

3:30 PM 2 hours
P-09

Room 225 A-B

Papers: Contact Lens Risk Factors

Moderators: Fiona Stapleton, MSc, MCOptom, PhD,
FAAO, Danielle Robertson, OD, PhD, FAAO

3:30 PM. **INCIDENCE AND RISK FACTORS FOR CORNEAL
INFLAMMATORY EVENTS WITH DAILY SILICONE HYDROGEL LENS
WEAR (120462)**

Loretta B. Szczotka-Flynn, OD, PhD, FAAO, Ying Jiang, MD, Sangeetha Raghupathy, BSOptom, Michael Jacobs, MD, PhD, Case Western Reserve University, Jami R. Kern, PhD, Alcon Research Ltd

RESULTS: The KM unadjusted cumulative probability of remaining CIE free for both lens care groups was 92.3% (95% CI 88.1 to 96.5). There was 1 participant with microbial keratitis (MK), 5 with asymptomatic infiltrates (AI), and 7 with contact lens peripheral ulcers (CLPU) providing KM survival estimates of 92.8% (95% CI 88.6 to 96.9) and 98.1% (95% CI 95.8 to 1.0), for sterile keratitis and symptomatic CIEs, respectively. The presence of substantial bacterial bioburden on lid margins was associated with about a 4-fold increased risk for the development of a CIE ($p < 0.05$). High levels of coagulase negative staphylococci were isolated from lids margins more commonly from participants that developed CIEs compared to participants that that did not experience a CIE (24% vs 11%, $p = 0.0007$).

PURPOSE: To determine the probability and risk factors for development of a corneal inflammatory event (CIE) during daily wear of lotrafilcon A silicone hydrogel contact lenses.

METHODS: Eligible participants ($n = 218$) were fit to lotrafilcon A lenses for daily wear and followed over 12 months. Participants were randomized to either a PHMB-preserved multipurpose solution or a 1-step peroxide disinfection system. The main exposures of interest were bacterial contamination of lenses, cases and lid margins. Kaplan-Meier (KM) plots were used to estimate the cumulative unadjusted probability of remaining CIE free, and multivariate Cox proportional hazards regression was used to model the hazard of experiencing a CIE.

CONCLUSIONS: The probability of experiencing a sterile CIE during daily wear of lotrafilcon A contact lenses is low and symptomatic CIEs are rare. High levels of coagulase negative staphylococci in combination with pathogenic microorganisms on lid margins likely precipitate sterile CIEs.

ADDITIONAL COMMENTS: Sponsor: Alcon Laboratories

3:45 PM. **INFLAMMATORY CHANGES ON THE OCULAR SURFACE
WITH CONTACT LENS WEAR: RESULTS OF A RANDOMIZED CLINICAL
TRIAL (120045)**

Bernardo M. Cavalcanti, MD, Andrea Cruzat, MD, Yureeda Qazi, MD, Neda Baniyasadi, MD, Monique Trinidad, Bsc, Massachusetts Eye and Ear Infirmary

RESULTS: Increased ocular surface staining, but minimal ocular injection was observed in all groups. Conjunctival staining correlated to peripheral DC ($r > 0.36$ for all quadrants).

Interobserver and intraobserver reproducibility and repeatability was over 0.9 for Cronbach's alpha and intraclass score ($p < 0.0001$). RM demonstrated higher increased staining for central and peripheral corneal staining ($p = 0.04$), corresponding with highest percentage of increase in DC density in total areas (13/14/16%; OF, CC, RM), central (26/34/47%), and temporal (21/22/23%) at 6 weeks compared to baseline values ($p = 0.04$ for temporal and total areas). No statistical difference was found when comparing the different CL solutions

PURPOSE: Assess clinical changes and subclinical immune cell response to 3 randomized CL solutions in naive CL wearers

METHODS: Multicenter, double-masked, clinical trial was conducted at MEEI and UI. 85 naïve CL wearers (170 eyes), fitted with silicone hydrogel CL (PureVision; Oasys; Biofinity), were randomized into one of 3 CL solution groups (OPTIFREE RepleniSH (OF, $n = 27$); ClearCare (CC, $n = 28$); ReNuMultiPlus (RM, $n = 30$)). Ocular surface staining and injection grading were performed at baseline, week 1 and 6 post-CL wear. Laser in vivo confocal microscopy (IVCM; HRT3/RCM) of the central and 4 peripheral corneal areas were performed at same time points. 3 masked observers analyzed the images for dendritiform immune cells (DC)

CONCLUSIONS: IVCM revealed increased immune cell infiltration in all groups after CL wear as early as 1 week, while corneal and conjunctival staining was detected later at 6 weeks. While our data demonstrates that increased ocular surface staining and immune cell density are both due to CL wear and CL solutions, proper combinations may prevent or worsen outcomes. Additional clinical trials are needed to confirm the potential influence of contact lens type and contact lens solution combinations on the ocular surface

ADDITIONAL COMMENTS: Support: NIH K08-EY020575, New England Corneal Transplant Research Fund, Falk Medical Research Trust, Alcon Research

4:00 PM. **CONTACT LENS CARE BEHAVIORS ASSOCIATED WITH INFLAMMATORY AND INFECTIOUS CORNEAL CONDITIONS** (120046)

Aaron B. Zimmerman, OD, MS, FAAO, Andrew J. Emch, OD, MS, FAAO, Julia R. Geldis, OD, MS, FAAO, Gregory J. Nixon, OD, FAAO, G. Lynn Mitchell, MAS, FAAO, The Ohio State University College of Optometry

RESULTS: Ninety-five subjects completed the survey with 36 subjects having CL related red eyes. Of the 36 red eye subjects, 27 were undergrad students (univariate OR 4.7, 95% CI 1.9, 11.8). Age of the current CL case was 7.1(± 8.0) months in the red eye group and 6.9(± 8.5) for the non-red eye group ($p = 0.92$). Of those with a CL related red eye, 71% did not use fresh solution daily (ie topped off)(univariate OR 6.3, 95% CI 2.2, 17.5). Other risk factors were overnight wear (OR 2.6, 95% CI 1.1, 6.3) and the use of any type of Polyquad /Aldox combined solution (OR 6.4, 95% CI 1.1, 36.8). Comparing undergrad students alone, age appeared to be the only significant risk factor ($p = 0.021$) with topping off showing marginal significance(aOR 3.9, 95%CI 0.9, 16.5).

PURPOSE: To evaluate contact lens (CL) care risk factors associated with corneal inflammatory or infectious conditions among undergraduate and graduate students.

METHODS: A survey was administered to CL wearing patients at a university clinic. Questions addressed age, education level, CL and case replacement, type of care solution

and utilization, overnight wear, and lens brand. Surveys were given to patients presenting with new onset CL related red eyes and to CL wearing patients without complications entering for an annual exam to serve as controls. Surveys were distributed as time permitted, and data collection occurred during normal clinic hours.

CONCLUSIONS: Among 18 to 36 year old CL wearing patients, age and lens care solution are predictors of a red eye event. The risk of an event decreases with age (12% risk reduction per year). In this particular survey sample, patients using Polyquad based care solutions are more than 6 times more likely to experience a red eye event compared to patients using peroxide solutions (aOR=6.4, 95% CI of 1.1 to 36.8). Polyquad solution users are nearly 5 times more likely to experience an event when compared to PHMB solution users (aOR=4.9, 95% CI of 1.6 to 15.7). There was no difference in the risk when comparing PHMB and peroxide users (p=0.78).

ADDITIONAL COMMENTS: This was an unfunded study.

4:15 PM. **AGE-RELATED DIFFERENCES IN BEHAVIOR,
ENVIRONMENTAL FACTORS AND GENERAL HEALTH STATUS (120976)**

Heidi Wagner, OD, MPH, FAAO, Nova Southeastern University School of Optometry, Meredith E. Jansen, OD, MS, FAAO, Indiana University School of Optometry, G. Lynn Mitchell, MAS, FAAO, The Ohio State University College of Optometry, Beth T. Kinoshita, OD, FAAO, Pacific University College of Optometry, Dawn Y. Lam, OD, FAAO, Southern California College of Optometry

RESULTS: The cohort was 34% male and balanced across the age bins. Wearers 18-21 years old were more likely to report replacing SCLs only when there was a problem (27% vs 14%, p=0.018) and to rinse SCLs with tap water (21% vs 9%, p=0.004). This group also reported more recent nights with <6 hours of sleep (p=0.005), more colds/flu (p=0.014), higher stress levels (p=0.021) and higher-density living situations (69% vs 29%, p<0.0001). Wearers 18-25 years were more likely to wear SCLs when showering (83% vs 71%, p=0.008) and when swimming (p=0.009). Wearers 18-25 years also reported more frequent napping in SCLs (73% vs 56%, p=0.001), sleeping in SCLs after alcohol use (45% vs. 31%, p=0.018), and when traveling (43% vs. 28% p=0.005), as well as lower rates of regular hand washing on lens insertion (p=0.020) and removal (p=0.033).

PURPOSE: The CLAY study group has reported that the risk of corneal infiltrative events (CIEs) with soft contact lens (SCL) wear is highest in late adolescence and early adulthood. This study assesses the association between patient age and behaviors, environmental factors and general health status that may contribute to CIEs in young SCL wearers with an age-targeted risk survey for SCL wearers.

METHODS: After ethics approvals, a non-clinical population of young adult SCL wearers were surveyed in 5 US cities. Data from 363 SCL wearers aged 18-33 years was collected electronically. Responses were analyzed by age year bins (18-21, 22-25, 26-29, 30-33) using Chi-square test.

CONCLUSIONS: Patient age influences lens wearing behaviors, living environments and health status that may contribute to increased CIEs in younger wearers. Targeted, age-specific education should be considered for both new and established SCL wearers.

ADDITIONAL COMMENTS: Support: Unrestricted grant from Alcon Research, Ltd.;

Nova Southeastern University (Chancellors Research and Development Grant; Health Professions Division Research Grant).

4:30 PM. **PREDICTIVE VARIABLES THAT ARE ASSOCIATED WITH VISION LOSS AND DISEASE SEVERITY IN CONTACT LENSES- ASSOCIATED MICROBIAL KERATITIS (120473)**

Konda Venkata Nagaraju, Brien Holden Vision Institute, Prashant Garg, MH Ali, Parthasarathi Kalaiselvan, L V Prasad Eye Institute, Mark Willcox, BSc(Hons), PhD, FAAO, University of New South Wales, School of Optometry and Vision Science

RESULTS: Out of 20,903 lens wearers who attended the centre, 125 cases and 118 controls were identified. The number of male and females were 63 (50.4%) and 62 (49.6%) in cases, 46 (39%) and 72 (61%) in controls with mean age of 25 (± 8.6) years. The mean severity score for mild, moderate, and severe cases was 8.0 ± 1.2 , 14.5 ± 2.6 , 22.7 ± 2.3 respectively. A significant association existed between severity score and wear duration ($P=0.03$). Age, occupation, wear duration, and mode of wear were found to be statistically different between cases and controls. 28 cases healed with >2 lines of vision loss and 15 cases healed with had $=2$ lines of vision loss. The odds of having vision loss with Gram-negative bacteria when compared with other organisms was not statistically significant ($P=0.679$).

PURPOSE: To investigate the possible predictive variables that affect disease severity and vision loss in cases of contact lens-MK from a tertiary eye care centre.

METHODS: This is a retrospective study, where cases were identified with a history of contact lens wear and having a corneal ulcer between September 2001 and November 2011 from medical and microbiology databases screening. Contact lens wearers having no disease were selected as controls based on a randomization method during the same period. Severity score was based on vision loss, infiltrate location and hospital admission and the weight of the variable used in the clinical management of the disease. Visual acuity (VA) loss was calculated by subtracting post-event from pre-event and was graded.

CONCLUSIONS: Contact lens wear duration was significantly associated with MK severity score. In spite of being able to control the disease using antibiotics, a significant proportion of cases (36%) had vision loss. However, the type of causative micro-organism had no effect on vision loss.

4:45 PM. **GRAM-NEGATIVE BACTERIA CASE CONTAMINATION: THE EFFECT OF TAP WATER (120534)**

Daniel Tilia, BOptom (Hons), MOptom, FBCLA, Thomas Naduvilath, MSc, Percy Lazon de la Jara, PhD, University of New South Wales, School of Optometry and Vision Science, Thomas Naduvilath, MSc, Brien Holden Vision Institute, Brien A. Holden, BAppSc, PhD, FAAO, Vision Co-operative Research Centre

RESULTS: A total of 513 Pxs completed questionnaires ($G1=325$, $G2=188$). Pxs in $G1$ were more likely to be noncompliant in using tap-water to rinse their cases compared to $G2$ ($p=0.01$ odds ratio= 1.9 95% CI= $1.2-3.2$). Females were more likely to use tap-water to rinse cases compared to males ($p=0.04$ odds ratio= 2.1 95% CI= $1.1-4.2$). In both

groups, case contamination with Gram-negative bacteria (GNB) was significantly higher when tap-water was used to rinse cases instead of LCP (G1: 41%v17% p=0.001, G2: 17%v7% p=0.04). Case contamination rate with GNB significantly increased with increasing frequency (none/sometimes/all the time) of tap-water use (G1 17%/31%/56% p=0.001, G2 7%/15%/20% p=0.02)

PURPOSE: To determine the influence of patient instruction on lens case compliance and the association of noncompliance with case contamination

METHODS: Data was retrospectively analysed from 14 prospective, 3 month, unmasked studies where 6 commercially available contact lenses (CL) and 7 lens care products (LCP) were tested following a similar protocol. Polypropylene cases were replaced every month and collected at 1 and 3 month visits for microbial analysis. In 9 of the 14 studies, participants (Pxs) were given verbal instructions about lens case hygiene; to rinse case with LCP after CL insertion and air dry: Group 1 (G1), n= 340: Alcon: ClearCare (H2O2) AQuify (PHMB) OPTI-FREE Express and RepleniSH (Polyquad and MAPDA), B+L: renu fresh (PHMB). In the remaining 5 studies, the same instructions were given verbally and in written format: Group 2 (G2), n=200: AMO: RevitaLens OcuTec (polyquaternium-1/alexidine dihydrochloride), B+L: Biotrue: (polyquaternium-1/PHMB). Pxs completed a survey at case collection visits. The frequency of noncompliance, its association with study instructions and case contamination was analysed using Fishers exact test and logistic regression

CONCLUSIONS: Noncompliance to lens case hygiene increases the risk of contamination with GNB, even with new dual-disinfection systems. Lens case hygiene compliance can be significantly improved by effective communication of instructions

5:00 PM. **COMPLIANCE WITH LENS REPLACEMENT AND THE INTERVAL BETWEEN EYE EXAMINATIONS (120059)**

Kathryn A. Dumbleton, MSc, MCOptom, FAAO, Doris Richter, OD, MASc, Lyndon W. Jones, PhD, FCOptom, FAAO, University of Waterloo, Centre for Contact Lens Research

RESULTS: 2147 linked questionnaires from 141 offices were eligible for analysis. 54% of patients were wearing 2WR, 37% 1MR lenses and 9% DD lenses. Wearers of 2WR lenses were significantly less compliant with the MRRF than wearers of both DD and 1MR lenses (34% versus 74% and 67%, both p<0.001). Patients purchasing an annual supply of lenses were more compliant with lens replacement (55% versus 45%, p<0.001). The mean IEE was 16 months (median 14 months) and was longer for wearers who were non-compliant with the MRRF (17.4 months versus 14.5 months, p<0.001). Other factors affecting IEE were household income (p=0.030), insurance (p<0.001), purchase source (p<0.001) and gender (p=0.007).

PURPOSE: While Eye Care Practitioners (ECPs) may recognize that their patients do not always follow their recommendations for lens replacement, many may not realize the possible implications for their offices. The purpose of this study was to investigate whether there is a relationship between contact lens compliance and the interval between eye examinations (IEE).

METHODS: The study was conducted in ECP offices in the United States. ECPs and patients independently completed linked questionnaires evaluating their contact lens wear

and care. In addition to general demographics, information was also collected on the IEE and patients' contact lens purchase patterns. Patients were required to be current wearers of daily disposable (DD) lenses or re-usable silicone hydrogel lenses with a manufacturers' recommended replacement frequency of 2 weeks (2WR) or 1 month (1MR).

CONCLUSIONS: Patients who were not compliant with the MRRF had a longer IEE than compliant wearers and were less likely to purchase an annual supply of lenses. In addition, patients who purchased lenses from their ECP, had a higher household income, had insurance covering eye examinations, and were of female gender were found to attend their ECPs for eye examinations more frequently. This correlation between IEE and compliance may impact the ECP office success.

ADDITIONAL COMMENTS: Financial support for this study was provided by Alcon.

5:15 PM. **THE "PANTRY LOAD" EFFECT - CAN IT HELP DRIVE MORE COMPLIANT CONTACT LENS REPLACEMENT? (120652)**

Cristina M. Schnider, OD, MBA, FAAO, Anne Marie Jedraszczak, VISTAKON®

RESULTS: At the study onset, 51% of 2W and 40% of 1M wearers in the US study stated a tendency to stretch replacement schedules (NS). During the study, 84% of 2W and 78% of 1M wearers actually 'stretched' (3.3wks & 5.6wks between replacements for all users; 3.7s & 6.3w for stretchers - NS). However, for all wearers, the % who replaced on time was 28.7% when they had less than a 6 month supply in reserve, and 39.4% ($p < 0.05$) when they had over 6 months of lenses. The effect was significant for both users of 2W and 1M lenses. In the Canadian study, users of the 24-pack option were 4X more likely to always replace their lenses on time, and for the less compliant patients, the time to replace was reduced nearly 1 week.

PURPOSE: It is well documented that many contact lens wearers tend to 'stretch' when it comes to adhering to practitioner prescribed replacement intervals. The methodology used in quantifying stretching behavior can lead to a wide variety of stretch scenarios, but data from JJVCI indicates that ~80% of wearers of 2-weekly and monthly prescribed lenses do not regularly replace CLs as recommended, and that actual replacement times often exceed recommended by 1-2 weeks for both groups. This research looked at various behaviours of CL patients in 1 US and 1 Canadian study, and investigated the impact of the number of lenses on hand on actual replacement frequency.

METHODS: Wearers of 2-week CL brands ($n=587$) and monthly brands ($n=217$) in the US, and purchasers of 6-packs ($n=119$) and 24-packs ($n=35$) of a 2-weekly CL brand in Canada were surveyed weekly over an 18 week period as to when they replaced their lenses, how many lenses they had on hand, and for general perceptions of the wearing experience. Compliant replacement was defined as within 15 days for 2W lenses and 31 days for 1M lenses.

CONCLUSIONS: Ensuring that patients have an adequate supply of lenses on hand can reduce the tendency to wear lenses beyond their intended replacement interval.