Contact Lens Patient:

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Disclosures:
- Alcon
- Allergan
- AMO
- Bausch & Lomb
- CooperVision
- Paragon Vision Science
- Polymer Technology

- Contact lens wear
- Non-CL related conjunctivitis
  - Bacterial
  - Viral
  - Allergic
- Dryness
- Other irritants
  - Smoke
  - Dust
  - Pool Chlorine

Red = Inflammation
Rubor (redness)
Tumor (swelling)
Calore (heat)
Dolore (pain)

A protective response

While modern medical technology has greatly enhanced our ability to diagnose and treat disease, it has also promoted laziness—especially mental laziness—among many physicians. Habitual reliance on sophisticated medical gadgetry for diagnosis prevents physicians from using the most sophisticated, intricate machine they’ll ever and always have—the brain.

Herbert L. Fred, MD
Professor, Department of Internal Med.
The University of Texas

A Good History
442 consecutive patients
Compared experience:
- Senior Resident 80.1%
  (4 yrs)
- Experience Clinician 84.4%
  (>20 yrs)

Paley L, et al. Utility of Clinical Examination in the Diagnosis of Emergency Department Patients Admitted to the Department of Medicine of an Academic Hospital Arch Intern Med 2011;171(15):1393-1400
Most valuable tools?  
- History alone: 18.8% (19.8%)
- Basic tests (BT) alone: 0.8% (0.3%)
- Hx + BT: 14.7% (14.7%)
- Hx + Physical examination (PE): 16.9% (16.5%)
- Imaging studies: 6.5% (6.1%)

Where?  
- Both eyes?  
- Nasal canthus?  
- Eyelid margins?  
- Seasonal?  
- After computer use?  
- Modifying factors?  
- Rubbing?

How do your eyes feel?  
- Itch: Allergy?  
- Burn: Dryness?

Where?  
- Both eyes?  
- Seasonal?  
- After computer use?  
- Modifying factors?  
- Rubbing?

Quality: Itch  
- Where?  
- Both eyes?  
- Nasal canthus?  
- Eyelid margins?  
- Seasonal?  
- After computer use?  
- Rubbing?

Quality: Burn  
- Where?  
- Both eyes?  
- After reading/computer use?  
- After CL application?  
- Rubbing?

Associated symptoms  
- Produce matter?  
- Stringy vs globular  
- White vs green  
- Mattet shut in am?  
- Watery?  
- Photophobia?

Red Eye: Potential Causes  
- Contact lens wear  
- Non-CL related conjunctivitis  
- Bacterial  
- Viral  
- Allergic  
- Dryness  
- Other irritants  
- Smoke  
- Dust  
- Pool Chlorine

Is redness associated with CL wear?  
- Modifying factors (What helps?)  
- Removing CL’s!!!

Do symptoms get worse when you wear your CL’s?  
- Do symptoms get better when you remove your CL’s?  
- Do you wake up with red eyes?  
- DW  
- EW

**Causes of CL Red Eye**

- **Hypoxia**
  - More likely if:
    - Long hours of wear
    - Higher prescription (thinner lens)
    - High corneal oxygen demand?

- **Silicone Hydrogels**
  - More Oxygen!
  - 66% of US market

**Benefits of Silicone Hydrogels**
- Fewer hypoxic changes
- Less limbal redness
  - 31% (EW) - 35% (DW) with hydrogels

**Corneal Oxygen Demand**

**Quint and Sweeney**
- Corneal microcysts
  - 90-100% in hyd EW

**Signs of Hypoxia**
- Limbal redness
- Neovascularization
- Corneal microcysts
- Myopic creep
  - 40% of EW Hyd wearers

**Related Research**
Hypoxia
Mechanical/Allergic

Causes of CL Red Eye

Hypoxia
Mechanical/Allergic

Mechanical issues
SEALS
Contact lens-induced papillary conjunctivitis (CLPC)
Higher rate of local CLPC with Silly lenses (4.6%) CL Silly rate significantly reduced


Silicone Hydrogels
Mechanical issues
SEALS
Contact lens-induced papillary conjunctivitis (CLPC)
Higher rate of local CLPC with Silly lenses (4.6%)


To the Rescue?
MK rates unchanged (5xDW)

1989 Hyd: 20.9/10,000
2005 SiHy: 18.0/10,000
2008 SiHy: 25.4/10,000


Concern about corneal inflammatory events (CIEs)
26.7% incidence
2x increase vs hydrogel 1,2


Symptoms:
Watery, painful eye
Onset: On waking with EW
Etiology: Gram neg bacteria
Treatment: D/C CL Wear Meds?
1/3 will recur


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- **CIPU → CPLU?**
  - [Courtesy: CEESIU/PDO Guide to Corneal Infiltrative Conditions]

- **Bacteria bind in higher levels to SiHy lenses**
  - Related to increase in CIEs?
  - [Subbaroaran U], et al. Influence of protein deposition on bacterial adherence to contact lenses. (Optom Vis Sci 2011;88(8):459-466)

- **CLPU (Contact Lens Peripherul Ulcer)**
  - Silicione Hydrogels
  - MK rates unchanged (~5xDW)
  - Concern about corneal inflammatory events (CIEs)
    - 26.7% incidence
    - 2x increase vs hydrogel
  - Material/wear sch/other?

- **Risk factors for CIEs**
  - Age
    - Greatest risk: late adolescence and early adulthood
  - Years of contact lens wear
  - Silicone hydrogel material
    - Unreported overnight wear?
    - Higher lens modulus?
  - Care system issues?
  - Lens replacement schedule
    - Other than daily disposable
  - [Carnt N, et al., Contact lens-related adverse events and the silicone hydrogel lenses and daily wear care system used, Arch. Ophthalm., 127(12):1616-1623.]

- **Chalmers et al. March 2012**
  - 12.5 X less likely with Daily Disposable in maileable lenses

- **Daily Disposables: Usage in USA**
  - 2009: 11%
  - 2010: 13%
  - 2011: 14%
  - 2012: 17%
  - 2013: 20%
  - [Nichols, J. Contact Lens Spectrum, Jan 2014]

- **Why Not DD?**
  - Limited Parameter Availability?
    - Spheres
    - Tinted Spheres
    - Torics
    - Multifocals
  - Environmental Concerns?
Not adding chemicals to the waste stream
Cardboard boxes: recyclable
The Foil Pack:
  - Foil top: aluminum recycling
  - Plastic bottom: Plastic #5 recycling

Poorest level of compliance involves contact cases. 2
Poor storage case hygiene can put patients almost at as much risk for MK as EW. 3
Most asked question on ContactLensSafety.org
“Now should I clean my contact lens case?”

Limited Parameter Availability
Environmental Concerns
Concerns about Overwear?

Compliance with replacement is higher than 2wk or 1 mo. Why?
  - Easy
  - Lead cause of non-compliance: Forgot which day due to replace
  - Not an issue with DD
  - No change in behavior required

3. Szczotka-Flynn LB. New gold standard references for contact lens-related MK. Cont Lens Spect. 2009 January
Immediately after lens removal:
- Discard old solution
- Rub case with clean fingers (5 sec)
- Rinse with disinfecting solution
- Wipe dry with clean cloth
- Store:
  - with lids off, upside down
  - in clean area
- Avoid tap water

* Silver impregnated cases: store with lids on

CL-induced infiltrates in USA in 2010:
- Severe:
  - 17,248 cases
  - $1500/episode
- Non-Severe:
  - 32,031 cases
  - $1000/episode
- Total Cost: $58 million overall


Daily Disposable
- No case

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<thead>
<tr>
<th></th>
<th>1-Day</th>
<th>2-wk</th>
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<tbody>
<tr>
<td>Cost (1 yr supply)</td>
<td>$value</td>
<td>$value</td>
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<tr>
<td>Solution Costs</td>
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<td>$value</td>
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<tr>
<td>Rebates</td>
<td>$value</td>
<td>$value</td>
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<tr>
<td>Difference (2 wk)</td>
<td>$0.26 more per day</td>
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<tr>
<td>Difference (Monthly)</td>
<td>$0.10 more per day</td>
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For Part-Time Wearers: cheaper than reusable!

* Drs. Quinn, Foster & Associates

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<thead>
<tr>
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<th>1-Day</th>
<th>2-wk</th>
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<tbody>
<tr>
<td>Material price competitive with on-line</td>
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<td>Profit: 2 x more than 2 wk or Monthly</td>
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<tr>
<td>Additional incentive</td>
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<td>Reduced fitting fee</td>
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<td>Total Profit</td>
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<td>30% higher than 2 wk</td>
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<tr>
<td>23% higher than Monthly</td>
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Daily Disposables - Benefits

- It's what's best for the patient
- It's what's best for the patient
- It's what's best for the patient
- It's what's best for the patient
- It's good for the practice
- Happy patients
- Make a recommendation or prescribe!
- Beneficial even if patient initially declines
  - You've meet the standard
  - May be embraced at next visit

Sources of Microbial Contamination
- Contact Lens Case
- Solution Bottle
- Hands
- Environment – soil, water
- Old, deposited contacts

Handwashing
- Hands as a vector, even with DD
  - Lipid Deposits
  - Discomfort
  - CIEs
  - MK