NCC2018 Paper Abstracts
Free paper sessions
Sunday, March 11, 2018 16:30 – 17:30
Netherlands, Veldhoven, de Koningshof, Beneluxzaal
Organization Section: NCC/ BCLA
Moderator: Byki Huntjens

Paper Number: 15
Presentation time: 16:30-16:40
The Repeatability of Lid Parallel Conjunctival Folds and Lid Wiper Epitheliopathy
Heiko Pult
Purpose: In the past decade of years, lid parallel conjunctival folds (LICPOF) and lid-wiper epitheliopathy (LWE) has shown to be promising new dry eye tests. Classic dry eye tests are criticized to be unrepeatable (Nichols J. et al. 2004), when being observed over a couple of weeks. However, those data are unknown in LIPCOF and LWE. This study investigated the repeatability of LIPCOF and LWE over a period of one month.
Method: LIPCOF and LWE of both eyes of 30 volunteers (female: 21, mean age 32.7 ±9.4 years) were evaluated at day 1 (V1), day 14 (V2) and day 28 (V3). LIPCOF was classified using the Pult scale. Temporal and nasal scores were summarized to LIPCOF Sum. LWE was examined using fluorescein and lissamine green and classified by the Korb scale. Repeatability between visits was analysed by Kappa statistic, intra class coefficient (ICC) and limits of agreement (LoA) as 1.96 x standard deviation.
Results: Mean LIPCOF Sum grade at V1 was 1.8 ±1.0 and 0.98 ±0.87 for LWE. Kappa between visits for LIPCOF Sum was 0.28 and 0.23 ($p<0.001$; VI – VII and VI - VIII, respectively) and for LWE 0.12 ($p=0.059$) and 0.11 ($p=0.092$). 95% LoA for the differences between visits was 2.18 and 2.04 for LIPCOF Sum and 1.92 and 1.82 for LWE (VI – VII and VI - VIII, respectively). ICC for LIPCOF Sum was 0.802 and 0.730 and 0.685 and 0.628 for LWE ($p<0.001$; VI – VII and VI - VIII, respectively).
Conclusions: Repeatability of LIPCOF and especially of LWE was limited. However, ICC of LIPCOF and LWE was better as published values of tear meniscus height, tear break up time, Schirmer or phenol red thread test.
Research funding received: None

Paper Number: 16
Presentation time: 16:40-16:50
A novel method for objectively investigating toric lens rotational stability
Benjamin Straker, Giovanna Olivares, Ranganath Raja, Youssef Toubouti
Purpose: Current clinical methods of measuring toric soft lens (TCL) rotational stability are short in duration, subject to variability and may not reflect real-world performance. This study investigated the feasibility of a novel method for quantifying stability of a TCL under real-world conditions.
Method: TCLs were manufactured in senofilcon A with white fiducial markings and plano optics. Lenses were fitted bilaterally to twelve subjects for a minimum of 5 hours wear. Subjects captured photographs of both eyes every 30 minutes using a smartphone (iPhone 6 Plus) with a custom eyecup and macro lens attachment (Olloclip Macro Pro 7x Lens). Photographs were reviewed for acceptability and analysed to determine lens rotation relative to the intercanthal angle. For each eye, stability was quantified as the standard deviation (SD) of rotation measurements over the wear period. Within-subject correlation between right and left eye stability was investigated.
Results: Two eyes were excluded from image analysis due to photographs failing to meet acceptability criteria, leaving 273 images from 22 eyes included. Rotation data appeared to follow a normal distribution; assuming normality allows the calculation of prediction intervals for lens rotation and residual astigmatic blur. The stability (SD) ranged from 0.91° to

5.4° with a mean of 2.4°, inferring a 95% prediction interval of approximately ±5° for an average eye wearing the design used in this study. Stability was poorly correlated between right and left eyes, suggesting ocular anatomy and subject activity did not account for between-eye variation.
Conclusions: A novel objective method may be used to evaluate toric lens stability under real-world conditions. Future investigations may use this method to investigate lens movement during different activities or eye movements, or to quantitatively compare the performance of alternative designs.
Research funding received: Study sponsored by Johnson & Johnson Vision Care

Paper Number: 17
Presentation time: 16:50-17:00
Improving Your Spectacle Patients In-Practice Experience with Contact Lenses During Frame Selection
David Ruston, Meredith Jansen - Bishop, Scott Allison, Scott Hasty, Daryl Walerius, Kyle Conway, Melissa Usseglio, Mike Mayers
Purpose: The objective of this market research study was to assess the impact of offering spectacle-only patients complimentary contact lenses (CLs) during frame selection on customer experience, total optical sales, and potential contact lens category growth.
Method: Five USA optometry practices were recruited. An initial interviewing period served as a control, where ECPs treated spectacles-only patients normally. Upon completing the control period, practices transitioned to the test period where patients were fitted with CLs to wear while choosing new frames; CLs were removed at end of the visit. Any spectacle-only patient over 18 who did not specifically present for CLs was invited to participate. All vision correction needs were accommodated. Following the visit, patients completed a brief iPad survey.
Results: 205 unique patients completed each phase (control/test). Of those in the test group, 129 (63%) opted into wearing CLs during frame selection. The type of CLs used by the 129 CL wearing consumers were: 40% spherical, 19% toric, 35% multifocal, and 5% monovision. Statistical analysis was conducted on the CL-wearing test group (n=129) vs. control group (n=205). Patients who wore CLs while selecting new eyewear reported they could see themselves more clearly (p=0.05), were more likely to make an eyewear purchase on that visit (p=0.0003), spent ~20% more on optical eyewear (p=0.04), were >2.5X more likely to have received or scheduled a CL fit (p=0.01), and were 3X more likely to consider scheduling a CL fitting in the future (p=0.0003). Additionally, almost 9 out of 10 subjects were highly satisfied, wanting this experience the next time.
Conclusions: Similar to the results from the Enhancing the Approach to Selection Eyewear (EASE) study previously conducted in the UK, this market research study demonstrates by offering spectacle-only patients CLs, their eyewear selection process is positively impacted while continuing to grow overall business including CLs.
Research funding received: Study sponsored by Johnson & Johnson Vision Care

Paper Number: 18
Presentation time: 17:00-17:10
Longitudinal changes in Langerhans cell density of the cornea and conjunctiva in contact lens-induced dry eye
Yahay Alzahrani, Louisa Holguin, Nicola, Pritchard, Nathan Efron
Purpose: The aim was to determine longitudinal changes in Langerhans cell density (LCD) in the human cornea and conjunctiva during asymptomatic and symptomatic contact lens wear.
Method: Twenty-five participants with contact lens-induced dry eye (CLIDE) and 35 without CLIDE (NO-CLIDE), diagnosed using a range of symptom questionnaires

and objective tests (tear film break up, cotton thread tear test and corneal staining) were enrolled. The central cornea and nasal bulbar conjunctiva were examined using a Heidelberg laser scanning confocal microscope at baseline and following one, four and 24 weeks wear of daily disposable hydrogel contact lenses. Twenty-three non-contact lens-wearing controls were also examined. Langerhans cells were counted manually from randomly selected images.
Results: In the cornea, mean and standard error of the mean LCD was greater after one week of lens wear in CLIDE (55 ± 7 cells/mm2) versus NO-CLIDE (43 ± 4 cells/mm2) ($p = 0.041$) and controls (27 ± 4 cells/mm2) ($p < 0.001$). LCD was also greater in NO-CLIDE versus controls ($p = 0.010$). At week 4, LCD was greater in CLIDE (41 ± 6 cells/mm2) versus controls (27 ± 4 cells/mm2) ($p = 0.004$). There were no other significant differences between groups at weeks four or 24. In the conjunctiva, LCD was greater after one week of lens wear in CLIDE (17 ± 1 cells/mm2) ($p = 0.003$) and NO-CLIDE (17 ± 3 cells/mm2) ($p = 0.001$) versus controls (7 ± 1 cells/mm2). There were no significant differences between groups at weeks four or 24.
Conclusions: The initial transient increase in corneal and conjunctival LCD in CLIDE (versus NO-CLIDE) suggests an inflammatory component in the aetiology of this condition
Research funding received: N/A

Paper Number: 19
Presentation time: 17:10-17:20
Comparison between subjective fluorescein breakup time and automated tear breakup time measurements using the E300 corneal topographer
Byki Huntjens, Jeroen A. Mulder, Mirjam M. van Tilborg
Purpose: Comparison of invasive fluorescein tear film breakup time (FBUT) and the automated measurement of tear film stability known as Tear Film Surface Quality (TFSQ) breakup time using placido disc videokeratography measured with and without fluorescein sodium (NaFl).
Method: In 57 eyes of 57 subjects (males n=23, females n=34), FBUT using a single dose of NaFl was measured three times and automated TSFQ breakup time was measured twice under two different conditions: non-invasively (without NaFl), and using a single dose NaFl, using the E300 corneal topographer (Medmont International Pty Ltd., Victoria, Australia). Mean age (± SD) was 35.1±15.2 years ranging from 19 to 65 years. There was no history of ocular diseases, contact lens wear, or previously diagnosed dry eye. Subjects were grouped by age (<40 years [n=34] versus ≥40 years [n=23]) and Ocular Surface Disease Index (OSDI) score (≤12 'normal' [n=36] versus >12 [n=21]).
Results: There were no significant differences between the three consecutive measures of FBUT ($p=0.62$), two measures of TFSQ breakup time without NaFl ($p=0.67$) or with NaFl ($p=0.96$). There were strong significant correlations between TFSQ without and with NaFl ($r=0.709$, $p<0.0005$) and moderate significant correlations between the FBUT and TFSQ breakup time without NaFl ($r=0.583$, $p<0.0005$) and with NaFl ($r=0.432$, $p=0.001$). Average FBUT was significantly shorter (8.1 ± 6.9 sec) compared to TFSQ breakup time without NaFl (12.6 ± 12.9 sec) and with NaFl (13.6 ± 12.6 sec; $p=0.002$, partially eta squared=0.21), irrespective of age group ($p=0.36$) or gender ($p=0.60$) or OSDI score ($p=0.67$).
Conclusions: Automated TFSQ break up time measured with the Medmont E300 topographer is repeatable when measured with and without the addition of NaFl dye; however, the TFSQ break up time is overall significantly increased compared to subjective FBUT. Both measures of tear breakup time are therefore not interchangeable.
Research funding received: None

Paper Number: 20
Presentation time: 17:20-17:30

Intraocular Pressure (IOP) measurements in Keratoconic patients: Do variations in IOP respect variations in corneal thickness and corneal curvature?

Jonathan Jackson, Rebecca Cairns, Michael O'Gallagher

Purpose: To explore the relationship between IOP measurements and topographical variations in corneal curvature and corneal thickness in a cohort of keratoconic patients presenting to a regional corneal clinic in Northern Ireland.

Method: IOPs were recorded, using a hand held ICARE tonometer, at central, nasal and temporal locations on the right and left corneae of 27 consecutive patients attending a newly established keratoconic clinic in Belfast. Corneal thickness and sagittal corneal curvature results, were recorded in matched locations using the Pentacam Topographer. Patients with a history of corneal surgery or anterior surface pathology were excluded from the study. The relationships between all three parameters were investigated.

Results: The median (interquartile range) central corneal curvature (CCC), central corneal thickness (CCT) and IOP measurements for 49 eyes were 44.1D (42.2D to 48.1D); 495µm (460µm to 526µm); 10mmHg (8mmHg to 13mmHg) respectively. Mid temporal and nasal corneal curvature, corneal thickness, and IOP values, recorded on midline, were; temporal 41.9D (40.7D to 42.8D); 621µm (579µm to 650µm); 14mmHg (11mmHg to 16mmHg); nasal 40.8D (39.5D to 42.5D); 641µm (599µm to 698µm); 13mmHg (12mmHg to 17mmHg). A moderate correlation was shown between a reduction in CCT and an increase in mean central corneal dioptric power (Spearman's Coefficient (ρ) -0.72 P<0.01). A moderate correlation was found between a reduction in CCT and a reduction in IOP, as recorded centrally, (ρ=0.37 P=0.01). Mid-peripheral values demonstrated similar trends in the relationship between corneal curvature and IOP (nasal ρ=-0.47 P<0.01; temporal ρ=-0.38 P<0.01) and corneal thickness and IOP (nasal ρ=0.29 P=0.05; temporal ρ=0.33 p=0.02).

Conclusions: In this study we demonstrate a strong correlation between corneal thickness (um), corneal curvature (mm) and IOP (mmHg) measurements. Topographical variations in intraocular pressure mimic changes in both corneal curvature and corneal thickness.

Research funding received: None

End of session