

The background of the slide features a grayscale image of hands being washed under a stream of water. Numerous water droplets of various sizes are scattered throughout the scene, some in sharp focus and others blurred, creating a sense of motion and cleanliness. The overall aesthetic is clean and professional.

CONTACT LENS CARE AND COMPLIANCE

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FINANCIAL DISCLOSURES

- I WORK FOR BAUSCH & LOMB SPECIALTY VISION PRODUCTS
 - MANAGER OF CONSULTATION AND CUSTOMER SERVICE TEAMS

EVOLUTION OF SCL LENS CARE CIRCA 1971

- HEAT DISINFECTION WITH COMPONENTS:
 - DAILY CLEANER
 - SALINE RINSE
 - (HOMEMADE! WITH SALT TABLETS AND DISTILLED WATER)
 - STEAM DISINFECTION
 - SALINE SOLUTION HEATED TO 70-80 DEGREES FOR 10-20 MINUTES
 - WEEKLY ENZYME CLEANERS

PROBLEMS WITH HEAT DISINFECTION

- CAUSED DENATURED PROTEIN THAT INCREASED INCIDENCE OF GPC
- ONLY 90% OF UNITS WORKED; ELECTRICAL FAILURE
- IN THE MORNING, PATIENTS WOULD RINSE LENS WITH HOMEMADE SALINE; WHICH WOULD DEFEAT THE PURPOSE OF THE HEAT DISINFECTION



EVOLUTION OF SCL LENS CARE CHEMICAL SYSTEMS

- CHEMICAL DISINFECTION:
 - DAILY CLEANERS
 - SALINE RINSE
 - OVERNIGHT CHEMICAL DISINFECTION
 - THIMEROSAL, CHLORHEXIDINE
 - MORNING SALINE RINSE
 - WEEKLY CLEANERS



EVOLUTION OF SCL LENS CARE CHEMICAL MULTIPURPOSE SOLUTIONS

- ALL-IN-ONE MULTIPURPOSE SOLUTIONS:
 - CLEAN, RINSE AND DISINFECT IN ONE STEP
- PATIENTS WERE TOLD THEY NO LONGER NEEDED TO “RUB AND RINSE” THEIR LENSES

RUB VS. NO RUB



- THE NO RUB LABEL WAS APPROVED BY REPLACING RUBBING WITH EXTRA RINSING
- EITHER *RUB IT OFF* OR *HOSE IT OFF*
- SILICONE HYDROGEL LENSES NEED TO BE DIGITALLY CLEANED TO PREVENT
 - LIPID BUILD UP (DECREASES WETTABILITY AND BLURS VISION)
 - DENATURED PROTEIN BUILD UP (INCREASES INFLAMMATION)
- 2010: FDA RECOMMENDED THE REMOVAL OF “NO RUB” FROM CONTACT LENS SOLUTION LABELS

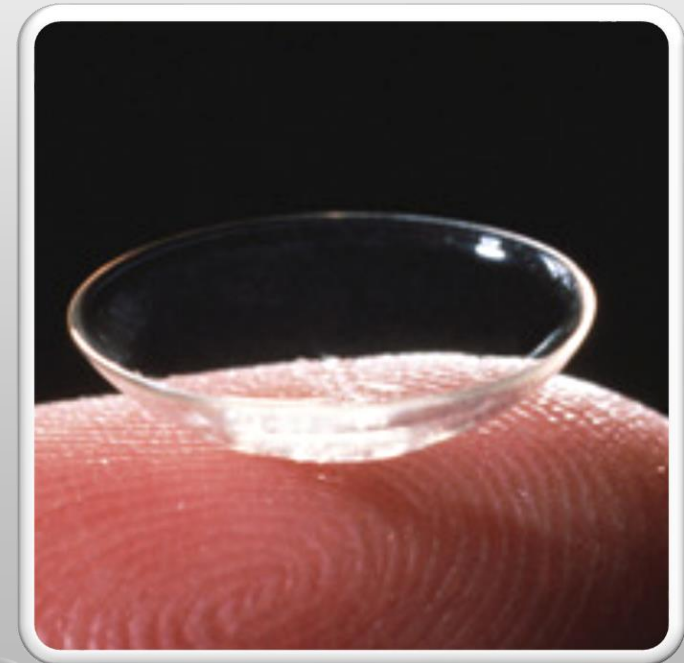


LABEL: NO RUB MESSAGE: NO CARE

- THIS “NO CARE” CONCEPT HAS LED TO DANGEROUS COMPLACENCY AMONG PATIENTS AND PRACTITIONERS AS REGARDS TO DISINFECTION, COMFORT AND LENS FUNCTIONALITY

2010: SOFT LENS DROPOUTS

- UNFORTUNATELY, A SIGNIFICANT NUMBER OF CONTACT LENS WEARING PATIENTS WERE LOST EACH YEAR DUE TO *DRYNESS PERCEIVED DISCOMFORT*
- 2010 SURVEY FOUND THAT THE MEAN DROPOUT RATES AMONG CONTACT LENS WEARERS WAS REPORTED AT 15.9% IN THE UNITED STATES
- **THIS REPRESENTS A LOSS OF 1 IN 6 CONTACT LENS WEARERS**



NEW FORMULATIONS

- INDUSTRY RESPONDED BY INTRODUCING NEW PRODUCT FORMULATIONS TO ADDRESS LENS DRYING CONCERNS
- LUBRICANTS/HUMECTANTS/OSMOTICS WERE ADDED TO LENS CARE PRODUCTS TO REDUCE LENS DEHYDRATION
- LENS MATERIALS WERE DEVELOPED WITH LESS WATER CONTENT TO HELP WITH DEHYDRATION
 - INTRODUCTION OF SILICONE HYDROGEL LENSES

SILICONE HYDROGEL PROPERTIES/CHARACTERISTICS

- SI-HY LENS CHEMISTRY MAKES THEM BEHAVE DIFFERENTLY
 - VERY HIGH OXYGEN PERMEABLE
 - INCREASED LENS MODULUS OR STIFFNESS
 - LOWER WATER CONTENT = LESS LENS DEHYDRATION
 - LOW LEVELS OF TOTAL PROTEIN UPTAKE, BUT HIGHER BINDING OF DENATURED PROTEINS
 - HIGHER LEVELS OF LIPID UPTAKE
 - INCREASED GPC



LOOKING FOR THE PERFECT SOLUTION

- THE KEY TO PRESERVATIVE/DISINFECTION USE IS TO HAVE SUFFICIENT CONCENTRATIONS FOR ANTIMICROBIAL EFFICACY, YET LOW ENOUGH TO PREVENT TOXICITY
- TOXICITIES ARE DOSE RELATED EVENTS
- ALL PRESERVATIVES ARE TOXIC IF USED IN EXCESS CONCENTRATIONS

MPS FORMULA INGREDIENTS

- THE PRESERVATIVE COMBINATIONS ARE NOT THE ONLY COMPONENTS OF A SOLUTION.
- THE CHEMICAL COMBINATIONS OF BUFFERS, CHELANTS, SURFACTANTS, ELECTROLYTES, AND LUBRICANTS ALL WORK TOGETHER TO CREATE THE FINAL CONTACT LENS SOLUTION.

OPHTHALMIC PRESERVATIVES

○ **BAK (BENZALKONIUM CHLORIDE)**

- ADDED TO GLAUCOMA DROPS TO HELP DRUG PENETRATION
- TOXIC TO CORNEAL EPITHELIAL AND ENDOTHELIAL CELLS, INCREASES CONJUNCTIVAL ALLERGIC RESPONSE AND DECREASES LIPID LAYER

○ **POLYQUAD (POLYQUATERNIUM-1)**

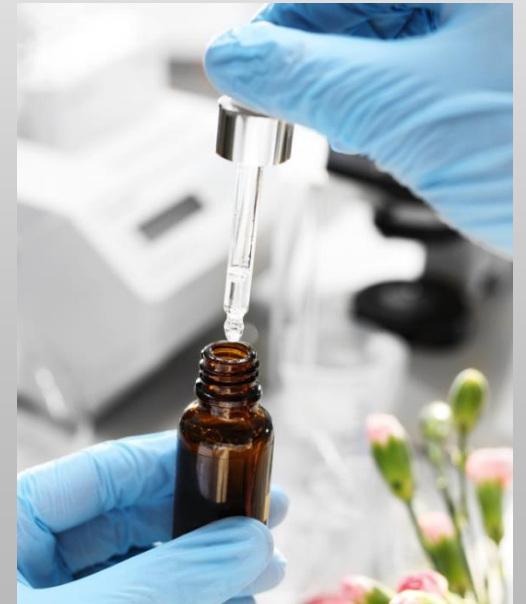
- DETERGENT DERIVED FROM BAK
- GOOD COVERAGE AGAINST BACTERIA, FUNGI, YEASTS AND MOLDS
- BEEN SHOWN TO CAUSE SUPERFICIAL EPITHELIAL DAMAGE
- RELATED TO DECREASING AQUEOUS TEAR PRODUCTION

○ **PHMB (POLYHEXAMETHYLENE BIGUANIDE)**

- HIGH KILL RATE AGAINST ACANTHAMOEBA AND BACTERIA
- NON-IRRITATING TO CORNEAL CELLS
- LOW EFFICACY AGAINST FUNGUS

OPHTHALMIC PRESERVATIVES

- **ALDOX (MYRISTAMIDOPROPYL DIMETHYLAMINE)**
 - GOOD COVERAGE AGAINST FUNGI AND ACANTHAMOEBA CYSTS AND TROPHS
- **EDTA (EDETATE DISODIUM)**
 - CHELATING AGENT
 - ENHANCES THE ANTIMICROBIAL ACTIVITY OF DISINFECTANTS
 - DECREASES DEPOSIT FORMATION



INFECTION OUTBREAK

- WHILE INDUSTRY WAS TRYING TO CREATE NEW FORMULATIONS FOR BETTER DISINFECTION WITH LESS TOXICITY, NEW PRODUCTS CREATED WORLD-WIDE INFECTION OUTBREAKS





FUNGAL KERATITIS

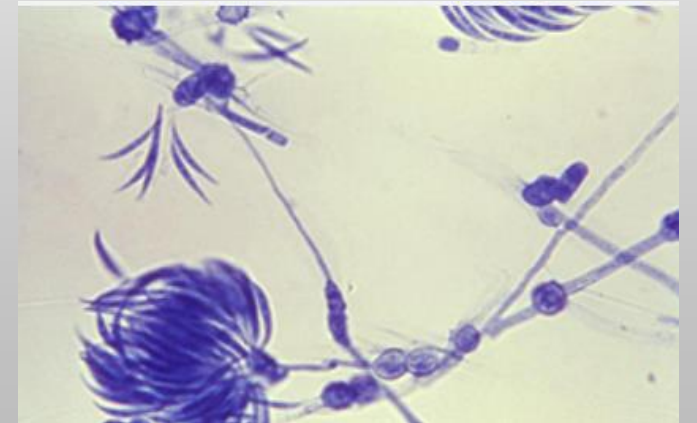
- CASES OF FUNGAL KERATITIS ASSOCIATED WITH *RENU WITH MOISTURE LOC* WERE REPORTED IN SUB TROPICS OF SOUTH ASIA AND LATER IN THE USA AND OTHER COUNTRIES

OUTBREAK OF *FUSARIUM* KERATITIS 2006

- CHANG ET AL. (USA)
 - CASE-CONTROL
 - 164 CONFIRMED CASES
 - 154 ASSOCIATED WITH *RENU WITH MOISTURE LOC*
- KHOR ET AL. (SINGAPORE)
 - 68 CASES
 - ASSOCIATED WITH POOR CONTACT LENS HYGIENE AND *RENU WITH MOISTURE LOC*

Chang et al., JAMA 23:2006

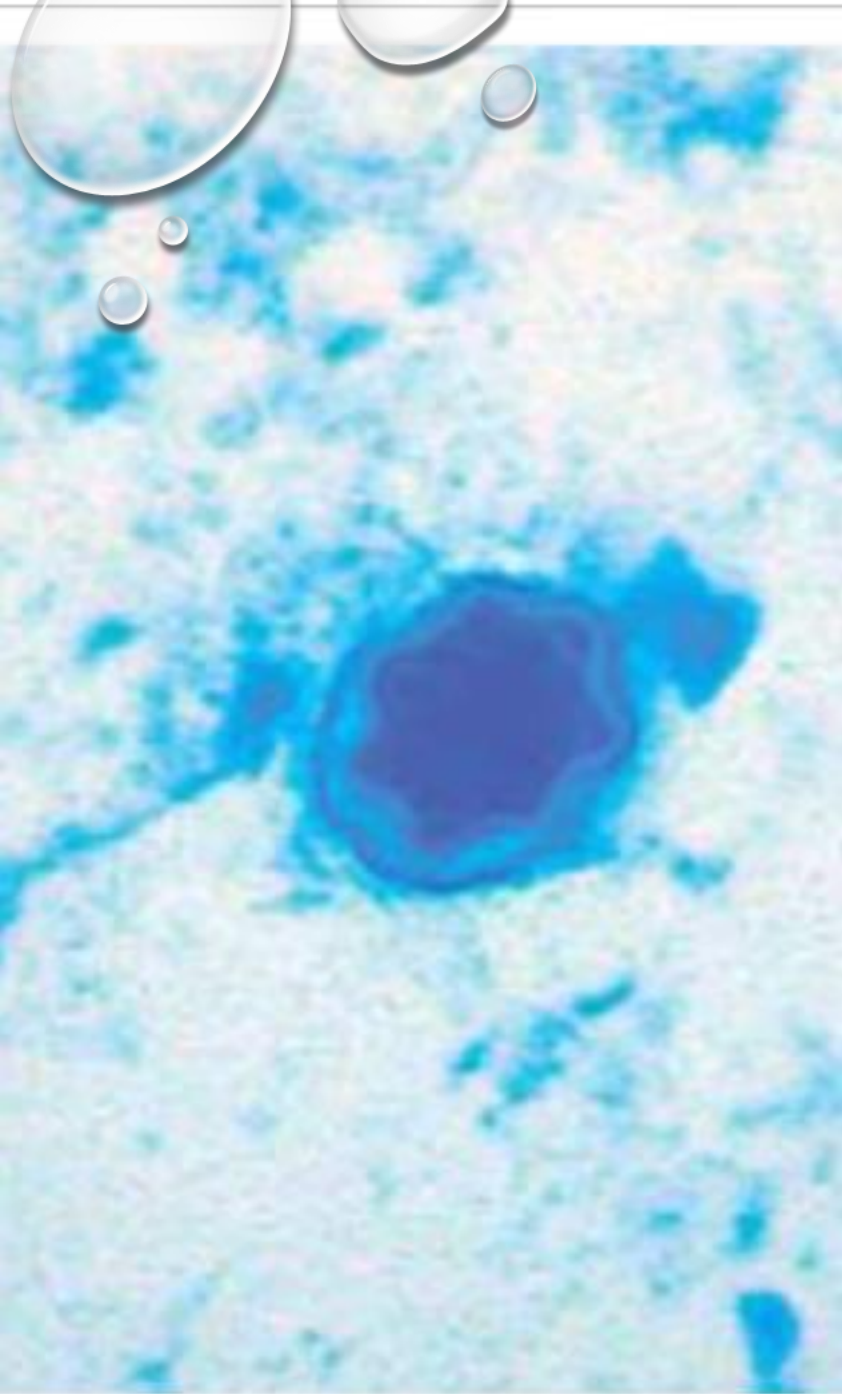
Khor et al., JAMA 295: 2006



ACANTHAMOEBA KERATITIS 2007



- ABBOTT MEDICAL OPTICS (AMO) (FORMERLY ADVANCED MEDICAL OPTICS)
 - RECALLED COMPLETE MOISTURE PLUS ON MAY 26, 2007
 - THIS ACTION FOLLOWED REPORTS AND DATA FROM CDC REGARDING A SEVENFOLD INCREASE OF ACANTHAMOEBA KERATITIS
 - SOLUTION WAS NOT CONTAMINATED BUT WAS FOUND INEFFECTIVE IN PREVENTING ACANTHAMOEBA KERATITIS



ACANTHAMOEBA KERATITIS 2007

- FIRST REPORTED IN 1973
- ACCORDING TO CDC, ESTIMATED 85% OF U.S. ACANTHAMOEBA KERATITIS CASES AFFECT CONTACT LENS WEARERS

INCIDENCE OF MICROBIAL KERATITIS PER 10,000 CONTACT LENS WEARERS

- OVERALL INCIDENCE 4/10,000
 - RGP (DW) 1.2/10,000
 - RGP (EW) 7.7/10,000
 - DAILY DISPOSABLE 2.0/10,000
 - SOFT LENSES (DW) 1.9-4.1/10,000
 - SOFT LENSES (EW) 19.5/10,000

- PERMANENT VISION LOSS (> 2 LINES): 0.6

IN SUMMARY

- OVERNIGHT OR EW CTL MAY BE ASSOCIATED WITH A 6-15 FOLD INCREASE IN RISK OF INFECTIOUS KERATITIS
- DAILY DISPOSABLE CTL HAVE LOWER RISK OF INFECTION SEVERITY AND VISION LOSS
- IMPROPER MAINTENANCE AND WEARING BEHAVIOR INCREASE RISK OF INFECTIOUS KERATITIS
- >80% OF CTL WEARERS REPORT AT LEAST ONE BEHAVIOR THAT PUTS THEM AT RISK FOR INFECTION
 - WETTING THE LENS WITH SALIVA
 - REUSING MPS SOLUTION
 - TOPPING OFF SOLUTION
 - FAILURE TO RUB AND RINSE LENSES WITH MPS SOLUTION
 - USING SALINE TABLETS AND DISTILLED WATER
 - NOT CLEANING OR REPLACING CTL CASE
 - SHOWERING IN LENSES

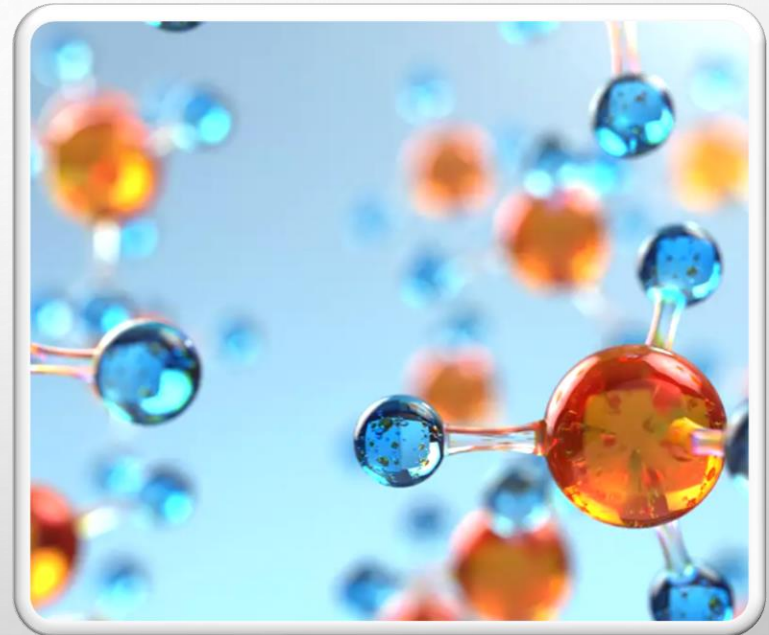




CURRENT MPS FORMULATIONS

HOW DO PRODUCTS DIFFER?

- CHEMISTRY
 - DISINFECTANT PERFORMANCE
 - CLEANING PERFORMANCE
 - BIO-COMPATIBILITY – LENS IS A “DELIVERY DEVICE” FOR MPS TO THE EYE
- PHYSICAL PROPERTIES
 - VISCOSITY
 - WETTING PROPERTIES ON LENS AND EYE
- CLINICAL PERFORMANCE





OPTIFREE PUREMOIST (ALCON)

- HYDRAGLYDE MOISTURE MATRIX SPECIFICALLY CREATED TO USE WITH SILICONE HYDROGEL LENSES TO INCREASE LENS WETTABILITY
 - REDUCES HYDROPHOBIC SURFACE
 - REDUCES LIPID DEPOSITS
- DUAL DISINFECTION
 - POLYQUAD AND ALDOX
 - INCREASED CONCENTRATION OF ALDOX AS COMPARED TO REPLENISH
 - CITRATE AS CLEANING AGENT/BUFFER
- EDTA



BIOTRUE (BAUSCH & LOMB)

- DUAL DISINFECTION SYSTEM
 - PHMB AND POLYQUAD
- MATCHES PH OF TEARS
- HYALURONAN IS PRIMARY LUBRICANT
 - NATURALLY FOUND IN TEARS

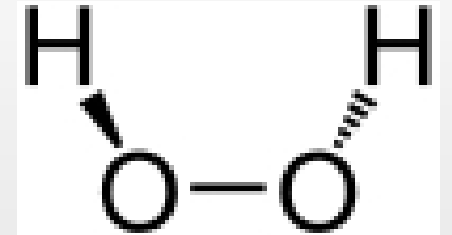


RENU ADVANCED FORMULA (BAUSCH & LOMB)

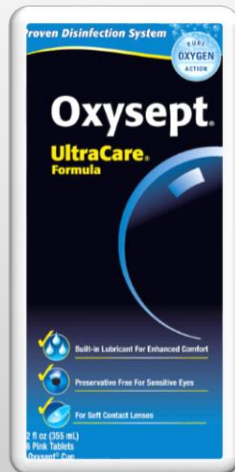
- HYDRANATE (HYDROXYALKYLPHOSPHONATE)
 - REMOVES PROTEIN DEPOSITS
- PRESERVED WITH DYMED (POLYAMINOPROPYL BIGUANIDE)
- EDTA

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 AND LIPIDS FROM LENS SURFACES



HYDROGEN PEROXIDE DISINFECTION SYSTEMS



- CATALASE ENZYME NEUTRALIZED (OXYSEPT)
 - FULL 3% STRENGTH FOR >20 MIN; DELAYED NEUTRALIZATION USING TABLET
- CATALYTIC DISC NEUTRALIZED (CLEARCARE)
 - DECREASING PEROXIDE CONCENTRATION
 - AGE OF DISC DETERMINES IF NEUTRALIZATION OCCURS IN A FEW MINUTES OR SEVERAL HOURS
 - TRIPLE ACTION IS ORIGINAL FORMULA
 - HYDRAGLYDE HELPS WITH WETTABILITY TO HELP DECREASE LENS DEHYDRATION

HYDROGEN PEROXIDE DISINFECTION SYSTEMS



- VERY EFFECTIVE AND PRESERVATIVE-FREE
- FOR DAILY USE; NOT FOR OCCASIONAL CL WEARERS
- CAUTION PATIENTS NOT TO STORE “SPARE LENSES” IN NEUTRALIZED PEROXIDE
- MOST COMMON PROBLEM IS TOXICITY FROM NON/INSUFFICIENTLY NEUTRALIZED H₂O₂

GAS PERMEABLE CARE SYSTEMS



BOSTON ORIGINAL/ADVANCE FORMULA 3 STEP CLEANING PROCESS



- USES DAILY CLEANER, CONDITIONING SOLUTION AND LIQUID ENZYME
 - DAILY CLEANER
 - SURFACTANT CLEANER; CAN NOT BE USED WITH ALL GP LENS MATERIALS/SURFACE TREATMENTS AS IT WILL SCRATCH THE LENSES
 - USED EVERY NIGHT AND RINSED WITH SALINE
 - CONDITIONING/STORING SOLUTION
 - A STERILE, AQUEOUS BUFFERED, SOLUTION CONTAINING A CELLULOSE DERIVATIVE POLYMER AND POLYVINYL ALCOHOL AS WETTING AND CUSHIONING AGENTS
 - LIQUID ENZYME
 - USED WEEKLY TO REMOVE PROTEIN/LIPID BUILDUP

BOSTON SIMPLUS MULTIPURPOSE

- FOR CLEANING, REMOVING PROTEIN, RINSING, DISINFECTING, CONDITIONING, STORING
- RECOMMENDED THAT NO EVENING RUB REQUIRED; JUST RUB AND RINSE IN THE MORNING PRIOR TO LENS INSERTION
- NO WEEKLY PROTEIN REMOVER NEEDED



UNIQUE PH MULTIPURPOSE

- FOR CLEANING, REMOVING PROTEIN, RINSING, DISINFECTING, CONDITIONING, STORING
- RECOMMENDED THAT NO EVENING RUB REQUIRED; JUST RUB AND RINSE IN THE MORNING PRIOR TO LENS INSERTION
- NO WEEKLY PROTEIN REMOVER NEEDED



TANGIBLE CLEAN MULTIPURPOSE



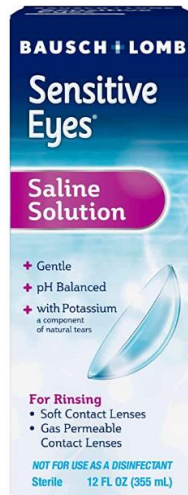
- FOR CLEANING, REMOVING PROTEIN, RINSING, DISINFECTING, CONDITIONING, STORING
- RECOMMENDED THAT NO EVENING RUB REQUIRED; JUST RUB AND RINSE IN THE MORNING PRIOR TO LENS INSERTION
- NO WEEKLY PROTEIN REMOVER NEEDED



CLEARCARE HYDROGEN PEROXIDE SYSTEM

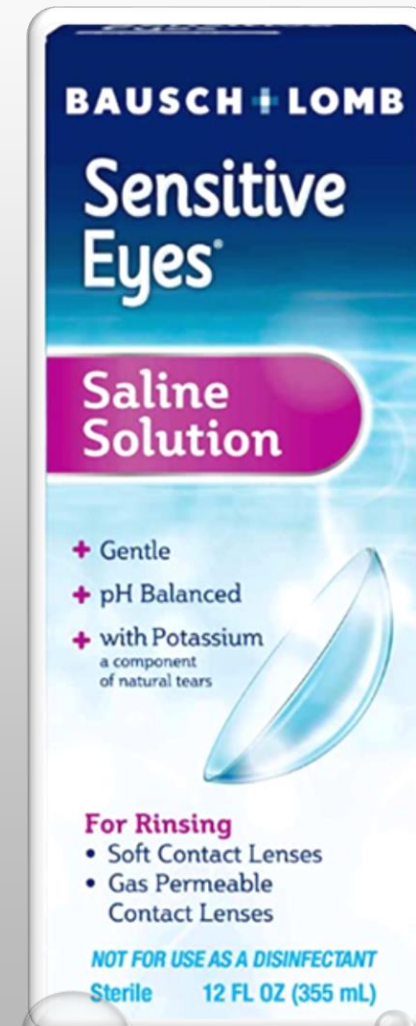
- APPROVED BY FDA FOR USE WITH SOFT LENSES AND GAS PERMEABLE LENSES
- PRESERVATIVE-FREE BENEFITS
- FOR ADDED LENS WETTABILITY, HAVE PATIENTS RUB AND INSERT GAS PERMEABLE LENS WITH BOSTON CONDITIONER OR ARTIFICIAL TEAR

SALINE



SENSITIVE EYES SALINE BAUSCH & LOMB

- NOT PRESERVATIVE FREE
- BUFFERED ISOTONIC SOLUTION THAT CONTAINS POTASSIUM AND IS PH BALANCED
- USED TO RINSE CLEANER OFF OF LENSES AND TO INSERT LENSES
- CONTAINS BORIC ACID, SODIUM BORATE AND SODIUM CHLORIDE



PRESERVATIVE FREE SALINE

- BOTTLES MUST BE DISCARDED WITHIN 30 DAYS OF BEING OPENED
- SODIUM CHLORIDE VIALS
- SINGLE USE DOSAGE; 3ML; 5ML; 15ML



PRESERVATIVE FREE SALINE

- 5 NATURAL ELECTROLYTES TO MIMIC BODY'S NATURAL TEARS
 - SODIUM, PHOSPHATE, POTASSIUM, CALCIUM, MAGNESIUM
 - PH OF 7.4
- SINGLE USE DOSAGE 10ML





RECOMMENDATIONS

- LENS CARE
 - WASH HANDS
 - COMPLIANT LENS REPLACEMENT
 - DO NOT STORE OPENED “SPARE LENSES”
 - RUB AND RINSE DAILY
 - USE FRESH SOLUTIONS DAILY
 - DO NOT TOP-OFF SOLUTION

RECOMMENDATIONS

- CASE CARE
 - EMPTY/RINSE DAILY
 - CLEAN CASE WITH MILD DETERGENT AND HOT WATER OR H₂O₂
 - AIR DRY DAILY
 - WIPE OUT WITH TISSUE OR CLEAN TOWEL
 - REPLACE EVERY 3 MONTHS



2017: SOFT LENS DROPOUTS

- IMPROVED TECHNOLOGY IS DECREASING CONTACT LENS DROPOUTS BUT THERE ARE STILL CONTACT LENS PATIENTS THAT ARE LOST DUE TO CONTACT LENS DISCOMFORT
 - RECENT STUDY FOUND THAT THE RETENTION RATE FOR NEW SOFT LENS WEARERS DURING THE FIRST 12 MONTHS OF WEAR WAS 77.6% (531 TOTAL PARTICIPANTS)
 - OF THE **22.4% DROPOUTS** (119/531)
 - **41% DUE TO PROBLEMS WITH VISION**
 - (48/531) 9% TOTAL PARTICIPANTS
 - **36 % DUE TO DISCOMFORT**
 - (42/531) 8% TOTAL PARTICIPANTS
 - **25% DUE TO HANDLING PROBLEMS**
 - (29/531) 5.4% TOTAL PARTICIPANTS
 - **THIS REPRESENTS A LOSS OF 1 IN 12 CONTACT LENS WEARER**



QUESTIONS?