What’s New in Lens Care
Avoiding Complications

Michael A. Ward, MSc, FAAO, FSLSC
mward@emory.edu

GSL 2017
Michael A Ward
Potential COI Disclosures
previous 12 months

• GPLI Advisory Board
• Columnist for Contact Lens Spectrum
• Review Board, Review of Cornea and Contact Lenses
• Consultant to Industry: Alden, B+L, X-Cel
• I do not own stock or have financial interest in any contact lens or lens care company
Evolution of SCL Lens Care chemical systems

Chemical disinfection:
- daily cleaners
- saline rinse
- overnight chemical disinfection (e.g. thimerosal, chlorhexidine)
- morning saline rinse
- weekly cleaners
Toxic Reactions to MPS

• Early or late onset of S&S
• Often a history of recurrent low-level irritation/redness that resolves post d/c CL wear and returns when CL wear resumes; +/- multiple treatments with Ab & anti-inflammatory meds
• Injection and SEIs tend to present early at superior limbus, then more diffuse
Multivariate Risk Factors for CIEs

- Incidence ~ 3-7%
- Reusable SCL
- Extended Wear
- Silicone Hydrogel
- Likely association with storage case contamination

Szczotka-Flynn et al Optom & Vis Sci 2014
Current MPS Formulations

- Opti-Free PureMoist
- RevitaLens
- Biotrue

© Emory
Blink RevitaLens (AMO)

- polyquaternium-1 (PQ-1) – 0.0003%
- alexidine dihydrochloride – 0.00016%
- Tetronic 904 – Surfactant/lubricant
- Borate buffer
- EDTA
BioTrue (B+L)

- polyhexamethylene biguanide (PHMB) – 0.00013%
- polyquaternium-1 – 0.0001%
- poloxamine
- hyaluronan
- borate buffer, EDTA
OptiFree Pure Moist (Alcon)

• Same disinfectants as OFX & OFR
  – antimicrobial Aldox 0.0006% (myristamidopropyl dimethylamine)
  – antimicrobial Polyquaternium-1 @ 0.001%
• HydraGlyde
  – Tetronic1304 & EOBO
  – Surfactants, lubricants
• Sorbitol
• EDTA

© Emory
Hydrogen Peroxide
Mode of action

- $\text{H}_2\text{O}_2 \Rightarrow \text{H}_2\text{O} + \text{O}_2$
  - produces free radical superoxide, which is toxic to microbes;
  - damages DNA
- strong oxidant
- not affected by organic matter
- removes proteins & lipids from lens surfaces

© Emory
Peroxides

- Very effective, and preservative free
- For daily use; not for occasional CL wearers
- Caution patients not to store ‘spare lenses’ in neutralized peroxides
- Most common problem is toxicity from non/insufficiently neutralized H₂O₂
Contact Lens Wear

• Contact lens wear is not a sterile event, but it should be a clean one

• Consider:
  – Our eyes are not sterile
  – Our fingers are not sterile
  – Only new lenses are sterile – until they are touched
Risk Factors for Microbial Keratitis

- #1-Sleeping in contact lenses
- Wearing CL during water activities
- High ametropias
- < 25 years of age, and new wearers
- Ordering CLs on line (4.8 X)
- Poor hygiene; smoking
GP Lens Care
GP Lens Care includes

- Surface cleaning/debulking of debris
- Disinfection
- Surface conditioning
- Cushioning
- Wetting/rewetting
- Lens storage & case care
Rub & Rinse to remove

- Dirt and microbes
- Tear debris
- Eye area cosmetics
- Facial/hand creams
- Rub & Rinse prepares lens surface for disinfection and surface conditioning
HCL/GP Cleaners

- Abrasive
  - Boston Cleaner

- Mildly Abrasive
  - Alcon Opti-Free
  - Boston Advance

- Non-Abrasive
  - Optimum by Lobob
  - Extra Strength Cleaner (Walgreens, Sereine)
What should be used to rinse off daily cleaners?

- Water
  - tap / filtered
  - bottled
  - distilled
- MPS
- Saline
  - multidose
  - unit dose
  - aerosol
Multipurpose All-in-one Solutions

Cleaning, disinfecting, soaking, wetting

• Simplus (B+L)
• Unique pH /
  – Opti Free GP (Alcon)
Unique pH (Menicon)

- Polyquaternium-1 preserved @ 0.0011% & EDTA
- Hydroxypropyl guar, PEG, PG, boric acid
- Viscosity adjusts with pH
  - $\uparrow$ pH = $\uparrow$ viscosity
  - $\downarrow$ pH = $\downarrow$ viscosity
- Can add Opti-Free Supraclens Daily Protein Remover if needed
- Rub & rinse lenses prior to application!
Boston Simplus (B+L)

- Contains poloxamine to remove dirt & repel deposits from lens surfaces
- Hydroxyalkylphosphate (HAP) for protein removal
- Chlorhexidine & PAPB for disinfection
- Glucam-20 & Hydroxypropylmethyl Cellulose (HPMC)
  - Cushioning on insertion
  - Uniform wetting
- No evening rub; + Morning rub n rinse

© Emory
GP Care Systems

- Boston
- Boston Advance
- Optimum
  - ESC, CDS, WRW
- Menicon
  - CDS, WRW
Isopropanol-based Cleaners

- Miraflo\-w
- Sereine (Optikem)
- Sof/Pro2 (Lobob)
- All contain 15.7% isopropanol with surfactants
- Poloxamer 407
- Amphoteric 10
Optimum (Lobob)

- 3 part system
- Separate:
  - Extra strength cleaner
  - Cleaning, soaking, disinfecting
  - Wetting/Rewetting
Optimum (Lobob)

- **Cleaning/ Disinfecting/ Storage:** CDS
  - benzyl alcohol 0.1%, disodium edetate 0.5%, surfactants

- **Rewetting Drops:** WRW
  - benzyl alcohol 0.1%
  - disodium edetate 0.5%
  - sorbic acid 0.05%
  - PVA, PVP, mc
Surface Cleaning and Debulking; Rub & Rinse

- Dirt and microbes
- Tear debris
- Eye area cosmetics
- Facial/hand creams
- Rub & Rinse prepares lens surface for disinfection and surface conditioning

© Emory
‘spare set’  GP Lens Storage

Lens Storage

• If stored wet:
  – Re-clean and change solution at least weekly

• store dry for long term storage, and repeat disinfection cycle prior to lens wear (4 h)
Enzymatic Cleaners

- Papain (papaya)
  - no longer available
- Pancreatin (porcine protease)
  - Supraclens
- Subtilisin A (endopeptidase from *B. subtilis*)
  - Ultrazyme, Boston one-step liquid enzyme, Unizyme
Progent (Menicon)

A = sodium hypochlorite
B = potassium bromide

- Mix A and B doses in the Progent vial
- Soak the lenses for 30 minutes (soaking over 30 minutes may discolor lenses)

Sterile water rinse after treatment now included
Plasma Treatment of GPs

- Plasma treatment is not a lens coating
- The treating of GP lenses with oxygen plasma is a very effective cleaning method to remove any remaining residues (e.g. oils, waxes) from the lens manufacturing process

© Emory
Plasma Treatment of GPs

- Plasma used by the contact lens laboratory is created by radio frequency ionization of oxygen (O$_2$) gas in a vacuum chamber.
- Especially effective in cleaning surfaces of organic lipids.
Plasma Treatment of GPs

- decreases the wetting angle =>
  - resulting in a more hydrophilic lens surface
- decreases lens awareness and therefore increases comfort
Scleral Lens Care Instruction
Surface Cleaning and Debulking; Rub & Rinse

- Dirt and microbes
- Tear debris
- Eye area cosmetics
- Facial/hand creams
- Rub & Rinse prepares lens surface for disinfection and surface conditioning

© Emory
GP Lens Cleaners

Remove accumulated secretions & contaminants from lenses
GP Lens Cleaners

- **Abrasive cleaners** (e.g. Boston Daily Cleaner (B+L), and OptiClean II (Alcon) are especially good at removing attached deposits
- **Non-abrasive, solvent-type cleaners** (e.g. Optimum ESC (Lobob) and MeniCare GP CDS (Menicon, Lobob) are especially good at removing oils and organics
- Ideal: alternate cleaner types
AVOID Multipurpose All-in-one Solutions

- Simplus (B+L)
- Unique pH (Menicon)
- Opti Free GP (Alcon)

• Or add a daily cleaner
Inadequate Surface Cleaning

• Inadequate cleaning results in
  – hydrophobic surfaces
  – irregular surfaces
  – debris attachment cycle

• Resulting in decreased vision, comfort and wearing time
Scleral Lens Care

• Disinfection
  – Peroxides: ClearCare (Alcon), PeroxiClear (B+L)
  – Boston Advance Conditioner (B&L)
  – Optimum CDS (Lobob)

• morning saline rinse
Scleral Lens Care

- Filling Fluid Reservoir
  - Unit dose sterile saline (Addipak)
  - PFAT
  - No Preservatives

© Emory
Unit Dose Saline

• Menicon introduced last year
  – 5ml
  – non-preserved
  – unit dose saline
  – for rinsing and filling scleral lens

• Not for lens storage
New Unit Dose Saline

- B+L introduces
- Buffered saline
- 10ml vials
- 30d supply box
- For SCL and GP
- Available from Webstore in February

ScleralFil preservative free saline solution is a sterile buffered isotonic saline solution that has boric acid, sodium borate, and sodium chloride in purified water. mward@emory.edu
Environmental contamination of tear film

- Do not apply oil-based cosmetics or moisturizers to eyelids
- Oils can spread along skin and contaminate the tear film
Risk Factors for Microbial Keratitis

- Sleeping in contact lenses
- Wearing CL during water activities
- High ametropias
- < 25 years of age, and new wearers
- Ordering CLs on line (4.8 X)
- Poor hygiene; smoking

© Emory
Contact Lens Wear

• Contact lens wear is not a sterile event, but it should be a clean one
• Consider:
  – Our eyes are not sterile
  – Our fingers are not sterile
  – Only new lenses are sterile – until they are touched
Recommendations

Lens Care

- Wash hands
- Replace lenses as prescribed
- Do not store opened, old ‘spare’ lenses; spare lenses should be in unopened original containers
- Rub-n-rinse daily
- Use fresh solutions daily
- Do NOT top-off
Recommendations

Case Care

– Empty/rinse daily
– Clean case with mild detergent and hot water; alternatively H₂O₂
– Tissue wipe and air dry daily
– Replace often (1-3mo)
Thank you!

mward@emory.edu