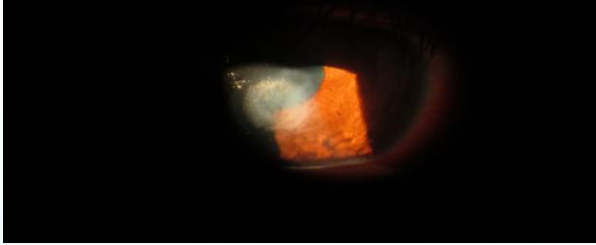


The Oh Crap Moment: When Ocular Emergencies Happen!



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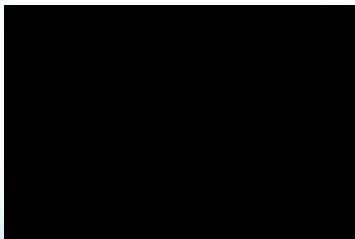
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Disclosures

- The content of this COPE Accredited CE Presentation was prepared independently by Michael Cooper, OD and Margie Recalde, OD without input from members of the ophthalmic community.
- Dr. Cooper is affiliated with Allergan, Alcon Surgical, BioTissue, Shire, JJVC, TearScience, Glaukos, Bausch + Lomb/Valeant, Quidel, Mentholatum, and TearLab as a consultant/speaker.
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2

Setting the Stage...



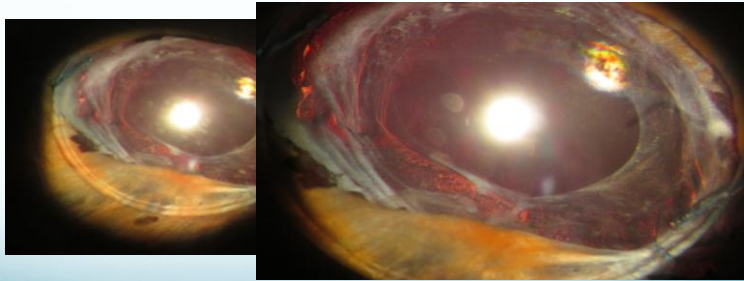
3

Patient Case #1

- 32 year old Caucasian male
- Same day referral from Windham ER, patient was hit by exploding sparkler firework into his right eye.
- Swollen, painful red eye that was shut upon presentation
- Vision was unstable with excessive tearing.
- Patient has had prior surgery twice for a previous paintball injury in the same eye.

4

“Peek a Boo” IOL



5

Exam

- VAsc 20/200 OD, 20/25 OS
- Positive Slit Lamp findings:
 - Upper and Lower right lid: 2+ swelling and ecchymosis
 - Open wounds on right cheek
 - 3+ cell in anterior chamber, no flare present
 - No Seidel Sign, cornea intact, but 1+2 KP present
- Gonioscopy revealed multiple areas of iris tears and prolapse superior OD
- IOP: 11 OD, 16 OS
- Dilated Fundus Exam:
 - Commotio Retinae parafoveal,
 - Multiple chorioretinal scars extending from ONH to nasal macula

6

Treatment

- Cyclo 1% bid OD
- Durezol qid OD
- Generic Cosopt tid OD (pre-existing medication)
- Bacitracin ophthalmic ointment tid for abraded skin tissue

7

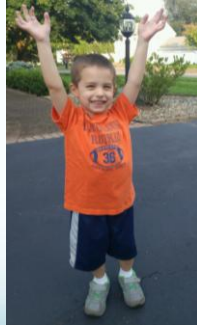
Long Road Ahead

- Took 2-3 months for the Traumatic Iridocyclitis to resolve
 - It could take longer...
- Luckily, pressure remained low and did not spike
 - It can...
- Be mindful of retinal pathology
 - Macula
 - Peripheral
 - Acquired Optic Neuropathy

8

Injury Epidemiology

- Ocular injuries in children account for 20%–50% of all ocular injuries.
- Perforating eye injuries make up 21–24% of serious ocular trauma and are a significant cause of visual loss.
- It is estimated that they can be prevented in up to 90% of cases.
- There is a male predominance of 2–6:1

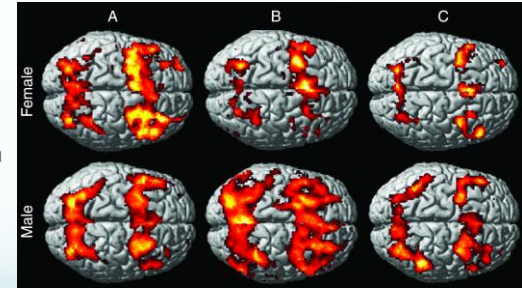


Nelson LB, Wilson TW, Jeffers AB. Eye injuries in childhood: demography, etiology, and prevention. *Pediatrics*. 1989;84(3):438-441.
 Javitt JC, Kameir U, Barilani M, Fostner MR. Open globe injuries in children. *Gravitas Acta Oculi*. Optometric. 2002;28(5):420-426.
 Lindberg J, Brown-Horst M, Chapter 15. Bilateral and Comminuted Injuries From Ocular Trauma. *Principles and Practice*. Thieme 2011; 123-130
 Croxall CM, Enderscott M, Satcher BM. Heavy lid: Intraocular foreign bodies: Management, prognostic factors and visual outcomes. *Ophthalmology* 107 (3): 608-613
 Mural VP, Ellis MK, Williams DP, Han DP. Retained intraocular foreign bodies and endophthalmitis. *Ophthalmology* 97: 1532-1538
 Baranek GS, Topping TM, Hoshida RK et al. Posttraumatic endophthalmitis. *Arch Ophthalmol* 107: 541-552
 Parames DJ, MacComber MW, Hanayon ML et al. Open globe injury: Update on types of injuries and visual results. *Ophthalmology* 103:1793-1803

9

Concussion

- Sports and recreational activities contribute to about 21 percent of all traumatic brain injuries among American children and adolescents.⁷
- Studies show that 90% of all traumatic brain injury patients suffer from visual dysfunctions.⁹
- Out of 100 adolescents diagnosed with a concussion, 69% were also diagnosed with a functional vision problem.¹⁰
- One out of five teens reported at least one concussion diagnosis during their lifetime, and 5.5 percent have had more than one concussion.¹¹



⁷Sports-Related Head Injury. American Association of Neurological Surgeons. Accessed 2/20/18. <http://www.aan.org/About/Neurological-Conditions-and-Treatments/Stroke-related-Head-Injury>
⁹Claiffredo KJ, Kapoor N, Palmer D, Suroff JB, Han ME, Craig S. Occurrence of oculomotor dysfunctions in acquired brain injury: a retrospective analysis. *Optometry* 2007;78(4):155-61.
¹⁰Mason CL, Scherman M, Galloway M, Goodman A, Robinson RL, Master SR, Grady MP. Vision Diagnoses are Common After Concussions in Adolescents. *Clin Pediatr (Phila)*. 2016 Mar;55(3):260-7. doi: 10.1177/0009922815594367. Epub 2015 Jul 7.
¹¹Phi Veliz, PhD et al. Prevalence of Concussion Among US Adolescents and Correlated Factors. *JAMA*, September 2017 DOI: 10.1001/jama.2017.9087

10



NEURO-OPTHALMIC REHABILITATION ASSOCIATION
 Enhancing Neurological Recovery Through Vision Rehabilitation

- Increase public and professional awareness and understanding of the need for and where to find Neuro-Ophthalmic Rehabilitation services.
- Advance professional knowledge and understanding of Neuro-Ophthalmic care and promote research in visual science.
- Encourage an interdisciplinary team approach among all professionals who provide rehabilitative services to individuals who have suffered a traumatic brain injury.



<https://noravisionrehab.org/>

11

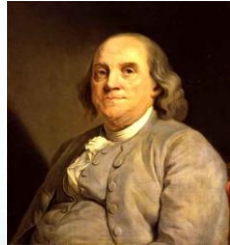
Ocular Emergency

- Immediate Appointment if any of the following:
 - Sudden, painless loss of vision
 - Sudden onset of flashes/floaters
 - Chemical burn: Have patient irrigate eye under running water for 20 minutes prior to coming
 - Potential penetrating injuries
 - Injury to head/neck or eye

12

It's all about the Benjamins— Well at least Franklin

- Our instincts are what guide us best...
- “By failing to prepare, you are preparing to fail.”
- Always remember to “Keep Calm”



13

Educate Staff on Emergency Protocol



14

2 is 1, 1 is none

- Use a systematic approach that engages front and back office staff to prepare and manage emergent cases
- Invaluable preparations can be made in advance of any incident
- Make effective and critical decisions that can be managed quickly (not rashly)
- All staff and doctors should know how to respond confidently.
- AOA Standard of Conduct
- Section B. Emergency Optometric Care

“A request for optometric care in an emergency should receive immediate response. Once having undertaken an emergency case, an optometrist shall neither abandon nor neglect the patient.” *Ethics in Clinical Optometry*

15

TRIAGE QUESTIONS*

What is the problem? How did it happen? Have you experienced this before? Have you had any ocular trauma or surgery lately? When did the symptoms start? Are the symptoms constant or intermittent? Was this onset sudden or gradual? Are the symptoms getting better or worse? In which eye, or is it happening in both eyes?

SEE?	LOOK?	FEEL?
<p>Clarity: How is your vision? Is there a gradual or sudden change in how well you see?</p> <p>Do you have trouble reading at a distance? Do you have trouble reading or seeing up close?</p> <p>Glare/Halos: Do you have glare? Halos?</p> <p>Loss of Vision: Are there any new blind spots in your vision? Do you see a curtain/wall over your vision?</p> <p>Double Vision: Do you see double? Is the double vision new? Is it like a shadow, or truly two images? Are they side-by-side? Or one on top of the other? Does the double vision go away when you close one eye?</p> <p>Flashes and Floaters: Do you see flashes of light or floaters? Do you see a few or many floaters?</p> <p>Light Sensitivity: Are your eyes sensitive to light? Do you need to wear sunglasses inside? Are you keeping your eyes shut?</p> <p>Ocular Migraines: (baldedoscope, zigzag lines, double, distorted, blacks out)</p> <p>Relief: Does anything you do make the vision better/worse?</p>	<p>Redness: Is your eye red? What part of your eye is red? The white part? The colored part? The eye lids? Bumps on your eyelids, forehead, cheeks, nose, lips?</p> <p>Is there pain associated with the redness? Anyone else around you with red eyes?</p> <p>Swollen: Are your eyelids swollen? Are they red? Are they bleeding or oozing?</p> <p>Drainage/Bleeding: Is there any drainage or tears? What color is the drainage? Is it thick, drainage or watery discharge?</p> <p>Droopy Lid/Brow: Are your eyelids droopy in one or both eyes? Is this new? Any other changes in your eyes or face?</p> <p>Cuts, Bruises, Abrasions: Are there any cuts, scrapes, or bruising?</p> <p>Pupils: Are your pupils the same size as each other? Is this difference in size new?</p> <p>Overall Appearance Factors: Does your eye look normal? Any other part of your face look different, droopy, asymmetrical, or worse?</p> <p>Relief: Does your eye look better/worse at certain times?</p>	<p>Discomfort: Do you have eye pain, burning/ stinging/soresness? Do your eyes feel dry/itchy/ irritated?</p> <p>Where is the Discomfort? Inside/outside the eye? Eyeball vs. on the lids? Around the brow/ temples/cheeks?</p> <p>Severity of Discomfort: Describe how your eye feels. On a scale from 1 to 10, rank your eye pain (0=none, 10=extremely bad).</p> <p>Timing: When did the discomfort start? Does the discomfort fluctuate? What seems to make it better/worse?</p> <p>Foreign Bodies: Can you describe what got in your eye (rock, plant material/wood, chemical, etc)? If a chemical in the eye, BRINSE PRO-FUSELY and/or go to the emergency room.</p> <p>Scratches and Chemical Injuries: Did something scratch your eye? Did something get into your eye? Is it still there? What is it?</p> <p>Blinking: Does blinking make it better/worse?</p> <p>Overall Feeling: Any headache, nausea, vomiting, dizziness? Numbness of your face/body? Changes in use of one side of your body?</p> <p>Relief: Does anything relieve the discomfort?</p>

Ophthalmic Professional

*Note that for the See, Look, and Feel questions above, any “yes” answers to questions appearing in red indicate a more serious problem. Triage personnel must be familiar with the practice’s specific guidelines to ensure the patient receives the proper direction and/or is scheduled appropriately. (Also see “How to determine urgent vs. emergency care” on p. 20.)

16

Patient Case #2

- 17 year old female
- 3 days ago, patient was hit OS by another person's head while playing soccer.
- Black eye OS with swelling and tenderness upon touch
- Vision stable
- Mother concerned about internal bleeding
- Urgent care visit 3 days ago: Ice and ibuprofen

17

Exam

- VAsc 20/30 OD, 20/30 OS
- Positive findings:
 - Upper and Lower left lid: 2+ swelling and ecchymosis
 - Subconjunctival Hemorrhage inferior and temporal
- IOP Ta 14mmHg OD, 16mmHg OS at 4:50 pm
- Dilated Fundus Exam: WNL OU
- All other exam findings WNL OU

18

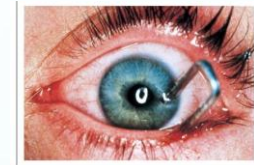
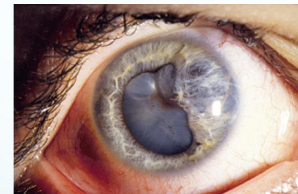
Be Suspicious



- Assume the worst until it is ruled out
- Blunt Ocular Trauma: Always maintain a high index of suspicion for what is often an occult injury.
- Patients with a history of significant ocular and periocular blunt trauma should be considered ruptured until proven otherwise.

19

Occult and Overt Globe Rupture



Signs of occult rupture include hemorrhagic chemosis and pupil irregularity.

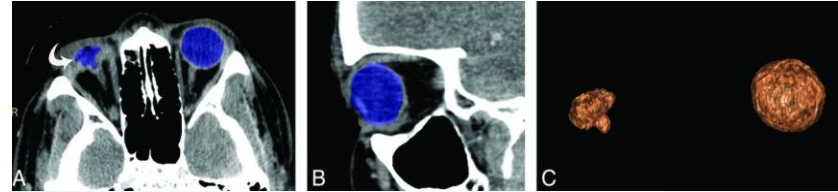
20

Blunt Force Trauma



21

Stab Wound...



22

History

- Take a careful history (clinical and legal reasons)
 - High or Low velocity injury
 - Circumstances of Injury
 - Prior Eye Surgery
 - Vision: Reduced vision and/or Diplopia
 - Pain
 - RD symptoms (flashes, floaters, curtain/veil)
 - Was patient wearing eye protection?

23

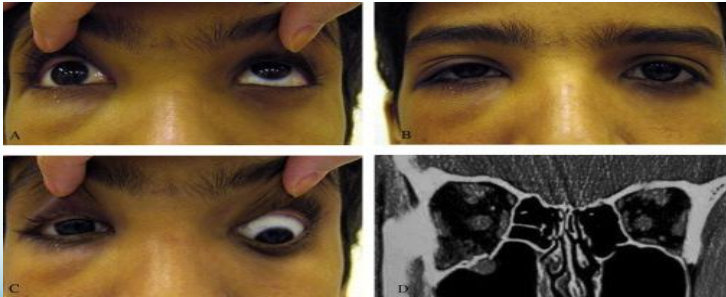
History

- Is patient systemically stable?
 - Nausea, vomiting
- Young Patients with Blunt Trauma



24

White-Eyed Blowout Fractures (WEBOF)



EOM testing crucial!

25

Orbits

- Enophthalmos = ruptured globe

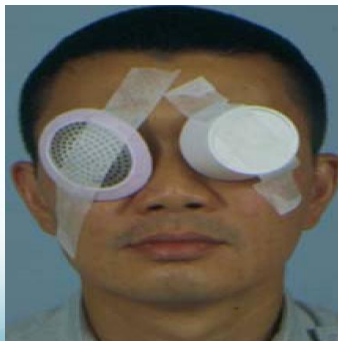


- Orbital Blowout Fracture:
 - Orbital crepitus indicates subcutaneous emphysema from an associated sinus fracture.
 - Numbness of cheek, upper lip, and/or teeth.

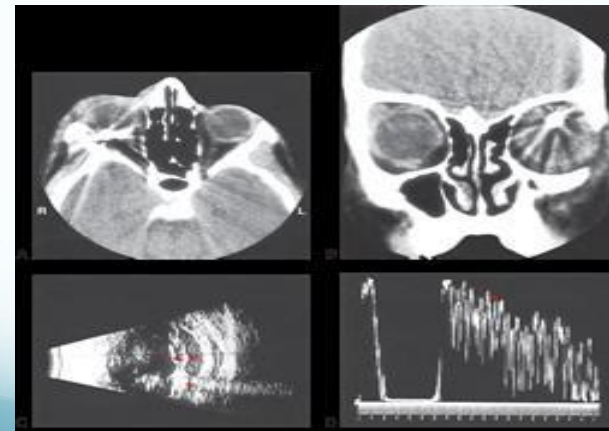
26

Protecting the Eye

- If there is suspicion of a ruptured globe:
 - **Never** patch the eye
 - Cover with a Fox Shield or you can MacGyver it...



27



28

Imaging Techniques

- CT scan of brain and orbits with thin cuts (1.5mm or less) (**NOT MRI**) to evaluate for:
 - Intraocular foreign body (IOFB)
 - If wood suspected, obtain MRI after CT
 - Orbital fractures
 - Other head trauma

*If CT not immediately available, obtain plain X-ray of orbits pre-operatively and CT (as above) post-operatively.

29

Bilateral Eyelid Bruising



Battle's Sign

Highly suggestive of basilar skull fracture, with a positive predictive value of 85%. They are most often associated with fractures of the anterior cranial fossa

30

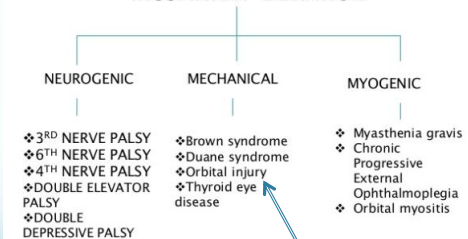
Double vision?

- Key Questions to ask for Diplopia Cases:
 - Monocular or Binocular Diplopia?
 - Comitant= angle of deviation remains the same in all gazes with no limitation to ocular movement
 - hereditary, uncorrected refractive error
 - Incomitant= angle of deviation varies in different gazes with no limitation to ocular movement. Secondary > primary angle deviation.
 - Usually from traumatic injury or vascular disease

31

CLASSIFICATION

INCOMITANT DEVIATION



32

Dangerous Diplopia Cases to Detect

- Diplopia due to Pupil Involving CNIII Palsy
- Problem with more than one of the following: lid, pupil, eye movement
- Multiple cranial neuropathy
- Diplopia variable due to weakness or fatigue
- Diplopia with onset of new kind of headaches, scalp tenderness, pain with chewing.

33

Pupils



- +APD
- R/O compressive optic neuropathy from retrobulbar hemorrhage
- STAT REFERRAL
- A peaked, teardrop-shaped, or otherwise irregular pupil suggests globe rupture.

34

Conjunctiva

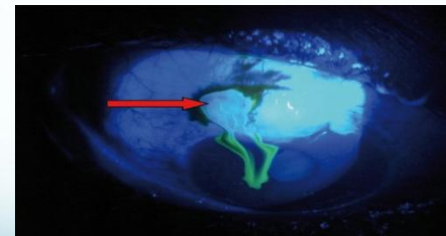
- Conjunctival lacerations may overlie more serious scleral injuries.
- Severe subconjunctival hemorrhage (often covering 360 degrees of bulbar conjunctiva)
 - retrobulbar hemorrhage
 - occult scleral rupture
 - STAT REFERRAL



35

Cornea and Sclera

- Check for Seidel's Sign



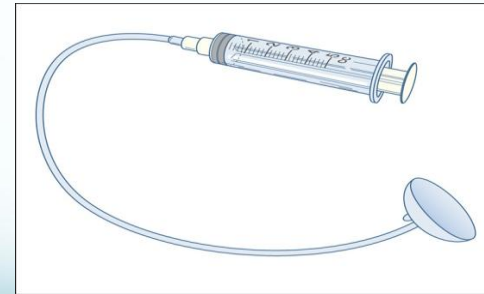
36

Patient Case #3

- 25 year old Indian male
- Same day referral from UCONN Infirmery, patient was exposed to **trifluoroacetic acid** from a chemical experiment explosion in the laboratory.
- Swollen, painful red eye that was shut upon presentation
- Vision was relatively stable with excessive tearing.
- At laboratory bench, immediate action taken to flush with a Morgan Lens present for several minutes.

37

Morgan Lens Setup



38

Exam

- VAsc 20/30 OD, 20/20 OS
- Positive findings:
 - 2 areas of epithelial and intrastromal central corneal defects measuring approximately 4 mm in size (~35% of the cornea)
 - 1+-2 bulbar and palpebral conjunctival injection/hyperemia
 - pH measurement: 7
- IOP(cc) Ta 18mmHg OD, 16mmHg OS at 2:18 pm
- No Seidel Sign: Must rule out necrotizing tissue for risk of perforation

39

Acid vs. Basic Chemical Burn Scales

Grade	Prognosis	Clinical findings	Conjunctiva Involvement	Analogue Scale*
IV	Poor	Cornea opaque, iris and pupil obscured	>1/2 limbal ischemia	
Dua Classification for Ocular Surface Burns				
Grade	Prognosis	Clinical findings	Conjunctiva Involvement	Analogue Scale*
I	Very good	0 clock hours of limbal involvement	0%	0/0%
II	Good	< 3 clock hours of limbal involvement	< 30%	0.1-3/1-29.9%
III	Good	Between 3-6 clock hours of limbal involvement	30-50%	3.1-6/31-50%
IV	Good to guarded	Between 6-9 clock hours of limbal involvement	50-75%	6.1-9/51-75%
V	Guarded to poor	Between 9 and 12 clock hours of limbal involvement	75-100%	9.1-11.9/75.1-99.9%
VI	Very poor	Total limbus (12 clock hours) involved	Total conjunctiva (100%) involved	12/100%

*The analogue scale records the amount of limbal involvement in clock hours of affected limbus/percentage of conjunctival involvement. The conjunctival involvement should be calculated only for the bulbar conjunctiva, up to including the conjunctival fornices.



Figure A (Above) B (Below)



Image Legend

Figure A – Acute Grade II burn. **Figure B** – Grade II burn one week after presentation. **Figure C** – Acute grade III burn with corneal haze. Involvement of approximately 6 clock hours. **Figure D** – Acute grade IV burn (Roper

Treatment

Standard Care (I/II)

- Cycloplegia
- Topical Antibiotics (ointments to fluoroquinolones)
- Topical Steroids (Yes, they do help!)
- Preservative Free AT
- Oral Vit C (2 g)
- Doxycycline (100 mg)
- Debridement

Advanced Care (III/IV)

- Ascorbic Acid (10%)
- Citrate (10%)
- Platelet Rich Plasma
- Debridement
- Amniotic Membrane
- Limbal Stem Cell Transplant
- COMET
- Boston Keratoprosthesis

41

Amniotic Membranes

- Fetal Wound Healing
- Rapid uptake of nutrients and mobilization of stem cells.
- Similar to therapeutics, earlier initiation of membrane allows for better response.
- **Cautionary Note:**
 - **Wet cryopreserved = Wound Healing**
 - **Dry cryopreserved = Wound Coverage**



42

The Ocular Surface Landscape

HC-HA/PTX3 Improves the Quality of the Stem Cell Niche Environment



Time and Quality of Healing

		findings relate to the degree of limbal, regrowth begins to ed limbal stem cells. ng growth while que conjunctival epithelium. Mild injuries show uries can have persis ses peaks by day 14-	
Late Repair	After day 2	Treatment should attempt to stimulate collagen synthesis while	
		All population is intact, repair here is focal stem cell loss, f the cornea. In more severe on of the cornea, ultimately ival epithelium or stromal es of severe limbal damage, n cannot be salvaged.	

44

Savage Commentary

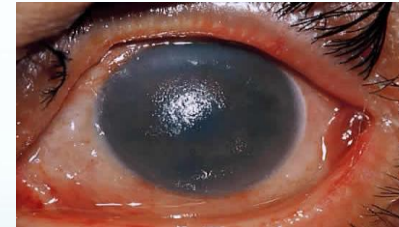
“People are not Perdue Oven Stuffer Chickens with pop up timers.”



45

Words of Caution...

- A **white and quiet** eye is not always better
- Indicative of Alkali burn that has caused diffuse conjunctival ischemia and blanching of vessels.



46

Patient Case #4

- 30 yo Caucasian female
- Windham Hospital Emergency Room for a Girl Fight at the Strip Club after candle holder with hot wax candle thrown at head.
- Swollen, painful red eye that was shut upon presentation
- Vision is significantly decreased and pain scale is...
- Let's talk about the background to the present scenario



47

Exam

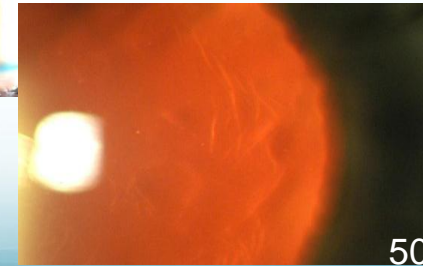
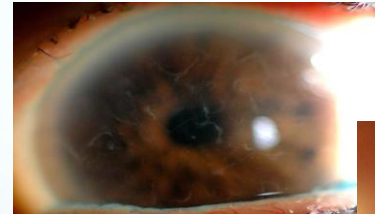
- VAsc 20/200 OD, 20/20 OS
- Positive findings:
 - Geographic central corneal epithelial defect measuring approximately 5.5 mm round in size (~70% of the cornea)
 - 2+ bulbar conjunctival injection/hyperemia
 - Luckily, no anterior chamber reaction (Yet...)
- Unable to get IOP measurement at initial visit
- No Seidel Sign

48

Recurrent Corneal Erosion (Syndrome)

- Chronic relapsing disease of corneal epithelium
- Characterized by disturbance of epithelial basement membrane
- Defective adhesions
- Recurrent breakdown of corneal epithelium
- Redness, photophobia, tearing
- Usually at night or upon awakening
- May be related to REM during sleep cycle

49



50

History

- First reported in 1872
 - Hansen
 - “Intermittent neuralgic vesicular keratitis”
 - Antecedent trauma
- Szili (1900)
 - “epithelial irregularities and gray dots”
- Stood (1900)
 - “trauma to corneal epithelium and anterior stroma → inability of new epithelium to form normal attachments to injured anterior Bowman’s layer.”
- Vogt (1921)
 - “fine white dots on Bowman’s layer; fluorescein staining lines; irregular epithelial surface with localized edema.”

51

Epidemiology

- Case Series; Brown, BJO 60:84-96,1976
 - Age 24-73
 - Highest incidence in 3rd and 4th decade (Avg: 42.5 yo)
 - Initial abrasion to 1st recurrence: 2days – 16 yrs
 - Dominant inheritance in 3%
 - 10% of cases are bilateral

52

Most Common Symptoms & Frustrations

- Pain
- Watering
- Blurred Vision

Management can be frustrating for both patient and doctor

- Patient discouraged because of recurrent pain and decreased vision
- Doctor disheartened by inability to cure disease

53

Etiology/Pathogenesis

Primary

- Epithelial basement membrane dystrophy
 - Map-dot-finger
- Dystrophies involving Bowman's layer
 - Reis-Bucklers
 - Thiel-Behnke
- Stromal dystrophy
 - Lattice
 - Macular
 - Granular

Secondary

- Degeneration
- Trauma
- Post Refractive Surgery

54

RCE Rapid Fire

- Incidence of RCE 1:150 cases following a traumatic abrasion
- Majority – 87% (one study) occur within the lower half of the cornea irrespective to the etiology
 - In close proximity to Hudson-Stahli line
- Tiredness, menopause, menstruation, and alcohol were recognized as aggravating factors
- EBMD cases who suffer trauma are more likely to suffer from RCE

55

Anatomy Dysregulation

- Reattachment of corneal epithelium following an abrasion appears faulty
- Variety of adhesion complex defects have been observed
 - Reduplication of BM
 - Loculation of connective tissues
 - Absence of BM and hemidesmosomes
- Corneal Epithelium
 - develops pale, swollen basal cells
 - pseudocystic collections of cellular and amorphous debris are found within the epi (due to aberrant BM)
- Leads to elevation of epi and accumulation of underlying debris and the further formation of abnormal BM
- Cycle self-perpetuates

56

- Epithelium separation is maximal at night due to superficial edema induced by hypotonicity of tears caused by lack of evaporation
- During lid closure, the surface tension of the tears will cause an adherence between the lids and corneal epithelium
- Opening the eyes quickly creates a shearing force, which is greater than the force of adherence of the affected epithelium which results in epithelial avulsion

57

How to Communicate RCE

- Skin of the eye is not healing or bonding correctly
 - Primer and Paint
 - Crumb coat and Fondant



58

What To Say If “Things” Go South

- More often than not, these conversations occur after the 2nd or more commonly 3rd episode.
 - **Pearl:** Apologize without apologizing.
- Create an actionable plan
 - Allow for patient input
 - Explain customization
- Share latest technology
 - Motivate

59

Diagnosis

- Hx of previous trauma to involved eye
- SLE with indirect illumination
- Retroillumination after dilation
- Ragged greyish-staining area of epithelium
- Cellulose sponge test looking for loose epithelium
- “positive cellulose sponge test”
- Topography
- Anterior OCT Imaging



Treatment Options

Medical – (>95% successfully managed, 70% remaining symptom free x 1 yr, 40% 4 years)

- Promoting epithelial regeneration
 - Patching (rare), bandage contact lenses
 - Antibiotics, cycloplegics, hyperosmotics, corticosteroid, immunomodulation
 - Oral tetracyclines and Vitamin C
 - Mechanical
- When medical management is not successful
 - Debridement + Amniotic Membrane
 - Anterior Stromal Puncture (ASP)
 - Phototherapeutic keratectomy (PTK)
 - Diamond burr superficial keratectomy
 - Nd:YAG
 - Alcohol Delamination

61

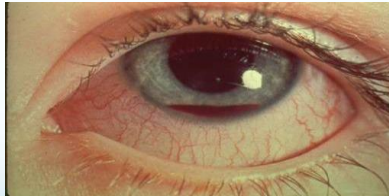
Words of Wisdom

- Reach out to your Optometry and Ophthalmology peers for collaborative care support or 2nd opinion.
- Be wary of long term complications
 - Dry Eye Disease
 - Lid and Palpebral Conjunctiva scarring/madarosis/ shortening
 - Cicatricial Ectropion/Entropion
 - Glaucoma (15-55%)

62

Anterior Chamber

- A shallow anterior chamber may be the only sign of occult globe rupture and is associated with a worse prognosis.
- Rule out Hyphema
- Traumatic Iritis
- Post surgical



63

Patient Case #5

- A 19 year old Caucasian male presents as a same day referral from the UCONN Sports Medicine department for a left eyelid and left side of nose lacerations along with blurry vision secondary to slashing during a hockey practice.
 - The lacerations have been stitched (8 interrupted 6-0 nylon sutures), but the physician's letter is concerned about the vision in his left eye.
 - The patient is in moderate pain (6 of 10 pain scale), has a subconjunctival hemorrhage 270 degrees.
 - Slightly opaque corneal appearance on external exam.

Anxious about his prognosis due to his playing status and scholarship

64

Findings

- VAcc: 20/20 OD; 20/100 OS (PH 20/40)
- Pupils hard to analyze due to corneal haze OS, but appear reactive without APD OU
 - No Seidel Sign
- IOP: 13 OD, 22 OS
- Gonioscopy did not reveal angle recession, 3+ 360, flat iris approach, +PAS (OS)
- AC: No hyphema OU, No cell OD, 3+-4 cell OS
- Dilation revealed no H/T/RD 360 and mild commotio retinae. Stromal haze began to clear after administration of dilation drops and Alphagan P.
 - VA post dilation was 20/50 OS.

65

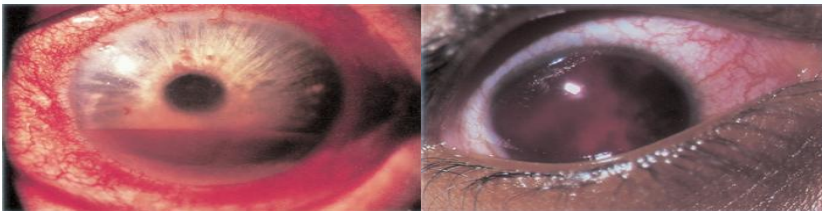
Treatment

- External picture taken for medico-legal purposes.
- Called parents after verbal agreement with patient.
- Patient was seen daily and given the following regimen:
 - Cyclo 1% bid OS
 - Pred Acetate 1% 8x/day OS for 2 days, then cycled down thereafter based on appearance.
 - Alphagan P tid OS
- Day 2
 - VA was 20/20 OD, 20/25 OS
 - IOP was 12 OD, 14 OS
 - AC reaction dropped from 3+-4 to 1+-2 cell OS
 - No stromal haze, but commotio retinae still present

66

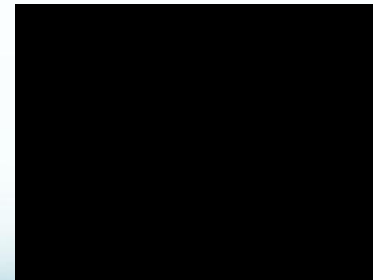
Hyphema Presentation

- Micro to Eight Ball, Hypopyon may be present



67

Popping Bottles



68

Patient Case #6

- 45 year old Hispanic male presents for an emergency with a painful right eye after the cap from his Corona Light bottle popped off as a projectile into his eye. Pain scale 10 of 10.
- VAcc: 20/70 (PHNI) OD, 20/25+2 OS
- Multiple metal fragments in cornea– central, @2, 8
- AC: 2+-3 cell OD and Grade 1 hyphema; no cell OS
- IOP: 9 OD, 12 OS
- No prior Hx of trauma and no Hx of Sickle cell anemia

69

Hyphema Grading Scale

- **Grade 0:** No visible layering, but red blood cells within the anterior chamber (microhyphema)
- **Grade I:** Layered blood occupying less than one third of the anterior chamber
- **Grade II:** Blood filling one third to one half of the anterior chamber
- **Grade III:** Layered blood filling one half to less than total of the anterior chamber
- **Grade IV:** Total filling of the anterior chamber with blood.

70

Findings and In Office Treatment

- Seidel Sign was negative.
- Removed all metal fragments with 30G needle and #11 Disposable scalpel. Gentle buffing with Alger Brush thereafter.
- Gonioscopy revealed 3+-4 360, no angle recession or PAS
- Dilated Fundus examination revealed mild commotio retinae, PVD, no H/T/RD 360

71

Treatment (at home)

- Day 1
 - Cyclo 1% bid OD only
 - Pred Acetate 1% 6x/day OD only
 - Risk of rebleed in literature, so I titrated the dose
 - Besivance qid OD only
 - Bandage lens inserted and positioned
 - Pt advised no heavy lifting, bed rest, and no drinking Corona Light or any beer bottle/can until further notice

72

It Gets Better...

- Days 2 to 5
 - VAcc is 20/30+1 OD (PHNI), 20/25 OS
 - Grade 1 Hyphema slowly resolves to resolution by day 5
 - AC reaction decreases to tr-1+ cell by day 5
 - No commotio retinae evident on dilated examination
 - Corneal wound sites sealing in nicely. BCL was removed on Day 2.
- Treatment was titrated as follows:
 - Cyclo 1% remained at bid
 - Pred Acetate 1% tapered from 6-4-3 to bid by day 5
 - Besivance qid until Day 10, then stopped

73

Then It Gets Worse...

- He cracked open another Corona Light towards his face and flew back into the same eye about 2-3 weeks later!
 - Hyphema was Grade 0-1, started same regimen.
- I instructed him to pop the cap off in a towel or simply away from his face next time...
- The only residual issue was his refractive error acquired astigmatism likely due to the corneal injuries.

74

If you do see Hypopyon...

- Suspect Herpetic Infection or Ghost Cell Glaucoma

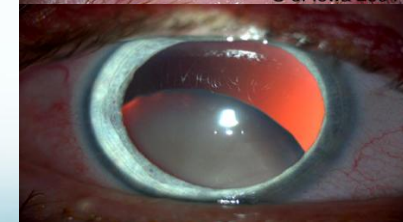


75

Iris



Lens



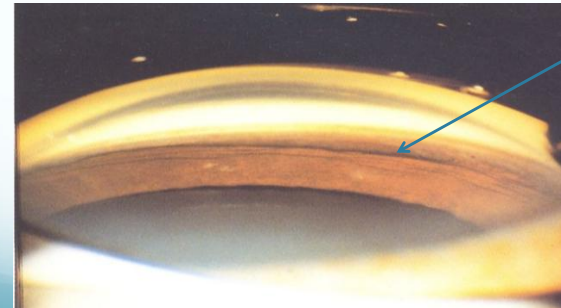
76

Uveal Prolapse= Globe



77

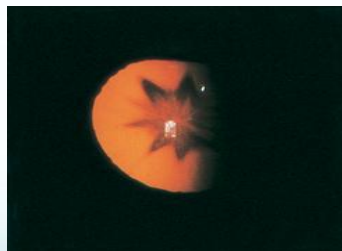
Angle Recession



Dark Chocolate Brown Pigment

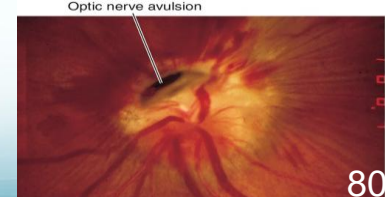
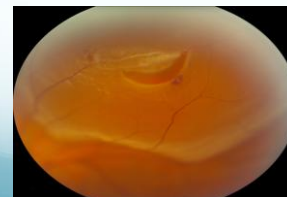
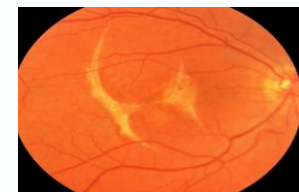
78

Traumatic Cataracts



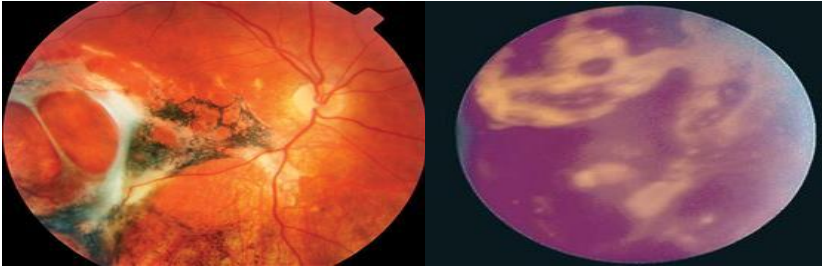
79

Fundus



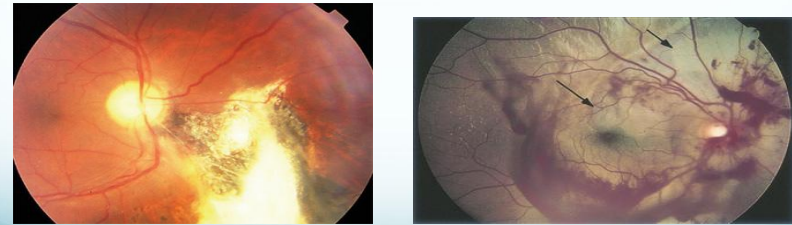
80

High Velocity Retinal Trauma



81

The Aftermath of Retinal Trauma



82

Patient Case #7: Not So Lucky...

- 65 year old patient complains of severe headaches temporally on the right side and blurry vision in the right eye for several days. Dilated exam reveals optic nerve edema but no hemorrhages.
 - What other questions would you ask?
 - Are we the only providers she has seen?
 - What ophthalmological information is pertinent to collect?
 - How would you manage and treat this patient?

83

Findings

- VAcc: 20/800 OD (PH 20/400); 20/40 OS (PH 20/25)
- 2+ APD OD, sluggish
- SLE WNL and No cell evident
- Pseudophakia OU w/ mild PCO
- ONH edematous OD, no disc heme present
 - OS had a question of pallor vs. pseudopallor
- 1+-2 RPE changes, moderate sized drusen x2
- 1 Cotton wool spot seen along the sup arcade



84

Diagnosis and Treatment

- AAION w/ tentative GCA/Temporal Arteritis pending biopsy
- Sent to ER immediately for further evaluation and recommended administration of **corticosteroids** prior to biopsy even with a pending physical examination.
 - Bloodwork for ESR/CRP and CBC w/ differential given to patient to hand deliver to ER team
- Unfortunately, the damage was done. He survived the incident, but his vision was CF 2' post treatment.

85

	TRUE FKS	PSEUDO-FKS
HISTORY	Progressive visual loss in one eye with optic atrophy, often asymptomatic in fellow eye with papilledema	Two separate acute attacks of sudden visual loss with optic disc edema that resolves to optic atrophy.
SYMPTOMS and SIGNS	Other symptoms and signs of increased intracranial pressure may be present (e.g., headache, diplopia, nausea, vomiting)	In NAION, typically no other symptoms are present. Giant cell arteritis (A-AION) may have headache, scalp tenderness, jaw claudication). Other inflammatory or demyelinating etiologies (e.g., optic neuritis, neuromyelitis optica) may have other neurologic signs and symptoms.
VISUAL ACUITY	Variable ↓ in affected eye but often normal in the eye with papilledema	Variable loss of vision in both eyes.
VISUAL FIELDS	Variable ↓ visual field in eye with optic atrophy and an enlarged blind spot or other nerve fiber layer defect in eye with papilledema.	Variable loss of visual field in optic neuropathy pattern in both eyes (e.g., central, nerve fiber layer loss)
CUP:DISC	Not applicable	A small, crowded, cupless optic disc is a structural risk factor for NAION.
APPEARANCE OF OPTIC DISC	One eye has optic atrophy and the fellow eye has papilledema. The presence of other ophthalmoscopic signs of increased intracranial pressure related papilledema may be helpful (e.g., retinal or choroidal folds, subretinal fluid, hemorrhage, exudate, cotton wool spots).	The optic disc edema or optic atrophy may be sector or diffuse.

86

Urgent Care Equipment & Supplies

- Alger Brush
- Spud
- pH Indicator (0-13)
- Fox Shield
- Media for Culturing (ie. Plates, Rapid Culture Tubes)
- Betadine Wash
- Rapid Pathogen Screening
- Glaucoma Medications: topical and oral for emergencies
- Steroids and Mydriatics for Acute Iritis/Iridocyclitis
- Topical Anti-bacterial Medications

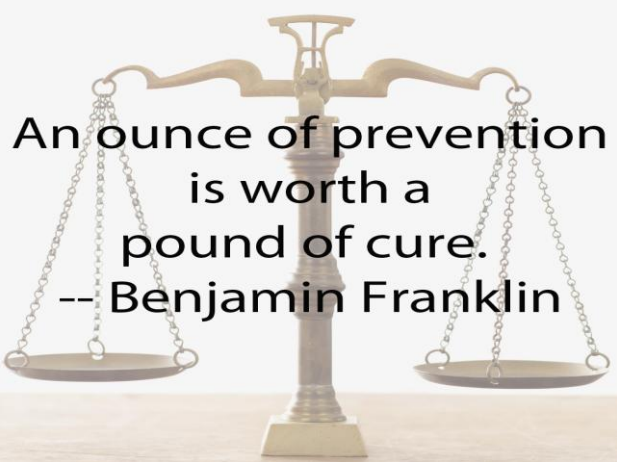
87

Annual Exams REQUIRED

- Ocular Trauma Patients followed for life:
 - Angle recession glaucoma
 - Cataract
 - Peripheral retinal tear
 - Statistics indicate that patients who have trauma in one eye are likely to have trauma in the other eye and are more likely to die from trauma later in life.



88



An ounce of prevention
is worth a
pound of cure.
-- Benjamin Franklin

89