GP Care Systems

IACLE Module 5.4
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GP LENS CARE AND MAINTENANCE

PURPOSES

- Reduce microbial contamination
  - disinfection
- Minimise deposit accumulation
- Increase lens wettability
- Act as mechanical buffer between lens, cornea & lid
  - increase comfort
Characteristics of GP Lens Materials

- Small matrix pores
- Silicone component decreases wettability
- More hydrophobic surface than SCL
  - NB silicone hydrogels
  - particularly prone to lipids if fluorinated
- Deposits remain on lens surface
- Complex surface chemistry
- Can be affected by production techniques
Protein Deposits on GP
Lipid Deposits on GP
Ring Deposit (Plaque)
GP Solution Preservatives

- BAK: benzalkonium chloride
- CHX: chlorhexidine
- THI: thimerosal
- EDTA: Ethylenediaminetetraacetic Acid
- Isopropyl alcohol
- PHMB: Polyhexamethylene biguanide
- PAPB: Poly(aminopropyl biguanide)
- Polyquad: Polyquarternium-1
GP LENS CLEANING

- Daily surfactant
  - proteolytic for protein
  - alcohol-based for lipid
- Enzyme
- Polish (as necessary)
- Cleaning pad?
Contact Lens Cleaners

- **Main Functional Components:**
  - antimicrobial agents
  - surface-active agents (surfactants)
    - nonionic
      - poloxamer; tyloxapol
    - ionic
      - anionic (-ve) eg sodium lauryl sulfate
      - cationic (+ve) eg BAK (also a preservative)
      - amphoteric (charge depends upon surrounding pH)
        - miranol
Cleaning Agents

- Nonabrasive surfactants
  - many types
  - often include alcohol
    - Miraflow/AOFlow
- Abrasive surfactants
  - small particles
    - polymeric beads
      - OPTI-CLEAN II; Boston original
  - can scratch the surface
  - can alter parameters
GP LENS CLEANING TECHNIQUE

- **Avoid:**
  - vigorous rubbing
  - excessive pressure on the lens
  - prolonged cleaning with mildly abrasive cleaners
    - add negative power
    - reduce thickness
GP LENS CLEANING
RECOMMENDED TECHNIQUE

- Place lens in the palm of the hand
- Rub lens with finger for minimum of 10 seconds
- Rinse with saline ONLY!
- NB ‘left lens syndrome”
**GP LENSES CARE & MAINTENANCE**

- **DISINFECTION:**
  - Micro-organisms can attach to deposits
  - Use chemical disinfection systems
    - *Not* thermal!
  - Soaking time for 4 hours to overnight or as recommended
  - Preservatives incorporated
  - Very rarely peroxide
    - Poor wettabiliy
    - *Used for trial lens disinfection*
GP LENS WETTING AND SOAKING SOLUTIONS

- Also known as *conditioning* solutions

- Functions:
  - disinfection
  - wetting
  - storage
GP LENS WETTING AND SOAKING SOLUTIONS

Composition:
- antimicrobial agent(s)
- wetting agent
- viscosity-enhancing agent
- buffer system
- salt(s)
Anti-microbial agents

- Quaternary ammonium compounds
  - BAK, Polyquad

- Alcohols and acids etc.
  - Chlorobutanol, sorbic acid, boric acid, Chlorine

- Mercurials
  - Thimerosal

- Biguanides
  - PHMB, PAPB

- Oxidizers
  - \( \text{H}_2\text{O}_2 \)

- Chelating Agents
  - EDTA
Wetting agent:
- improve the wetting characteristics of the lens surface:
  - convert hydrophobic surface to hydrophilic
  - assist tear film to spread more easily and evenly on lens surface
  - increase comfort on insertion
GP LENSES: NON-WETTING

Non wetting areas can be due to:
- deposits
- manufacturing process
  - "burnt" surface
- polishing compounds
- surface contamination
**GP LENS CARE & MAINTENANCE**

**LUBRICATING DROPS/IN EYE WETTING**

- Used during lens wear to:
  - increase comfort
  - cleans lens surface
  - maintain lens wettability
Two Step Systems

- Boston Original (B&L)
  - cleaning and soaking
- Boston Advance Comfort Formula (B&L)
  - cleaning and soaking
- Optisoak – use with Opticlean II (Alcon)
- Optimum (Lobob)
  - cleaning and soaking
- Wet - N - Soak PLUS (AMO)
  - soaking & wetting
**Boston Original Formula**

- Chlorhexidine gluconate
- Most abrasive daily cleaner
- Digitally clean for 20 seconds, rinse off, soak for 4 hours
- Discard conditioner after 60 days
Boston Advance Comfort Formula

- PAPB and Chlorhexidine gluconate
- Less abrasive daily cleaner with surfactants
- Digitally clean for 20 seconds, rinse off, soak for 4 hours
- Discard after 90 days
Claris (Menicon)

- Cleaning / soaking solution - Benzyl alcohol
  - Rub, rinse and store in same solution
  - Must rub for 30 seconds, rinse, soak for 6 hours

- Rewetting drops
  - Lenses must be rinsed with saline prior to lens insertion
  - Rewetting drops used for cushioning
Optimum (Lobob)

- Cleaning / soaking solution - Benzyl alcohol
  - Rub, rinse and store in same solution
  - Must rub for 30 seconds, rinse, soak for 6 hours
- An extra strength cleaner is included for tough deposits
- Rewetting drops
  - Lenses must be rinsed with saline prior to lens insertion
  - Rewetting drops used for cushioning
Opti-Soak (Alcon)

- Conditioning solution
  - Preserved with Polyquad
- Viscous
  - may cause blurry vision for several minutes after insertion
- Daily cleaner
  - Used with OptiClean II
- Digitally clean for 20 seconds, rinse off, soak for 4 hours
Wet-n-Soak (Allergan)

- Conditioning solution
  - benzalkonium chloride
- Low viscosity
- Daily cleaner - non-abrasive surfactant
- Digitally clean for 20 seconds, rinse off, soak for 4 hours
GP MULTI-PURPOSE SOLUTIONS

- One bottle system (OBS)
  - Boston Simplicity
  - Boston SIMPLUS includes enzyme
  - Solocare Hard
  - Unique pH

- Combination of cleaning, disinfecting and soaking functions

- Convenient
Boston Simplicity

- **Preservatives:**
  - Chlorhexidine gluconate
  - PAPB
  - EDTA

- **Cleaning agents:**
  - PEO sorbitan monolaureate
  - betaine surfactant

- **Wetting agents:**
  - silicone glycol copolymer
  - devitalized PEG
Boston Simplicity

- **Cushioning agent:**
  - cellulosic viscosifier

- **Usage:**
  - Digitally clean for 20 seconds,
  - Rinse with same solution
  - Soak for 4 hours
Boston SIMPLUS

- Cleaning, removing protein, rinsing, disinfecting and conditioning GP’s

- Contains:
  - Poloxamine
  - Hydroxylalkylphosphonate
  - Boric acid, Na borate, NaCl
  - Hydroxypropymphethyl cellulose
  - Chlorhexidine gluconate (.003%)
  - Polyaminopropyl biguanide (.0005%)
Latest Product

- **Alcon Unique-pH**
- **Multipurpose product**
  - polyquad
  - tetronic
- **Contains HP guar**
- **Low viscosity**
  - overnight wetting
- **High viscosity**
  - at tear pH
  - in-eye conditioning
Unique pH (Alcon)

- Easy to clean and rinse with low viscosity
- Provides cushioning and greater wetting after insertion
- Digital rub with 2-4 drops, rinse with same solution, soak for 4 hours
Laboratory cleaners / solvents

- Extra strength cleaners that:
  - Remove finishing resins left on lenses by manufacturing process
  - Clean badly deposited lenses, especially lipids

- Examples
  - Boston Laboratory Cleaner (B&L/Polymer Technology)
  - Fluoro-Solve (Paragon Optical)
Protein Removers

- Periodic use
  - frequency?
  - RGP and silicone hydrogel usage?
  - frequent replacement usage?

- Hydrolyse protein into amino acids

- Particularly formulated for action against lysozyme

- Prior and post cleaning essential

- Occasional sensitivity
Protein Removers: Components

- Protease - proteolytic enzyme
- Lipase - breaks lipids into glycerol and fatty acids
- Pronase - breaks down mucin
- Amylase - breaks down mucin
- Buffer - optimises pH
- Effervescent - aids in disintegration of tablet
- Vehicle - liquid or tablet
Protein Removers: Source

- Papain
  - plant (*Carica papaya*)
  - protease only
  - sensitization common
    - eg Allergan “Enzymatic”

- Pancreatin
  - animal (pork pancreas)
  - protease, lipase & amylase
    - eg Alcon “SupraClens”

- Subtilisin
  - micro-organism (*Bacillus subtilis*)
  - protease only
    - eg Allergan “Complete”
    - eg Boston “Liquid Enzyme”

Boston “Liquid Enzyme” containing Subtilisin A and Glycerol
GP LENS CARE & MAINTENANCE

- LENS REPLACEMENT:
  - Replace lenses annually
    - EW may require more often
  - Residual deposits can irritate lids, especially the upper lids
  - Resurface (polish) lenses annually as an alternative to replacement
Before dispensing:
- clean and soak lenses overnight
- verify lenses
- check wettability
CARE AND MAINTENANCE

REMEMBER

- Do not mix solution types and brands
- Assess patient’s compliance
  - no mix and match
  - no topping up!
- Remind patient to clean lens case weekly
GP TRIAL LENS DISINFECTION

- Clean with alcohol-based cleaner immediately after use
- Place in clean vial (suspending lens if possible)
- Can wet store in disinfecting/storage conditioning solution when not in use (change regularly)
- OR use 3% hydrogen peroxide for 2 hours, then neutralise
  - preferably store dry
- Clean lenses again immediately before next use