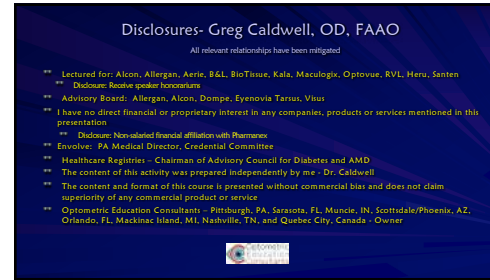
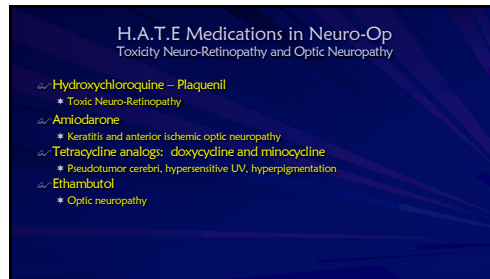


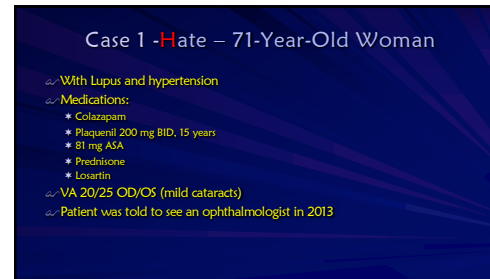
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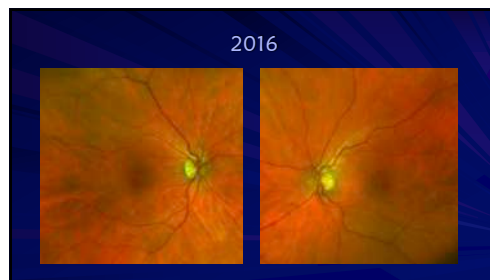
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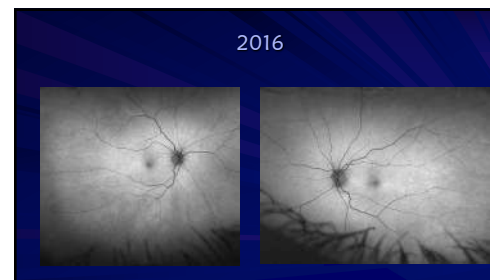
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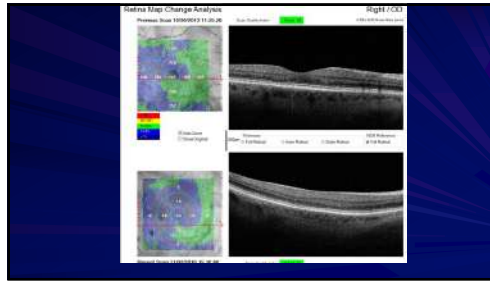
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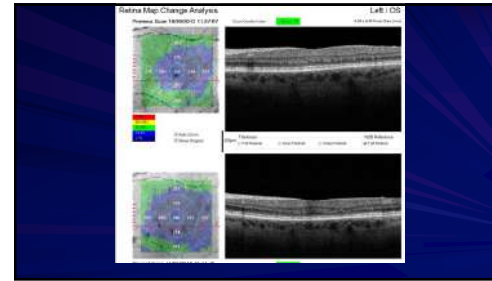
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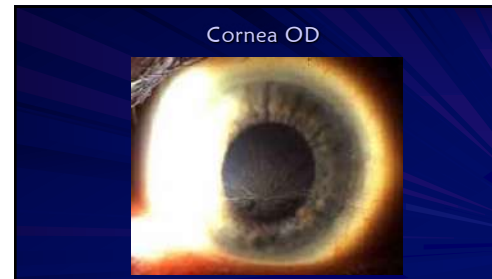


10

Case 2 - hAte- 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

11

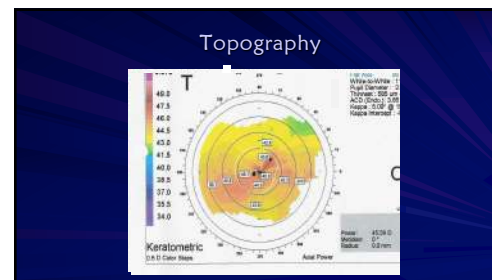


12

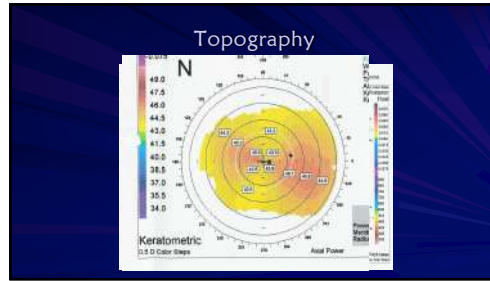
Patient's Medications

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

13



14



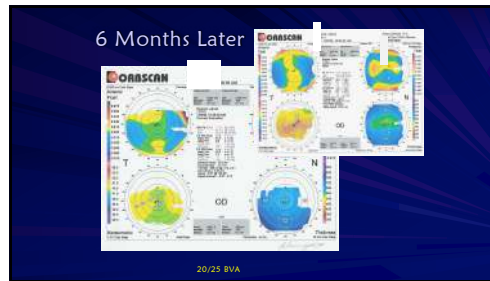
15

Called Primary Care Physician to Discuss Findings

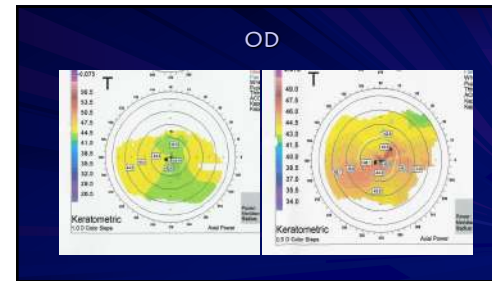
- D/C amiodarone
- Primary Care Physician switches patient to diltiazem

Class	Action	Drugs
I	Sodium channel blockade	Quinidine, Procainamide, Disopyramide, Lignocaine, Mexiletine, Tocainide, Flecainide, Phenytoin
II	β-adrenergic blockade	Propafenone, Acebutolol, Carvedilol, Esmolol ...
III	Prolong repolarisation	Amiodarone, Bretylium, Sotalol, Diltiazem, Azimilide
IV	Ca2+ antagonist	Verapamil, Diltiazem, Semotiadil

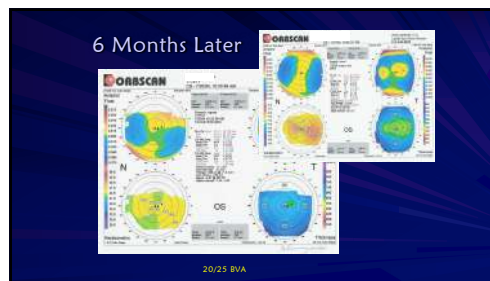
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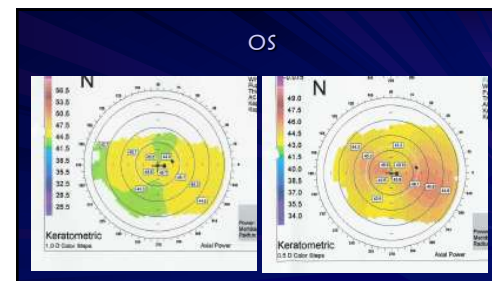
17



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19



20

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>

21

Cornea Verticillata (Whorls)

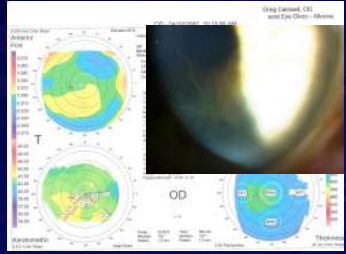
- ⌚ Drug-induced
 - * Amiodarone
 - * Chloroquine/hydroxychloroquine
 - * Tamoxifen
 - * Chlorpomazine
 - * Indomethacin

22

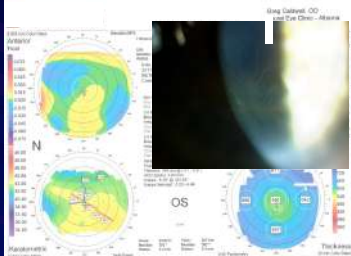
Another Patient Complaining of Blurry Vision Taking Amiodarone



23



24



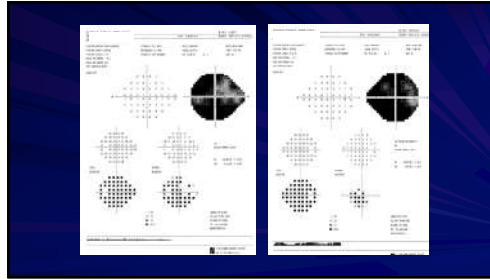
25

Case 3 - hAte

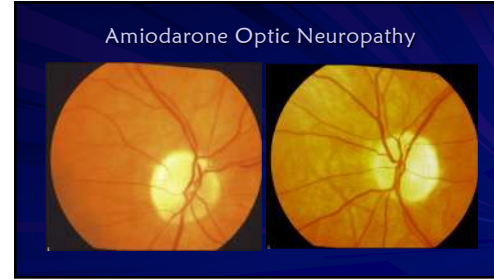
65-year-old woman 67-year-old man complains of vision slowly deteriorating over the past 8 months

- ⌚ 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

26



27



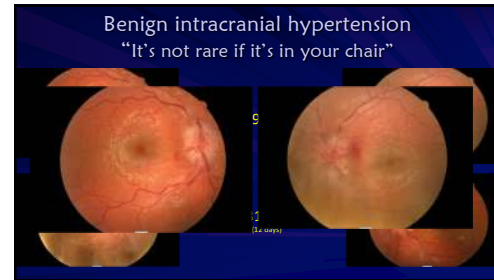
28

haTe-Doxycycline and Minocycline

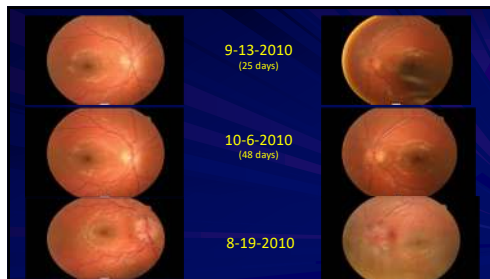
Case 4

T – Tetracycline Analogs

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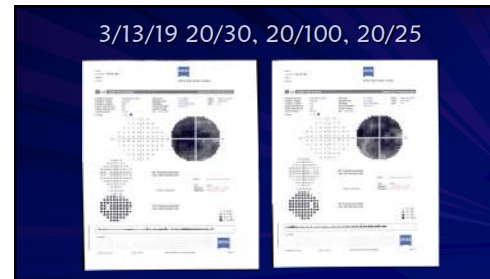


34

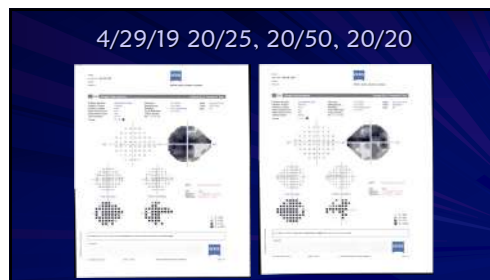
Case 5 -hatE- 81-year-old woman

- Calls the office reporting decreased vision (3-13-19)
 - Was warned vision could decrease due her medications
 - Glaucoma patient
- Mycobacterium avium infection
 - Ethambutol, rifampin, and azithromycin
 - Ethambutol started October 2017
- Glaucoma patient
 - Was on latanoprost and Rhopressa
 - Had KDB
 - No glaucoma drops currently

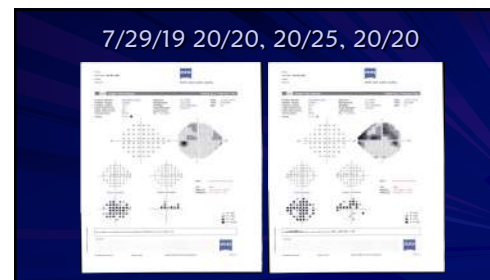
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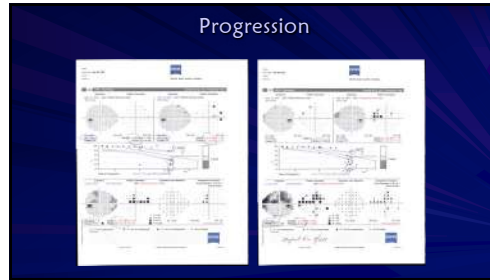
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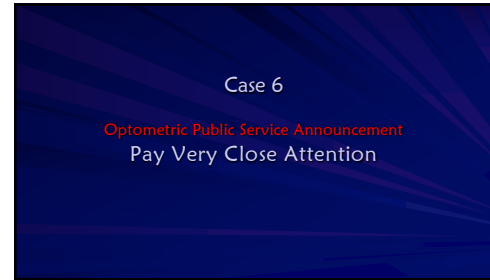
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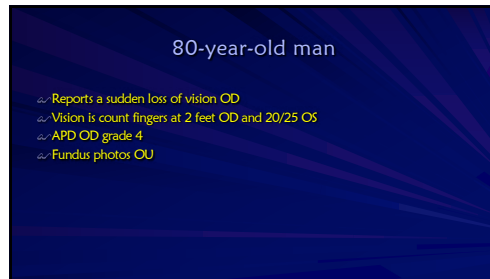
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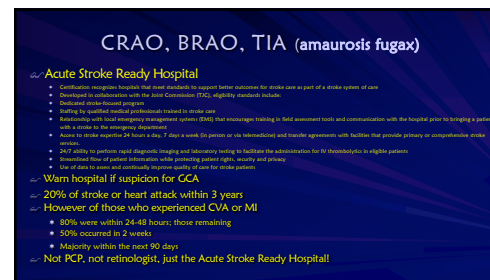
41



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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

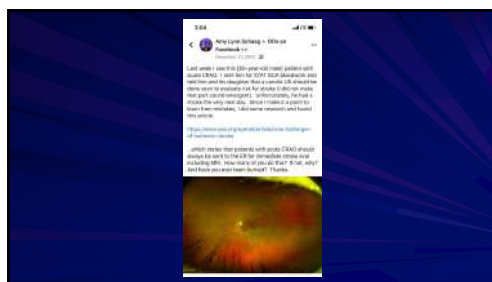


45



IDENTITY	FACILITY NAME	STATE	ZIP	PHONE
ALABAMA	Drexler Eye Institute	Alabama	36033	205.333.7300
ALABAMA	Peak Hospital	Alabama	35004	205.332.3300
ALABAMA	West Alabama Hospital - Uxbridge	Alabama	35891	205.332.2000

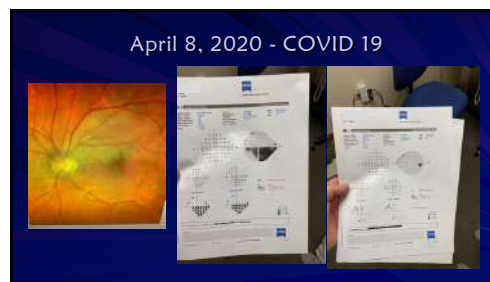
46



SGA (@SocGrAn) 4/8/20
Last week, more than 100,000 people were hospitalized with COVID-19 in the US. For 2019, the American Society of Geriatric Ophthalmology (ASGO) has issued the following statement: "As the COVID-19 pandemic continues, it is increasingly important that we ensure our patients with eye disease receive the care they need. Eye exams are a critical part of the overall health assessment and should be performed as soon as possible. It is important to ensure that our patients receive the care they need. It is important to ensure that our patients receive the care they need." #EyeExams #COVID19 #EyeHealth

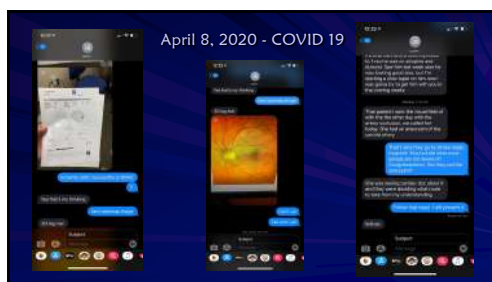
47

April 8, 2020 - COVID 19



48

April 8, 2020 - COVID 19



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Case 7- 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

50

"Ghost Image" OS

Va 20 / 20
cc 20

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

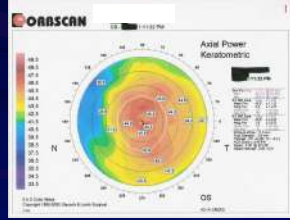
EOMS: full, unrestricted
CE ortho D/N

PERRL (-)APD
CF: full by FC OU

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

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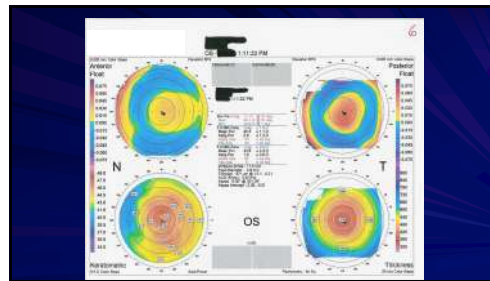
Any Thoughts About "Ghost Images"?



~ Previous unremarkable tests

- * Topography
- * Fluorescein angiography
- * CAT scan
- * MRI

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How I felt when I finally realized keratoconus starts posteriorly



54

Forme Fruste Keratoconus

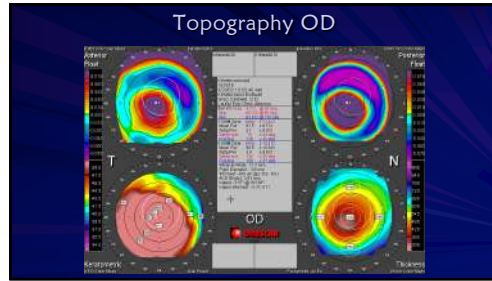
- ~ Treatment
 - ~ RGP lens in office and trial frame over refraction
 - * Eliminated "ghost image"
 - ~ Patient currently only in spex
 - * Not interested in RGP lens
- ~ RTC 1 year, BVA and topographies

55

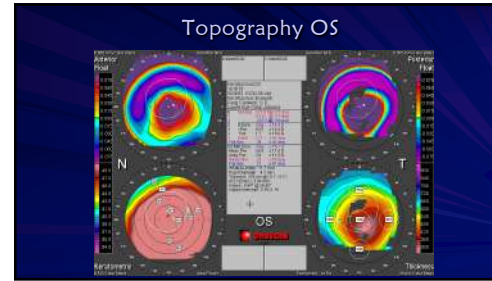
Case 8- Advanced Keratoconus



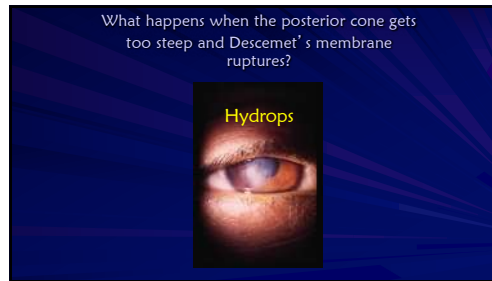
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Keratoconus

- 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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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

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Watch Out for Keratoconus!
Potential Signs & Symptoms

Typically onset occurs in teenage years or early twenties

Prevalence: 4.9% of population
Hereditary: 30% of patients

Family History of Keratoconus

Visual Complaints: Blurred Vision, Distortion of Images

Refractive Anomalies: Myopia, Astigmatism

Unsuccessful Attempts at Vision Correction

Progressive Loss of UCVA & BCVA

Increasing Astigmatism

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

- Remove epithelium
- Soak cornea Proseal® Viscous (phosphoric 5% phosphate in 20% dextran ophthalmic solution) for 30 minutes
- Check for flare
- Once flare is observed, measure corneal thickness. If corneal thickness is less than 400 µm, instill 2 drops of Proseal (phosphoric 5% phosphate in ophthalmic solution) until the corneal thickness increases to at least 400 µm
- Irradiate for 30 minutes. Continue applying Proseal Viscous (phosphoric 5% phosphate in 20% dextran ophthalmic solution) during irradiation.

* Refer to prescribing information for entire FDA-approved procedure

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Case 9 - 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

67

$$\begin{matrix} Va & 20 & / & 40 \\ cc & & & 20 \end{matrix}$$

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

EOMS: full, unrestricted
CT: ortho D/N

PERRL (-)APD
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

68

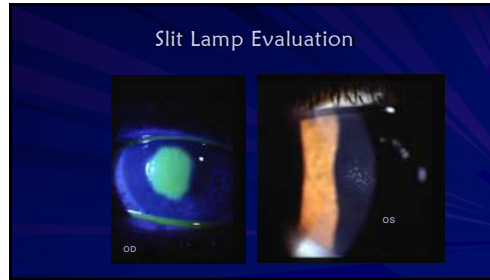
Diagnosis:
Keratoconus 2° LASIK
RGP OD 20/20-2
This lasted for about 3 months
Multiple RGPs later due to progression of astigmatism to 8.5 D (RVA 20/50-2)
Finally RGP was done Jan 2006

69

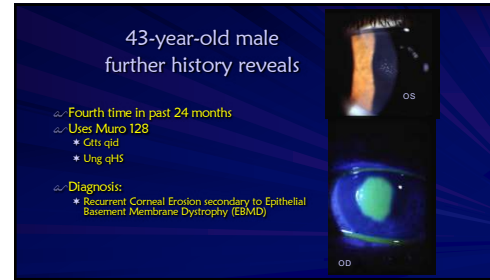
Case 10 - 43-year-old man

- 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

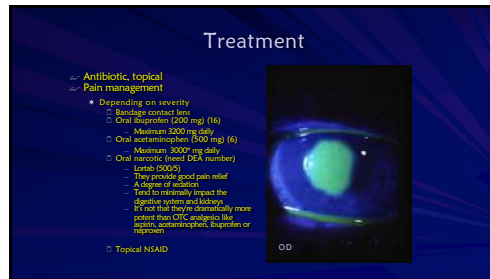
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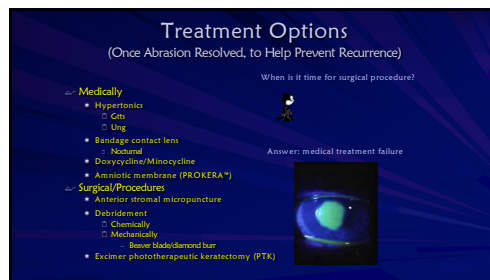
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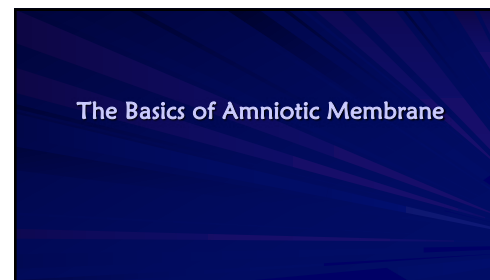
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75



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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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Cryopreservation

- Preserve AM at -80°C
 - Without forming ice
 - Minimal manipulation from fresh AM
 - Maintains the structural and biological integrity of the membrane
 - Retains meaningful quantities of **HC-HA/PTC**
 - Accrues regenerative healing
 - Retain the original **tenacity strength** of AM
 - Facilitating ease of handling during surgery


The processing method is the key to retaining potency.



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Regenerative Tissue Engineering

- Innovative biologic healing
- A 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

Prokera - Slim	Prokera	Prokera - Plus
		
Mild to Moderate	Mild to Moderate	Severe
<ul style="list-style-type: none"> Microbial, HSV Recurrent Corneal Erosions Corneal Abrasions / Wounds 	<ul style="list-style-type: none"> Neurotrophic PED Severe Infectious Keratitis Post DSEK for Bullous Keratopathy Corneal Wounds 	<ul style="list-style-type: none"> Chemical Burns Severe Johnson Syndrome Severe Corneal Keratitis Corneal Wounds

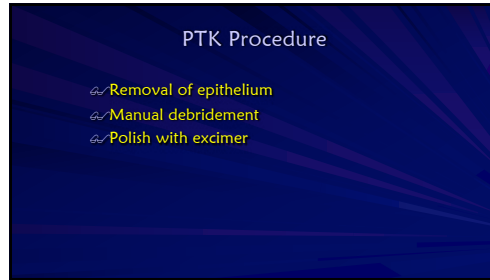
81

Excimer Phototherapeutic Keratectomy (PTK)

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



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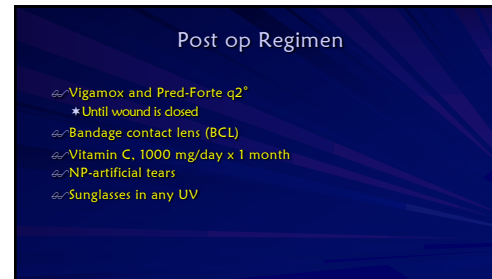
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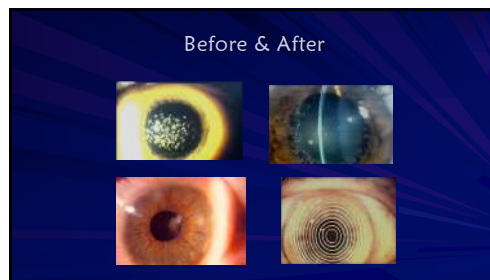
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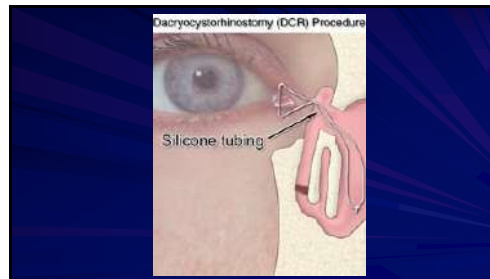
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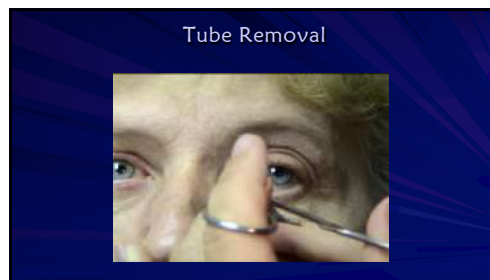
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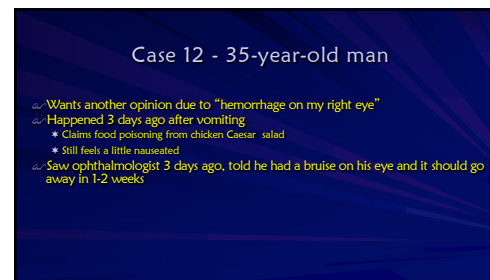
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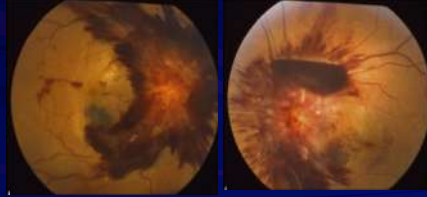
35-year-old man

- ⌚ 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

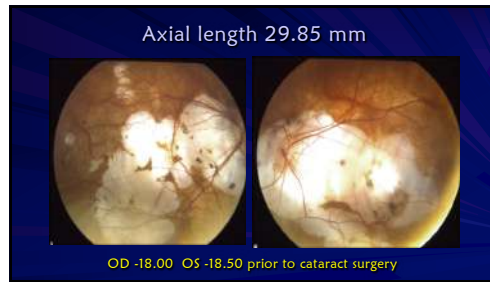
- ⌚ Emergency referral to neurologist due to high suspicion of intracranial hemorrhage and elevated intracranial pressure
- ⌚ Intracranial hemorrhage confirmed with MRI
- ⌚ Patient later diagnosed with Hairy Cell Leukemia and cryptococcal meningitis

99

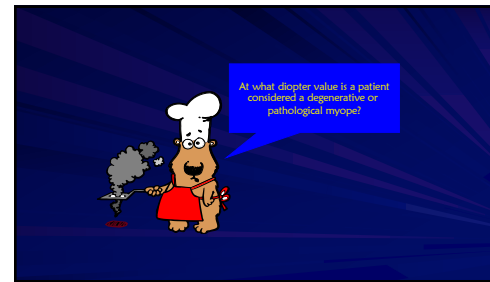
Case 13 - 58-year-old woman

- ⌚ 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

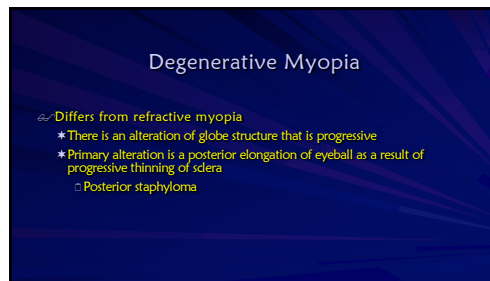
100



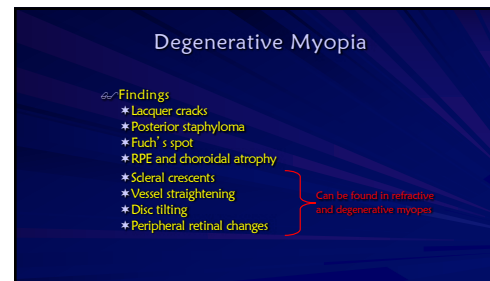
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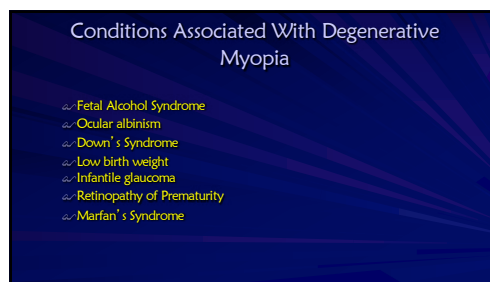
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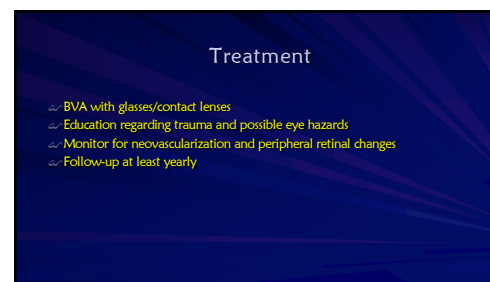
103



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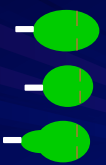
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Which patient is at higher risk of retinal detachment?



Two patients are in your office
-8.00 D refractive myope
-14.00 D degenerative myope

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~ Axial myopia
* Peripheral retina concerns

~ Degenerative myopia
* Posterior pole concerns

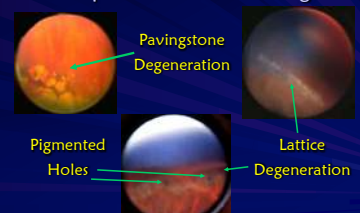
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Clinical Pearl

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

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Peripheral Fundus Findings



Pavingstone Degeneration

Lattice Degeneration

Pigmented Holes

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Case 14
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	Current Correction
Count fingers at 2 feet OU	R plano L -1.00 sphere

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

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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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Charles Bonnet Syndrome
“Release Hallucination”

Visual hallucinations

- * Irritative (brief)
 - o Epilepsy
 - o Migraine
- * Release (continuous)
 - o Stroke
 - o Sensory deprivation

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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
 - o Ask the patient

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Thank You!
Questions!

Ocular Disease Grand Rounds
Improving Eye Care and Outcomes for Patients

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Heidelberg, Germany
May 2023

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