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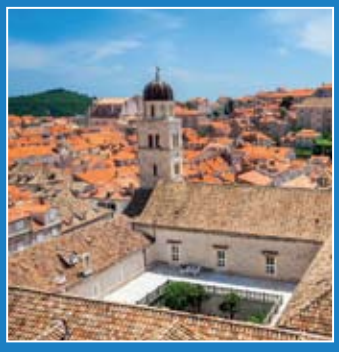
European Contact Lens and Ocular Surface Congress

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SELECTED ABSTRACTS

O-01

Lens Materials, Ocular Surface Disease

INFLAMMATORY CELLS IN THE CENTRAL CORNEAL EPITHELIUM IN DRY EYE

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Introduction: Dry eye disease is a multifactorial disorder of the tear film and ocular surface. Although the pathogenesis of dry eye disease is not fully understood, it is recognized that inflammation has a prominent role in the development and propagation of this debilitating condition. Factors that adversely affect tear film stability and osmolarity can induce ocular surface damage and initiate an inflammatory cascade that generates innate and adaptive immune responses. These immunoinflammatory responses lead to further ocular surface damage and development of a self-perpetuating inflammatory cycle.

Purpose: Central cornea examination by confocal microscopy has made it feasible to investigate cell morphology and detect various cell populations on the ocular surface *in situ* at microscopic resolution in real time.

Materials and methods: Confocal microscopy of the central corneal epithelium in healthy and dry eye subjects; determination of the ocular surface disease index (OSDI)

Results: Leukocyte infiltration is found in dry eye subjects in the central part of corneal epithelium.

Conclusions: Leukocyte infiltration in the central part of corneal epithelium could be the very first objective sign of dry eye.

O-02

Lens Materials, Ocular Surface Disease

EFFICACY AND SAFETY OF INTRAPERITONEALLY APPLIED CELECOXIB IN THE EXPERIMENTAL DRY EYE MODEL IN MICE

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Purpose: To investigate therapeutic effect of celecoxib, a specific COX-2 enzyme inhibitor, on the inflammation and angiogenesis as the main events in the etiology of dry eye disease.

Materials and methods: Thirty-two 8-10 week-old male Balb/c mice were used and divided into four groups of 8 animals. Dry eye was induced in group 1, group 2 and group 3 animals using topical benzalconium chloride method. Celecoxib solution, DMSO, 0.025 mg/mouse/day, was given intraperitoneally to group 2 animals (n=8) and celecoxib 0.5 mg/mouse/day intraperitoneally was given once to group 3 animals (n=8). Group 1 and group 4 animals (n=8 each) received no treatment. No drug was administered to group 4 animals. Three weeks later, the levels of CD31, LYVE-1, IL-1α, IL-6, IL-17, VEGF-C, VEGF-D, VEGFR-3, IL-2 and COX-2 were measured qualitatively with immunofluorescent staining. The levels of IL-1α, IL-1β, IL-6, IL-10, TNF-α, IL-17, IF-γ, VEGF-C, VEGF-D and VEGFR-3 were determined by real time polymerase chain reaction. The corneal thickness, number of stromal fibroblasts and polymorphonuclear leukocyte counts were determined histopathologically. Clinical analysis of corneal vascularization was performed using the MATLAB software with slit lamp biomicroscopic examination.

Results: On immunofluorescent staining, the scores of the CD31, LYVE-1, IL-1α, IL-6, IL-17, VEGF-C, VEGF-D, VEGFR-3, IL-2 and COX-2 levels were found to be qualitatively higher in dry eye group (group 1) as compared to control group. These scores were lower in dry eye + celecoxib group (group 3) as compared with dry eye group (group 1). The levels of IF-γ, VEGF-C, VEGF-D, TNF-α, IL-1α, IL-1β and IL-10 were found to be significantly lower in dry eye + celecoxib group (group 3) than in dry eye group (group 1). The levels of VEGFR-3, IL-6 and IL-17 were also decreased in dry eye + celecoxib group (group 3), however, the difference did not reach statistical significance. The values in dry eye + DMSO group (group 2) were found to be higher in the gene expression studies in comparison to other groups. In histopathologic sections, corneal thickness was increased and the number of stromal fibroblasts and PMNL scores were decreased with celecoxib treatment. Corneal vascularization was found to decrease nonsignificantly in the treatment group in comparison to dry eye group.

Conclusion: The effects of celecoxib treatment on dry eye disease were demonstrated by gene expression evaluation. Immunohistochemical, histopathologic, and clinical evaluations support these data. Celecoxib is a new agent as a candidate for use in the treatment of dry eye disease.

O-03

Lens Materials, Ocular Surface Disease

THE BENEFITS OF USING THERAPEUTIC CONTACT LENSES IN THE ANTERIOR EYE SEGMENT SURGERY

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Purpose: This study presents some anterior pole surgery where the use of therapeutic contact lenses (TCL) proved to be of great benefit.

Materials and methods: We used TCL for the management of wound dehiscence after cataract surgery (n=3), excessive filtration after glaucoma surgery (n=5), pterygium (n=85), penetrating corneal wounds (n=28) and bullous keratopathy (n=6).

Results and discussion: The small wound dehiscence after cataract surgery (through small incisions for phacoemulsification) were solved within a few days using only a TCL, without re-suturing the wound. The excessive filtration after glaucoma surgery turned to normal using TCL. In pterygium surgery, we used TCL in all cases to protect ocular surface and for amniotic membrane stabilization. The use of TCL in the treatment of perforating corneal wounds demonstrated its benefits by minimizing (to zero in some cases) the suture points, thus reducing the unnecessary iatrogenic corneal scars, accelerating wound healing and allowing binocular vision with early social reintegration. We performed amniotic membrane transplantation + TCL in some cases of bullous keratopathy. Although the transplant of the amniotic membrane cannot be considered definitive solution in bullous keratopathy, it has great benefits as an inexpensive and repetitive option for these patients before undergoing keratoplasty.

Conclusions: The use of TCL offers a new and simple solution during anterior eye segment surgery.

O-04

Lens Materials, Ocular Surface Disease

AMNIOTIC MEMBRANE OR BANDAGE CONTACT LENS?

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Introduction: Amniotic membrane consists of a thick basement membrane and avascular stromal matrix. The main effects of amniotic membrane are as follows: promoting healing, minimizing inflammation, cultivating stem cells, and serving as a structural reinforcement material. It is biocompatible with multiple tissue types on the ocular surface. The main fields of its use in ophthalmology include corneal diseases, conjunctival diseases and limbus reconstruction.

Purpose: We investigated therapeutic effect of amniotic membrane in cases with corneal persistent epithelial and stromal defects (ulceration). The results were compared with the retrospective results that we obtained with the bandage contact lens wearers in similar cases.

Materials and methods: The abnormal corneal basement membrane was removed microsurgically before the bandage contact lens fitting and before the application of amniotic membrane too. Amniotic membrane was used as a graft (inlay form) in corneal persistent epithelial defects and as a multiple layer graft in deep stromal defects (ulceration). Six patients with persistent corneal epithelial defects and three patients with deep stromal defect were treated with amniotic membrane. We investigated retrospective results obtained with the bandage contact lens in 20 patients with persistent corneal epithelial defects and five patients with stromal defect.

Results: The results showed that both the amniotic membrane and the bandage contact lens were successful in the treatment of persistent corneal epithelial defects; however, in cases of stromal defect, only the amniotic membrane proved successful. In bandage contact lens wearers, the stromal defect surface was epithelialized, but the stromal defect was not loaded.

Conclusion: The amniotic membrane is very effective in the treatment of persistent corneal epithelial defects and in deep stromal defects, but therapeutic silicone-hydrogel bandage lenses remain a good and simple alternative in the treatment of superficial defects of the cornea.

O-05

Lens Materials, Ocular Surface Disease

COMPARISON OF THE EFFECTS OF PREOPERATIVE WEARING SOFT AND RGP CONTACT LENSES ON DRY EYE AFTER LASIK SURGERY

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Purpose: Dry eye is defined as a disorder of the tear film caused by the lack of tears and/or tear evaporation, which causes damage to the ocular surface in the interpalpebral part, associated with the subjective symptoms and visual disturbances. It is accompanied by increased osmolarity of the tear film and ocular surface inflammation. Dry eye is the most common early and late complication after laser-assisted in situ keratomileusis (LASIK) surgery (5%-52%). The aim of the study was to examine whether dry eye is more frequent after LASIK in wearers of soft or rigid gas permeable (RGP) contact lenses, and in patients wearing glasses.

Materials and methods: A total of 80 consecutive patients (157 eyes) underwent LASIK. Ten eyes were excluded from the study because of the lack of postoperative data. The remaining sample was divided into 3 groups (according to the type of correction that the patient had preoperatively): 73 eyes with soft contact lenses (SCL), 22 eyes with RGP contact lenses, and 52 eyes with glasses. The tear film was examined with Schirmer test and tear breakup time (TBUT) test preoperatively and one month postoperatively. The SPSS 15.0 was used on statistical analysis.

Results: Preoperative Schirmer test was 29.1±4.9 in SCL group, 31.2±3.8 in RGP group, and 32.7±2.3 in the group with glasses. Postoperatively, Schirmer test yielded the following results: 25.6±3.6 in SCL group, 29.8±5.2 in RGP group, and 30.4±4.6 in the group with glasses. There was no statistically significant between-group difference either before and after the surgery, or between preoperative and postoperative findings in the same group. Preoperative TBUT was 7.98±2.71 in SCL group, 8.54±1.68 in RGP group, and 8.75±1.25 in the group wearing glasses; the respective postoperative findings were 4.67±1.17, 7.90±1.46, and 9.35±0.65. There was a statistically significant difference after the surgery between the SCL group in comparison with the other two groups ($p<0.01$). Also, there was a statistically significant difference between the RGP group and the group with glasses ($p=0.23$). Within the SCL group, preoperative *versus* postoperative TBUT yielded $p<0.01$.

Conclusion: As demonstrated in our paper, contact lenses, especially soft, significantly contribute to the occurrence and duration of dry eye after LASIK. The mechanism of dry eye with contact lenses is not well understood yet and it is probably multifactorial. According to our experience, the recommended preoperative break of 5-7 days is insufficient for most users of soft lenses.

O-06

Scleral Lenses and Specialty Lenses

CORRELATION BETWEEN DURATION OF ORTHOKERATOLOGY LENS WEAR AND CORNEAL EPITHELIAL AND STROMAL THICKNESS IN SCHOOLCHILDREN

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Purpose: This study investigated correlation between the duration of lens wear and epithelial and stromal thickness in low to moderate and high myope orthokeratology lens wearers.

Materials and methods: Twenty-six high myope (mean refractive error -7.64±1.54D) orthokeratology lens wearers and 30 low to moderate myopes (mean refractive error -3.08±1.06D) orthokeratology lens wearers were recruited cross-sectionally from the participating practices. These subjects were Chinese schoolchildren aged 9-18 years. The recruited orthokeratology lens wearers had worn lenses for 6-65 months. Epithelial and stromal thickness of the central and midperipheral cornea was measured with the Sonogage Cornea-gage Plus Ultrasound Pachometer (Sonogage, Cleveland, OH). In each group, epithelial and stromal thickness was analyzed with Spearman correlation test to assess correlation with the duration of orthokeratology lens wear.

Results: Minimal and almost absent correlation was found in epithelial measurements at all points in both low to moderate and high myopic groups. Correlation was also almost absent in the midperipheral stromal thickness when tested against the duration of lens wear. However, a weak correlation was found between stromal thickness and duration of wear in the central stroma measurements of the low to moderate myopes (r=0.207) and high myopes (r=-0.254).

Conclusions: The central stroma of the low to moderate myope orthokeratology wearer was found to become thicker with time and the central stroma of the high myope orthokeratology wearer was found to become thinner with time when tested for correlation with the duration of wear. These results suggest a possible longitudinal change in the corneal stromal thickness with orthokeratology lens wear.

O-07

Free Topics

RESULTS OF REFRACTIVE SURGERY AFTER MANY YEARS OF ORTHO-K

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Purpose: To evaluate the efficacy and safety of refractive surgery after Ortho-K treatment.

Materials and methods: Retrospective analysis of surgical correction (laser correction and phakic-intraocular lens (IOL) implantation) in 53 patients (106 eyes) that had previously used Ortho-K correction by Paragon CRT Lenses for a long period. The mean age of patients that started Ortho-K was 15.4 years. The mean age of patients before surgical correction was 20.6 years. The mean duration of Ortho-K usage was 5.3 years. Forty-eight patients (96 eyes) underwent laser correction and 5 patients (10 eyes) were implanted pIOL (ICL, STAAR, Switserland). The mean myopia at the beginning of Ortho-K was -3.26±1.62 (from -1.25 to -6.0) D. The best uncorrected visual acuity (BUVA) before Ortho-K was 0.14±0.12 (0.04-0.45). The mean central pachymetry was 531±35 μm.

Results: At the time of Ortho-K treatment, the mean BUVA was 0.93±0.16. After Ortho-K was stopped and after 1-month 'washout', the corneal topography was stable and 'restored' its initial shape (no residual flattening), as controlled by the Difference Map (ORBSCAN, B&L). In 38 cases (76 eyes) (71%), there was no progression of myopia after Ortho-K. In 9 cases (18 eyes) (17%), myopia progression by -0.74±0.19D was recorded. In 6 cases (12 eyes) (≈6%), there was slight regression of myopia by +0.5±0.12D on average. Five patients (10 eyes) (9.5%) were corrected by implantation of posterior chamber pIOLs (ICL, STAAR). Laser correction was done in 48 patients (96 eyes) (90.5%): advanced surface ablation (ASA) in 20 patients (40 eyes) (41.6%) and LASIK treatments in 28 patients (56 eyes) (58.4%). The following laser programs were used: conventional (42.7%), tissue sving (35.7%)and aspheric (21.6%). Efficacy of correction: achieved BUVA: 1.0 - 93.7%; 0.9 - 5.4%; 0.8 - 0.6%; target refraction: +0.25±0.5 - 73.2%; ±0.75 - 89.3%; ±1.0 - 100%; complications: ASA – late epithelialization (8 days and more) – 6%; LASIK – 9% epitheliopathy.

Conclusions: Ortho-K treatment may stabilize myopia in teens, allowing for laser correction with lesser depth of ablation, safer and with stable results. One month after withdrawal from CRT, cornea restores its initial configuration. Laser correction is possible not less than 1 month after Ortho-K treatment has been stopped. Laser correction after many years of CRT is safe. Safety index is 1.2. The efficacy of laser correction after CRT is comparable with the results of patients using glasses or ordinary CL for correction. Efficacy index is 0.95.

O-08

Free Topics

KERATOCONUS – MISSING AN EARLY DIAGNOSIS TURNS TO A MEDICOLEGAL PROBLEM

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Purpose: To evaluate the ophthalmologists' abilities to detect early signs of keratoconus, in order to afford their patients the accessibility to crosslinking treatment at the right time.

Materials and methods: Examination of all ophthalmology residents in Israel, by the author, for their skills in retinoscopy, refraction and contact lens basics, during the last six years.

Results: During the 2007-2013 period, 144 ophthalmology residents passed their first and second examinations in order to become specialists in this field. Ten percent of the questions in the first written examination were on the theory of optics, refraction and contact lenses, while retinoscopy on an eye-model was a separate part of the second oral examination. Seventy-two (50%) residents passed the first part successfully at first attempt and 108(75%) passed the retinoscopy examination.

Conclusions: The field of optics, refraction and contact lens fitting is not at a high level of knowledge by Israeli ophthalmologists, the situation being the same in many European countries, especially where optometry has become an academic profession. In many countries, ophthalmologists are ever less engaged in refraction and contact lens fitting. Considering keratoconus, with a prevalence of about 1:200 in the population, its early detection has become a critical issue these years, when the crosslinking treatment is recognized therapy for these patients. There must be emphasis on educating ophthalmology residents in the very basic skills of optics and refraction, to provide due care to our patients, as well as to prevent medicolegal problems associated with the too late diagnosis of keratoconus.

O-09

Keratoconus

IMPORTANCE OF CORNEAL TOMOGRAPHY IN DIFFERENTIATING ATYPICAL KERATOCONUS AND REGULAR NON-ECTATIC CORNEAS WITH HIGH ASTIGMATISM

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Purpose: The purpose is to present clinically atypical cases of keratoconus, diagnosed only by corneal tomography, and also cases suspect of keratoconus that appeared to be completely regular.

Case 1: P.D., a 49-year-old male patient, complained of progressive distance vision loss. Based on his earlier documentation, he had no astigmatism or previous eye injury in his medical history. The usual automatic keratorefractometric measurement showed: OD -0.5Dsph/-2.5Dcyl ax 90, OS -1.25Dsph/-0.5Dcyl ax 75. Keratometric (K) values were below 44.5D. Biomicrosopic findings of the anterior segment were normal. Eventually, due to the suspect increase of astigmatism, we performed corneal tomography which showed an obvious corneal ectasia.

Case 2: B.F., a 30-year-old male patient, complained of low distance vision in the past year. There was no previous history of eye disease or injury. On visual acuity testing, myopic astigmatism was detected, higher in the left eye. Even though K values were more or less normal, corneal tomography was performed to show forme fruste keratoconus in the left eye, while the other eye corneal map was completely regular.

Case 3: Z.N., a 32-year-old male patient, presented to our office because of difficulties in prescribing spectacle correction. Regular acuity testing showed low mixed astigmatism on both eyes (OD +0.75/-1.5 ax 90, OS +0.2/-1.5 ax 90), but the BSCVA could not get above 0.7. Biomicroscopic investigation of the anterior and posterior parts of the eye was normal. Corneal tomography showed a keratoconic pattern with corneal thinning. K value was OD 46.5, OS 44.2, and central corneal thickness was OD 485 mcm, OS 487 mcm.

Case 4: G.A., a 29-year-old male patient, was referred to our office because of high astigmatic correction and suspect keratoconus. There was no previous eye history, except for having got his spectacles when at the age of 11 years. His refractive error was OD +1.0/-7.5Dcyl ax 170, OS -7.75Dcyl ax 180. BSCVA was OD 0.7, OS 0.5. There were no pathologic findings on the anterior or posterior parts of the eye. Corneal tomography showed completely normal corneal pattern, with only high K values.

Conclusion: Based on these cases, it is concluded that in patients with almost normal K findings, no clinically obvious eye pathology, but with the loss of best spectacle visual acuity and astigmatism increase with time, the early forms of keratoconus should always be suspected, thus corneal tomography should be performed to detect it. Also, corneal tomography is crucial in detecting regular corneas in cases with atypically high K values difficult to correct in classic spectacle way.

O-10

Keratoconus

CORNEAL COLLAGEN CROSSLINKING IN PEDIATRIC PATIENTS: ONE-YEAR FOLLOW UP RESULTS

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Purpose: To evaluate the safety and efficacy of corneal collagen crosslinking (CXL) in keratoconus patients younger than 19.

Materials and methods: Forty-seven patients (84 eyes) underwent CXL for the treatment of keratoconus and were included in this retrospective study. Uncorrected distance visual acuity (UDVA), best corrected visual acuity (CDVA), manifest refraction, corneal topography, confocal microscopy and biomicroscopic findings were evaluated at baseline and at 1, 3, 6 and 12 months.

Results: The mean age of patients was 15.5±2.0 (12-18) years and the mean follow up 23.4±9.1 (12-48) months. The mean UDVA improved from 0.82±0.52 LogMAR (~20/200) to 0.55±0.37 LogMAR (~20/50) and CDVA from 0.29±0.29 LogMAR (~20/32) to 0.16±0.16 LogMAR (~20/25) at the end of 12 months. The mean spherical equivalent refraction improved from -5.97±4.16 to -5.60±4.50D at 1 year and the mean Kmax significantly decreased from 57.5±7.4 D preoperatively to 55.6±2.0 D at 1 year. No sight threatening complications were seen in any patient eye.

Conclusion: Corneal collagen crosslinking appears to be safe and effective in halting the progression of keratoconus in pediatric patients at 1-year follow up.

O-11

Keratoconus

ALTERATIONS IN CONTACT LENS FITTING PARAMETERS POST CROSSLINKING IN KERATOCONUS PATIENTS OF INDIAN ETHNICITY

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Purpose: To evaluate changes in corneal topographic parameters and its correlation with contact lens fitting parameters post crosslinking with riboflavin (CXL) in keratoconus patients of Indian ethnicity.

Materials and Methods: A prospective intervention study was carried out in 20 eyes of 14 patients (mean age 21.75±2.97 years) with progressive keratoconus that underwent CXL and rigid gas permeable (RGP) contact lens fitting profile evaluation both pre and post CXL.

Results: Over a 6-month follow up post CXL, improvement in visual acuity (VA) by one Snellen line, both uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) with RGP lens, contrast sensitivity improvement, hyperopic shift of 1.4D in spherical error, decrease in flat/mean/apical K by 0.8D, 0.8D and 1.3D respectively, resulted in significant improvement in RGP contact lens fit. Almost 20% increase in near ideal fit (3-point touch with feather apical touch), 100% acceptable fit and 65% improved subjective comfort (evaluated by lens fit scoring system) was observed. The number of hours of comfortable contact lens wear improved from 1.25 to 9 h/day (8 hour increase). Lens drop out rate and lens intolerance were drastically reduced after CXL.

Conclusion: Even minimal post CXL alterations in corneal topography translate into a highly significant improvement in contact lens fit, patient tolerance and comfort. This has a tremendous impact on improving the quality of life in these young adults at the threshold of their professional career.

O-12

Keratoconus

EVALUATION OF EFFICACY AND SAFETY OF QUERCETIN AS AN ALTERNATIVE TO RIBOFLAVIN IN CROSSLINKING TREATMENT ON RABBIT CORNEA

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Purpose: To evaluate the efficacy and safety of quercetin, a photooxidative and photosensitive agent, as an alternative to riboflavin in crosslinking (CXL) treatment on rabbit cornea.

Materials and Methods: Sixty rabbits of the Australia-New Zealand race were used in the study. In the first stage, standard CXL treatment was applied with UVA to 30 eyes, 0.1% riboflavin to 10 eyes, 1% quercetin to 10 eyes, and 10% Tween 20 buffer-5% 0.2 M Tris buffer solution, a quercetin solution, to 10 eyes. Only epithelial debridement was used on 10 eyes as control group. On days 7 and 42 following the administration of CXL, keratocyte apoptosis, corneal edema, corneal thickness, myofibroblastic activity and inflammation were evaluated on corneal histopathologic sections under light microscope. Corneal thickness and intraocular pressure were measured in all eyes before treatment and enucleation. In the second stage, CXL treatment was applied to 15 eyes, 0.1% riboflavin to 5 eyes, 1% quercetin 5 eyes, and 10% Tween 20 buffer-5% 0.2 M Tris buffer solution to 5 eyes. Only epithelial debridement was used on 5 eyes serving as control group. Corneal strips prepared from the corneas of rabbits were tested by biomechanical tests using computer-controlled biomaterial testing device.

Results: Mild grade keratocyte loss was seen on histopathologic evaluation early, i.e. on day 7 of CXL treatment with both riboflavin and quercetin. Inflammation symptoms and endothelial cell damage were not observed. On day 42, corneas of all subjects returned to normal with keratocyte repopulation. No statistically significant difference was found between the groups according to histopathologic evaluation parameters. ($p>0.05$) Young's modulus showed 50% increase in riboflavin group and 18% increase in quercetin group compared to controls on biomechanical evaluation. No statistically significant difference was found between the groups ($p>0.05$). Also, 30% strain decrease was recorded in riboflavin group and 15% strain decrease in quercetin group as compared with control group. However, there was no statistically significant between-group difference ($p>0.05$).

Conclusion: Although CXL treatment by using quercetin is safe, the effect is insufficient. Additional studies are needed to enhance the efficacy of this treatment modality.

O-13

Lens Materials, Ocular Surface Disease

EFFECT OF CONTACT LENS MATERIALS AND CORNEAL BIOMECHANICAL PROPERTIES ON INTRAOCULAR PRESSURE IN NEOPHYTE SOFT CONTACT LENS WEARERS

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Purpose: Contact lenses are one of the main options of refractive error correction. The aim of this study was to determine the effect of soft contact lens wear on intraocular pressure in normal eyes.

Materials and methods: This was a longitudinal interventional clinical trial conducted at University of Minho, Portugal. Goldmann correlated intraocular pressure (IOP) was measured by Ocular Response Analyzer in 58 normal eyes of 29 subjects that had never worn contact lenses before. Subjects were fitted with daily disposable (Nelfilcon A or Stenofilcon A) lens on one eye and monthly disposable lens (Lotrafilcon B or Comifilcon A) on the other eye in random manner. Measurements of IOP were repeated every month during three months of contact lens wear. Changes in IOP were analyzed. Effect of contact lens materials and corneal biomechanical properties [corneal resistance factor (CRF) and corneal hysteresis (CH)] on the changes of IOP were also studied.

Results: IOP was reduced by 2.5±2.5 mm Hg after three months of contact lenses wear ($p<0.001$). During the first month, IOP was reduced by 1.1±2.4 mm Hg ($p=0.006$) and in the second month by 1.0±2.4 mm Hg ($p=0.009$). However, during the third month, the IOP reduction was 0.3 mm Hg, which was statistically non-significant ($p=0.486$). The change in IOP was correlated with lens material ($p=0.013$) and was maximal with Comifilcon A. Changes in IOP correlated positively with both CRF ($p<0.001$) and CH ($p=0.023$).

Conclusion: Soft contact lens reduced the IOP during three months of lens wear in neophyte contact lens wearers. IOP reduction was higher with Comifilcon A lens. Eyes with high corneal biomechanical properties had greater IOP reduction. A study with a larger sample size and longer duration is necessary to confirm this finding.

O-15

Lens Materials, Ocular Surface Disease

A NEW ALTERNATIVE TREATMENT FOR REFRACTORY CORNEAL ULCERS: TOPICAL COENZYME Q10 EYE DROPS

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Purpose: To evaluate the efficacy and reliability of topical coenzyme Q10 eye drops in three cases of refractory corneal ulcers.

Patients and Methods: Three cases of refractory corneal ulcers in which conventional therapy failed used topical coenzyme Q10 eye drops in addition to their ongoing medical therapy. All cases were followed-up regularly by the same person in terms of corneal healing. Corneal images with fluorescein were taken following detailed ocular surface examination at all times.

Results: An 11-year-old boy (case 1) with vernal keratoconjunctivitis was referred to our department because of severe itching, photophobia, redness, tearing and foreign body sensation in his left eye. He had a history of uncontrolled use of topical steroids for many years. On slit-lamp examination, there was an irregularly shaped geographical ulcer in the central cornea. A 55-year-old woman (case 2) complained of right refractory corneal ulcer. She had suspicious history of herpetic keratitis on the same eye. Slit-lamp examination revealed central corneal ulcer, ciliary injection and hypopyon in the right eye. A 9-year-old girl (case 3), who had been followed-up at other departments for six months, had a refractory deep corneal ulcer probably due to corneal infection in the right eye. All three cases were treated with first-line conventional agents and monitored regularly. However, none of them revealed satisfactory clinical outcome. Then, topical coenzyme Q10 eye drops were added to the ongoing medical therapy twice to four-times daily. While the first case revealed prominent decrease in the size of corneal ulcer, the other two cases showed complete corneal healing except for punctual fluorescein staining and corneal surface irregularity.

Conclusion: Topical coenzyme Q10 eye drops should be considered as an important treatment agent promoting corneal epithelial wound healing in challenging cases.

O-18

Scleral Lenses and Specialty Lenses

NEW HYBRID LENSES: FOR WHOM … AND HOW?

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Purpose: A new hybrid lens is now available as an alternative to the more traditional soft and rigid contact lenses. This hybrid lens disposes of a Rigid Gas Permeable (RGP) central zone and a Silicone Hydrogel peripheral skirt and is intended for quarterly replacement. Its benefits for both wearers and practitioners are unquestionable: improved wearing comfort, great visual acuity, easy fitting, etc., but which patients will benefit most from those innovative lenses?

Materials and methods: A recent study was conducted in France between December 2013 and March 2014 by a group of 16 expert ophthalmologists. A total of 156 patients were enrolled with the objective to determine the precise indications of this new generation hybrid contact lens and to evaluate its performance, from the point of view of both the patient and the practitioner. The performance of the lens (comfort, lens handling, visual acuity, overall satisfaction) was analyzed for several types of ametropia and cornea in order to determine the possible success factors for each of the subgroups.

Results: Study results offered better insight into the added value of the lens for each of the different categories of wearers. Results showed the hybrid lens to have an excellent overall prescription rate with homogeneous results. Best results were achieved for complex ametropia, such as high myopia, high astigmatism, keratoconus and post-surgery.

Conclusion: The main indications of new hybrid lenses are the same as those of RGPs, being complex ametropia. The new generation hybrid lenses enable to equip ametropia not covered by frequent replacement soft lenses. They can successfully be used for refitting wearers of RGPs lacking comfort and even enable to refit abandoners. The fitting process is easy but needs to be rigorous. A number of case studies for both regular and irregular cornea illustrate the fitting process and added value of the new generation hybrid contact lenses.

O-19

Scleral Lenses and Specialty Lenses

A NEW ALTERNATIVE FITTING APPROACH FOR PROVIDING AN ADEQUATE COMFORT AND VISUAL PERFORMANCE IN KERATOCONUS: SOFT HYDROCONE SILICONE HYDROGEL LENSES

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Purpose: To evaluate visual performance and subjective comfort levels of a new alternative approach, soft HydroCone silicone hydrogel lenses, in keratoconus patients.

Materials and Methods: Fifty eyes of 50 keratoconus patients (18 male and 32 female, mean age 24.16, range 9-45) who were fitted with soft HydroCone (Toris K) silicone hydrogel lenses were included in the study. All patients were evaluated at baseline and after two weeks of lens wear. Uncorrected and best spectacle/contact lens corrected visual acuity, manifest and topographic refractive indices, ocular higher order (HO) aberrations, and point spread function (PSF) (the Strehl ratio) were noted on all visits. Ocular health status including bulbar hyperemia, corneal and conjunctival staining was also evaluated. Comfort level and visual performance in both daytime and nighttime conditions were scored 0-5 (0: worst, 1: bad, 2: fair, 3: moderate, 4: good, and 5: excellent) after 2 weeks of lens wear.

Results: Best-corrected visual acuity was significantly better with the lens than with spectacles ($p<0.001$). The mean increase in visual acuity was 4.5 (range, 1 to 9) lines. Mean K_{max} values significantly decreased from 54.5 D to 46.6 D with the lens ($p<0.001$). The mean baseline topographical spherical equivalent values significantly decreased from -6.02 to -1.35 with the lens ($p<0.001$). Total ocular and total HO aberrations significantly decreased with the lens ($p<0.001$ and $p=0.038$, respectively). Total coma and trefoil significantly decreased with the lens ($p<0.001$ and $p=0.001$, respectively). PSF values were found to be higher with the lens ($p<0.001$). The higher the Strehl ratio, the better was the potential image quality. While comfort in 43 (91.5%) eyes was classified as good/excellent, only 4 (8.5%) eyes had moderate comfort scores. Visual acuity was classified as good/excellent in 45 (95.7%) eyes in daytime and in 37 (78.7%) eyes in nighttime conditions.

Conclusion: Soft HydroCone (Toris K) silicone hydrogel keratoconus lenses should be considered as a new alternative fitting approach for keratoconus patients for providing optimal comfort and visual performance.

O-20

Scleral Lenses and Specialty Lenses

SAFETY AND EFFICACY OF KERASOFT IC CONTACT LENSES IN REFRACTIVE CORRECTION

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Purpose: To determine the safety and efficacy of the Kerasoft IC (Ultravision International Limited, Bedfordshire, England) silicone hydrogel contact lenses in correction of refractive errors.

Materials and methods: Charts of 26 eyes of 17 patients who were fit with Kerasoft IC lenses at the Department of Ophthalmology, Ankara University Faculty of Medicine, Cornea and Contact Lens Service, were analyzed retrospectively. The number of trial lenses required for ideal lens fit, uncorrected visual acuity (UDVA), spectacle-corrected visual acuity (CDVA), contact lens-corrected visual acuity (CL-CDVA), slit lamp biomicroscopy findings, duration of daily lens wear and patient comfort were noted.

Results: The mean age of patients was 31.5±11 (18-53) years. Kerasoft IC was fitted in 7 patients (13 eyes) with keratoconus, 2 (2 eyes) patients with post LASIK ectasia, 1 patient (1 eye) with post-traumatic corneal scar, 2 (2 eyes) patients with post-keratoplasty irregular astigmatism, 2 patients (4 eyes) with degenerative myopia and 3 patients (4 eyes) with myopic astigmatism. The mean UDVA, CDVA and CL-CDVA were 1.15±0.37 logMAR (~20/250), 0.27±0.25 logMAR (~20/40) and 0.20±0.18 logMAR (~20/32), respectively. The mean manifest refraction spherical equivalent was -3.19±9.9 diopters. The mean number of trial lenses required for ideal lens fit was 1.3±0.4 lenses and the mean duration of daily lens wear was 12.29±1.04 hours. The mean follow up was 29.5±6.1 months. In all cases, CL centralization, stabilization and movement were assessed as 'very good' to 'excellent'. At the last follow up examination, all patients evaluated lens comfort as 'very good' to 'excellent'. No sight threatening complications were observed during the follow up period.

Discussion: Kerasoft IC lenses seem to be safe and effective for the correction of a wide range of refractive errors, particularly in patients with irregular astigmatism or contact lens intolerance.

O-21

Scleral Lenses and Specialty Lenses

SCLERAL RGP LENSES FOR CORRECTION OF COMPLICATED CORNEAS

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Purpose: Retrospective study to summarize the first 2 years of experience with fitting of the Rigid Gas Permeable (RGP) Scleral Lenses.

Materials and Methods: Starting from 2012, 251 NormalEye (Paragon, US) RGP mini-scleral lenses were fitted, as follows: 180 lenses were fitted to correct keratoconus, mainly after stabilization of the corneas by corneal collagen crosslinking (CXL), 39 lenses for correction of post LASIK and RK residual (or induced) refractive errors, 5 lenses for post penetrating keratoplasty (PKP), 18 lenses for mixed astigmatism, 7 lenses for post-traumatic corneas, and 2 lenses for dry eye syndrome. K readings varied from K min 27D to K max 60 D. Spherical refraction error (mean RMS) was 7.9D and varied from (+)13.5 to (-)16.75 D. The mean cylinder was 6.2D and varied from 4.0D to 12.0D. BCVA (mean) was 0.27 and varied from 0.06 to 0.65

Results: All lenses were fitted using Trial Set, fitting algorithm and fluorescein test. After fitting, clearing central and peripheral cornea, and refracting, individual lenses were ordered. In all cases, we were able to achieve good centration and corneal clearance. These lenses were well tolerated in a daily wear regime. After the period of adaptation, patients were able to wear lenses for a mean of 12 hours (range 6 to 18 hours). Over Lens Refraction in all cases varied from (+)0.5D to (-)0.5D Sph., and from 0.0D to 1.0D Cyl. In all cases, BCVA was better than 0.5 and varied from 0.6 to 1.2

Conclusions: Paragon NE Scleral Lenses are safe and effective to correct a wide array of refractive errors. There is a straightforward algorithm of fitting. NE mini-scleral lenses are comfortable and well tolerated in a daily wear regime.

O-22

Scleral Lenses and Specialty Lenses

THE POSSIBILITIES OF BEST FITTING IN CUSTOMIZED PERMEABLE SCLERAL LENSES

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In 2014, scleral lenses must be used for some optical and therapeutic indications. Scleral lenses have become the only solution in some cases of irregular astigmatism such as advanced keratoconus, keratoplasty, pellucid marginal degeneration or severe dry eye such as Ten Syndrome, graft *versus* host disease, and ocular pemphigoid. We report our 15-year experience acquired at Bichat-Claude Bernard Paris University Hospital and Charles Nicolle Rouen University Hospital in optimizing adaptation and patient comfort with customized permeable scleral lenses. We describe the concepts and various possibilities in the manufacture and hope for the future. All our experimentations aimed to improve fitting and bring a longer wearing time for our patients who feel very uncomfortable without their scleral lenses.

O-23

Scleral Lenses and Specialty Lenses

ANGULATION OF THE MINI SCLERA LENS TO IMPROVE SCLERAL FITTING

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Introduction: Scleral lens design is based on different zones according to the shape of the eye, with optical zone in the middle and the outer scleral landing known as haptic zone. Right in-between these two zones is the transition zone or limbal zone that sets the sagittal height of the lens. With the Misa-lens®, the transition zone consists of two curvatures, the elongation and the connecting curve. Fitting a scleral lens implies good alignment and as little as possible pressure *per* surface on the conjunctiva covering the sclera. In some eyes, the limbal anatomy and profile are such that the angle between the scleral curve and the haptic curve from the lens is too steep, thus it can cause too much pressure on the vulnerable limbal zone causing limbal redness, pain and less than optimal wearing times. Handling these different transition profiles from cornea to sclera used to be by altering the base curve (BCR) of the haptic zone. For the Mini Misa-lens®, a new angulation is developed so that alignment between the scleral lens and limbal area can improve without changing any base curve.

Case report: A 61-year-old woman presented for consultation because of troubles with her rigid gas permeable (RGP) contact lenses. She had tolerated them well for 7 years, but now they kept falling out.

Solution: Topography showed deformation of her cornea, so we switched RGP lenses to mini scleral lenses (Mini Misa). During the fitting process, conjunctival blanching and some compression at each meridian were noted after a few minutes. The blanching and limbal redness caused by compression were even more obvious after a few hours. The Mini Misa scleral lens allows now to make minimal changes in the angle of the connecting curve without influencing vault height, BCR and diameter. In this patient, changing the angulation to a steeper version resolved the problem. No compression or blanching of the limbal vessels was seen at 1-, 3- and 6-month follow up. Visual acuity was 1.0 on both sides with this mini scleral lens. Comfortable wearing time was 14 hours a day.

Conclusion: The new angulation of the Mini Misa allows better alignment between the sclera and the lens by altering the fit across the transition zone. Different angulations, in steps of 2.5 degree, can be chosen according to different transition profiles. Limbal area is preserved of compression and the patient comfort increases. This expansion in fitting parameters of the Misa-system makes it possible to direct the landing zone more precisely, taking into account the diverse limbal anatomy.

O-24

Scleral Lenses and Specialty Lenses

SCLERAL LENSES FOR CORRECTION OF IRREGULAR AND HIGH REGULAR ASTIGMATISM

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Purpose: One of the main indications for the use of scleral lenses is correction of irregular astigmatism as a result of primary keratectasia: keratoconus, keratoglobus, pellucid marginal degeneration and iatrogenic ectasia after refractive surgery. Scleral contact lenses can be used after corneal transplant, trauma or infection. Due to the specific design, the space between the cornea and the back surface of a scleral lens acts as a fluid reservoir that provides comfort for people with severe dry eyes. Important indications also include the correction of high astigmatism in patients intolerant to rigid gas permeable (RGP) lenses. Three case reports are presented to show the efficacy of scleral lenses in correcting irregular and high regular astigmatism in patients intolerant to RGP and to compare comfort between RGP and scleral contact lenses.

Materials and methods: We fitted mini-scleral lenses to a patient with keratoconus, a patient with post-traumatic irregular cornea due to perforating injury and a patient with high astigmatism intolerant to RGP lenses. Complete ophthalmologic examination and corneal tomography were done. The best corrected visual acuity with RGP and scleral lenses was analyzed and compared**.** We conducted a contact lens comfort survey (on a scale of 1 to 10) and subjective vision assessment. Follow up was 3 months.

Results: The best corrected visual acuity (BCVA) in the patient with keratoconus was 1.0 (Snellen) with RGP and 0.8-0.9 with scleral lens. On the comfort scale, this patient rated RGP with 0 and scleral lenses with 9.5. In the patient with post-traumatic irregular cornea, BCVA was 0.7-0.8 with RGP and 0.6-0.7 with scleral lens. On the comfort scale, he rated RGP lenses with 2 and scleral lenses with 10. In the patient with high astigmatism intolerant to RGP lenses, BCVA was 0.5-0.6 with both RGP and scleral lenses. On the comfort scale, he rated RGP lenses with 2 and scleral lenses with 10.

Conclusion: In our small sample, scleral lenses provided good visual acuity and comfort. After subjective vision assessment, patients reported that the quality of vision was better with RGP lenses but comfort was by far better with scleral lenses. Using high-quality materials ensures long time of wear, easy fitting and comfort. A wide range of indications provide the possibility of frequent use and we hope that future practice will justify our expectations.

O-25

Scleral Lenses and Specialty Lenses

MINI-SCLERAL CONTACT LENSES: SETTLING, APICAL CLEARANCE AND CORNEAL THICKNESS CHANGES AFTER EIGHT-HOUR WEAR

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Purpose: The purpose of this work was to define the timing and magnitude of scleral contact lens settling, the factors influencing settling, and to examine whether the amount of apical clearance has an impact on comfort and vision or it is associated with hypoxia induced corneal swelling.

Material and methods: Eleven patients (22 eyes) with keratoconus were fitted with a mini-scleral lens (Esclera™, Brazil). Three different lenses with successively greater sagittal depths were applied to each eye to achieve three levels of initial apical clearance: 100-200 μm (low clearance), 200-300 μm (medium clearance) and >300 μm (high clearance). Lenses of 16.5 or 17.5 diameter were used according to the white-to-white distance. Corneal apical clearance was measured at 15 min, 1 h, 2 h, 4 h, 6 h and 8 h with optical coherence tomography (OCT). Corneal thickness was measured with OCT and Pentacam, in the morning and immediately after removal of the contact lens. The same procedures were repeated with the other 2 lenses with different sagittal depths.

Results: The mean settling was 26.8±18.8 μm (42.7%) at 1 h, 39.5±26.5 μm (62.9%) at 2 h, 50.7±31.6 μm (80.8%) at 4 h, 57.4±34.6 μm (91.4%) at 6 h and 62.8±38.4 μm (100%) at 8 h. Settling showed high inter- and intra-subject variation. There was no significant difference in the amount of settling with respect to the amount of initial corneal clearance. The amount of settling was higher for smaller diameter lenses ($p=0.03$). The amount of settling was not related to the age of the patient. There was a slight statistically significant increase of 1.3% in the central corneal thickness as measured with OCT ($p=0.03$). Corneal thickness as measured with Pentacam at three locations increased slightly (center, 1.2%, apex, 1.1% and thinnest 0.8%; $p<0.001$ all). The amount of thickness change did not differ significantly with respect to the amount of final apical clearance. LogMAR visual acuity significantly increased with the scleral lens ($p<0.001$). Visual acuity and comfort were not affected by the amount of final apical clearance.

Conclusion: The average amount of settling was 67.2 μm after 8 h, 80% of which occurred during the first 4 h. Settling showed significant intra- and inter-subject variation. Slight corneal swelling (1.3%) within clinically acceptable limits occurred after 8-h wear.

O-26

Lens Materials, Ocular Surface Disease

THERAPEUTIC SCLERAL LENS TO RESCUE SEVERE OCULAR SURFACE DISEASE

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Purpose: To demonstrate the magical effect of therapeutic scleral lens healing corneal ulcer in severe ocular surface disease after failure of classical therapy.

Materials and methods: Case reports of corneal ulcers resistant to conventional therapy in severe ocular surface disease of various etiology: severe corneal burn (thermal and chemical), corneal exposure in lagophthalmos, trophic ulcer in corneal anesthesia, and Gougerot Sjögren disease. All these eyes were fitted with scleral lens (Misa* lens from Microlens*, The Netherlands).

Results: All the eyes healed in several days after continuous scleral lens wear alone.

Conclusion: Therapeutic scleral lens should be always attempted in front of severe corneal ulcer resistant to conventional therapy.

e-P01

Keratoconus

ORBIFLEX K AS A RIGID GAS PERMEABLE CONTACT LENS IN KERATOCONUS SUBJECTS

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Purpose: To evaluate the Orbiflex K as a rigid gas permeable (RGP) contact lens in respect to ease of application, patient comfort and effect on visual acuity.

Materials and methods: Forty-seven eyes of 28 keratoconus patients followed up at Bozyaka Education and Research Hospital. Orbiflex K (Swisslens, Switzerland) was applied to all patients. The 'three-point touch' fitting approach was used. Demographic features, best spectacle corrected visual acuities, keratometric readings, corneal topography, contact lens parameters, best contact lens corrected visual acuities and the number of trials to find the best fitting contact lens were noted. Fifteen minutes after the trial, patients were asked to score the comfort of contact lens from 1 to 5 (1 = not comfortable to 5 = very comfortable) for each eye.

Results: The mean age of 16 female and 12 male patients was 33.1±13.3 (15-65) years. The mean best spectacle visual acuity was 0.59±0.44 (0.1-2) logMAR, mean best-corrected rigid gas permeable (RGP) contact lens visual acuity 0.06±0.10 (0-0.4) logMAR ($p<0.000$), mean keratometry reading 49.9±3.9 (42.94-58) D, mean central corneal thickness 438.5±41.6 (338-534) μm, mean base curve (BC) on keratometry measurements 6.85±0.55 (5.48-7.82) mm, and mean BC of prescribed RGP contact lenses 6.81±0.54 (5.5-7.9) mm ($p=0.162$). BC values were highly correlated ($r=0.942$, $p<0.000$). The best fitting contact lens was found at first trial in 35 (74.5%) patients, at second trial in 11 (23.4%) patients and at third trial in one (2.1%) patient. Lens comfort was scored as 5 (very comfortable) in 25 (53.2%) eyes, 4 (comfortable) in 19 (40.4 %) eyes and 3 (tolerable) in 4 (6.4%) eyes.

Conclusion: High correlation of BC on keratometric readings and best fitting contact lens may shorten the duration of clinical examination. We think that Orbiflex K RGP contact lenses are good alternatives for keratoconus patients for their high tolerance and patient comfort.

e-P02

Keratoconus

EFFICACY OF EPI-ON CROSSLINKING IN ACUTE KERATOCONUS ASSOCIATED WITH DOWN'S SYNDROME

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Purpose: To evaluate 5-month efficacy of epi-on crosslinking (CXL) in acute keratoconus associated with Down's syndrome.

Materials and methods: A 22-year-old female patient with acute keratoconus of the left eye associated with Down's syndrome underwent epi-on CXL as keratoplasty was not available at that moment due to a number of reasons. The patient was assessed preoperatively and at day 1, week 1, and then at month 1, 3 and 5 after the procedure. Uncorrected visual acuity (UCVA), best-spectacle corrected visual acuity (BSCVA), pachymetry, central keratometry and optical coherent tomography (OCT) were performed at these visits.

Results: No side effects were observed during the follow up period. Clinical improvement was noted from the first days after the epi-on CXL: photophobia disappeared, the eye calmed, and the cornea partially regained its transparency. UCVA improved from 0.01 to 0.05 in 1 month and to 0.08 in 5 months. Spectacles did not improve the patient's vision initially, but at the end of the follow up period, BSCVA was 0.2. It was impossible to determine the corneal thickness exactly before the procedure as it was over 1000 μm. In 1 month, corneal edema significantly decreased and pachymetry data were 396 μm in optical zone and 377 μm in the thinnest point. The cornea became thicker in 5 months with 411 μm pachymetry value in the center and 389 μm in the thinnest area. We were not able to perform keratometry initially due to corneal edema. Comparison of central keratometry data in later period showed that the cornea became flatter mainly due to K_{min} values, the keratometric cylinder decreased from 16 to 12 D from 1 to 5 months. OCT of the cornea showed reduction of corneal edema at 1 month and structural integrity of the stroma in combination with a more regular shape 5 months after the treatment. We have recently tried scleral lenses for this patient. There is hope for her successful visual rehabilitation as visual acuity of the left eye in trial lens was 0.5.

Conclusion: Epi-on CXL proved to be a safe and effective therapeutic option in treating acute keratoconus associated with Down's syndrome.

e-P03

Keratoconus

COMPARISON OF TOPOGRAPHY-GUIDED AND AUTOKERATOMETER BASED SELECTION FOR SEMI-RIGID GAS PERMEABLE CONTACT LENS IN PATIENTS WITH KERATOCONUS AFTER CORNEAL COLLAGEN CROSSLINKING

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Purpose: To compare topography-guided (TG) and autokeratometer (AK) based selection for semi-rigid gas permeable (SRGP) contact lens in patients with keratoconus after corneal collagen crosslinking (CXL).

Materials and methods: Seventy-two eyes of 38 patients diagnosed with keratoconus having undergone CXL at least three months before were recruited for this prospective double-masked study. We assessed and compared the base curve of SRGP calculated by corneal topography (SCHWIND SIRIUS; SCHWIND eye-tech-solutions GmbH & Co. KG, Kleinostheim, Germany) and measured with autokeratometer to predict the final base and select the right contact lens. Best-corrected visual acuity (BCVA) detection, slit-lamp examinations, computerized topographic analyses and autokeratometer measurements were performed in all patients. Final lens parameters were chosen after an optimal fluorescein pattern (three-point-light touch) had been achieved.

Results: The mean age of patients was 22.5±4.6 years. There were 20 female and 18 male patients. The mean interval between CXL and application of contact lens was 10.4±8.3 months. The mean flat and steep keratometry values were 7.11±0.49 and 6.59±0.54 mm, respectively. The difference between topography guided base curve (BC) and autokeratometer based BC was significantly different (p=0.005). There was no difference between final BC and autokeratometer based BC (p=0.08) and topography guided BC (p=0.25). No significant differences were recorded between final BCCLVA (best corrected contact lens visual acuity) and topography guided or fitted by autokeratometer. The difference between final BC and autokeratometer fitted BC and also between TG-BC and AK-BC was negatively correlated with flat keratometry value.

Conclusions: Although there was no difference between final and TG-BCCVLA, and AK-BCCVLA, TG-BC would be more appropriate for contact lens selection in eyes with keratoconus after CXL. The more the cornea steepens, the higher is the difference between TG and AK based BC increases.

e-P04

Keratoconus

KERATOMETRIC AND VISUAL CHANGES AND STABILIZATION AFTER CORNEAL CROSSLINKING IN EYES WITH KERATOCONUS

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Purpose: To evaluate keratometric and visual changes and stabilization after corneal crosslinking (CXL) in eyes with keratoconus.

Materials and methods: Forty-one eyes with keratoconus of 31 patients were included in this retrospective study. Before and after corneal CXL, best corrected visual acuity (BCVA, logMAR) and corneal topography analyses (SCHWIND SIRIUS; SCHWIND eye-tech-solutions GmbH & Co. KG, Kleinostheim, Germany) were performed. Changes in BCVA, topographic keratometry and asphericity (Q) values were statistically analyzed in postoperative month 1, 3 and 6.

Results: The mean age of patients was 26.9±3.8 (17-36) years. There were 18 female and 13 male patients. The mean flat keratometry values measured preoperatively and at postoperative month 1, 3 and 6 were 47.1±3.7, 47.6±3.7, 47.2±3.9 and 47.2±3.6 D, respectively. The respective values of steep keratometry were 50.4±4.2, 51.2±4.2, 50.7±4.3 and 50.4±4.1 D. There were significant differences between postoperative month 1 and month 3 keratometric measurements in steep meridian ($p=0.02$), but no difference between month 3 and month 6 in either steep or flat meridian ($p=0.09$). The mean BCVA determined preoperatively and at postoperative month 1, 3 and 6 was 0.5±0.3, 0.6±0.4, 0.5±0.3 and 0.4±0.3, respectively ($p<0.05$). The mean Q values were 1.33±0.6, 1.23±0.58 and 1.18±0.56 at postoperative month 1, 3 and 6.

Conclusion: In eyes with keratoconus, there were no differences in keratometry between postoperative months 3 and 6 after CXL. We believe that contact lens could be applicable at postoperative month 3 month after CXL for keratoconus.

e-P05

Keratoconus

USE OF ULTRAHEALTH-SYNERGEYES CONTACT LENS IN KERATOCONUS: VISUAL PERFORMANCE AND VISION-RELATED QUALITY OF LIFE

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Purpose: To assess visual performance and vision-related quality of life of Ultrahealth-SynergEyes contact lens in patients with keratoconus and to evaluate its fit by optical coherence tomography.

Materials and methods: Eighteen eyes of 10 patients with keratoconus were fitted with an Ultrahealth-SynergEyes hybrid contact lens (SynergEyes, Carlsbad, CA). The lens fit was evaluated by the fluorescein pattern and also by anterior segment OCT imaging. Within 5 minutes after insertion, fluorescein pattern was evaluated with slit-lamp biomicroscopy and after 30 minutes the lens fit parameters of the central corneal and limbal clearance and peripheral landing zone alignment were evaluated by OCT (RTVue, Optovue Inc., Fremont, CA). Visual performance was evaluated with high and low contrast visual acuity (logMAR, Weber) and spatial frequencies contrast sensitivity (CSV-1000, VectorVision, Greenville, OH) test. Subjective performance with comfort and vision (100 mm visual analog scale (VAS)) and vision-related quality of life (NEI-RQL-42) with the lens were measured before and after lens wear.

Results: The mean high and low contrast visual acuity and spatial contrast sensitivity significantly improved after the lens wear ($p=0.007$, $p=0.001$ and $p<0.05$, respectively). The mean central corneal clearance was 110±37.1 microns. Patients reported high scores for comfort and vision (VAS score, 85.5 and 89.2, respectively) and a statistically significant increase was found in the NEI-RQL-42 questionnaire with the lens.

Conclusion: The Ultrahealth-SynergEyes contact lens provided good visual performance, high patient satisfaction and significant improvement in vision-related quality of life in patients with keratoconus. Anterior segment OCT imaging facilitated the evaluation of the fit.

e-P06

Keratoconus

OASYS FOR ASTIGMATISM CONTACT LENSES FOR THE CORRECTION OF RESIDUAL AMETROPIA AFTER INTRASTROMAL RING IMPLANTATION IN KERATOCONUS

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Purpose: To evaluate the safety and efficacy of Oasys for Astigmatism (Johnson & Johnson, USA) contact lenses for the correction of residual astigmatism in patients who had undergone INTACS implantation for keratoconus.

Materials and methods: The charts of patients fitted with contact lenses for correction of residual astigmatism after INTACS implantation were evaluated retrospectively. Uncorrected, spectacle-corrected and contact lens-corrected visual acuities, centration, movement and stabilization of the contact lens, the number of trial lenses required for ideal fit, slit lamp biomicroscopy findings, patient comfort, and daily duration of contact lens wear were evaluated.

Results: Seven eyes of 5 patients were fitted with Oasys for Astigmatism contact lenses after INTACS implantation. The mean age of patients was 32.0±7.5 years and the mean follow up was 31.4±24.2 months. The interval between contact lens fitting and INTACS implantation was 20.1±20.9 months. The mean uncorrected visual acuity was 0.44±0.22 LogMAR (~20/50) after INTACS implantation and improved to 0.13±0.09 LogMAR (~20/25) with contact lenses. In all patient eyes, centralization, stabilization and movement of the contact lens were evaluated as 'very good' to 'excellent'. No clinically significant side effects were encountered during the follow up period.

Conclusion: Oasys for Astigmatism contact lenses seem to be safe and effective for the correction of residual refractive error after INTACS implantation surgery in keratoconus.

e-P07

Keratoconus

WHICH LENSES PROVIDE BETTER VISUAL PERFORMANCE AND COMFORT IN KERATOCONUS PATIENTS? SOFT HYDROCONE SILICONE HYDROGEL LENSES VERSUS RIGID GAS PERMEABLE LENSES

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Purpose: To compare the soft HydroCone (Toris K) silicone hydrogel lenses and rigid gas permeable (RGP) lenses in terms of visual performance and subjective comfort levels in keratoconus patients.

Materials and methods: Ten keratoconic eyes fitted with RGP lenses and 15 eyes fitted with soft HydroCone (Toris K) silicone hydrogel lenses were included in the study. All patients were evaluated at baseline and after two weeks of lens wear. Uncorrected and best spectacle/contact lens corrected visual acuity, manifest and topographic refractive indices, ocular higher order (HO) aberrations, and point spread function (PSD) (the Strehl ratio) were noted at all visits. Ocular health status including bulbar hyperemia, corneal and conjunctival staining was also evaluated. Comfort level and visual performance in both daytime and nighttime conditions were scored 0-5 (0: worst, 1: bad, 2: fair, 3: moderate, 4: good, and 5: excellent) after 2 weeks of lens wear.

Results: The mean age in the two groups was comparable (25.2 years). Sex distribution was also similar in the two groups (Toris K group: 10 F/5 M and RGP group: 5 F/3 M). Best-corrected visual acuity values were significantly better with the lens than those with spectacles in the two groups ($p<0.001$). However, there was no statistically significant between-group difference. Reduction in K_{max} values was significantly higher in RGP group (11.4 D) when compared with soft HydroCone lens group (5.9 D) ($p<0.001$). The mean baseline topographical spherical equivalent values decreased significantly from -9.8 to -0.8 with the RGP lenses and from -5.7 to -1.2 with the soft HydroCone lenses. Reduction with the RGP lenses was significantly higher than that with the soft HydroCone lenses ($p=0.003$). Total ocular aberration values decreased significantly with both lenses ($p<0.001$). When aberration values were analyzed in detail, the reduction in aberration values was found to be higher with the soft HydroCone lenses, however, the difference was not statistically significant. While 92.9% of cases were classified as good/excellent in the soft HydroCone lens group, only 70% of cases had good/excellent comfort scores in the RGP group ($p=0.27$). Daytime and nighttime visual performance scores were similar in the two groups ($p>0.05$).

Conclusion: Soft HydroCone (Toris K) silicone hydrogel keratoconus lenses can provide similar visual performance, slightly better correction in ocular aberrations and better subjective comfort levels when compared with RGP lenses.

e-P08

Keratoconus

PROTEOLYTIC METALLOPROTEINASES IN KERATOCONUS

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Introduction: The most important proteoglycans in the corneal collagen are lumican and mimecan because they are responsible for corneal transparency through their action in interfibrillar proteins (collagen type VI and XII). The epithelial cells interact with a specialized structure, which is the extracellular matrix of the basal membrane, made of specialized collagen type IV and isoforms of laminin. This is the most significant molecule for preservation of corneal transparency.

Purpose: Analyzing the activity of the metalloproteinases MMP-1, MMP-2 and MMP-9 in keratoconus corneas through literature review of databases.

Methodology: The research group of the Primary Visual and Ocular Care of the Faculty of Health Science, La Salle University, Bogota, Colombia, held a literature review on molecular biology linked to keratoconus and extracellular matrix extracted from the following databases: Medline, Cochrane, LILACS and EMBASE. No limit was applied according to language or study design.

Results: Structural defects in keratoconus represent significant pathogenic factors of the disease including fragmentation of Bowman's layer, basal epithelial tissue and anterior stroma tissue fibrillation. The possible causes leading to defects include alterations in the corneal collagen metabolism and extracellular matrix composition. The extracellular matrix requires a balance with the proteolytic or protease enzymes that regulate degradation and corneal remodeling. There are natural proteinase inhibitors in the tear film and cornea, which prevent excessive degradation of the normal tissue. When there is an imbalance between the proteases and their inhibitors, there is pathologic degradation of the stromal collagen and proteoglycans. Two matrix metalloproteinases, MMP-2 and MMP 9, identified through immunohistochemical studies, have shown the latter to synthesize through corneal keratocytes and to protect the cornea, turning local tissue into an active tissue that eliminates collagen molecules. Overexpression of these MMPs goes hand in hand with the surge in the protease inhibitors, lysosomal inhibitors and cathepsin inhibitors B and G, culminating in a decrease in the alpha-1 proteinase inhibitor and alpha-2 macroglobulin. This action increases the concentrations of superoxide dismutase and reduces the concentration of zinc.

e-P09

Keratoconus

CONGENITAL CONDITIONS AND CORNEAL HYDROPS IN KERATOCONUS – CASE REPORTS

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Purpose: Report of three cases of acute, unilateral hydrops in patients with bilateral keratoconus and congenital conditions.

Setting/Venue: Keratoconus is a bilateral, non-inflammatory and progressive corneal ectasia with an incidence of 1 *per* 2000. It is diagnosed more often in people with Down's syndrome. Acute hydrops is an influx of aqueous into the cornea as a result of a break in Descemet's membrane. It can cause sudden decrease in vision, pain, photophobia and profuse tearing. It occurs in 3% of patients with keratoconus and generally resolves without intervention over 2-4 months. Treatment regimens can be divided into conservative, medical, and surgical options.

Materials and methods: A 22-year-old woman with congenital deformation of lacrimal canaliculus, a 39-year-old woman with Down syndrome and a 32-year-old man with mental retardation, all presented with a sudden decrease of visual acuity, redness, pain, burning sensation and increased tearing. Slit-lamp examination revealed conjunctival hyperemia, very extensive corneal edema, and in two cases large fluid-filled intrastromal clefts.

Results: With conservative and medical therapy, corneal edema in all cases took a few months to resolve and left a smaller or bigger residual scar. In the last 10 years, intracameral injection of air or expansile gas has been advocated, but further studies are required to validate the area and depth of the tear, beyond which intracameral gas injection is unhelpful. Owing to issues of patient compliance, reinjection of gas, possible pupil block glaucoma and lack of benefit in terms of final visual acuity or reduction in need of transplantation surgery, we did not decide to treat our patients with intracameral gas injections.

Conclusions: Larger studies are required to further refine the possible prevention and treatment options. Accurate and prompt clinical diagnosis of hydrops with close observation allows for early detection and treatment of complications such as perforation and infection. Acute hydrops is not an indication for emergency corneal transplantation, except for rare cases of corneal perforation, which may be first treated with tissue adhesives and bandage contact lenses.

e-P10

Lens Care and Comfort

MANAGEMENT OF ALBINO PATIENTS WITH COLOR SOFT CONTACT LENS

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Purpose: The albinos have a number of vision defects such as blurred vision, amblyopia, glare, photophobia and nystagmus. The aim is to report the use and effectiveness of color soft contact lens in albino patients with nystagmus.

Materials and methods: Eight eyes of 4 patients were included. The NL 55 prosthetic color contact lenses were applied to all patients. Changes in visual functions and quality of life were investigated.

Results: The mean patient age was 18.3 (range 8-28) years. The mean best corrected visual acuity with Snellen chart was 0.25 (0.1-0.3), the mean spherical power of prescribed contact lens 2.58±3.23 (-2.50-(+6.0)) D and cylindrical power -0.58±0.95 (-2.25-0) D. Their vision improved when using contact lenses by one line on average. Visual functions improved, as reported by the patients and their families. They reported that their vision was clearer, while nystagmus and glare were reduced when using contact lenses.

Conclusion: The benefits of wearing color soft contact lenses in albino patients with nystagmus include improving not only their vision but also their quality of life. Colored iris pattern imprinted on the contact lens reduces the amount of light that enters the eye and improves visual ability of the patients.

e-P13

Lens Materials, Ocular Surface Disease

INVESTIGATION OF *IN VIVO* DISCOLORATION OF CONTACT LENSES WITH IMAGING AND SPECTROSCOPIC TECHNIQUES

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Purpose: Evaluation of surface changes on the silicone hydrogel contact lenses that showed *in vivo* discoloration, by atomic force microscopy (AFM), scanning electron microscopy (SEM) and spectroscopic techniques such as Fourier Transform Infrared (FT-IR) and Surface-Enhanced Raman Scattering (SERS).

Materials and methods: A 42-year-old male patient with keratoconus, whose occupation was driving vehicles and who had been wearing rigid gas permeable contact lenses for more than 10 years, was admitted to our department with bilateral central corneal opacities. To avoid the risk of progression of leukoma and loss of vision, he was fitted with soft contact lenses made up of silicon hydrogel filcon V3 and designed for keratoconus (Toris K, SwissLens). A corrected visual acuity of 0.7 was achieved on each eye with the following fitting: -14.00 (-5.00x10) 7.60mm (K34) OD, -17.00 (-3.50x155) 7.40mm (K34) OS. A year later, he brought us two pairs of prescribed lenses that showed progressive gray discoloration in a few months while he was wearing the lenses. The patient denied using any topical or systemic medication that could possibly change the color of lenses or any contact lens solution other than those routinely prescribed for daily and weekly cleaning (i.e. polyquad and hydrogen peroxide). The two pairs of lenses and an unused control lens were examined at Yeditepe University Nanobiotechnology Center.

Results: The AFM and SEM images showed deposition of materials of biological origin along with decomposition of the lens surface. The FT-IR data indicated that the intensity of the -OH groups on the surface of the lenses was increased. The SERS study suggested that the deposits on the lens surface could be of protein or carbohydrate origin.

Conclusion: The combined evaluation of the data suggested that color change of the lenses was secondary to the structural breakdown of the surface polymer as a result of pH changes of the patient's tears. The free -OH groups that were formed as a result of decomposition could also be chemically attached to the proteins and other bio-macromolecules causing discoloration of the lenses.

e-P14

Lens Materials, Ocular Surface Disease

CONTACT LENSES AND PROLONGED USE OF SCREENS AND DISPLAYS (COMPUTER VISION SYNDROME)

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Purpose: The use of screens and displays has become common, actually ubiquitous. We look at computer, monitor, smart phone and tablet screens during education, at work, in our free time, when on vacations, etc.

Materials and methods: Social networks are becoming a new popular way of meeting, dating, friendship and communication among youth. It can be said that today it is a "near-point world", and the new way of living, so called "life in the box".

Results: Spending more than three hours a day in front of the screen/display is a prerequisite for the development of computer vision syndrome (CVS). The main causes of CVS are prolonged looking at the screens and displays *(accommodative spasm)*, uncorrected and poor corrected refractive errors *(poor visual acuity)* and dryness *(dry eye syndrome).* Ophthalmic signs and symptoms are discomfort, eye irritation, stinging, dryness, redness, scratching, difficulty of wearing contact lenses, itching, eye muscle fatigue, flickering letters in front of the eyes, blurred and double vision (occasionally), blurred vision at distance, the problem to re-focus and pain in the orbit. Advice and suggestions: it is necessary to perform ophthalmologic examination and to have appropriate correction (contact lenses); to blink every 3 or 4 seconds or 16 to 20 times a minute in order to adequately moisturize the eyes, provide good eyes comfort and prevent eyes redness and irritation, along with the mandatory use of artificial tears; apply the "20-20-20-20" rule: place the computer screen or display at a 20-inch (50-cm) distance; take regular 20-second pause after every 20 minutes of work; look at 20-feet (6-m) distance during the work pause. Computer screen/display should be placed in front of the face, screen centered approximately 4 to 8 cm below the eyes level, with the top of the screen tilted backwards at the angle of 10 to 20 degrees. When looking at the screen/display, the intensity of ambient lighting should be approximately half of its power.

Conclusions: Necessary are accurate vision corrections (contact lenses), regular and adequate blinking, regular use of artificial tears and applying the "20-20-20-20" rule. Users of devices with screens/displays at workplace should undergo ophthalmic examination before beginning to work and once a year thereafter.

e-P15

Lens Materials, Ocular Surface Disease

THERAPEUTIC USE OF AIR OPTIX NIGHT AND DAY (ALCON, USA) CONTACT LENSES

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Purpose: To evaluate the safety and efficacy of Air Optix Night & Day extended-wear contact lenses when used for therapeutic purposes.

Materials and methods: One hundred and fourteen eyes of 100 patients presenting at the Ankara University Medical Center, Cornea and Contact Lens Service, and requiring bandage contact lens use for ocular surface disorder were retrospectively evaluated with regard to therapeutic contact lens indication, duration of contact lens wear, visual acuity before and after treatment, symptoms and complications related to contact lens wear.

Results: There were 42 (42%) female and 58 (58%) male patients; their mean age at the time of presentation was 51±23 (range 6 to 87) years. Therapeutic contact lens indications included bullous keratopathy (46 eyes), persistent epithelial defect (18 eyes), recurrent corneal erosion (18 eyes), ocular surface irregularity due to dry eye disorders (15 eyes), toxic epitheliopathy (2 eyes), postkeratectomy (5 eyes), dellen (1 eye), chemical or traumatic epithelial defect (3 eyes), lamellar laceration (3 eyes) and corneal edema due to graft insufficiency (3 eyes). The mean duration of bandage contact lens wear was 9.0±10.0 months (range, 2 days to 5 years). Visual acuity before contact lens wear was 1.28 logMAR (~20/400) units and improved to 1.24 logMAR (~20/320) units after contact lens wear. No sight-threatening complications related to contact lens wear were encountered. A culture-negative sterile corneal infiltrate developed in one patient and was treated with cessation of lens wear and topical antibiotics.

Conclusion: The Air Optix Night & Day contact lenses appear to be a safe and effective alternative in several ocular surface problems for attenuation of symptoms and promotion of healing. These high-Dk contact lenses are especially advantageous in patients requiring long term therapeutic contact lens.

e-P16

Lens Materials, Ocular Surface Disease

OCULAR PEMPHIGOID – CASE REPORT

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Ocular pemphigoid is an autoimmune disease characterized by the presence of antibodies against basal membrane leading to conjunctival tissue degradation that may sometimes prove devastating. This paper presents a patient with ocular pemphigoid and advanced therapeutic modalities used for ocular surface reconstruction, such as amniotic membrane transplantation, therapeutic contact lens insertion and tarsus sprain, with good functional and aesthetic results.

e-P17

Lens Materials, Ocular Surface Disease

TOPICAL INTERFERON ALFA 2B AS A SINGLE THERAPEUTIC AGENT IN THE TREATMENT OF RECURRENT CORNEAL AND CONJUNCTIVAL INTRAEPITHELIAL NEOPLASIA: THREE-YEAR FOLLOW UP

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Purpose: To report on the role of topical interferon alfa-2b (IFNα2b) in the treatment of recurrent corneal and conjunctival intraepithelial neoplasia.

Case report: A 58-year-old patient with recurrent corneal and conjunctival intraepithelial neoplasia diagnosed at the University of Baskent was evaluated. The patient had a history of histologically proven primary corneal and conjunctival intraepithelial neoplasia and was treated by surgery and cryotherapy before recurrence. The patient with a diagnosis of recurrent corneal and conjunctival intraepithelial neoplasia was treated with recombinant topical IFNα2b 1 million IU/mL four times a day until lesion resolution was noted.

Results: The mean time to clinical resolution was 12 weeks. The patient has been tumor free for 3 years now. No side effects of treatment were noted.

Conclusion: Topical IFNα2b is an effective single agent therapy for recurrent corneal and conjunctival intraepithelial neoplasia.

e-P18

Lens Materials, Ocular Surface Disease

TEYSUNO (TEGAFUR/GIMERACIL/OTERACIL) INDUCED SUPERIOR CORNEAL EPITHELIOPATHY IN TWO PATIENTS UNDERGOING CHEMOTHERAPY FOR METASTATIC CANCER

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Purpose: To describe corneal superior arcuate pattern epitheliopathy in patients undergoing Teysuno chemotherapy.

Material and methods: Two patients, both enrolled in a clinical study for a new chemotherapeutic agent Teysuno, presented to the ophthalmology services with new onset visual acuity changes, ocular irritation, dry eye sensations and epiphora. The first patient was diagnosed with a metastatic colon adenocarcinoma in 2009 and was recovering from his third cycle of Teysuno treatment started two months earlier. He had bilateral best corrected visual acuity of 1.0 that needed significant with the rule astigmatism correction. The second patient, also in his third cycle of Teysuno treatment for esophageal carcinoma with lung metastases, had a mildly decreased visual acuity due to excessive tearing. In both cases, the complaints began during the third treatment cycle.

Results: On clinical examination, both patients had similar bilateral superior arcs of punctate epitheliopathy that showed fluorescein positive staining. The regions of corneal staining corresponded to the contact region of the upper lids and the cornea; changes were restricted to the epithelium. In the first patient, staining was accompanied by local corneal epithelial thinning and steepening of the corneal curvature. Based on the hypothesis that the symptoms were related to the effect of chemotherapy, intensive topical lubricants were started. In this patient, the condition persisted and bilateral bandage contact lenses were placed to improve comfort and protect the cornea from further irritation. In the second patient, Teysuno was discontinued due to the lack of efficacy. Symptoms and corneal changes returned to normal within one month.

Conclusion: Teysuno is an oral chemotherapeutic drug consisting of a fixed combination of Tegafur, a prodrug of 5- fluorouracil (5-FU), and two modulators that prevent 5-FU from early breakdown (Gimeracil) and decrease the toxicity levels in normal gastrointestinal mucosa (Oteracil). In this clinical trial, ocular side effects were seen in 50% (2/4) of patients receiving Teysuno. To the best of our knowledge, this is the first case report describing Teysuno related atypical corneal superior arcuate pattern epitheliopathy. The symptoms ameliorated with topical lubricants and bandage contact lenses; they improved upon chemotherapy discontinuation. Early recognition is therefore important to provide comfort and protection to the cornea during the course of treatment.

e-P19

Lens Materials, Ocular Surface Disease

MULTIFOCAL VERSUS MONOVISION CONTACT LENS CORRECTION IN PRESBYOPIC PATIENTS

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Purpose: To compare visual performance with multifocal (MF) contact lens *versus* monovision (MV) with single-vision contact lenses.

Materials and methods: A crossover study of 20 presbyopic patients was conducted. Patients were randomized first into either MF or MV lens for 15 days for each modality, with a washout period between each lens type. Measurements included monocular and binocular visual acuity (VA) at distance and near vision and near stereo acuity, and subjective evaluation of visual comfort and ability using a questionnaire that evaluated subjective comfort and handling, subjective visual performance, and subjective task performance.

Results: An interesting observation was improvement in distance and near VA from 1 to 15 days with the MF lens, whereas the patients maintained their VA or, in some cases, had worse VA with the MV correction. The stereo acuity was significantly better with MF than with MV. Despite some differences in visual function between the two presbyopic corrections in this study, there was no significant difference in the subjective perception of visual performance between the two lens types.

Conclusions: Multifocal contact lens correction provided satisfactory levels of VA comparable with MV without compromising stereo acuity in this crossover study. There was no difference in comfort profiles between the MF and MV contact lenses made of the same material.

e-P20

Lens Materials, Ocular Surface Disease

THE USE OF BANDAGE CONTACT LENSES IN ADENOVIRAL KERATOCONJUNCTIVITIS

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Purpose: To evaluate the safety and efficacy of the use of the bandage contact lenses in adenoviral keratoconjunctivitis related ocular surface problems.

Materials and methods: Twenty-two eyes of 15 consecutive patients presenting at the Ankara University Medical Center, Cornea and Contact Lens Service, and requiring bandage contact lens (BCL) use for adenoviral keratoconjunctivitis related ocular surface problems were enrolled. Visual acuity score, slit-lamp examination findings, indication for the bandage contact lens application, total follow up period and adjuvant medical treatment were recorded. All patients were followed up with regard to the success of treatment and adverse effects associated with BCL use.

Results: The patient mean age at the time of presentation was 26.8±15.2 years. Bandage contact lens indications included filamentous keratopathy (7 eyes), epithelial defect (11 eyes), bullous keratopathy (2 eyes) and filamentous keratopathy with epithelial defect (2 eyes). Following the first appearance of symptoms, the mean time to BCL application was 9.4±3.9 days. The mean duration of contact lens wear was 10.7±7.2 days and the mean follow up 26.5±15.2 days. Preservative-free artificial tears and topical antibiotics were used in all cases. Besides, topical 0.4% povidone-iodine solution (14 eyes), topical ganciclovir 0.15% gel (15 eyes) and topical steroids (18 eyes) were used in various combinations. At the end of the follow up period, the mean visual acuity improved from 0.21±0.7 logMAR units (~0.6) to 0.l±0.04 logMAR units (~1.0) (p=0.007). No sight-threatening complications related to contact lens wear were encountered.

Conclusion: Bandage contact lens use appears to be safe and effective in the treatment of adenoviral keratoconjunctivitis related ocular surface problems. The prophylactic use of topical antibiotics may be a good approach in terms of preventing secondary infections.

e-P21

Scleral Lenses and Specialty Lenses

ROSE K2 (MENICON, DAVID TOMAS CONTACT LENSES, UK) CONTACT LENSES IN KERATOCONUS

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Purpose: To evaluate the safety and efficacy of Rose K2 (Menicon, David Tomas Contact Lenses, UK) contact lenses in different grades of keratoconus.

Materials and methods: The charts of keratoconus patients who had been fitted with Rose K2 contact lenses between January 2005 and April 2014 at the Department of Ophthalmology, Ankara University School of Medicine, Cornea and Contact Lens Service, were analyzed retrospectively. Prior to lens fit, all patients underwent complete ophthalmologic examination and were divided into 4 groups of mild, moderate, severe and advanced keratoconus according to keratometric values. Patients were evaluated according to the lens fitting characteristics, biomicroscopic findings and visual rehabilitation at the end of the follow up period.

Results: Three hundred and thirty-six eyes of 186 patients were included in the study. Ninety seven (28.9%) eyes had mild, 122 (36.3%) eyes moderate, 39 (11.6%) eyes severe and 78 (23.2%) eyes advanced keratoconus. The mean manifest refraction spherical equivalent was -7.19±6.20 diopters and the mean manifest refractive cylinder 3.45±2.27 diopters. An adequate contact lens fit could be obtained with the Rose K2 lenses in all eyes. The mean follow up after starting contact lens wear was 9±3.5 months (1-48 months). In all patients, the mean uncorrected, best spectacle corrected and best contact lens corrected visual acuities were 1.01±0.42 (Ì´ 20/200), 0.38±0.34 (Ì´ 20/50), 0.04±0.11(Ì´ 20/22) logMAR, respectively (p<0.01). The ideal contact lens was flatter than the mean keratometric value in 83.5% of mild, 86% of moderate, 92.3% of severe and 100% of advanced keratoconus cases.

Conclusion: Rose K2 contact lenses may be successfully fitted at each stage of keratoconus. As the grade of keratoconus increases, the ideal fitting achieved with flatter base curves compared to the mean keratometry reading.

e-P22

Scleral Lenses and Specialty Lenses

SCLERAL LENS TO RESCUE CORNEAL SURGERY FAILURE

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Purpose: To determine the efficacy, ease and safety of scleral lens after failure of corneal reshaping surgery procedure.

Materials and methods: Thirty eyes with very irregular corneal graft, 10 eyes with post Lasik ectasia, 10 eyes with failure of intracorneal ring segment implantation, 2 eyes with an irregular PKR and 2 eyes with very irregular cornea after radial keratotomy were fitted with scleral lens (Misa* Lens, Microlens, The Netherlands).

Results: The mean LogMAR visual acuity (VA) was 0.05. The first fit was successful in 80% of cases and no severe complications were seen during follow up.

Conclusion: Scleral lens fitting is an attractive solution to correct irregular cornea after failure of reshaping surgery procedure.

e-P23

Scleral Lenses and Specialty Lenses

OCULAR ABERROMETRIC CHANGES WITH CORNEAL MULTIFOCAL GP CONTACT LENS

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Purpose: To investigate ocular aberrometric index changes induced by the application of Multifocal Rigid Gas Permeable (MF RGP) contact lenses (CL) in a sample of 18 presbyopic eyes.

Materials and methods: Thirty-one presbyopic subjects took part to this study. For each eye, wavefront analysis was performed in three optical conditions: multifocal (R)GP contact lens (MF, VIP Design, Hexafocon A), Single Vision (R)GP contact lens (SV CL, Hexafocon A) and no Contact Lense (no CL). Exclusion criteria were ocular disease, history of ocular surgery, small pupil size(<4.0 mm) and low quality of Hartman-Shack's images. Data were extracted from Hartman-Shack aberrometer measurements (Keratron Onda, Optikon 2000, It). Zernike coefficients were scaled to a pupil diameter of 4.0 mm. The Root Mean Square (RMS) index, mean and standard deviation of higher order aberrations (HOAs, fourth to seventh order), Spherical Aberration (SA) and coma were evaluated. Instrument uncertainty was estimated evaluating data obtained by five different applications (using 3 MF CL types, 1 SV CL and no-CL) in one study subject.

Results: Significant differences in Spherical Aberration RMS values were observed comparing MF CL to SV CL wear and with no-CL ($p<0.0009$ and $p<0.00001$).

Spherical Aberration (4;0) became more positive with multifocal RGP CL than single vision RGP CL and without CL ($p<0.0006$ and $p<0.000002$). No significant differences were found for other RMS values for the three conditions.

Conclusions: Multifocal RGP CL wear induces Spherical Aberration enhancement. Differences for other wavefront aberrations were not significant because they were influenced by factors such as CL dynamics, tear film changes and measurement time.

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Scleral Lenses and Specialty Lenses

MINISCLERAL CONTACT LENS DECENTRATION WITH THREE DIFFERENT INSERTION METHODS

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Purpose: To investigate decentration of mini-scleral contact lens with three different insertion methods (fingers, plunger and bottomless plunger).

Materials and methods: A sample of 21 right-handed people (aged 22-54 years) were asked to insert the mini-scleral lens on the right eye with each insertion method; then pictures of the eye were taken using a slit lamp; these pictures were used to evaluate decentration of the lens. Decentration was measured as the distance between the center of the pupil and the center of the lens. The measure was taken using the DoubleCAD XT software.

Results: The results showed that the best centering was achieved using the bottomless plunger, while the greatest mean decentration was obtained using fingers; in 98.4% of the examined cases, the lens center was displaced downward to the center of the pupil and toward the temple.

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Scleral Lenses and Specialty Lenses

MINI SCLERA CONTACT LENS CORRECTION FOR IRREGULAR ASTIGMATISM AFTER CALCIFIC BAND KERATOPATHY REMOVAL

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Case report: A-63-year-old man had bilateral calcific band keratopathy developed on the left eye and painful chronic corneal erosion in the area of calcium deposit. The preoperative best corrected visual acuity (BCVA) on the left eye was 0.9. He underwent corneal scraping with ethylenediaminetetraacetic acid chelation. Seven months after the surgery, his BCVA was 0.5. Scheimpflug corneal tomography revealed an irregular astigmatism. He was successfully fitted with a mini sclera contact lens and the visual acuity improved to 1.0.

Conclusion: Mini sclera contact lens can be fitted for postoperative irregular astigmatism after calcific band keratopathy removal with good visual outcome.

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Free Topics

2400 BC IN EGYPT: IRY, THE FIRST OPHTHALMOLOGIST

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Purpose: The first ophthalmologist known to have existed seems to be Iry, a Royal Oculist who lived during the 6th Egyptian Dynasty (ca. 2400 BC). This poster will briefly reflect the information available on Iry and his achievements.

Method: Selective literature research of books and journal articles *via* PubMed, Google and Scholar.

Results: Not only were there many physicians in the Pyramid Age, but there were also very specialized ones. Iry, the 6th Dynasty court physician and high priest, was not only "doctor of king's belly", "shepherd of the king's anus" but also "the king's eye-doctor", which was specifically noted. His stele was discovered in a tomb near the Great Pyramid of Cheops. Iry described several eye diseases, but did not offer remedies. Interestingly to note: "irty" was the ancient word for "eyes" or "to see".

Conclusions: Doctors who specialized in ophthalmology were regarded extremely high in Egyptian society and were the pride of many Pharaohs. Today, very little is known about Iry, the first ophthalmologist. Many of scientific traditions of the Greeks were probably derived from the cultures of Egypt and Mesopotamia; much has been attributed to Greek scientists because they were the first who left records of their achievements.

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Free Topics

REVERSE GEOMETRY RIGID GAS PERMEABLE CONTACT LENSE USE AFTER KERATOTOMY AND LASIK

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Introduction: Reverse geometry rigid gas permeable contact lenses used in a patient after two eye operations, keratotomy and LASIK.

Purpose: The aim is to report the results of the application of reverse geometry rigid gas permeable contact lenses.

Methods: Keratometry postoperative eyes

OD R1=9.89 mm (34.12D)

R2=8.56 mm (39.37D)

OS R1=10.03 mm (33.62D)

R2=9.25 mm (9.25D)

Refractometry OD +3.25 sph -4.75 cyl ax10

OS +6.0 sph -3.25 cylax37

Visual acuity without correction VOD=0.4 VOS=0.1

Spectacle correction VOD cc +3.0 sph ≈ -2.5 cyl ax10=0.8-0.9

VOS cc +5.5 sph ≈-2.5 cyl ax60=0.5

Keratotopography

Results: Made in Bausch+LombHastings,UK, reverse geometry RGP of ML92 material

OD BC 9.84 PWR + 2.75 diam 9.5

OS BC 9.98 PWR + 5.25 diam 9.5

Visual acuity with contact lenses VOD=0.9 VOS=0.8

Contact lenses fit well, centrally.

Conclusion: When spectacle correction for residual refractive error after corneal refractive surgery is not possible, improvement in visual acuity might be achieved by reverse geometry rigid gas permeable contact lenses.

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Free Topics

EFFECT OF PUREVISION HD (BAUSCH & LOMB, USA) CONTACT LENSES IN REFRACTIVE CORRECTION

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Purpose: To evaluate the safety and efficacy of PureVisionHD (Bausch & Lomb, USA) contact lenses in the correction of refractive errors.

Materials and methods: Medical records on 384 eyes of 196 patients who had been fitted with PureVisionHD contact lenses at the Cornea-Contact Lens Department of Ankara University Faculty of Medicine were retrospectively evaluated. The mean manifest refraction spherical equivalent (MRSE), mean manifest refraction cylindrical (MRCyl), uncorrected visual acuity (UDVA), best spectacle corrected visual acuity (BCVA), contact lens-corrected visual acuity (CL-CDVA), the number of trial lenses used until the ideal fit was obtained, centralization, movement and rotational stability of the lenses and slit-lamp biomicroscopy findings were noted.

Results: The mean age of patients was 24.8±7.3 and the mean follow up 11.3±4.7 months. Out of 384 eyes, there were 320 eyes with myopia, 21 eyes with hyperopia, 33 eyes with myopic astigmatism and 10 eyes with mixed astigmatism. The ideal contact lens fit was obtained by one trial lens in all patient eyes. The mean MRSE was -2.50±2.07 D and the mean MRCyl 0.72±0.79 D. The mean UDVA was 0.74±0.21 logMAR (~20/100), mean BCVA 0.0075±0.04 logMAR (~20/20) and mean CL-CDVA 0.0071±0.04 logMAR (~20/20). At the last follow up examination, all contact lenses had very good centration and movement. More than 5 degrees of rotation was not documented in any patient eye with myopic astigmatism at any control visit. No unwanted side effects due to contact lens wear were encountered in any patient eye.

Discussion: Pure vision HD contact lenses seem to be safe and effective for the correction of a range of refractive errors.