NCC 'Beyond 2020' Paper Abstracts
Free paper sessions
Monday, March 16, 2020 09:30 – 10:45
Netherlands, Veldhoven, de Koningshof, Diezezaal
Organization Section: NCC/ BCLA
Moderator: Marcella McParland

Paper Number: 24
Presentation time: 09:30-09:09:37
Does the use of a novel povidone-iodine based RGP solution affect contamination rates of orthokeratology lenses and cases?
Pauline Cho, Sin-Wan Cheung, Maureen Boost
Purpose: To determine rates of contamination of lenses and lens cases in ortho-k wearers using povidone-iodine (PI) based RGP care system and investigate risk factors for contamination.
Method: Eighty subjects, who were undergoing myopia control study using ortho-k, were recruited and randomly assigned to four cleaning routines (No rub, Rub with PI solution, Rub with daily cleaner, D: Rub with daily cleaner and biweekly enzymatic cleaner). A conjunctival swab was collected before commencement of lens wear and cultured on blood agar aerobically and anaerobically, as well as on chocolate and MacConkey agars. All isolates were identified by Maldi TOF. At 1, 3, and 6 months after commencing ortho-k, lenses were swabbed and returned to the subjects. Lens cases, which were replaced monthly, were collected and cultured as above.
Results: Sixty-eight subjects completed the 6-month study. Very low rates of contamination in both lenses and lens cases were noted. Throughout the study, ocular pathogens were found in two subjects only, one in the lens case (Acinetobacter) ('No-rub' group) and one on the lens (S. pneumoniae) ('Rub with daily cleaner and biweekly enzymatic cleaner' group). Contamination was associated with age, with younger subjects having a lower risk. It was not affected by the cleaning routines.
Conclusions: This clinical study, which showed low rates of contamination, confirmed laboratory studies, which indicated that use of PI-based solutions was able to kill organisms present in biofilm and thus reduce build-up of reservoir of potentially pathogenic organisms on lenses or in the lens cases.
Research funding received: Collaborative Research Agreement between The Hong Kong Polytechnic University and Ophtecs Corporation, Japan

Paper Number: 25
Presentation time: 09:37-09:09:44
Evaluating the prophylactic action of lipid and non-lipid containing tear supplements in a simulated adverse environment: a randomised crossover trial
Jennifer Craig, Sanjay Marasini, Alex Muntz, Michael Wang
Purpose: To evaluate the prophylactic action of lipid and non-lipid containing artificial tear supplements in a simulated adverse environment.
Method: Twenty-eight participants with symptomatic dry eye (57 % female, with mean age ± standard deviation of 29 ± 9 years) were recruited in a prospective, double-blinded, randomised crossover trial. On separate days, participants were randomised to single application of a nanoemulsion tear lipid supplement (Systane® Complete, Alcon) to one eye, and a non-lipid containing eye drop (Systane® Ultra, Alcon) to the contralateral eye. Participants were then exposed to a previously validated simulated adverse environment (moving air at a speed of 3.2 ms-1, generated by a standing fan placed 1m from the eyes, for 2.5 minutes). SANDE symptom score, non-invasive tear film breakup time, lipid layer grade, and tear meniscus height were assessed at baseline, following tear

supplement instillation, and after exposure to the simulated adverse environment, and compared statistically using repeated measures two-way analysis of variance (ANOVA).
Results: Post-instillation, both treatments resulted in clinically meaningful and statistically significant improvements in SANDE symptom score and non-invasive tear film stability (all $p<0.05$), although increased lipid layer quality was limited to the lipid-containing tear supplement ($p=0.003$). Although protective effects were observed with both treatments following exposure to the simulated adverse environment, superior SANDE symptom scores, non-invasive tear film stability, and lipid layer quality were observed in the lipid-containing tear supplement group (all $p<0.05$). No significant changes were observed in tear meniscus height in either treatment group (both $p>0.05$).
Conclusions: Both the lipid and non-lipid containing artificial tear supplements exhibited prophylactic efficacy against the simulated adverse environment, with the nanoemulsion eye drop most effectively preserving tear film quality and reducing dry eye symptoms.
Research funding received: This research was an investigator initiated trial that received funding from Alcon Ltd Pty, Australia. The funder had no role in the design or conduct of the study.

Paper Number: 26
Presentation time: 09:44-09:51
Solution related in vitro dewetting behavior of different SCL materials
Sebastian Marx, Felix Zimmermann, Julia Wittekind, Wolfgang Sickenberger
Purpose: In vitro dewetting characteristics of different silicone hydrogel daily disposable contact lenses were measured out of their specific blister solution using Non-Invasive Keratograph Drying-Up Time procedure to determine short-term dewetting characteristics. In vitro dewetting characteristic curves of same CL materials soaked in saline solution (control solution) and artificial tear solution (ATS) were measured to determine additional dewetting characteristics.
Method: Non-Invasive Keratograph Drying-Up Time was measured for six different CL materials including Nelfilcon A, Delefilcon A, Senofilcon A, Stenfilcon A, Somofilcon A and Narafilcon A out of their specific blister solution, out of saline and out of ATS. For soaking the lenses in saline or ATS, all lenses were rinsed with saline to remove blister solution. 20 lenses of each solution/ material combination were measured. In vitro dewetting behavior of these lenses over 180 seconds was determined and expressed by area under curve values (AUC).
Results: Fasted dewetting occurred for all materials when measured out of blister solution, indicated by the highest averaged AUC value over all lens materials of 9243,3 ± 38,3. Slower dewetting was detected for all materials when measured out of their specific blister solution 7755,9 ± 37,1 and out of ATS 7988,8 ± 40,0. Intra group results were statistically different (Kruskal-Wallis) with $p<0,001$ for saline and blister solution. Intra group differences were smaller for ATS but also statistically different $p<0,05$.
Conclusions: Pure saline solution leads to faster in vitro dewetting for all materials in comparison to their specific blister solution or ATS. In vitro dewetting experiments focused on saline only, may show bigger differences as present in reality. The use of ATS allows to decrease the gap between in vitro and in vivo measurements.
Research funding received: IIT research grant received by Alcon

Paper Number: 27
Presentation time: 09:51-09:58
Evaluation of Contact Lens Care Products using ISO Antimicrobial Efficacy Standards
Paul Shannon, Rhonda Walterson, Monica Crary

Purpose: Contact Lens Care (CLC) products contain biocides that are effective against common ocular pathogens. ISO Standards have been developed to ensure CLC products maintain appropriate antimicrobial efficacy during use. The EN ISO 14729 and EN ISO 18259 standards establish the intrinsic antimicrobial efficacy of a product as well as the antimicrobial efficacy when a solution is utilized with contact lenses and contact lens cases. The purpose of this study was to determine the antimicrobial efficacy of three commercially available CLC products by the two ISO standards.
Method: Three commercially available CLC products: polyaminopropyl biguanide 0.00013%/polyquaternium 0.0001% (SOLN1), polyquaternium-1 0.001%/myristamidopropyl dimethylamine 0.0006%, (SOLN2) and alexidine dihydrochloride 0.00016% and polyquaternium-1 0.0003% (SOLN3) were evaluated per ISO 14729 and ISO 18259 standards. In addition, the three solutions were evaluated using a modified ISO 14729 with Acanthamoeba trophozoites (ATCC 50370 and ATCC 30461). Antimicrobial efficacy of each solution in each test was determined by log reductions and percent reductions using standard microbiological methods.
Results: SOLN1 was less efficacious than SOLN2 and SOLN3 against F. keratoplasticum in both test tubes (Log reduction 2.9 vs 4.4 vs 4.3 respectively) and lens cases (Log reduction 1.9 vs 4.4 vs 4.5). Similarly, SOLN2 was more efficacious than SOLN1 and SOLN3 against C. albicans in tubes (Log reduction 4.5 vs 1.9 vs 1.8) and cases (Log reduction 4.5 vs 1.4 vs 2.7). SOLN2 showed significantly more antimicrobial efficacy than SOLN1 and SOLN3 against Acanthamoeba trophozoites ATCC 30461 (Percent reduction 99.97 vs 25.52% vs 51.82%) and ATCC 50370 (Percent reduction 99.25% vs 37.60% vs 59.52%).
Conclusions: CLC products do not demonstrate equivalent efficacy in all ISO Standards and are impacted by the presence of contact lenses and cases.
Research funding received: All authors are employees of Alcon Laboratories.

Paper Number: 28
Presentation time: 09:58-10:05

CONTACT LENS HYGIENE: THE UNTOLD STORY

Marianne Lindenberg, Cor Oosting-Klock, Jan Roelof Polling, Mirjam Van Tilborg

Purpose: It has been shown that non hygiene compliant contact lens wearers have a higher risk of complications. Studies show that the overall compliance varies from 40-98%, depending how it is defined. Hygiene instruction might be incomplete, leaving contact lens wearers unwillingly noncompliant. The purpose of this study was to determine the content and frequency of the hygiene instruction for soft contact lenses given by eye care professionals in the Netherlands.
Method: An online survey was conducted. Optometrists and contact lens specialists (eye care professionals, ECPs) in this research were invited to participate by an invitation through email, Facebook or LinkedIn. This invitation was open 29 October to 30 November 2018. The survey was conducted through Google Forms and the data was captured anonymous. The survey included: the characteristics of the ECPs, work situation, the actual instruction and the frequency of discussion. ECPs were asked to answer a total of 33 questions. The collected data was analyzed descriptively.
Results: Of the 134 ECPs, 51 were optometrists and 83 contact lens specialists. Only 6% (n=7) of ECPs documented all the 12 questioned topics such as hand hygiene, contact lens hygiene and lens case hygiene in their lens instruction protocol. The survey showed that topics such as contact lens solutions and expectations are less frequently included in the handout than discussed in the contact lens instructions. 62% (n=83) of ECPs indicated that they always provide their customers with a

written information leaflet. 29% (n=29) of ECPs indicated to discuss the hygiene instruction during the first contact lens instruction moment and in every follow up visit.
Conclusions: The hygiene instruction given by ECPs in the Netherlands seems to lack structure. Agreements regarding this instruction are not made within all practices. In general, regular repeated instructions and written instructions are often not provided to customers.
Research funding received: None

Paper Number: 29
Presentation time: 10:05-10:12
Factors affecting microbial contamination on the back surface of worn soft contact lenses
Fiona Stapleton, Jaya Sowjanya Siddireddy, Katherine Wong, Qing Shen, Ajay Kumar Vijay, Tan Jacqueline
Purpose: To investigate the effect of lens packaging type, the presence of chelating agent EDTA in the packaging solution and microbial contamination of the fingers on the level and rate of microbial contamination on the back surface of worn silicone hydrogel and hydrogel contact lenses.
Method: Twenty-five experienced soft contact lens wearing subjects completed each lens wear comparison. At the first two visits, participants were randomized to the lens material type to be worn bilaterally (silicone hydrogel with EDTA or hydrogel without EDTA) and the eye to which lenses removed from the two different types of lens packaging (reduced handling or conventional) was to be inserted. At the third visit, both lenses were removed from the reduced handling lens packaging and participants were randomized to wear the silicone hydrogel lens without EDTA or the hydrogel lens with EDTA in the packaging. At each visit participants washed their hands, underwent a finger swab and inserted the lenses. After 45 mins of wear, lenses were removed aseptically by a masked investigator and the lens back surface was placed on molten nutrient agar. Microbial count was conducted after 24 hours. Analysis of variance and chi-square tests were conducted.
Results: A total of thirty-eight subjects were enrolled: 14 males and 24 females with average age 30.9 ± 12.5 years. The multivariable analysis showed that in the presence of EDTA, conventional lens packaging was associated with a 3.38x increased risk (95%CI 1.02-11.11, p=0.046) of lens contamination compared to the reduced handling packaging. Lens material was not significantly associated with lens contamination. In the absence of EDTA, conventional lens packaging was associated with a 3.41x increased risk (95%CI 1.02-11.36, p=0.046) of lens contamination compared with the reduced handling packaging, but the silicone hydrogel lens material was associated with a 6.28x increased risk (95% CI 1.65-23.81, p=0.007) of lens contamination compared with the hydrogel lens material. Finger contamination was not significantly associated with lens contamination in the presence or absence of EDTA.
Conclusions: The reduced handling packaging was effective for reducing the proportion of contaminated lenses, while the presence of EDTA appeared to ameliorate this effect for silicone hydrogel lenses. Finger contamination was not associated with lens contamination.
Research funding received: Study sponsored by Menicon Co. Ltd.

Paper Number: 30
Presentation time: 10:12-10:19
Difference in choroidal thickness of Danish children, after treatment with Ortho-k measured using Swept-source OCT
Brit Sørensen
Purpose: The purpose of this study was to investigate, whether there was a difference in choroidal thickness on Danish Caucasian children wearing ortho-k(OK) and single vision lenses (SVL). Furthermore, if there was a difference in

choroidal thickness between sex, and if there was a correlation on choroidal thickness for age and spherical equivalent.
Method: Observational analytical cross-sectional study. 36 myopic Danish children, from a randomized 18-month prospective PhD study was included in this study. There was 22 girls and 14 boys. OK 15, SVL 21. Mean age of 10.69 +/- 1.67 year, OK 10.27 +/-1.39 year, SVL 11.00 +/- 1.82 year. Mean spherical equivalent of -2.42 +/- 1.21 D, OK -2.28 +/- 1.22 D, SVL -2.52 +/- 1.22 D. Data was collected at the eye-department, Vejle Hospital. Choroidea was measured using SS- OCT DRI Triton Topcon Japan. The statistical calculation was made with unpaired t-test and simple linear regression.
Results: The result showed a significant difference, 49.08 µm (9.57; 88.59) (P = 0.016), in the choroidal thickness between OK and SVL. No statistically significant difference in choroidal thickness compared to sex 32.85 µm, (-9.15; 74.86), (p = 0.1212). No statistically significant correlation for choroidal thickness and age 3.07 µm (-9.77; 15.92),(p = 0.630), and spherical equivalent 13.64 µm (- 3.51;30.78), (p = 0.115).
Conclusions: The result, 49.08 µm (9.57; 88.59) (P = 0.016), shows a significant difference in choroidal thickness after treatment with OK and SVL, but no significant difference between sex. There was no statistically significant correlation for the choroidal thickness for age and spherical equivalent. It may therefore indicate that OK can be attributed to the difference in choroidal thickness of Danish Caucasian children. Although the study showed significant results for the difference the topic should be further investigated in other studies with bigger study population.
Research funding received: N/A

Paper Number: 31
Presentation time: 10:19-10:26

Contact Lens Trial Conversion in a UK survey - The dynamics between those who try and those who buy
Marcella McParland, Zoe Bull, Abi Pursey, Anna Sulley
Purpose: Retention with contact lens (CL) wear is around 3 in 4 new wearers, with many stopping during the first 2 months; key factors for lapsing are handling, comfort and vision. To identify key factors that influence becoming a CL wearer, we investigated likelihood to purchase CLs following a trial.
Method: A quantitative online research survey was conducted with neophytes in UK who had a CL trial within the last 5 years. They were questioned on motivation to wear CLs and trial experience. Comparisons were made between convertors and non-converters to CLs.
Results: Of the 522 CL triallists (91% female, 8% 18-34 years, 32% 35-54 years, 60% aged 55+), 292 purchased (56%), and of these, 31% continued to wear CLs. For those who trialled within one year, 65 (60%) purchased and 42% were still wearing CLs. Those who converted were motivated by having a new look (26%), CL convenience (21%) and playing sport (12%). The opportunity to trial CLs was a key factor in conversion, and 83% were satisfied with the trial experience. Non converters were more passive about wearing CLs, often had a poor experience with staff, and expectations were often not met, particularly with handling and insertion/removal instruction. The key barrier to purchase was handling (48%); while 50% asked their ECP for more support, 10% asked friends and 38% didn't seek any help. 60% non-converters decided within days to cease wear.
Conclusions: Many consumers trial CLs but never become a wearer; for every 10 who trial only 3 become committed CL wearers. Those highly motivated are more likely to succeed and an opportunity to trial CLs is a key factor in subsequent purchase. Providing good clear instruction on handling is critical, along with regular

contact after the trial to help motivate continuing wear.
Research funding received: Study sponsored by CooperVision

Paper Number: 32
Presentation time: 10:26-10:33
Association Between Initial Subjective Ratings and Overall Lens Acceptance in Daily Disposable Contact Lens Wear
José Vega, Gary Orsborn
Purpose: Patients' experiences with first attempts at trying contact lenses may influence the overall acceptance of lenses and ultimately the success of new fits. The purpose of this study was to determine if initial subjective patient experiences influence the overall acceptance of daily disposable lenses at the dispensing visit.
Method: This was a randomised, double-masked, crossover, bilateral study. Two daily disposable contact lenses, midafilcon A (MA) and somofilcon A (SA), were dispensed in random order and assessed. Initial subjective ratings were collected using a 0 - 100 visual analog scale.
Results: Fifty-five subjects, aged 18 to 40 (mean ± SD: 26.3 ± 6.3 years), were dispensed lenses. Results of ratings at dispensing were as follows for lens handling (MA: 84.5 ± 16.9, SA 94.7 ± 8.2, $p<0.0001$); lens removal from blister (MA: 66.8 ± 23.5, SA 92.9 ± 11.1, $p<0.0001$); comfort (MA: 86.0 ± 15.1, SA 92.8 ± 8.7, $p=0.001$); vision (MA: 93.1 ± 8.5, SA 95.0 ± 8.6, $p=0.19$), and overall lens acceptance (MA: 80.4 ± 13.7, SA 93.1 ± 6.6, $p<0.0001$): Lens handling and overall lens acceptance were moderately correlated for MA ($r=0.57$, $p<0.001$,) and weakly correlated for SA ($r=0.39$, $p=0.003$). Lens removal from the blister was highly correlated with overall lens acceptance for MA ($r=0.74$, $p<0.001$), and moderately correlated for SA ($r=0.57$, $p<0.001$). Comfort and overall lens acceptance were moderately correlated for both MA ($r=0.62$, $p<0.001$) and SA ($r=0.63$, $p<0.001$). Vision and overall lens acceptance were weakly correlated for MA ($r=0.39$, $p=0.004$), moderately correlated for SA ($r=0.57$, $p<0.001$).
Conclusions: The evaluation of midafilcon A and somofilcon A lenses in this clinical study has demonstrated that initial overall lens acceptance is influenced by lens handling, lens removal from the blister, and comfort. Insights from these results may be useful when considering which lenses to try when fitting new patients.
Research funding received: Both authors are employees of CooperVision, Inc.

Paper Number: 33
Presentation time: 10:33-10:40
Comparison of the clinical performance of a novel silicone hydrogel and a HEMA-based daily disposable contact lens
Lakshman Subbaraman, Stacie Cummings, Anne Brobst
Purpose: Verofilcon A is a novel, daily disposable, silicone hydrogel contact lens with "SmartSurface" chemistry. The objective of this study was to assess overall lens preference, as well as overall comfort, handling and quality of vision of verofilcon A compared to a commercially available HEMA-based daily disposable lens (etafilcon A).
Method: Twenty-two subjects completed this three site, prospective, randomized, double-masked, parallel crossover pilot study. Lenses were worn bilaterally for 7-10 days each. At the end of each wearing period subjects were asked to rate their overall comfort, overall handling and overall quality of vision on an analog scale (10-point scale; 1 = poor, 10 = excellent). Subjects were asked about their overall lens preference and the reason for their preference at the end of the second lens wear period.
Results: 77.3% of subjects preferred verofilcon A lenses over etafilcon A lenses (strongly preferred verofilcon A = 59.1%; preferred verofilcon A = 18.2%). The reason for verofilcon A preference was in comfort 41.2%, handling 35.3%, vision 17.6% and other 5.9%. These reasons were in line with the individual lens scores for overall comfort rating, overall handling

and overall quality of vision (mean (SD; 95% CI). Overall comfort was rated 9.2 (0.9; 8.8-9.6) for verofilcon A and 8.1 (1.8; 7.3-8.9) for etafilcon A. Overall handling was rated 9.5 (0.7; 9.2-9.9) for verofilcon A and 7.5 (2.1; 6.6-8.5) for etafilcon A, and overall quality of vision was rated 9.2 (1.1; 8.7-9.7) for verofilcon A and 8.8 (1.7; 8.0-9.5) for etafilcon A.

Conclusions: This pilot study observed a high overall preference for the new lens verofilcon A. Subjective rating was higher than 9 out of 10 for overall comfort, overall handling, and overall quality of vision for verofilcon A.

Research funding received: Study sponsored by Alcon

End of session