photrexa *(riboflavin 5'-phosphate in ophthalmic solution)* until the corneal thickness increases to at least 400 µm

5. Irradiate for 30 minutes

Continue applying Photrexa Viscous *(riboflavin 5'-phosphate in 20% dextran ophthalmic solution)* during irradiation.

* Refer to prescribing information for entire FDA-approved procedure

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Descemet's Stripping Endothelial Keratoplasty DSEK

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Case 3

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28-year-old man

- Had LASIK 14 months ago
- His right eye is now very blurry
- He tried calling for an appointment the center is now closed

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Va cc 20/40 20

Current Correction
R +0.50-7.00 x 040
L -0.25 sphere

EOMS: full, unrestricted PERRL (-)APD
CT: ortho D/N CF: full by FC OU

- SLE-trace fibrosis at flap edges, no stain
- SLE-few multi-directional striae OD>OS
- SLE-clean interface OU
- Fundus-unremarkable

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graphy
OD

- Diagnosis:
  - Keratectasia 2° LASIK
- RGP OD 20/20-2
  - This lasted for about 3 months
  - Multiple RGPs later due to progression of astigmatism to 8.5 D (BVA 20/50-2)
  - Finally PKP was done Jan 2006

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Case 4

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43-year-old man

- Called your office today
- Eye pain in the right eye since this morning
- OD 20/80 OS 20/20
- Externals: normal
- Review of Systems: unremarkable

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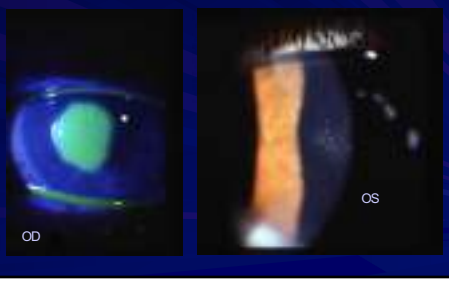
Slit Lamp Evaluation



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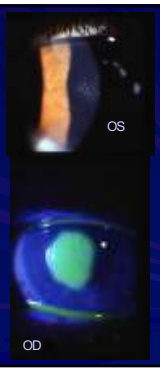
43-year-old male further history reveals

- Fourth time in past 24 months
- Uses Muro 128
  - Gtts qid
  - Ung qHS
- Diagnosis:
  - Recurrent Corneal Erosion secondary to Epithelial Basement Membrane Dystrophy (EBMD)



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Treatment

- Antibiotic, topical
- Pain management
  - Depending on severity
    - Bandage contact lens
    - Oral ibuprofen (200 mg) (16)
      - Maximum 3200 mg daily
    - Oral acetaminophen (500 mg) (6)
      - Maximum 3000[a] mg daily
    - Oral narcotic (need DEA number)
      - Lortab (500/5)
      - They provide good pain relief
      - A degree of sedation
      - Tend to minimally impact the digestive system and kidneys
      - It's not that they're dramatically more potent than OTC analgesics like aspirin, acetaminophen, ibuprofen or naproxen
    - Topical NSAID

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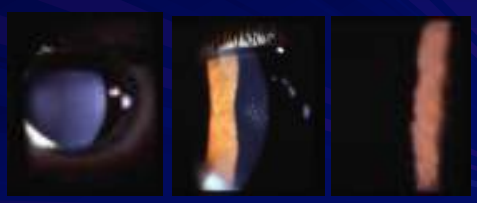
Review of Map-Dot-Fingerprint



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Treatment Options
(Once Abrasion Resolved, to Help Prevent Recurrence)

- Medically
  - Hypertonics
    - Gtts
    - Ung
  - Bandage contact lens
    - Nocturnal
  - Doxycycline/Minocycline
  - Amniotic membrane (PROKERA™)
- Surgical/Procedures
  - Anterior stromal micropuncture
  - Debridement
    - Chemically
    - Mechanically
      - Beaver blade/diamond burr
  - Excimer phototherapeutic keratectomy (PTK)

When is it time for surgical procedure?

Answer: medical treatment failure

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The Basics of Amniotic Membrane

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The Amniotic Membrane

- The amniotic membrane is the innermost lining of the placenta (amnion)
- Amniotic membrane shares the same cell origin as the fetus
  - Stem cell behavior
- Structural similarity to all human tissue

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The CRYOTEK™ Method

- Patented and proprietary cryopreservation
- Ensures key active components of the Extracellular Matrix (ECM) are retained
- The **only** method that retains both:
  - The integrity of the tissue structure
  - The key active (ECM) components
- Safe and effective
  - Supported by over **300** peer-reviewed articles
  - Over **100,000** implanted
- Bio-Tissue Cryopreserved Amniotic Membrane is the **ONLY** AM granted wound healing indication by the FDA.

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Technology Highlights

Impressive regenerative **platform** that possesses natural growth factors and optimal scaffolding properties within a complex extracellular matrix that are:

- Anti-inflammatory
- Anti-scarring
- Anti-angiogenic

Therapeutic actions:

- Promotes Stem Cell Expansion
- Suppresses pain
- Promotes cellular migration
- Expedites recovery

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PROKERA®: BIOLOGIC CORNEAL BANDAGE

- PROKERA® utilizes the proprietary CryoTek™ cryopreservation process that maintains the active extracellular matrix of the amniotic membrane which uniquely allows for regenerative healing.
- PROKERA® is the only FDA-cleared therapeutic device that both reduces inflammation and promotes scar less healing
- PROKERA® can be used for a wide number of ocular surface diseases with severity ranging from mild, moderate, to severe

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PROKERA®: Biologic Corneal Bandage
An Active Amniotic Membrane

Mild to Moderate	Moderate to Severe	Severe
• (Microbial, HSV) • Recurrent Corneal Erosions • Corneal Abrasions / Wounds	• Neurotrophic PED • Severe Infectious Keratitis • Post DSEK for Bullous Keratopathy • Corneal Wounds	• Chemical Burns • Stevens Johnson Syndrome • Severe Corneal Ulcers • Corneal Wounds

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Excimer Phototherapeutic Keratectomy (PTK)

- Corneal Opacities
  - Scarring
  - Granular dystrophy
- Surface Irregularity
  - Saltzman nodules
- Surface Breakdown
  - Epithelial basement membrane dystrophy

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PTK Procedure

- Removal of epithelium
- Manual debridement
- Polish with excimer

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PRK

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PTK

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Post op Regimen

- Vigamox and Pred-Forte q2°
  - Until wound is closed
- Bandage contact lens (BCL)
- Vitamin C, 1000 mg/day x 1 month
- NP-artificial tears
- Sunglasses in any UV

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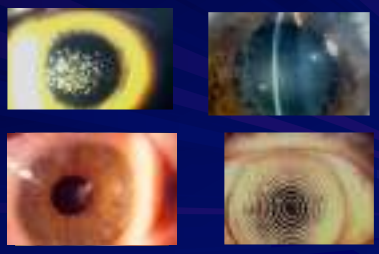
Before & After



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Case 5

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84 year old woman

- Right eye red and painful
- Started about 10 days ago
- See photos for discussion

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Diagnosis? Treatment?

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1 Week Later

Treatment Plan?

- Continue with topical and oral antibiotics
- Surgical consult for dacryocystorhinostomy (DCR)

Reminder 1 week ago

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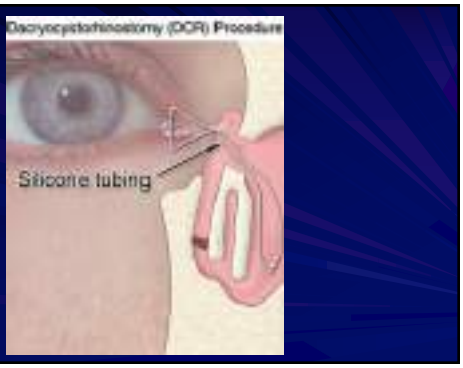

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After Dacryocystorhinostomy (DCR)

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Tube Removal

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Case 6

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35-year-old man

- Wants another opinion due to "hemorrhage on my right eye"
- Happened 3 days ago after vomiting
  - Claims food poisoning from chicken Caesar salad
  - Still feels a little nauseated
- Saw ophthalmologist 3 days ago, told he had a bruise on his eye and it should go away in 1-2 weeks

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35-year-old man

- BVA 20/100 OD, 20/70 OS
  - Hx of amblyopia OD
  - Current Rx OD +5.50 OS +4.50
- Any concerns?
- Patient noticed blurry vision OS
  - Started 2 weeks ago
  - Did not mention because he is more concerned about the blood on his right eye
- Headaches for 2 weeks, decrease if patient stands up
- ROS: unremarkable
- Decide to dilate OU

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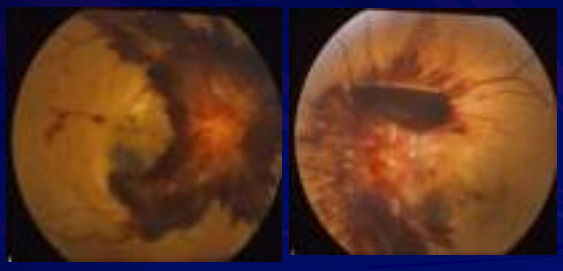
Retinal Findings



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Differential Diagnosis

- Hypertensive retinopathy
- Blood dyscrasia
- Terson's syndrome
- Valsalva retinopathy
- Purtscher's retinopathy
- Shaken baby syndrome

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Terson's Syndrome

- Terson's syndrome originally was defined by the occurrence of vitreous hemorrhage in association with subarachnoid hemorrhage
- Terson's syndrome now encompasses any intraocular hemorrhage associated with intracranial hemorrhage and elevated intracranial pressures
- Intraocular hemorrhage includes the development of subretinal, retinal, sub-hyaloidal, or vitreal blood
- The classic presentation is in the sub-hyaloidal space

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Treatment

- Emergency referral to neurologist due to high suspicion of intracranial hemorrhage and elevated intracranial pressure
- Intracranial hemorrhage confirmed with MRI
- Patient later diagnosed with Hairy Cell Leukemia and cryptococcal meningitis

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Case 7

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8-year-old girl

- Mom noticed the left eyelid has become red and has pimples
- Started two days ago
- Slowly getting more pimples on the eyelid
- Globe not affected

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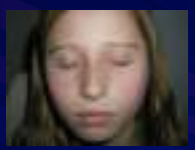
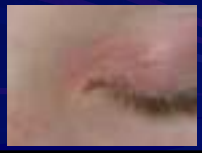
Slit Lamp Evaluation





- Diagnosis
  - Herpes simplex blepharitis
- Treatment
  - 400 mg Acyclovir 5x/day
  - Call to pediatrician

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Case 8

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58-year-old woman

- VA OD 20/200 OS 20/400
- Longstanding history of macular degeneration
- Anything suspicious here?
  - ?? Longstanding AMD in 58-year-old??
- History of cataract surgery OU
- Glasses Rx OD -1.00 OS -1.00

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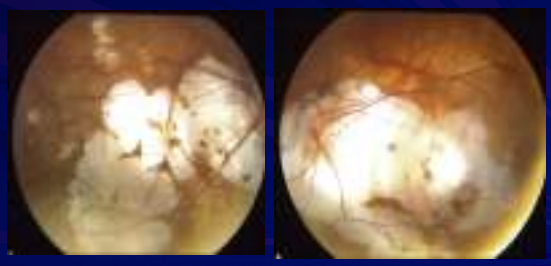
Axial length 29.85 mm



OD -18.00 OS -18.50 prior to cataract surgery

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Degenerative Myopia

- Differs from refractive myopia
  - There is an alteration of globe structure that is progressive
  - Primary alteration is a posterior elongation of eyeball as a result of progressive thinning of sclera
    - Posterior staphyloma

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Degenerative Myopia

- Findings
  - Lacquer cracks
  - Posterior staphyloma
  - Fuch's spot
  - RPE and choroidal atrophy
  - Scleral crescents
  - Vessel straightening
  - Disc tilting
  - Peripheral retinal changes

Can be found in refractive and degenerative myopes

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Conditions Associated With Degenerative Myopia

- Fetal Alcohol Syndrome
- Ocular albinism
- Down's Syndrome
- Low birth weight
- Infantile glaucoma
- Retinopathy of Prematurity
- Marfan's Syndrome

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Treatment

- BVA with glasses/contact lenses
- Education regarding trauma and possible eye hazards
- Monitor for neovascularization and peripheral retinal changes
- Follow-up at least yearly

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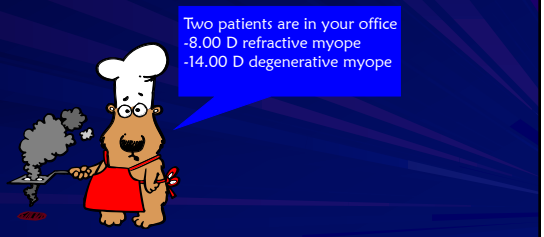
Which patient is at higher risk of retinal detachment?



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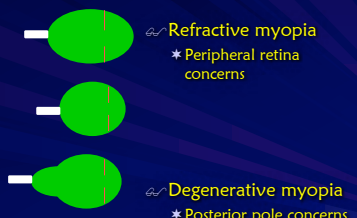

- Refractive myopia
  - Peripheral retina concerns
- Degenerative myopia
  - Posterior pole concerns

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Clinical Pearl

- Refractive myopia
  - Peripheral retina is general concern
- Degenerative/Pathological myopia
  - Posterior pole is general concern
    - Posterior staphyloma

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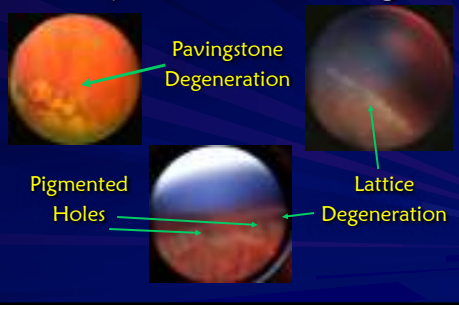
Peripheral Fundus Findings



85

Case 9

86

88-year-old man
I see faces of friends that I have not seen for years, wheels of cars and at times pine trees

BVA
Count fingers at 2 feet OU

Current Correction
R plano
L -1.00 sphere

EOMS: full, unrestricted
CT: ortho D/N by Hirschberg

PERRL (-)APD
CF: central defect OU

87

Recommend psyche consult?

- Alert and Oriented x 3
  - Person
    - Knows who he is, who is with him
  - Place
    - Knows where he is, knows where he lives
  - Time
    - Knows what month, day, date and year

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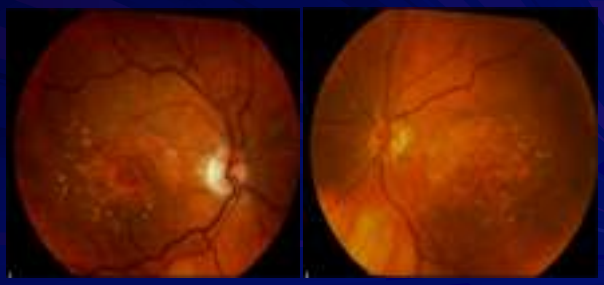
Diagnosis and Treatment?



89

Charles Bonnet Syndrome
"Release Hallucination"

- Visual hallucinations
  - Irritative (brief)
    - Epilepsy
    - Migraine
  - Release (continuous)
    - Stroke
    - Sensory deprivation

90

Treatment

- Reassurance
  - That this is normal for patient with severe vision loss to experience hallucinations
- Clinical Pearl
  - Any patient 20/100 or worse in better eye
    - Ask the patient

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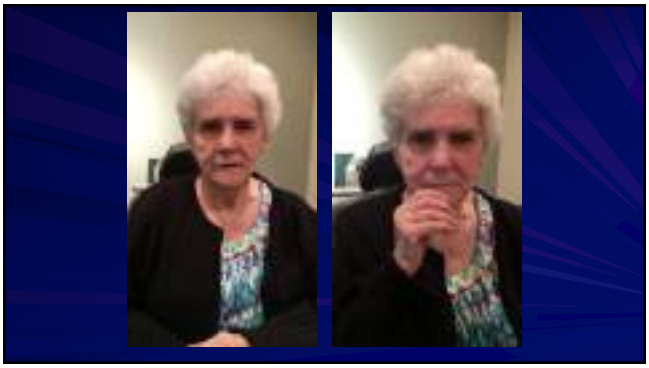

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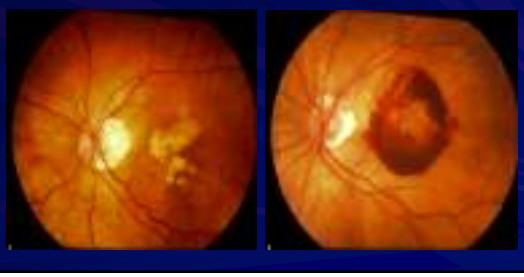
Clinical Pearl
Is there a difference between
Geographic Atrophy and Disciform Scar



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Case 10

94

65-year-old woman

- Referred by an optometrist due to corneal edema and map-like anterior opacities
  - Impression is EBMD versus corneal degeneration
- Patient reports decreasing vision over past 6-9 months
  - Especially at near
- Vision 20/50 OU

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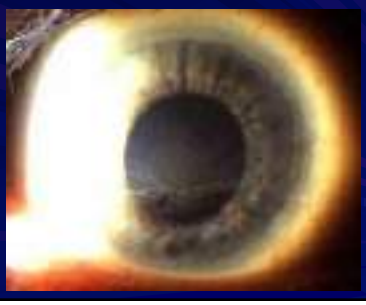
Cornea OD



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Patient's Medications

- Baby ASA
- Lanoxin
- Synthroid
- Glucophage
- Pravochol
- Amiodarone
- Neurotin
- Zoloft
- Vitamin E

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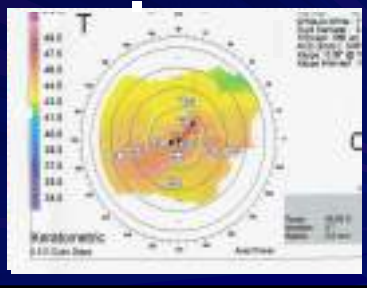
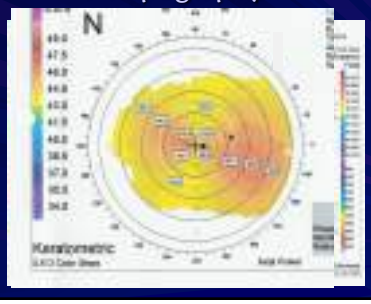
Topography



98

Topography



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Called Primary Care Physician to Discuss Findings

- D/C amiodarone
- Primary Care Physician switches patient to diltiazem

Class	Action	Drugs
I	Sodium channel blockade	Quinidine, Procainamide, Disopyramide, Lignocaine, Mexiletine, Tocainide, Flecainide, Phenytoin
II	ß-adrenergic blockade	Propranolol, Acebutolol, Carvedilol, Esmolol …
III	Prolong repolarisation	Amiodarone, Bretylium, Sotalol, Difetilide, Azimilide
IV	Ca2+ antagonism	Verapamil, Diltiazem, Semotiadil

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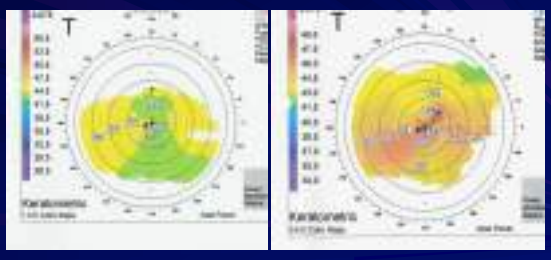
6 Months Later

20/25 BVA

101

OD



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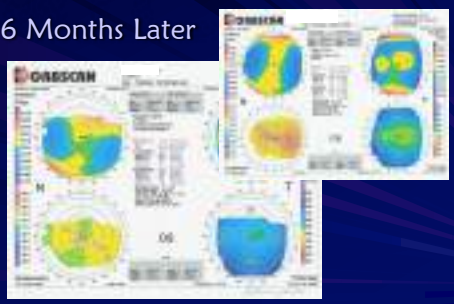
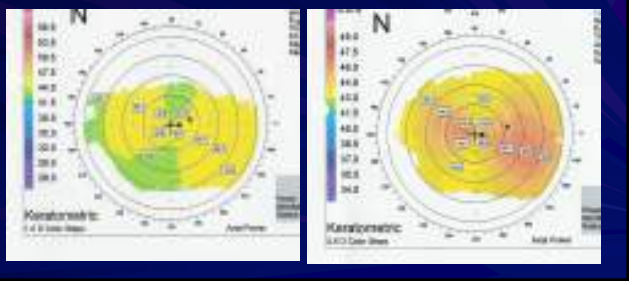
6 Months Later



20/25 BVA

103

OS



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Amiodarone Ocular Side Effects

- Halos and colored lights, reported symptoms
- Corneal opacities
  - Epithelial basal cell layer
  - Bilateral, dose and duration related
  - Reversible
  - Dot, Linear, cornea verticillata (whorl like pattern found later)
- Conjunctiva, lens, retina and optic nerve deposits
- Optic neuropathy has been reported
  - Unilateral and bilateral cases

http://www.optometry.co.uk/articles/20020517/patel20020517.pdf

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Cornea Verticillata (Whorls)

- Drug-induced
  - Amiodarone
  - Chloroquine/hydroxychloroquine
  - Tamoxifen
  - Chlorpomazine
  - Indomethacin

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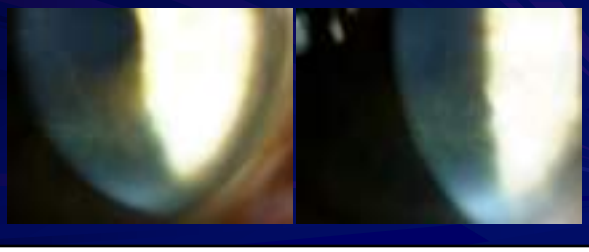
Another Patient Complaining of Blurry Vision Taking Amiodarone



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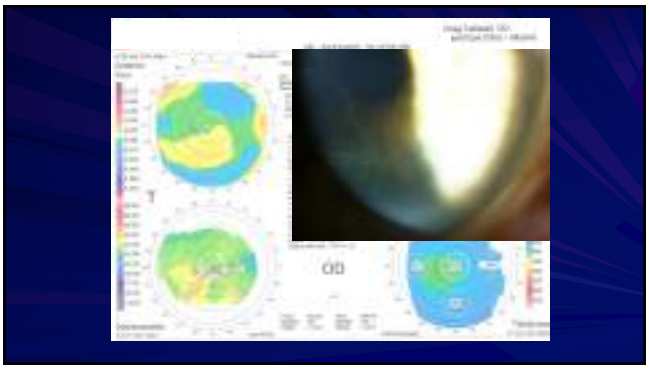
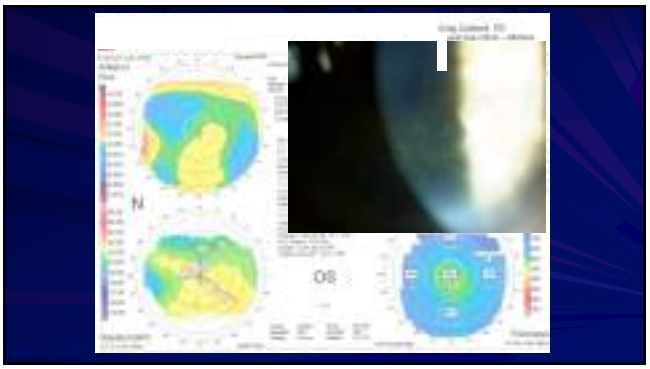


108



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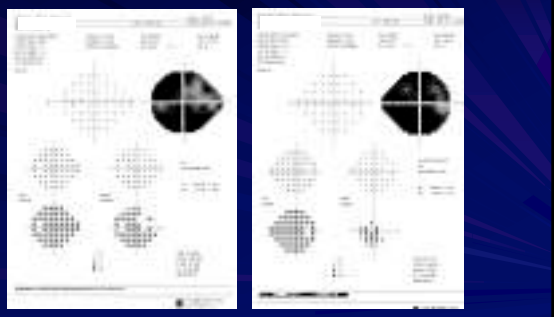
Case 11

110

67-year-old man complains of vision slowly deteriorating over the past 8 months

- History of NA-ION 10 months ago OD
- Patient sees family physician for physical due to recent NA-ION
  - Patient has not been to PCP for 35 years
  - Patient started Cardarone
  - VA 20/80 OD 20/25 OS (9 months ago)
- VA 20/400 OD 20/200 OS (today)
- CF: severe constriction OU
- SLE: vortex corneal whorls OU

111



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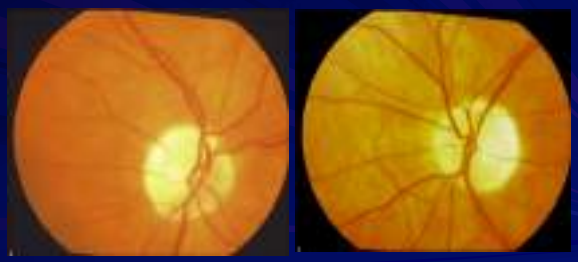
Amiodarone Optic Neuropathy



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Optometric Education Consultants

Thank you!

Anterior and Posterior Segment Case Presentations

Enough Pearls to Make a Necklace

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