College of Optometry
UNIVERSITY OF HOUSTON

CE in Dallas

March 29-30, 2025

Conference Director
Marcus Gonzales, OD, FAAO

Sunday Handouts

Sunday, March 30, 2025			
7:00 am - 8:00 am	**Check-In, Continental Breakfast, & Exhibit Hall**		
8:00 am - 8:05 am	**Announcements & CE Credit Overview**		
8:05 am - 9:45 am	**Retina Brainteaser Cases** *Chris Borgman, OD, FAAO*	2 D/T Hours	COPE ID # 92086-SD
9:45 am - 10:15 am	**Break**		
10:15 am - 11:05 am	**Optic Nerve Anomalies** *Chris Borgman, OD, FAAO*	1 D/T Hour	COPE ID # 96589-NO
11:05 am - 12:00 pm	**Glaucoma: What Would You Do?** *Chris Borgman, OD, FAAO*	1 D/T Hour	COPE ID # 91425-GL
12:00 pm - 1:00 pm	**Lunch**		
1:00 pm - 1:50 pm	**Importance of Early Detection in Corneal Ectasia** *Bryan Williams, OD, FAAO*	1 D/T Hour	COPE ID # 96595-TD
1:50 pm - 2:05 pm	**Break**		
2:05 pm - 2:55 pm	**Ball Room 1**		
	2025 Professional Responsibility Course for Texas Optometrists *Andrew Kemp, OD, FAAO*	1 GEN/PR Hour	COPE ID # 96618-EJ
	Ball Room 2		
	Use of Scleral Contact Lenses in the Management of Corneal Ectasias *Bryan Williams, OD, FAAO*	1 D/T Hour	COPE ID # 96597-CL
2:55 pm - 3:05 pm	**Break**		
3:05 pm - 3:55 pm	**Ball Room 1**		
	Opioids: Improving Care with Knowledge and Experience *David Dinh, OD, FAAO*	1 D/T Hour	COPE ID # 97240-PH
	Ball Room 2		
	Anterior Segment Jeopardy (Part 1) *Marcus Gonzales, OD, FAAO & Andrew Kemp, OD, FAAO*	1 D/T Hour	COPE ID # 96609-GO
3:55 pm - 4:05 pm	**Break**		
4:05 pm - 5:00 pm	**Ball Room 1**		
	Human Trafficking Training for Health Care Providers *Natalie Alonzo, MBA*	1 GEN/ HT Hour	COPE ID # 92565-PB
	Ball Room 2		
	Anterior Segment Jeopardy (Part 2) *Marcus Gonzales, OD, FAAO & Andrew Kemp, OD, FAAO*	1 D/T Hour	COPE ID # 96010-GO

Retina Brainteaser Cases…

Chris Borgman, OD, FAAO

SOUTHERN COLLEGE OF OPTOMETRY

COPE Disclosures:

- I do not have any relevant financial relationships to disclose.
- The content and format of this course is presented without commercial bias and does not claim superiority of any commercial product or service.

Conflict of Interest…

- I have no disclaimers or conflict of interests to report…..
- I'm not perfect…
- Some cases are more straight forward than others…
- I will email you my reference list if you want it….

- Email: cborgman@sco.edu

Case #1:

"Why does my uveitis keep coming back?"

Case History…

- 38 year old AF
- History of recurrent iritis q6 months x 2 years OS only
- Vietnamese immigrant; non-English speaking
- POH: (+)phaco OS 18 months prior secondary to PSC
- PMH: denies all
- FMH: unknown
- SH: unremarkable
- ALL: NKMA/NKDA

Exam…

- VA = 20/20 OD, 20/30+ OS (sc)
- EOM's/Pupils/CVF = WNL OU
- Adnexa = WNL
- Slit Lamp = OD WNL, OS had old corneal KP's, no current A/C rxn, stable PCIOL OS with no PCO
- IOP = 16 mmHg, 15 mmHg with Goldmann
- DFE: see pictures

Labwork ordered…..

- CBC with diff = WNL
- ESR = WNL
- RF = WNL
- ANA = WNL
- PPD = WNL
- Chest x-ray = WNL
- ACE, Lysozyme = WNL
- Lyme titers = non-reactive
- RPR =WNL
- HIV = WNL
- Toxocariasis titers = WNL
- Toxoplasmosis titers = IgG reactive, IgM non-reactive

Note:
- IgM is elevated in acute infection
- IgG is elevated in chronic infection

Toxoplasmosis Iritis….

- Intraocular infection of the intracellular parasite *Toxoplasma gondii*
- Recurrent posterior uveitis; usually unilateral
- 90% posterior uveitis = toxoplasmosis
- Sx = floaters, blurry vision, pain, photophobia, veils, etc.
- Sn = iritis, vitritis, retinochoroiditis, retinal scars

- Most common onset = 20-40 years of age
  - Congenital possible too
- Posterior pole = 50% of cases

- Optic nerve involved in ~5% of cases
  - Aka = "toxoplasma neuroretinitis"

- HIV patients at highest risk when CD4 <250

- USA = 30% exposed
- Europe, Asia, Africa, S. America = 40-80% exposed

T. Gondii Life Cycle…

- T. Gondii life cycle:
  - Cats = definite host (needed)
- Humans more than likely get it from undercooked meat and/or contaminated drinking H20
- Direct exposure from cats themselves is possible but rarer…

T. Gondii Treatment…

- Observation only in most cases…
- If macula/ONH/vision threatened then Tx is indicated…
- Vision Threating Defn: any lesion within temporal arcades or adjacent to ONH

1. "Classic therapy" (pyrimethamine, sulfadiazine, prednisone)
   - Pyrimethamine can cause: leukopenia and thrombocytopenia, GI problems, dermatological problems too; hence #2 most common Tx now
2. Trimethoprim/sulfamethoxazole (Bactrim) and oral prednisone
3. Clindamycin and prednisone

- Note: Topical steroids (Pred Forte, Durezol) still important for anterior iritis

Ocular Toxoplasmosis Prevention…?

- Similar concept to recurrent HSV….
- Trimethoprim/sulfamethoxazole (160-800 mg) PO q3 days
- Decreased recurrent episodes from 23.8% to 6.6% over 20 month period
- Viewed as best with history of recurrency and/or scars adjacent to the fovea
- Promoting resistance???

Case #2:

"Doc, I can't see very well…"

Case History…

HPI: onset 5 days, OS>OD, D & N, h/o trauma with coat hanger 5 days earlier OS, (+)floaters/flashes OS>OD

POH: LEE 6-8 months; current Rx 2 months old

PMH: LME >4 years, (+) arthritis, (+) Sickle Cell (SC variant)

Meds: denies, vitamins only

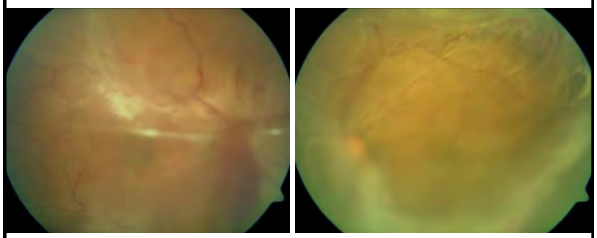
Allergies: PCN

SH: unremarkable

Exam…

- **VA's:**
  OD 20/50- (PHNI),
  OS 20/60- (PHNI)
- **EOM:** FROM OU
- **CVF:** FULL OU
- **Pupils:** equal, round, RL 4+ OU, (-)APD OU
- **SLE:** unremarkable OD, OS
- **Tonometry:** 14 mmHg OD, 13 mmHg OS
- **DFE:** see pics

DFE…



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SC Trait vs. SC Disease

- AA = normal
- AS = trait
- AC = trait
- SS = sickle cell disease (anemia)
- SC = sickle cell disease
- Spectrum of SCD: 80% AS, 4% SS, 2% SC, 14% other types

Sickle Cell Disease (SCD)

- Inherited disorder of Hemoglobin molecules
  - Most common hemoglobinopathy
- 60,000 people in U.S. with SCD (not trait)
- 8.0% of African Americans have sickle cell trait (AS)

Elagouz et al. "Sickle Cell Disease and the Eye: Old and New Concepts." Survey of Ophthalmology. July-August 2010;55:359-377.

Hemoglobin Review

- **Normal Hemoglobin**:
  - 2 α-chains and 2 β-chains
  - Hemoglobin A = normal; "adult"
  - Lifespan of 120 days
- **Sickle Cell Hemoglobin**:
  - Different combos of β-chains; α-chains are unchanged
    - β-chains are reduced/missing = Thalassemia
  - Hemoglobin S = abnormal
  - Hemoglobin C = abnormal
  - Lifespan of 16 days
    - Cleared by spleen much more quickly →severe anemia

Pathogenesis of SCD

•Low O2 environments →"sickling" → sticky → vascular occlusions

•Point mutation on hemoglobin β-chain
•Glutamate is replaced by Valine = SS
•Glutamate replaced by Lysine = SC
•Hb loses O2 →Valine/Lysine binds to open spot in molecule forming long rigid strands → sickle shape

•Occlusions cause tissue ischemia throughout body leading to various complications

Laboratory Testing

1. Sickledex test (screener)
   - •Identifies presence of Hb S (99% accurate)
     - •Sickle Cell Trait---may be NEGATIVE
       - •May be masked by normal Hb A molecule (rare)
2. Hemoglobin Electrophoresis
   - •Performed if Sickledex is positive or inconclusive
   - •Capable of identifying:
     - •Hb AA
     - •Hb AC
     - •Hb AS
     - •Hb SS
     - •Hb SC
     - •Hb Sthal variants

SC Retinopathy: Stage 1(Non-Proliferative)

1) Peripheral Retinal Arteriolar Occlusions
2) Salmon Patches (fresh intraretinal hemmorrhages)
3) Black Sunbursts (resorbed hemmorrhages associated with RPE hyperplasia)
4) Venous Tortuosity
5) Angioid Streaks (rarely can develop CNVM)

Alexander, Larry J. Primary Care of the Posterior Segment. "Sickle Cell Retinopathy." 2nd Edition. 2002. pgs 439-443.

SC Retinopathy: Stage 2 (Non-Proliferative)

•Arteriovenous anastomosis
  •Shunt vessels
  •Arterioles→ Venules

Duanes Clinical Ophthalmology: Diseases of the Retina. Vol 3:17. Sickle Cell Disease. 2008.

SC Retinopathy: Stage 3 (Proliferative)

•VEGF released from the retina in response to ischemia

•Seafan neovascularization proliferates
  •Most common in superior-temporal quad
  •Very similar to PDR in diabetics

•Tx: PRP laser to non-perfused retina, direct laser to feeder vessels and/or neo

•Alternate Tx: Avastin injections

•According to Massachusetts Eye and Ear Infirmary, 60% of sea-fan neo spontaneously regresses on it's own…

Risk of Converting to VH and RD from Stage 3	Timeframe
5.3%	6.3 years
2%	6.3 years

Regina et al. "Sickle Cell Disease and the Eye: Old and New Concepts." Survey of Ophthalmology. July-August 2008;53:398-377.

SC Retinopathy: Stage 4 (Proliferative) ---Vitreous Hemorrhage

- Risk of Vitreous Hemorrhage:
- SC---21-23%
- SS---2-3%

- Results from fibrous tissue traction on sea-fan neo which breaks and leaks into vitreous

- Tx: Usually monitored for 3-6 months. Non-clearing or sight-threatening →PPV

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SC Retinopathy:Stage 5 (Proliferative) ---Retinal Detachment

- Stems from fibrous scaffolding of seafan neovascularization which contracts/pulls on retinal tissue→RD

- Tx: RD repair surgery (scleral buckle, laser, cryotherapy)
- Scleral buckle in SCD has 70% chance of anterior segment necrosis
  - Non-SCD has only 5% chance
- Prognosis: guarded (depends on location, extent, etc.)

Alexander, Larry J. Primary Care of the Posterior Segment. "Sickle Cell Retinopathy." 2nd edition. 2002. pgs 639-643.

Systemic Complications

- Any one of these alone or in combo could be called **"sickle cell crisis"**
  - Organ Infarcts:
    - Lungs → pulmonary embolism
    - Spleen → increased risk of infection
    - Kidney
    - Liver → jaundice
  - Anemia
  - Gallstones
  - Stroke/CVA
  - Joint Pain
    - Arms, Legs, Chest, Abdomen
    - Can be severe

Current Systemic Tx Options

1. Pain Relievers---joint and bone pain
2. Blood transfusions---replaces defective RBC's, only cure available
3. Antiplatelet therapy---decreases risk of clotting
4. Anticoagulation---decreases risk of clotting
5. Thrombolytic agents---clear already blocked vessels
6. Gene Therapy---replacing defective Hb chains; area of research
7. Nitrous Oxide---induces vasodilation
8. Hydroxyurea---increases production of Hb-F via transcription
   - Hb-F has higher affinity for O2
   - Decreases chances that RBC's will sickle in low O2 environment

Hydroxyurea (HU) Therapy

- Harminder et al. found that Hb-F was increased from 12.83% to 19.17% in one year

- 20-25 mg/kg once daily dosing

- Mean overall Hb levels increased from 9.15g/dL to 9.98 g/dL

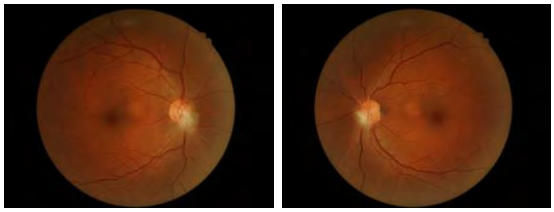
- Conclusion:
  - HU treatment resulted in ↑Hb-F levels, ↓SCD crisis, ↑ intervals between blood transfusions, and ↓hospital admissions.
    - Authors suggest increasing acceptance of HU therapy
    - Concurrent use of transfusions as needed

Singh H, Dulhani N, Kumar BN, Singh P, Tiwari P. Effective control of sickle cell disease with hydroxyurea therapy. Indian J Pharmacol [serial online] 2010 [cited 2010 Aug 31];42:32-5. Available from: http://www.ijp-online.com/text.asp?2010/42/1/32/2459

Back to the patient….

- Sickle cell SC → highest risk of retinopathy
- Set up with retinal specialist who recommended PPV OU
- Patient no-showed to surgery date
- Has not returned calls/letters
- "Unless your patient is too young or cognitively impaired to know better, you can't care more for him than he cares for himself."
  - Drs. Joe Sowka and Alan Kabat

New Case: 39 YO AAM
What is going on here?



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Persistent Fetal Vasculature…

- Defn: Failure of hyaloid vasculature to undergo programmed involution
- Anterior, posterior, combined forms
- 3% of all full term infants have some form of PFV
- MOA: dysregulation of apoptosis
- Unilateral (89-98%)
- Bilateral (2-11%)
- The nomenclature changed from PHPV to PFV in 1997
  - Reflects the inclusion of pathology throughout this system:
    - Vasculature
    - Iris
    - Lens
    - Vitreous
    - Retina
    - Macula
    - Optic nerve

Case #3:
"Doc, my vision is patchy…"

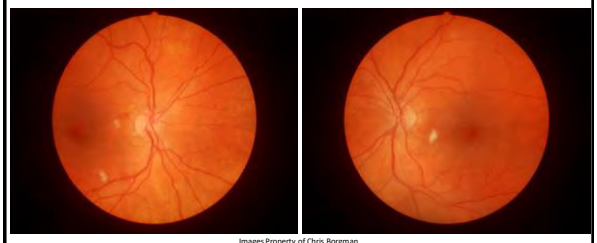
Case History…

- 31 YO WF
- CC: "blurry/patchy vision" OS>OD, onset 3-4 weeks, spots missing in vision OS>OD, sudden onset
- (-) DM, (-)HTN, (-)tobacco
- LME = unknown, long time per pt
- (-) head, chest, or ocular trauma, (+)broken femur
- Meds = oxycodone PRN, Ca pill, Vit D
- ALL = NKMA

Exam…

- VA = 20/20 OD, 20/30 OS, PHNI OS (sc)
- EOM's = WNL
- Pupils = WNL
- CVF = WNL
- Amsler = "patchy" vision paracentrally L >R
- MR: OD plano 20/20 slow
  OS pl – 1.00 x 090 20/20-2 slow
- SLE: WNL OU
- IOP = 16 mmHg OU
- DFE: see pics

DFE…



Images Property of Chris Borgman

Labwork….

- CBC with diff, ESR, FBS, HbA1c, ANA, RF, ANCA, RPR, Hepatitis panel, HIV, ANA, Lyme titer, BMP, thyroid panel, lipid panel, Protein S & C, ANCA, anticardiolipin, antiphospholipids, PT/PPT
- ALL WNL!!!

➢Remember, patient had femur fracture from football accident 3-4 weeks prior…

Purtscher-like Retinopathy…

- Purtschers Retinopathy = retinal hemorrhages, CWS, ONH edema in patients with severe head trauma or compressive chest trauma
  - 83-92% cases have intraretinal hemorrhages & CWS
  - When non-traumatic case, called "Purtscher's-Like"
- Average age = 34 YO
- 60% male
- 60% bilateral, 40% unilateral
- Sx start within 24-48 hours to 2 days usually
- VA = 20/20 → NLP reported
- Central scotoma in 93% cases
  - Paracentral > arcuate> peripheral

Purtscher's-Like Retinopathy Potential Causes…

- Acute pancreatitis
- Pancreatic cancer
- Renal failure
- Autoimmune diseases
- Pregnancy complications (preeclampsia, HEELP, amniotic fluid embolus, etc.)
- Multiple Myeloma
- Thrombotic Thrombocytopenia purpura
- Childbirth
- Long bone fractures
  - Femurs, shoulder joints

Pathophysiology?

- MOA: truly unknown
  - Leading theory → pre-capillary arteriolar occlusion due to embolization from air, fat, granulocyte, platelets, fibrin other leuko-aggregates formed after complement activation
  - Noticeably, visible retinal emboli are absent!
  - Air emboli from chest compression syndrome

Fat Emboli? How?

- Systemic embolism may stem from:
  - Patent foramen ovale
  - AV pulmonary shunts
  - Persistent ductus arteriosus
- "Fat emboli are commonly released from the intramedullary fat into the venous circulation after long bone fracture, surgery, and pancreatitis…such emboli would be more likely to occlude the smaller 5 um retinal capillaries at the time of injury."

  --- Agrawal & McKibbin (2006)
  - Fat emboli = 5-10 um
  - Precapillary arterioles = 45 um
  - Retinal capillaries = 5 um

Emboli are approximately the same size as the retinal capillaries!

Management…

- FANG
  - Arteriolar occlusions
- ICG
  - Evidence for choroidal hypoperfusion
- Follow up:
  - 1 month
  - 2-3 months
  - 6-12 months
- Treatment:
  - Monitor
    - Resolution in 1-3 mo typically
  - Corticosteroids (no statistically significant difference in studies)
  - Hyperbaric oxygen

Back to patient…

- Failed to return as directed…
- Did see retinal specialist who confirmed PLR

Case #4:

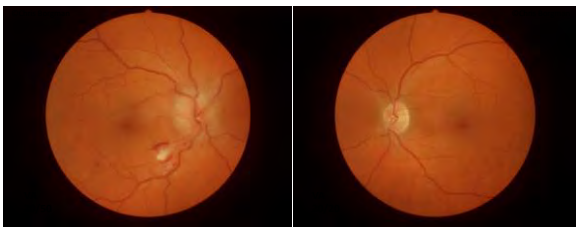
"Doc, I don't feel so good…"

Case History…

- 43 year old WM
- Referred for vision loss and HA after being admitted to hospital, onset 1 week, OD > OS, D = N
- LME = doesn't remember; long time ago
- BS = 600+
- HbA1c = 18.6%.....wow!
- BP = 200/120
- Also, hypertriglyceridemia and hypercholesterolemia
- CT/CTA = WNL OU in emergency room

Exam…

- BCVA = 20/50 OD, 20/20 OS
- EOM's = WNL OU
- Pupils = PERRLA, (+)mild APD OD
- CVF = WNL OS, inf nasal restriction OD
- HVF = WNL OS, central and inf nasal defects OD
- Adnexa/SLE = WNL OU
- DFE: see pictures
- IOP = 19 mmHg OU via Goldmann
- ESR and CRP = WNL in ER department work-up



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Diabetic Papillopathy….

- Defn: optic disc edema in a DM patient with minimal or mild optic nerve dysfunction
- Some suggest is on mild end of NAION spectrum
  - Typically more peri-papillary hemorrhages than NAION
- 70% have Type 1 DM
- 60% are unilateral; 40% bilateral
- No specific Tx for edema; treat DME if present; spontaneous recovery usually occurs over several weeks to months
- May have permanent visual field or acuity defects
- Control underlying systemic issues (BS, BP, BC, etc.)
- FANG can differentiate between DM papillopathy and NVD
  - Rarely needed…

Back to patient…

- Sent to retina given proximity of exudate and CWS to macula….
- FANG ruled out CSME → retina chose to monitor
- Patient returned 2 months later
- VA = 20/25-2 OD, 20/20 OS
- Dramatically improved optic nerve swelling on OCT and exam
- Monitor q6 months given BS levels

Case #5:

"Doc, I can't breathe very well…"

Case history #1…

- 64 year old white female
- "Vision…is…blurry……OS……I can't breathe very well…"
- Stopped exam → sent patient to ER in wheelchair

Case History #2….4 weeks later

- Chest CT in ER showed numerous masses → stage 4 lung cancer
  ---Smoker x 50+ years, 1-2 packs/day
- Full body scans revealed metastasis to liver, brain, brainstem, neck, chest, spine, and abdomen → EVERYWHERE!
- Refused chemo, started radiation

Choroidal Metastasis OS

---Sup/Temp with exudative RD involving fovea

Choroidal Metastasis…

- Women > Men (70%:30%)
- Average age = 50-60 years of age
- Men = Lung Cancer
- Women = Breast Cancer
- Most common intraocular malignancy
- Usually amelanotic, shallow, oval/round mass
  - "leopard spots" = macrophages containing lipofuscin
- 90+% are posterior to equator of eye!……..why?
  - Choroid is highly vascularized!
- Less than 10% have metastasis from sites other than lungs or breasts
- Sx = blurred vision, floaters, VF defects, metamorphopsia, asymptomatic
- SRF and serous retinal detachments are found in 91% of cases
- History of malignancy in 65-75% of patients

Types of Retinal Metastasis…

- Choroid is most common site of metastasis to eye
  - Breast carcinoma = 39-49% of uveal metastases
  - Lung carcinoma = 21-29%
  - GI Tract = 4%
  - Kidney, skin (melanoma), prostate, pancreas, thyroid, testes …
- In 17-18% of cases the primary metastasis site remains unknown

"Ocular ultrasound is really important with metastases because they tend to be echogenic, whereas melanoma tends to be echolucent."
--- Carol Shields, MD (Wills Eye Hospital)

Posterior segment B-scan (ie. ultrasound) is best tool for helping to identify retinal/choroidal metastases and other tumors.

Most important differentials…

- Amelanotic choroidal melanoma/nevus
- Choroidal hemangioma
- Lymphoma
- Choroidal osteoma
- Disciform macular scarring
- Posterior scleritis
- CHRPE
- Rhegmatogenous RD

Is color of mass important?

- Some tendencies but <u>not</u> specific in all cases…
  - Pale-yellow = lung/breast cancer
  - Dark grey/Brown = cutaneous melanoma
  - Orange/red = renal cell or thyroid carcinoma
  - Pink/Yellow-orange = carcinoid tumors

Choroidal Metastasis Treatment…

- Ocular:
  - External-beam radiotherapy
  - Chemotherapy
  - Hormonal therapy
  - Plaque radiotherapy
  - Enucleation
  - Any combination of the above
- Systemic:
  - Left to oncologist….radiation, chemotherapy, surgery, etc.
- Sometimes ocular tissues are simply monitored for response to systemic treatment
- Life expectancy strongly considered too!

Prognosis…

- Ocular metastasis carries an exceedingly poor systemic prognosis…
- Life expectancy = 12-21 months (gross mean)
- Bleak outlook overall…
- Ocular oncology referral

Back to the patient…

- Patient declined chemotherapy, agreed with radiation Tx
- Referred to local retina specialist too…
- Given spread to entire body specialist wanted to monitor with systemic treatment only first given bleak outcome
- Patient died 4 months later…

<u>Case #6:</u>

"Doc, I feel great and don't have any problems…"

Chief Complaint:

- 10 YO AAF; First eye exam ever
- Failed school screening
- Referral said OD>OS blurriness
- Patient denied any difficulties with vision
  - A's and B's for grades; "does very well"
- Father had never noticed any problems before

Case History

- POH: (-)injuries, (-)surgeries, (-)strab, (-)Rx before, (-)trauma
- PMH: denies all, sees PCP yearly, full term baby with no problems during delivery, normal milestones
- FOH: (+) grandmother with borderline POAG
- FMH: denies all
- MEDS: denies all
- ALL: NKMA, NKDA

Ocular Exam Continued…

Refraction: OD: +1.50-1.50x180 20/80
OS: +0.75 sph 20/20

OD	Slit Lamp Exam	OS
Clear	**Lids/Lashes**	Clear
Clear	**Conjunctiva**	Clear
Clear	**Cornea**	Clear
4+ T/N	**Angles**	4+ T/N
D & Q	**A/C**	D & Q
Clear, Brown	**Iris**	Clear, Brown
Clear	**Lens**	Clear

Tonometry: 20 mmHg OU via Goldman

Choroidal Rupture

- Tear in choroid, Bruch's membrane, and RPE layers
- Typically follows blunt trauma
  - 5% of time ; M>>F
- May acutely be covered by hemorrhage or commotio retinae (Berlin's Edema)
- Yellow or white crescent shaped streak
- Concentric to optic nerve

Rupture Mechanism of Action

- Two Types of Choroidal Rupture:
  - 1)**Direct**---site of injury, usually parallel to ora serrata, more anterior
  - 2)**Indirect**---contrecoup injury, typically posterior pole, "classic rupture"

Choroidal Rupture Complications…

- CNVM
  - Occurs in 5%-10% of rupture cases
  - Months to years after trauma (up to 37 years) (avg 7-8 months) (81% within one year)
  - FANG/ICG and/or OCT to help with Dx
  - Usually anterior to RPE in neurosensory space
- Scar Tissue of Retina/Rupture Site
  - Fully scarred 3-4 weeks after trauma
  - Usually have to wait for hemorrhages to reabsorb in order to have clear view

Choroidal Rupture Treatment…

1. **Monitor with Amsler Grid**
   - q6-12 months
   - No Tx if no CNVM
2. **Laser Photocoagulation**
   - Juxtafoveal and extrafoveal CNVM
3. **Photo-Dynamic Therapy**
   - Subfoveal CNVM
4. **Surgical Removal of CNVM**
   - Subfoveal CNVM
5. **Anti-VEGF Agents** (Avastin, Lucentis)
   - Subfoveal CNVM

Choroidal Ruptures and Final Visual Acuity

- Ament et al. studied 111 indirect ruptures (2006)…
- Final Acuity Results ≥1.5 Years:

	Peripheral CR	Macular CR	(-) CNVM	(+) CNVM
Total (n)	34	73	99	12
Final VA ≥ 20/40	59%	22%	38%	8%

- **CNVM Likelihood:** older age, length of CR (not width), macular rupture location
- **Poor Prognosis with:** macular rupture location, (+) CNVM, ↓ baseline VA

Traumatic Macular Holes…

- **83%** macular holes are idiopathic
  - Tend to be gradual formation over weeks to months
- **5%-15%** holes due to trauma (TMH)
  - Coincide with traumatic event; immediate formation
- **95%** achieve hole closure with surgery

Mechanism of Action…

- Very similar to choroidal rupture MOA
- Anteroposterior compression of globe → stretches retinal tissues
- **2 Theories:**
  1. Immediate Tear of Retina --- immediate hole upon trauma
  2. Tangential Vitreous Traction --- delayed/slow hole formation
- **Treatment:**
  - PPV with Fluid-Gas Bubble Exchange
  - "Tamponade"

TMH Monitoring Only Outcomes…

- Yamashita et al. studied 18 total eyes with TMH
- 44% showed spontaneous closure within 8.4 months (Japanese studies)
- Other 2 studies show range of 10-67% spontaneous closure of TMH
- **Final VA same as with surgery**

- Problem: Which pts will close spontaneously?

TMH Surgical Outcomes…

- Yamashita et al. combined 2 studies (39 eyes total) (2002)...
  - 95% achieved hole closure with surgery
  - 77% had final VA of ≥20/40
  - Surgery = faster closure of hole
  - Surgery has no affect on final VA
  - Monitor for several months in acute setting then surgery for traumatic macular holes
  - Chronicity may play a role as well

Patient outcome…

- Sent to retinal specialist….
  - Declined further surgery given lack of clear timeline of trauma
- Youngest of 7 children…
- Vaguely remembers trauma with roller skate to same eye as a child at the hands of an older sibling…
- (-) CNVM----------Tx = monitor only
- Polycarbonate for protection at all times
- Be aware of child abuse in odd cases like this…

Case #7:

"Doc, I have this occasional flash in my eye."

Exam…

- 53 YO AF (Vietnamese migrant) (limited English)
- CC: "mild flashing lights" OD, onset few years, worse when bending over, (+)PVD in previous records OD
- PMH: denies, LME 6 months prior
- FMH: (+)HTN
- SH: unremarkable
- Meds: BC pill
- ALL: NKMA

Exam…

- VA = 20/20 OD, 20/20 OS (cc)
- EOM/Pupils/CVF = WNL OU
- SLE = mild pinguecula OU temporally
- Tonometry = 15 mmHg OD, 14 mmHg OS with Goldmann
- DFE = see pictures…

DFE…

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DFE 2 months later…

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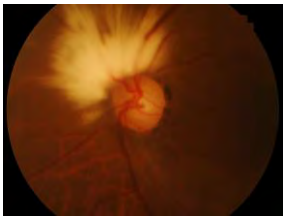
Huh? What is going on here?

- Biggest differential Dx = Cotton Wool Spot
- "Myelinated nerve fiber layers can be confused with cotton wool spots…If uncertainty persists, photograph the lesion and reappoint the patient for re-evaluation. Cotton wool spots fade over several weeks, whereas myelinated nerve fiber layers do not."
  - The Handbook of Ocular Disease Management: 10th Anniversary Edition. Review of Optometry; April 15, 2008; 46A-47A.

NFL Myelination…

- "Normal myelination typically progresses from the chiasm to the optic nerve from the eighth month of gestation until birth and then stops at the lamina cribrosa." --- Shelton JB, et al. JAMA Ophthalmol. (2013)
- Congenital mainly
- Progression/Regression has been documented too

Worst NFL Myelination I've seen…



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Case #8:

"Doc, I need my DOT form filled out today."

Case History…

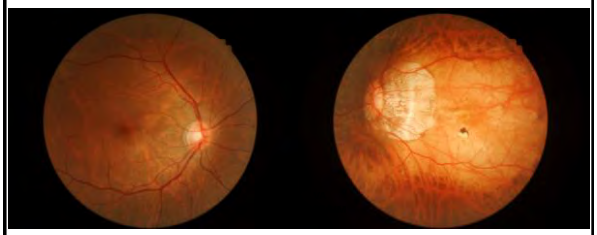
- 38 year old WF
- CC: "failed my DOT test and need this form filled out"
- "Vision OD is fine but my OS is bad" (stable for years)
- POH: OS has been bad since car accident when she was 1-2 YO
- PMH: unremarkable
- FMH: unremarkable
- Meds: denies
- ALL: NKMA/NKDA

Exam:

- 20/20 OD, 20/HM OS (PHNI)---cc
- EOM's = WNL OU
- Pupils = mild APD OS
- CVF = WNL OD, some nasal hemifield difficulty OS
- Adnexa/SLE = WNL OU
- IOP = 11 mmHg OD, 13 mmHg OS
- DFE: see pictures

- Refraction: OD -4.75 -1.25 x 090 20/20
  OS +/-6.00 sph 20/HM

DFE…



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Post-Dilated Retinoscopy…

- OD: -4.75 -1.25 x 090 20/20

- OS: -29.00 sph ! 20/800

- Myopic Degeneration OS = Dx

Myopic Degeneration

- F>M
- Usually > 6.00 D myopia

- Complications:
1. Retinal breaks
   - Increased risk of RD's, tears, etc.
2. Choroidal neovascular membranes
   - 5-10% of cases with axial length >26.5 mm
3. Fuch's spots
   - Previous CNVM and/or subretinal hemorrahges
4. Posterior staphylomas
5. Lacquer cracks --- breaks in Bruch's membrane complex; 4% eyes
6. PVD
   - Occurs at earlier age
7. Diffuse pigmentary alteration/chorioretinal degeneration
8. Lattice Degeneration --- not more common in myopic degeneration
9. Increased glaucoma risk?

Treatments?

- Controversial…
- Myopia control???
  - Spectacles: single vision vs. MF's
  - CL's: single vision vs. MF's
  - Ortho-K
  - Atropine/Pirenzepine
- Scleral reinforcement???
- CNVM:
  - Laser photocoagulation
  - Anti-VEGF agents

Case #9:

The case of misdiagnosis…

Case History…

- 49 YO AAF

- CC: "doing well….just want Rx updated"
- POH: history of "*dominant/familial drusen*" , (-)trauma
- PMH: (+)bilateral hearing loss since birth
- FMH: unremarkable
- SH: unremarkable
- ALL: denies

Exam…

- VA = 20/20 OD, OS (cc)
- EOM's = WNL OU
- Pupils = WNL OU
- CVF = WNL OU
- Refraction:
  - OD: -1.75 – 0.75 x 090 20/20
  - OS: -1.75 – 1.25 x 060 20/20
- SLE = WNL OU ; early cataracts OU
- Tonometry = 18 mmHg OU with Goldmann

DFE…

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Diagnosis in the past…

- Dominant Drusen = previous diagnosis

- Differentials now…
  - Usher's Syndrome with RP
  - Syphilitic Chorioretinopathy
  - Rubella Retinopathy

Electrophysiological & Lab Tests…

- ERG = normal

- CBC with diff = WNL
- FTA-ABS = negative
- RPR = negative/non-reactive
- Rubella IgG = positive
  - (greater than 10 = positive/immune)
    - Patient's level was 13.8

Dx = Rubella Retinopathy…

- *Toga viridiae* family → found only in humans
- Respiratory tract transmission
- Consequence of rubella infection in utero
  - Ocular & systemic complications possible
- Last major worldwide pandemic was 1963-65 (50 YO today)
  - 10% of all pregnant women infected, 30% of those pregnancies resulted in CRS
- Triad: heart disease, deafness, & cataracts
- 70-90% of worldwide population has antibodes to Rubella
- 95% of US population is seropositive due to vaccines…
- Risk of malformations during pregnancy = first 16 weeks is largest risk
  - 90% → 2-10 weeks
  - 34% → 11-12 weeks
  - 17% →13-16 weeks
  - 3% → 17-18 weeks
  - 0% → 19+ weeks

Immune System & Rubella…

- Non-immune maternal exposure to Rubella virus during 1st trimester of pregnancy
  - If mother has immunity then risk of is virtually nil
- Organogenesis occurs 1-8 weeks of gestation
- Maternal IgG is only Ig that can cross placenta…however, this occurs around 8 weeks at the earliest…
  - Max IgG from mother around 32 weeks gestation
  - IgM too large…never crosses placenta
  - IgA only for mucosal surfaces….does not cross placenta
  - Endogenous IgG synthesis at 24 weeks gestation by fetus
- An acquired infection around this time (**1st trimester**) can easily affect the vulnerable fetus due to "no defense"
  - Biggest risk to fetus is here
  - Most active organogenesis and most rapid cell division here

Rubella Pathogenesis…

- Reduced organogenesis:
  1. Cellular deficiency → tissue destruction/scarring
     - Decreased growth rate
     - Shortened survival time
  2. Endothelial cell damage → vascular damage
- Notably, inflammation does not seem to play a role in pathogenesis
- Risk of CRS after re-infection is only 5-8%

Congenital Rubella Syndrome

1. Congenital cardiopathy
   - 30% of cases
2. Sensorial deafness
   - Most common
   - 60% of CRS cases
3. Ocular defects (30-40% of CRS cases)
   - Salt 'N Pepper Retinopathy – 60% of CRS
   - Nuclear Cataracts – 27% of CRS cases; must be ≤6 weeks gestation
   - Microphthalmia – 10-20% cases
   - Iris atrophy -- notoriously poor dilators; difficult phaco
   - Glaucoma –10-15% cases
   - Strabismus/Amblyopia
   - Hyperopia > myopia (shorter eyeballs)

Salt 'N Pepper Retinopathy

- Pathognomonic for prenatal rubella infection
- Pigmentary retinopathy of RPE
  - Neural retina = unaffected
  - Choroid = unaffected
- 40-60% of CRS cases
- Non-progressive (vast majority)
- Electroretinogram (ERG) = normal too
- Visual acuity not affected
  - CNVM possible

FAF vs. FANG in Dx of Rubella Retinopathy…

- "…fundus autofluorescence (FAF) can sensitivity and noninvasively highlight areas of dysfunctional RPE. Thus, FAF in the absence of FANG can be sufficient to establish the diagnosis of rubella retinopathy."
  - Goldberg N, et al. (2009)

Rubella Retinopathy Expectations

- RPE pigmentary changes & hearing loss → Think Rubella!
- Good vision is the rule
- ERG = normal
- Dilation can be difficult…..may need multiple mydriatics…
  - Iris atrophy 2' poor development of iris dilator muscles
- When in doubt…consider IgG/IgM
  - Rule out syphilis!
- Ask about maternal infections during utero….a lot of patients are aware!

MMR Vaccine and Seropositivity

- MMR = measles, mumps, rubella
  - Given within first year of life in developed countries now
  - Repeat around 15 years old too
- ***"…confirmation by RT-PCR, serum rubella IgM or persistently high levels of IgG were not useful since laboratory evidence of rubella virus must be obtained in the first year of life to be informative."***
  - **Tamayo MT, et al. (2013)**
- IgG will be persistently high in anyone who has been given the MMR vaccine in past
  - What about my patient then???

Case #10:

- "Doc, I'm having trouble reading for quite some time now."

Case History

- 62 YO AAM
- "Blurry vision"
- HPI: OD only, onset "some time ago", constant, gradual until it stabilized
- PMH: denies ; LME unknown
- Meds: denies all
- All: NKDA
- SH: every day smoker

Exam

- BCVA: 20/40 OD, 20/20 OS
- CVF, Pupils, EOM's = WNL OU
- Slit lamp = WNL OU
  - Some minor cataracts OU
- Tonometry = 9 mmHg OD, 10 mmHg OS
- DFE: see pics

DFE…

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Macula Close up…

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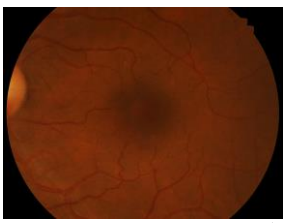

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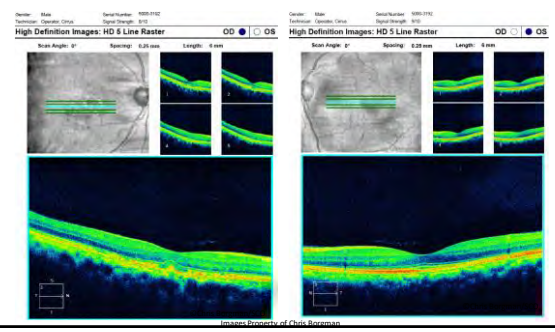

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Polypoidal Choroidal Vasculopathy

- Controversial overall…
- Idiopathic; aka---"posterior uveal bleeding syndrome"
  - Technically classified under "ARMD"
- Typically unilateral ; M = F
- Main differential Dx = ARMD!!!
  - Younger age of onset than ARMD
  - Persons of "color" more often ; Asians > African-Americans ??
    - Only 8-13% of Caucasians with CNVM
  - *Lack of drusen!*
  - Characteristic FANG/ICG and OCT findings;
    - ICG is more helpful than FANG!
- "Typically has a relapsing-remitting course with chronic, multiple, recurrent serosanguinous detachments of the RPE, neurosensory retina, and subretinal NVM."

ARMD vs. PCV

ARMD	PCV
Older patients	Younger patients
Caucasians	Non-white races
Drusen present	Drusen absent
Macular location	Extra-macular; peripapillary
Indistinct lesions	Distinct lesions
Genetic background differs	Genetic background differs
---	Choroidal vascular hyperpermeability

- Although, these are different pathologies….."PCV is a type of choroidal neovascularization. Hence, PCV is currently categorized as a phenotype of age-related macular degeneration (AMD)."
  - Honda S, et al. (2014)

PCV Associations/Risk Factors…

- Hypertension (41-45%)
- Smoking
- Elevated CRP
- h/o CSCR
- Myopic degeneration w/ staphyloma

PCV Stages…

1. Orange/Red lesion in choroid/sub-RPE layers
2. Pigment Epithelial Detachment with +/- SRF
3. Subretinal fibrinous material after resolution
   - My patient likely is in this stage

Treatment…

- Very similar to wet ARMD and dry ARMD…
  - Anti-VEGF injections
  - Photo-dynamic therapy
  - Combo: PDT & Anti-VEGF = added benefit!
  - If inactive, monitoring retina q6 months is appropriate
- "Patients found to have exudative, hemorrhagic retinopathy, without signs of active inflammation or precursors to ARMD, should be considered suspicious for IPCV."

---Handbook of Ocular Disease, *Review of Optometry* (2013)

Case #11:

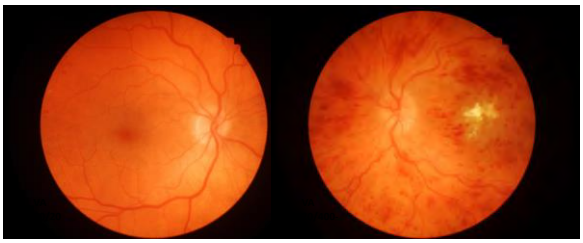
- "Doc, I lost vision in my left eye 4 months ago…..will it ever come back?"

Case History

- 48 YO WF
- CC: sudden, painless vision loss OS only x 4 months
- PMH: Type II DM, HTN, ↑ triglycerides, ↑ cholesterol, mild kidney failure,
- FMH: unremarkable
- SH: (-)tobacco, (-)EtOH, (-) Drug Abuse
- ALL: PCN
- Has had coronary stenting 2 years prior and DM foot surgery

- VA: 20/20 OD, 20/400- OS
- (+)APD OS
- CVF = WNL OD, UTT OS
- IOP = 18 mmHg OU

Dx = CRVO OS



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Next steps…

- Sent to retina for anti-VEGF injections
  - Unfortunately, no improvement noted after 4 months of Tx
- PCP ordered additional labwork:
  - Monoclonal antibody testing

Multiple Myeloma…

- Multiple myeloma is a neoplastic plasma-cell disorder resulting from malignant plasma cells in the bone marrow
  - Plasma cells are of B-cell lineage…
- 1.4% of all cancers
  - 10-15% of hematological cancers
  - 1.5-2.0% of cancer related deaths
  - Life expectancy = 3-4 yrs post-diagnosis (60-70% cases)

3 Main Stages in MM Spectrum…

1. **Monoclonal Gammopathy of Undetermined Significance (MGUS)**
   - 1% chance of developing MM in 1 year
2. **Smoldering Multiple Myeloma (SMM)**
   - 10% chance of developing MM in 1 year
3. **Multiple Myeloma (MM)**

Plasma Cell Disorder	Serum monoclonal protein (g/dl)	Clonal bone marrow plasma cells (%)	End organ damage present?
MGUS	<3	<10	(-)CRAB
SMM	>3	>10	(-)CRAB
MM	>3	>10	(+)CRAB

- End Organ Damage = CRAB
  - HyperCalcemia
  - Renal failure
  - Anemia
  - Bone lesions

Hyperviscosity???

- MM can cause a hyperviscosity syndrome secondary to the paraproteinemia associated with the disease.
  - Excess production of antibodies from abnormal plasma cells
    - AKA: monoclonal protein → paraproteinemia

Ocular Concerns…

- Retinal vein occlusions!
- Multiple myeloma should be considered as a differential diagnosis in young patients (<50 YO) with retinal vein occlusions, even if other risk factors for venous occlusion like hypertension, diabetes mellitus and hypercholesterolemia are present.
  - Borgman CJ. Clin Exp Optom. 2016

Systemic findings… All from monoclonal protein

- Spontaneous bone fractures
- Spinal cord compression
- Osteolytic lesions
- Renal failure
  - 15-25%
  - Secondary to hypercalcemia
    - Which is secondary to osteoclast bone resorption
- Anemia
- Recurrent infections
- Thromboembolism
  - Monoclonal proteinemia

MM Treatment

- Currently, MGUS and SMM do <u>not</u> represent an indication for treatment, as no clear benefit of treatment has been found in these patients, as with patients with multiple myeloma.
- When staged at MM:
  - Immunomodulatory agents
  - Corticosteroids
  - Stem-cell transplantation
  - Chemotherapy
  - Anticoagulation

Thanks!

- Questions? Accolades?
- cborgman@sco.edu

- Complaints?
- wmcgriff.@sco.edu

Optic Nerve Anomalies

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Assistant Professor

SOUTHERN COLLEGE OF OPTOMETRY

COPE Disclosures:

- I do not have any relevant financial relationships to disclose.
- The content and format of this course is presented without commercial bias and does not claim superiority of any commercial product or service.

Rules for this lecture…

- I have no disclaimers or conflict of interests to report…..
- Don't look ahead!
- I'm not perfect…
- Some cases are more straight forward than others…
- I will email you my reference list if you want it….

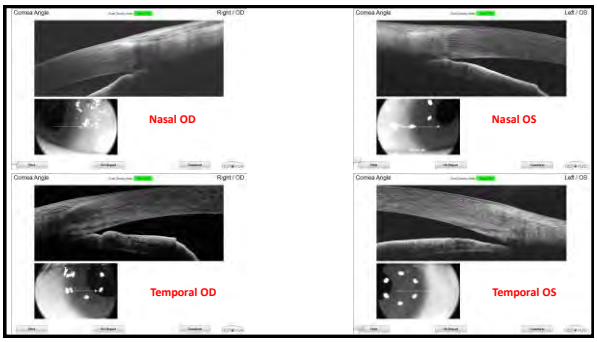
- Email: cborgman@sco.edu

Case #1:

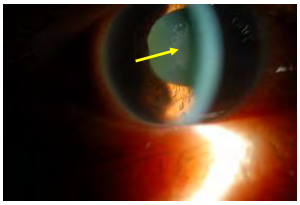
- Courtesy of Beth Sparrow, OD

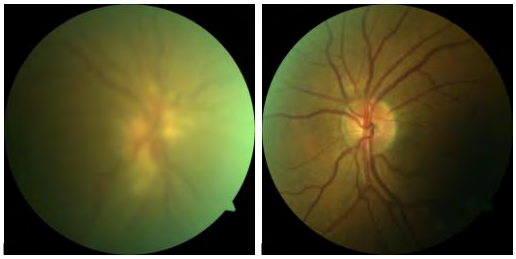
Case History…

- 50 YO AF
- CC: "referred by colleague for second opinion"
- BCVA: 20/100 OD, 20/25+ OS
- Pupils: mid-dilated pupils OD, (+)reverse APD OD
- EOM's: WNL
- CVF: constricted OD, FTFC OS
- Initial IOP: 60 mmHg OD, 28 mmHg OS
- IOP at this visit: 34 mmHg OD, 13 mmHg OS
- Gonio: closed angles OD, minimum anterior TM OS
- SLE: see pics
- Undilated fundus exam: see pics

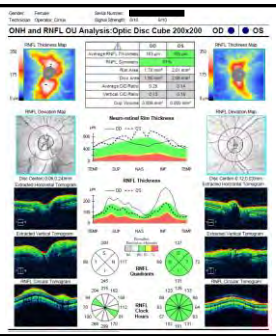


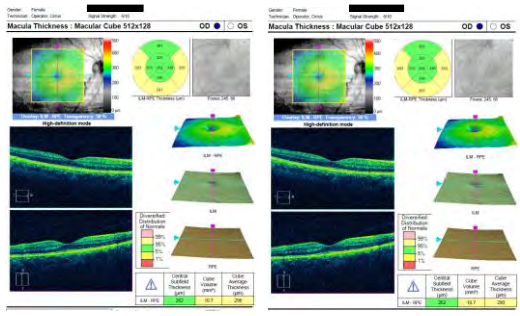
Glaucomflecken!

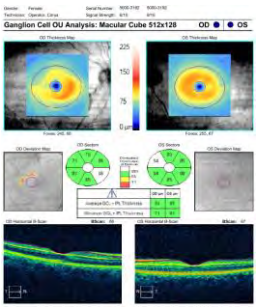




Blurry OD 2° glaucomflecken!



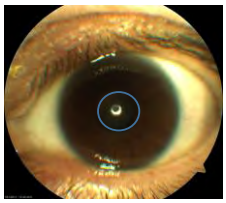




Notes from glaucoma specialist…

- Ocular Meds: Simbrinza 0.2% BID, OD
- Procedures Performed:
  - LPI, OD
  - 1 week later-Trab. w/ lysis of posterior synechiae, OD
  - 3 months later -Phaco IOL w/ bleb revision, OD
  - 4 months later -LPI, OS
- VA sc post phaco:
  - OD: 20/25
  - OS: 20/20-1
- Pupils:
  - OD: unreactive, fixed mid-dilated
  - OS: PERRL
- TAG: 13 mmHg OD, 14 mmHg OS via Goldman
- C/Ds: 0.8/0.25

Latest follow up 5 months later…

- Mid-dilated pupils OD remains

NAION and angle closure….how?

- Hypoperfusion of the ONH!
- Increased IOP → compression of blood vessels (**posterior ciliary arteries & its branches**)
  in prelaminar region leading to NAION
  - **Similar cases have been described with RVO's and RAO's as well!**
  - Choroidal blood supply to ONH/peripapillary choroid → most at risk
- **Ocular Perfusion Pressure = Diastolic BP – IOP**
  - Some use: Mean Arterial Pressure – IOP = OPP
- Downward spiral:
  - axonal ischemia → axoplasmic flow stasis → more axoplasmic accumulation → more axonal edema → more ischemia

Only total 7 patients in literature… ---Concomitant NAION & Angle Closure

- Onset: presentation → 1 week
- Initial VA: 20/30 → HM
- Highest IOP: 40-56 mmHg
- Final VA: 20/20 → HM
- VF defects: mixed overall

- Kuriyan AE, Lam BL. *Clin Ophthalmol.* 2013;7:1233-8.

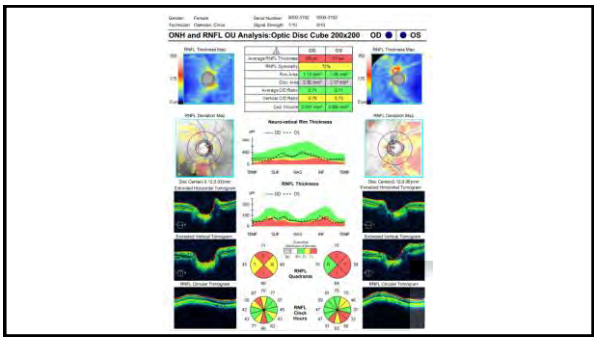
Case #2:

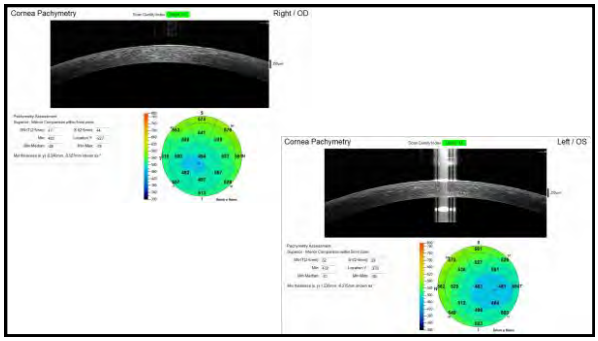
Case History

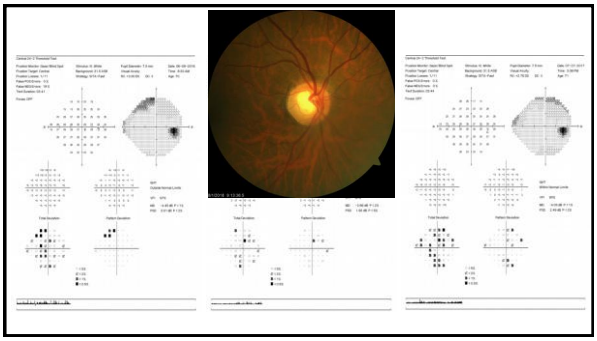
- 71 YO AAF
- CC: "6 month glaucoma followup"
- HPI: OS>OD, 2+ yrs, good compliance, vision stable OD, slowly worsening vision OS (?)
- POH: (+)POAG OU – latanoprost qhs OU
- PMH: (+)DM, (+)HTN, (+)hyperchloesterolemia
- Meds: Lantus, Glyburide, Simvastatin, Atenolol, Valsartan
- Allergies: NKDA
- SH: unremarkable

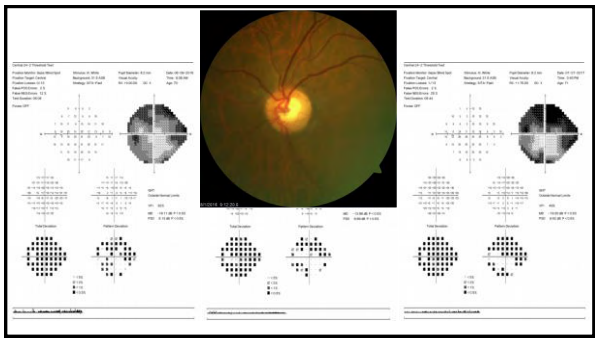
Exam

- BCVA: 20/20 OD, 20/20-2 OS
- CVF: FTFC OU
- Pupils: PERRL, (+)APD OS with BIO light source
- EOM: Full OU
- Color: passed OU
- SLE: moderate cataracts OU
- DFE: see pics
- IOP: 15 mmHg OD, 16 mmHg OS (on latanoprost)
- Tmax: 16 mmHg OU







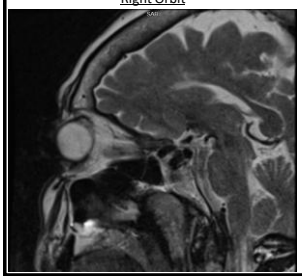


Ordered CT of orbits/chiasm

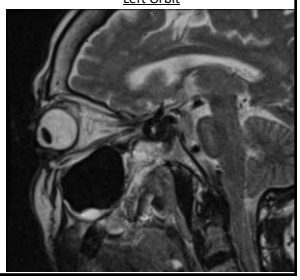
- CT report:
- *"The cavernous portion of the internal carotid artery on both left and right are somewhat ectatic with atherosclerotic calcifications present, and the distal ICA on the left bulges superoanteriorly toward the left optic nerve anterior to the junction of the optic chiasm, greater than on the right…Pituitary normal in size and pituitary stalk lies in the midline. Optic nerves, optic chiasm, and ICA's may be further evaluated with MRI of the brain and orbits with and without enhancement, with MRA of the brain to further evaluate carotid arteries also."*

MRI's

Right Orbit

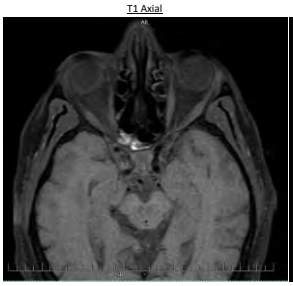


Left Orbit

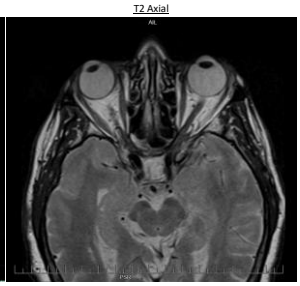


MRI's

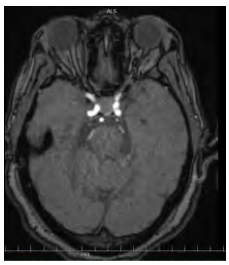
T1 Axial

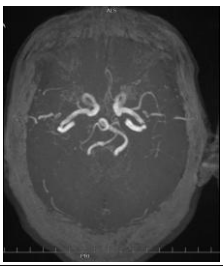


T2 Axial



MRA's





Dolichoectasia!

- ICAD is distended and enlarged
- Compresses optic nerve immediately as it passes through optic canal

What happened to patient?

- Sent for neurosurgical consult with local neurosurgeon
- No specific treatment available
  - Pt and neurosurgeon elected to monitor only
- Monitoring patient every 6 months
  - IOP check
  - Repeat VF's & OCT's

Case #3:

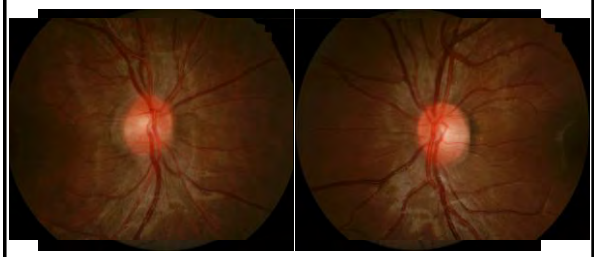
- Courtesy of Rena Lepine, OD

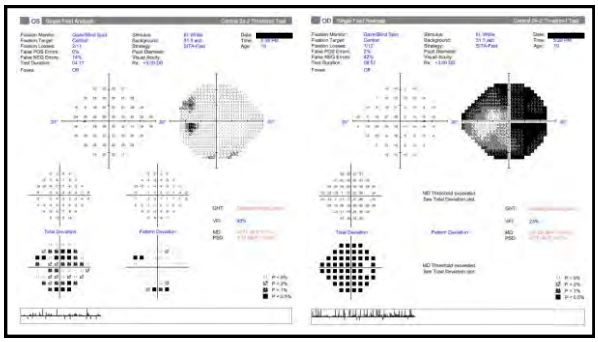
Case history…

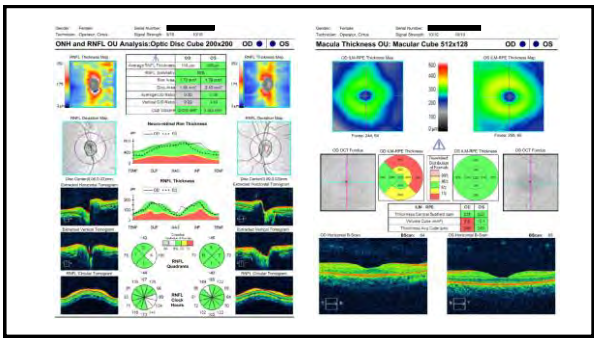
- 19 yo AAF
- CC: "blurry vision"
- HPI: OD only, constant, onset 2 months (?), (+)glare noted, (-)trauma, (-) relief with Visine drops, (+)frontal HA's started about same time, (-)relief with ibuprofen
- POH: glasses only
- PMH: unremarkable
- Meds: Ibuprofen PRN
- Allergies: nickel
- SH: denies all, (-)pregnant
- BP: 128/78

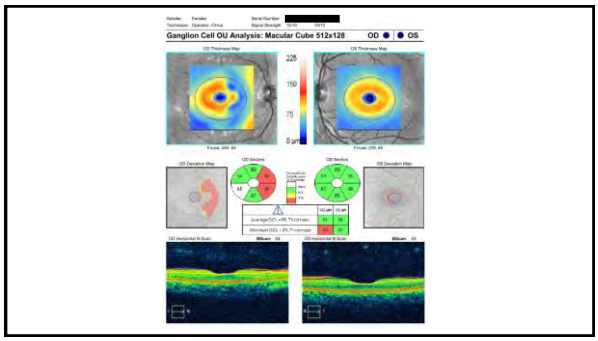
Exam…

- BCVA: 20/25+ OD, 20/20 OS
- Pupils: PERRL, (+)APD OD
- EOM's: Full OU
- CVF: sup temp defect OD, FTFC OS
- Cover Test: ortho @ D & N
- Color: very reduced OD, normal OS
- SLE: unremarkable OU
- DFE: see pics
- Tonometry: 16 mmHg OU with Goldman





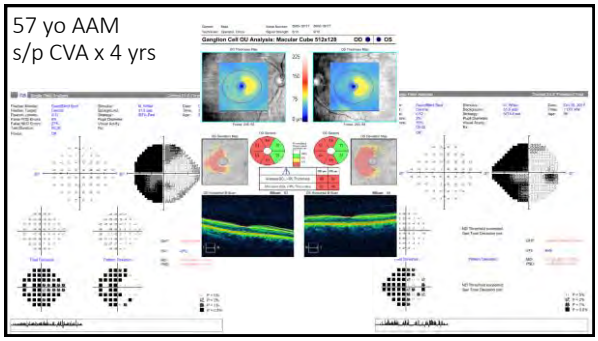




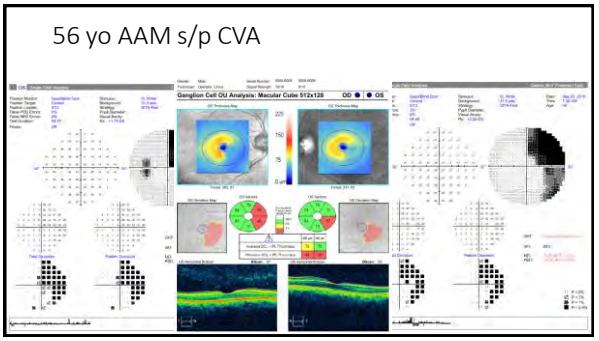
Workup/outcome…

- Brain/orbit MRI (with and without contrast) → WNL
- Neurology consult → monitor patient only x 2-3 months
  - Clinically isolated incident per neurologist → not enough for MS diagnosis at that time
- Further labwork ordered → pt no-showed to blood draw
  - CBC c diff
  - NMO IgG
  - RPR
  - FTA-ABS
  - Lyme titer
  - ACE
  - ANA
  - Vit B deficiencies
  - Folic acid levels
- VEP consideration???
- Pt lost to followup/no-showed…

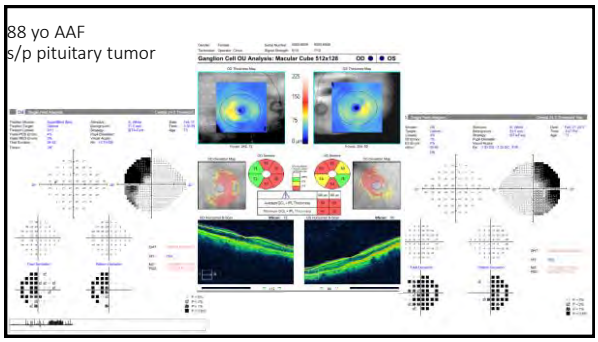
57 yo AAM
s/p CVA x 4 yrs



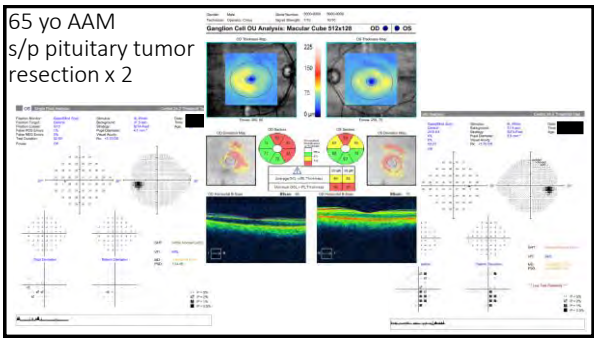
56 yo AAM s/p CVA



88 yo AAF
s/p pituitary tumor



65 yo AAM
s/p pituitary tumor resection x 2



Vertical GCC thinning = pre-LGN lesion!

- Note: trans-synaptic degeneration has been reported but not fully proven yet

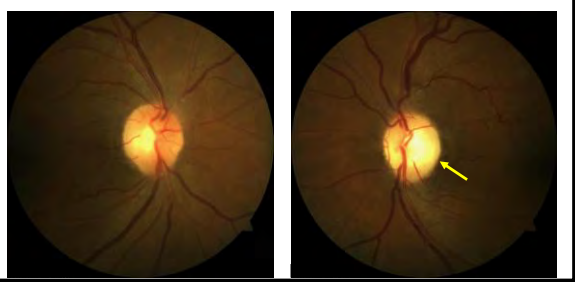
Case #4:

Case History

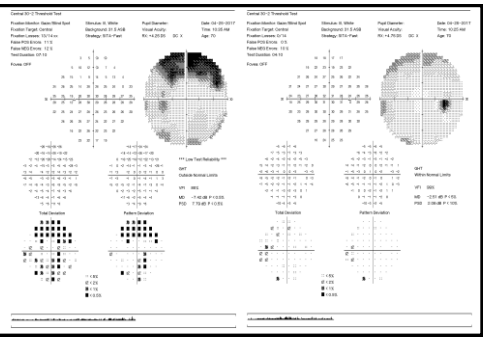
- 89 YO AAF
- CC: headaches
- HPI: back of head, mod-severe, HA's have woken up from sleeping before, went to ER (CT of head normal)
- POH: unremarkable
- PMH: (+)ovarian cancer – in remission, (+)HTN, (+)osteoarthritis, (+)depression
- Meds: Amlodipine, sertraline, APAP, benazepril, tramadol
- Allergies: NKDA

Exam…

- BCVA: 20/25-2 OD, 20/25-2 OS
- Pupils: PERRL, (+)APD OS
- Color: 6/6 OD, 6/6 OS with HRR
- Red-Cap Desaturation: 100% OD, 50% OS
- SLE: 1+ cortical cataracts OU
- DFE: see pics
- IOP: 12 mmHg OU via Goldman (12-14 OU in 2 previous exams)
- BP: 125/80 in-office



1 mo later



Dx= ION

What can cause RNFL thinning on OCT?

- Glaucoma = most common!
- Most non-glaucomatous optic neuropathies cause loss of temporal RNFL
- But many others are possible…and can be difficult to tease apart…
  - ION
  - Optic neuritis
  - Compression optic neuropathy
  - Hereditary optic neuropathies
  - Optic nerve drusen
  - Traumatic optic neuropathy
  - Multiple Sclerosis
  - Alzheimer's
  - Parkinson's

Dias et al. 2017

- Neuro-oph disorders as NTG mimickers
- NO (n) = 101 eyes ; NTG (n) = 42 eyes
- 85% of cases diagnosed correctly by glaucoma specialists
  - 12% NTG misdiagnosed as NO
  - 25% NO was misdiagnosed as NTG
- 16% cases of NO looked like NTG
  - ION most common
  - Compressive optic neuropathy
  - Hereditary optic neuropathy

Dias DT, et al. Neuroophthalmological conditions mimicking glaucomatous optic neuropathy: analysis of the most common causes of misdiagnosis. *BMC Ophthalmology*. 2017.

Disc cupping…

- Glaucoma = most common cause of disc cupping
- "The clinical differentiation of glaucomatous from nonglaucomatous disc cupping is often difficult." ---Greenfield 1998
- Pallor of neuroretinal rim = 94% predicting nonglaucomatous cupping
- Obliteration of neuroretinal rim = 87% glaucomatous cupping
- But can be very difficult to define clinically

Greenfield et al. *Ophthalmology*. 1998;105:1866-74.

Neuro image all cases of NTG?

- Cost?
- "*The potential cost of performing neuroimaging studies in the evaluation of all patients with NTG may approach $500 million in the United States alone.*"
  --- Greenfield, 1998
- Yield rate?
- **3.8-6.9%** of patients referred for NTG had a compressive lesion upon neuroimaging
- "*Based on these data, routine neuroimaging has a low sensitivity for detecting such lesions, and we recommend a more selective approach…the low incidence of compressive lesions in our series is consistent with that in previous studies and suggests that routine neuroimaging may be of little clinical value.*"
  --- Greenfield 1998

Greenfield et al. *Ophthalmology*. 1998;105:1866-74.

Greenfield, et al. Ophthalmology. 1998

- N= 29 pts (52 eyes) → NTG
- N= 28 pts (44 eyes) → intracranial masses
  - Pituitary lesions → 57%
  - Meningioma → 21.4%

NTG	Intracranial Mass
Older (69 YO)	Younger (50 YO)
Female>Male	M ~ F
Better visual acuity	Worse visual acuity
VF defects bordering horizontal midline	VF defects bordering vertical midline
Vertical elongation of cup	

Greenfield et al. Ophthalmology. 1998;105:1866-74.

Best predictors of nonglaucomatous cupping

NTG	Intracranial Mass
Splinter disc hemorrhage (100%)	Pallor of NRR (90%)
Family Hx glaucoma (96%)	VF defect borderling vertical midline (81%)
NFL bundle VF defect (84%)	Visual acuity <20/40 (77%)
Vertical loss of NRR (77%)	<50 YO (93%)

"This supports our finding that pallor of the optic nerve in excess of cupping is a highly specific sign of nonglaucomatous cupping (90.4%) but is a relatively insensitive finding (45.5%)." --- Greenfield 1998

Greenfield et al. *Ophthalmology*. 1998;105:1866-74.

More opinion against neuroimaging in NTG patients…

- "…if it looks like normal-tension glaucoma, you do not have to do neuroimaging to sleep at night." --- Richard P. Mills, MD (glaucoma specialist, Seattle)
- "If a patient lacks one characteristic of compressive visual loss, there is a great likelihood that another characteristic is detectable…Viewed from the perspective of the total clinical picture, the multiple clinical measures that can be brought to bear on the clinical decision for an individual patient make a potential diagnostic error most unusual, if not rare. Moreover, if one commits to observation over time…then the diagnostic error rate approaches zero."

  --- Richard P. Mills, MD

Greenfield et al. *Ophthalmology*. 1998;105:1866-74.

Greenfield. *Semin Ophthalmol*. 1999

- "Dyschromatopsia-a marked relative afferent pupillary defect, neuroretinal rim pallor out of proportion to optic disc cupping. and visual field defects that do not correspond to the pattern or magnitude of optic disc cupping suggest nonglaucomatous disorders. As previously described, routine diagnostic neuroimaging is unnecessary and should be performed selectively in atypical cases." --- Greenfield, 1999
- "An effective, albeit imperfect, rule of thumb dictates that eyes with retention of central acuity, absence of dyschromatopsia, and vertical cupping that corresponds to a nerve fiber bundle visual field defect are generally glaucomatous. Compressive lesions of the anterior visual pathway are an uncommon finding in the evaluation of glaucoma patients with visual field loss associated with normal levels of IOP. Clinically silent lesions, unassociated with visual pathway compression, may be found in less than 10% of patients." --- Greenfield, 1999

MRI in NTG is controversial…

- Ahmed et al. found 4 (6.5%) of 62 NTG patients had compressive etiology on MRI findings felt to explain NTG findings
- "Although a neuroophthalmologist is capable of diagnosing most forms of compressive optic neuropathy, it would be fairly difficult for any clinician to do so in these cases. Considering this fact, and the prevalence of these lesions amongst NPG patients, we think that neuroradiologic screening is the most efficacious strategy for these patients." --- Ahmed I, et al. 2002
- But all authors of this paper practice in Canada…
- Is cost of screening feasible in USA with our current healthcare system???

Ahmed I, et al. Neuroradiologic screening in normal-pressure glaucoma: study results and literature review. *J Glaucoma*. 2002;11:279-86.

Optic nerve features favoring nonglaucomatous cupping…

Findings	Conditions
Generalized disc pallor	Optic neuritis, ION
Sectoral pallor	ION
Retinal arteriolar narrowing	CRAO, ION, trauma, radiation
Bilateral, symmetrical, temporal, segmental pallor	Hereditary optic neuropathy
Unilateral, segmental temporal pallor	Optic neuritis
Severe optic pallor with arteriolar attenuation	CRAO
Retinal vascular sheathing/dilated venous collaterals	CRAO

Ambali and Rizzo. Nonglaucomatous cupping of the optic disc. *Int Ophthalmol Clin*. 2001: 139-49.

Bottom Line…

- "Neuroimaging is warranted in patients with cupping, normal IOP, visual-field loss, and NGOA with associated risk factors including age younger than 50 years, visual acuity of less than 20/40, vertically aligned visual-field defects, pallor of the residual neuroretinal rim, field defects approaching the vertical meridian, asymmetrical loss of color vision, an afferent pupillary defect, cranial pain, and symptoms of hypothalamic–pituitary dysfunction."

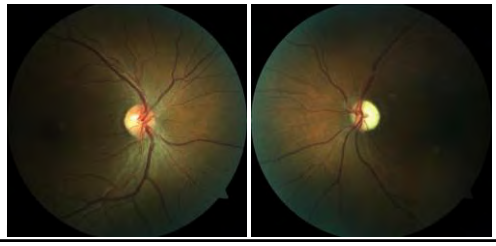
Piette and Sergott. *Curr Opin Ophthalmol*. 2006;17:1-6.

Back to this patient…

- Suspected:
  - Compression
  - Asymmetric perfusion pressure
- MRI → normal
- Carotid artery ultrasounds → normal
- Did not order CTA/MRA…..should I have?
- Ophthalmodynamometry?
- Left with NTG as diagnosis!
  - Started topical PGA OU

What about unexplained optic nerve pallor?

Normal OD, Pallor OS



Retrograde vs. Anterograde degeneration?

Retrograde:
Cell bodies → RGC's in retina
Synapse → LGN

LGN → RGC's = retrograde

Ex: Compression, TON, MS, etc.

Anterograde:
Cell bodies: RGC's in retina
Synapse: LGN

RGC's → LGN = anterograde

Ex: Glaucoma

Optic atrophy…

- Can develop with lesions at any point in the retinogeniculate pathway:
  1. Intraocular disease: damage to retinal ganglion cells, NFL, or optic disc
  2. Disease within/surrounding intraorbital, intracanalicular, or intracranial optic nerve
  3. Optic chiasm, optic tract, LGN damage
  4. Retrogeniculate pathway diseases that produce trans-synaptic degeneration

Van Stavern GP, Newman NJ. Optic neuropathies: a review. Ophth Clin N Am. 2001:61-71.

Types of Optic Atrophy

- **Primary**
  - Damage to retinal ganglion cells or their axons in the absence of disc edema
    - Ex → Compression (pituitary tumor)
    - Ex → Optic Neuritis
- **Secondary**
  - Atrophy caused by optic disc edema at some point in their course
    - Ex → chronic papilledema
- **Segmental**
  - Discrete RNFL bundle lesions that occur in inner retina or optic nerve
    - Ex → temporal pallor secondary to toxicity (EMB, methanol, etc.)
    - Ex → ION
- Band/Bow-Tie
  - Degeneration of retinal ganglions nasal to the fovea
    - Ex → optic chiasm or optic tract lesion
- Retrogeniculate with trans-synaptic degeneration
  - Very rare in adults; usual in utero

Unexplained optic atrophy…

- Most common:
  - Young patient = optic neuritis
  - Older patient = ischemic optic neuropathy
- "*The differential diagnosis of optic atrophy is quite wide and many inappropriate unnecessary, or expensive screening tests could be performed.*" --- Lee AG, et al.

Lee AG, et al. The diagnostic yield of the evaluation for isolated unexplained optic atrophy. Ophthalmol. 2005;112:757-9.

Should we order MRI/CT for all unexplained optic atrophy?

- n= 91 patients with unexplained optic atrophy
- 18 (20%) of the 91 = compressive lesion causing optic atrophy
- 73 (80%) = no etiology found on neuroimaging
- 51 patients underwent labwork
  - 0% had abnormal labs linked to optic atrophy!

- "*On the basis of our results, we recommend neuroimaging for all patients with unexplained optic atrophy and consideration for directed laboratory studies only.*" --- Lee AG, et al. 2005

Lee AG, et al. The diagnostic yield of the evaluation for isolated unexplained optic atrophy. Ophthalmol. 2005;112:757-9.

Approach for Unexplained Optic Atrophy

Lee et al · Evaluation of Isolated Unexplained Optic Atrophy

Table 2. Summary of Recommended Approach to Optic Atrophy

1. Obtain a complete history to try and establish an active or prior etiology for optic atrophy (e.g., medical history of optic neuritis or multiple sclerosis, trauma history, vasculopathic risk factors and documentation of prior disc edema, family history of dominant optic atrophy, toxic-nutritional risk factors, inflammatory disorders such as sarcoidosis).
2. Perform a complete ocular examination (including formal visual field testing) for findings that might suggest an etiology for the optic atrophy (e.g., uveitis, cecocentral scotomas with temporal pallor both eyes, hemianopic visual field loss).
3. Review the records for neuroimaging suggesting a compressive etiology.
4. If, after the complete history and examination the patient still has unexplained, isolated optic atrophy, proceed with cranial and orbital neuroimaging with contrast (i.e., magnetic resonance imaging of head and orbit with fat suppression and gadolinium or a computed tomography scan if magnetic resonance imaging is contraindicated).
5. Consider further serologic testing as directed by history and examination. Screening evaluations are not recommended, unless the pretest likelihood of disease is sufficient to warrant testing (e.g., if syphilis, Lyme disease, or sarcoid are endemic in the study population).
6. Perform serial evaluations to verify the stability of the visual loss. If progressive optic neuropathy develops, then consideration for neuroophthalmic consultation, repeat neuroimaging, and additional testing is reasonable.
7. Strongly consider personally reviewing the neuroimaging with the neuroradiologist in cases of unexplained optic atrophy even with a "normal" imaging report.
8. Consider consultation with a neuroophthalmologist, especially in neurologically noninclined or progressive cases.

Lee AG, et al. The diagnostic yield of the evaluation for isolated unexplained optic atrophy. Ophthalmol. 2005;112:757-9.

Should we order labwork in unexplained optic atrophy?

- Of 91 total patients, 51 (44%) underwent additional labwork, including:
  - CBC with differential
  - Serologic testing (FTA-ABS/RPR, Lyme, etc.)
  - Heavy metal screening
  - Vitamin B12 levels
  - LP
  - Carotid ultrasounds
  - ESR/CRP
  - ANA
  - Leber's hereditary optic neuropathy
  - ACE
- 0% of the 51 had abnormal labwork which could be linked to ON atrophy
- "*We recommend that the laboratory evaluation be directed by either a suggestive history or examination or for patients from endemic populations.*" --- Lee AG, et al. 2005

Lee AG, et al. The diagnostic yield of the evaluation for isolated unexplained optic atrophy. *Ophthalmology.* 2005;112:757-9.

Summary: When to order neuroimaging for optic atrophy?

Definite Indications	Potential Indications
VF defects respecting vertical meridian	Relative APD
Pallor of neuroretinal rim	<50 years old
Hypothalamic and/or pituitary dysfunction	Asymmetrical loss of color vision
Other neurological abnormalities	Visual acuity <20/40

Borgman Rule: (+)vertical GCC thinning? → strongly consider neuroimaging!

Fraser et al. *J Neuro-Ophthalmol.* 2013;33:377-89.

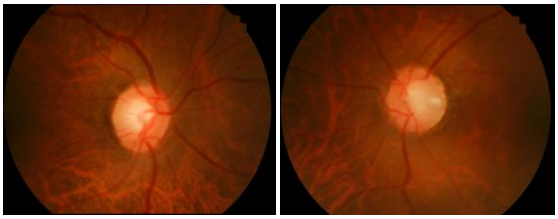
Case #5:

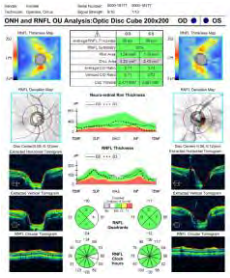
History

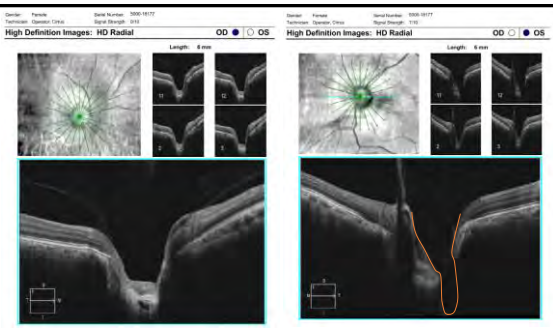
- 73 YO AAF, established patient x 2 years
- CC: "annual DM exam"
- HPI: vision stable OU, sees PCP every ~6 months, stable BG control x 10+ yrs, unknown A1c, doesn't check BG at home---"normal" at PCP office
- POH: glaucoma suspect L>R per Hx
- PMH: (+)T2DM, (+)HTN
- Meds: metformin, metoprolol, gabapentin, losartan, ASA 81 mg
- Allergies: season, NKDA
- SH: (-)tobacco, (-)drugs, (+)occasional EtOH

Exam

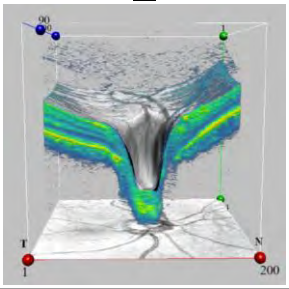
- VA: 20/20 OD, 20/60+ OS sc
- CVF: FTFC OU
- Pupils: PERRL, (-)APD
- EOM's: FROM OU
- Refraction:
  - OD: +0.50 sph 20/20
  - OS: +0.50 sph 20/50-
- SLE: WNL OU
- DFE: see photos
- IOP: 14 mmHg OU with Goldman



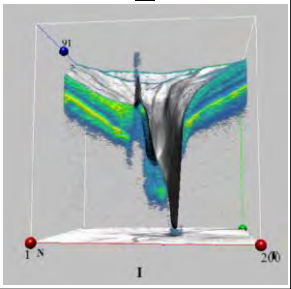


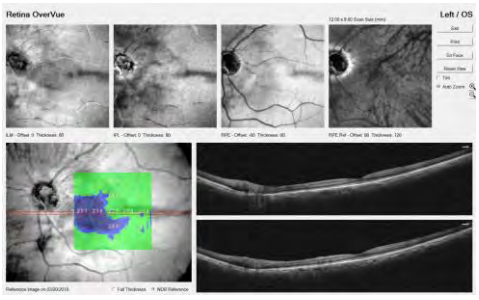


OD



OS





Optic Disc Pits

- First described in 1882
- Congenital >> acquired
- M=F
- 85-90% unilateral, 10-15% bilateral
- Majority of patients are asymptomatic!
  - Usually found incidentally
- 70% Inferior/Inferotemporal location
  - 20% central location
  - Majority have only 1 pit, but multiple pits have been reported
- Disc margin is <u>not</u> affected, & optic cup remains intact
  - RNFL defects are possible though

https://webeye.ophth.uiowa.edu/eyeforum/atlas/pages/optic-nerve-pit-maculopathy.htm

http://www.mrcophth.com/opticdisccases/pit.html

Optic Disc Pits

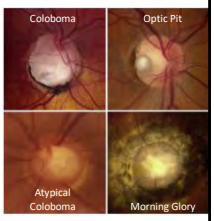
- Pathophysiology
  - Unclear; controversial
  - Incomplete closure of optic fissure → coloboma spectrum disorders
    - Some good arguments against this though…
- What is the pit?
  - Herniation of dysplastic retinal tissue through a defect of the lamina cribrosis into subarachnoid space

http://www.mrcophth.com/opticdisccases/pit.html

Georgalas I, et al. Optic disc pit: a review. *Graefes Arch Clin Exp Ophthalmol*. 2011;249:1113-22.

Cavitation disorders spectrum

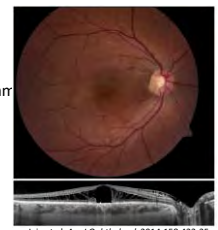
- Part of cavitation disorders spectrum
  - Aka "atypical optic nerve colobomas"
  - Includes: (coloboma, morning glory, tilted disc syndrome)
- VF defects possible
  - Arcuate defect → most common misdiagnosis is glaucoma
  - Enlarged blindspot
- Biggest complication → maculopathy!
  - 2' fluid leakage into retinal tissues



Jain et al. *Am J Ophthalmol*. 2014;158:423-35.

Optic Disc Pit Maculopathy (ODP-M)

- Best seen with high resolution OCT images!
- All retinal layers can be involved → OPL most comm
  - CME-like appearance
  - Serous macular RD/elevation → 25-75% cases
  - Macular schisis possible too
  - Spontaneous resolution in ~25% cases



Jain et al. *Am J Ophthalmol*. 2014;158:423-35.

Source of the fluid?

- <u>2 Sources</u>:
  1. Vitreous cavity
  2. Subarachnoid space

Jain et al. *Am J Opthalmol*. 2014;158:423-35.

Br J Ophthalmol. 2016;100:478-83.

- n=46 total
  - n=24 → PPV c JPL (average VA=20/100)
  - n=22 → PPV only (average VA = 20/100)
- Post Treatment:
  - Visual acuity improvement:
    - PPV c JPL → 20/60
    - PPV only → 20/50
  - Macular thickness:
    - PPV c JPL → 309 µm
    - PPV only → 292 µm
- "In conclusion, PPV with induction of posterior vitreous detachment, air–fluid exchange and JLP for ODP maculopathy had similar anatomical and functional outcomes compared with PPV without JLP. Therefore, JLP is <u>not</u> recommended." --- Abouammoh et al. 2016.

Pars plana vitrectomy with juxtapapillary laser photocoagulation versus vitrectomy without juxtapapillary laser photocoagulation for the treatment of optic disc pit maculopathy: the results of the KKESH International Collaborative Retina Study Group

Marwan A Abouammoh,[1] Sulaiman M Alsulaiman,[1] Vishali S Gupta,[2,3] Ahmed Moosa,[2] Akiko Hikaka,[4] Maria H Berrocal,[5] Megan Chenworth,[2,6] Jay Chhablani,[7] Yosuke Oshima,[8] Waseem M AlZamil,[9] Antonio Mariello Cavella,[9] Gabriela Papa-Oliva,[10,11] Alay S Banker,[12] Fernando Arevalo,[13,14] for the King Khaled Eye Specialist Hospital International Collaborative Retina Study Group

Optic Disc Pit Treatment Options

- No fluid in retina → monitor
- Fluid present → refer to retinal specialist
  - Monitor? -- up to 80% without treatment result in 20/200 vision…
  - Laser photocoagulation
  - PPV alone → gold standard at this time!
  - PPV with supplementary laser photocoagulation
  - PPV with gas tamponade
    - With supplementary laser photocoagulation
  - Other attempted, but unproven approaches…
    - Autologous platelets/fibrin
      - Attempt to seal-off fluid
    - Radial retinotomy
    - Stuffing of inverted ILM in ODP post-PPV

Jain et al. Am J Ophthalmol. 2014;158:423-35.
Chatziralli I, et al. Clin Ophthalmol. 2018;12:1417-22.

Our patient…

- Stable
- Educated patient on Sn/Sx ODP-maculopathy
- Monitoring every 12 months

Thank you!

- Questions?????
  - cborgman@sco.edu

SOUTHERN COLLEGE OF OPTOMETRY

- Complaints/concerns????
  - wmcgriff@sco.edu

Glaucoma: What would you do?

CHRIS BORGMAN, OD, FAAO
MEMPHIS, TN
SOUTHERN COLLEGE OF OPTOMETRY

COPE Disclosures:

--I do not have any relevant financial relationships to disclose.

--The content and format of this course is presented without commercial bias and does not claim superiority of any commercial product or service.

For most practitioners, the perfect approach for every glaucoma case is challenging and elusive…

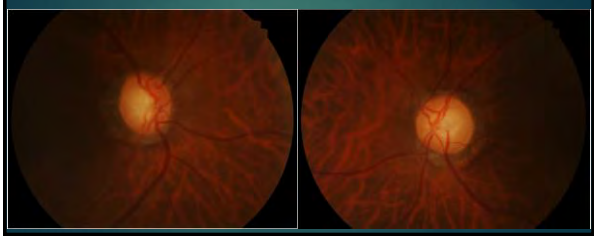
- "Even with the same available data, one doctor's interpretation of the results (with subsequent initiation of therapy—or not) may vary tremendously from the approach of another clinician……Equally competent doctors have different thresholds and different philosophies."
  - Melton & Thomas, Ophthalmic Drug Guide 2017

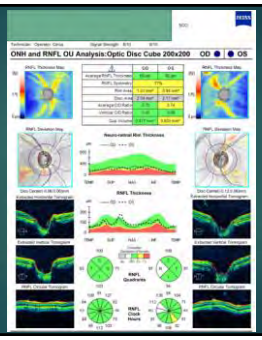
Case #1

Case History…

- 63 YO AAF
- (+)HTN → BP in-office: 136/83
- Meds: amlodipine & benazepril
- BCVA: 20/20 OD, 20/20 OS
- IOP: 28 OD, 30 OS with Goldman
- Gonio: WNL OU

DFE…

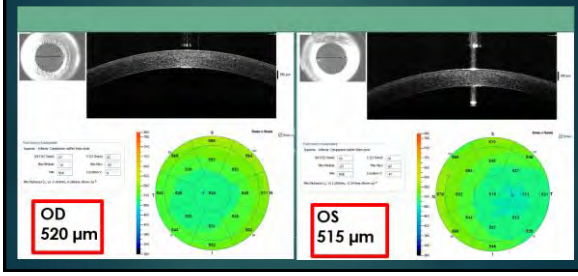


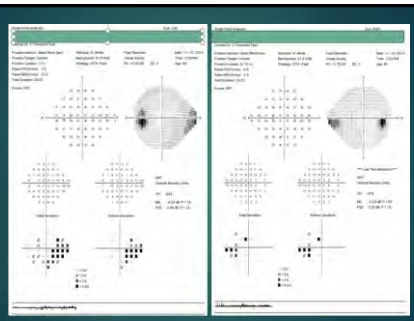


Based on the OCT alone, is this glaucoma?

A. Yes, without a doubt!
B. Definitely not, everything is all green.
C. I'm leaning yes, but want more tests.
D. I'm leaning no, but want more tests.

Pachymetry…



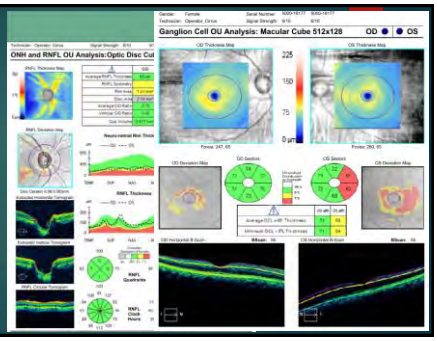


Do these VF defects correlate with optic nerve appearance?

Do these visual fields correlate with the optic nerve appearance?

A. Yes, for sure.
B. No, for sure.
C. I thought "no glaucoma" a few slides ago, but now I think "yes this is glaucoma"
D. Can I see the RNFL OCT again? I think I missed something…

Let's take another look at the RNFL….



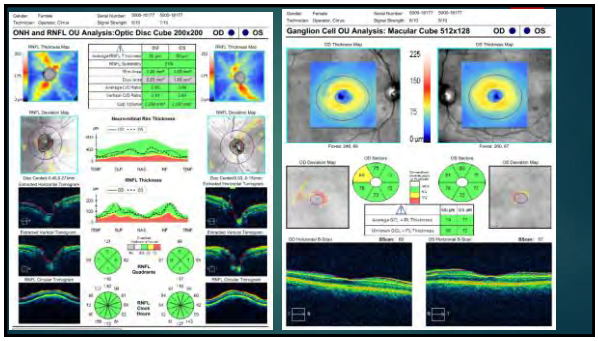
Management…

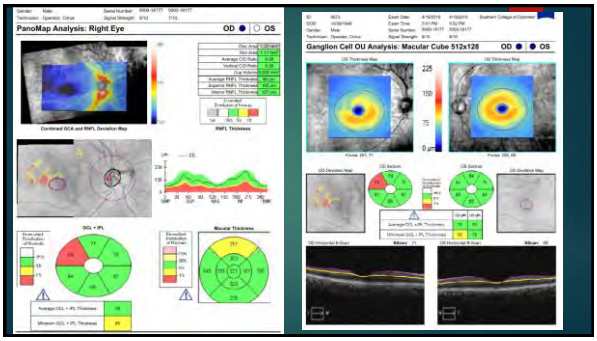
- Started Latanoprost qhs OU…….RTC 1 month
- 1 month later:
  - IOP: 26 OD, 28 OS via Goldman
  - iCare: 21 OD, 25 OS

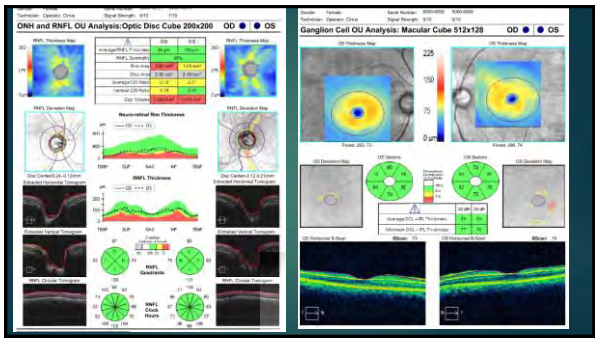
But was 28 OD, 30 OS truly the maximum IOP? Low? High? Average?

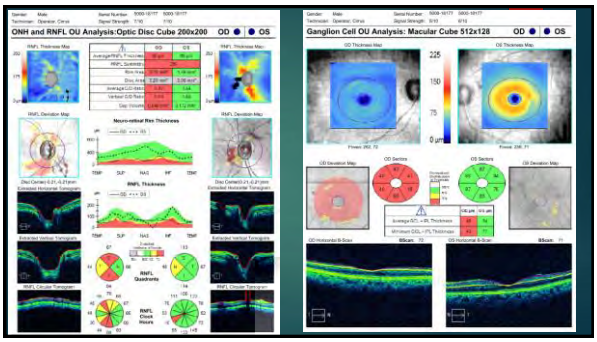
Do you routinely use ganglion cell complex (GCC) scans in managing glaucoma patients?

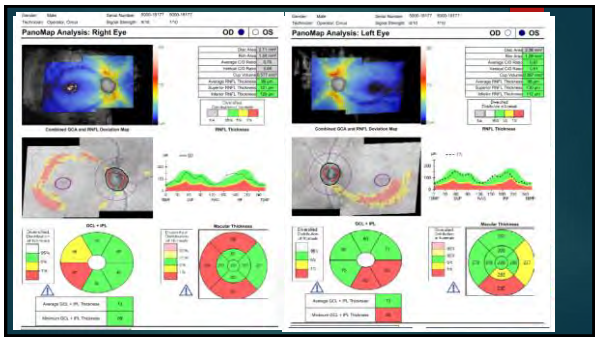
A. No
B. Yes
C. I'm unfamiliar with GCC

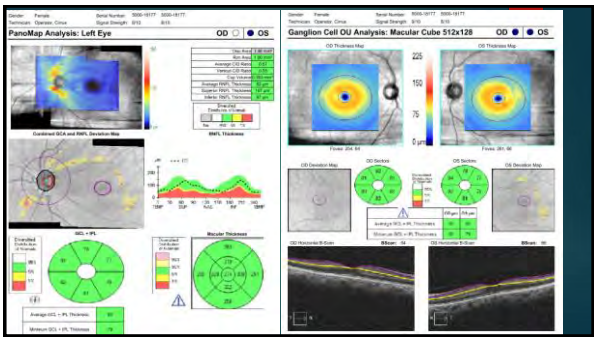












Did I convince you to consider using GCC more often on your glaucoma patients?

A. Yes, I'm definitely going to include it more now
B. No, I'm already using it with my patients.
C. No, I'm not convinced of its use in glaucoma yet.

Back to our case:
What is the definition of a PGA "non-responder"?

A. <10% IOP reduction
B. <20% IOP reduction
C. <30% IOP reduction

What is definition of "non-responder"?

- Varies per source!
- **Most commonly used:
  - **≤10% reduction in IOP from baseline over 1**-2 visits
- Other studies have used:
  - <20% IOP reduction form baseline
  - <5 mmHg IOP reduction from baseline

How often are patient's non-responders to PGA's?

A. 10% of the time
B. 20% of the time
C. 30% of the time
D. 40% of the time

How often are patients "non-responders" to PGA meds?

- Non-response rate of latanoprost → up to 28% in some studies!
- Other studies show 18-25% non-response rate with PGA's
- Bottom Line: ~20% failure rate overall

Do all PGA's lower IOP equally?

A. Yes
B. No
C. I don't know
D. Wait…what's glaucoma again?

Do all PGA's lower IOP equally?

- Premise: Lumigan vs. Travatan vs. Xalatan in Tx-naïve patients; is one better?
- N=122 patients…OHTN, POAG, PEX, PDG
- Completely independent study → no pharm companies involved/sponsored
- 40 bimatoprost, 42 latanoprost, 40 travoprost
- Followed for 6 months:
  - Bimatoprost = 35% reduction IOP
  - Latanoprost = 29% reduction IOP
  - Travoprost= 30% reduction IOP
- Differences were NOT statistically significant!
- "All the three drops are well-tolerated; and the difference between their tolerance and efficacy at 6 months was similar. These results may reassure ophthalmic departments when choosing a first-line prostaglandin analogue when managing patients with glaucoma or ocular hypertension." – Faridi, et al. 2010.

Faridi UA, et al. *Clin Exp Ophthalmol*. 2010;38:678-82.

Lin L, et al. *Ann Pharmacother*. 2014.

- Premise: meta-analysis looking at all 4 PGA meds; which one is best?
- N=4834 patients on PGA meds, 1731 patients on timolol
  - 1247 pts=bimatoprost
  - 1721 pts = latanoprost
  - 1207 pts = travoprost
  - 659 pts = tafluprost
- All reached 30% IOP reduction target better than timolol; equally among PGA's
- "By applying an advanced technique known as network meta-analysis that compared all 4 PGAs simultaneously, we showed that bimatoprost 0.03% had greater efficacy in achieving the outcome of proportion of patients reaching target IOP reduction of at least 30% from baseline, followed by travoprost 0.004%=latanoprost 0.005%, and tafluprost 0.0015%."
- Bottom Line for Overall IOP reduction:
  - All work well for 30% reduction in IOP
  - Bimatoprost > travoprost = latanoprost > tafluprost

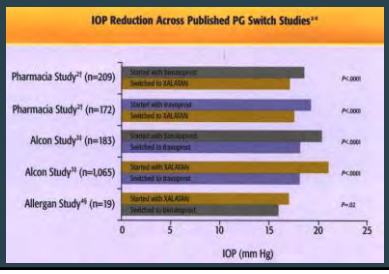
Lin L, et al. *Ann Pharmacother*. 2014;48:1585-93.

If your initial PGA choice fails, what do you do next?

A. Try another PGA
B. Switch to AA/BB/CAI
C. Switch to combination drop
D. Refer for SLT

If one PGA fails, switch to another PGA?

IOP Reduction Studies: Switching Between Prostaglandin Analogs



Switching between PGA's?

Latanoprost → Lumigan	Latanoprost → Travatan	PGA's → Zioptan
Sonty S. J Ocul Pharm. 2008	Br J Ophth. 2012.	Clin Ophth. 2011.
Law SK. Ophthalmol. 2005		
WilliamsRD. Adv Ther. 2002		
Casson. J Glaucoma. 2009		
Gandolfi SA. Ophthalmol. 2003		
Sato et al. J Ocul Pharm 2011		
Sawada. Japan Ophthal. 2014		
Germano. J Glaucoma. 2016		

YES! 2-4 mmHg usually

Latanoprost → Lumigan	Latanoprost → Travatan	Latanoprost → Zioptan
Carasco. Oftalmol. 2013	Graefes Arch Oph 2012	ScientWorldJ 2012
	Caraasco. Oftalmol. 2013	

NO!

Back to case…

- Switched to Lumigan qhs OU
- IOP 1 month later…. 20 OD, 20 OS

- Did I give latanoprost enough time?
- How/why does Lumigan work better?

How/why is bimatoprost different?

- "Bimatoprost is unique, in that it also has an effect on the conventional pathway. Thus, bimatoprost has a dual mechanism of action, whereby it lowers IOP by acting on both the pressure-sensitive and -insensitive outflow pathways."

- N = 30 patients; latanoprost → bimatoprost
- "Following the switch to bimatoprost, the additional percent of IOP lowering ranged from 17.8 to 22.0% in OD and from 15.0 to 24.0% in OS. Of note, no further adjunctive IOP lowering therapy was added to the regimen of any patient after the switch to bimatoprost."

Sonty S, et al. *Journal of Ocular Pharm & Therapeutics*. 2008;24:517-520.

Sonty S, et al. 2008.

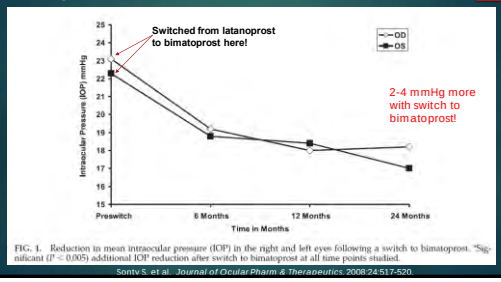


FIG. 1. Reduction in mean intraocular pressure (IOP) in the right and left eyes following a switch to bimatoprost. *Significant ($P < 0.05$) additional IOP reduction after switch to bimatoprost at all time points studied.

Sonty S, et al. *Journal of Ocular Pharm & Therapeutics*. 2008;24:517-520.

PGA's in general: What do I do?

- My general trend….
- Start with generic latanoprost due to $$$$$
- RTC 4-6 weeks
- If less than expected IOP reduction occurs….reinforce compliance
- RTC 2-3 months later
- If IOP still less than expected, switch to bimatoprost
- RTC 4-6 weeks
- If minimal (or no response) I may add adjunctive med to PGA, or abandon PGA's altogether
- If patient fails 2 different PGA's, then I typically abandon PGA class
  - But this is super rare!

What is the best time of day for PGA administration?

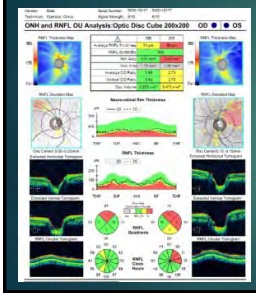
A. Morning only
B. Bedtime only
C. Whenever is most convenient for patient

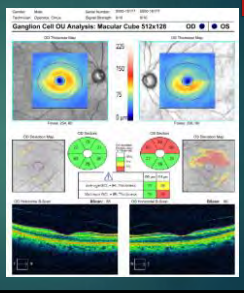
When is best time for PGA administration?

- N =30 ; QPM x 1 month then switch to QAM x 1 month
- "There was no statistically significant difference in IOP response to the medication between morning and evening dosing. This may represent a potentially greater effect of the medication dosed in the evening being counterbalanced by greater adherence to the medication in the morning. Although this was not a primary endpoint of this study and time of day of IOP measurement was not controlled, this is an important finding."
- "This study shows that taking a daily topical antihypertensive medication in the morning is felt to be more convenient than the evening in this cohort of patients, which potentially could lead to greater adherence in the morning than in the evening. The convenience of morning administration may be due to a more regular morning routine for patients, difficulty remembering to instill the drop in the evening, or both."

Ford BA, et al. Morning dosing of once-daily glaucoma medication is more convenient and may lead to greater adherence than evening dosing. *J Glaucoma*. 2013;22:1-4.

Is this glaucoma?

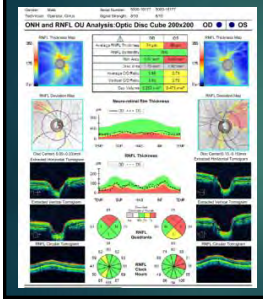


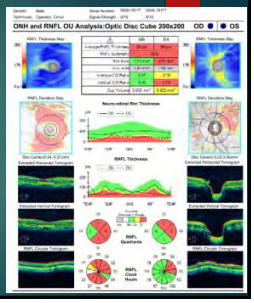


Do you think this is glaucoma?

A. Yes, without a question!
B. No way!

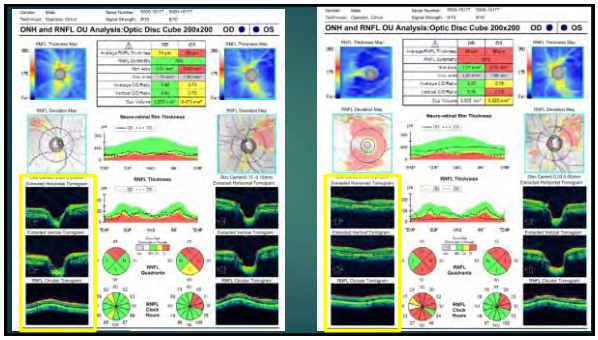
Did progression occur?





Is this glaucomatous progression?

A. Yes!
B. No!
C. Can I compare the OCT's again?



Case #2:

Case history

- 65 YO WF
- CC: "blurry vision"
- HPI: OD=OS, slowly worsening x 6 months, (-)pain, (+)glare when driving at night
- POH: (+)POAG OU --- controlled with Travatan Z qhs OU x 5 years
- PMH: (+)T2DM, (+)HTN, (+)SLE
- Meds: metformin, lisinopril, HCTZ, prednisone 10 mg
- Allergies: NKDA
- SH: quit smoking 25 years ago, (-)EtOH

Exam…

- VA: 20/40 OD, 20/50 OS, PHNI OU
- Pupils: PERRL, (-)APD
- EOM's: Full OU
- CVF: FTFC OU
- MR: OD -2.00 – 1.00 x 180 20/40
  OS -2.50 sph 20/50
- SLE: 2-3+ PSC OU, 1+ cortical cataracts
- IOP: 20 mmHg OD, 19 mm Hg OS
  - Tmax: 29 mmHg OD, 28 mmHg OS
- DFE: 0.6/0.6 OD, 0.7/0.7 OS, inferior sloping OU, WNL otherwise OU

Do you stop PGA's prior to cataract surgery?

A. No, never.
B. Yes, if DM.
C. Yes, every time.
D. Used to, but don't anymore.
E. Cataract surgeon decides for me.

PGA's and risk of CME…

- Thought: PGA use increases CME risk 2' increased vascular incompetence from proinflammatory actions
- Hernstadt et al. 2017 → meta-analysis on this topic
  - 13 studies with 86,300+ eyes → 4416 on PGA's
    - 97 (out of 4416) → clinically significant CME → 2.2%
    - 28 (out of 4416) → angiographic CME → <1%
- "Based on current literature, no evidence supports stopping PGA use prior or during the course of cataract surgery to reduce CME." -- Hernstadt et al. 2017
- "Apart from stopping use of PGA, reasonable alternatives include the concurrent use of NSAIDs with PGA…or to closely follow these patients for the development of CME." -- Hernstadt et al. 2017

Hernstadt DJ, et al. Effect of prostaglandin analogue use on the development of cystoid macular edema after phacoemulsification using STROBE statement methodology. *J Cataract Refract Surg*. 2017;43:564-9.

Newest PGA/CME article I could find…

- Systematic review (4 RCT studies included)
- Pseudophakic CME = patient complaints of reduced VA in postop period of cataract surgery and OCT evidence of intraretinal fluid and increased macular thickness
- Peak incidence of PCME: first 5 weeks post-surgery
- UK study: 60% OMDs continued PGA, 20% routinely stopped PGA's, 20% stopped PGA's if risk factors present
- Incidence of clinically significant PCME = 1-2%
- Asymptomatic PCME: IFVA (16%), OCT (41%)
- "The results showed no causal relationship between pseudophakic CME in patients using PGA undergoing uneventful cataract surgery, suggesting they do not have to be suspended in patients without known risk factors of pseudophakic CME."

Santamaria AB, et al. Cystoid macular edema related to uncomplicated cataract surgery and topical prostaglandin analogs: a systematic review of randomized controlled trials. *Cureus*. Nov 2024;16:e72920.

Did this slide/study change how you will approach PGA's and phaco in the future?

A. Yes, you've changed my mind.
B. No, I never stopped PGA anyway.
C. No, I'll still d/c the PGA.
D. Doesn't matter to me…I'm still letting surgeon decide

Do NSAID's and PGA's cancel out eachother's effects?

A. Yes
B. No
C. Never thought of it before

NSAIDs & PGAs: Friend or Foe?

Does concurrent use cancel effect of each drug?

PGA's and NSAID's….friend or foe?

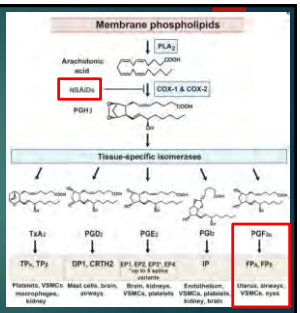
- Costagliola C, et al. *Curr Eye Res*. 2008
  - N=32 ; ketorolac and latanoprost
  - Ketorolac enhanced IOP lowering effect
- Sorkhabi R, et al. *J Glaucoma*. 2011
  - N=22 ; diclofenac and latanoprost
  - Diclofenac may interfere with IOP lowering effect (average ~2 mmHg)
- Turan-Vural E, et al. *Acta Ophthalmologica*. 2012
  - N=30 ; ketorolac and 3 PGA's tested
  - Ketorolac enhances IOP effect with PGA's
- Ozyol P, et al. *J Glaucoma*. 2016
  - N=35 ; nepafenace and 3 PGA's tested
  - No clinical significance on IOP measurements; might potentiate IOP effect
- Sakata R, et al. *J Ocul Pharmacol Ther*. 2016
  - n=28 ; bromfenac and travaprost tested
  - Bromfenac did not affect IOP-lowering effect

Quick summary:
4 of 5 studies (n=125)
--Yes, use them together!

1 of 5 studies (n=22)
--No, mild effect on IOP

NSAIDs & PGAs: Friend or Foe?

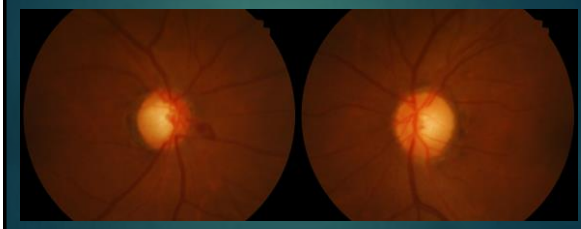
- PGA's bind to PGF2α receptor
- NSAID's block PG synthesis
  - No effect on PG receptors!
- Therefore, they likely do NOT interfere with one another
  - Might even enhance the IOP lowering effect
    - Less competition at receptor site???
- OK to use PGA & NSAID concurrently!



Ricciotti E, et al. Arterioscler Thromb Vasc Biol. 2011.

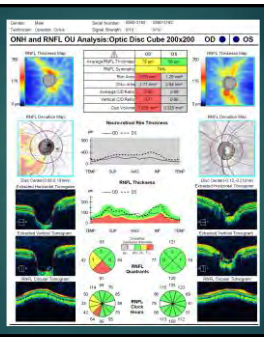
Heat Check:

65 YO AAM
IOP → 21 mmHg OD, 20 mmHg OS via GAT

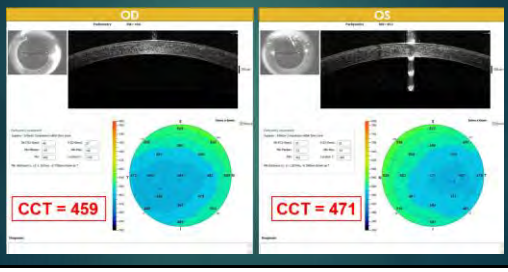


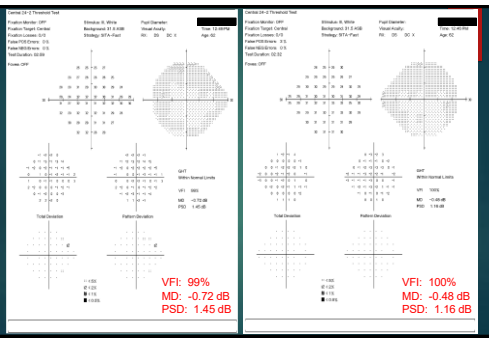
Signal Strength:
OD: 9/10
OS: 9/10

Avg RNFL:
OD: 75 µm
OS: 95 µm

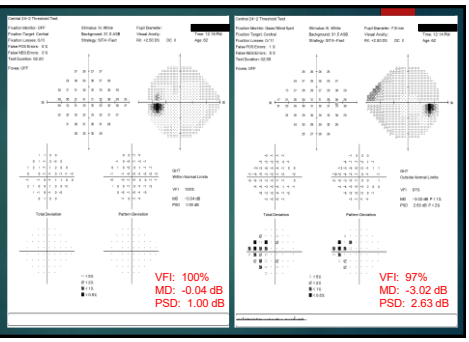


Pachymetry...



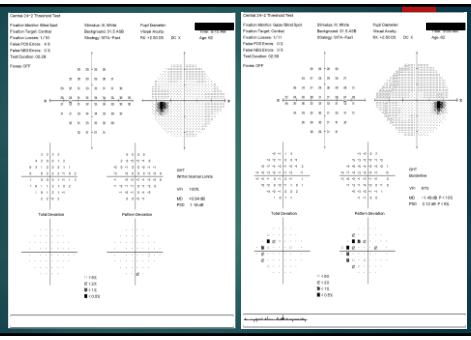


Repeat 20 minutes later



Visual fields overlap!

6 mo later



Bottom Line?

- Don't trust 3rd year optometry students & technology…

What do you use as an adjunct glaucoma medication after a PGA?

A. Brimonidine
B. Timolol
C. Levobunolol
D. Dorzolamide
E. Brinzolamide
F. Combo drop
G. SLT

Best adjunct med after PGA med???

A Randomized, Investigator-Masked, 4-Week Study Comparing Timolol Maleate 0.5%, Brinzolamide 1%, and Brimonidine Tartrate 0.2% as Adjunctive Therapies to Travoprost 0.004% in Adults with Primary Open-Angle Glaucoma or Ocular Hypertension

Ricardo Reis, MD[1]; Carlos F. Queiroz, MD[2]; Lúcia C. Santos, MD[2]; Marcos P. Avila, MD[2]; and Leopoldo Magacho, MD[2]
[1]Hospital Santa Casa de Misericórdia, São José do Rio Preto, São Paulo, Brazil; and [2]Ophthalmology Department, Federal University of Goiás, Goiânia, Brazil

- N=52 total eyes
- Purpose: After travopost, what is best adjunct med?
- IOP after one month of adjunctive treatment:
  - Timolol 0.5% BID = 3.9 mmHg further IOP reduction
  - Brinzolamide 1% BID = 4.0 mmHg further IOP reduction
  - Brimonidine 0.2% BID = 2.3 mmHg further IOP reduction

Nick Opitz, OD

Reis R, et al. *Clin Ther*. 2006;28:552-9.

BB vs. AA vs. CAI vs. others…

- Systematic Review and Meta-Analysis in 2010
- What is best to add to PGA?
  - AA vs. BB vs. CAI
- All agents revealed statistically similar IOP lowering efficacy:
  - 2.3 to 3.0 mmHg
- However, CAI and BB were more effective than AA

- But…
  - Neuroprotection component? → AA is best
  - Nocturnal reduction in IOP? → CAI is best

Tanna AP, et al. Meta-analysis of the efficacy and safety of (2 –adrenergic agonists, (-adrenergic antagonists, and topical carbonic anhydrase inhibitors with prostaglandin analogs. *Arch Ophthalmol* 2010; 128:825–833.

Do any of the newer glaucoma meds perform better than the "old faithful" glaucoma meds?

A. Vyzulta
B. Roclatan
C. Rhopressa
D. Too early to tell…

Combination Glaucoma Meds:

Review…and something new???

What is your favorite combination glaucoma medication?

A. Cosopt
B. Combigan
C. Simbrinza
D. I don't think combo agents are better than solo agents

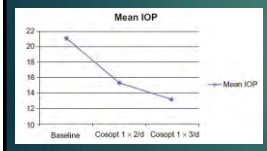
Cosopt vs. timolol/dorzolamide

Bottom Line:
Cosopt = good drug!

- Cosopt > timolol alone
- Cosopt > dorzolamide alone
- Cosopt = 25-30% reduction in IOP on average
- Cosopt = timolol + dorzolamide concomitant
  - 97% confidence that they are equal treatments (Strohmaier, et al. 1998)
  - 15-20% reduction IOP for both sides
  - 0.73 mmHg more in concomitant group…significant?
- When switched from concomitant T/D → Cosopt….
  - >81% maintained IOP or had lower IOP than T/D concomitantly…

- SE's: Cosopt = timolol + dorzolamide concomitant
  - Hutzelmann, et al. 1998.

Cosopt 3x/day instead of 2x/day???



- N = 29 patients
- BID x 4 weeks, then TID x 4 weeks
- IOP decrease:
  - BID → ~26%
  - TID → ~37%
- "Our results indicate that increasing Cosopt dosage from twice to three times a day is associated with increased efficacy in IOP reduction, with no change in its safety profile. The additional reduction in IOP was considerable and statistically significant."

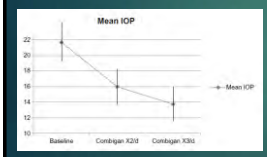
Shemesh G, et al. *Clin Ophthalmol*. 2012.

Combigan vs. brimonidine/timolol

Bottom Line:
Combigan = good drug!

- Combigan > brimonidine alone
- Combigan > timolol alone
- Combigan = timolol + brimonidine concomitant
  - <0.97 mmHg between groups at all study points
    - Goni FJ. *Eur J Ophthalmol.* 2005.
- SE's: Combigan = timolol + brimonidine concomitant

Combigan 2x/day vs. 3x/day???



- N = 31 patients
- BID x 4 weeks, then TID x 4 weeks
- IOP decrease
  - BID → ~26%
  - TID → ~36%
- "The findings of this study are clinically important, because increasing the Combigan dosage achieved a statistically significant additional reduction in IOP, with no change in the safety profile."

Moisseiev E, et al. *Clin Ophthalmol.* 2013.

Cosopt vs. Combigan???

- Cosopt = Combigan (Arcieri 2007)
- Cosopt = Combigan (Hatanaka M, et al. 2008)
- Cosopt < Combigan (Garcia-Feijoo, et al. 2010)
  - Only by 0.95 mmHg though!
- "In this present meta-analysis, we reviewed 7 RCTs comparing the FCBT (fixed combination brimonidine/timolol) with the FCDT (fixed combination dorzolamide/timolol) in patients with elevated IOP, and found no significant difference regarding efficacy in lowering IOP at peak and diurnal mean."
  - Budengeri P, et al. 2013 → meta-analysis
- Final thoughts: Cosopt = Combigan!!!

Budengeri P, et al. *J Ocular Pharm Therapeutics.* 2013.

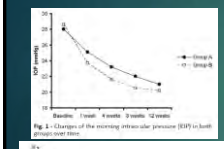
Simbrinza vs. brimonidine/brinzolamide

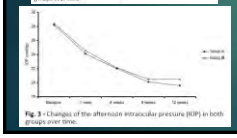
Bottom Line:
Simbrinza = good drug!

- Simbrinza > brimondine alone
  - Simbrinza lowered IOP by 1.0-3.0 mmHg more than brimonidine
- Simbrinza > brinzolamide alone
  - Simbrinza lowered IOP by 1.0-2.5 mmHg more than brinzolamide
- Simbrinza = brimondine + brinzolamide concomitantly???
  - No studies on this have been published yet…

FDA new drug application results → *https://www.accessdata.fda.gov/drugsatfda_docs/nda/2013/204251Orig1s000StatR.pdf*

Cosopt vs. Simbrinza???





- N=44
- Group A = Cosopt BID
- Group B = Simbrinza BID
- Morning IOP: Simbrinza > Cosopt
  - Only by 1.2 mmHg though!
- Afternoon IOP: Simbrinza = Cosopt
- SE's: Cosopt = Simbrinza
- Bottom Line: Simbrinza = Cosopt

Kozobolis V, et al. *Eur J Ophthalmol.* 2017.

Bottom Line: Combination drops…

- Efficacy:
  - Cosopt = Combigan = Simbrinza (-ish)
  - Cost, SE's, availability drive choice…

My general approach…

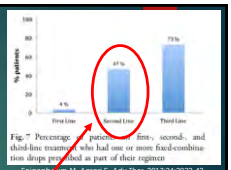


Fig. 7 Percentage of patients on first-, second-, and third-line treatment who had one or more fixed-combination drops prescribed as part of their regimen

Fajgenbaum M, Ansari E. *Adv Ther*. 2017;34:2033-42.

- After PGA treatment…
- Add combination med
- Then decision for SLT or incisional surgery is simpler…
- Combination meds are prescribed ~47% time as second line agent…

Fajgenbaum M, Ansari E. Prescribing trends in a glaucoma clinic and adherence to EGS guidelines: a retrospective, non-interventional, single center UK study. *Adv Ther*. 2017;34:2033;42.

How good are compliance rates according to patients?

A. 60+% compliance
B. 70+% compliance
C. 80+% compliance
D. 90+% compliance

What are patients' actual compliance rates?

A. 50% w/ 1 med, 30% w/ 2 meds
B. 70% w/ 1 med, 50% w/ 2 meds
C. 90% w/ 1 med, 70% w/ 2 meds

Compliance with drops

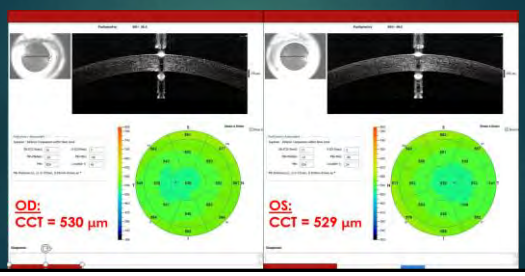
- Actual compliance rates = 41-72% (Kass et al. 1986)
  - 97% patients report good compliance though!
- Compliance drops from: 70% (1 med) to 50% (2 meds)
  - Greenberg 1984

Heat check!

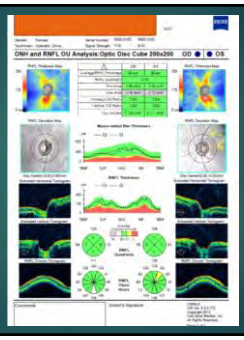
- 54 YO AAF
- First eye exam in "a long time…maybe since childhood"
- BCVA = 20/20 OD, 20/20 OS
- Goldmann tonometry = 28 mmHg OD, 29 mmHg OS
- FHx glaucoma = aunt on mother's side
- Gonio = ciliary body 360 degrees OU

What other information (or tests) do you want at this point?

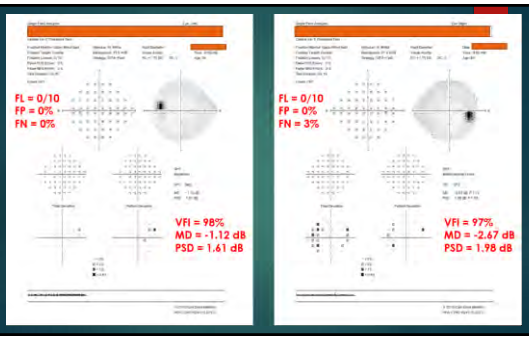
Pachymetry…



OD:
Signal Strength = 7/10
Avg RNFL = 96 µm
Disc Area = 2.38 mm²

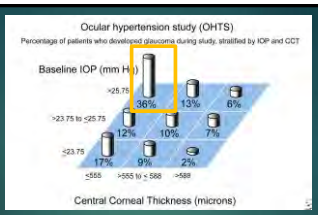


OS:
Signal Strength = 8/10
Avg RNFL = 96 µm
Disc Area = 2.13 mm²



What landmark study do you want to use for this patient?

A. EMGTS
B. OHTS
C. CIGTS
D. CNTGS
E. AGIS



Highest Risk Group!

Started on Lumigan QHS OU → RTC 3-4 weeks IOP check

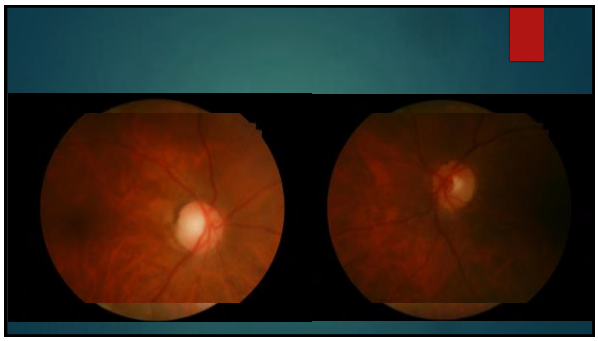
Target = ≤ 21 mmHg OU (~30% decrease)

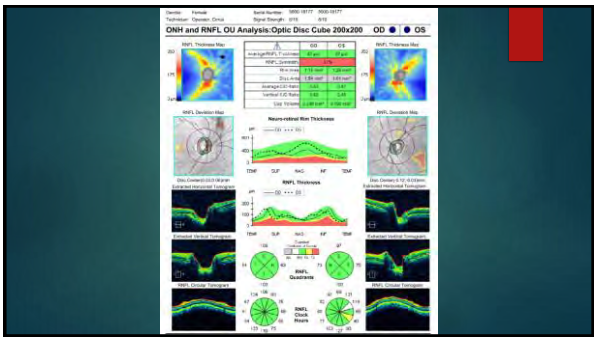
Case #3

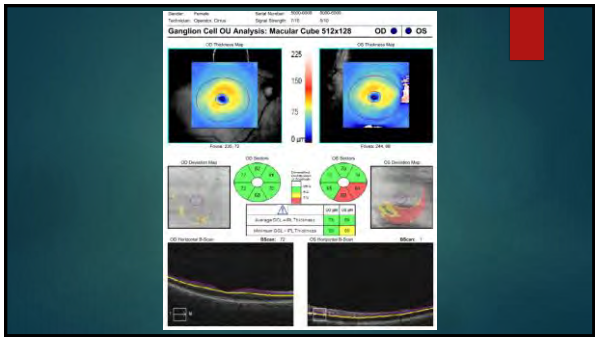
Case History

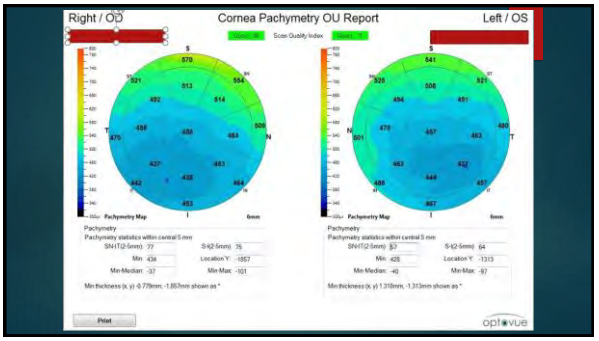
- 87 AAF
- POH: (+)POAG OU….Travatan qhs OU + Cosopt BID OU
- PMH: (+)HTN
- Meds: valsartan, ASA 81 mg
- Allergies: NKDA, seasonal

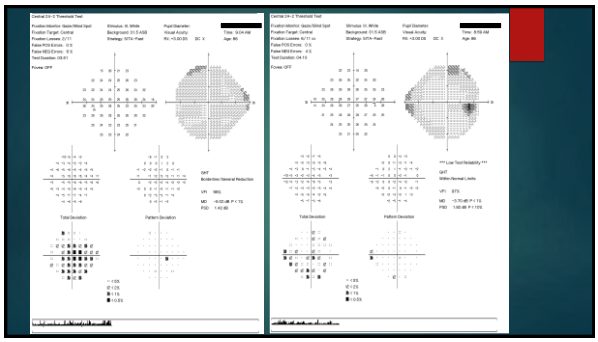
- BCVA: 20/30 OD, 20/30 OS
- SLE: (+)DES OU, (+)PCIOL OU, (-)PCO
- IOP: 18 mmHg OD, 18 mmHg OS
- Tmax: 20 OD, 18 OS????











Life expectancy in US in 2021…

- Per CDC:
  - Men: 73.5 yo
  - Women: 79.3 yo

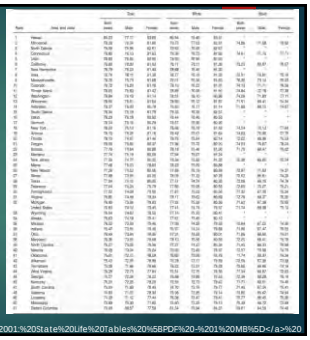
https://www.cdc.gov/nchs/fastats/life-expectancy.htm

True or False: Per CDC, Texas has the 28th best life expectancy in the U.S.?

A. True
B. False

Life expectancy per state!

- Florida → #20
- Texas → #28
- Michigan → #32
- Arkansas → #42
- Tennessee → #43 ….
- Georgia → #45
- Mississippi → #50 ….



https://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_09.pdf#x2013;2001%20State%20Life%20Tables%20%5BPDF%20-%201%20MB%5D%20

Life Expectancy Risk Factors?

- Stroke
- HTN
- Diabetes
- Obesity
- Heart disease
- Atherosclerosis
- High cholesterol
- Smoking
- Age
- Poverty?

What are the chances this patient makes 100 yo?

Age (yrs)	Male Total Chance of Survival in Tennessee	Female Total Chance of Survival in Tennessee
80	36%	55%
85	22%	40%
90	10%	25%
95	3%	12%
100	0.7%	4%
105	0.07%	0.9%

https://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_09.pdf#x2013:2001%20State%20Life%20Tables%20%5BPDF%20-%201%20MB%5D%20

What do you want to do with this patient's glaucoma drop regimen?

A. Nothing, leave her on max meds
B. Stop Cosopt, continue Travatan Z
C. Stop Travatan Z, continue Cosopt
D. Stop all glaucoma drops
E. Ask patient what she wants to do

Questions?? Accolades??

- Email → cborgman@sco.edu

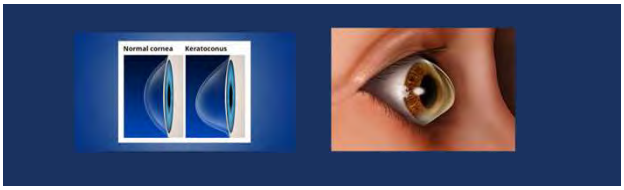
Complaints???

- Email → rsavoy@sco.edu

SOUTHERN COLLEGE OF OPTOMETRY

IMPORTANCE OF EARLY DETECTION OF CORNEAL ECTASIA

BRYAN WILLIAMS, OD, FAAO, FSLS



1

BACKGROUND

- Texas Tech University
  - Class of 2014
- University of Houston College of Optometry
  - Class of 2018
- UAB School of Optometry
  - Cornea & Contact Lens Resident 2018-2019

2

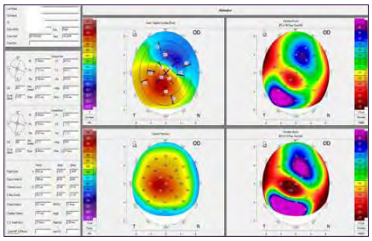
FINANCIAL DISCLOSURES

- Consultant:
  - Alcon
  - Bausch + Lomb Specialty Vision Products

3

KERATOCONUS

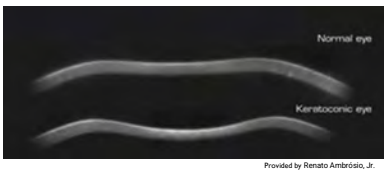
- BACKGROUND
  - Progressive, bilateral, asymmetric
  - Focal thinning and steepening resulting in an irregular topography
  - Genetic and environmental component
  - Onset in pediatric population
- 3 KEY CLINICAL CHARACTERISTICS
  - Abnormal ***posterior*** ectasia
  - Abnormal corneal thickness ***distribution***
  - ***Non-inflammatory*** corneal thinning



4

KERATOCONUS

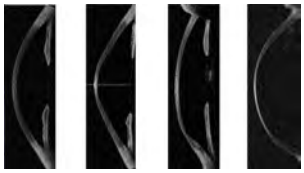
- **LOSS OF BIOMECHANICAL STRENGTH**
  - Loss of Bowman's insertions
  - Loss of lamellar density in the area of the cone



Provided by Renato Ambrósio, Jr.

5

OTHER ECTASIAS

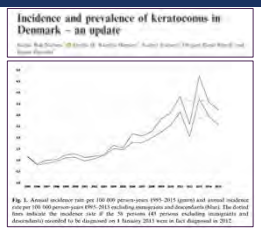


- NATURAL
  - Keratoconus
    - Subclinical
    - Forme fruste
  - Pellucid Marginal Degeneration (PMD), Keratoglobus
- IATROGENIC
  - Post-refractive ectasia

6

Studies Suggest Prevalence May be Higher in Certain Populations

Reference	Prevalence	Geography
Kennedy et al. 1986	0.05% or 1:2000	US
Jonas et al. 2009	2.3%	India
Millodot et al. 2011	2.3%	Israel
Xu et al. 2012	0.9%	China
Hashemi et al. 2014	2.5%	Iran
Godefrooij et al. 2017	0.26% or 1:375	Netherlands
Torres Netto et al. 2018	4.79%	Saudi Arabia
Chan et al. 2020	1.2% or 1:84	Australia
Hashemi et al. 2020*	0.14% or 1:700	Global Meta-Analysis


Incidence and prevalence of keratoconus in Denmark – an update

Acta Ophthalmol. 2019: 97: 752–755

Hashemi H, Heydarian S, Hooshmand E, et al. The Prevalence and Risk Factors for Keratoconus: A Systematic Review and Meta-Analysis. Cornea. 2020;39(2):263-270.

7

PREVALENCE

- June 2022 Study Presented at ARVO
  - International Keratoconus Academy (IKA) and Illinois College of Optometry collaboration
  - Screened ~2,500 kindergarten through 12th grade aged children with Pentacam tomography
  - Inner city Chicago demographic
  - Prevalence of 1 in 352

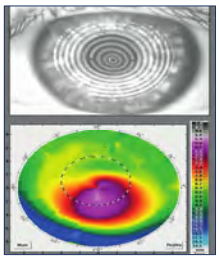
International Keratoconus Academy
Of Eye Care Professionals

ICO

8

DETECTION DEVICES

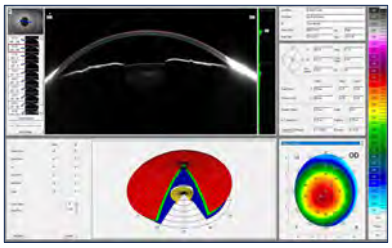
- **PLACIDO TOPOGRAPHY**
  - Common, does NOT measure back surface cornea or pachymetry distribution



9

DETECTION DEVICES

- **SCHEIMPFLUG TOMORGRAPHY**
  - Front & back elevation, pachymetry distribution (anterior, posterior, global corneal data)
  - Lower resolution, higher metrics
  - Numbers vs Best fit sphere



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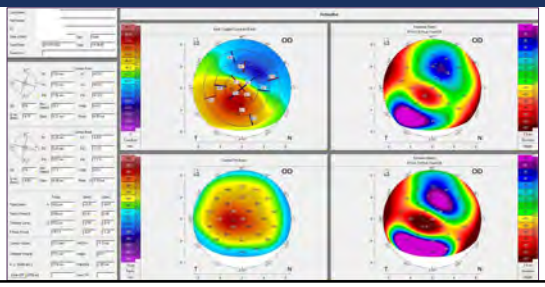
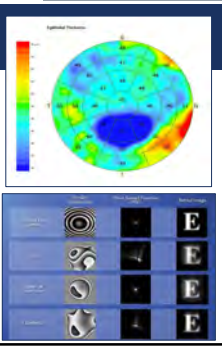
DETECTION DEVICES



11

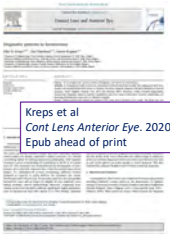
DETECTION DEVICES

- **AS-OCT Global & Epithelial Thickness Maps (ETM)**
  - Abnormalities are early indicators of KCN
  - Higher resolution, thickness metrics
  - ETM yields donut pattern
- **Wavefront Aberrometry**
  - Point spread function
- **Scheimpflug Tomography w/ integrated aberrometry**
- **Biomechanical scans**
- **Genetic Testing**



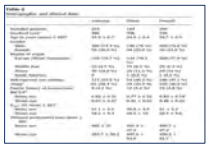
12

Despite advances in diagnostic tools, keratoconus is still often diagnosed at a relatively late stage



- Analysis of a group of patients who were newly diagnosed with keratoconus (KCN) indicated that only 13% of the patients were diagnosed before 18 years of age
- 70% had reached topographical keratoconus classification stage 2 by the time of diagnosis.

Kreps et al
Cont Lens Anterior Eye. 2020;
Epub ahead of print



13

EVERY DAY RED FLAGS

- Keratometry Reading > 45 (47 is statistically significant)
  - *Max K on average is 8D > than steep SIM K*
- Family History
- Corneal cylinder >2.0D
- Oblique cylinder axis
  - 77% oh KCN patients will have ATR or oblique cylinder
- Anisometropia

14

EVERY DAY RED FLAGS

- Unexplained reduced BCVA
- Large refractive error shifts
- Inconsistent refraction answers
- Chief complaint of glare, haloes, starbursts
- Scissoring reflex on retinoscopy
- Contact lens trial instability
- Co-morbidities
  - Down Syndrome, Sleep Apnea, Floppy Eyelid Syndrome
- Pregnancy

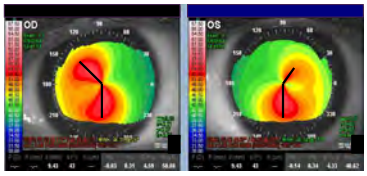
15

DIGGING DEEPER RED FLAGS

- Abnormal pachymetry
- Abnormal ETM on Anterior Segment OCT
- High order aberrations
- Was the AR difficult to capture
  - Ask your technician, distorted mires aren't always dry eye
- Signs of atopy or heavy eye rubbing

16

THE "LAZY 8" BOW TIE



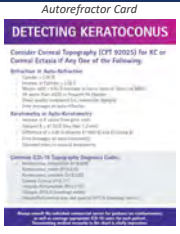
Skewing of radial axes in corneal topography produces a "lazy 8" bow tie pattern.

17

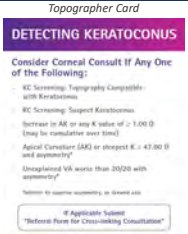
SIGNS AND SYMPTOMS THAT COULD SIGNAL KC

Remind your staff which patients to screen with corneal topography

Autorefractor Card



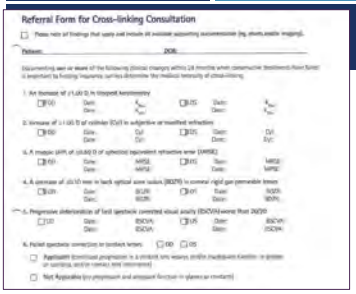
Topographer Card



Understand when to refer a patient for a Corneal Consult

18

IMPORTANT DATA


Referral Form for Cross-linking Consultation

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THE ROLE OF CROSS LINKING

- FDA Approval in the US in 2016, much earlier in other countries
- Stopping progression should be priority #1 in patient care
  - Don't wait, send early
  - 70% progressed in 3-month study during COVID
- Know the insurance requirements in your area for coverage
- >90% of patients do not progress following procedure

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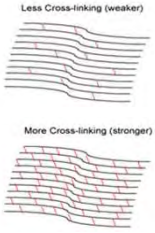
CORNEAL COLLAGEN CROSS LINKING (CXL)

- Covalent bonds are increased in the anterior corneal stroma but UV light
- Setting patient expectations extremely important
  - Vision will initially be ***worse,*** will improve after the 1-month mark
  - Most cones will flatten, but not intended to reverse disease
  - Not a refractive procedure
  - Will need visual correction following procedure



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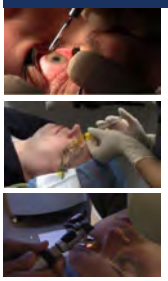
FDA-APPROVED ILINK CROSS-LINKING PROCEDURE SUMMARY



1. Remove epithelium.

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

✓ 30 minutes

3. Check for flare.

4. Once flare is observed, measure corneal thickness.

✓ If corneal thickness is less than 400 µm, 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.

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EXAMPLE FOLLOW-UP SCHEDULE

VISIT	PLAN
Day 1 to 1 Week	• Topical antibiotic, steroid • Frequent lubricants • No eye rubbing • Remove BCL once epithelium heals
Month 1	• OCT Imaging • Tomography / Topography • Vision assessment • Contact lens refitting evaluation
Month 3, 6, 12 *(Follow-ups potentially performed and billed by diagnosing physician depending on practice preference)*	• Continued evaluation utilizing tomography / topography • Vision assessment

No Global Period • Follow-up visits can be billed to insurance.

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WHY EARLY DETECTION IS IMPORTANT

- Keratoconus in children is far more aggressive than in adults
  - CLEK Study (2006) found that younger age of diagnosis resulted in higher likelihood of PKP
- High economic impact of KCN over a liftetime
  - ~$25K more than standard myopic patient
- Impacts Quality of Life (UC Davis Study)
  - Quality declines over time
  - 67% of KCN patients report normal mental health vs. 98% in standard population

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WHY EARLY DETECTION IS IMPORTANT

- Maintain as much vision as possible
  - Significant progression can happen in as little as 3 months
- Avoid need for corneal transplant
  - Since CXL implenetation in US, rate of PKP in the US has decreased (~56% according to Eye Bank data)
  - KCN no longer the #1 indication for PKP, repeat PKP is new the #1

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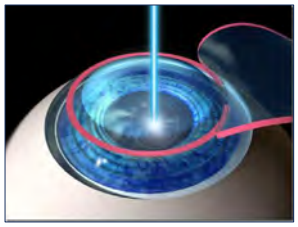
CASE 1 – LASIK CONSULTATION SURPRISES



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CASE HISTORY

- **CHIEF COMPLAINT**
  - Patient requests exam to determine candidacy for LASIK
- **DEMOGRAPHICS**
  - 30yo BF
- **OCULAR HISTORY**
  - Mild myope with oblique cyl based on entering spec Rx
  - Biweekly spherical CL wearer, has tried toric CLs in the past but never felt like they fit properly
- **OCULAR MEDICATIONS**
  - None
- **MEDICAL HISTORY**
  - None
- **SYSTEMIC MEDICATIONS**
  - None
- **ALLERGIES**
  - None

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/20
  - OS with glasses: 20/20
- **HABITUAL SPEC RX**
  - OD: -3.00-1.00x150
  - OS: -2.50-1.00x020
- **AUTOREFRACTOR**
  - OD: -3.00-1.00x180
  - OS: -2.50-1.50x001
- **KERATOMETRY**
  - OD Kmax: 48.0D
  - OS Kmax: 50.2D
- **PACHYMETRY**
  - OD minimum: 552um
  - OS minimum: 535um
- **MANIFEST SPEC RX**
  - OD: -3.00-1.00x152
  - OS: -2.25-1.00x020
- **SLIT LAMP/IOP/FUNDUS EXAM**
  - OU: WNL

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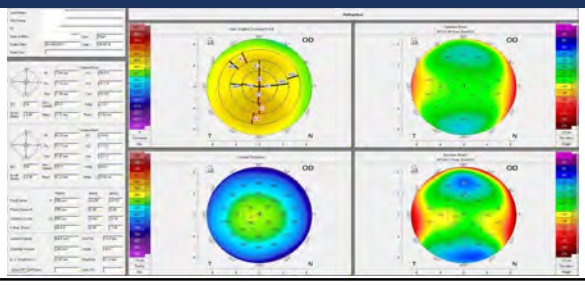
PENTACAM SCANS



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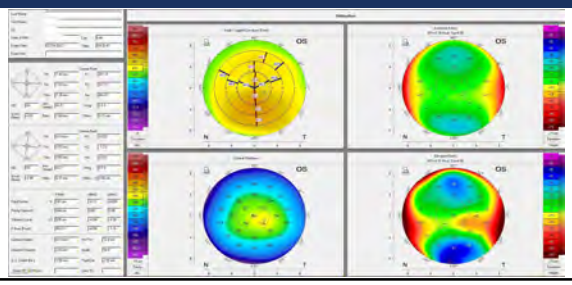
PENTACAM SCANS



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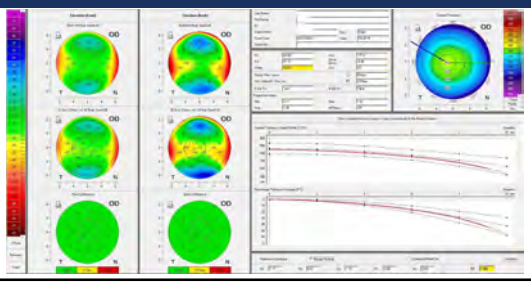
PENTACAM SCANS



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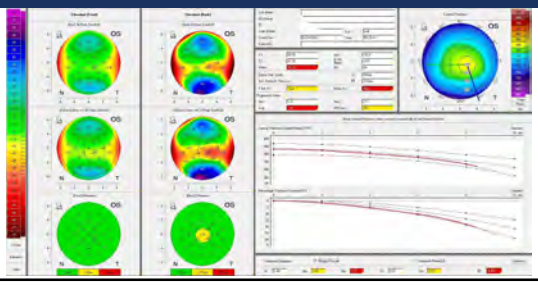
PENTACAM SCANS



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TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - Subclinical Keratoconus, OS>OD
- **PLAN**
  - Educated against LASIK/PRK/SMILE
  - Discussed potential for ICL
    - *Will discuss later*
  - Educated against eye rubbing
  - Monitor tomographies closely for any progression

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CASE HISTORY

- **CHIEF COMPLAINT**
  - Patient requests exam to determine candidacy for LASIK
- **DEMOGRAPHICS**
  - 30yo WM
- **OCULAR HISTORY**
  - Moderate myope with minimal cyl correction based on entering spec Rx
  - Daily spherical CL wearer
- **OCULAR MEDICATIONS**
  - None
- **MEDICAL HISTORY**
  - ADD
- **SYSTEMIC MEDICATIONS**
  - Vyvanse
- **ALLERGIES**
  - Seasonal

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/20, NVA: 20/20
  - OS with glasses: 20/20-, NVA: 20/50
- **HABITUAL SPEC RX**
  - OD: -4.50
  - OS: -3.25-0.50x150
- **AUTOREFRACTOR**
  - OD: -4.25-0.25x150
  - OS: -2.25-2.50x147
- **KERATOMETRY**
  - OD Kmax: 46.8D
  - OS Kmax: 51.1D
- **PACHYMETRY**
  - OD minimum: 561um
  - OS minimum: 540um
- **MANIFEST SPEC RX**
  - OD: -4.50 DS
  - OS: -2.25-1.25x110
- **SLIT LAMP EXAM/IOP/FUNDUS EXAM**
  - OU:WNL

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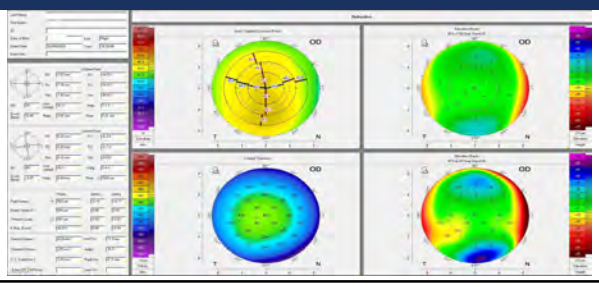
PENTACAM SCANS



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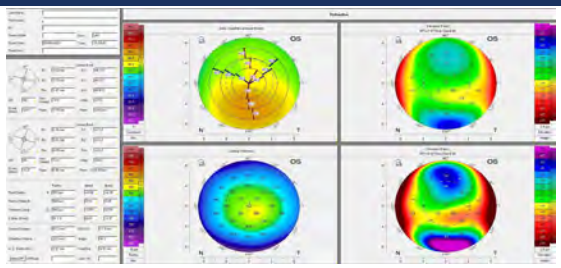

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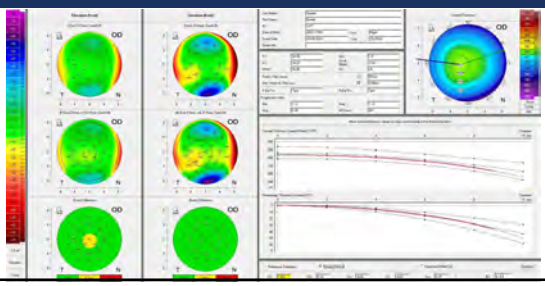

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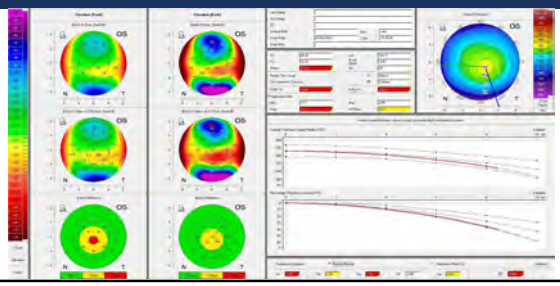

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TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - Subclinical Keratoconus, OS>OD
- **PLAN**
  - Educated against LASIK/PRK/SMILE
  - Discussed potential for ICL
    - *Will discuss later*
  - Educated against eye rubbing
  - Monitor tomographies closely for any progression

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CASE 2 – TO CROSS OR NOT TO CROSS?

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CASE HISTORY

- **CHIEF COMPLAINT**
  - Blurred distance vision, eyestrain when using devices for long periods of time
- **DEMOGRAPHICS**
  - 9yo WM
- **OCULAR HISTORY**
  - Mild myope with high amounts of cyl correction OU based on entering spec Rx
- **OCULAR MEDICATIONS**
  - None
- **MEDICAL HISTORY**
  - None
- **SYSTEMIC MEDICATIONS**
  - None
- **ALLERGIES**
  - None

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/25--
  - OS with glasses: 20/25--
- **HABITUAL SPEC RX**
  - OD: -1.50-4.25x020
  - OS: -2.75-4.75x174
- **AUTOREFRACTOR**
  - OD: -1.75-4.75x179
  - OS: -3.00-4.50x164
- **KERATOMETRY**
  - OD Kmax: 44.2D
  - OS Kmax: 45.2D
- **PACHYMETRY**
  - OD minimum: 535um
  - OS minimum: 538um
- **MANIFEST SPEC RX**
  - OD: -2.00-4.25x002
  - OS: -2.75-4.25x169
- **SLIT LAMP/IOP/FUNDUS EXAM**
  - OU:WNL

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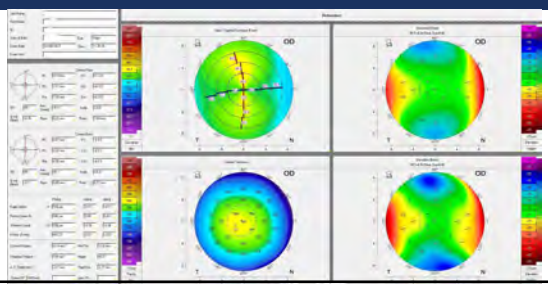
PENTACAM SCANS



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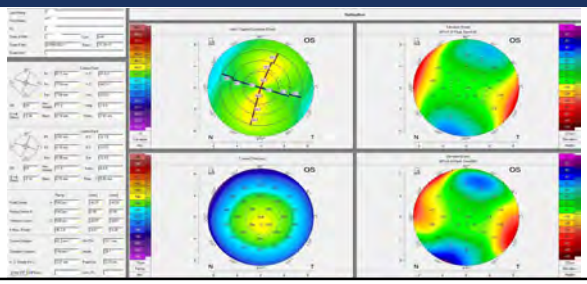

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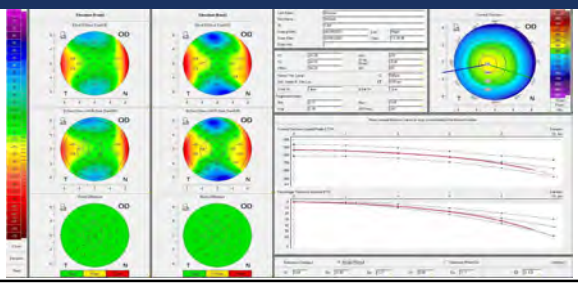

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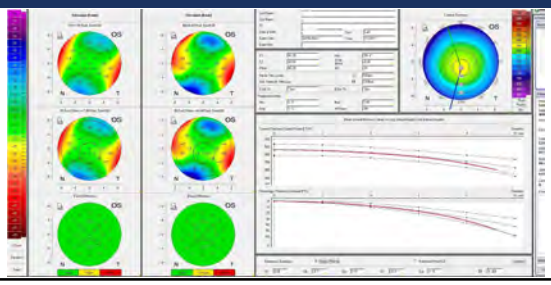

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TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - WTR Astigmatism
- **PLAN**
  - Discussed myopia control and contact lens options, patient's mother declined at this time
  - Educated against eye rubbing
  - Monitor tomographies ***very*** closely for any progression

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CASE HISTORY

- **CHIEF COMPLAINT**
  - Blurred vision OD>OS
  - Referred by another provider for CL evaluation
- **DEMOGRAPHICS**
  - 41yo HF
- **OCULAR HISTORY**
  - High hyperope with high cyl correction OD>OS based on presenting spec Rx
  - Tried soft CL OD in the past but never had clear vision
  - Tried scleral CL OD in the past but was never able to achieve a comfortable fit
- **OCULAR MEDICATIONS**
  - None
- **MEDICAL HISTORY**
  - ADD
- **SYSTEMIC MEDICATIONS**
  - Adderall
- **ALLERGIES**
  - None

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EXAM FINDINGS

- **ACUITIES**
  - OD unaided: 20/100 PH 20/40--
  - OS unaided: 20/20-
  - Near VA w/ +3.00 readers
    - OD: 20/60
    - OS: 20/40
- **AUTOREFRACTOR**
  - OD: +7.00-4.50x002
  - OS: +3.25-0.75x168
- **KERATOMETRY**
  - OD Kmax: 45.4D
  - OS Kmax: 44.2S
- **PACHYMETRY**
  - OD minimum: 517um
  - OS minimum: 533um
- **MANIFEST SPEC RX**
  - OD: +6.50-4.75x005
  - OS: +3.25-1.00X167
- **SLIT LAMP/IOP/FUNDUS EXAM**
  - OU: 2+ MGD
  - Otherwise WNL

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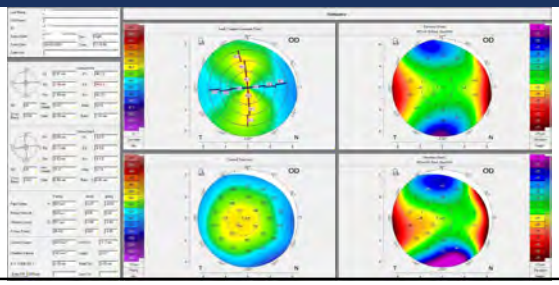
PENTACAM SCANS



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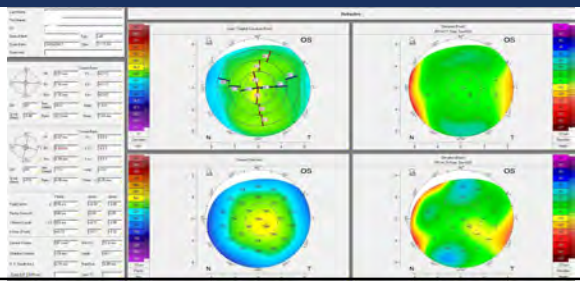

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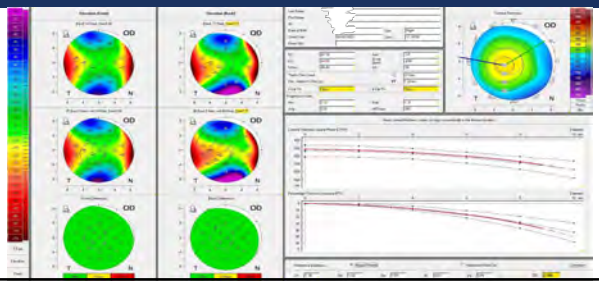

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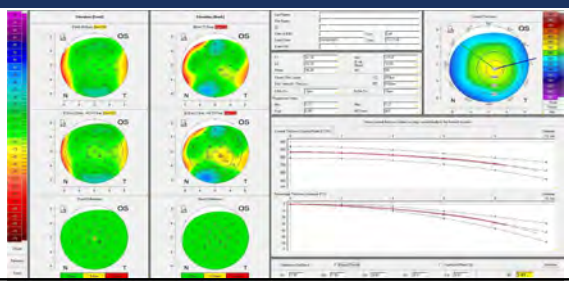
PENTACAM SCANS



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TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - Form Fruste KCN
- **PLAN**
  - Proceed with SMap3D scleral CL order OD, Biofinity Energys CL OS
  - Educated against eye rubbing
  - Monitor tomographies closely for any changes

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CASE HISTORY

- **CHIEF COMPLAINT**
  - Requests routine eye exam, no vision concerns
- **DEMOGRAPHICS**
  - 27yo HM
- **OCULAR HISTORY**
  - Low myope with low cyl OD, low hyperope with high cyl OS based on entering spec Rx
- **OCULAR MEDICATIONS**
  - None
- **MEDICAL HISTORY**
  - None
- **SYSTEMIC MEDICATIONS**
  - None
- **ALLERGIES**
  - None

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/20
  - OS with glasses: 20/20
- **HABITUAL SPEC RX**
  - OD: -0.50-0.75x005
  - OS: +0.75-4.00x005
- **AUTOREFRACTOR**
  - OD: -0.25-1.25x004
  - OS: +1.00-4.50x007
- **KERATOMETRY**
  - OD Kmax: 47.0D
  - OS Kmax: 49.2D
- **PACHYMETRY**
  - OD minimum: 570um
  - OS minimum: 575um
- **MANIFEST SPEC RX**
  - OD: -0.75-1.00x006
  - OS: +0.75-4.50x006
- **SLIT LAMP EXAM**
  - OU: WNL

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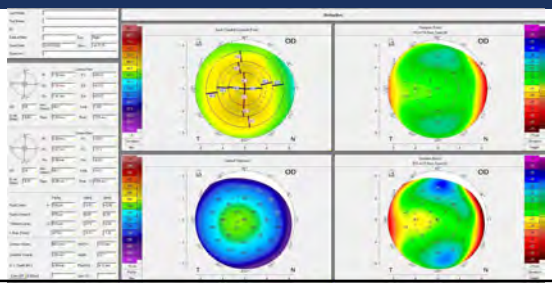
PENTACAM SCANS



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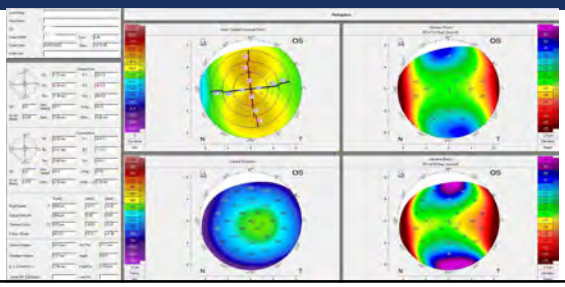

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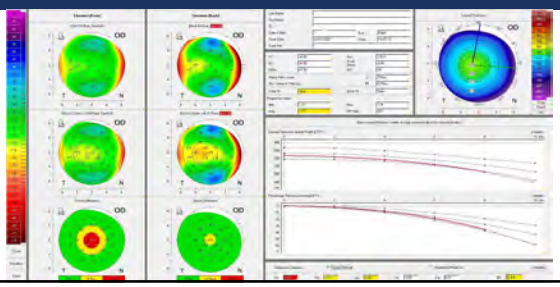

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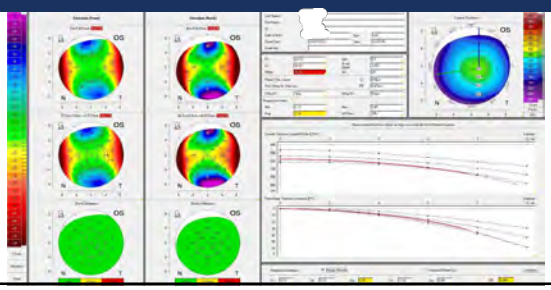

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TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - High WTR, regular astigmatism, OS>OD
- **PLAN**
  - Update spec Rx
  - Educated against eye rubbing
  - Discussed potential for progression and CXL in future if there are changes
  - Monitor tomographies ***very*** closely for any progression

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SECOND OPINION FOR A CONTACT LENS EVALUATION

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CASE HISTORY

- **Demographics**
  - 24yo HF
- **Ocular History**
  - Unremarkable
  - Monthly spherical soft CL wearer
  - Vision seems to be getting worse over the past year or two
- **Ocular Medications**
  - None
- **Medical History**
  - None
- **Systemic Medications**
  - None
- **Allergies**
  - None

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/20-
  - OS with glasses: 20/20-
- **HABITUAL SPEC Rx (2.5 YEARS OLD)**
  - OD: -0.50-0.75x180
  - OS: -1.75-0.50x035
- **AUTOREFRACTOR**
  - OD: -1.00-1.50x009
  - OS: -3.50-3.75x169
- **SIM KERATOMETRY**
  - OD: 45.37@100 / 44.00@010
  - OS: 47.75@076 / 44.75@166
- **MANIFEST SPEC RX**
  - OD: -0.75-0.75x180
  - OS: -1.75-1.00x035
- **SLIT LAMP EXAM**
  - OU: WNL

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EXAM FINDINGS

- **CL Trials Given @ Previous Office:**
  - Biofinity Toric
  - OD: -0.50-0.75x180, VA: 20/25
    - ~15 degrees rotation left seen on eye
  - OS: -1.50-1.75x170, VA: 20/50-
    - Inferior decentered, significant rotation, unstable fit on eye

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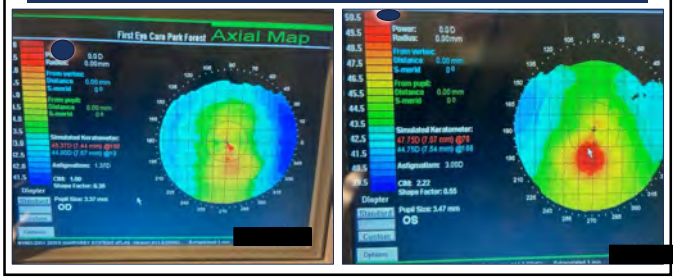
TOPOGRAPHY



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TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - Unstable Keratoconus, OS>OD
- **PLAN**
  - Refer to cornea specialist for CXL
  - Educated against eye rubbing
  - Discussed potential for specialty CL correction in the future

68

DON'T FORGET ABOUT POST-REFRACTIVE ECTASIA

69

TOO LITTLE, TOO LATE

70

CASE HISTORY

- **Chief Complaint**
  - Blurred vision at all distances
  - Referred by another provider for scleral CL evaluation
- **Demographics**
  - 26yo BF
- **Ocular History**
  - Cross linking OD 2 months prior
  - Corneal scarring OS preventing cross linking procedure candidacy
- **Ocular Medications**
  - Refresh celluvisc qhs OD
  - Tapering down Pred Forte OD (currently at bid OD)
- **Medical History**
  - None
- **Systemic Medications**
  - None
- **Allergies**
  - None

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EXAM FINDINGS

- **ACUITIES**
  - OD unaided: 20/50 PH 20/30-
  - OS unaided: 20/150 PH: 20/80
- **AUTOREFRACTOR**
  - OD: +3.75-4.00x071
  - OS: Unable to obtain data
- **KERATOMETRY**
  - OD Kmax: 74.1D
  - OS Kmax: 68.5D
- **PACHYMETRY**
  - OD minimum: 372um
  - OS minimum: 430um
- **MANIFEST SPEC RX**
  - OD: -0.50-0.75x075, 20/40
  - OS: -1.25-4.00x090, 20/80
- **SLIT LAMP EXAM**
  - OD: Stromal corneal haze s/p CXL
  - OS: Central corneal scarring at apex of cone
- **IOP/FUNDUS EXAM**
  - WNL

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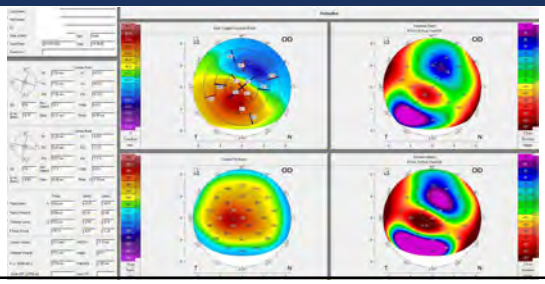
PENTACAM SCANS



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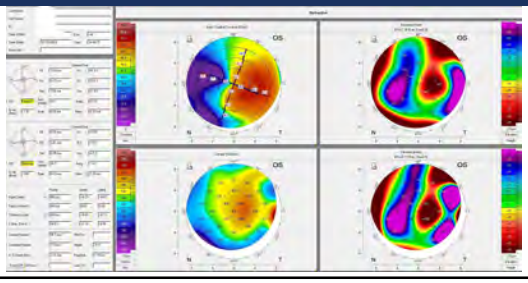
PENTACAM SCANS



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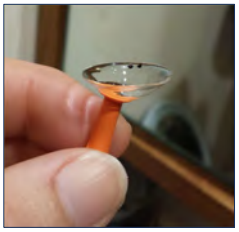
TREATMENT AND MANAGEMENT

- **DIAGNOSIS**
  - Unstable KCN OU
- **PLAN**
  - Proceed with Zenlens Prolate scleral CL order OU
  - Educated against eye rubbing
  - Monitor tomographies closely for any changes
  - Continue co-management with cornea specialist



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CONCLUSION

- Keep KCN red flags in mind
- Priority #1 should be stopping progression
- Refer early, follow up often

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ON THE HORIZON

- New treatment options
  - Glaukos US FDA Phase III Oxygen + Transepithelial CXL
  - Laser Diode CXL Clinical Trial (Phase 2 trial)
- Varying indications for CXL
- Epi on vs. Epi Off
- ICL Options for refractive surgery options
- Topography guided PRK
  - Removes sparing amounts of tissue in small zones without destabilizing the cornea
- Corneal Tissue Addition for Keratoconus (CTAK)
  - CLEI single location study (36D change down to a 5D change), better biocompatibility than Intacs

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USE OF SCLERAL CONTACT LENSES IN THE MANAGEMENT OF CORNEAL ECTASIAS

BRYAN WILLIAMS, OD, FAAO, FSLS

1

BACKGROUND

- Texas Tech University
  - Class of 2014
- University of Houston College of Optometry
  - Class of 2018
- UAB School of Optometry
  - Cornea & Contact Lens Resident 2018-2019

2

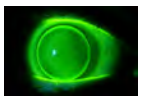
FINANCIAL DISCLOSURES

- Consultant:
  - Alcon
  - Bausch + Lomb Specialty Vision Products

3

WHAT ARE "SPECIALTY" LENSES?

- Corneal RGPs
- Custom Soft Lenses
- Hybrid lenses
- *Scleral lenses*




4

SCLERAL LENSES

5

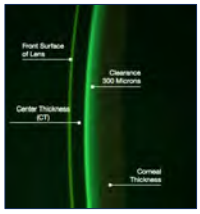
SCLERAL LENS BASICS

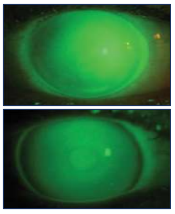
- Designed to vault the cornea and rest on the sclera
- Come in many different sizes and variations
  - 13.5mm – 25mm
- Highly customizable

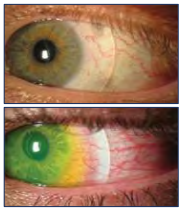
6

FITTING GOALS

- Central Clearance
- Limbal Clearance
- Landing zone alignment







Photos courtesy of CL spectrum, Dr. Gregory W. DeNaeyer & Dr. Robert Breece

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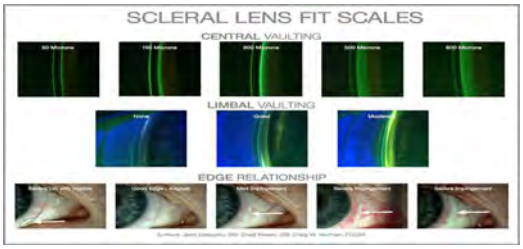
FITTING GOALS



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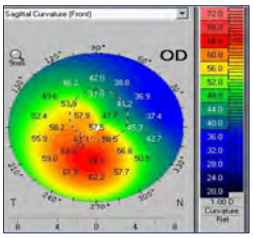
FITTING TECHNIQUES

- Helpful information to have:
  - Refraction
  - Keratometry
  - Corneal Topography
  - Visible Iris Diameter (HVID)
- Diagnostic Lens Selection
  - Steepest K
  - "Eye ball" it



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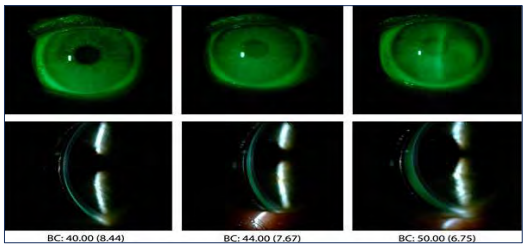
FITTING TECHNIQUES

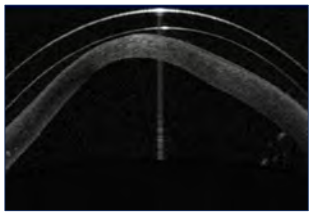


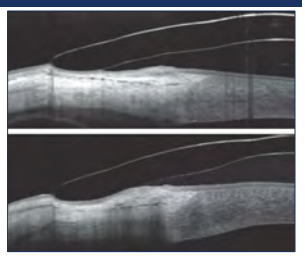
Photos courtesy of GP Lens Institute – Scleral Lens Education Society, Dr. Matt Kaufman

10

FITTING TECHNIQUES

- OCT analysis





Photos courtesy of Global Vision Rehabilitation Center

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FITTING TECHNIQUES

- Lens Dispense and Follow Ups
  - Similar to soft lens fitting
    - Evaluate lens under slit lamp
    - Evaluate cornea after lens is removed
    - Most changes cannot be made in office
  - Evaluate lenses on eye after at least two hours at follow up
    - Lenses will settle
    - Perform over refraction

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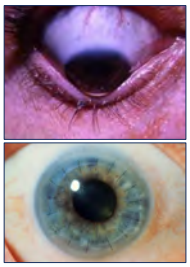
INDICATIONS

- Any irregular cornea
  - Keratoconus/Pellucid marginal degeneration
  - Post-refractive surgery ectasia
  - Post-corneal transplant
  - High magnitude of irregular astigmatism
- Corneal scarring and opacities
- Ocular surface disease
- Soft lens or corneal lens intolerance



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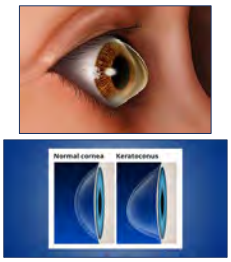
KERATOCONUS

- Progressive thinning of the cornea which causes it to bulge outward into a cone shape
- Begins in teens, continues into middle age



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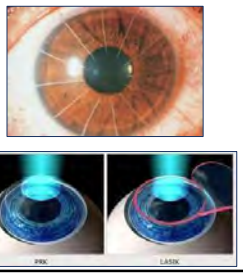
POST-REFRACTIVE ECTASIA

- Irregular corneal shape following any refractive surgery (LASIK, PRK, RK, etc)



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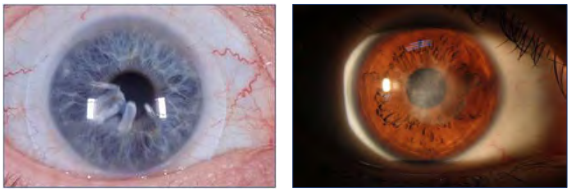
CORNEAL SCARRING



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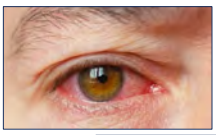
OCULAR SURFACE DISEASE

- Severe Dry Eye
- Stevens Johnson Syndrome
- Graft vs. Host Disease
- Incomplete Lid Closures



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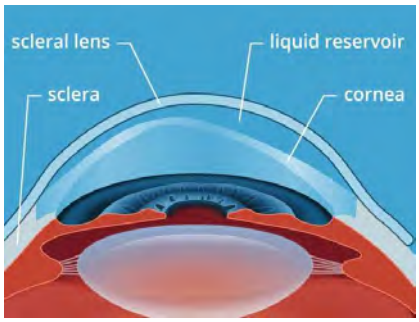
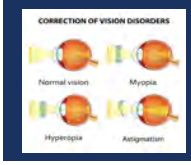


GOALS OF SCLERAL LENSES



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WHERE DO THE PATIENTS COME FROM?

- Mostly referral based
- Cornea specialists
- Fellow ODs
- Refractive surgery centers
- Rheumatologists

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BREAD AND BUTTER

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CASE HISTORY

- **Demographics**
  - 33yo Hispanic female
- **Referred for scleral lens fitting OU**
- **Ocular History**
  - Bilateral keratoconus, OS>OD
  - Cross Linking done OD in 2017
- **Ocular Medications**
  - None
- **Medical History**
  - None
- **Systemic Medications**
  - Birth control
- **Allergies**
  - Sulfa drugs

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/40-1, PHNI
  - OS with glasses: CF at 3 feet, PHNI
- **SLIT LAMP EXAM**
  - OU: Corneal scarring, vertical striae, paracentral corneal thinning, OS>OD
  - OU: 1+ papillary conjunctival reaction
  - Otherwise unremarkable
- **KERATOMETRY**
  - OD Kmax: 54.5D
  - OS Kmax: 80.6D
- **KERATOMETRY**
  - OD Kmax: 54.5D
  - OS Kmax: 80.6D
- **PACHYMETRY**
  - OD minimum: 448 microns
  - OS minimum: 363 microns

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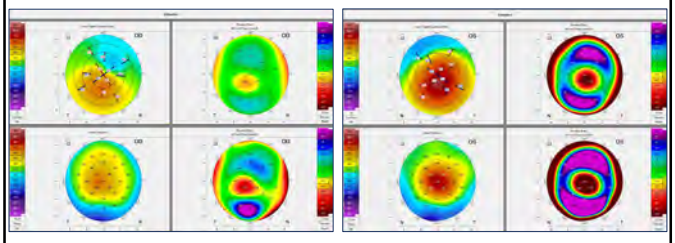
EXAM FINDINGS



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CONTACT LENS FITTING

DIAGNOSTIC LENSES

- OD
  - Trial Zenlens Prolate TPC 17.0
  - BCVA with ORx: 20/25-2
- OS
  - Trial Zenlens Prolate STD 17.0
  - BCVA with ORx: 20/30-2

LENSES ORDERED

- OD
  - Zenlens Prolate 9.10 BC, 17.0, F3/S3 TPC, 4750 SAG, +5.25 DS
- OS
  - Zenlens Prolate 8.50 BC, 17.0, STD, 5100/5350 Bi-Elevation, +1.25 DS

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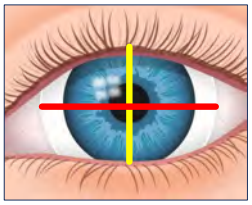
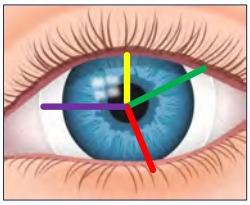
TORIC PERIPHERY LENSES

Jupiter Toric PC lens



Custom Europa Toric PC lens



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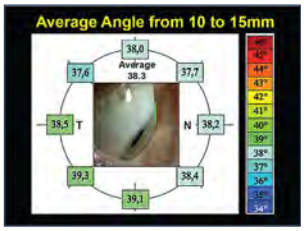
SCLERAL TORICITY



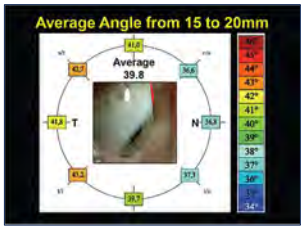


Photo courtesy of CL Spectrum, Dr. Stephanie Woo and Dr. Brooke Messer

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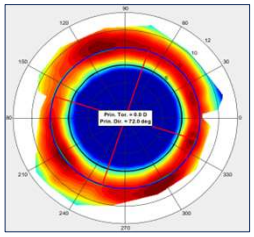
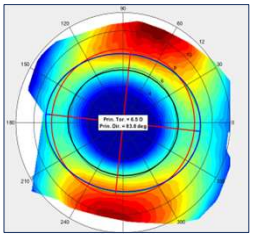
BENEFITS OF SCLERAL TOPOGRAPHY



Zero diopters of toricity



6.5 diopters of toricity

Photo courtesy of Dr. John Laurent

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UNDERSTANDING THE SCLERAL SHAPE

- According to the Journal of Contact Lens Research and Science:
  - Scleral shape pattern analysis of 152 eyes
    - 5.7% spherical
    - 28.6% regular toric (180-degree periodicity)
    - **26%** irregularly toric (non-customary 180-degree periodicity)
    - **40.7%** with asymmetric elevations

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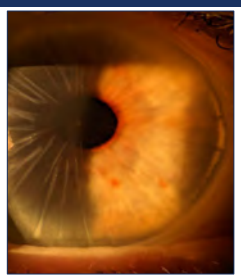
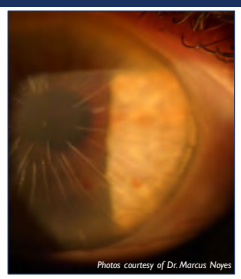
CASE 2 – POST-RADIAL KERATOTOMY





Photos courtesy of Dr. Marcus Noyes

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CASE HISTORY

- **CHIEF COMPLAINT**
  - Blurred vision at distance and near
  - Referred by cornea specialist for scleral contact lens evaluation
- **DEMOGRAPHICS**
  - 58yo WF
- **OCULAR HISTORY**
  - Bilateral RK surgery in 1991
  - Dry Eye Syndrome
  - Bilateral early cataracts
- **OCULAR MEDICATIONS**
  - None

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CASE HISTORY

- **MEDICAL HISTORY**
  - Thyroid disease
  - Sjogren's Syndrome
  - Hypertension
  - Elevated Cholesterol
  - Arthritis
  - Migraines
  - History of COVID related complications in (hospitalized in 8/2021)
  - Seizure disorder
- **COMANAGEMENT**
  - Currently being followed by a neuro-optometrist as well as a cornea specialist

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EXAM FINDINGS

- **ACUITIES**
  - OD with glasses: 20/40--
  - OS with glasses: 20/50--
- **HABITUAL SPEC RX**
  - OD: +3.25-1.50x126
  - OS: +6.25-1.50x161
- **KERATOMETRY**
  - OD Kmax: 63.9D
  - OS Kmax: 68.5D
- **PACHYMETRY**
  - OD minimum: 443um
  - OS minimum: 407um
- **MANIFEST SPEC RX**
  - OD: +3.25-1.50x126
  - OS: +6.25-1.50x161
- **High Exophoria at distance and near**

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EXAM FINDINGS

- **SLIT LAMP**
  - OU: 1+ MGD
  - OU: 16 cut RK
  - OU: 1-2+ NS
- **IOP/FUNDUS EXAM**
  - OU: WNL

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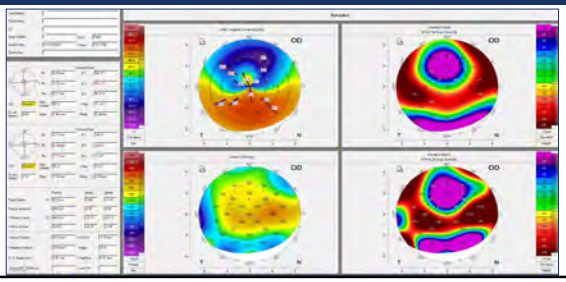
PENTACAM SCANS



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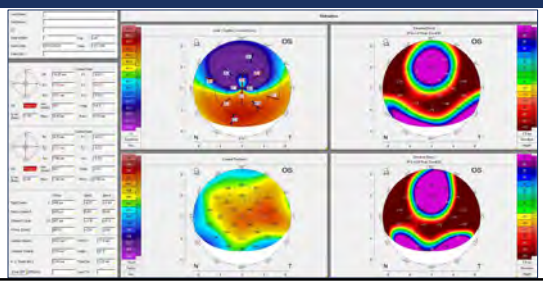
PENTACAM SCANS



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CONTACT LENSES

- **1st TRIAL LENS**
  - OD - Europa
    - BC: 7.5D
    - Diameter: 16.0mm
    - PWR: -1.50
    - SAG: 4560
  - OS – Europa
    - BC: 7.34
    - Diameter: 16.0
    - PWR: -2.00
    - SAG: 4660
- **FIT**
  - **OD:** Adequate central and limbal clearance, well centered, stable
    - **ORx:** -8.00, 20/40-
  - **OS:** Adequate central and limbal clearance, well centered, stable
    - **ORx:** -10.00, 20/40-
- **PLAN**
  - Order lenses based off SMap3D scan OU
  - Return for A&R training when lenses arrive

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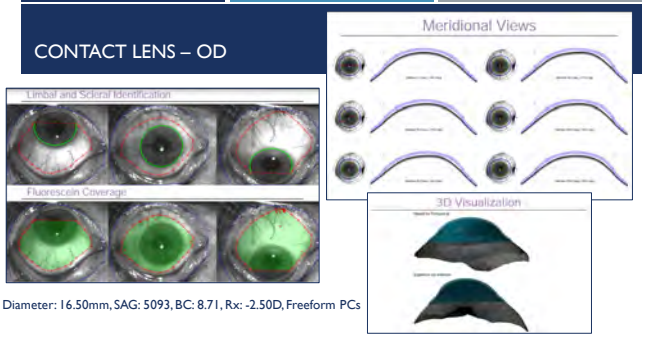
CONTACT LENS – OD



Diameter: 16.50mm, SAG: 5093, BC: 8.71, Rx: -2.50D, Freeform PCs

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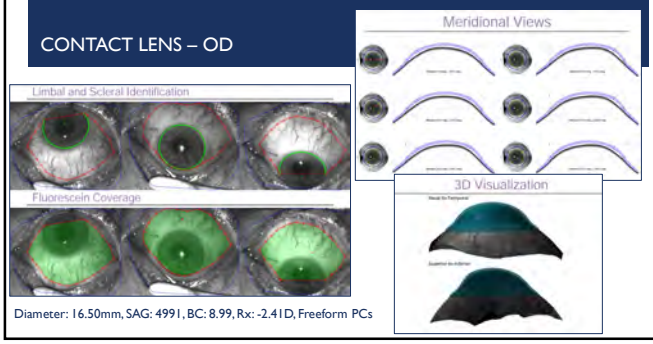
CONTACT LENS – OD



Diameter: 16.50mm, SAG: 4991, BC: 8.99, Rx: -2.41D, Freeform PCs

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CONTACT LENSES – DISPENSE APPT 1/23/23

- **First Latitude Lens Fit OD**
  - Between 275-300um central clearance
  - Good limbal clearance
  - Smooth landing zone, no edge lift or blanching
  - ORx: Plano, 20/30-
- **First Latitude Lens Fit OS**
  - Between 275-300um central clearance
  - Good limbal clearance
  - Smooth landing zone, no edge lift or blanching
  - ORx: +1.00, 20/25

- **A&R training Completed successfully**
- **Both CLs dispensed**
- **No lens changes made at this time**
- **Plan to RTC in 1-2 weeks for CL F/U**

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CONTACT LENSES – FOLLOW UP APPT 2/23/23

- **Patient reports she is happy with vision and comfort in both contact lenses**

- **First Latitude Lens Fit OD** (4 hours wear time)
  - Between 225-240um central clearance
  - Good limbal clearance
  - Smooth landing zone, no edge lift or blanching
  - ORx: Plano, 20/40
- **First Latitude Lens Fit OS** (4 hours wear time)
  - Between 175-200um central clearance
  - Good limbal clearance
  - Smooth landing zone, no edge lift or blanching
  - ORx: +1.25, 20/25--

- **Good fit and vision with contact lenses**
- **Order ORx in left lens and ship to patient**
- **Plan to RTC in 2 months for CL F/U**

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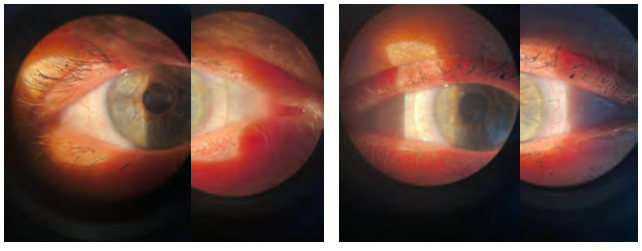
CONTACT LENSES – FOLLOW UP APPT 2/23/23



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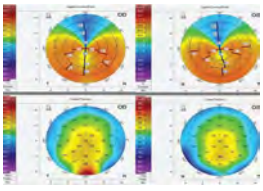
CASE – PELLUCID MARGINAL DEGENERATION



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CASE HISTORY

- **CHIEF COMPLAINT**
  - Blurred vision at distance and near
  - Referred by cornea specialist for scleral contact lens evaluation
- **DEMOGRAPHICS**
  - 44yo HF
- **OCULAR HISTORY**
  - Pellucid Marginal Degeneration
  - Dry Eye Syndrome
- **OCULAR MEDICATIONS**
  - Xiidra twice daily
  - Pataday prn

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CASE HISTORY

- **MEDICAL HISTORY**
  - Type 2 Diabetes
  - Eczema
  - Asthma
- **MEDICATIONS**
  - Clobetasol
  - Ozempic
  - Rinvoq
  - Symbicort
  - Tacrolimus
  - Zyrtec

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EXAM FINDINGS

- **ACUITIES**
  - OD with contacts: xx
  - OS with contacts: xx
- **KERATOMETRY**
  - OD Kmax: 75.7D
  - OS Kmax: 70.6D
- **PACHYMETRY**
  - OD minimum: <300um
  - OS minimum: <300um
- **MANIFEST SPEC RX**
  - OD: -12.00DS → 20/80
  - OS: -14.00DS → 20/70--

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EXAM FINDINGS

- **SLIT LAMP**
  - OU: atopic signs surrounding eyelids and adnexa
  - OU: neovascularization of the cornea 360 degrees; severe inferior ectasia with stromal thinning
- **IOP/FUNDUS EXAM**
  - OU: WNL

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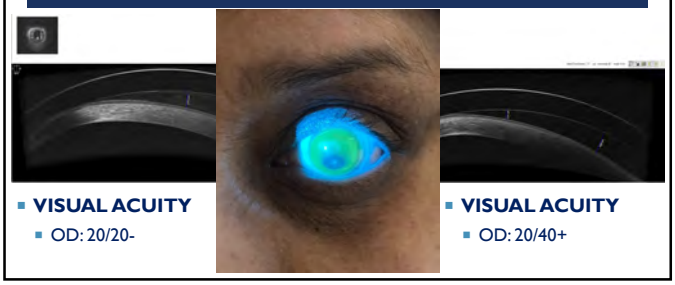
PRESENTING CONTACT LENS FIT



- **VISUAL ACUITY**
  - OD: 20/20-
- **VISUAL ACUITY**
  - OD: 20/40+

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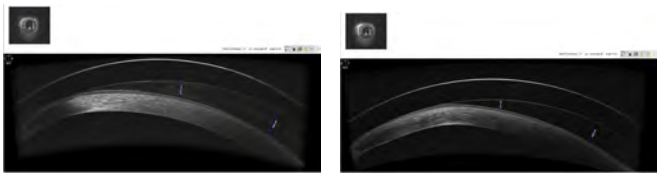
PRESENTING CONTACT LENS FIT



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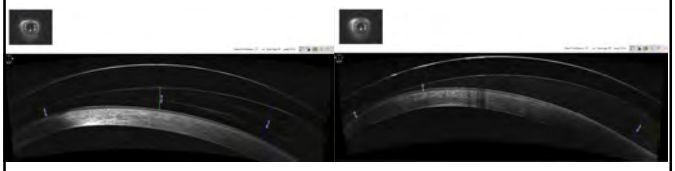
FIRST LENS ORDERED



- **VISUAL ACUITY**
  - OD: 20/20-
- **VISUAL ACUITY**
  - OD: 20/20

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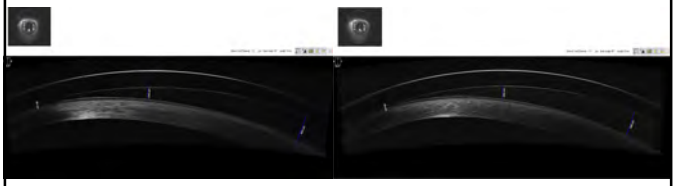
FINAL LENS



- **VISUAL ACUITY**
  - OD: 20/20
- **VISUAL ACUITY**
  - OD: 20/20

50

CONCLUSION

- Keep an eye out for potential areas to improve vision
- Corneal ectasia can be intimidating, consultation teams are your friends
- Patients will appreciate the effort you are putting in

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QUESTIONS?

- bwilliams@insightfortworth.com

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2025 Texas Professional Responsibility Course

University of Houston College of Optometry
Andrew Kemp, OD, FAAO
Course master

1

Welcome to the 2025 Professional Responsibility Course sponsored by the University of Houston College of Optometry. As you know, this course is a requirement for Texas license holders. What you may not know is that ***all*** fees associated with this course are devoted to permanent projects that are important for ***the future of the profession***.

Thank you for choosing UHCO for your continuing education.

2

The development and production of the 2025 Professional Responsibility Course is underwritten by the Harris Lee Nussenblatt Lecture Series Endowment.
This endowment was established in 1992 by the Nussenblatt Family in memory of former Associate Professor Harris Nussenblatt, OD. The Lecture Series focuses on issues related to professional ethics, public health and practice administration

3

Preface

The content of the 2025 Professional Responsibility Course is at the discretion of the Texas Optometry Board.

Pay attention to any updates from TOB
Subscribe to the E-newsletters!

4

AGENDA - TEXAS OPTOMETRY BOARD

- Continuing Education Requirements
  - Utilization of CE Broker
- CPR/BLS CE requirement
- Maintenance of Patient Records/Documentation of the Initial Exam...
- Initial Examination Requirements in an OD/MD setting
- Board Inspections
- Complaint Signage/Brochure Requirements
- FTC Eyeglass Rule update
- AOA Practice Guidelines
- Professional Responsibility Network

5

Continuing Education Updates and Requirements

6

Continuing Education
Amendments to Texas Administrative Code Sec.275.1-275.3

- Continuing education requirements have not changed
  - 32 Hours every two years...more detail soon...
  - One-time controlled substance course is now a prerequisite for therapeutic licensure
  - No changes to the number of hours

7

7

Continuing Education Requirements

- 32 hours per renewal cycle
- 24 of the 32 hours must be on the diagnosis or treatment of ocular disease (D/T)
- PR: Two hours shall be in professional responsibility
  - One each calendar year
  - Its own CE category
- Opioid: Two hours (For Optometric Glaucoma Specialists/TG)
  - One each calendar year
  - Counts towards D/T hours
- Human Trafficking
  - One hour each renewal cycle
- CPR/BLS
  - recertification every renewal cycle, general CE hours

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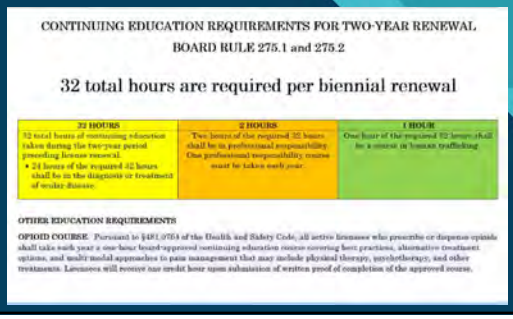
Continuing Education - TOB Website Reference



CONTINUING EDUCATION REQUIREMENTS FOR TWO-YEAR RENEWAL
BOARD RULE 275.1 and 275.2

32 total hours are required per biennial renewal

32 HOURS	2 HOURS	1 HOUR
32 total hours of continuing education taken during the two-year period preceding license renewal. • 24 hours of the required 32 hours shall be in the diagnosis or treatment of ocular disease.	Two hours of the required 32 hours shall be in professional responsibility. One professional responsibility course must be taken each year.	One hour of the required 32 hours shall be a course in human trafficking

OTHER EDUCATION REQUIREMENTS

OPIOID COURSE. Pursuant to §481.0764 of the Health and Safety Code, all active licensees who prescribe or dispense opioids shall take each year a one-hour board-approved continuing education course covering best practices, alternative treatment options, and multi-modal approaches to pain management that may include physical therapy, psychotherapy, and other treatments. Licensees will receive one credit hour upon submission of written proof of completion of the approved course.

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Obtaining Continuing Education

- Live CE courses approved by the TOB - synchronous
- On-line CE courses approved by the TOB - asynchronous
  - Limited to eight (8) hours per calendar year
- Education for an advanced degree in field of optometry
  - One hour for each semester hour earned
- Research
  - Sixteen hours for one full year of research
- Clinical rounds
  - One hour for every two hours - Limited to four hours per calendar year

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Continuing Education Course Approval

- These providers receive automatic CE approval
  - Courses sponsored by an optometry college or school accredited by the American Optometric Council on Education (ACOE);
  - Courses sponsored by the American Optometric Association (AOA) or an affiliate of the AOA;
  - Courses sponsored by the American Academy of Optometry (AAO) or an affiliate of AAO;
  - Courses accredited by the Council on Optometric Provider Education (COPE);
  - Courses sponsored and or approved by the Texas Health and Human Services Commission;
  - Courses sponsored by the American Board of Optometry;
  - Courses approved by the Accreditation Council for Continuing Medical Education (AACME)
- Other Providers must apply and submit to CE broker
  - Courses must be submitted to CE broker two weeks prior to each Board meeting

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CPR Course Requirements
Board Rule 273.17

- Cardiopulmonary resuscitation (CPR) is an emergency lifesaving procedure performed when the heart stops beating. A certification in CPR includes training and successful course completion in cardiopulmonary resuscitation, AED and obstructed airway procedures for all age groups according to recognized national standards.
- Basic Life Support (BLS) is a basic level of pre-hospital and inter-hospital emergency care and non-emergency medical services care. A certification in BLS includes training and successful course completion in airway management, cardiopulmonary resuscitation (CPR), control of shock and bleeding and splinting of fractures, according to recognized national standards.

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CPR Requirements

- Requirement for Initial License. Commencing effective January 1, 2023, all applicants for initial licensure shall provide proof of successful completion of a CPR or BLS certification prior to receiving a license.
- Requirement for Renewal of License. Effective January 1, 2023, all active licensees shall provide proof of successful completion of a CPR or BLS certification for renewal of a license each renewal cycle. Licensees may be credited two general hours of continuing education for CPR certification and four general hours of continuing education for BLS certification.
  - CPR certificate must be valid at the time of renewal

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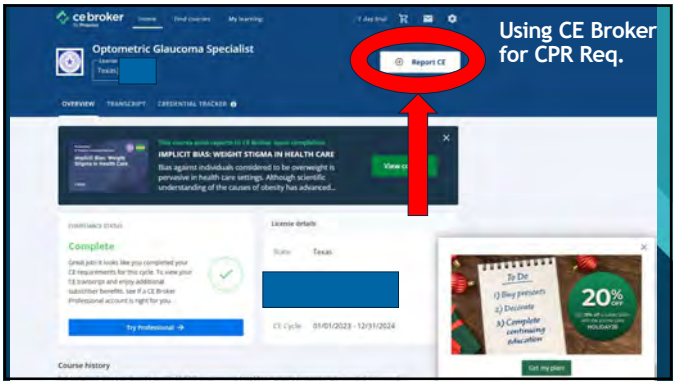

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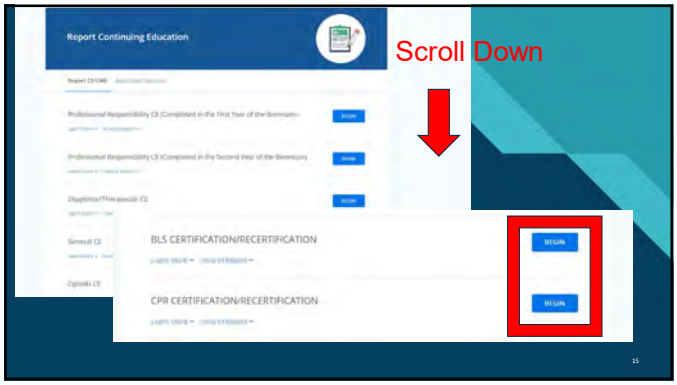

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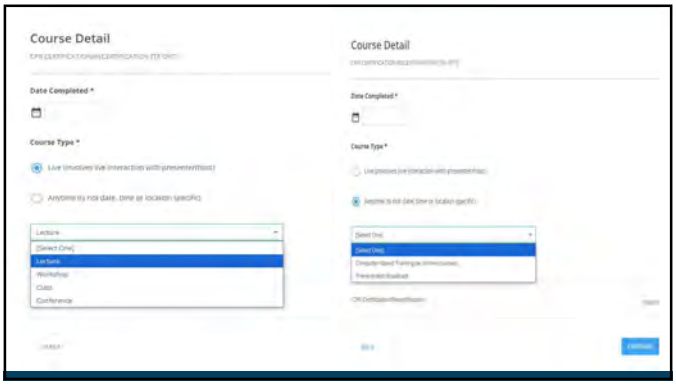

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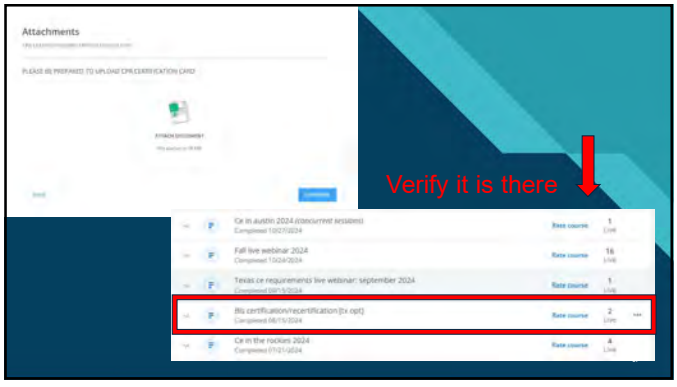

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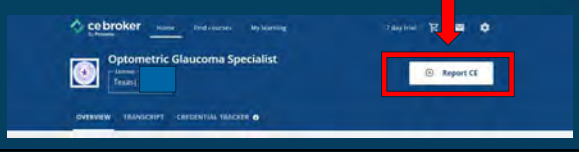
Opioid Exemption

- Opioid course is only required for glaucoma certified ODs who want to be able to prescribe opioids
  - Not required to prescribe non-opioid controlled substances
  - Therapeutic ODs don't need to do the exemption
  - Not required to have a DEA license
    - There are some new requirements for DEA renewal (detail not covered in this course)
- If you choose not to prescribe opioids, you must choose the exemption



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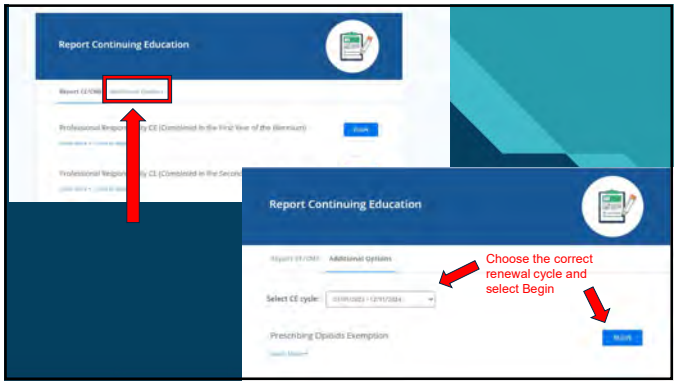

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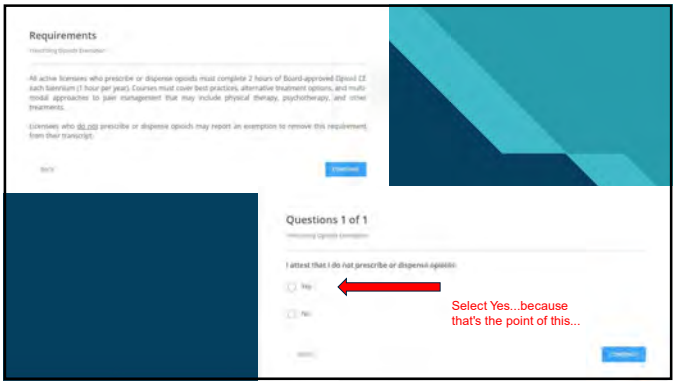

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Trivia Break

- What year was the Texas Optometry Board Created?

1921

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Texas Administrative Code: Patient Records Rule 277.7

In order to protect the patient's health, an optometrist or therapeutic optometrist shall create and maintain a legible and accurate written patient record for each patient. Every patient record shall provide sufficient information such that:

- another optometrist or therapeutic optometrist can identify the examination performed and the results obtained, and
- the Board can accurately assess a licensee's compliance with §§279.1 and 279.3 of this title, and Optometry Act §351.353.

- This was specifically written to assist the Board in assessing the Initial Exam of a Patient

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Patient Records

- Checklists MAY be used if listed in detail...

- Use CAUTION when utilizing EHRs to create normative values!!

- If a test cannot be performed, you MUST document why (examples..)
  - CT: unable d/t monocular status
  - AA: pt is pseudophakic
  - Tonometry: patient refused

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Section 353.351: Initial Examination of a Patient

- The patient record for each initial examination for which an ophthalmic lens prescription is signed shall contain, at a minimum, written notations recording the procedures and findings required by §§279.1 and 279.3 of this title, and Optometry Act §351.353, in the following format:
- An accurate identification of the patient;
- The date of the examination;
- The name of the optometrist or therapeutic optometrist conducting the examination;
- Past and present medical history, including complaint presented at visit;
- A numerical value of the monocular uncorrected or monocular corrected visual acuity in a standard acceptable format;

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Initial Examination of a Patient

- The results of a biomicroscopic examination of the lids, cornea, and sclera;
- The results of the internal examination of the media and fundus, including the optic nerve and macula, all recorded individually;
- The results of a retinoscopy. A tape from an automatic refractor is acceptable;
- The subjective findings of the examination. A tape from a computer assisted refractor/photometer is acceptable if the instrument is being used to obtain subjective findings;
  - Far point and near point

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Initial Examination of a Patient

- The results of an assessment of binocular function, including the test used and the numerical endpoint value;
- The amplitude or range of accommodation expressed in numerical endpoint value including the test used in the examination;
- A tonometry reading including the type of instrument used in the examination; and
- Angle of vision: the extent of the patient's field to the left and right.

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Texas Administrative Code: Rule 279.1

- The optometrist or therapeutic optometrist shall, in the initial examination of the patient for whom contact lenses/ophthalmic lenses are prescribed:
- Personally make and record, if possible, the following findings of the conditions of the patient as required by §351.353 of the Act:
- biomicroscopy examination (lids, cornea, sclera, etc.), using a binocular microscope;
- internal ophthalmoscopic examination (media, fundus, etc.), using an ophthalmoscope or biomicroscope with fundus condensing lenses; videos and photographs may be used only for documentation and consultation purposes but do not fulfill the internal ophthalmoscopic examination requirement; and
- subjective findings, far point and near point; (the results of a manifest refraction)

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Texas Administrative Code: Rule 279.1

- Either personally make and record or authorize an assistant present in the same office with the optometrist or therapeutic optometrist to make and record the following findings required by §351.353 of the Act. The authorization for assistants to make and record the following findings does not relieve the optometrist or therapeutic optometrist of professional responsibility for the proper examination and recording of each finding required by §351.353 of the Act:
- (A) case history (ocular, physical, occupational, and other pertinent information);
- (B) visual acuity;
- (C) static retinoscopy O.D., O.S., or autorefractor;
- (D) assessment of binocular function;
- (E) amplitude or range of accommodation;
- (F) tonometry; and
- (G) angle of vision, to right and to left.
- You MUST document why a particular test was not possible to perform
  - No documentation is the assumption it was not performed

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What's the worst that could happen?

- The willful or repeated failure or refusal of an optometrist or therapeutic optometrist to comply with any of the requirements in the Act, §351.353 and §351.359, shall be considered by the board to constitute prima facie evidence that the licensee is unfit or incompetent by reason of negligence within the meaning of the Act, §351.501(a)(2), and shall be sufficient ground for the filing of charges to cancel, revoke, or suspend the license. The charges shall state the specific instances in which it is alleged that the rule was not complied with. After the board has produced evidence of the omission of a finding required by §351.353, the burden shifts to the licensee to establish that the making and recording of the findings was not possible

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What about when an OD works with an MD/DO?

Back to the Act - Section 351.005(a)(2) & (b)

- *(a) This chapter does not:*
- *(2) prevent or interfere with the right of a physician licensed by the Texas Medical Board to:*
- *(A) treat or prescribe for a patient; or*
- *(B) direct or instruct a person under the physician's control, supervision, or direction to aid or attend to the needs of a patient according to the physician's specific direction, instruction, or prescription;*
- *(b) A direction, instruction, or prescription described in Subsection (a)(2)(B) must be in writing if it is to be followed, performed, or fulfilled outside the physician's office*

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MD Delegation to an OD

- **What is FACT.**
- A physician licensed to practice medicine in Texas under the Physicians Medical Practices Act has broad authority to *"delegate to a qualified and properly trained person acting under the physician's supervision any medical act that a reasonable and prudent physician would find within the scope of sound medical judgment to delegate…" (TOTALLY open ended!)*
- **When an optometrist is under delegation of a physician per the terms of Section 157.001 of the Medical Practices Act which means the physician signs the medical record and the prescription, the optometrist is operating under the PHYSICIAN'S license and IS NOT bound by the Texas Optometry Act. IF the OD signs the record or prescription, the service was provided by the OD and the OD is under the Texas Optometry Law and Board rules.**

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Clarifying Delegation to an OD

- **More FACT**
- **Delegation is NOT the same as direction, instruction or prescription.**
- Optometrists simply employed by, contracted with (legally or illegally), under the direction of, or who receive a paycheck signed by a physician are NOT operating under delegation unless they have specific individual patient-centered directions from the physician.
- NOTE: Texas optometrists have NO legal delegation authority.

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Are there any legal opinions on this?

- Sure…we can look to precedent issued in 2023 by a Texas Administrative Law Judge (ALJ) and resultant rulings adopted by the Texas Optometry Board.

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Texas Optometry Board Conclusions

The Board has affirmed that licensees must comply with the Act even if acting under the direction of a medical doctor unless that direction is sufficiently specific, addressed to the optometrist, and aids the needs of the patient. If the optometrist signs the prescription, that licensee must comply with the required 10 findings under Section 351.353 during an initial examination when a prescription.

This applies to all exam settings in which an OD is providing an ophthalmic lens prescription in the initial examination of a patient

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Summary

- Please review the examination requirements for the initial examination of a patient when ophthalmic lenses are prescribed (Sec. 351.353)
- The OD that signs the prescription and/or the exam record is responsible for all elements
- It must be LEGIBLE
- If something was not possible, document why!

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What was the OD license renewal fee in 1925?

- 5$

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Board Inspections

- The board will and is obligated to review a certain number of ODs per year to check for compliance
  - They may also perform inspections based on complaints
- They have the authority and ability to enter and inspect your office
- They have the authority to review patient records
  - Exceptions exist in HIPPA law to allow for this
  - The board investigator will typically ask for five INITIAL patient records for which an ophthalmic prescription was written

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Texas Administrative Code: Rule 273.9 Complaint Signage Requirements

- In order for the public to be informed regarding the functions of the Board and the Board's procedures by which complaints are filed with and resolved by the Board, each licensee is required to display at every location where optometric services are provided information regarding the Board's name, address, and telephone number.
- The licensee may either display a placard or sign furnished by the Board or provide to all patients and consumers a consumer pamphlet developed by the Board containing the name of the Board, mailing address, and telephone number for the purpose of directing complaints to the Board.
- The placard or sign shall be conspicuously and prominently displayed in a location where it may be seen by all patients.
- The consumer pamphlet, if chosen, shall be prominently displayed and available to patients at all times.

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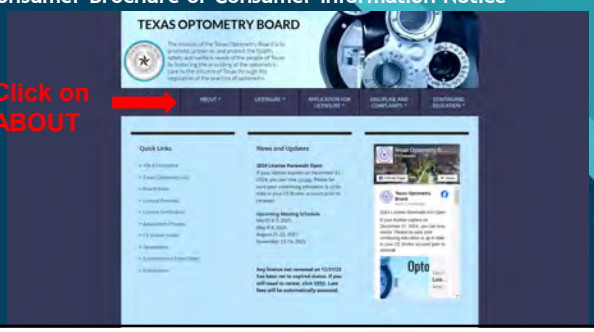
Consumer Brochure or Consumer Information Notice

Click on ABOUT



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Click on Optometrists

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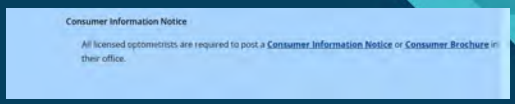
Scroll down....

- You can either choose to display the Consumer Information Notice, or provide all patients/consumers with the Consumer Brochure



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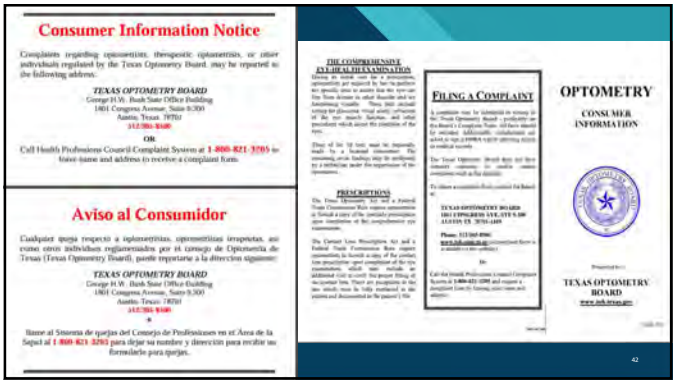

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In what year did the number of ODs in Texas exceed 3,000?

- 1998

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Federal Trade Commission (FTC) - Eyeglass Rule

- Update announced June 27th, 2024, and took effect on September 24th, 2024
- New revisions that apply to optometry and ophthalmology aimed at promoting competition and consumer choice
- What has been the rule (1978) – prescribers must provide patients with a FREE copy of their prescription immediately following a refractive exam
  - CANNOT place a liability waiver on the prescription
  - You MAY charge a fee for verifying ophthalmic goods dispensed by another seller

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Title 16: Chapter I: Subchapter D: Part 456 Ophthalmic Practice Rules (Eyeglass Rule)

- You may refuse to give a copy until the patient has paid for the refractive exam
  - You CANNOT withhold for other outstanding balances or awaiting payment from insurance
- You CANNOT condition the scheduling/performance of an exam based on the promise of a purchase of goods

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Eyeglass Rule - Confirmation of Receipt -> What changed

- Reminder, you MUST provide a free copy of an eyeglass prescription to the patient (if applicable)
- The patient can choose the method of delivery
  - Electronic vs paper
- Upon completion of a refractive eye examination, and after providing a copy of the prescription to the patient, the prescriber shall do one of the following:
- (i) If a paper copy of the prescription was provided to the patient, request that the patient acknowledge receipt of the prescription by signing a separate statement on paper or in a digital format confirming receipt of the prescription; or
- (ii) If a digital copy of the prescription was provided to the patient (via methods including an online portal, electronic mail, or text message, and pursuant to [illegible]), retain evidence that such prescription was sent, received, or made accessible, downloadable, and printable

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Eyeglass Rule

- FTC suggested statement to use:

  "My eye care professional provided me with a copy of my prescription at the completion of my examination" (patient would sign)

- Must be provided whether or not a patient asks for it
- If a patient refuses to sign the acknowledgement, the doctor should make note of this and sign it.

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Eyeglass Rule - Cont'd

- It must be provided BEFORE selling glasses – digital or paper
- If performing a refraction that doesn't result in a prescription – I recommend indicating why it was performed or why a prescription is not recommended (ie. For BCVA purposes prior to cataract surgery)
- You may use one document to fulfill the requirement of the Eyeglass Rule and Contact Lens Rule.
  - If both were finalized at the same visit

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Eyeglass Rule - Cont'd

- You must keep record of this for at least 3 years
- You may obtain patient consent to digital delivery just once, unless the method of that delivery changes

Exemptions
- If the prescriber has no direct or indirect financial interest in the sale of eyewear
  - You cannot have an optical
  - You cannot be affiliated with an optical
  - You cannot share a space or be co-located with an optical
- If you are employed by a Federal, State, or local government entity

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Eyeglass Rule Reporting and Penalties

- If you suspect a violation, you can report online at
  - ReportFraud.ftc.gov
- Failure to comply will result in warning letters sent and potential civil monetary penalties
  - Up to $50,120 PER violation

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What does the Texas Optometry Act Say about Eyeglasses? Section 351.365

- If, after examining a patient, an optometrist or therapeutic optometrist believes that lenses are required to correct or remedy a defect or abnormal condition of vision, the optometrist or therapeutic optometrist shall:
- inform the patient; and
- provide the patient with a copy of the patient's spectacle prescription.
  - Remember the FTC says this must be a free copy

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Texas Optometry Act and Eyeglasses

- The optometrist or therapeutic optometrist shall expressly indicate verbally or by other means that the patient has the following alternatives for the preparation of the lenses according to the prescription:
  - the optometrist or therapeutic optometrist will prepare or have the lenses prepared; or
  - the patient may have the prescription filled by a dispensing optician but should return for an optometrical examination of the lenses.
  - This section does not require an optometrist or therapeutic optometrist to provide a prescription to a patient before the patient has paid the examination fee.
    - The examination fee specific to the eyeglass prescription

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Texas Optometry Act: Section 351.359

- An ophthalmic lens prescription must include:
  - the signature of the optometrist or therapeutic optometrist; and
  - the information and parameters the optometrist or therapeutic optometrist considers relevant or necessary.
  - The prescription may not contain a restriction that limits the parameters to a private label not available to the optical industry as a whole.
    - Does not limit your recommendations...only prevents restrictions

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TAC: Board Rule279.4 - More state law about eyeglasses

- A prescription for spectacles or ophthalmic devices is defined as a written order signed by the examining optometrist, therapeutic optometrist or physician, or a written order signed by an optometrist, therapeutic optometrist or physician authorized by the examining doctor to issue the prescription. If the prescription is signed by the examining optometrist or therapeutic optometrist, the prescription may be signed electronically, provided that:
- the prescription is electronically signed by the practitioner using a system which electronically replicates the practitioner's manual signature on the written prescription; and
- the security features of the system require the practitioner to authorize each use.

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TAC: Board Rule279.4 - More state law about eyeglasses

- An optometrist or therapeutic optometrist may issue a duplicate prescription in the following manner:
  - giving or delivering an original signed copy of the prescription to the patient or to another person when requested by the patient;
  - faxing an original signed prescription to a person authorized to fill the prescription
- There is no clear indication as to the ability to charge for a duplicate but...

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AOA Practice Guidelines

- The AOA has published consensus-based clinical practice guidelines

Amblyopia	Myopia
Primary angle closure glaucoma	Accommodative and vergence dysfunction
Age-related macular degeneration	Learing related vision problems
Adult cataracts	Primary open angle glaucoma
Ocular surface disorders	Adult eye and vision examinations
Strabismus: exotropia and esotropia	Eye care in patients with diabetes mellitus
Retinal detachment and peripheral vitreoretinal disease	Pediatric eye and vision examinations
Visual impairment (low vision rehabilitation)	

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AOA Practice Guidelines

- It is a good idea to regular check through these guidelines as things can be reviewed and changed
- No Texas law states these must be followed, however...
- If you are involved in a malpractice or clinical based complaint, these guidelines will likely be used as a comparative standard

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Glaucoma and Texas Optometrists

- There is ongoing review of all glaucoma related complaints until 2027 (OD/MD review)
- Clinical practice guidelines such as AOA guidelines are used during this review

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Professional Recovery Network - Est. 1981 - helping Optometry since 2003

- Peer assistance program designed to guide impaired healthcare professionals through a safe and healthy recovery.

Mission Statement

We adhere to a dual philosophy that provides an opportunity for confidential recovery while protecting the public from unsafe professional practice. We believe that professionals who have a substance use disorder or mental health problem should be offered the chance to enter recovery and confront their problems before having disciplinary action taken against their licenses.

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Professional Recovery Network
Pharmacy - Dentistry - Veterinary - Optometry

- Designed to HELP
- Provide confidentiality
- Treat doctors with integrity
- Provide recovery before disciplinary action is taken by licensing agency
- If enrolled in a monitoring program, there may be fees associated

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Reporting

- Self-Referral (best option if possible)
  - Can remain anonymous from the licensing board as long as follow through the process
- Third-party referral
  - General public
  - Other healthcare providers
  - Any other anonymous individuals
- TOB ordered

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How to contact the Recovery Network

http://www.txprn.com/

Confidential hotline
1-800-727-5152

Program Director
Raquel Leal, LPC (512) 615-9176
Case Managers
Abby Coronado, LMSW (512) 615-9180
Marina Lichtenberger, LMSW (512) 615-9155
Will Turnery, LMSW (512) 615-9182

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Thank You !

apkemp@central.uh.edu

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Board $0 $0 $0 $0

Anterior Seg/Peri-OP Jeopardy!

Marcus Gonzales, Andrew Kemp

Board $0 $0 $0 $0

Disclosures

- Marcus Gonzales
  - No financial disclosures
- Andrew Kemp
  - No financial disclosures

Board $0 $0 $0 $0

Nicholas Colatrella, OD, FAAO, Dipl AAO, ABO, ABCMO

Jeffrey Varanelli, OD, FAAO, Dipl ABO, ABCMO

Special Thanks!

Board $0 $0 $0 $0 Reset

Instructions

- To start a new game, click the "reset" button on the board slide. This will reset the board, set each player's score to 0, and randomly move the Daily Double.
- Click "Adj Scores" from the board to manually change scores.
- Click on the lights at the bottom to start a countdown (click below to change).
- Incorrect response: Click the "incorrect" button if the player responds incorrectly, and their score will subtract.
- Correct response: Press the "correct" button if the player responds correctly, and the correct response will then be shown.
  - To skip viewing the correct response, check the box below
- If no one gets the question correct, press the arrow to go to the next slide (or return to the board if the checkbox below is checked).
- Troubleshooting:
  - Do not delete the value shape (e.g. $400) from any slide. If you don't like it, you can move it off the screen, but DON'T DELETE IT, and don't change its text!!!
  - Do not delete question slides and copy them in from somewhere else. You can do this to replace "answer" slides, but just not question slides (unless you re-apply the hyperlinks to the board)
  - If none of the functions are working, see "Macro Troubleshooting"

Adjust Countdown Timer

☑ Enable Daily Doubles

☐ Return to Board on correct response

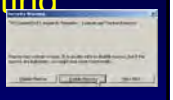
Import from Excel Template
(Template available online)

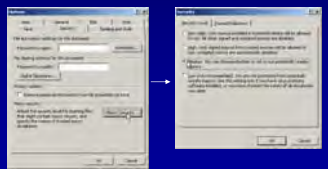
Template by Kevin Dufendach. Updates at http://sites.google.com/site/dufmedical/jeopardy
Please send questions and comments to krd.public+Jeopardy@gmail.com

Board $0 $0 $0 $0

Macro Troubleshooting

- If you're having trouble getting this PowerPoint to work, be sure to "Enable Macros" when opening the file.
- If you don't see this box when you open PowerPoint, your security settings may be set too high. In this case, go to the "Tools" menu and select "Options." Click on [Macro Security…] and then select "Medium." Press OK until you return to the show. Now save this file and then re-open it. You should now receive the dialog shown above. Click "Enable Macros"





Note: some of the functions may not work with versions of PowerPoint other than PowerPoint 2010 for Windows

Instructions Reset $0 $0 $0 $0 Adj Scores Double

Refractive Surg Pre-Op	Cataract Surg Pre-Op	Trauma – Part 1	Anterior Segment OCT	Corneal Conditions	Eye Humor+Trivia
$100	$100	$100	$100	$100	$100
$200	$200	$200	$200	$200	$200
$300	$300	$300	$300	$300	$300
$400	$400	$400	$400	$400	$400
$500	$500	$500	$500	$500	$500

Board | $0 | $0 | $0 | $0 | $100

This is what ICL stands for.

Board | $0 | $0 | $0 | $0 | $100

$100 response

- What is Implantable Collamer Lens?

Indicated for a wide range of refractive errors

** contains porcine collagen

Board | $0 | $0 | $0 | $0 | $200

What is the minimum bed thickness recommended for LASIK surgery?

Board | $0 | $0 | $0 | $0 | $200

$200 response

- What is 250 – 300um?
- This risk factor has been considered to reduce the risk of post-LASIK ectasia
- Need to consider flap thickness (approx. 100um) as well when considering corneal thickness
- Also consider min K value (36-38) for myope and max K value (46-48) for hyperopes

Board | $0 | $0 | $0 | $0 | $300

This corneal condition has no abnormal findings on slit-lamp examination and Placido disc topography but is contraindicated when considering LASIK.

Board | $0 | $0 | $0 | $0 | $300

$300 response

- What is forme fruste keratoconus?

Keratoconus first affects the endothelial curvature of the cornea
- This is NOT pick up on anterior topography

Instruments that measure endothelial curvature are necessary for LASIK evaluations
- Can find hits with refractive error changes but not perfect

LASIK Xtra might provide options for patients

Board | $0 | $0 | $0 | $0 | $400

What slit lamp finding is significant for ICL consideration but not for LASIK/PRK/SMILE?

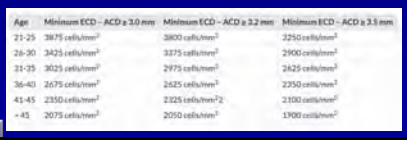
Board | $0 | $0 | $0 | $0 | $400

$400 response

- What anterior chamber angle/depth?

Anterior chamber angle of grade 2 or less could result in endothelial cell loss during surgery or accelerated loss after surgery

Contraindicated in patients with Fuch's endothelial dystrophy



Age	Minimum ECD – ACD ≥ 3.0 mm	Minimum ECD – ACD ≥ 3.2 mm	Minimum ECD – ACD ≥ 3.5 mm
21-25	3875 cells/mm²	3800 cells/mm²	3250 cells/mm²
26-30	3425 cells/mm²	3375 cells/mm²	2900 cells/mm²
31-35	3025 cells/mm²	2975 cells/mm²	2625 cells/mm²
36-40	2675 cells/mm²	2625 cells/mm²	2350 cells/mm²
41-45	2350 cells/mm²	2325 cells/mm²2	2100 cells/mm²
>45	2075 cells/mm²	2050 cells/mm²	1900 cells/mm²

Endothelia count density requirements per STAAR Surgical

Board | $0 | $0 | $0 | $0 | $500

This length of time you should wait before recommending LASIK in a patient with previous herpetic keratitis.

Board | $0 | $0 | $0 | $0 | $500

$500 response

- What is about one year?

There will always be a risk for reactivation

One study of 48 eyes – showed no reactivation s/p LASIK with 1 year of no reactivation

Consider prophylactic antivirals before surgery (i.e 400 mg acyclovir BID)

Depend on health status

Consider ICL surgery?

Board | $0 | $0 | $0 | $0 | $100

This measurement helps predict post-operative astigmatism following cataract surgery.

Board | $0 | $0 | $0 | $0 | $100

$100 response

- What is Keratometry?

The only source of astigmatism following cataract surgery should be the cornea

General recommendations for managing post-operative astigmatism

0 – 1D → LRI, spherical equivalent, LASIK

1 – 6D → toric IOL

1 – 2.5D → limitations for toric MF IOLs

Topographers that measure HOAs can aid in best choices (RMS values)

Board | $0 | $0 | $0 | $0 | $200

This is condition causes the lens to be unstable in the capsule and may be caused by trauma.

Board | $0 | $0 | $0 | $0 | $200

$200 response

- Zonular dehiscence

This may not be known until during surgery

Large dilation pre-operatively may be helpful

This complication should be discussed in all patient with previous trauma and pseudoexfoliation

Board | $0 | $0 | $0 | $0 | $300

This test should be performed on a patient with an opaque cataract prior to cataract surgery.

Board | $0 | $0 | $0 | $0 | $300

$300 response

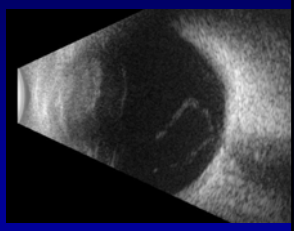
What is B-scan ultrasound ophthalmoscopy

Must determine if the retina is intact
- Very important with unilateral cataracts!

Should match timeline on vision loss

ROS is important

Can be billed with certain cataract diagnosis - 76512



Board | $0 | $0 | $0 | $0 | $400

This is the minimum endothelial cell count considered safe for cataract surgery.

Board | $0 | $0 | $0 | $0 | $400

$400 response

- What is 500 – 700 cells per square millimeter

Slit lamp evaluation of the endothelium should be performed pre-operatively

Consider corneal focused surgeons with corneal compromise. Will require combo surgeries (DSEK) or alternative cataract surgery (MSICS)

Board | $0 | $0 | $0 | $0 | $500

This medication for heart arrythmia is a contraindication for the use of a light adjustable lens.

Board | $0 | $0 | $0 | $0 | $500

$500 response

- What is amiodarone?

Any medication that leads to photosensitivity has the same contraindication

- Tetracycline
- Doxycycline
- Hydroxychloroquine
- NSAIDs (piroxicam/naproxen)
- Accutane
- etc…

Board | $0 | $0 | $0 | $0 | $100

Trauma 1

Board | $0 | $0 | $0 | $0 | $100

$100 response

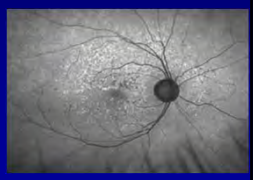
- ?

FAF is a powerful ancillary test that allows clinicians to detect metabolic activity of the RPE.

- Metabolic activity is highlighted by the excitement (hyperfluorescence) of lipofuscein
- Cell death is indicated by lack of excitement (hypofluorescence)

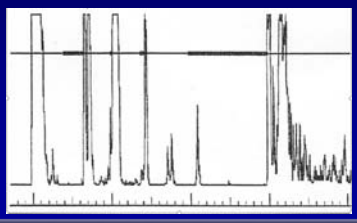
Useful for conditions that may impact the RPE:

- CSR
- Retinal dystrophies
- Stargardt disease
- White dot syndromes
- Macular degeneration



Board | $0 | $0 | $0 | $0 | $200

The most accurate biometry with opaque media.



Board | $0 | $0 | $0 | $0 | $200

$200 response

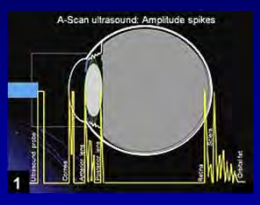
- What is an immersion A-scan?

Immersion:

- More accurate due to no corneal compression
- ***Separate spikes for probe, anterior surface of cornea, and posterior surface of cornea***
- Preferred method

Applanation:

- Can result in cornea compression
- Will rely on assessing the anterior chamber depth
- One spike represents probe + cornea (no separation of front/back)



Board | $0 | $0 | $0 | $0 | $300

This defining characteristic on ophthalmic B-scan is helpful in the diagnosis of choroidal melanoma

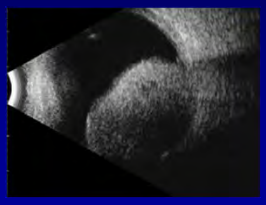
Board | $0 | $0 | $0 | $0 | $300

$300 response

- What is acoustic hollowness?

Acoustic hollowness refers to the low-medium reflectivity (sometimes called the silent zone) of an elevated mass

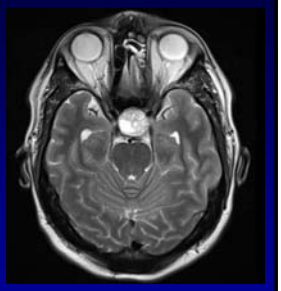
In choroidal melanoma, the lesion on a b-scan will be characterized by surface hyper-reflectivity with the silent zone.



https://eyewiki.aao.org/Echography_(Ultrasound)

Board | $0 | $0 | $0 | $0 | $400

The part of the brain where this lesion is seen in this MRI.



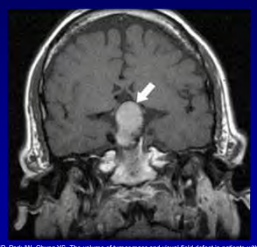
Board | $0 | $0 | $0 | $0 | $400

$400 response

- What is the pituitary gland?

Located in the sella tursica, the pituitary gland is a part of the endocrine system and is responsible for several hormones.

An enlarged pituitary gland (macroadenoma) may result in compression of the optic nerve, frequently leading to bitemporal visual field loss.



Lee JP, Park IW, Chung YS. The volume of tumor mass and visual field defect in patients with pituitary macroadenoma. Korean J Ophthalmol. 2011;25(1):37-41. doi:10.3341/kjo.2011.25.1.37

Board | $0 | $0 | $0 | $0 | $500

This new ophthalmic imaging technique uses mirrors that adjust based on wavefront feedback to improve image quality.

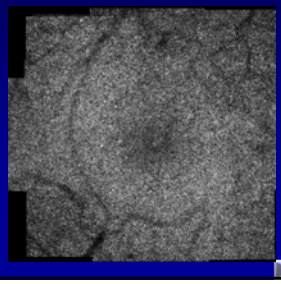
Board | $0 | $0 | $0 | $0 | $500

$500 response

- What is adaptive optics?

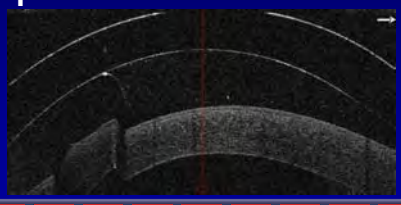
This may be able to revolutionize the quality of ophthalmic images in new technology.

First started in astronomy, this concept uses hundreds of adjustable mirrors to account for the wavefront profile of each individual patient.



Board $0 $0 $0 $0 $100

This adjustment should be made to improve this sclera fit.



Board $0 $0 $0 $0 $100

$100 response

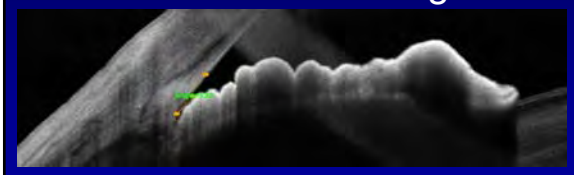
- What is decrease sagittal depth/flatten BC?

Flattening BC or decreasing sagittal depth can both decrease clearance
Also can considering going with a smaller lens

Excessive clearance can cause:
central bubbles
discomfort
landing zone blanching
corneal hypoxia
150-200um clearance is needed to prevent corneal edema

Board $0 $0 $0 $0 $200

This surgery is recommended for a patient with this angle OCT and IOPs of 30 mmHg.



Board $0 $0 $0 $0 $200

$200 response

- What is cataract surgery?

EAGLE trial. Augusto Azuara-Blanco, et al. 2016.

Patients 50 years or older, clear lens or cataract, with or without glc damage, and IOPs 30 mmHg or higher

Clinically effective and cost-effective over 10 years

Azuara-Blanco A, Burr J, Ramsay C, Cooper D, Foster PJ, Friedman DS, Scotland G, Javanbakht M, Cochrane C, Norrie J; EAGLE study group. Effectiveness of early lens extraction for the treatment of primary angle-closure glaucoma (EAGLE): a randomised controlled trial. Lancet. 2016 Oct 1;388(10052):1389-1397. doi: 10.1016/S0140-6736(16)30956-4. PMID: 27707497

Board $0 $0 $0 $0 $300

This anterior segment OCT finding differentiates an OSSN from a normal pterygium.

Board $0 $0 $0 $0 $300

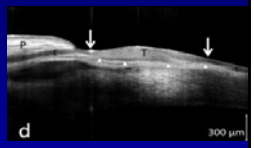
$300 response

- What is Epithelial thickening? (or sharp delineation)

OSSN typically arises adjacent to the limbus.

Caused by a suppressed/mutated p53 gene, OSSNs are associated with HPV and HIV

Garcia L, et al. 2020 noted that with a cutoff of 141 um of epithelial thickness, this screening was 100% sensitive and specific



Board | $0 | $0 | $0 | $0 | $400

This is the recommended follow-up or a small endothelial detachment following cataract sugery.

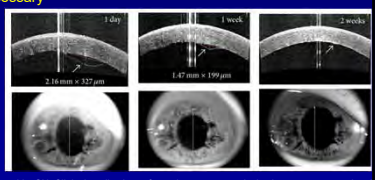
Board | $0 | $0 | $0 | $0 | $400

$400 response

- What is monitoring?

AS-OCT can be used for early detection and monitoring of endo detachments

This along with other findings (VA/pain/edema) will help determine if more immediate attention is necessary



Lim SH. Clinical applications of anterior segment optical coherence tomography. *J Ophthalmol.* 2015;2015:605729. doi:10.1155/2015/605729

Board | $0 | $0 | $0 | $0 | $500

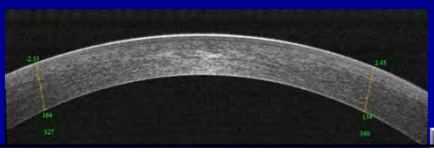
This is the most common and often earliest sign of corneal graft rejection.

Board | $0 | $0 | $0 | $0 | $500

$500 response

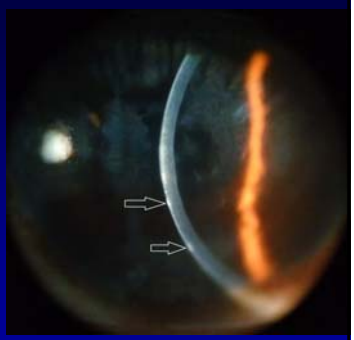
- What is corneal edema?
  - Important to have a baseline corneal thickness!
    - Corneal thickness should be "normal" around 3 months post-op ~550 um
    - Thicknesses over > 600 um are at a much greater risk of failure
  - Early topical corticosteroids can help decrease risk of complete failure

McDonnell PJ, Enger C, Stark WJ, Stulting RD. Corneal thickness changes after high-risk penetrating keratoplasty. Collaborative Corneal Transplantation Study Group. Arch Ophthalmol. 1993 Oct;111(10):1374-81. doi: 10.1001/archopht.1993.01090100082032. PMID: 8216018.



Board | $0 | $0 | $0 | $0 | $100

This common, non-infectious contact lens compication can result in permanent vision loss if not treated.



Board | $0 | $0 | $0 | $0 | $100

$100 response

- What are sub epithelial infiltrates?

These are immune responses to bacterial endotoxins

MUST have a steroid as part of the management plan

Can be difficult to differentiate from infectious keratitis

- Clear zone
- More peripheral
- Typically, less pain
- Better vision

Board | $0 | $0 | $0 | $0 | $200

This condition is seen when the absence of the mucin layer of the tear film leads to adjacent stromal corneal thinning.

Board | $0 | $0 | $0 | $0 | $200

$200 response

- What is corneal dellen?

Can be caused by any adjacent elevations or surface disease
Pterygiums, post trauma, post surgeries (blebs), lagophthalmos
Should resolve within 2 days – 2 weeks

Frequent lubrication! BCL? Patch/tape tarsorrophy

Board | $0 | $0 | $0 | $0 | $300

This procedure should be performed to remove loose epithelium in a patient suffering from recurrent corneal erosions.

Board | $0 | $0 | $0 | $0 | $300

$300 response

- What is corneal debridement?

Can be performed with different instruments (Weck-Cel Sponge, diamond burr**)

If the loose epithelium is not taken care of, the RCE will continue to

Can utilize BCLs, vitamin C, doxycycline, artificial tears for management post operatively

Board | $0 | $0 | $0 | $0 | $400

When used in high doses, this common aminoquinolone immunomodulator can result in whorl keratopathy.

Board | $0 | $0 | $0 | $0 | $400

$400 response

- What is Plaquenil (hydroxychloroquine)?

What is Plaquenil (hydroxychloroquine)?
Commonly used for RA, Sjogrens, lupus at lower dosed (100mg QD - 200mg BID)

High doses (800 - 1200mg daily) can be used to augment cancer treatments (chemotherapy and radiation)
Increased risk with duration – very high risk by 4 years
Intra lysosomal accumulation of lipids within the corneal epithelium\
No correlation with retinal findings
Current clinical trials for adjunct use in melanomas, breast cancer and prostate cancer

Board | $0 | $0 | $0 | $0 | $500

This noninfectious condition can be seen in uncontrolled rheumatoid arthritis.

Board | $0 | $0 | $0 | $0 | $500

$500 response

- What is peripheral ulcerative keratitis?

Can also be cause by other uncontrolled systemic inflammatory conditions
- •ANCA vasculitis
- •Inflammatory bowel syndrome
- •Lupus

Immune complexes in the cornea activate the complement system to send neutrophils and macrophages that start breaking down the stroma

Treatment includes lubrication, cyclosporin, doxycycline, vitamin C, topical corticosteroids**, oral steroids?

Board | $0 | $0 | $0 | $0 | $100

Excluding the cornea, this anatomical location has the highest density of nerve endings.

Board | $0 | $0 | $0 | $0 | $100

$100 response

- What are the fingertips?

2410/mm^2!!

Cornea has around 7000/mm^2

Board | $0 | $0 | $0 | $0 | $200

At what elevation do humans see best?

Board | $0 | $0 | $0 | $0 | $200

$200 response

- What is See Level?

Board $0 $0 $0 $0 $300

What organism has the most eyes?

Board $0 $0 $0 $0 $300

$300 response

- What is the scallop?

Board $0 $0 $0 $0 $400

Why couldn't the red-light bulb understand the green-light bulb?

Board $0 $0 $0 $0 $400

$400 response

- They weren't on the same wavelength!

Board $0 $0 $0 $0 $500

Which animal has the largest field of vision?

Board $0 $0 $0 $0 $500

$500 response

- What is the chameleon?

almost 360 degrees!

References

1. Rachitskaya, Aleksandra, et al. "Choroidal Osteoma." *EyeWiki*, American Academy of Ophthalmology, 15 Aug. 2023, eyewiki.aao.org/Choroidal_Osteoma.
2. Juliano J, Patel S, Ameri H, Md. Acquired Vitelliform Macular Degeneration: Characteristics and Challenges of Managing Subretinal Fluid. J Ophthalmic Vis Res. 2021;16(4):582-591. Published 2021 Oct 25. doi:10.18502/jovr.v16i4.9748
3. Garg, Seema. "Retinitis Pigmentosa: Clinical Presentation and Diagnosis." Edited by Matthew F Gardiner and Jane Givens, *UpToDate*, Wolters Kluwer, 9 Sept. 2022, www.uptodate.com/contents/retinitis-pigmentosa-clinical-presentation-and-diagnosis/print.
4. Desai, Manishi, et al. "Plateau Iris." *EyeWiki*, American Academy of Ophthalmology, 22 Dec. 2023, eyewiki.aao.org/Plateau_Iris.

Questions?

doctorgonzales@gmail.com
apkemp88@gmail.com

OPIOIDS: IMPROVING CARE WITH KNOWLEDGE AND EXPERIENCE

David Dinh, OD FAAO
University of Houston College of Optometry

1

NO FINANCIAL DISCLOSURES

University of Houston College of Optometry – CE Team

- Amanda Johnson
- Cristian Loayza
- Lorellye Macomber
- Victoria Hackney
- Daniel Miller

2

DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIPS FOR ALL INDIVIDUALS IN A POSITION TO CONTROL THE CONTENT OF THIS CE ACTIVITY

Instructor	Name of Commercial Interest	Nature of Relationship
David Dinh, OD FAAO	Fortrea	Consultant Clinical Investigator
	Essilor	Honorarium

3

TODAY'S GOALS

- **History** — What are opioids? What's the big deal?
- **Clinical Impact** — How does this influence patient care?
- **Alternative Options** — What other choices in our toolbox?
- **Optometric Goals** — Applying concepts to everyday scenarios

4

OPIOIDS THROUGH THE YEARS

Naturally occurring

- Papaver somniferum – opium poppy
- Use dating back to Neolithic era – 5500 BC
- Opium → morphine → codeine

Semi-synthetic

- Morphine-derived substances
- Heroin, oxycodone, hydrocodone, buprenorphine

Synthetic – opioid-like effect

- Non-morphine opioid substances
- Methadone, fentanyl

5

OPIOIDS – WHO? WHAT? WHY?

"analgesic to treat pain severe enough to require daily, around-the-clock, long-term opioid treatment and for which alternative treatment options are inadequate"

Common opioids:

- Morphine
- Heroin
- Fentanyl
- Hydrocodone
- Hydromorphone (Dilaudid®)
- Methadone
- Codeine
- Oxycodone (Oxycontin®)
- Percocet® (oxycodone + acetaminophen)

6

GETTING TO WORK

01 Site of Action

Requires transport across the blood-brain barrier

02 Absorption

High GI permeability → oral administration

- Notable exceptions: fentanyl

03 Metabolism

High first-pass effect → clinical heterogeneity

- **Site of prodrug conversion to active metabolite**
- **Can be bypassed to enhance effect avoid first-pass inactivation**

7

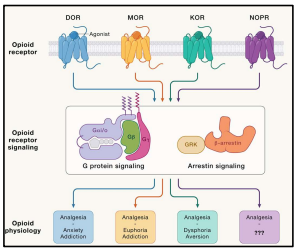
WARM RECEPTION

3 opioid receptors – post-synaptic, analgesic effects

- μ (MOR) – most commonly used receptor
- κ (KOR) – used in conjunction for morphine and oxycodone
- δ (DOR) – little use amongst most prescribed opioids

Nociceptin receptor (NOPR)

- Similarity to classic receptors in analgesic effects
- Affinity preference: agonists typically do not react to classical receptors



8

WHAT HURTS?

Pain – 2020 IASP definition

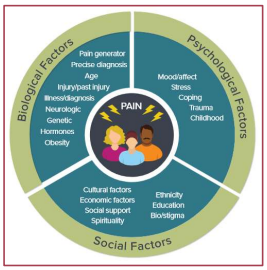
- *An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage*

Some notable features of pain:

- Biological, psychological, and social influences
- Life experiences help form our basis of pain
- Pain does not need to be verbalized
- A report of pain should be respected
- Pain and nociception are mutually exclusive
- Pain has adverse effects on function and social and psychological well-being.

9

BIOPSYCHOSOCIAL MODEL



10

TIMING IS EVERYTHING

Acute → <3 months

- May be recurrent because of chronic disease
- Respond well to opioids → USE WITH CAUTION!

Chronic → 3 months

- Often begin as unresolved acute pain
- Multimodal approach
- Identification of risk factors for substance use disorders
- Non-opioid options

11

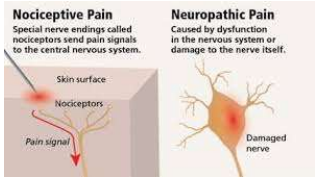
ON THE ORIGIN OF PAIN

Nociceptive

- Secondary to actual or potential tissue damage
- Typically acute
- Examples: stubbed your toe, burned your hand on the stove

Neuropathic

- Dysfunction within the nervous system
- Acute or chronic
- Examples: postherpetic neuralgia, diabetic peripheral neuropathy



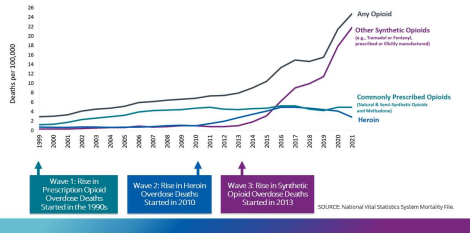
12

WHY DOES IT MATTER?

13

THE OPIOID EPIDEMIC

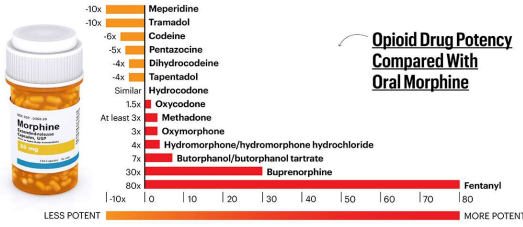
Three Waves of Opioid Overdose Deaths



14

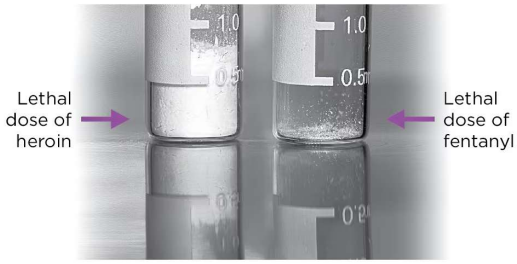
THE DRUGS

THE FDA HAS APPROVED 18 OPIOID DRUGS
The generic names are listed here. Drugs primarily used in surgery (such as alfentanil and remifentanil) were not included.



Nicolas Rapp, AARP Bulletin

15



16

ATTEMPTS AT CONTROL

Aggregate Production Quota for Opioids (grams)			
	2016	2025	Overall
Fentanyl	2,300,000	731,341	-68%
Hydrocodone (for sale)	86,000,000	27,121,498	-68%
Hydromorphone	7,000,000	1,951,508	-72%
Morphine (for sale)	62,500,000	20,805,957	-67%
Oxycodone (for sale)	139,150,000	53,584,449	-61%
Oxymorphone (for sale)	6,250,000	464,464	-93%
Overall Decline:	**303,200,000**	**104,659,217**	**-65%**

Source: Established Aggregate Production Quotas for Schedule I and II Controlled Substances and Assessment of Annual Needs for the List I Chemicals Ephedrine, Pseudoephedrine, and Phenylpropanolamine for 2025

17

CONTROLLED SUBSTANCES ACT

Factors determining schedule classification:

(1) Its actual or relative potential for abuse.
(2) Scientific evidence of its pharmacological effect, if known.
(3) The state of current scientific knowledge regarding the drug or other substance.
(4) Its history and current pattern of abuse.
(5) The scope, duration, and significance of abuse.
(6) What, if any, risk there is to the public health.
(7) Its psychic or physiological dependence liability.
(8) Whether the substance is an immediate precursor of a substance already controlled under this subchapter.

Source: Controlled Substances Act Section 201(c), [21 U.S.C. § 811(c)]

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DEA DRUG SCHEDULES

Schedule	Potential for Abuse	Examples
I	High Potential for Abuse **NO** medical applications	Heroin, Marijuana, Ecstasy
II	High Potential for Abuse **SOME** medical applications	Hydrocodone, Cocaine, Methadone
III	Moderate-Low Potential for Abuse	<90mg of codeine (e.g. Tylenol III)
IV	Low Potential for Abuse	Tramadol®, Xanax®
V	Lowest Potential for Abuse	Robitussin AC®

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IS IT AN EYECARE PROBLEM?

Table 2. Opioid Prescribing Patterns Categorized by Number of Prescriptions Written[a]

Prescriptions Written Annually, No.	Ophthalmologists, No. (%) 2013 (n = 19 615)	2014 (n = 19 587)	2015 (n = 19 712)
0	8718 (44)	9004 (46)	9599 (49)
1-10	8556 (44)	8403 (43)	8032 (41)
11-100	2150 (11)	1977 (10)	1896 (9)
>100	191 (1)	203 (1)	185 (1)

JAMA Ophthalmology. 2017;135(11):1216-1220

Table 3. Opioid Prescribing Patterns after Ophthalmic Surgery before and after Implementation of Opioid Prescribing Guidelines According to the Levels Recommended for Type of Surgery

	Level 0 (No Opioids Recommended)			Level 1 (≤40 Oral Morphine Equivalent)			Level 2 (≤80 Oral Morphine Equivalent)		
	Before Intervention (n = 2506)	After Intervention (n = 2304)	P	Before Intervention (n = 479)	After Intervention (n = 430)	P	Before Intervention (n = 38)	After Intervention (n = 24)	P
No. (%) of opioid prescriptions	48 (2.3)	24 (1.0)	0.001	57 (11.9)	51 (12.5)	0.79	10 (26.3)	6 (25.0)	1
OME (mg), mean (standard deviation)	114.1 (82.5)	54.9 (23.1)	<0.001	80.7 (36.9)	32.6 (12.4)	<0.001	62.4 (34.1)	51.7 (34.5)	0.26
No. (%) of opioid prescription refills	22 (1.0)	29 (1.3)	0.52	9 (1.9)	10 (2.3)	0.56	0 (0.0)	0 (0.0)	1
No. (%) of surgical cases that met prescribing guidelines	2048 (98)	2280 (99.0)	0.001	426 (89)	393 (96)	<0.001	36 (95)	24 (100)	0.52
No. (%) of opioid prescriptions									
>220 OME	4 (0.2)	0 (0.0)	0.04	1 (0.2)	0 (0.0)	0.36	0 (0.0)	0 (0.0)	1
>80 OME	35 (1.7)	4 (0.2)	<0.001	19 (4.0)	0 (0.0)	<0.001	2 (5.3)	0 (0.0)	0.52
>40 OME	44 (2.1)	16 (0.7)	0.001	53 (11)	15 (3.7)	<0.001	9 (24)	6 (25)	1

OME = oral morphine equivalent.

JAMA Ophthalmology. 2020 Nov;127(11):1454-1459

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CAN WE DO BETTER?

Table 3. Opioids Prescribed After Corneal Surgery in Patients Receiving a Prescription

	Opioid Use Cohort							
	Before Guideline Changes (n = 38)			After Guideline Changes (n = 31)				
Tablet Variable	No. of Tablets	Mean (SD)	Median (Range)	No. of Tablets	Mean (SD)	Median (Range)	Difference, Mean (95% CI)	*P* Value[a]
Prescribed	34	18.8 (4.2)	20 (3-30)	31	6.6 (3.1)	5 (1-15)	12.2 (10.4-14.0)	<.001
Used	29	8.3 (7.0)	6 (0-30)	28	4.0 (3.2)	4 (0-14)	4.3 (1.4-7.2)	.005
Remaining	29	10.3 (6.9)	12 (0-20)	28	2.9 (2.7)	2.5 (0-10)	7.5 (4.7-10.2)	<.001

[a] Calculated using the 2-sample *t* test.

JAMA Ophthalmology. 2019 Oct 31;138(1):76-80

Key Takeaways

- Fewer prescribed opioids resulted in fewer leftover pills
- Fewer prescribed pills maintained adequate pain management

21

WHAT CAN I DO?

22

BEST PRESCRIBING PRACTICES

2016 CDC Guideline for Prescribing Opioids for Chronic Pain

- Originally intended for PCPs

Lessons Learned

- Rapid reduction in opioid prescribing – Good or Bad?
- Misapplication by boards, insurances, pharmacies, etc.
- Loss of nuance in clinical decision making

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BEST PRESCRIBING PRACTICES

2022 CDC Guideline for Prescribing Opioids for Pain

4 Categories of Updated Recommendations

- Should I Start an Opioid?
- Which Opioid to Use?
- How Long Should I Use Opioids?
- How to Assess Risks with Opioid Use?

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I'M READY TO PRESCRIBE. WHAT NEXT?

Internal Controls
- Frequent Follow-ups
- Evaluate therapeutic effect
- Stabilize and titrate dosing
- Lab work and counseling to evaluate for misuse

Limited dosing quantities and pill counts
- Consideration for origin of pain, expected duration

E-prescribing

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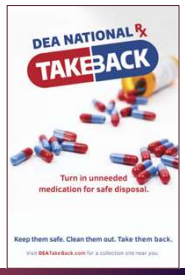
I'M READY TO PRESCRIBE. WHAT NEXT?

Internal Controls
- Patient Education
- Set realistic expectations
- Situations for discontinuation → Patient Contracts
  - Risks outweigh benefits
  - Evidence of misuse → Urine Drug Screening
- DEA Drug Disposal Sites
- Provider Education
  - Education at all levels



26

I'M READY TO PRESCRIBE. WHAT NEXT?

External Controls
- Abuse-deterrent Formulations (ADF)
  - Abuse Deterrence vs. Access
- DEA Drug Scheduling
  - 2014 Hydrocodone rescheduling
- Prescription Drug Monitoring Program

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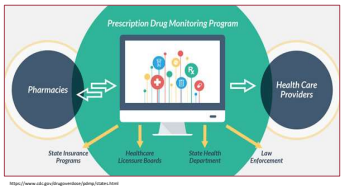
PRESCRIPTION DRUG MONITORING PROGRAM

Goals
- Prevent doctor shopping
- Enhance tracking among different state/federal organizations
- Allow for insight on prescribing habits to identify outliers

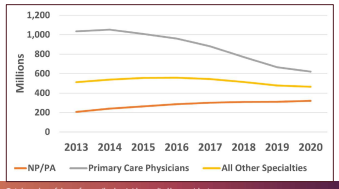
Key Features
- Pharmacy updates after filling controlled substance
- Prescriber access to patient filled drug history



28

OK, I'M REALLY READY TO PRESCRIBE

Are you staying in your lane?
- Multimodal approach to chronic pain management
- Did you perform a comprehensive systemic, family, and social history?
- Do you have the specialized training to best address the root cause of pain?



Total number of days of prescribed opioids supplied by provider type.
Source: Centers for Medicaid and Medicare Public Use File, 2013–2020.

29

…BUT SHOULD I?

Absolute Contraindications
- Current addition to opiates
- Known history of opiate addiction → technically relative…

Relative Contraindications
- Pulmonary disease or dysfunction
- Renal impairment
- Personal OR family history of substance use disorders (non-opiate related)
- Allergy to opiates
- Head injuries

30

"HOUSTON, WE HAVE A PROBLEM"

31

HOUSTON, WE HAVE A PROBLEM

Drug-drug interaction

- Respiratory depression → reversible
- Cardiac rhythm anomalies/Ventricular tachycardia: QT prolongation → torsade des pointes (TdP)

Liver metabolism → CYP450, CYP3A

- Enhanced by CYP450 inhibitors: alcohol
- Enhanced by CYP3A4 inhibitors: fluoxetine, clarithromycin, fluconazole, and valproate
- Genetic mutations preventing expression of liver enzymes used for metabolism

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EXPECTING THE UNEXPECTED

Short-term Side Effects

- sedation, dizziness, nausea, vomiting, constipation

Long-term Side Effects

- physical dependence, tolerance, and respiratory depression

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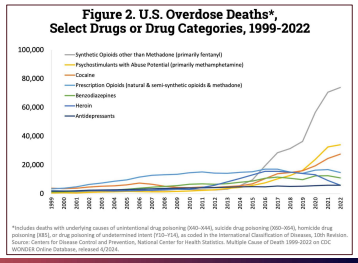
SIGNS OF AN OPIATE OVERDOSE

Things to look for:

- Altered/depressed consciousness
- Difficulties breathing
- Cold/clammy/cyanotic skin
- Pupil abnormalities
- Constricted → Acute
- Dilated → Anoxic brain injury

Opiates account for about half of all drug-related overdose deaths



34

CTRL+Z – THE GREAT UNDO COMMAND

Naloxone (Narcan®)

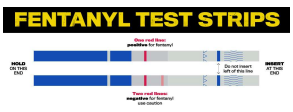
- Opioid receptor antagonist → requires active systemic opioids
- Reverses opioid effects and acute respiratory depression → 2-5 minutes latency of action
- Available as auto-injector or nasal spray
- All states allow for anyone to purchase from pharmacy and without a prescription in most states

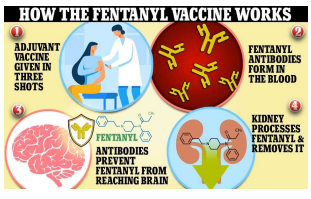
35

AN OUNCE OF PREVENTION

Reducing drug-harm outcomes

- Fentanyl test strips
- Fentanyl "vaccine"





36

CHOOSING A DIFFERENT PATH

37

IS THERE ANOTHER WAY?

Physical manipulation/Manual Therapy

- Chiropractic manipulation – high velocity, low amplitude
- Massage – tissue extensions
- Exercise – blood flow and endorphins
- Surgery – positional correction
- Acupuncture/Acupressure – acupoint activation → endorphins

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AND DOES IT WORK?

Manual Manipulation → Neurophysiological results

- Interaction of inflammatory mediators and nocireceptors
  - Decrease in cytokine concentration
  - Increase in serotonin and endorphins
- Decreased cortical activity in pain centers of the brain

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IS THERE ANOTHER WAY?

Stress-reduction

- Meditation → mindfulness
- Cognitive-Based Therapy
- Yoga

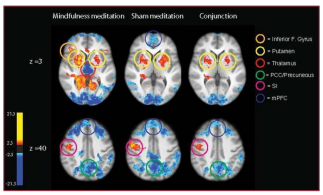
40

AND DOES IT WORK?

Non-invasive, sustained results compared to standard therapies

- Mindfulness-Based Stress Reduction vs. lower back pain
  - Improved Quality of Life
  - Lower pain scores
- Sustained results → three years out

Placebo Effect?



Ann N Y. *Acad Sci.* 2016 June; 1373(1): 114–127.

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PAIN IN OPTOMETRY

Concepts to Consider

- Sources of eye pain:
  - Location
  - Mechanical vs. Inflammation
- Level of pain management required
- Duration of disease/condition
- Discuss disposal
- Stay vigilant!

42

PAIN IN OPTOMETRY

Common non-opiate options
- Medications
- Corticosteroids
- Topical/Oral NSAIDs
- Immunomodulators
- Acetominophen/Ibuprofen
- *NEW* Journavx

Mechanical coverage
- Bandage Contact Lens
- Amniotic Membranes

43

JOURNAVX

- First-in-class non-opioid pain reliever → first in 20 years
  - Indications: moderate-to-severe ACUTE pain
  - Blocks pain signaling in the peripheral nervous system
  - BID dosing @ ~$16/pill
- Because of site of action (i.e. non-CNS) → little to no risk of addition → NOT A CONTROLLED SUBSTANCE
- Processed in liver by CYP3A
  - Avoid with CYP3A inhibitors, grapefruit, etc.

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PAIN IN OPTOMETRY

- Common controlled substance options
  - Hydrocodone → Schedule II
  - Codeine-containing medication
    - Tylenol #3 → Schedule III
  - Tramadol → Schedule IV
- Requires DEA number and state pharmacy registration for PDMP access

45

TAKE HOME POINTS

- Understand and implement best practices:
  - Risk-Benefit Analysis
  - Multimodal approach
  - Non-opiate options
- How important is all of this?
  - Over the course of this CE, 9 more Americans have died of an opioid-related overdose → 25% reduction over 2023!

46

QUESTIONS?

- dtdinh@central.uh.edu

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Board $0 $0 $0 $0

Anterior Seg/Peri-OP Jeopardy!

Marcus Gonzales, Andrew Kemp

Board $0 $0 $0 $0

Disclosures

- Marcus Gonzales
  - No financial disclosures
- Andrew Kemp
  - No financial disclosures

Board $0 $0 $0 $0

Nicholas Colatrella, OD, FAAO, Dipl AAO, ABO, ABCMO

Jeffrey Varanelli, OD, FAAO, Dipl ABO, ABCMO

Special Thanks!

Board $0 $0 $0 $0 Reset

Instructions

- To start a new game, click the "reset" button on the board slide. This will reset the board, set each player's score to 0, and randomly move the Daily Double.
- Click "Adj Scores" from the board to manually change scores.
- Click on the lights at the bottom to start a countdown (click below to change).
- Incorrect response: Click the "incorrect" button if the player responds incorrectly, and their score will subtract.
- Correct response: Press the "correct" button if the player responds correctly, and the correct response will then be shown.
  - To skip viewing the correct response, check the box below
- If no one gets the question correct, press the arrow to go to the next slide (or return to the board if the checkbox below is checked).
- Troubleshooting:
  - Do not delete the value shape (e.g. $400) from any slide. If you don't like it, you can move it off the screen, but DON'T DELETE IT, and don't change its text!!!
  - Do not delete question slides and copy them in from somewhere else. You can do this to replace "answer" slides, but just not question slides (unless you re-apply the hyperlinks to the board)
  - If none of the functions are working, see "Macro Troubleshooting"

Adjust Countdown Timer

☑ Enable Daily Doubles

☐ Return to Board on correct response

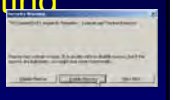
Import from Excel Template
(Template available online)

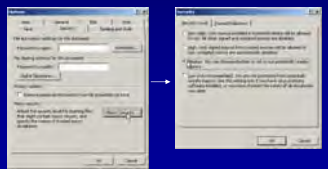
Template by Kevin Dufendach. Updates at http://sites.google.com/site/dufmedical/jeopardy
Please send questions and comments to krd.public+Jeopardy@gmail.com

Board $0 $0 $0 $0

Macro Troubleshooting

- If you're having trouble getting this PowerPoint to work, be sure to "Enable Macros" when opening the file.
- If you don't see this box when you open PowerPoint, your security settings may be set too high. In this case, go to the "Tools" menu and select "Options." Click on [Macro Security…] and then select "Medium." Press OK until you return to the show. Now save this file and then re-open it. You should now receive the dialog shown above. Click "Enable Macros"





Note: some of the functions may not work with versions of PowerPoint other than PowerPoint 2010 for Windows

Instructions Reset $0 $0 $0 $0 Adj Scores Double

Refractive Surg Pre-Op	Cataract Surg Pre-Op	Trauma – Part 1	Anterior Segment OCT	Corneal Conditions	Eye Humor+Trivia
$100	$100	$100	$100	$100	$100
$200	$200	$200	$200	$200	$200
$300	$300	$300	$300	$300	$300
$400	$400	$400	$400	$400	$400
$500	$500	$500	$500	$500	$500

Board $0 $0 $0 $0

DAILY DOUBLE

Enter your wager:

$ 1400 Go!

Instructions Single $0 $0 $0 $0 Adj Scores Final

Refractive Surg Post-Op	Cataract Surg Post-Op	Trauma II	Ocular Surface Disease	Ant Uveitis	Eye Humor+Trivia
$200	$200	$200	$200	$200	$200
$400	$400	$400	$400	$400	$400
$600	$600	$600	$600	$600	$600
$800	$800	$800	$800	$800	$800
$1000	$1000	$1000	$1000	$1000	$1000

Board ✓ $0 ✓ $0 ✓ $0 ✓ $0 $200

This LASIK complication.

Ting DSJ, Srinivasan S, Danjoux JP. Epithelial ingrowth following LASIK: prevalence, risk factors, maangement and visual outcomes. BMJ Ophthalm. 2018 Mar 29;3(1).

Board $0 $0 $0 $0 $200

$200 response

- What is epithelial ingrowth

Is visually significant in 1 to 2% of patients which has improved since the advent of femtosecond flap creation

Patients at increased risk include
Diabetics, existing EBMD or RCE and increased age

Formed due to poor flap adhesion
Small amount/non visually significant can be left alone

Board ✓ $0 ✓ $0 ✓ $0 ✓ $0 $400

Patients after ICL surgery are at higher risk for developing this type of glaucoma.

Board $0 $0 $0 $0 $400

$400 response

- What is pupillary block glaucoma?

The only group that experienced complications in FDA trial had an Rx > -10D

Could also increase risk of pigment dispersion glaucoma

Increased risk of cataract formation

Fenestrations in the newer lenses are intended to reduce/eliminate the risk of these complications

Board | $0 | $0 | $0 | $0 | $600

The earliest post operative time frame when a LASIK enhancement should be considered.

Board | $0 | $0 | $0 | $0 | $600

$600 response

- What is 3 months?

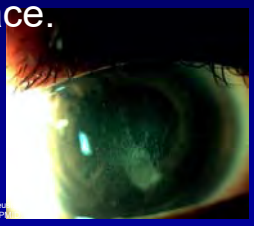
Typically, trainset visual disturbances (halo, glare, etc.) will dissipate or stabilize 3 to 6 months post operatively

Rule out other ocular surface related causes

Realistic expectations?

Board | $0 | $0 | $0 | $0 | $800

This LASIK complication is a sterile, infiltrative inflammation at the flap interface.



Grassmeyer JJ, Goertz JG, Baartman BJ. Diffuse Lamellar Keratitis in a Patient Undergoing Collagen Corneal Cross-Linking 18 Years After Laser In Situ Keratomileu Surgery. Cornea. 2021 Jul 1;40(7):917-920. doi: 10.1097/ICO.0000000000002653. PM 34086008; PMCID: PMC8178513.

Board | $0 | $0 | $0 | $0 | $800

$800 response

- What is diffuse lamellar keratitis (Sands of the Sahara)?

Sterile reaction to something that is on the flap

Typically occurs within the first 1 week post-op
Responds well and quickly to topical steroids (i.e. q1-2hrs)
Stage 1 – only peripheral cornea affected/vision normal
Stage 4 – severe vision loss with stromal scarring

Flap can be irrigated – mostly considered when vision is worse (20/80 or worse?)

Board | $0 | $0 | $0 | $0 | $1000

This is a complication of LASIK/SMILE resulting from an increased IOP post operatively.

Jia, Zhe et al. "Interface fluid syndrome: A potential lifelong complication after LASIK. A case report." *American Journal of Ophthalmology Case Reports* 11 (2018): 23 - 25.

Board | $0 | $0 | $0 | $0 | $1000

$1000 response

- What is interface fluid syndrome (IFS)?

Also referred to as pressure-induced interface keratitis (PISK)

Typically caused by a steroid response after surgery

Can be caused by anything that increases IOP in a post op patient
Also can be caused by dysfunctional endothelium

Board $0 $0 $0 $0 $200

This new medication was recently FDA approved for post operative inflammation

Board $0 $0 $0 $0 $200

$200 response

- What is a clobetasol propionate ophthalmic solution 0.05$?

- Dosing is 1 gtt BID x 2 weeks with no taper
- Potential for FDA approval for ocular surface disease
- Very high potent in other preparations.
- Newer to eye care with no comparisons yet to other topical steroids – likely as strong if not stronger than Durezol.

$200 to $300 cash pay owned by Eyenovia – also coming out with Optejet – spray eyedrops

Board $0 $0 $0 $0 $400

This is the recommended treatment of an air bubble seen in the anterior chamber one day after cataract surgery.

Keles A, Karaman SK. Corneal Effect of Air Bubble After Phacoemulsification. Beyoglu Eye J. 2022 Nov 15;7(4):261-266. doi: 10.14744/bej.2022.65902. PMID: 36628083; PMCID: PMC9794514.

Board $0 $0 $0 $0 $400

$400 response

- What is monitoring?

Air bubbles can be placed for a variety of reasons (increase volume of AC to prevent shallowing, prevent wound leakage, and possible infection prevention)

.

Air bubbles should dissipate on their own

Typically resolves in a few days

Board $0 $0 $0 $0 $600

This is typically the reason for an increased IOP one day after cataract surgery.

Board $0 $0 $0 $0 $600

$600 response

- What is retained viscoelastic material?

Viscoelastic material should be aspirated completely upon completion of surgery

Retained material will clog the trabecular meshwork and temporarily increase IOP

When to consider treatment?

Board $0 $0 $0 $0 $800

This diagnosis is typically seen on the 1 day or 1 week post operative visit following cataract surgery

Board $0 $0 $0 $0 $800

$800 response

- What is a retained lens fragment?

Estimates show that small fragments remain after cataract surgery in 0.1 – 1.5% of surgery cases

Treatment varies depending on patient symptoms and vision

Often lens fragments will disappear on their own

Can lead to corneal edema, OHT, CME

Surgical repair may require coordination of cataract and vitreoretinal surgeons

Board $0 $0 $0 $0 $1000

What is the most likely diagnosis with this presentation at the 1 day post operative visit?

Board $0 $0 $0 $0 $1000

$1000 response

- What is toxic anterior segment syndrome (TASS)?

Noninfectious, acute anterior chamber inflammation

Typically occurs 12-24 hours after surgery

Should show rapid response to topical steroid therapy but may take weeks to fully resolve

Atypical cases or non-responsive cases may require ACT tap to rule out endophthalmitis

Board $0 $0 $0 $0 $200

Trauma II

Board $0 $0 $0 $0 $200

$200 response

- What is the gain?

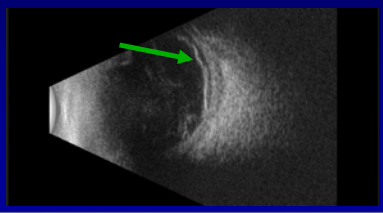
The gain controls the amount of sound that enters the eye.

Increasing the gain will improve the amplitude of the different peaks in the eye, although will also increase the noise in the measurements and decrease reliability.

You want the lowest gain possible that provides a measurement when performing biometry.

Board | $0 | $0 | $0 | $0 | $400

The arrow is a finding often seen in patients with sudden vision loss.



Board | $0 | $0 | $0 | $0 | $400

$400 response

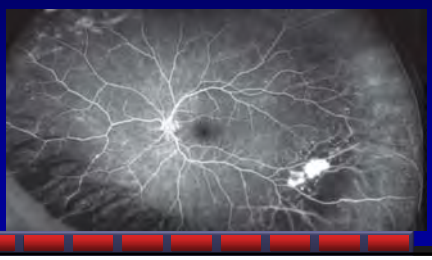
- What is a retinal detachment?

The retina will hyper reflect on B-scan and will be a thicker line than the posterior hyaloid face.

The movement of the retina will be more rigid than the more mobile vitreous.

Board | $0 | $0 | $0 | $0 | $600

Patients with episodes of extreme joint and abdominal pain may have this finding on FA.



Board | $0 | $0 | $0 | $0 | $600

$600 response

- What is sea fan neovascularization?

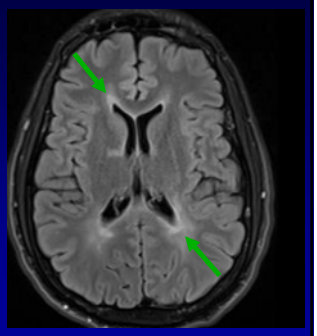
Sea fan neovascularization is a sign of proliferative sickle cell retinopathy. Retinopathy is more likely to occur in the heterozygous genotypes (HbSC, HbS-beta thalassemia).

While Anti-VEGF therapy and/or scatter laser photocoagulation may lead to regression of neovascularization, there is a high incidence of neovascularization and spontaneous regression complicates treatment modalities.

https://www.ncbi.nlm.nih.gov/books/NBK482164/

Board | $0 | $0 | $0 | $0 | $800

These FLAIR hyperintense lesions are consistent with this group of neurological diseases?



Board | $0 | $0 | $0 | $0 | $800

$800 response

- What is a demyelinating disease?

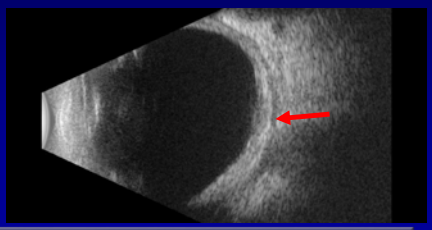
Most common demyelinating diseases:

- Multiple sclerosis
- Neuromyelitis optica spectrum disorder (NMOSD)
- Myelin oligodendrocyte glycoprotein (MOG)

The most common ocular sign of demyelinating diseases is optic neuritis.

Board | $0 | $0 | $0 | $0 | $1000

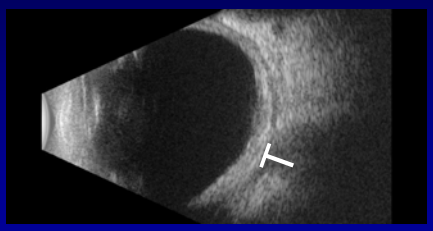
This B-scan finding is helpful in diagnosing posterior scleritis.



Board | $0 | $0 | $0 | $0 | $1000

$1000 response

- What is a T-sign?



Represents a collection of fluid in the posterior episcleral space.

Board | $0 | $0 | $0 | $0 | $200

This is the only FDA approved topical steroid for dry eye disease.

Board | $0 | $0 | $0 | $0 | $200

$200 response

- Who is Eysuvis (loteprednol 0.25%)?

What is Eysuvis (loteprednol) 0.25%?
1 gtt QID x 2 weeks was dosage used for approval ($500 on GoodRx)
Lotemax is same medication but 0.5%

Board | $0 | $0 | $0 | $0 | $400

This instrument in the treatment of ocular surface disease can result in these findings if done improperly

Jewsbury H, Morgan F. Uveitis and iris photoablation secondary to intense pulsed light therapy. Can J Ophthalmol. 2012 Aug;47(4):e13-4. doi: 10.1016/j.jcjo.2012.01.019. Epub 2012 Jun 29. PMID: 22883855.

Board | $0 | $0 | $0 | $0 | $400

$400 response

- What is intense pulsed light therapy?

This can result if the eye shield is not in place prior to apply to the eyelids.

Can also induce an anterior uveitis.

Energy is absorbed in pigment, water and blood vessels leading to destruction

Board | $0 | $0 | $0 | $0 | $600

This oral medication can be used to increase tear production in patients with Sjogren's syndrome.

Board | $0 | $0 | $0 | $0 | $600

$600 response

What is pilocarpine?

20 mg daily dose of pilocarpine can be used (5mg QID)

Can have side effects (sweating and headaches are among the most common)

Topical pilocarpine can have detrimental effects on the meibomian glands

Board | $0 | $0 | $0 | $0 | $800

This autoimmune conjunctivitis is a type II hypersensitivity that is often staged by inferior forniceal depth loss/symblepharon formation.

Board | $0 | $0 | $0 | $0 | $800

$800 response

- What is ocular cicatricial pemphigoid?

- Thought to be caused by the activation of an autoantibody/antigen complex, activating the complement system and leading to conjunctival destruction.
- Can be caused by topical medications such as pilocarpine and timolol
  - Qlosi (pilocarpine 0.4%) Vuity (pilocarpine 1.25%)

This should be managed topically and systematically with immunomodulators

Board | $0 | $0 | $0 | $0 | $1000

This is the most concerning diagnosis for this lesion.

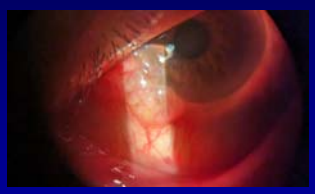


Photo by: Dr. Luca Albernaz. St George, Utah

Board | $0 | $0 | $0 | $0 | $1000

$1000 response

What is a squamous cell carcinoma?

Before biopsy, the diagnosis will be ocular surface squamous neoplasia

Proximity to limbus, growth over time, corneal involvement, gelatinous, hairpin vessels

Removal and topical agents such as interferon-α2b, mitomycin C, 5-flyorouracil, anti-VEGF (sub conj bevacizumb)

Board | $0 | $0 | $0 | $0 | $200

Anterior Uveitis

Board | $0 | $0 | $0 | $0 | $200

$200 response

- What is 10 mmHg (9.6 - 10.7)?

Corneal hysteresis refers to the measure of the viscoelastic adjustment of the cornea → reflects the cornea's ability to absorb and dissipate energy.

Low corneal hysteresis → Risk of progressive glaucoma

Zimprich L, Diedrich J, Bleeker A, Schweitzer JA. Corneal Hysteresis as a Biomarker of Glaucoma. Aug 10. doi:10.2147/OPTH.S236114Current Insights. Clin Ophthalmol. 2020;14:2255-2264. Published 2020

Board | $0 | $0 | $0 | $0 | $400

This recently approved PGE receptor agonist may be used to avoid prostaglandin-related side effects, such as loss of orbital fat.

Board | $0 | $0 | $0 | $0 | $400

$400 response

- What is Omlonti (omidenapg)?

A selective E-prostanoid subtype2 (EP2) agonist that received FDA approval in 2022.

Clinically as effective as non-selective PGA.

Advantage over older PGA → Less periorbital darkening

Still not commercially available in the US

Board | $0 | $0 | $0 | $0 | $600

This secondary glaucoma is associated with cardiovascular complications, such as aortic aneurysm and renal artery stenosis.

Board | $0 | $0 | $0 | $0 | $600

$600 response

- What is pseudoexfoliation glaucoma?.

Pseudoexfoliation is a systemic condition that can manifest in the eye. May result in glaucoma.

Can be very difficult to diagnose after cataract surgery – dilate those pre op cataracts!!

Has been associated with aortic aneurysms, ischemic heart disease, irregular heart rhythms. One study reported 44% of patients with aortic aneurysms had ophthalmic complications related to pseudoexfoliation.

Board | $0 | $0 | $0 | $0 | $800

This oral medication used for seizures & migraines can result in bilateral secondary angle closure.

Board | $0 | $0 | $0 | $0 | $800

$800 response

- What is Topamax (topiramate)?

Topiramate → Swollen Choroid (Choroidal Effusion)

Swollen Choroid (Choroidal Effusion) → Lens-Iris Forward → Myopic Shift

Swollen Choroid (Choroidal Effusion) → Ciliary Body Swells (Displaces Anteriorly) → Angle Closure

Stop med if possible, treat with usual AAC meds, although add **steroids & mydriatics** instead of miotics!

Board | $0 | $0 | $0 | $0 | $1000

A newly approved instrument that can complete this type of glaucoma surgery in approximately 2 seconds.

Board | $0 | $0 | $0 | $0 | $1000

$1000 response

- What is direct selective laser trabeculoplasty (DSLT)?

First SLT to deliver laser to the trabecular meshwork WITHOUT gonioscopy, transscleral.

Cleared by FDA in 2023.

Studies demonstrate comparable results to SLT, but faster and with less risk of complications.

Board | $0 | $0 | $0 | $0 | $200

Humor II

Board | $0 | $0 | $0 | $0 | $200

$200 response

- Because we dilate!

Board $0 $0 $0 $0 $400

This animal is credited with the best eyesight, being able to spot and focus on prey up to 2 miles away.

Board $0 $0 $0 $0 $400

$400 response

- What is an eagle?

Board $0 $0 $0 $0 $600

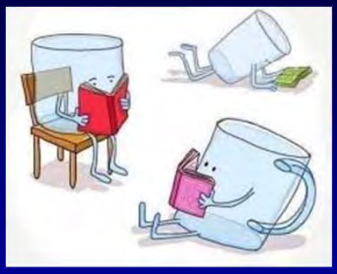
The reason the eye couldn't keep a job.

Board $0 $0 $0 $0 $600

$600 response

- Because it was a lazy eye!

Board $0 $0 $0 $0 $800



The meaning of this pun.

Board $0 $0 $0 $0 $800

$800 response

- What is Reading Glasses?

Board $0 $0 $0 $0 $1000

While a fingerprint has 40, this structure has 256 unique identification points.

Board $0 $0 $0 $0 $1000

$1000 response

- What is the iris?

Board $0 $0 $0 $0

DAILY DOUBLE

Enter your wager:

$ 500 Go!

Board $0 $0 $0 $0

DAILY DOUBLE

Enter your wager:

$ 0 Go!

Board $0 $0 $0 $0

Retinal Disease

FINAL JEOPARDY

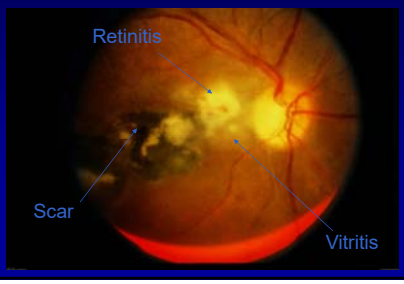
The most common infectious cause of posterior uveitis in immunocompetent patients.

Reveal Prompt Reveal Response

Board $0 $0 $0 $0

Final Jeopardy Response

- What is toxoplasmosis



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3. Garg, Seema. "Retinitis Pigmentosa: Clinical Presentation and Diagnosis." Edited by Matthew F Gardiner and Jane Givens, *UpToDate*, Wolters Kluwer, 9 Sept. 2022, www.uptodate.com/contents/retinitis-pigmentosa-clinical-presentation-and-diagnosis/print.
4. Desai, Manishi, et al. "Plateau Iris." *EyeWiki*, American Academy of Ophthalmology, 22 Dec. 2023, eyewiki.aao.org/Plateau_Iris.

Questions?

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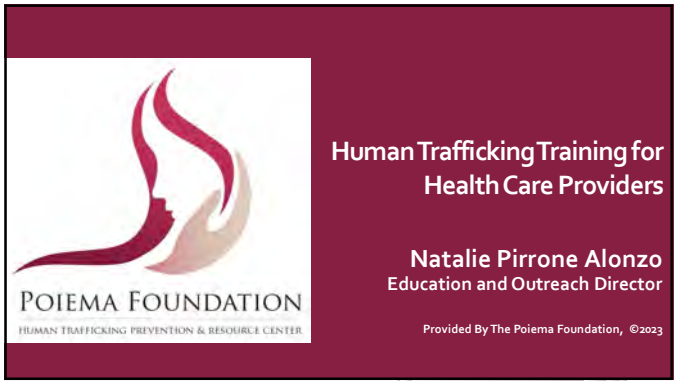
POIEMA FOUNDATION
HUMAN TRAFFICKING PREVENTION & RESOURCE CENTER
Human Trafficking Training for Health Care Providers
Natalie Pirrone Alonzo
Education and Outreach Director
Provided By The Poiema Foundation, ©2023

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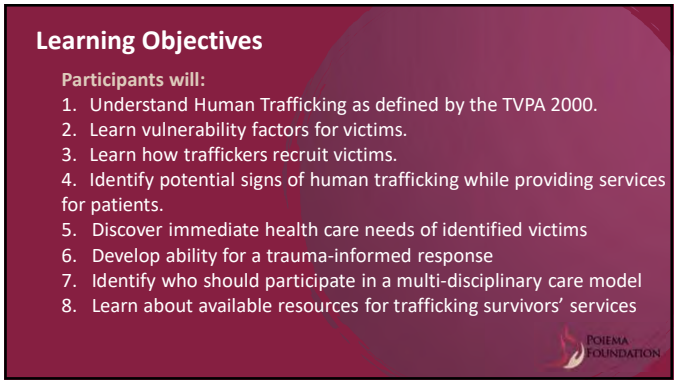
HUMAN TRAFFICKING PREVENTION & RESOURCE CENTER
Conflict of interest and disclosures
• The presenter has no financial relations with commercial interest(s) to disclose
• Statistics in this presentation should be viewed through a critical lens
• No standards currently exist for reporting human trafficking
Trigger warning:
• Violence, sexual assault, and sexual abuse are discussed. This may be triggering or upsetting for some participants

2


Learning Objectives
Participants will:
1. Understand Human Trafficking as defined by the TVPA 2000.
2. Learn vulnerability factors for victims.
3. Learn how traffickers recruit victims.
4. Identify potential signs of human trafficking while providing services for patients.
5. Discover immediate health care needs of identified victims
6. Develop ability for a trauma-informed response
7. Identify who should participate in a multi-disciplinary care model
8. Learn about available resources for trafficking survivors' services
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Human Trafficking

Human trafficking is a modern form of slavery.

It involves selling another person's body or labor in exchange for something of value.

TVPA 2000-The United States Department of Justice generally classifies human trafficking into two major categories: sex trafficking and labor trafficking.

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Trafficking Victims Protection Act (TVPA) 2000

PROCESS/ACTION
- Recruitment
- Harboring
- Transporting
- Provision
- Obtaining
- Patronizing*
- Soliciting*

*only for sex trafficking

MEANS
- Force
- Fraud
- Coercion

*Special Issue: These are not required when the victim is a minor.

PURPOSE
- Sexual Exploitation
- Forced Labor

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Trafficking vs. Smuggling

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Trafficking Vs. Smuggling

Trafficking

- Crime against a person
- Done without consent
- Exploitation; transportation not required
- No border crossing required

Smuggling

- Crime against a state
- Done with consent
- Requires transportation
- Must cross an international border

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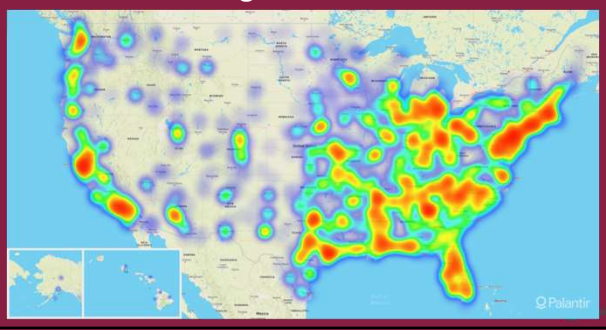
Trafficking in the United States



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Trafficking in Texas

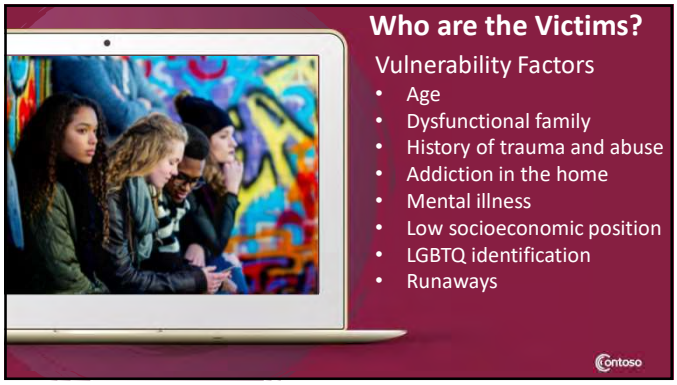
Labor Trafficking

- Agriculture
- Food service
- Factory work
- Day labor/construction
- Nanny
- Domestic work
- Caretaker for the elderly
- Landscaping

Sex Trafficking

- Strip clubs
- Brothels
- Massage parlors
- Nail Salons
- Donut shops
- Internet ads
- Escort services
- Recording studios
- Hotels
- The street
- Pornography
- Modeling
- Neighborhoods

9


Who are the Victims?
Vulnerability Factors
• Age
• Dysfunctional family
• History of trauma and abuse
• Addiction in the home
• Mental illness
• Low socioeconomic position
• LGBTQ identification
• Runaways
Contoso

10


Who are the traffickers?
• Friend
• Family
• Strangers
• "Boyfriends"

11


Maslow's Hierarchy of Needs
Maslow's Hierarchy of Needs
Self-actualization
Ego
Social
Safety
Physiological
The need for development, creativity, growth.
The need for self-esteem, power, control, recognition.
The need for love, belonging, inclusion.
The need for safety, shelter, stability.
The need for air, food, water, health.
https://www.educationviews.org/wp-content/uploads/2018/02/Maslow-1024x580.png
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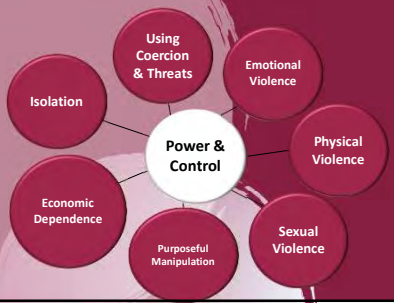
Recruitment/Grooming Process

Domestic Minor Sex Trafficking Power and Control Wheel



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Trauma Bonds

Trauma bonds are a major hurdle to the identification and restoration of victims.

Symptoms:

- Failure to self-identify
- Return to trafficker
- Refuse help
- Disjointed memories
- Aggression
- Protect pimp

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Trauma

DISREGULATED NERVOUS SYSTEM

• Hyperarousal:

Anger, panic and phobias, irritability, hyperactivity, frequent crying and temper tantrums, nightmares and night terrors, regressive behavior, increase in clinging behavior, running away.

• Hypoarousal:

Daydreaming, inability to bond with others, inattention, forgetfulness, shyness.

Physical symptoms can include: eyes widen, pale skin, complaints of being cold, flat affect.

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Characteristics of "The Life"

Impact on Physical Health/Clinical Settings

- Malnutrition
- HIV/AIDS
- STD's
- Hepatitis
- Effects of drug abuse
- Pregnancy/abortions
- Broken bones/bruises
- Dental injuries/cavities
- Cigarette burns
- Head/face trauma
- Exhaustion/sleep depravation
- Skin Conditions
- Concussions, traumatic brain injuries
- High blood pressure
- Untreated diabetes
- Substance abuse

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Characteristics of "The Life"

Impact on Emotional/Behavioral Health

- Nervous/anxiety/panic attacks
- Depression
- Suicidal ideation
- Dissociation
- Avoids eye contact
- Unable to answer questions
- Substance abuse
- Complex PTSD

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Characteristics of "The Life"

Other Indicators of Trafficking:

- Inappropriate clothing for the weather
- Accompanied by an older, controlling boyfriend or woman
- The adult with them doesn't let them answer questions
- Lives in an overcrowded home
- Lives at their place of employment
- Has tattoos indicating ownership/branding
- Disorientation-doesn't know their address
- May have multiple hotel keys or cell phones

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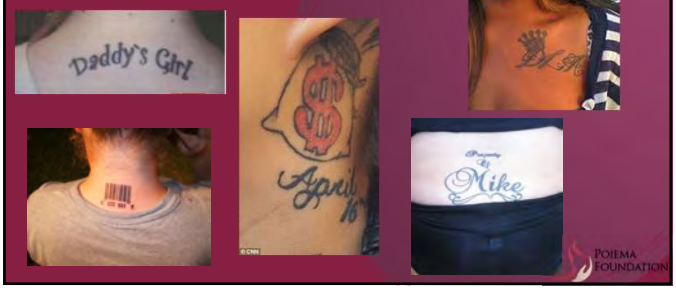
Characteristics of "The Life"



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Characteristics of "The Life"

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Trauma Informed & Patient Centered Approach

If you suspect your patient is a victim of human trafficking:

- Build trust by asking permission before you do a procedure
- Explain what you are doing during the exam (oral/physical trauma)
- If possible, try to provide a space to speak privately with the patient
- Use your authority to separate the patient from anyone who may have accompanied them to the clinic
- Have protocol in place; limit the number of staff involved
- Safety is of primary importance for everyone; equip your staff to understand the importance of confidentiality

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Trauma Informed & Patient Centered Approach

If you suspect your patient is a victim of human trafficking:

- Use a professional interpreter if possible (It is tempting to use their family member, but this could be their trafficker or their manager)
- Strive to minimize re-traumatization
- Maintain a nonjudgmental attitude

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Trauma Informed & Patient Centered Approach

Questions you may ask a potential victim of human trafficking:

- What type of work do you do?
- What are your work hours?
- Are you being paid?
- Are you able to come and go as you please?
- Where do you eat and sleep?
- How many people stay there?
- Do you owe money to your employer?

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Trauma Informed & Patient Centered Approach

Questions you may ask a potential victim of human trafficking:

- Have you ever been asked to work in an environment that is unfair, unsafe, or dangerous?
- Do you feel pressure to do something you don't want to do?
- Have you been physically hurt?
- Has your family been threatened?

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Trauma Informed & Patient Centered Approach

If you suspect your patient is a victim of human trafficking:

- Provide the patient with options for services, reporting, and resources
- If the patient is in immediate, life-threatening danger, follow your institutional policies for reporting to law enforcement. Whenever possible, try to work with the patient in the decision to contact law enforcement.
- Don't make promises you cannot keep!
- Multidisciplinary approach

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Multidisciplinary Team

This team may include 3-5 people from different organizations such as:

- Law enforcement
- Attorneys/legal experts
- Anti-human trafficking nonprofits
- Human trafficking task force members
- Domestic violence/sexual assault programs
- Local shelters

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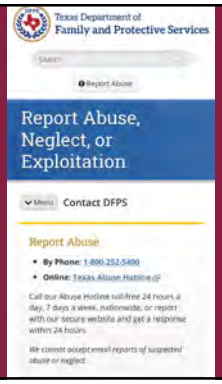
Mandatory Reporting

TEXAS LAW

Anyone who thinks a child, or person 65 years or older, or an adult with disabilities is being abused, neglected, or exploited must report it to DFPS.



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Resources for Protocols

National Human Trafficking Training and Technical Assistance Center

SOAR

https://nhttac.acf.hhs.gov/soar/eguide/respond/Response_Protocol

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Resources for Protocols

i:CARE

Health Care Provider's Guide to Recognizing and Caring for Domestic Minor Sex Trafficking Victims

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National Human Trafficking Resource Center (NHTRC)

1-888-3737-888

email: NHTRC@PolarisProject.org

TOLL-FREE | 24 Hours/day, 7 Days/week

Confidential | Interpreters available

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What Can I Do?

- Text BE FREE (233733)
- Respect the patient's decision

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Local Resources

Poiema Foundation
469-757-8888

Valiant Hearts
817-329-6921
Toll Free: 855-524-3747

Traffick 911 (for minors)
817-575-9923

Child Advocacy Centers

Mosaic Family Services
24-Hour Crisis Hotline
214-823-4434

Unbound Ft. Worth
24/7 Survivor Advocacy Referrals
(crisis & non-crisis)
817-668-6462

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Resources

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- https://www.springfieldnewssun.com/news/national/too-dumb-pimps-texas-police-arrest-connection-with-trafficking-girl/N0FA4mLdXuXdR6LWU7XaIN/
- Bottom: https://www.yourconroenews.com/neighborhood/moco/news/article/Human-trafficking-prostitution-sting-near-The-13363904.php#photo-16452228

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- *Trafficking Victims Protection Act 2000*. (electronic access: https://2009-2017.state.gov/j/tip/laws/61124.htm)
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Human Trafficking Awareness: Health Care Providers

Natalie Pirrone
Education and Outreach Director

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