Corneal Abrasions
Ocular Trauma & Foreign Bodies
Concepts, Myths, Cases

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Financial Disclosure
I am now or recently have been a speaker or advisory board member for Alcon, Allergan, AMO, Bausch & Lomb and Essilor Lenses. Medications & products from the above companies are sited in this presentation.

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My views are my own and do not represent the views of the DOD or US Government

Which was most painful?
1. Paper cuts
2. Metallic FB Post Lasik
3. Cigarette Burn

Just the Facts...
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• Abrasion: 3% all ER visits
• Occupational eye injuries – 60% of Facial injuries

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• ER – Eye visits – 6 - 8%  (Half abrasions)
• Abrasion: 3% all ER visits
• Occupational eye injuries – 60% of Facial injuries
• Days off with Abrasions – Average 2.2 - 2.8
• FB and Abrasions: 87% industrial eye injuries
• Males, Preventable, Younger
• Common Post-Op Complication
**Just the Military Facts**

- **Superficial injury: Abrasions & FB’s**
  - 133,274 (12,164 yr)
- **70% missed work / Avg 2.8 days**

Costs of Military Eye Injury, Frick, Kevin JHU PH NAEVR

**Injury Reduction:**

- **Critical & Cost Effective**
- **90% Ocular Trauma Preventable**
- **2003 – 2006:** 3276 Casualties
- **17% wearing Eye Pro**
  - Intense Eye Pro program – incidence and severity dropped dramatically

J Trauma, 2009 Apr 66 99 –103, Mcmanus et.al., Ocular injury reduction from ocular protection in current combat operations

**“Diagnosis before Treatment”**

Never... *Just another Abrasion*

★ Image courtesy U Iowa Hospitals
“Diagnosis before Treatment”
Never... Just another Abrasion

Cornea Cross Section

One Human Hair = 50μ

Corneal Repair

- Cell migration, proliferation, differentiation and Matrix re-modeling
- Limbal stem cells drive the Epithelial process
- Stromal healing -> Keratocytes to fibroblasts and myoblasts
- Scarring – a later discussion

Myth-busters

- Limited Anesthetics: do not delay healing, more effective, 7.7 to 3.9 vs Placebo
- NSAID’s short term – no corneal melts < 72 hrs
- Topical NSAID’s reduce pain scores:
  Statistically significant pain reduction (95 % CI)

**Patch/ BSCL/ Ointment or None?**

- **Same healing time** – < 3 mm abrasion
- **Un-supervised anesthetic Drop**: 14 days of use, Epi defect 100%, infiltrates in 8 eyes
- **Tobacco** - 20 yr retrospective – averaged 1 day longer to closure, much longer in Keratitis

**Pain Management**

- **Expectation Management:**
  - Time frame to healing & better/worse vision
- **NSAID’s - Numerous studies**
- **Cold packs, cool PF AT’s**

**Non/Slow Healing Epithelium**

- **Tobacco Users **
- **Diabetics or Pre-diabetics **
- **Non – compliant, “won’t rest”**
- **EBMD prior diagnosis**
- **HSV – secondary to TX**

**Non Healers: Case # 1**

**Post PRK:**
- 37 y.o. black male, compliant
- 7 Days P.O. – 4 mm epis, no FML
- 12 days – Ragged edges, non-closure
- 14 days – Less pain, non-closure

**References:**
- U.S. Department of Health & Human Services
- Centers for Disease Control and Prevention
- United States Department of Labor Bureau of Labor Statistics
**DDX and Treatment**

- Medica-mentosa
- Bacterial / Fungal infection
- HSV
  - Decrease in Pain
  - Haze vs Stromal / Epithelial


**Treatment**

- Switch to Polytrim – Q 3 – 4 hrs
- Begin Valtrex – 1000 MG TID x 48 Hrs, then QD x 5-7 days $\$\$\$\$ (Acyclovir $) 5 x$ the bio-availability
- Zirgan Ung: Gancyclovir 5 x day x 48 hr, TID $\$$$$$
- Follow Up: 1, 3, 5 days

- **Pathogenesis**

  - Resident in Tri-geminal ganglion
  - Re-activation – UV, Trauma
  - Steroids +/-

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  - PCR DX
  - Masquerader
  - Prophylaxis

**Abrasion: “Stopped Healing”**

Strategies:
1. D/C any steroids
2. Remove BSCL
3. CTR – ALT – DELETE – Scrape edges
4. Ointment and see in 24 hrs

**Non Healers: Case # 2**

Tree Branch Abrasion:
Hiking on the Appalachian Trail
2 x 6 mm abrasion/ VA 20/70
Cleaned the edges – Vegetative
Ciloxan, Ketorolac, UNG

- U.S. Department of Health & Human Services
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**Non Healers: Case #2**

**Tree Branch Abrasion:**
- Entering VA – 20/60
- 4 x 6 mm abrasion
- Ciloxan, PF AT’s, Ketorolac
- Failed to heal x 7 days

- U.S. Department of Health & Human Services
- Centers for Disease Control and Prevention
- United States Department of Labor Bureau of Labor Statistics

**Re-consider DX?**

- Ciprofloxacin x 14 days

**Another Tree Branch at 6 Months PRK PO**
- If the patient had PRK, then closer FU is necessary
- Following Closure – see one week later
- If haze has begun – Steroid taper

**Closed Grape... Open Grape**
- Patient presents with FB sensation, following a vine “snapping” back and hitting the eye
- VA – 20/60, 5 mm Abrasion
- CL bandage lens/ Vigamox
- 5 days, not healing... referred...Friday PM

A Stitch Not in time...for the Vine

- Open globe identified: + Seidels
- Posterior Pole examined
- Closed with stitches
- AM – Sat, Seidel +
- Cyanoacrylate glue + BSCL
- IOP rise
- Co-sopt

Day after stitches...leaking....glue
Day 7 – No leak – 20/80...IOP 42
Homatropine/ Cosopt
Start PF 1% QID
Risks?

Keeping in Mind the Rare but Critical

- Closed globe.... Or open globe ?
- Method of injury
- Anterior Chamber/ Iris
- Hypotony / Seidel’s sign /
  Flat chamber/ irregular chamber
- Limit physical activity

Corneal Foreign Body

Foreign Body Removal

- Document the History/ entering acuity/ self–treatment / Safety glasses?
- What is the FB – Vegetative, Metallic, Wood
- Anesthetize the eye – both of them
- Instrument of choice – 25 G needle, Spud
- Drop of NSAID
- Approach tangential
- Education and Expectation/ RX

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12 y.o. with Cigarette Corneal Burn

- VA: 20/40
- Minimal pain and FBS
- Anesthetized O.U.
- Saline rinse /evert/ swab
- NSAID 1 gtt
12 y.o. with Cigarette Corneal Burn

- Debride Epi – Defect + 1 mm
- Vigamox QID
- Cylcoplege
- BSCL
- Sunglasses
- RTC 24 hrs PM
- “Will heal in 48-72 hrs”

Foreign Body Removal

- Bandage contact lens or not?
- See you in 24 hours
- Meds/vision / sequelae
- 25 Gauge needle
- Swab Fornix/Upper Lid

Take Home

- Abrasions are common but never routine
- If delayed healing…reconsider
- CRS Post Abrasion is different
- FB…have an index of suspicion
- Documentation
- This is primary care

We Never Forget Who we are Working For

Lockheed Martin Slogan

Enhancing Readiness, Survivability and Efficiency in the Human Weapon System