Category: Comfort and lenses

P-01

Antioxidant Protection of a Model Tear-Film Component in Soft Contact Lenses

Charles Scales(1) , Shivkumar Mahadevan(1) , Leilani Sonoda(1) , Mark Lada(1) , Patricia Martin(1) , Don Riederer(1) , Zohra Fadli(1)

(1) Jonhson&Johnson Vision, Jacksonville, United States

Purpose: The tear-film contains naturally occurring anti-oxidants essential to preserving beneficial components, i.e. lipids and proteins, and maintaining ocular homeostasis. Soft contact lens (CL) materials interact with the tear-film (TF) in different ways, with some taking up large amounts of protein/lipids with minimal to no negative clinical impact. This uptake may be beneficial, as long as the components do not oxidize and degrade during wear. Herein, the benefits of using an antioxidant, i.e. a UV-blocking, phenolic benzotriazole known as Norbloc (NB), in a CL to curtail degradation of a TF component, namely, cholesterol (CH), is demonstrated.

Materials and methods: Two experimental silicone hydrogel lens formulations were prepared with and without NB, i.e. (L1) and (L2), respectively. Both were subjected to incubation with CH followed by exposure to oxidative conditions with prescribed doses of H_2O_2 (0, 3, and 10 % in PBS), UV exposure (24 hours, at 3 mW/cm2), and combinations thereof. The extent of lipid oxidation within L1 and L2 after each exposure condition was determined via high performance liquid chromatography with mass spectrometry (HPLC-MS) analysis of lens extracts. The appearance of two oxidative degradants of CH, namely, 5a,6a-Epoxycholestan-3β-ol (aCHEI) and 5b,6b-Epoxycholestan-3β-ol (bCHEI), was used to assess the extent of lipid oxidation.

Results: Generally, higher levels of CH epoxides (i.e. a- and b-CHEI) were observed with L2 lenses after exposure to H_2O_2 and UV compared to L1 lenses. Following exposure to 10 % H_2O_2 and UV for 24 hrs. at 3 mW/cm2, L2 lenses showed statistically higher amounts of CH degradation to aCHEI (10.1 % ± 1.57) compared to L1 lenses (7.3 % ± 1.94, p=0.020). Under identical conditions, the L2 lenses also showed a statistically higher amount of CH degradation to bCHEI (7.3 % ± 1.15) compared to L1 lenses (3.8 % ± 0.99 p=0.001).

Conclusion: The use of an antioxidant in CLs imparts a protective effect onto adsorbed/absorbed TF components such as CH, i.e. lipid degradation is lower in a CL that contains NB, compared to one that does not. These data support the hypothesis that use of an antioxidant in a CL may help maintain TF components in their native state in vivo, which may positively impact clinical performance.

Category: Comfort and lenses

P-02

Antioxidant Capacity of a Phenolic Benzotriazole (Norbloc) in Soft Contact Lens Materials: A Benefit Beyond UV Blocking

Zohra Fadli(1) , Shivkumar Mahadevan(1), Charles Scales(1)

(1) Johnson & Johnson Vision, Jacksonville, United States

Purpose: Phenolic benzotriazole-based ultraviolet (UV) absorbers are used in a variety of consumer applications, particularly in polymers, cosmetics and sunscreens. Norbloc (NB), a compound within this class, is used in some contact lenses (CL) to help protect the eye from the transmission of direct and reflected UV rays. The phenolic structure of this compound suggests an anti-oxidant (AO) benefit in addition to UV absorption. To demonstrate this added benefit, the AO capacity of the UV-active structure within NB was measured and compared to that of known biologically significant AOs.

Materials and methods: A hydrolyzed version of NB was obtained and the AO capacity was measured using Oxygen Radical Absorbance Capacity (ORAC), a known method widely used in the food industry. ORAC capacity of NB was compared to that obtained for 10 known AO compounds, i.e. Astaxanthin, Vitamin E, Epigallocatechin Gallate, Alpha Lipoic Acid, Butylated Hydroxytoluene, Glutathione, Gingerol, Ubiquinone, Gallic acid and Trolox.

Results: The ORAC test demonstrated that the NB derivative has a very high AO capacity, with an ORAC score of 4132 Trolox Eq./gram. This value is 4 times higher than that for Vitamin E and significantly higher than several other biologically significant AO compounds, with the exception of Gingerol, which had an ORAC score of 8179 Trolox Eq./gram.

Conclusion: NB, a UV blocker present in certain manufacturers' CLs Lenses is a phenolic benzotriazole derivative that exhibits a high AO capacity, as demonstrated by the ORAC test. The AO capacity was 4 times higher than Vitamin E and significantly higher than other known AO used in this study. This data suggests that there may be an additional benefit of using NB in a CL, beyond UV blocking, i.e. the protection of tear-film components and ocular system from oxidative damage. Additional studies are currently underway to investigate the clinical implications of using NB in CLs materials.

Category: Comfort and lenses

P-03

Crosslink density influences the adhesive strength of silicone hydrogel surfaces against corneal epithelial cells

Liu Chunzi(2) , Charles Scales(1) , Gerald Fuller (2)

(1) Johnson & Johnson Vision, Jacksonville, United States ; (2) Stanford University , Stanford, United States

Purpose: The degree of crosslinking in soft hydrogel materials can significantly affect their adhesion to different surfaces, i.e. the greater the amount of cross-linking, the lower the adhesion. In contact lens (CL) applications, lens/cornea or lens/eyelid adhesion should be minimized to facilitate removal, allow for sufficient lens movement, and prevent discomfort. Yet, the effect of crosslinking on the adhesion of CLs to the human cornea remains unknown. Herein we used a customized rheometer to examine the adhesive strength between corneal epithelial cells and silicone hydrogel formulations with systematically varied crosslink densities.

Materials and methods: To quantify the strength of adhesion between corneal epithelial cells and silicone hydrogel materials, step strain deformations were applied onto mucin-expressing telomerase immortalized human corneal epithelial cell (hTCEpi) monolayers in contact with a silicone hydrogel lens. The resulting stress relaxations of a series of silicone hydrogel materials derived from senofilcon A with increasing crosslink densities (i.e. L1, L2, L3, L4 and L5 containing crosslinker levels of 1.2, 1.35, 1.5, 1.65, and 1.8 %, respectively) and delefilcon A were tested accordingly. The measured stress relaxations were directly influenced by the tenacity of adherence of the cells against the displaced lens surface. These stresses were converted to an effective modulus and this residual unrelaxed modulus provided a direct indication of the strength of adhesion (SoA).

Results: Within the senofilcon-derived series, L1 (containing the lowest crosslink density) showed the highest SoA (39.1 ± 32.67 Pa) compared to L2 (1.6 ± 10.77), L3 (11.3 ± 4.00 Pa), L4 (5.4 ± 9.01 Pa), and L5 (5.6 ± 8.63 Pa). The delefilcon A lens (38. 8± 26.61 Pa) exhibited a comparable SoA to L1 (p=0.495), suggesting the surface of delefilcon A has a lower crosslink density and a higher SoA to corneal epithelia than lenses with greater degrees of crosslinking, i.e. L2 (p=0.037), L3 (p=0.072), L4 (p=0.048), and L5 (p=0.048).

Conclusion: These results demonstrate that increasing crosslink density diminishes the adherence of lenses to mucin-expressing corneal epithelial cells. Consequently, the adhesiveness of CLs to ocular tissues may impact the comfort level for lens wearers and affect ease of removal. This result provides guidance on development of silicone hydrogel formulations to further improve CL comfort and handling.

Category: Comfort and lenses

P-04

Corneal epithelial thickness and corneal curvatures changes during the day: The effects of daily disposable contact lens wear

Semra Akkaya Turhan(1) , Didem Dizdar Yigit(1) , Ebru Toker(1)

(1) Marmara University, School of Medicine, Ophthalmology Department of Ophthalmology, Istanbul, Turkey

Purpose: To evaluate the changes in corneal epithelial thickness and corneal anterior and posterior curvatures during the day and the effect of wearing daily disposable soft contact lenses.

Materials and methods: Thirty-one healthy volunteers were enrolled in a randomized crossover study. At the baseline visit, epithelial thickness maps (OCT; Optuvue, Inc., Fremont, CA, USA) and keratometric measurements (Pentacam, Oculus, GmbH, Germany) were performed in the morning and in the afternoon (8 hours after). Then each subject was fitted with the following brand of daily disposable contact lenses in random order: Dailies Total 1 (Delfilcon A), Dailies Aqua Comfort (Nelfilcon A), True eye (Narafilcon A) and Biotrue Oneday (Nesofilcon A) on consecutive days. All fitted lenses had a power of -3.00 dioptер. Measurements were repeated before putting the contact lens on and after an-eight-hour period of contact lens wear.

Results: Without contact lens wear, diurnal measurements showed significant steepening in the anterior topographical indices (K1: p<0.0001; K2: p<0.0001; and Kmax: p=0.04) in the afternoon but there were no significant changes in posterior topographical indices, corneal pachymety thickness, or corneal epithelial thickness. However, no significant differences were observed in any measured parameter after 8 hour of daily disposable contact lens wear.

Conclusion: While anterior topographical indices' changes depend on the natural diurnal variations, corneal epithelium thickness and corneal curvatures were not affected by daily soft contact lenses. It seems that anterior segment OCT may be useful for detecting changes in cornea caused by the contact lens wear.

Category: Comfort and lenses

P-05

Comparison of Senofilcon A and Samfilcon A silicone hydrogel bandage contact lenses on postoperative pain and on epithelial healing time after transepithelial Photorefractive Keratectomy

Buse Guneri Beser(1) , Elvin Yildiz(1)

(1) Republic of Turkey Ministry of Health Haydarpasa Numune Research and Training Hospital, Istanbul, Turkey

Purpose: To evaluate and compare the effects of two distinct silicone hydrogel bandage contact lenses following Transepithelial Excimer Laser Photorefractive Keratectomy (PRK)

Materials and methods: Fourty-eight eyes of 24 patients who underwent Transepithelial PRK due to myopic refractive error were included in this study. Half of patients who were consecutively randomized were treated with Senofilcon A (Acuvue Oasys, Johnson & Johnson, USA) contact lens while the remaining half of the patients were treated with Samfilcon A (Ultra, Bausch & Lomb, USA) contact lens. Patients were examined every day until the postoperative epithelial defect was closed. The pain status of the patients was questioned by the visual analogue scale. Epithelial defect size was assessed using slit lamb biomicroscopy.

Results: The mean age of 14 women (58.3%) and 10 men (41.7%) included in the study was 27.12 ± 6.05. The mean pain score for Senofilcon A and Samfilcon A bandage contact lenses was 7.33±2.05 vs 5.66±2.31 (p=0.01) on the first postoperative day; 3.9±2.26 vs 4.00±1.95 (p=0.73) on the second postoperative day and 1.00±0.33 vs 1.7±0.76 (p=0.29) on the third postoperative day. Mean operational ablation zone diameter was 7.67± 0.42 mm for Senofilcon A group and 8.01±0.48 mm for Samfilcon A group. (p=0.008) Average epithelial defect size for Senofilcon A and Samfilcon A was 15.46±9.91 mm^2 vs 20.56±8.48 mm^2 on first postoperative day (p=0.62); 1.60±4.05 mm^2 vs 2.48±0.48 on second postoperative day (p=0.33) and 0.14±0.71 mm2 vs 0.14±0.30 mm^2 on third postoperative day (p=0.056). Mean time to epithelial healing was 2.83±0.48 days in Senofilcon A group and 2.95±0.75 in Samfilcon A group (p=0.56).

Conclusion: The effects of Senofilcon A and Samfilcon A bandage contact lenses were found to be similar concerning the epithelial healing time after transepithelial PRK surgery. It was seen that Samfilcon A lens was superior to Senofilcon A lens in terms of reducing the pain on the first postoperative day.

Category: Comfort and lenses

P-06

The effect of contact lens manufacture technology and material on pre-corneal tear film and non-invasive tear break up time

Nese Arslan(1) , Mutlu Acar(1) , Canan Gurdal(1)

(1) Diskapi Yildirim Beyazit Education and Research Hospital, Ankara, Turkey

Purpose: our aim is to study the pre-corneal tear film thickness and tear break up time on 3 types of contact lenses

Materials and methods: 82 new contact lens users (1-3 months) were included in this study. Study group was classified according to contact lens manufacture technology and material
1. Lotrafilcon B 42
2. Senofilcon A 19
3. Samfilcon A 21

All contact lens wearer underwent anterior segment optical coherence tomography(OCT) with the contact lens on, tear break up time (TBUT) and non-invasive tear break-up time(NIAvgBUT) with and without contact lens.
The height of the tear film under the contact lens was measured, studied and analyzed between groups.
The tear break up time on the contact lens surface and cornea was analyzed between groups.
The pre-corneal tear film was analyzed according to the contact lens base curve (BC).

Results: 76.8% of the contact lens users are female. Age interval ranged between 16-43 (mean 24,6±5.8). Pre-corneal tear film Mean was 99±13.7 µm , mean NIAvgBUT on contact lens surface was 9.68±3.94. There was no difference between results of NIAvgBUT on contact lens and cornea. There was no statistical difference in pre-corneal tear film thickness between groups ($p < 0.001$).

Conclusion:
As a result, the NIAvgBUT, tear break up time was found in normal range with no differences between groups of last generations of contact lenses if well fitted. We believe that larger number of study groups and longer contact lens use time is required to analyze same parameters to show that new generation of contact lenses use has no harm on ocular surface.

Category: Comfort and lenses

P-07

Visual rehabilitation with hybrid contact lens in patients with irregular cornea

Seung Hyuck Lee(1)

(1) Yonsei Plus Eye Center, Sungnam, Korea (Republic of)

Purpose: This study aims to report the outcomes of new-generation hybrid contact lenses for visual rehabilitation of patients with irregular cornea.

Materials and methods: 8 eyes of 4 irregular cornea patients were fitted with hybrid lenses. Each patient's keratometric values, ocular surface irregularity indices, central corneal thickness (CCT), uncorrected visual acuity (UCVA), spectacle-corrected visual acuity, contact lens-corrected visual acuity, contact lens fitting data, and contact lens daily wearing time were recorded. Follow-up examinations were performed at 1st week, 1st month, and 3rd month visit after successful fitting of the lenses.

Results: The mean age of the patients was 38.42 ± 4.89 years. The mean spherical component of refractive error was -4.46 ± 2.1 D, and the mean astigmatism was -5.31 ± 1.55 D. The median UCVA was 1.00 logarithm of the minimum angle of resolution (logMAR), which improved to 0.40 logMAR after spectacle correction. The median visual acuity with hybrid contact lenses was 0.05 logMAR. Two patients discontinued contact lens wearing due to conjunctival hyperemia. No contact lens - related complications such as decompensation, corneal imprint, and infection were documented during the follow-up period.

Conclusion: The new-generation hybrid contact lenses can be considered helpful in the visual management of keratoconus patients and irregular cornea after trauma or corneal ablation surgery, particularly who are unable to achieve an adequate visual outcome with spectacles.

Category: Free topics

P-09

Challenges of Tonometry by ocular response analyzer in keratoconus and contact lens induced corneal warpage

Fateme Alipour(1) , Mojgan Letafatnejad(2) , Narges Hassanpour(1) , Amir- Hooshang Beheshtnejad(1) , Seyed- Farzad Mohammadi(1) , Mehdi Yasseri(2)

(1) Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran ; (2) Tehran University of Medical Sciences, Tehran, Iran

Purpose: To compare Intra-ocular pressure (IOP) values measured by ocular response analyzer in contact lens induced corneal warpage and normal and keratoonic eyes.

Materials and methods: Prospective observational case control study; 94 eyes of 47 warpage suspicious and 46 eyes of 23 keratoconic patients were enrolled. Warpage suspected cases were followed until a definite diagnosis was made (warpage, normal, or keratoconus). Ocular response analyzer tonometry was done for all cases in each visit.

Results: 44 eyes of 22 patients had contact lens related corneal warpage. 46 eyes of 23 people were diagnosed as non-warpage normal eyes. 46 eyes of 23 known keratoconus patients were included for comparison. The demographic and refractive data were not different between warpage and normal groups but were different in the keratoconus group. Both IOPcc and IOPg.1 were statistically different with the highest value in the warpage group followed by normal and keratoconus groups; just like their central corneal thickness (CCT). Mean of IOPg.1 [P1] was 14.94 ± 2.65, 13.7 ± 2.33, and 10.86 ± 3 and IOPcc was 15.73 ± 2.4, 15.28 ± 2.43, and 14.08 ± 2.55 in the warpage, normal, and keratoconus groups, respectively. IOPg.1 and IOPcc in warpage group (based on baseline diagnosis) did not regress to become closer to IOP of normal eyes after discontinuation of contact lens in their follow up visits (P value for IOPg.1 and IOPcc trends in warpage group was 0.07 and 0.09 with CCT control respectively).Both IOPcc and IOPg.1 showed a statistically significant decrease in keratoconic eyes in comparison with normal eyes.After CCT control, there was not any statistically significant difference between three groups in their measured IOPcc and IOPg except for IOPcc in Keratoconus Vs Warpage (P: 0.02).What about the last IOP in the warpage group? We have to mention that it did not regress to become closer to normal patients in follow up visits.

Conclusion: IOP measurement by ORA may be different in people who develop contact lens induced warpage and keratoconus.

Category: Free topics

P-10

The impact of learning and experience on time taken to apply and remove contact lenses

Meredith Bishop(1) , Frank Yi(1) , Jane Veys(1)

(1) Johnson&Johnson Vision, Jacksonville, United States

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.

Materials and methods: 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.

Conclusion: 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.

Category: Free topics

P-11

Calculator of the astigmatism induced by back surface toric rigid gas-permeable lens and its use in two case reports

Daniela Malaguido(1) , Luiz Formentin(2,3)

(1) Professional Update of the Contact Lens-Department of Ophthalmology - Escola Paulista de Medicina da Universidade Federal de São Paulo, São Paulo, Brazil ; (2) Head of the Contact Lens-Department of Ophthalmology - Escola Paulista de Medicina da Universidade Federal de São Paulo-, São Paulo, Brazil ; (3) General Coordinator - Department of Ophthalmology - Santo Amaro Hospital , Guarujá, Brazil

Purpose: The overall incidence of ocular astigmatism is 68%, and about 6% of the people have more than 2.00 dioptres. It is accepted that rigid gas-permeable lenses (RGP) afford superior visual correction when the astigmatism is external. If the corneal astigmatism is superior to 2.5 dioptres, a back surface toric RGP lens is necessary to fit well. Due to the difference between the refractive index of the tear film and the BS toric lens astigmatism is induced. The aim of this work is presenting a calculator that quantifies the power of the induced cylinder when a BS toric lens is fitted. Two case reports are presented to demonstrate the use of the calculator.

Materials and methods: The calculator was developed in Excel considers parameters such as the index of refraction of the tear, the air and the lens material, and also the different curves of the lens.

Results: Case report 1: male, 18 years old, poor visual acuity in left eye since childhood and he can not wear spectacles. Ophthalmological examination: high hypermetropic astigmatism just in left eye (anisometropia). In this case, an aspherical RGP lens was inserted and resulted in excessive clearence along the vertical meridian (“dumbbell” pattern). Then, a back surface toric RGP lens was inserted, which improved alignment, but induced astigmatism. As the lens was tight, changes in the base curve were done and entered into the calculator, which automatically recalculated the CPI. Through this tool the lens was ordered, observing the result in which material the induced cylinder was lower.
Case report 2: female, 42 years old and desires fit contact lens. Ophthalmological examination: mixed astigmatism in right eye and hypermetropic astigmatism left eye. Aspherical RGP lenses were fitted in both eyes. Good mechanical fit and excellent visual acuity were observed in the left eye. However, the right eye, despite the good fit, presented residual astigmatism. Changed the RGP trial lens aspherical to a BS toric RGP whose over-refraction was spherical. Placing the BS toric parameters in the calculator, it was observed that the induced cylinder power practically coincided with the residual astigmatism and neutralized it. Thus, the use of a front surface cylinder was unnecessary.

Conclusion: The calculator method is an automated procedure based on the input of a toric trial lens parameters and the derived adjustments that simply consider the base curve and-or the lens material. Data are inserted in a table and more complex calculation is not necessary. In addition, the calculator dispenses a time-consuming and costly investment in acquiring many trial lenses.

Category: Free topics

P-12

Comparisson of corneal asymmetry index between two groups: indigenous and afroecuadorians.

Antonio López-Alemany(1) , Andrea Villegas Teran(1)

(1) University of Valencia, Valencia, Spain

Purpose: To compare the corneal asymmetry index between two groups: indigenous and afroecuadorians.

Materials and methods: This study was developed in Imbabura – Ecuador by the ocular surface group of investigation “Miguel Refojo” of Valencia University - Spain. There were analized 195 right eyes from 195 patients (indigenous 100, afroecuadorians 95) ages between 20 and 45 years. Corneal topography was done to each patient by corneal topographer Tomey TMS – 4N. There were excluded patients with any ocular diseases. The stadistict analysis was made by the SPSS software versión 24. The U Mann Whitney test was applied for independent groups after accomplishing all the assumptions with 95% confidence interval ($p<0.05$). All participants signed the informed consent.

Results: There were analized 195 right eyes. The median of corneal asymmetry index for the indegenous group (mdn=0.47) and for the afroecuadorian group (mdn=0.48) was not statistically signficant different (p=0.845).

Conclusion: The median of corneal asymmetry index was not statistically significant different between the two groups.

Category: Free topics

P-13

Comparative study of corneal asphericity between two population groups: Indo-Americans and Afro-Ecuadorians.

Antonio López-Alemany(1)

(1) University of Valencia, Valencia, Spain

Purpose: To compare the value of corneal asphericity (Q) between two American and Ecuadorian population groups.

Materials and methods: This comparative study was developed in the Province of Imbabura, Ecuador by the ocular surface research group "Miguel Refojo" of the University of Valencia. We analyzed 195 right eyes of 195 patients (100 American Indian, 95 Afroecuadorian) in ages between 20 and 45 years. Corneal topographies were made to each patient using the Tomey TMS - 4N reflection topography. All subjects with corneal or systemic pathology were excluded. The statistical analysis was carried out using the SPSS software version 24. The parametric test t-test was applied to independent samples after fulfilling all the assumptions for a 95% confidence interval (p?0.05).

Results: 195 eyes were analyzed. The mean of the corneal asphericity was -0.33 ± 0.13 for the group of the Indo-Americans and -0.34 ± 0.14 for the Afro-Ecuadorians, there being no statistically significant differences between both groups (p = 0.736).

Conclusion: The mean value of the corneal asphericity between the two population groups: Indo-Americans and Afro-Ecuadorians are equal in a statistically significant

Category: Free topics

P-14

Potential Malpractice Cases of Non-Ophthalmologists in Contact Lenses?

Kazim Hilmi Or(1)

(1) Private Office of Ophthalmology, Nişantasi. Istanbul, Turkey

Purpose: Contact lens patients in many countries in the world are examined by non-ophthalmologists. Contact lenses are fitted, precribed and sold also by non physicians in many countries. As in any medical condition there are also complications and/or malpractice cases in relation to contact lenses.

Materials and methods: The malpractice laws and the responsibilities of non-medical professions are discussed in some fictive cases of contact lens fitting, selling and malpractice. These professions are not used to deal with complications and their probable legal charges. (The author is an ophthalmic surgeon having a doctoral degree in Forensic Medicine and master degree in Vision, Artificial Vision and Low Vision Rehabilitation.)

Results: In contact lens complications with legal charges, non-physician professions may have more problems in courts. The charges may be even higher than for ophthalmologists/physicians.

Conclusion: Contact lenses cases without complications may encourage non-physicians to deal with all contact lens cases. But even cases which seem easy at the beginning may end up with complications, which may become a matter of court trials. Even for ophthalmologists there may be legal problems, which may be even in a higher rate for other professions.

Category: Keratoconus

P-15

Adapted fluence corneal cross- linking in mild to moderate keratoconus- short term results

Fateme Alipour(1) , Saeed Khaheshi(1) , Reza Ghaffari(1) , Amirhooshang Beheshtnejad(1) , Mahmoud Jabbarvand Behrouz(1) , Farhad Hafezi(2)

(1) Eye Research center, Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran ; (2) Dept. of Ophthalmology, Geneva University Hospitals, Geneva, Switzerland

Purpose: Considering the wide spectrum of disease severity and progression probability of keratoconus, developing severity/ progression probability based nomograms for CXL protocols is desired. This study is designed to evaluate the safety and efficacy of adapted fluence CXL (lower dose of UV -A irradiation) in mild to moderate keratoconus (grade I and II based on Amsler- Krumeich classification).

Materials and methods: Non-randomized comparative interventional case series.; 46 eyes of 38 patients with mild to moderate keratoconus [17 eyes of 17 patients in group 1 (adapted fluence group) and 24 eyes of 29 patients in group 2 (standard treatment)]were recruited in this study. After epithelial removal and30 minutes of instillation of isotonic 0.1% riboflavin-dextran solution, patients in group 1 received an adapted fluence setting (7 minutes of 9 mW/cm2UV-A at 5 cm, 3.78 J/ cm2), while patients in group 2 received the standard treatment (10 minutes of 9 mW/cm2 UV-A at 5 cm, 5.4 J/cm2). Visual, keratometric, biomechanical outcomes, and intraoperative pain were compared between groups.

Results: At last follow up (mean 12 months, range 6- 27 months), there were no statistically significant differences in changes of uncorrected visual acuity (UCVA), best spectacle corrected visual acuity (BSCVA), mean and maximum keratometric values, corneal hysteresis (CH), corneal resistance factor (CRF), and endothelial cell counts, demarcation line depth, and intraoperative pain scores between groups (all P-values< 0.05).

Conclusion: The results of this pilot study show comparable short term outcomes between the 7 minute and the standard 10 minute duration of treatment with accelerated CXL in mild to moderate keratoconus. Should the results of this study confirmed in long term follow up, this modified treatment method using an adapted fluence setting could be considered as an alternative to standard treatment in these patients.

Category: Keratoconus

P-16

The relationship between choice of contact lens type in keratoconic eyes and severity of keratoconus

Asli Kirmaci(1) , Ferah Ozcelik(1) , Murat Arici(1) , Cigdem Altan(1) , Osman Bulut Ocak(1) , Muhittin Taskapili(1)

(1) University of Health Science Beyoglu Eye Training and Research Hospital, Istanbul, Turkey

Purpose: The aim of this study is to evaluate the relationship between severity of keratoconus and choice of contact lens (CL) type (soft CL, Toris-K or Rose-K CL) based on visual acuity (VA) rehabilitation and patient comfort in keratoconic eyes.

Materials and methods: Seventy eyes of 45 keratoconic patients who were examined in our CL department between 2015-2016 were included in this retrospective study. Topographic and pachymetric parameters of keratoconic corneas by means of Sirius (SCHWIND eye-tech-solutions GmbH, Kleinostheim), such as mean central keratometry (K) and corneal thickness at the thinnest location were recorded. Severity of keratoconus was graded according to Amsler-Krumeich classification. Each of soft CL, Toris-K and Rose-K CL were fitted for each eye at different visits. The selection of CL type was decided according to both level of improvement in VA obtained by CL fitting, and degree of patient comfort measured by VAS score. Patients were asked to score the comfort of the CL from 1 to 5 (1:not comfortable, 5:very comfortable) for each eye 30 minutes after CL application. Refractive errors, K values, uncorrected VA (UCVA), best spectacle corrected VA (BCVA), best CL corrected visual acuities (BCLCVA) for each CL and comfort rating via visual analogue scales (VAS) were recorded for each patient.

Results: The mean age of 45 patients was 26.7±7.2 years (range: 15 to 47). The mean K in diopters (D) was 48.76±3.86 D (42.39-60.19), and the mean CT in micrometers (µm) was 438.21±46.24 µm (317-533). Nineteen patients (%27.1) were stage 1, 35 patients (%50.0) were stage 2, and 16 patients (%22.9) were stage 3 according to Amsler-Krumeich classification.The mean Snellen UCVA and BCVA were 0.15±0.14 and 0.40±0.24 respectively. The mean Snellen BCLCVA with soft CL, Toris-K and Rose-K CL were 0.50±0.24 (0.05-1.0), 0.57±0.20 (0.2-1.0), and 0.67±0.17 (0.3-1.0), respectively. Soft CL was chosen in 15 patients (%21.4), Toris-K in 22 patients (%31.4), and Rose-K in 33 patients (%47.1) as aids for visual rehabilitation. The mean VAS score was 4.47±0.68 for soft CL, 3.76±0.81 for Toris-K, and 3.27±0.76 for Rose-K. Soft CL was chosen in nine eyes (%47.4) in Stage 1, Toris-K in 15 eyes (%42.9) and Rose-K in 16 eyes (%45.7) in Stage 2, and Rose-K in 12 eyes (%75) in Stage 3 (p=0.003).

Conclusion: There was a statistically significant relationship between the choice of CL type and the severity of keratoconus. As the severity of keratoconus increased, the choice of CL type showed a shift from soft CL to Toris-K and then Rose-K, respectively.

Category: Keratoconus

P-17

Wound healing after corneal collagen cross-linking using different epithelial removal techniques: Epikeratome versus a blunt spatula

Semra Akkaya Turhan(1) , Berru Yargi(1), Furkan Cam(1) , Ebru Toker(1)

(1) Marmara University, School of Medicine, Department of Ophthalmology, Istanbul, Turkey

Purpose: To determine differences in corneal wound healing and safety usingeither epikeratome with a mechanical scraper or a blunt spatula before Corneal Collagen Cross-Linking (CXL)

Materials and methods: Twenty-two eyes of18 patients with progressive keratoconus undergoing CXL (9 mW/cm210 min - total energy dose of 5.4 J/cm2) were randomized into 2 groups for epithelial removal: mechanical group (n=11 eyes), using a blunt spatula and Epi-Bowman Keratectomy (EBK) group (n=11 eyes), using an epikeratome (Epi-Clear, Orca Surgical, Ashkelon, Israel). A bandage contact lens was applied at the end of the procedure. The time taken for epithelial removal, pain score using the Wong-Baker's pain scale, epithelial defect area, time for complete re-epithelialization, integrity of Bowman's layer and the epithelial profile using anterior segment optical coherence tomography (Optuvue Inc. Fremont, CA) during healing were evaluated and compared between the two groups. Ocular symptom score (OSDI) and tear break up time (TBUT) were also evaluated preoperatively.

Results: There were no significant differences in keratometric values, refractive errors, visual acuities, OSDI score and TBUT, preoperatively (p>0.05) between the two groups. The Bowman's layer was damaged in 6 eyes in the mechanical group, while it was intact in all eyes treated with EBK removal. The average time for epithelial removal in the EBK group was significantly shorter (3.0±1.6 min) than in the mechanical group (5.4±1.2 min) (p=0.001). The average time for complete epithelial healing was 2.91±0.70 d in the EBK group and 2.64±0.50 with the mechanical group (p>0.05). Regular and smooth corneal healing was observed in both groups. There was no significant difference in either the pain scores or in epithelial thickness profile between the two groups.

Conclusion: In CXL, EBK prevents the damage of the Bowman's layer and appears to be a faster method to accelerate the epithelial debridement.

Category: Keratoconus

P-18

Isotonic riboflavin solution with HPMC in thin corneas: Intraoperative pachymetric changes and long-term efficacy

Semra Akkaya Turhan(1) , Berru Yargi(1), Ebru Toker(1)

(1) Marmara University, School of Medicine, Department of Ophthalmology, Istanbul, Turkey

Purpose: To assess intraoperative corneal thickness changes with isotonic riboflavin (RF) solution with HPMC (hydroxyl propyl methylcellulose) in patients with thin corneas undergoing accelerated corneal collagen crosslinking (A-CXL) and to evaluate the long-term efficacy.

Materials and methods: Thirty-one eyes of 27 progressive keratoconus patients with a corneal thickness < 400 µm after epithelial removal were included in this retrospective study. A 0.1% RF solution with HPMC was applied for 20 min to soak the corneal stroma. All patients underwent A-CXL using continuous ultraviolet-A (UVA) light exposure at 9 mW/cm210 min - total energy dose of 5.4 J/cm2. Intraoperative thinnest corneal thickness (TCT) measurements using ultrasound pachymetry were obtained before and after epithelial removal, after riboflavin loading, and during UVA light exposure at 5 and 10 min. Uncorrected visual acuity (UDVA, CDVA) spherical error, cylindrical error, spherical equivalent (SE), and keratometric values with corneal topography by Scheimpflug camera were recorded.

Results: The mean preoperative TCT was 423.7±23.3 µm (range, 386-470 µm) and after epithelial removal it decreased to 378.8±14.7 µm (range, 345-399 µm; Δ: -44.9 µm). After RF instillation for 20 min, TCT significantly increased to 434.6±27.3 µm (Δ: 54.1 µm; range, 9.7-100 µm) ($p<0.0001$). TCT remained stable during UV-A irradiation at 5 and 10 min ($p>0.05$). Hypotonic riboflavin was not required in any patient to swell the cornea. No adverse effects were recorded. With a mean follow-up interval of 20.48±9.98 (12-45) months, the mean keratometric values, visual acuity and refractive error remained stable.

Conclusion: The use of HPMC containing isotonic RF solution alone successfully increases corneal thickness to safety limits in patients with thin corneas and appears to be effective in stabilizing keratoconus progression.

Category: Keratoconus

P-19

Efficacy of conventional versus accelerated corneal collagen cross-linking in pediatric keratoconus: 2-year outcomes

Semra Akkaya Turhan(1) , Ebru Toker(1), Berru Yargi(1)

(1) Marmara University, School of Medicine, Department of Ophthalmology, Istanbul, Turkey

Purpose: To compare the efficacy and safety of conventional corneal collagen crosslinking (CXL) with accelerated corneal collagen crosslinking in pediatric patients with keratoconus

Materials and methods: Patients were consecutive cases of progressive keratoconus receiving either conventional (3 mW/cm2) irradiance for 30 min or accelerated CXL (9 mW/cm2irradiance for 10 min). Visual acuities (UDVA, CDVA) spherical error, cylindrical error, spherical equivalent (SE), and keratometric values with corneal topography by Scheimpflug camera were recorded. Follow-up measurements were taken up to 2 years after treatment were compared with baseline values.

Results: The study enrolled 48 eyes; 22 eyes had accelerated CXL (mean age, 16.0±1.7) and 26 eyes had conventional CXL (mean age, 15.7±1.6). Compared to preoperative values, all mean K values significantly improved in the accelerated CXL group (K1; Δ=-0.64 D, p<0.0001, K2; Δ=-0.63 D, p=0.009 and Kmax; Δ=-0.55 D, p=0.028) but no significant changes were observed in the mean UDVA and CDVA. In the conventional CXL group, all mean K values and CDVA significantly improved (K1; Δ=-0.65 D, p=0.017, K2; Δ=-0.87 D, p=0.006, Kmax; Δ=-1.47 D, p=0.011). No significant changes were observed in refractive errors in either CXL group. There was no significant difference in the keratometric readings, visual acuities and refractive errors between two groups at 2-year follow-up.

Conclusion: Both conventional and accelerated CXL protocols appear to be effective in stabilizing keratoconus progression in pediatric patients. Accelerated CXL having the advantage of shorter treatment duration may prove to be a good alternative in paediatric patients with better tolerability.

Category: Keratoconus

P-20

The impact of keratoconus on vision related quality of life: NEI Refractive Error Quality of Life Instrument-42

Semra Akkaya Turhan(1) , Berru Yargi(1), Ebru Toker(1)

(1) Marmara University, School of Medicine, Department of Ophthalmology, Istanbul, Turkey

Purpose: To determine the impact of keratoconus on vision-related quality of life (QoL) by using NEI Refractive Error Quality of Life Instrument-42 (NEI RQL-42).

Materials and methods: Seventy-six keratoconus patients and 30 healthy controls were recruited. Patients completed the NEI RQL-42 to evaluate vision-related quality of life. Complete ophthalmologic examinations including binocular best-corrected visual acuity (BCVA), spherical equivalent, and keratometric measurements (K1, K2, Kmean, Kmax) in the worse eyewere performed. Keratoconus was classified according to the classification of Amsler-Krumeich. The impact of severity of the disease (BCVA ³0.4 logMAR, steep K reading ³52, Amsler-Krumeich grades) on vision-related quality of life was also analyzed.

Results: The mean age was 23.6±5.0 (18-40) years. The mean values for binocular BCVA, Kmean, spherical equivalent were 0.3±0.2 logMAR, 48.3±4.2 and -6.3±4.0, respectively. Fifteen (19.7%) of the keratoconus patients were classified as stage 1, 30 (39.5%) as stage 2, 16 (21%) as stage 3, and 15 (19.7%) as stage 4, based on Amsler-Krumeich classification. The overall score and the 4 subscale scores (clarity of vision, symptoms, appearance, and satisfaction with correction) of the NEI RQL-42 questionnaire were significantly lower in keratoconus patients compared to healthy controls ($p<0.05$). NEI-RQL-42 scores were not found to be related with either vision or the severity of keratoconus.

Conclusion: Vision-related quality of life is affected in patients with keratoconus regardless of the disease severity.

Category: Keratoconus

P-21

Comparative Long-term Outcomes of Conventional and Accelerated (9 mW/cm2) Corneal Collagen Crosslinking in Progressive Keratoconus

Yagmur Seda Yesiltas(1) , Omur Ucakhan-Gunduz(1)

(1) Ankara University Faculty of Medicine, Department of Ophthalmology, Ankara, Turkey

Purpose: To compare the safety and efficacy of conventional versus accelerated (9 mW/cm^2) corneal collagen crosslinking (CXL) in progressive keratoconus in long-term follow-up.

Materials and methods: In this prospective study, consecutive progressive keratoconus patients were randomized to receive either conventional CXL (CCXL) or accelerated CXL (ACXL) at 9 mW/cm^2. Visual, refractive, keratometric, topographic and aberrometric outcomes and stromal demarcation line depth (DLD) measurements were compared at the end of 2-year follow-up.

Results: Thirty-two eyes of 32 patients in the CCXL and 27 eyes of 27 patients in the ACXL groups completed 2-year follow-up. The mean age of patients was 23.1±3.8 years (19-34 years) in CCXL and 24.6±5.0 years (20-38 years) in ACXL. At post-CXL 2 years, both uncorrected and corrected visual acuities improved statistically significantly in both groups. The improvements in keratometric readings, flattening rate (flattening of the Kmax more than 1D), 3 topographic indices and vertical coma were significantly better in the CCXL group compared to the ACXL group ($p<0.05$). The DLD as measured by anterior segment optical coherence tomography or in vivo confocal microscopy was better detectable and statistically significantly deeper in the CCXL group compared to the ACXL group, and deeper DLD correlated significantly with improvements in the mean keratometry measurements. Progression was noted in 11.1% of eyes in the ACXL group, whereas progression was not observed in any patient eye in the CCXL group.

Conclusion: In this prospective randomized study, ACXL using HPMC-assisted riboflavin imbibition for 10 minutes was less effective in halting the progression of keratoconus at 2-year follow-up compared to CCXL.

Category: Keratoconus

P-22

eyebrid contact lenses to fit keratoconus: about three cases

Juliette Knoeri(1) , Marie Borderie(1) , Vincent Borderie(1)

(1) CHNO XV XX, Paris, France

Purpose: To find the place of hybrid contact lenses in relation to the corneo scleral contact lenses for patients presented at gas permeable contact lenses fitting's failure

Materials and methods: 3 patients presented an advanced keratoconus with an intolerance to the gas permeable contact lenses were successfully fitted with hybrid contact lenses at the department of contactology in XVXX hospital. We study the ocular surface characteristics, OSDI score, signs of allergy, visual acuity without correction, visual acuity with gas permeable lenses, visual acuity with hybrid contact lenses, the topographical characteristics, the patient's satisfaction.

Results: Patients present a gas permeable contact lenses intolerance despite a good fitting. Indeed, their visual acuity with gas permeable contact lenses is good. The keratoconus stage is 3 according to the Amsler- Krumeich classification for the three patients. One keracotoconus is totally decentered. Three patients have signs of perannual allergy without symptoms of dry eye. The gain of quality of life were major.The final corrected visual acuity is 2/2 instead of 2/16.

Conclusion: The 3 patients obtain good visual and clinical results. Thanks to the eyebrid contact lenses we delay the corneal graft for the three patients. The manipulation's learning for eyebrid contact lenses is easier for the patients than for corneo-scleral contact lenses. They need a mandatory annual control to screen corneal neovascularisation.

Category: Keratoconus

P-23

Keratoconus early detection

Dean Saric(1) , Senad Ramic(1)

(1) Clinical Hospital "Sveti Duh", Zagreb, Croatia

Purpose: The aim of this study was to find out if it is possible to detect keratoconus in children of patients that already have diagnosed keratoconus as early as possible since we know that genetics plays a role in possibility of developing keratoconus.

Materials and methods: We examined children between 8 and 15 years of age of 57 patients with diagnosed keratoconus. Slip lamp assessment, corneal tomography and best corrected visual acuity was done as most commonly accepted techniques in eye examination of keratoconus suspects

Results: Subclinical keratoconus was found in one third of examined children.

Conclusion: Keratoconus screening can be performed in children of parents with diagnosed keratoconus. It is useful method to diagnose early stage of disease with possibility of preventing further development of disease.

Category: Keratoconus

P-24

Characteristics of Astigmatism after MyoRing Implantation

Masoud Khorrami Nejad(1) , Mahsa RanjbarPazooki(1) , Hesam hashemian(1)

(1) School of Rehabilitation, Shahid Beheshti University of Medical Sciences, Tehran, Iran., Tehran, Iran

Purpose: This study was designed to investigate the changes in the corneal toricity six months after the myoring implantation in patients with Keratoconus (KC).

Materials and methods: This retrospective study was performed by extraction and comparison of astigmatism before and six months after myoring in 34 eyes of 28 patients with KC with mean age of 41.41 ± 29.

Results: The results showed a significant decrease in the mean of cylindrical refractive errors from -4.27 Diopter(D) 3.15D to 2.18D 1.63D(P <0.001). Also, the mean of astigmatism in the anterior surface of the cornea after surgery was decreased by 1.16D (P = 0.001) and the mean posterior corneal astigmatism has improved with a decrease of 0.24D (P = 0.009).
The prevalence rate of the cylindrical axes of the refraction before the operation with 21%, 44% and 35%, were with the rule (WTR), oblique, and against the rule (ATR) while after the operation converted to WTR, oblique, and ATR with 18%, 24% and 58%, respectively.

Conclusion: Myoring action provides a significant improvement in the amount of corneal toricity that results in better quality and quantity of vision.

Category: Keratoconus

P-25

Corneal asphericity changes after MyoRing implantation in moderate and severe keratoconus.

Masoud Khorrami-Nejad(1) , Ozra Aghili(1) , Mahsa Ranjbar Pazooki(1)

(1) School of Rehabilitation, Shahid Beheshti University of Medical Sciences, Tehran, Iran., Tehran, Iran

Purpose: To evaluate of myoring implantation effect on corneal asphericity in moderate and severe Keratoconus (KCN).

Materials and methods: This cross-sectional observational study comprised 32 KCN eyes of 28 patients which had femtosecond-assisted MyoRing corneal implantation. Preoperative and 6 mounts postoperative uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), manifest refraction, corneal asphericity at 6,7,8,9 and 10 mm optical zone in superior, inferior, nasal, temporal and central areas, thinnest location value and keratometry readings were the main outcome measures of the study.

Results: A significant improvement in UDVA and CDVA was observed 6 months after surgery (P< 0.001), which was consistent with the significant reduction in sphere (4.67D) and cylinder (2.19D). in addition, a significant reduction in the main corneal asphericity at 6,7,8,9 and 10 mm optical zone in superior, inferior, nasal, temporal and central areas was found (p<0.001). The mean thinnest location thickness value decreased from 437.15 ± 30.69 to 422.81 ± 36.91. Furthermore, a significant corneal flattening was found. The k1, k2, and km changes was 5.32 D, 7 D, 6.17 D respectively (p<0.001).

Conclusion: MyoRing implantation is effective for improving corneal parameters in KCN and allows successful corneal remodeling and provides significant improvement in visual acuity and refractive error.

Category: Ocular surface disease

P-26

Central toxic keratopathy after small incision lenticule extraction

Kyungmin Koh(1) , Mingu Kang (2) , Kyoung Yul Seo(2) , Kyuyeon Hwang(1)

(1) Kim's Eye Hospital, Department of Ophthalmology, Konyang University College of Medicine, SEOUL, Korea (Republic of) ; (2) Institute of Vision Research, Department of Ophthalmology, Yonsei University College of Medicine, SEOUL, Korea (Republic of)

Purpose: CTK (central toxic keratopathy) is a noninflammatory postsurgical condition that presents with central corneal opacity and a significant hyperopic shift. Small-incision lenticule extraction (SMILE) is a refractive surgery which a corneal stromal lenticule is formed using femtosecond laser system and removed through a small peripheral corneal incision. The authors present a case of CTK after SMILE.

Materials and methods: A 35-year-old male presented with 2 months history of decreased vision of the right eye. He had undergone SMILE surgery 7 months ago. Preoperatively, Manifest Refraction (MR) of his right eye was - 6.75sph - 0.25cyl × 180, with corrected distance visual acutity (CDVA) of 20/20. Keratometric readings (Pentacam; Oculus, Wetzlar, Germany) were 44.70/44.90 diopters. Central corneal thickness was 565 μm. No anterior and posterior segment abnormalities were observed. The femtosecond laser system (VisuMax, Carl Zeiss Meditec AG, Jena, Germany) was used to perform the SMILE procedure. The surgery was conducted uneventfully. One day postoperatively, the uncorrected distance visual acuity (UDVA) was 20/50. At 3 months, it was 20/25 and the CDVA was 20/25 with a MR +0.25sph -0.75cyl × 15.

Results: Seven months postoperatively, examination revealed the typical central toxic keratopathy triad: corneal thinning, hyperopic shift and a reduction in best corrected visual acuity to 20/50. MR of his right eye was +4.00sph -0.75cyl × 90. Central corneal thickness of his right eye was 373μm.

Conclusion: SMILE has been considered as an alternative procedure to conventional laser in-situ keratomileusis (LASIK) because of its benefits of reduced denervation, less post-operative dry eye, and no flap-related complications. Although SMILE has small incision, CTK may be induced. Because SMILE is s on the rise, this rare case is important for other refractive surgern to look up, and as the basis for larger studies.

Category: Ocular surface disease

P-27

The ocular surface questionnaires as a stimulus of the symptomatology in the patient.

Antonio López-Alemany(1) , Miguel Fons-Cogollos(1)

(1) University of Valencia, Valencia, Spain

Purpose: To assess whether the questionnaires that are used in the diagnosis of the processes that affect the ocular surface if are stimulants of the symptomatology in asymptomatic patients.

Materials and methods: Four questionnaires, Mc Monnies, Schein, Donate and OSDI, were used randomly in a series of asymptomatic patients to assess the existence or not of symptoms related to ocular surface pathology.

Results: 112 women and 82 men answered the questionnaires. Among women, 55 were aged 45 or younger, and 57 were older than 45 years. Among men, 39 were aged less than 45 years and 47 were over 45 years old. Symptomatology was presented when respondents answered 42.97% of the women and 26.01% of the men. The older, the greater the positive response to the questionnaires in men, 24.47% in less than or equal to 45 years and 29.08 in over 45 years, unlike in women, 50% and 36.41% respectively. The Mac Monnies questionnaire was the one with the highest positivity in both men, 30.23% and women, 51.79%, and the least that of Schein, 23.81% and 18.75% respectively.

Conclusion: The questionnaires raise the symptomatology of asymptomatic patients. Presenting a greater positivity in women than in men

Category: Ocular surface disease

P-28

Therapeutic use of scleral contact lenses in a patient with neurotrophic persistent epithelial defect

Yagmur Seda Yesiltas(1) , Omur Ucakhan-Gunduz(1)

(1) Ankara University Faculty of Medicine, Department of Ophthalmology, Ankara, Turkey

Purpose: We report a case of scleral lens management of long-standing neurotrophic persistent epithelial defect (PED) resulting from intracranial tumor resection.

Materials and methods: Case report

Results: A 42-year-old man with a history of ocular redness and declining visual acuity in the left eye was admitted to our clinic. Best corrected visual acuity was 20/200 in the left eye. Slit-lamp examination revealed a 1.6 mm x 1.3 mm corneal epithelial defect, corneal stromal edema surrounding the defect, conjunctival hyperemia, and diffuse punctate keratopathy in the left eye. He was diagnosed with neurotrophic PED in the light of his past medical history revealing his ocular findings that occurred after intracranial tumor resection. Several therapeutic contact lens trials had failed to heal the epithelial defect. The patient was then fitted a scleral contact lens in an attempt to alleviate symptoms and promote healing. Within 2 days, corneal epithelial defect healed, his vision had improved to 20/20 in the left eye. The patient's visual acuity and corneal surface integrity have remained stable for 6 months of follow-up, and the quality of patient life was improved with aid of scleral lens.

Conclusion: Scleral lens wear seems to be valid long-term alternative to standard treatment options for selected patients with neurotrophic PED. Scleral contact lenses provide these patients with effective protection of the ocular surface while optimizing visual function.

Category: Ocular surface disease

P-29

Are scleral lenses safer for meibomian glands?

Moatez Billah Mekki(1) , Yahiaoui Said(1) , Titah Okba(1) , Taibi Amine(3) , Belaoudmou Ramzeddine(2)

(1) Ibn Al Haythem Center, Algiers, Algeria ; (2) Epidemiology unit, Lamine Debaghine Hospital, Algiers, Algeria ; (3) Ophthalmology Unit, Hadjout Hospital, Tipaza, Algeria

Purpose: To determine if scleral lenses are safer for meibomian glands compared with other kind of lenses.

Materials and methods: Descriptive transversal study, preliminary investigation. The interaction of the scleral lens with the posterior ocular surface was assessed clinically in keratoconus patients wearing scleral lens for more than 2 years and compared with soft lens, hybrid lens and corneal rigid gas permeable lens wearers and with control sample. 40 randomized patients less than 60 years old, consulting for routine control at Ibn AlHaythem Center, Algiers, during 3 days. Lid wiper epitheliopathy LWE grade, tear film break up time BUT, quality of meibum and meibomian gland trophicity in meibography were assessed and compared between the 5 groups. The worst score of each eye was retained and in independent manner between the parameters assessed.

Results: 40 eyes of 40 patients were enrolled, 16 control eyes, 7 eyes with scleral lens, 9 eyes with RGP lens, 6 eyes with soft SiHy lens and 2 eyes with hybrid lens. There was no significaive difference (p >0.05) between all the parameters assessed.

Conclusion: Scleral lens would not be safer for meibomian glands compared with other contact lenses.

Category: Ocular surface disease

P-30

How can we protect the ocular surface.

Adriana Stanila(1,2) , Dan Mircea Stanila(1,2)

(1) Ofta Total Clinic, Sibiu, Romania ; (2) Ofta Total Clinic, Sibiu, Romania

Purpose: Ocular surface disorders can disturb any medical or surgical eye condition, ocular surface and tear film being the first ocular protetion barrier. The aim of this study is to bring in atention the methods of ocular surface protection and the therapeuthical options related with ethiology.

Materials and methods: We took in our study cases with diferent oular surface disorders and possibilities of treatment as follows:medical treatment with artificial tears, autologus serum, matricial therapy, liposome therapy, regenerative therapy, antibiotic drops, corticosteroids, noncorticosterois anti-inflamatory drops, protective tratment with terapeutical contacr lenes, amniotic membrane transplant and surgical treatment with cojunctival flap, tarsorraphy and wieght in the upper lid implant.

Results: We will sow our result using diferent therapies.We obtained good results usins thie cimbinat therapies. the protection of ocular surface was individualisation according to the approached pathology.

Conclusion: The tretment of ocular surface is multifactorial. The combination of diferents medical, protetic and surgica ltheraies can lead to very good results.

Category: Ocular surface disease

P-32

Comparison of Efficacy of Different Treatments in Severe Vernal Keratoconjunctivitis Cases

Sukran Bekdemir(1) , Gulseren Ozel(2) , Sahin Pektas(1) , Sina Evsen(3)

(1) Ergani State Hospital Eye Department Ergani, Diyarbakir, Turkey ; (2) Ergani State Hospital Pathology Department Ergani, Diyarbakir, Turkey ; (3) Health Sciences University Gazi Yasargil Trainning and Research Hospital Eye Clinic , Diyarbakir, Turkey

Purpose: To investigate the effect of topical 0,05% cyclosporin A versus loteprednol and ketotifen treatments on clinical signs and ocular surface in patients with severe vernal keratoconjunctivitis (VKC).

Materials and methods: In this prospective clinical study, 48 eyes diagnosed as VKC were divided into two groups according to treatment method: Group 1 (n= 23) were given cyclosporin A, Group 2 (n=25) were given loteprednol and ketotifen treatment. Subjective symptom scores of patients; itching, lacrimation, photophobia, mucoid discharge, foreign body sensation, and objective clinical sign scores; conjunctival hyperaemia, punctate epithelial keratopathy, Trantas dots, limbal edema, giant palpebral papillae were evaluated before and at the second month of the treatment. Also, impression cytology was performed to the patients before and at the second month of treatment.

Results: Before the treatments there was no significant difference between symptoms and clinical scores, squamous metaplasia grade (SMG), goblet cell density (GCD) of the groups (p >0,05). With the treatment in group 1 significant increase in GCD and decrease in symptoms and clinical sign scores were observed (all, p <0,01) , no significant change in SMG was observed (p> 0,05). In the group 2 SMG, symptoms and clinical sign scores significantly decreased (all, p <0,01), no change was observed in GCD. After the treatment itching, lacrimation and Trantas dots are significantly lower in group 2, there was no difference in terms of other parameters between the groups (p>0,05).

Conclusion: It was observed that loteprednol and ketotifen treatment was more effective in decreasing subjective symptoms compared to cyclosporin A treatment in VKC cases. The reason of this may be the effect of cyclosporin A starts later. For that reason, by the combination of early relaxing effect of loteprednol and ketotifen treatment and healing and anti-inflamatory effect of cyclosporin A on ocular surface, a more effective treatment can be obtained.

Category: Ocular surface disease

P-33

The effect of reading task on tear film stability and blinking

Anete Petrova(1) , Inese Loca(1) , Linda Eglite(1) , Kristine Dumberga(1) , Egija Kliesmete(1) , Evita Kassaliete(1) , Anda Balgalve(2) , Gunta Krumina(1)

(1) University of Latvia, Faculty of Physics, Mathematics and Optometry, Department of Optometry and Vision Science, Riga, Latvia ; (2) OC VISION SIA, Riga, Latvia

Purpose: Computer users often experience eye strain, fatigue, discomfort, feeling of dryness and many other symptoms. Problems with tear film stability and blinking potentially trouble contact lens use for computer users. The aim of this study was to evaluate tear film stability before and after reading task, as well as evaluate blinking quality and quantity during reading task in different reading material positions.

Materials and methods: 44 employees and students from the building of University of Latvia Academic center for Natural Sciences participated in the measurements of tear film stability, blinking quality and quantity. Blinking quality and quantity was evaluated with analysis of a record of a video camera that was attached just above the upper edge of portable computer display where reading material was presented. 3 different reading material positions was adjusted – upper edge of computer display aligned with the height of participant's eyes; 17° and 25° below participant's eye level. Invasive tear break up time (TBUT) was evaluated using sodium fluorescein strips. Non-invasive TBUT was evaluated with a tearscope (Polaris, Bon).

Results: Total average blinking rate in our study during reading on computer display was 7 times per minute that is lower than normal blinking frequency. During 5 minutes of reading task average blinking rate decreased from 8 to 6 times per minute. Number of incomplete blinks increased during reading task (from 50 to 61%) and number of complete blinks reduced (from 50 to 39% of all blinks). Female participants demonstrated 2 times more blinks per minute (9±1) than male participants (5±1). Blinking rate increased with age for female participants (age group till 25 years blinking 4-6 times per minute, 25-45 years blinking 8-11 times per minute). Tear film stability measurements showed that invasive TBUT reduced after reading task from 7,46 ± 0,49 seconds (s) to 5,73 ± 0,42 s and non-invasive TBUT reduced from 10,18 ± 1,07 s to 7,44 ± 0,60 s. Statistically significant effect of reading material position was not observed, however average invasive TBUT was longer after reading in the middle height position.

Conclusion: Reading task reduces blinking quantity 4 times from standard average. Number of incomplete blinks increases during reading task. Tear film stability was reduced after reading task. Longer tear break up time was observed with non-invasive method. Acknowledgement: Research is supported by University of Latvia Fund and Mikrotikls SIA (Project No.2184).

Category: Speciality lenses

P-36

Hybrid Contact Lens Orthokeratology for High Astigmatism

Trinh Doan, O.D.(1)

(1) SynergEyes, Inc, Carlsbad, United States

Purpose: To describe a case supporting efficacy of a new design of hybrid contact lens for orthokeratology in treating high astigmatism.

Materials and methods: N/A - It is a case report

Results: Case Report: A 34-year-old female presented with a subjective refraction of -2.25-3.50x 170 in the right eye and -1.50 -3.50 x010 in the left eye. Best spectacle corrected visual acuity was 20/25 OD and 20/25-2 OS. The new design of hybrid contact lens uses reverse geometry along with patient's eccentricity, HVID, and central corneal measurements for lens fitting. Patient was instructed to wear lens during the day like standard hybrid lens. The lens provided centered treatment zone. At 1 week follow up, the manifest refraction was -0.75 -0.25x165 OD 20/20- OD and -0.75sph 20/25 OS. No corneal staining was observed with slit lamp evaluation.

Conclusion: Majority of standard orthokeratology lenses are rigid gas permeable with of spherical reverse geometry and modality of night time wear. These standard RGP orthokeratology-lenses have shown to be effective in correcting moderate level of myopia, but ineffective for correction of moderate level of astigmatism. The new design hybrid lens described in the case report was effective in correcting astigmatic errors up to 3.0 diopters. This provides the alternative approach for orthokeratology and improvement for treatment of high astigmatism.

Category: Speciality lenses

P-37

Evaluating the impact of wearing Soft Toric, RGP and MSD Contact Lenses on corneal structure and contrast sensitivity over 6months

Fateme Alipour(2) , Shima Dehghani(1) , Mahya Soleiman Zade(2) , Maryam Kasiri(2) , Sepide Hagu Aghaie(2)

(1) Zahedan University of Medical Sciences, Zahedan, Iran ; (2) Tehran University of Medical Sciences, Tehran, Iran

Purpose: To determine effects of wearing soft toric, RGP and MSD contact lenses on confocal characteristics of the cornea and contrast sensitivity

Materials and methods: A prospective observational study was conducted on 60 neophyte patients fitted with contact lenses(34F 39M,avg. age:26±7yrs.).Patients were instructed to use soft(Toric Silicone hydrogel), RGP(Boston) and MSD(Blanchard)lenses based on clinical implication.Inclusion criteria were age >18 and BCVA≥ 3/10.Patients with a history of prior intraocular surgery or systemic diseases involving the eye were excluded.Baseline examinations included LogMAR visual acuity(ETDRS chart), refraction,slit lamp examination and fundoscopy.Confocal microscopy was used to measure subbasal nerve(SBN)(mm/mm2),Keratocyte(three levels, cell/mm2),Basal epithelial(cell/mm2)and Endothelial(cell/mm2)density.Contrast sensitivity testing was done using the CSV-1000 instrument.Data were recorded on the first visit and on a follow up after 6 months.Recordings were done when wearing the contact lenses had stopped for 12hrs.Comparative analysis within each group was done using paired t-test.

Results: 8,17 and 8 patients wearing soft toric,RGP and MSD lenses,respectively,completed the 6 months follow up. LogMAR visual acuity did not show any significant changes after 6 months in either of the three groups.Contrast sensitivity test showed a significant decrease in spatial frequency of 3 cycles/degree(mean diff ± SD: 0.04 ±0.07, p;0.00) in the RGP group but not in spatial frequencies of 6,12 and 18 cycles/degrees.Contrast sensitivity did not show significant changes in MSD and soft toric lens wearers.Mean average difference(baseline-6 months)± SD between anatomical features of the cornea with confocal microscopy were as follows:RGP =>Significant decrease in Endothelial Density(273.40 ± 229.69,p:0.00) and Basal Epithelial Density(625.80 ± 635.19, p: 0.00).MSD =>Significant decrease in Basal Epithelial Density(884.75 ± 581.58,p:0.00).Soft toric =>No significant changes.

Conclusion: Our study did not show any significant change in SBN and keratocyte density after 6 months of wearing lenses in any of the three groups. Basal epithelial cell density showed significant decrease in the RGP and MSD groups. Endothelial cell density reduced significantly in RGP group. Given that,soft toric, MSD and RGP lenses may be considered sufficiently safe prescriptions for optical correction,if needed.Additionally,we suggest checking endothelial density every 6 months when RGP lenses are worn.

Category: Speciality lenses

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Experience of applying cosmetic Etafilcon A contact lens in cases with microcornea

Asli Kirmaci(1) , Ferah Ozcelik(1) , Cigdem Altan(1) , Semih Urvasizoglu(2) , Gamze Ozturk Karabulut(1) , Muhittin Taskapili(1)

(1) University of Health Science Beyoglu Eye Training and Research Hospital, Istanbul, Turkey ; (2) Eyup State Hospital, Istanbul, Turkey

Purpose: Microcornea is a condition that may also cause cosmetic complaints and its cosmetic rehabilitation is possible with colored contact lenses. The aim of this study to present our experiences of using cosmetic Etafilcon A contact lenses in cases with microcornea.

Materials and methods: Five patients with unilateral microcornea without systemic involvement were included. We applied 1-DAY ACUVUE® DEFINE® with Lacreon® contact lens with the same edge color to the patients.

Results: The corneal diameter asymmetry was acceptably adjusted, and each of our patients was very satisfied. The patients obtained the best corrected visual acuity with or without additional eye-glasses. They had no complain about vision in photopic and scotopic conditions.

Conclusion: 1-DAY ACUVUE® DEFINE® with Lacreon® lens promises to provide both refractive and cosmetic rehabilitation in cases of microcornea. This is the first study to report the use of this lens in cosmetic rehabilitation of patients with microcornea.

Category: Speciality lenses

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Lasik and contact lens challenge

Isabele Leone(1) , Laryssa Alves(1) , Livia Biselli(1) , Marcelo Sobrinho(1)

(1) PUC- CAMPINAS, Campinas, Brazil

Purpose: A.P.A.B, female, 35 years old, came to the Catholic Univ of Campinas (PUC) contact lens clinic reporting low visual acuity. She had an ocular history of refractive surgery (Lasik) in both eyes in 2008 (preoperative -5.00 spherical); and in 2014 required corneal transplantation in OS because after her Lasik, she presented ectasia in OS. In the exam, we observed that in the right eye it had stromal haze. In this way to improve his acuity, we made contact lens adaptation, testing several designs of lenses.

Materials and methods: In adapting contact lens after refractive surgery, rigid gas permeable lenses (RGP) represent the best option for correcting refractive errors or reducing symptoms. However due to the limitation of designs for oblated corneas, this adaptation is still a challenge for most professionals. It is recommended to wait at least 3 months after Lasik to initiate an adaptation.
The main indications of contact lens after Lasik are: irregular astigmatism, scarring, post-Lasik ectasia, stromal Haze, hyper or hypocorrection, perforation, dehiscence, decentralization or disk loss. In the adaptation post-Lasik, we can use: RGP (spherical, multi spheric and aspheric), reverse curve RGP, LCG (spherical, torica, special design), hybrid, piggyback system.

Results: Our patient had right eye acuity of 20/60 with the following degree: +3.00 -4.50 25°; and the left eye presented visual acuity without correction of CD 1m and its CL (adapted from another service), 20/30. After testing various types of contact lenses, we obtained a better result with: OR: Smart BFM reverse curve (36x40 + 1.00 11.4 20/40)

Conclusion: It should be remembered that the most common complication with use CL post-Lasik is ocular dryness, thus we have prescribed continuous use of ocular lubricants.

Category: Vision and lenses

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Visual performance with a daily disposable contact lens compared to best corrected sphero-cylindrical spectacle refraction

Chantal Coles-Brennan(1) , Kim Hoyt(1) , Kurt Moody(1)

(1) Johnson & Johnson Vision, Jacksonville, United States

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 a myopes wearing a daily disposable (DD) contact lens (CL) and wearing best corrected sphero-cylindrical spectacle refraction (SCR).

Materials and methods: 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 ($p<0.05$).

Conclusion: The senofilcon A DD 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.

Category: Vision and lenses

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New and existing wearer experience with a multifocal, daily disposable contact lens

Christophe de Combejean(1) , Valérie Elmaleh(3) , Aurore Muselier(2) , Anna Sulley(1)

(1) Johnson & Johnson Vision, Paris, France ; (2) Centre Ophtalmologique Saint Paul - Bastille, Paris, France ; (3) Cabinet médico-chirurgical de l'Alcazar, Beausoleil, France

Purpose: Clinical performance and fitting success of a daily disposable, centre-near multifocal contact lens (MFCL), with design optimised for add and refraction (etafilcon A, 1DAMMF), has previously been investigated. A multi-centre study was conducted to identify performance and satisfaction with both neophytes (NW) and habitual CL (HW) wearers.

Materials and methods: A 4-month, monadic, non-interventional study was conducted amongst eye-care practitioners (ECPs) in France. ECPs fitted the MFCL as per their routine practice procedure using the full 1DAMMF range (+6.00 to –9.00D (0.25D steps); 3 ADD powers). Performance and fit success were evaluated via ECP surveys completed in practice (pre & post-fit; and follow-up after approx. 1-week). Data were collated and analysed by an independent market research agency (Gallileo Business Consulting).

Results: ECPs (n=184) fitted 1930 patients; 62% (n=1206) were NW. Overall success rate at follow-up was 81%; of these, 57% was with 1 pair and 35% with 3 or 4 trial CLs (1-2 adjustments both eyes). NW success rate was 80% vs 84% for HW ($p<0.05$). Vision performance overall was rated very good/good by 78% patients (NW 76% vs HW 83%; $p<0.05$). Rating was similar (79%) for distance vision (NW 77% vs HW 81%; $p<0.05$). 71% rated both intermediate & near vision performance as very good/good with no differences between groups. Comfort throughout day was rated very good/good by 88% wearers (86% NW vs 89% HW, $p<0.05$). 78% wished to continue with 1DAMMF after the trial; more HW agreed (80%) than NW (77%), although this difference was not statistically significant. Overall satisfaction with the MFCLs was 77% (very good/good) with a difference between NW (74%) and HW (82%); ($p<0.05$). 96% ECPs were satisfied with ease of adaptation and fit, overall ECP satisfaction was 97%. ECPs rated fitting characteristics as optimal/acceptable in most fits (91% centration, 86% mobility). There were no adverse events during the assessment.

Conclusion: Results corroborate success rates and patient satisfaction with similar assessments conducted with 1DAMMF; success rate in a controlled clinical study where ECPs followed a validated fit guide was 94%, and in a similar in-market assessment in UK and US where ECPs used the fit guide the overall success rate was 83%. The results also highlight the success and satisfaction with both neophytes and habitual CL wearers with this MFCL, although some differences between the groups underline the need to pay attention to wearer expectations and ensure good communication and education to enhance success rates.

Category: Vision and lenses

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Scleral Contact Lenses In the Management of Irregular Astigmatism

Yagmur Seda Yesiltas(1) , Omur Ucakhan-Gunduz(1)

(1) Ankara University Faculty of Medicine, Department of Ophthalmology, Ankara, Turkey

Purpose: To evaluate the safety and efficacy of scleral contact lenses (SCL) for visual rehabilitation in irregular astigmatism.

Materials and methods: The charts of 26 patients (30 eyes) fitted with SCL between January 2014 and March 2018 was retrospectively reviewed. Demographic data, etiology prior to lens fitting, previous method of correction, uncorrected visual acuity (UDVA), spectacle-corrected visual acuity (CDVA), contact lens-corrected visual acuity (CL-CDVA), and daily duration of contact lens wear were analyzed.

Results: The most common indication was keratoconus in 73.3%, followed by postkeratoplasty irregular astigmatism in 13.3%, macular dystrophy in 6.7%, and radial keratotomy in 6.7% of patient eyes. The mean steepest keratometry was 55.0 ± 7.5 diopter(D) and the refractive astigmatism was 8.0 ± 4.4 D. The mean CL-CDVA was 0.78 ± 0.25 (range; 0.3–1.0) Snellen lines. Twenty-two (73.3%) eyes achieved a visual acuity of 0.5 Snellen line or more. Out of 26 patients fitted, 22 (24 eyes) patients continued to wear SCL. The mean duration of follow-up was 27.1 ± 10.7 months. No serious adverse events were encountered during the follow-up.

Conclusion: Scleral lenses yield satisfactory clinical results with good safety profiles and can be considered as lens of choice in selected eyes with irregular astigmatism.

Category: Vision and lenses

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Central corneal endothelium morphometric parameters in soft contact lens wearers

Urte Skirmantaite(1) , Saulius Galgauskas(2)

(1) Vilnius University Faculty of Medicine, Vilnius, Lithuania ; (2) Vilnius University, Faculty of Medicine, ENT and Eye diseases Clinic, Vilnius, Lithuania

Purpose: To measure the parameters of endothelium in the central part of the cornea and evaluate the influence of wearing the soft contact lenses on these parameters.

Materials and methods: A specular microscope was used to measure the corneal endothelium parameters in both eyes of 33 young people (a total of 66 measurements). All participants had no anterior segment diseases, diabetes mellitus, no eye injuries or surgical treatment in anamnesis. The participants were divided into two groups: soft lens wearers and control group. Factors, such as age, height, visual acuity, duration of lenses wear, lenses wearing mode and lenses oxygen permeability and moisture content were assessed to determine their impact on the morphometric parameters of the endothelium. Examination of the endothelium included central corneal thickness (CCT, µm), endothelial cell density (CD, cells/mm2), variation of cells size (CV, %) and the percentage of hexagon-like cells (HEX, %). IBM SPSS® 20.0 and Microsoft Excel® 2010 were used for the statistical analysis. The data were considered statistically significant at the level of $p<0.05$.

Results: A higher percentage of hexagon-like cells and lower variation of cell size were determined in soft contact lens wearers and the difference was statistically significant. The difference in central corneal thickness between the two groups was not found. Distribution of central corneal thickness (CCT) differs between groups statistically significantly – CCT in control group varies more than in soft lens wearers'. The measurements of the morphometric parameters in soft contact lens wearers did not depend on participants' height, lens air permeability and lens wearing mode. There was a weak positive correlation between the duration of lens wear and central corneal thickness in soft lens wearers, but it was not statistically significant. A weak positive correlation between sphere and central corneal thickness was observed in soft lens wearers, but was not statistically significant. There was a moderate negative correlation between variation of cell size and hexagon-like cells in soft lens wearers that was statistically significant. In soft lens wearers group there was a weak negative correlation between both hexagon-like cells (HEX) and central corneal thickness and between endothelial cell density and hexagon-like cells, but it was not statistically significant.

Conclusion: Soft contact lenses do not impact central corneal thickness and any other parameters of the endothelium, probably due to high oxygen permeability and high moisture content.