NCC2018 Paper Abstracts
Free paper sessions
Sunday, March 11, 2018 13:30 – 14:30
Netherlands, Veldhoven, de Koningshof,
Baroniezaal
Organization Section: NCC/ BCLA
Moderator: Amanda Bogers

Paper Number: 1
Presentation time: 13:30-13:38
Visual performance with a daily disposable contact lens compared to best corrected sphero-cylindrical spectacle refraction
Chantal Coles-Brennan, Kim Hoyt, Kurt Moody
Purpose: Standard visual acuity (VA) measures only test visual sensitivity at high spatial frequencies, usually under high luminance conditions. A more complete insight to visual experience may be obtained by measuring contrast sensitivity (CS). This study compared electronic LogMAR (eLogMAR) VA and CS in myopes wearing a daily disposable (DD) contact lens (CL) and wearing best corrected sphero-cylindrical spectacle refraction (SCR).
Method: This was a bilateral, non-dispensing, 3-visit, randomized-controlled, crossover, single-masked, single-site study to assess visual performance in subjects fit with: (i) a senofilcon A DD CL, and (ii) SCR in trial frame. Subjects were habitual CL wearers (not wearing senofilcon A DD) aged 18-35 years, with spherical refraction -1.00D to -9.00D, cylinder ≤-0.75D and best corrected VA 6/7.5 or better in each eye. eLogMAR VA under high luminance, low contrast (HLLC) and low luminance, high contrast (LLHC) conditions was measured (Precision Vision). Contrast sensitivity function (qCSF) was measured using the AST Sentio Platform (Adaptive Sensory Technology). The area under log of CSF (AULCSF) was calculated.
Results: All 43 subjects fit with CLs completed the study (mean age 26.8 years, SD4.65). LLHC monocular eLogMAR VA with CL vs SCR was 0.02 ± 0.01 vs 0.05

± 0.01 (least square mean ± SE, p<0.05). HLLC monocular eLogMAR VA was 0.15 ± 0.02 vs 0.21 ± 0.02 (p<0.05). Percent change in contrast threshold value CL vs SCR was -11.4% at 6.0cpd, -17.8% at 12.0cpd and -17.2cpd at 18.0cpd. AULCSF with CL vs SCR was 1.37 vs 1.32 least mean square (p<0.05).
Conclusions: The senofilcon A CL showed statistically significantly better eLogMAR VA than best SCR under both high luminance, low contrast and low luminance, high contrast conditions. CS testing confirmed the visual performance gains indicated by the acuity test with the CL also demonstrating a statistically significantly greater AULCSF than best SCR.
Research funding received: This work was derived from an internal Johnson & Johnson Vision Care contact lens clinical trial. No other research funds were granted.

Paper Number: 2
Presentation time: 13:38-13:46
The impact of learning and experience on time taken to apply and remove contact lenses
Meredith Bishop, Frank Yi, Jane Veys
Purpose: More than 4 in 10 contact lens (CL) considerers say application and removal is a potential barrier to wear, and the principal reason for dropout in the first year with spherical lenses is handling difficulties.   A study was conducted to assess the time needed for application and removal in neophytes (NW) and habitual (HW) wearers.
Method: NW and HW aged 18-45 years were recruited. HW had a single study visit where they applied and removed a hydrogel daily disposable (DD) lens while being recorded by an iPad application. NW first had a training visit where they watched training videos and then had 1:1 training with a staff member, like that done in practice. If successful (applying and removing the training lenses twice), they returned for a second visit to apply and remove the DD CL while being

recorded. Overall time of the video, and technique, was used for the analysis; a cut-off time (10 minutes) was applied. Subjective questionnaires were completed on handling aspects.

Results: A total of 59 subjects completed the study; 30 HW and 29 NW. Mean age was 30.2 ± 6.46 years; 52.5% were female. There were statistically significant differences ($p < 0.05$) for median time to apply and remove CLs; 20.5 seconds (range 7-108) versus 101.5 seconds (range 32-614) to apply and 8.0 seconds (range 3-21) versus 14.0 seconds (range 4-116) to remove for HW and NW respectively.

Conclusions: The differences in the time to apply and remove CLs between wearer groups, and a wide range of abilities across both groups, highlights the potential difficulties experienced by some NW with handling CLs, and the timing challenge in practice as they become comfortable with application and removal. These findings support the need for continued follow-up and support on applying and removing CLs for NW.

Paper Number: 3
Presentation time: 13:46-13:54
New and habitual wearers: how does their experience with a daily disposable toric soft contact lens differ?
Anna Sulley, Kyle Conway

Purpose: Research into new wearer retention shows poor vision, along with comfort and handling, is a key reason for lapsing within the first year with toric lenses. Fitting success of a daily disposable (DD), silicone hydrogel toric (TCL) has previously been investigated. A multi-centre in-market assessment was conducted to compare performance and satisfaction with the TCL in new (NW) and habitual (HW) wearers in real-world conditions.

Method: This was a monadic, non-interventional assessment in which US ECPs fit patients with a senofilcon A DD

TCL. Performance was evaluated via online survey after 3-5 days' wear. Data were collated and analysed post-hoc by an independent market research agency.

Results: Of 1072 patients fit by 95 ECPs, 341 completed the survey (73 NW, 268 HW). Among the HW group, 81% previously wore TCLs. Both groups wore the TCL for a mean 4.2 days (SD1.36). There were significant differences in those agreeing the TCL was comfortable while using digital devices (91.7% HW vs 79.5% NW, $p < 0.05$) and in challenging environments (air-con/heated; 89.6% vs 74.6%, $p < 0.05$). Asked whether they experienced clear, consistent vision in those conditions, differences were seen with challenging environments (92.7% HW vs 84.7% NW, $p < 0.05$) but not digital devices (92.5% vs 87.7%). There were no significant differences on whether the fit process was simple, quick and easy (97.0% HW agreed vs 97.3% NW), the TCL was easy to handle (97.4% agreed vs 95.9%) Overall, vision was consistent regardless of eye/head movements (91.8% vs 87.7%). Both groups reported consistent vision wearing the TCL, (94.0% HW vs 87.7% NW) and stable vision with daily activities (92.5% vs 86.3%).

Conclusions: This study shows high satisfaction in NW and HW with the TCL. Differences between groups highlight the need to pay attention to neophyte expectations, and ensure good communication and education to enhance success rates.

Paper Number: 4
Presentation time: 13:54-14:02
Are daily disposable toric soft contact lenses prism free in the optic zone?
Anna Sulley, Ben Straker, Mohamad Hasan, Todd Szarlan, Jason Tokarski

Purpose: Rotational stability of toric soft contact lenses (TSCLs) is achieved using various designs. A previous study with reusable TSCLs found prism-ballast and

peri-ballast designs have vertical prism in the central optic zone. An Eyelid Stabilised Design had significantly lower vertical prism than other TSCLs tested (ANOVA p<0.001). More daily disposable (DD) TSCLs have since become available. This study quantifies vertical prism in DDTSCLs using the same methodology.

Method: Vertical prism of TSCLs was computed using published refractive index and average thickness change vertically in the central 6mm optic zone on a full lens thickness map. Thickness maps were measured using scanning transmission microscopy (Phase Focus Virtual Lens). Six hydrogel and SiHy DDTSCLs were tested: etafilcon A, nelfilcon A, nesofilcon A, senofilcon A, somofilcon A and stenfilcon A, with eight parameter combinations for each lens (-6.00 DS to +3.00 DS, -1.25 DC, 90° and 180° axes), or as available.

Results: Results: Mean vertical prism was <0.05Δ for four of the six DTSCLs. Vertical prisms for etafilcon A (mean 0.00Δ, SD0.04) and senofilcon A (0.04Δ, 0.08) Eyelid Stabilised Designs were statistically significantly lower than for somofilcon A (0.75Δ, 0.07) and stenfilcon A (0.73Δ, 0.07) (both p<0.0001). No statistically significant difference was found compared to nelfilcon A (0.00Δ, 0.02) or nesofilcon A (0.02Δ, 0.01).

Conclusions: Some DDTSCLs have significantly more vertical prism in the central optic zone, and for SiHs, only the senofilcon A lens has no vertical prism. About half of astigmats (≥0.75DC) have monocular astigmatism. In monocular astigmats, or those wearing two different DDTSCL designs, vertical prism imbalance ≥0.5 could potentially create/exacerbate disturbances in binocular vision function. As DDTSCL prescribing increases, practitioners should be aware of this potential effect when selecting designs, particularly for monocular astigmats with pre-existing binocular vision abnormalities.

Paper Number: 5
Presentation time: 14:02-14:10
Changes in Accommodative Micro-Fluctuations after Wearing Contact Lenses of Different Optical Designs

Gary Orsborn, Masayoshi Kajita, Taku Muraoka, Jose Vega

Purpose: It has been postulated that eye fatigue symptoms associated with use of digital devices may be a result of ciliary muscle stress. Accommodative micro-fluctuations (AMF) are caused by ciliary muscle vibrations related to ciliary muscle stress during accommodation. Contact lenses with innovative optical designs may reduce AMF. The objective of this study was to evaluate changes in AMF in subjects wearing silicone hydrogel soft contact lenses with two different optical designs.

Method: This was a prospective, multi-centre (9 sites), randomized, cross-over, subject-masked, bilateral wear, non-dispensing study comparing comfilcon A lenses (CASD) (Biofinity sphere, CooperVision Inc.) and comfilcon A multiple aspheric curve design lenses (CADZO) (Biofinity Energys, CooperVision Inc.). Sixty-eight subjects, ages between 25 - 35 years old (mean, SD 26.4 ± 4.6), had their AMF assessed, while wearing CASD and CADZO lenses, using Righton Speedy "i" Series Auto Refractometer in accommodation analyser mode before and after reading a standard text in font size 8 on an iPhone5 for 20 minutes at a 25cm viewing distance. Phone screen brightness was set by automatic adjustment mode and ambient illumination was controlled at all sites. There was a washout period of at least 1 day before assessment with the second contact lens design.

Results: Mean ± SD change in AMF was 0.13 ± 5.7 and 2.25 ± 5.6 (relative values) for CADZO and for CASD, respectively. There was a statistically significant

difference in the mean change of AMF between CADZO and CASD (p=0.017, Paired t-test).

Conclusions: Less change in AMF frequency with CADZO lenses when compared to CASD lenses shows reduced ciliary muscle stress with innovative optical design lenses during reading on a smartphone at close distance for only 20 minutes. Future studies should evaluate the relationship between changes in AMF and digital eye fatigue symptoms, such as tiredness.

Research funding received: Study sponsored by Cooper Vision

Paper Number: 6
Presentation time: 14:10-14:18
Satisfaction survey of new and existing contact lens wearers fitted with comfilcon A multiple aspheric curve design contact lenses specifically design
Amanda Bogers, Louisette Bloise, Florence Malet, Caroline Bonneville, Sandrine Chéneau **Purpose**: Satisfaction survey of new and existing contact lens wearers fitted with comfilcon A multiple aspheric curve design contact lenses specifically designed for patients' digital lives Purpose Current lifestyles have changed dramatically and increased use of electronic devices has multiplied potential stresses on the ocular system. This study assessed visual comfort, eye fatigue symptoms and overall satisfaction with comfilcon A multiple aspheric curve design contact lenses (CADZO) (Biofinity Energys™, CooperVision Inc.) among new and existing wearers who self-reported symptoms of digital eye fatigue in a real-life practice setting.

Method: The study involved a total of 240 ophthalmologists who fitted 1,062 patients with CADZO, in France between September–December 2016. At the initial visit, visual symptoms were reported prior to dispensing CADZO. Patients wore the lenses for 21-28 days before completing a survey on symptoms linked to time spent in front of digital screens (computers, tablets, mobile phones).

Results: A total of 704 patient surveys were completed and analysed by an independent market research agency. Of the patients, 40% (n=280) were new to CLs and 60% (n=424) were existing wearers. All patients completing the survey spent at least 4h per day using screens at least 5 days a week. All self-reported symptoms linked to time spent in front of screens. Among all wearers, 87% reported very good or good visual comfort with CADZO when using digital devices. Of existing wearers, 79% reported their symptoms of eye fatigue when using digital devices were reduced with CADZO. Overall, 88% of new and 82% of existing wearers were satisfied with the lenses. Around nine in 10 fitters were satisfied overall with CADZO for new and existing wearers.

Conclusions: When using CADZO, wearers report good visual comfort and reduced symptoms of digital eye fatigue when using digital devices. Patients and fitters are satisfied overall with CADZO.

Research funding received: Study sponsored by Cooper Vision

Paper Number: 7
Presentation time: 14:18-14:26
Characterization of corneo-scleral geometry using Fourier domain profilometry in the healthy eye
David P Piñero, Roberto Soto-Negro, Antonio Martínez-Abad, Pedro Ruiz-Fortes, Rafael J Pérez-Cambrodí
Purpose: To characterize the peculiarities of the corneo-scleral geometry in healthy eyes, analyzing the associations between different topographic variables.
Method: This is a prospective case series including 88 healthy eyes (80.7%) of 88 patients with a mean age of 38.2±13.4 years (range, 21 to 73 years). In all cases, a complete ocular examination was performed, including the analysis of the corneo-scleral topographic profile with the Fourier domain profilometer Eye Surface Profiler (ESP, Eaglet-Eye BV, Houten, The Netherlands). The distribution of the different topographic

parameters analyzed was evaluated, as well as the relationships between corneal and scleral parameters.

Results: Mean values of 8.64±0.37 (range, 7.81-9.50 mm), 6.06±0.52 (4.88-7.63 mm) and 11.93±1.32 mm (8.17-15.89 mm) were obtained for inner, limbal and outer best fit sphere, respectively. Mean values of 8.54±0.38 (7.86-9.66 mm) and 13.35±1.29 mm (11.05-17.31 mm) were obtained for mean corneal and scleral radius, respectively. Regarding tangent angles at limbus, mean values of 35.31±6.55º, 38.76±5.90º, 32.75±7.04º and 25.91±8.99º were obtained for nasal, temporal, superior and inferior angles, respectively. Mean difference between temporal and nasal sagittal heights increased from -0.002±0.121 mm for a chord of 11 mm to 0.074±0.237 mm for a chord of 14 mm. A weak but statistically significant correlation was found between corneal and scleral radii (r=0.325, p=0.004). Significant correlations were found between flattest keratometric readings, and temporal and nasal sagittal heights (r≥0.482, p<0.001). No significant correlation was found between corneal astigmatism and temporal-nasal corneo-scleral sagittal asymmetry (p≥0.077).

Conclusions: The conjunctival-scleral surface is significantly flatter than the corneal surface in the healthy eye, with a very marked change in slope at limbus level although with supero-inferior asymmetry. Furthermore, temporal-nasal asymmetry of corneo-scleral profile is more relevant for larger diameters, and this asymmetry is not correlated with the level of corneal astigmatism. These peculiarities of the corneo-scleral surface should be considered in the design and fitting of scleral contact lenses.

Research funding received: None

End of session