

NCC2018 Poster Abstracts
Free poster sessions
Sunday, March 11, 2018 09:45 – 10:345
Netherlands, Veldhoven, de Koningshof,
Baroniezaal

Organization Section: NCC/ BCLA
Moderator: Langis Michaud & Jamie Kuhn

Poster Number: 1

Presentation time: 09:45-09:49

Subjective Assessments of Habitual Wearers of Enfilcon A sphere Lenses Following a Direct Refit with Fanfilcon A sphere Lenses for 4 Weeks

Jose Vega, Gary Orsborn, Robert Montes

Purpose: A new contact lens material fanfilcon A (FA) (CooperVision), was developed to improve on enfilcon A (EA) (CooperVision). To evaluate the impact of material changes, subjective response and preference ratings were collected from habitual wearers of enfilcon A (EA) following a direct refit with fanfilcon A (FA) lenses over 4-weeks of daily wear.

Method: This was a prospective, bilateral wear, subject-masked study comparing the performance of the subjects' habitual EA lenses following a direct refit with FA lenses. Habitual EA lenses were evaluated at the first visit and then subjects were re-fitted with FA lenses, with the same power as their EA lenses, for 4-weeks of daily wear. Subjects used Opti-Free® PureMoist® MPS as a lens care regimen.

Results: Thirty-five habitual EA contact lens wearers aged 18 to 39 (mean \pm SD: 24.1 ± 5.5 years), were enrolled and 34 completed the study. Results reported are from the 4-week visit. FA lenses were rated better for overall comfort than the EA lenses (8.9 ± 0.9 vs. 8.0 ± 0.9 , $p = 0.000$). Overall dryness ratings were better with the FA lenses than habitual EA lenses (8.8 ± 0.9 vs. 7.9 ± 1.3 , $p = 0.005$). FA lenses were rated better for ease of handling than EA lenses (9.6 ± 0.7 vs. 8.9 ± 1.4 , $p = 0.016$). FA lenses were more preferred for comfort and overall performance than the EA lenses ($p < 0.05$). After 4-weeks of wear, 94% of subjects reported that they were very likely / likely to switch to the FA lenses.

Conclusions: FA lenses provided superior comfort, dryness, and handling experiences than the subject's habitual EA lenses after a simple refit and 4-weeks of daily wear. Further work is needed to identify the complex interplay between key contact lens material properties and clinical outcomes.

Research funding received: Study sponsored by CooperVision Inc.

Poster Number: 2

Presentation time: 09:49-09:53

Clinical significance of contact lens related changes of ocular surface tissue observed on optical coherence images

Stefan Bandlitz, Thomas Ruland, David Schwarz, Alexandra Jandl, James Wolffsohn, Heiko Pult

Purpose: To investigate the relationship between the real contact lens imprint (CI) into the conjunctival tissue, observed by OCT and conjunctival staining and contact lens wearing comfort.

Method: 17 subjects (mean age = $26.6 \text{ SD} \pm 3.6$ years; 7 females) were fitted with three different base curves of the same silicone hydrogel custom lens type (Visell 50; Hecht Contactlinsen, Au, Germany) in a randomised order. Lens B was fitted according to the manufacturer's recommendation, Lens A was fitted 0.4mm flatter Lens C was fitted 0.4mm steeper. After 4 hours of lens wear the contact lens edge in the area of the conjunctiva was imaged nasally and temporally using OCT (Optovue iVue SD-OCT). To correct the distortions the imprint of all worn lenses was measured on a glass plate afterwards. Conjunctival staining in the limbal region after 4 hours of lens wear was classified using the CCLRU Grading Scale. Comfort scoring was based on visual analog scales from 0 to 100 =excellent.

Results: The mean CI of the contact lens edges (CLE) was $32.0 \pm 8.1 \mu\text{m}$ before and $7.3 \pm 6.5 \mu\text{m}$ after distortion correction of the OCT images. The distortion corrected CI with the 0.4mm steeper lens ($11.5 \pm 6.2 \mu\text{m}$) was significantly greater compared to the correct lens ($6.5 \pm 5.9 \mu\text{m}$) (One-way ANOVA followed LSD-test; $p = 0.017$) and greater compared to the 0.4 mm flatter lens ($3.9 \pm 5.3 \mu\text{m}$) ($p < 0.001$). There was no statistically significant difference between the correct lens and the 0.4 mm flatter lens ($p = 0.209$). The nasally measured imprint ($11.4 \pm 9.0 \mu\text{m}$) was significantly greater than the temporally measured ($3.3 \pm 7.6 \mu\text{m}$) ($p < 0.001$). Conjunctival staining did not correlated with CI ($p = 0.387$) or wearing comfort ($p = 0.966$).

Conclusions: The observed CI are a combination of real conjunctival compression and artefacts. A deeper imprint of the contact lens into the conjunctiva caused by a steeper

base curve was not related to clinical significant staining or changes in comfort.

Research funding received: N/A

Poster Number: 3

Presentation time: 09:53-09:57

Comparison of silicone hydrogel versus hydrogel daily disposables in an astigmatic population

Jill Woods, Cheryl McKinnon, Nina Tran, Doerte Luensmann, Meng C Lin

Purpose: There are now more options to correct astigmatism with daily disposable (DD) silicone hydrogel (SH) lenses. These typically have higher modulus than their hydrogel (H) counterparts and it is of interest how they compare with regard to comfort, lens movement and rotational stability.

Method: In an open label, two-centre, 1-week cross-over DD randomized, dispensing study, subjects wore MyDay toric (MDT) DD SH lenses (stenfilcon A; Optimised Toric Lens Geometry™, CooperVision) and 1-Day Acuvue Moist for Astigmatism (AMA) (etafilcon A; Blink Stabilized® design, Johnson & Johnson). At the 1-week visit the following measures were recorded; typical subjective comfort (0-100 integer scale); lens movement (mm), tightness (push-up 0-100 integer scale; 50=optimum), lens orientation, rotational recovery after 30° forced mislocation.

Results: 44 subjects completed the study and the 1-week visit mean data are presented here (order: MDT versus AMA). Comfort for both lenses was good, statistically better with MDT: insertion 89 vs 85, $p=0.047$; during the day 86 vs 77, $p<0.01$; end of day 77 vs 69, $p<0.01$. The majority of each lens type oriented $\leq 5^\circ$ from optimal position (68% vs 55%, $p=0.39$). Rotational recovery from mislocation was statistically better with MDT (temporal: 17° vs 12° , $p<0.01$; nasal: 17° vs 11° , $p<0.01$). Lens movement was less with MDT (0.24 vs 0.29, $p<0.01$), MDT was graded as a tighter fit (47 vs 54, $p<0.01$), and overall fit acceptance was higher for MDT (3.5 vs 3.3, $p<0.01$). High contrast LogMAR was not different between lenses (-0.09 vs -0.09, $p=0.78$).

Conclusions: Both SH and H lenses performed well though the SH lens performance was statistically better for comfort at all three time-points and for orientation, rotational recovery and overall fit. It appears that the clinical performance of MDT demonstrates high levels of comfort and fit in addition to providing SH oxygen benefits.

Research funding received: Products and funding for this study were provided by CooperVision Inc.

Poster Number: 4

Presentation time: 09:57-10:01

Comparison of lens orientation stability of two daily disposable silicone hydrogel toric lenses

Jill Woods, Amir Moezzi, Jalaiah Varikooty, Lyndon Jones

Purpose: Soft toric lenses require stabilization to maintain the correct orientation of the cylindrical power. This study compared orientation stability of two daily disposable (DD) silicone hydrogel (SiHy) lenses of different stabilization designs. MyDay Toric (MDT; stenfilcon A, CooperVision), uses an Optimised Toric Lens Geometry™ design and Acuvue® Oasys 1-Day with Hydraluxe™ for Astigmatism (AO1A; senofilcon A, Johnson & Johnson), uses a Blink Stabilized® design.

Method: 20 habitual soft toric wearers wore the lenses in a 1 week crossover, randomized, double-masked dispensing study. Lens orientation and LogMAR acuity were measured in three positions: head straight and tilted 30° to the right and left. To assess lens re-orientation efficiency, rotational recovery was measured by mis-orienting the lens 30° to the temporal and nasal side and measuring the degrees of recovery following 10 normal blinks.

Results: Results represent the 1-week, right eye data only (order: MDT vs AO1A). Lens orientation in primary gaze was statistically different between lenses (6° vs 3° ; $p=0.01$), with unlikely clinical relevance. Lens orientation was not different between lenses when the head was tilted to the right (18° vs 17° ; $p=0.41$) or left (17° vs 19° ; $p=0.20$). LogMAR acuity was not different between lenses with head straight (-0.07 vs -0.08; $p=0.45$) or with head tilted to the right (-0.03 vs -0.04; $p=0.07$). However, there was a difference with the head tilted to the left (-0.03 vs -0.06; $p=0.0499$), with unlikely clinical relevance. Rotational recovery from mislocation was superior for MDT from nasal mislocation (27° vs 19° ; $p<0.01$) and temporal mislocation (22° vs 17° ; $p=0.01$), with possible clinical relevance.

Conclusions: Two SiHy DD toric lenses using different stabilization designs performed well and similarly with respect to lens orientation and visual acuity when the head was in primary gaze and when tilted 30° to each side.

Research funding received: Products and funding for this study were provided by CooperVision Inc.

Poster Number: 5

Presentation time: 10:01-10:05

First and Third Generation Silicone Hydrogel Contact Lens Physical Properties Impact on Patient Preferences

Jose Vega, Gary Orsborn, Steve Diamanti

Purpose: Since the launch of silicone hydrogel lenses in 1999, there has been a trend toward naturally wetttable, lower modulus, and higher water content materials in the marketplace. Studies to date have not seen a direct correlation between lens modulus and comfort. This study aimed to understand if there are comfort-related patient preference differences that correspond with lenses of different moduli and water contents after 4 weeks of daily wear.

Method: This was a prospective, double-masked, randomized, bilateral, crossover, dispensing study comparing fanfilcon A, FA (a 3rd generation contact lens material with a modulus of 0.6 MPa, water content of 56%, and a naturally wetttable surface) with lotrafilcon B, LB (a 1st generation contact lens material with a comparatively stiffer bulk modulus (1.0 MPa), lower water content (33%) and requires a surface treatment step to achieve wettability). Both lenses were worn by 47 adapted soft contact lens wearing subjects (37 female, 10 male) for 4-weeks each in a daily wear modality. Subjects used Opti-Free® PureMoist® MPS.

Results: FA was significantly preferred ($p < 0.05$) over LB for all comfort-related attributes including overall comfort (72.5% vs. 27.5%), less dryness (71.5% vs. 28.5%), same comfort at end of day as when first inserted (71.5% vs. 28.5%), comfort at end of 4 weeks (71.5% vs. 28.5%) and comfort in dry environments (70.0% vs. 30.0%).

Conclusions: The findings suggest that lower bulk modulus and higher EWC lead to better comfort experiences and patient preferences after four weeks of wear. This finding is an important addition to the current state of knowledge of the impact of contact lens material properties on contact lens performance. Further work is needed to identify the complex interplay between key contact lens material properties and on-eye comfort to establish importance of each

individual material property variable on clinical outcomes.

Research funding received: Products and funding for this study were provided by CooperVision Inc.

Poster Number: 6

Presentation time: 10:05-10:09

Prospective Determining the soft contact lens sagittal depth to optimize fitting and comfort evaluation of new contact lens wearer retention rates

Langis Michaud, Eef van der Worp, Claude J Giasson, James Wolffsohn, Christian Mertz, Camil Tremblay, Sylvie Gregoire

Purpose: This study aims to evaluate the comfort of soft contact lenses fitted with variable sagittal depth and to determine which one represents the best option.

Method: This is a non-delivering prospective study. Ocular sagittal height of 14 participants was evaluated with an eye profiler (Eaglett Eye, The Netherlands). Four different lenses (-200 um, aligned, +200 um and +400 um vs ocular sag @ 14.5mm diameter); moncurve, Definitive material) were fitted in a random order on both eyes. Lenses were manufactured by the same lab (Microlens) and their parameters were checked with an OCT (Optimec, UK) before and after the experimentation. The lens position and movement were analyzed through a video technique (Aston University, UK), grading movement on push-up (mm) and the amount of drop (mm) in vertical gaze. Masked observers ranked each set of 4 lenses in order, from the least most optimal one. Comfort was evaluated with a Likert scale at insertion and after 30 minutes of wear.

Results: There was no statistical difference for comfort at insertion ($p = 0.327$) or after 30 minutes (Friedman, $p = 0.199$). Push-up movement was 0.8 mm (-200um), 0.81 (aligned and +200um), and 0.84 (+400 um) and showed no statistical difference (ANOVA $p = 0.784$) However, the lens drop, when subject was asked to look upward, was near statistical difference ($p = 0.057$) between -200 (0.73 mm), +400 (1.2 mm) and 0 or +200 um (0.82 and 0.83mm). Masked observers ranked the lens fitted with +200 um optimally centred for 14/28 eyes, and with optimal movement (20/28 eyes)

Conclusions: Based on objective analysis, lenses fitted between 0 and 200 um of sagittal depth vs ocular sag may be considered optimally fitted. Subjective analysis tends to

find lenses fitted with sag +200um the best option. Soft lenses can be effectively fitted with ocular sag as a reference instead of central curvature of the cornea.

Research funding received: Lenses provided by Microlens (Netherlands)

Poster Number: 7

Presentation time: 10:09-10:13

CASE REPORT: Designing a customized scleral lens to improve lenses with wavefront guided optics

Reinier Stortelder, Steve Dunn

Purpose: Patients with keratoconus are often fitted with scleral lenses because of the high wearing comfort and the high vision compared to other modalities. But even with these improvements the vision acuity is often sub-optimal. Keratoconic patients often complain halos, shadowed images, and glare while driving at night. Therefore, there is still a great demand to reduce and control the aberrations. Several research groups are working towards designing custom scleral lenses that incorporate wavefront guided optics to correct for higher order aberrations. These lenses need to be in a stable position on the eye and the centration needs to be predictable. Even with the slightest movement, the wavefront guided optics will adversely affect the visual acuity. Although scleral lenses tend to be relatively stable and well centered, they still tend to ride temporally and inferiorly. This will influence the pupil/optical zone relation.

Method: In this case study, a scleral lens was designed with a custom made haptic to achieve a better centration. An Eye Surface Profiler (ESP) measurement was used to achieve a corneo-scleral measurement of the eye. The custom-designed software was used to transform the height map into a customized scleral lens. After settling for 30 minutes, the lens assessment included the standard slit lamp routine evaluation of the vault and the haptic. Also wavefront-guided measurements have been taken.

Results: Good horizontal centration was achieved. The wavefront guided images were used to redesign the optical zone of the lens.

Conclusions: Corneo-scleral profilometry could solve the issues of decentered and excessively moving scleral lenses as shown in this case report. Corneal-scleral profilometry reduces the subjectivity in scleral lens evaluation. Combining the unique features of scleral lenses together with highly customized

haptics and wavefront guided optical zones show good potential to reduce halos, glare and shadowed images in irregular eyes.

Research funding received: N/A

Poster Number: 8

Presentation time: 10:13-10:17

CASE REPORT: Fitting a scleral lens on a central keratoconus patient using corneoscleral profilometry

Barry Leonard, Reinier Stortelder

Purpose: Fitting scleral lenses has three challenges. Vaulting the cornea, clearing the limbus and aligning the sclera. Corneoscleral profilometry will be used to design the lens. Over the last decade we've learned that up to 80% of all scleral lenses could have toric back surface design to achieve a better aligned so called sealed fit. Especially finding and fitting the correct haptics appears to be time consuming and patient demanding due to several re-orders for the more complicated cases.

Method: The patient in this case report is a 31-year-old female with bilateral keratoconus. Corneoscleral profilometry was used to provide the measurements for the first lens selection. The automated fitting algorithms of the Zenlens was used to predict the sagittal height of the scleral lenses, following the guidelines set by the manufacturer. Next, the algorithm selects the best aligning haptic based on the flattest and orthogonal meridian of the eye. The toric scleral lens was fitted from the Zenlens trial set. After settling 60 minutes, slit lamp routine and OCT were taken.

Results: Slit lamp assessment showed nasal and superior blenching OD. Therefore, a lens with a in which the steep axis was reduced was placed on the eye. The final dispensed lenses showed 250 microns apical clearance.

Conclusions: The corneoscleral profilometry helped to design a better fitting lenses for this patient. The predicted vaults showed a good apical and limbal clearance without having to try several trial lenses. Only the predicted haptics had to be changed due to blenching. Corneoscleral profilometry has the potential to assist in better and easier scleral fitting, offering an extension to the scleral lens trial sets which usually have none or just a few toric designed lenses. This may result in a less time consuming fitting process and may improve patient satisfaction because of the customized scleral haptics, and ultimately may result in longer wearing times.

Research funding received: N/A

Poster Number: 9

Presentation time: 10:17--10:21

Making a difference in quality of life with scleral lenses – two clinical cases with neurotrophic ulcers.

Sara de Lima

Purpose: The main use for scleral lenses is visual aid in irregular corneas. However, they are also beneficial as bandage lenses in severe ocular surface disease. Following cases illustrate two different ways to improve quality of life in patients with neurotrophic ulcers, a condition associated with hypoesthesia or anaesthesia of the cornea due to damage to the trigeminal nerve.

Method: Case 1 is a male patient who, at age 58 had a stroke that among other things resulted in a slow healing corneal ulcer. To shield the cornea a partial tarsorrhaphy was performed and soft bandage lenses were tried with little or no result. At age 71, he presented at the clinic with a central ulcer and BCVA 0,13. A scleral lens was fitted and two months later the ulcer was completely healed and BCVA had recovered to 0,6. The patient has now worn the scleral lens successfully for two years and the tarsorrhaphy has been reversed. Case 2 is a female patient who, at age 40, had an aneurysm causing an oculomotor nerve palsy leading to semi ptosis, inability to close the eyelid and total lagophthalmus. Over time an ulcer with neovascularisation caused by the corneal exposure developed. Not being able to move the eye, she also suffered from double vision and cosmetically the ptosis was disturbing. At age 48, she was referred to the clinic and a scleral lens was fitted. The ulcer healed completely after 6 weeks. Thanks to an excessive sagittal depth, the eyelid was elevated masking the ptosis. There was a possibility of improving BVCA from 0,05 to 0,3 but the vision was blurred intentionally with a high minus power to relief the double vision. The patient has now worn the lens successfully for two years.

Research funding received: None

Poster Number: 10

Presentation time: 10:21-10:25

Use of Fourier domain profilometry to optimize fully scleral lens fitting: a case report

David P Pinero, Roberto Soto-Negro

Purpose: We report the case of a 35-year old

woman diagnosed with keratoconus since she was 18 years old and wearer of corneal rigid contact lenses (CL). We refitted the case with the fully scleral CL ICD16.5 (Paragon Vision Sciences) for obtaining not only a successful visual restoration, but also a comfortable wear. We initiated the fitting with the spherical model of the CL, but it failed due to instability of the lens. We confirmed the presence of a clear asymmetry of the anterior scleral geometry in both eyes by using the profilometer ESP (Eye Surface Profiler, Eaglet Eye), with a difference between nasal and temporal sagittal heights of 470 and 170 μm in right and left eyes, respectively. Although this profile suggested the need for the fitting of a CL with significant peripheral toricity, we followed the manufacturer guidelines and performed a trial with a CL of moderate peripheral toricity (125 μm of difference between steep and flat meridian). The stability of the CL failed again and finally a CL with a peripheral toricity close to that measured with the profilometer was fitted. With this lens, good visual performance, lens stability and comfortability was obtained and maintained during a 1-year follow-up. This case suggests that fully scleral contact lens fitting might be optimized with the use of a corneo-scleral profilometers, minimizing potentially the number of trials. This potential benefit should be investigated further in future studies.

Research funding received: None

Poster Number: 11

Presentation time: 10:25-10:29

Adventures in Prosthetics - A Contact Lens Approach to Improving Cosmetic Appearance

Jamie Kuhn

Purpose: Two patients with corneal graft failures with subsequent vision loss and ocular hypertension presented to the clinic concerned with the cosmetic appearance of their non-seeing eye. Both were fit into a prosthetic contact lens modality to address this concern while maintaining proper ocular health. Each patient was evaluated with slit lamp biomicroscopy, corneal topography, and high-resolution photography. Due to the steepening of the corneas of each patient secondary to increased intraocular pressure, scleral cover shells were presented as a best option to each patient. One patient was unable to complete the scleral cover shell fitting due to discomfort with the procedure itself, and opted to be fit into a hydrogel soft

contact lens. Although the lens was decentered and not an ideal fit, the patient expressed desire to wear for only short periods of time until she is comfortable to attempt refit with a scleral shell. The hydrogel lens was tinted in-office with a brown iris and a center black-out pupil, and the tint was decentered opposite of lens decentration on a toric modality for stability. The second patient opted for the scleral shell, but the central steepening of the cornea did not allow for a stable and healthy fit. A scleral contact lens design of 18.2mm was fit appropriately and then ordered in PMMA material to allow for pigment uptake during the prosthetic artistry process. One patient was fit with an in-office tinted hydrogel soft contact lens, and the other in a PMMA hand-painted scleral contact lens; both patients are maintaining comfortable and healthy wear of the device. Both patients initially expressed concerns of cosmesis of their blind eye, attributing their psychological distress to anxiety with their appearance in public. Each patient showed significant improvement in cosmesis as well as confidence following dispense of a personalized prosthetic contact lens.

Research funding received: N/A

Poster Number: 12

Presentation time: 10:29-10:33

CASE REPORT: Designing state of the art back surface utilizing corneoscleral profilometry
Telamitsi Kyriakos, Reinier Stortelder

Purpose: Scleral lenses are often the best solution for irregular eyes, but a pinguecula might be a contraindication. The edge of the scleral lens often impinges the pinguecula. This case report shows.

Method: The patient is a 40-year-old male with bilateral keratoconus. A corneoscleral measurement has been using the Eaglet Profiler. The automated algorithm provided information about the vault and the haptics. The advised vault was a SAG5100. According to the algorithm, the best haptic in the horizontal meridian was a flat 4, and a steep 4 for the vertical meridian. The toric trial lens from the Zenlens fitting set with the haptic flat and steep 3 was used and allowed to settle for 2 hours.

Results: After settling, the lens showed an excellent corneal clearance of 300 microns and good alignment in three quadrants. The nasal side showed near good alignment horizontal, but after lens removal staining was observed at the pinguecula and some arc-

shaped staining was observed nasal/superior... Therefore, a trial lens with a 60 microns flatter haptic and a microvault with 90 microns was selected. In the vertical meridian, the steep 3 showed some edge lift, and therefore, a steep 4 was ordered. The microvault dimension were measured on the previously acquired corneoscleral profilometry, showing a local elevation of 140 micron and a width of 2.6mm with the highest elevation located at the position of the lens edge. After dispensing the final lens, no blenching nor staining was observed. Upon the return visit a lens decentration of 0.7mm was observed, this has unlikely clinical relevance. Resulting in good alignment of the microvault, but showing minimal impingement in the superior area of the pinguecula.

Conclusions: Corneoscleral profilometry helped fitting scleral lenses in this patient with pinguecula. The development of a new algorithm for designing microvaults lens decentration it may reduce misaligned microvaults in patients with pinguecula.

Research funding received: N/A

Poster Number: 13

Presentation time: 10:33-10:37

Change in Peripheral Corneal Thickness in Keratoconic Scleral Lens Wearers fitted for High and Low Limbal Clearance

Debby Yeung, Paul Murphy, Luigina Sorbara

Purpose: To investigate changes in corneal thickness (CT) in keratoconic subjects from wear of scleral lenses with 2 different limbal clearances (LC).

Method: A cross-over, randomized study compared scleral lenses (ZenLens™, Alden Optical, NY, USA) with low and high LC, differing by 50µm, but with the same central sagittal depth and lens thickness. 22 eyes of 11 keratoconic subjects (all male, mean age: 38.5±13.5 years, range 24-67) wore each lens for a minimum 2-week wear period (order randomly selected). Corneal pachymetry maps were obtained using Scheimpflug imaging (Pentacam HR, Oculus, Wetzlar, Germany), before and after lens wear period for each lens. CT values at central and peripheral cornea (transverse section chords of 6 and 8 mm) in 4 quadrants: superior, nasal, inferior, temporal, were compared and analyzed by lens design.

Results: Comparison of CT from baseline (no lens) to post-low and high LC lens wear showed no statistically significant difference

centrally ($P>0.05$), but a difference at 6 and 8mm (RM ANOVA, $P=0.013$). After ≥ 2 week of lens wear, CT increased centrally by $+3.97\pm 3.29\%$ and $+4.09\pm 3.78\%$ for low and high LC, respectively. CT increased by $+4.92\pm 3.17\%$ at 6mm and $+4.87\pm 3.23\%$ at 8mm for low LC; and $+3.05\pm 4.78\%$ at 6mm and $+3.23\pm 4.86\%$ at 8mm for high LC. Quadrant specific analysis showed a significant change in CT in all quadrants at both the 6mm and 8mm for low LC from baseline (all $P<0.05$). For the high LC, a significant change was found only in the temporal quadrant at 8mm chord ($P=0.0179$).

Conclusions: A significant increase in peripheral CT was found with low LC lens wear. The increase in central and peripheral CT with scleral lens wear of $\sim 4\%$ is consistent with the literature.

Research funding received: Independent Research Grant - Valeant

Poster Number: 14

Presentation time: 10:37-10:41

Effects of Three Different Daily Disposable Contact Lenses on Tear Film.

Giancarlo Montani, Fabio Carta, Maria Rosaria Mollo

Purpose: To evaluate changes induced by three different daily disposable CLs on tear osmolarity (TFO), tear meniscus height (TMH), pre lens tear film stability (PLTFS) and objective quality of vision.

Method: Forty-six subjects (new or CL wearers after a wash out period of three days) were enrolled for this open label randomized cross-over study. Their tear film characteristics were: $NIBUT>18$ sec, $TMH>18$ mm and $TFO<316$ mOsmol/L. Subjects were asked to wear for the first week of the study a contact lens in nesofilcon A always on the same eye and another one in delefilcon A on the fellow one. After three days of wash out it started the second week of the study with lenses in nesofilcon A again and lenses in stenfilcon A. Exams were performed at day 0 and for each CL combination at day 1 after 20min and at day 7 after a minimum of 8h of lens wear. At each examination were evaluated TMH with a slit lamp-adapted Fourier-Domain OCT, TFO with Tearlab, NIBUT and PLTFS with Easytearsview+ and objective quality of vision by means of Objective Scatter Index (OSI) for a period of 20sec between blinks measured with HD Analyzer.

Results: Nesofilcon A lenses demonstrated a greater TMH after 20min and 8h of wear

(respectively $206.73\pm 48.2\mu\text{m}$ and $196.13\pm 42.4\mu\text{m}$) than delefilcon A ($171.73\pm 42.4\mu\text{m}$ and $162.93\pm 42.36\mu\text{m}$; $p<0.05$) and stenfilcon A ($153.46\pm 49.7\mu\text{m}$ and $148.34\pm 53.64\mu\text{m}$; $p<0.05$). Nesofilcon A lenses demonstrated also a longer PLTFS (12.53 ± 6.27 sec and 12.08 ± 5.53 sec) than delefilcon A (8.33 ± 3.63 sec and 9.06 ± 3.51 sec; $p<0.05$) and stenfilcon A (8.40 ± 3.37 sec and 7.80 ± 5.26 sec; $p<0.05$). TFO were not significant different after 20min and 8h of wear with all lenses tested. Nesofilcon A lenses in respect to the other lenses tested presented also a more stable OSI over time.

Conclusions: These results could be attributable to the characteristics of nesofilcon A material that allows a better water retention and wettability in comparison to the other materials tested.

Research funding received: This study was supported with a research funding from Bausch+Lomb

Poster Number: 15

Presentation time: 10:41-10:45

Eyeshadow - Polymer interaction in soft contact lenses

Sara Picarazzi, Federica Corlazzoli, Alessandra Rossi, Miriam Ascagni, Stefano Farris, Alessandro Borghesi, Silvia Tavazzi

Purpose: The use of cosmetics associated with soft contact lenses (CLs) made of hydrogels (Hs) and silicone-hydrogels (SHs) may cause side effects. For this purpose, the contamination of soft CLs by a purple eyeshadow was evaluated both in vitro and in vivo.

Method: A Jasco V-650 spectrophotometer was used to measure the absorption of the dye component of a highly concentrated powder eyeshadow into CLs after exposure in a vial to 1 mg/mL cosmetic solution dissolved in 0.9% NaCl and after cleaning with maintenance systems. The dye absorption was compared with the mass of absorbed cosmetic including also the other cosmetic ingredients. In addition, analyses were performed on worn daily CLs (Delefilcon A) and worn monthly CLs (Filcon V), both worn with eyeshadow, the monthly CLs being treated with multipurpose solution overnight. 10 CLs were observed by a fluorescence microscope (Olympus BX51) and 3 CLs by a confocal fluorescence microscope (Leica TCSNT).

Results: From in vitro analyses, silicone-hydrogel (SH) are found to be more

contaminated by the investigated eyeshadow than hydrogel (H) CLs. The diffusion of the dye component in SHs can reach 100% of the available dye in the vial, its mean value being 84% (SD 20%). Except hilafilcon A, this value is lower ($p < 0.001$) in Hs ($19\% \pm 5\%$). As far as other ingredients are concerned, on average the absorbed mass of eyeshadow is found (667 ± 151) and (253 ± 157) μg in SHs and Hs ($p = 0.002$), 5 mg being the available mass in the vial. Also the CLs worn by eyeshadow wearers show contamination, both on the surface, where dye aggregates are observed near the edge, and in depth as observed by confocal fluorescence microscopy. Surface dye deposits were detected both in daily CLs and in monthly CL (worn 7 days, multipurpose solution over night).

Conclusions:

Research funding received: N/A

End of session

Digital poster only:

Poster Number: 16

Toric Soft CL Design considerations for wearer experience

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Purpose: Toric soft contact lens (TSCL) wearers sometimes report a “heavy” feeling of the lens or difficulty with removal. To help understand these symptoms, computer-based analytical tools were used to differentiate between TSCL designs and propose a mechanism that may cause the wearer experience.

Method: A Rotation-Centration Model (RCM) was used to determine the transient position of a TSCL on the eye and track dynamically the lens thickness felt by the lower eyelid margin during and in-between blinks. The portion of the lens volume that interacts with the lower eyelid was approximated by 3D modeling of the lens and lower eyelid. A Finite Element Analysis model was developed to simulate lens fit and approximate the force required to remove the lens from the eye. TSCL designs (Eyelid Stabilized ES and peri-ballast PB) were evaluated with these models.

Results: The average thickness experienced by the lower eyelid margin between blinks was 0.227mm for PB compared to 0.123mm for ES. The average thickness change experienced during a blink was 0.149mm for PB compared to 0.073mm for ES. The lens volume underneath the lower eyelid was

2.53ul for PB compared to 1.08ul for ES. The estimated removal force for PB was 0.409N compared to 0.224N for ES. PB had 1.8x larger lens thickness between blinks, 2x larger thickness change during a blink and 2.3x larger contact volume than ES.

Conclusions: The lower eyelid margin on average experienced more interactions with PB compared to ES design. The larger thickness on the lower half of the PB design also contributed to larger finger forces required to remove the lens. These findings using geometrical and simulation design analysis imply potential differences between designs in wearer experience including lens awareness, feeling of heaviness and ease of lens removal.

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