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Refractive

PP564

Long Term Outcomes of Femtosecond Astigmatic Keratotomy for High Residual Astigmatism in Post Keratoplasty Patients

Presenting author: Michael Mimouni, Canada

Purpose:
To assess the long-term outcomes of femtosecond astigmatic keratotomy (FSAK) in post keratoplasty patients.

Setting:
Tertiary Care Center

Methods:
This retrospective study included patients that underwent FSAK for astigmatism following penetrating (PKP) or deep anterior lamellar keratoplasty (DALK). Corneal cylinder, uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA) at 1 month, 1 year, 5 years and 10 years were collected and compared to baseline. The main outcome measure was stability of corneal cylinder, UCVA and BCVA. Overall, 61 eyes of 61 patients were included in this study with a mean age of 56±19 years of which 53.2% (n=33) were of male gender.

Results:
Reasons for the original keratoplasty included keratoconus (n=21), corneal ulcer (n=9), pseudophakic bullous keratopathy (n=5), trauma (n=4), Fuchs dystrophy (n=3), failed graft (n=1), granular dystrophy (n=1) and unknown (n=18). At one month following FSAK the cornea cylinder was significantly reduced from 9.0±3.9D to 4.74±3.05D ($p<0.001$). Thereafter the cornea cylinder remained significantly reduced at all visits up to 10 years ($p<0.05$ for all). Following FSAK, there was a significant improvement in logMAR UCVA from 1.22±0.49 to 0.85±0.53 ($p<0.001$) and logMAR BCVA from 1.04±0.56 to 0.48±0.44 ($p<0.001$) which remained stable up to 10 years.

Conclusions:
Following FSAK for astigmatism following PKP or DALK a significant reduction in corneal cylinder and significant improvement in UCVA and BCVA is achieved and maintained up to 10 years following the procedure.

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Impact of femtosecond laser in situ keratomileusis on retinal ganglion cell function evaluated by pattern electroretinogram (pERG)

Presenting author: Montserrat Garcia-Gonzalez, Spain

Purpose:
To analyze the effect of femtosecond laser-assisted in situ keratomileusis (FS-LASIK) on the electrical response of retinal ganglion cells using pattern electroretinography (pERG).

Setting:
Clínica Novovisión, Madrid, Spain.

Methods:
Longitudinal, prospective and observational pilot study. We included healthy myopic patients who underwent FS-LASIK to correct up to 6 diopters (D) of myopia and up to 2D of astigmatism. Patients with excessive blinking or tearing and those with Snellen uncorrected visual acuity less than 0.9 (decimal notation) on postop day 1 were excluded. Diopsys NOVA® (Diopsys Inc., NJ, USA) pERG records, using high- and low-contrast patterns, were obtained 16 hours and 1 month after FS-LASIK was performed. Magnitude (µV), Magnitude D (µV), Magnitude D/Magnitude ratio, and signal-to-noise ratio (dB) were analyzed. Wilcoxon test for nonparametric paired data was used.

Results:
pERG data from 24 eyes were analyzed from 24 patients who underwent FS-LASIK. Mean age was 35.79±9.9 years. Mean preoperative refraction was -2.69±7.6 D (sphere) and -0.38±0.40 D (cylinder). Mean surgical time was 56.88±7.6 seconds. No statistically significant differences were obtained for any of the studied parameters when comparing 16 hours with 1 month after FS-LASIK, with the exception of Magnitude with low contrast, which increased from 1.21±0.2 µV to 1.39±0.29 µV at 16 hours and 1 month postoperatively, respectively (P=0.03).

Conclusions:
FS-LASIK seems to induce a mild and transitory defect in retinal ganglion cell function. Only a mild decrease was detected in the magnitude value for low-contrast stimuli when pERG was performed 16 hours postoperatively, and it returned to normal 1 month after surgery.

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PP566

Longterm non-randomized results with a With a New Continuous Range of Vision Presbyopia-Correcting Intraocular Lens

Presenting author: Ivan Gabric, Croatia

Purpose:
To evaluate the long-term clinical outcomes and patient satisfaction with a new model of presbyopia-correcting intraocular lens (IOL).

Setting:
University Eye Clinic Svjetlost, Zagreb, Croatia

Methods:
This non-randomised case series enrolled 800 eyes of 400 patients undergoing phacoemulsification cataract surgery with bilateral implantation of the TECNIS Synergy IOL (Johnson & Johnson Vision). UCDVA, UCNVA, mesopic reading conditions and overall patient-reported visual performance were evaluated during a 12-month-follow up.

Results:
A total of 96.8% of patients chieved binocular postoperative uncorrected distance (UDVA) and near visual acuity (UNVA) of 0.00 logMAR (20/20), respectively. Mean postoperative mesopic UNVA for both eyes was 0.12 ± 0.04 logMAR. Likewise, mean binocular UDVA and UNVA were 0.00 ± 0.05 and 0.05 ± 0.03 logMAR. Posterior capsular opacification was observed as disturbing in 9% of patients and NdYAG laser capsulotomy was performed. Residual refractive error above 0.50 SE was observed in 17 eyes and was treated wit laser vision correction. Average residual refractive error before enhancement was 0.25 ± 0.13 sphere and 0.63 ± 0.23 cylinder.

Conclusions:
This new presbyopia correcting IOL provided full spectacle independence in 99% patients with a limited deterioration of contrast sensitivity and patient reported dysphotopsias. We perceived this as a satisfactory outcome by the patient if proper patient selection is performed.

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Bag-to-bag intraocular lens exchange with a wide optic intraocular lens for treatment of positive and negative dysphotopsia.

Presenting author: Lisa Rozendal, Netherlands

Purpose:
Positive dysphotopsia (PD) and negative dysphotopsia (ND) are bothersome complaints that can occur after cataract surgery with intraocular lens (IOL) implantation. Various methods to treat PD and ND have been proposed, but none of them has shown to resolve dysphotopsia in all cases. As the edge of optic is described as one of the factors in the multifactorial etiology of both types, moving the edge more peripherally might have a beneficial effect on the complaints. We therefore evaluated the efficacy and risks of a bag-to-bag IOL exchange with a wide optic IOL as surgical treatment for PD and ND.

Setting:
Department of Ophthalmology, Leiden University Medical Center, Leiden, The Netherlands

Methods:
Eleven pseudophakic eyes (45.5% OD) of nine different patients (66.7% female, mean age and standard deviation 64.8 ± 7.5 years) that were treated for any form of dysphotopsia with a bag-to-bag IOL exchange using a wide optic Aspira-aXA IOL (7.0 mm optical diameter) were retrospectively analyzed. Six eyes suffered from PD prior to the exchange, four eyes from ND and one eye from both. For each individual eye, the clinical outcome including the subjective reported change of the complaints within 3 months postoperatively were assessed. Additionally, the intraoperative and postoperative complications were collected and analyzed.

Results:
Six out of seven eyes with PD and four out of five eyes with ND showed complete resolution of complaints after the IOL exchange procedure. One eye with PD did not show resolution of complaints likely due to a pre-existent iridotomy that was first identified postoperatively and thereafter also seen on preoperative acquired examinations. One eye with ND showed partial resolution of complaints. One eye developed a vitreous prolapse and cystoid macular edema postoperatively and another eye developed posterior capsular opacification, all treated successfully.

Conclusions:
Bag-to-bag IOL exchange with a 7.0 mm optic IOL showed complete resolution of PD and ND in almost all patients. There was a minimal risk of complications postoperative and the complications that occurred were all well treatable with good visual outcomes. Therefore, an IOL exchange with a wide optic diameter IOL seems a promising surgical treatment for both positive and negative dysphotopsia.

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PP568

Patient Outcomes for Immediate Sequential Bilateral Cataract Surgery

Presenting author: Jan Venter, United Kingdom

Purpose:

Purpose: To evaluate the safety and efficacy of ISBCS versus DSBCS with multifocal Intra ocular IOLs

Setting:

Setting: Private Refractive Surgery (Optical Express) UK

Methods:

A cohort of patients who underwent Immediate Sequential Bilateral Cataract surgery with multifocal implants was compared to a matched cohort who underwent Delayed sequential bilateral cataract surgery with multifocal implants. The setting was private refractive surgery clinics. Monocular and binocular UCDVA and UCNVA scores were recorded 1 day, 1 month and 3 months post operatively. Patient reported outcome scores to include overall satisfaction were recorded at 1 day, 1 month and 3 months postoperatively. Clinical assessments, including any complications, were recorded in the electronic medical record.

Results:

Total ISBCS procedures were 2449 patients compared with 998 patients DSBCS procedures. Three months postoperatively, 88.3% of the ISCBS group had binocular UCDVA of 6/6 or better vs. 87.7% DSBCS group. ($p>0.05$); 85.2% of the ISBCS group had binocular UCNVA of N6 or better vs. 87.9% in the DSBCS group ($p=0.041$). Change in BCDVA of > 2 lines were measured at 3 months as 0.6% of ISBCS group and 0.7% ($p>0.05$) of DSBCS group. Complication rates were matched. Patients reported being “Very Satisfied” or “Satisfied” outcome in 85.5% of the ISCBS group, compared to 89.1% in the DSBCS group ($p=0.0219$)

Conclusions:

UCDVA outcomes were not significantly different between ISBCS and DSBCS procedures measured 3 months post operatively ($p>0.05$). . UCNVA scores also showed a small difference measured 3 months post operatively ($p=0.041$). Change in BCDVA was not significantly different between the groups ($p>0.05$). Complication profiles appear similar. Both cohorts report high levels of postoperative satisfaction.

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PP569

Mini-hyperopic transepithelial PRK (mhPRK): minimally invasive, rapid-recovery hyperopic PRK with customized excimer epithelial removal only in the peripheral hyperopic correction zone: 2-year clinical data of a novel technique

Presenting author: Anastasios John Kanellopoulos, Greece

Purpose:
To evaluate the safety and efficacy of a novel technique: minimally invasive, rapid-recovery hyperopic PRK with excimer epithelial removal only in the peripheral hyperopic correction zone

Setting:
LaserVision Clinical & Research Eye Institute, Athens, Greece

Methods:
24 eyes of 16 patients with hyperopia were treated with mhPRK. The amount of epithelial removal was customized to the OCT-derived 3D epithelial mapping and added as spherical correction to the hyperopic sphere manifest amount (+2.50 to +3.00 D) Bromfenac 0.9mg/ml was used through the first postoperative day. Visual acuity, CDVA, UDVA, refraction, post-operative pain measured on a subjective scale, epithelial healing and epithelial mapping profile were evaluated for 24 months.

Results:
Mean hyperopic SE: +2.46D (+0.75 to +3.25). Mean astigmatism -1.42D (-0.50 to -2.75) The mean postoperative pain scores were 0.27 ± 0.15 on a scale 0 to 4. Epithelial defect healed by day 4 in all cases (2-4) At 24 months UDVA was 20/20 (20/25-20/15) Residual refractive error: SE: -0.18 D, sphere: +0.15 D, cylinder -0.42 Diopters;

Conclusions:
These data suggest that mhPRK, is a safe and effective alternative to hyperopic laser vision correction. It may minimize postoperative discomfort, accelerate re-epithelialization and early visual recovery, compared to traditional larger-zone manual epithelial removal in PRK or even trans-epithelial (laser-epithelial removal) employed for hyperopic laser vision correction. These data appear superior to LASIK for the immediate postop rehabilitation and restrictions, similar in discomfort experienced, with a potentially superior intra-operative safety profile as the central cornea is left untouched.

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PP570

Detection of and Compensation for Static Cyclotorsion With an Image-Guided System in SMILE

Presenting author: bulent kose, Turkey

Purpose:
To evaluate the effect of cyclotorsion compensation with an image-guided system (Callisto eye; Carl Zeiss Meditec AG, Jena, Germany) on the visual and refractive outcomes of small incision lenticule extraction (SMILE) surgery for astigmatism.

Setting:
Department of Ophthalmology, Osmangazi Aritmi Hospital, Bursa, Turkey

Methods:
124 eyes of 124 patients with astigmatism of 0.75 diopters or greater who underwent SMILE for myopic astigmatism were reviewed. Patients were treated with cyclotorsion compensated SMILE or standard SMILE. After the sitting position reference axis was registered with IOLMaster 700, these data were transferred to the Callisto, which was connected to the operating VisuMax. Cyclotorsion was measured by Callisto and compensated for by repositioning the patient's until the reference axis from the IOLMaster 700 was parallel to a manually drawn reference axis on the screen before docking. The visual and refractive results were studied preoperatively and postoperatively.

Results:
The mean logMAR UDVA was 0.02 ± 0.10 and 0.06 ± 0.11 ($P = .13$) and the mean astigmatic error was -0.19 ± 0.17 D and -0.45 ± 0.38 D ($P < .001$) in the cyclotorsion compensated group and the standard group, respectively. In regard to vector analysis, the mean index of success was 0.00 ± 0.00 and 0.40 ± 0.48 (range: 0.00 to 2.72) ($P < .001$), and the mean absolute angle of error in degrees was 1.18 ± 2.23 and 3.76 ± 3.80 in the cyclotorsion compensated group and the standard group, respectively.

Conclusions:
Cyclotorsion compensation may result in improved axial alignment, more precise astigmatic correction, and better postoperative uncorrected distance visual acuity (UDVA) compared with the standard group. The combination of the Callisto eye system with a VisuMax laser might be an efficacious and reliable approach to enhance astigmatism treatment with SMILE surgery.

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Allograft Corneal Ring Implantation Management for Keratoconus: Comparison of 44 Cases in Different Stages

Presenting author: Sezer Hacıağaoğlu, Turkey

Purpose:
To analyze the intrastromal allograft ring segment (KeraNatural, Lions VisionGift, OR, Portland, USA.) implantation outcomes according to different keratoconus stages.

Setting:
Istanbul Medipol University, School of Medicine, Istanbul, Turkey

Methods:
In this retrospective noncomparative case series, 44 keratoconic eyes of 32 patients who had KeraNatural implantation were reviewed. Patients were grouped according to the Belin ABCD Keratoconus Staging (Stage I: 4 eyes; Stage II: 17 eyes; Stage III: 11 eyes; Stage IV: 12 eyes). All of the cases were treated with the Istanbul protocol. The uncorrected distance visual acuity (UDVA), best corrected distance visual acuity (BDVA), mean keratometry (Kmean) and maximum keratometry (Kmax) were analyzed and compared according to keratoconus stage.

Results:
The mean UDVA (Snellen) and BDVA (Snellen) statistically significant increase from 0.19 ± 0.17 and 0.28 ± 0.20 to 0.45 ± 0.26 and 0.56 ± 0.26 (P values; P<0.001, P<0.001, respectively). The mean Kmean (D) and Kmax (D) values statistically significant flattened from 49.01 ± 5.11 and 57.56 ± 7.06 to 45.71 ± 4.80 and 55.40 ± 6.73 (P values; P<0.001, P<0.001, respectively). There was no statistically significant difference in the changes in UDVA, BCVA, Kmean and Kmax values before and after surgery according to the stages (P values; P=0.341, P=0.941, P= 0.145, P = 0.679, respectively).

Conclusions:
Six-months results of this study indicate that the KeraNatural implantation enhance the visual performance and improves the anterior corneal curvature of the keratoconus patients. KeraNatural implantation with a İstanbul Protocol was effective for management of keratoconus of all stages. Larger clinical studies are needed to demonstrate the effectiveness with long term follow-up.

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Outcomes of bi-optics with Small Incision Lenticule Extraction as a sequential treatment following Implantable Collamer Lens for management of extreme myopia.

Presenting author: MAMTA LAKHANA, India

Purpose:
To study the safety and efficacy of bi-optics using Implantable Collamer lens(ICL) followed by SMILE for management of extreme myopia.

Setting:
Nethradhama Superspeciality Eye Hospital, Bangalore, India

Methods:
Data was analysed for patients who underwent bi-optics using ICL in the first stage and SMILE in the second stage for residual refractive error. Mean interval between stage 1 and stage 2 correction was 24.2±13.33 days. Mean follow-up after the SMILE procedure was 12.26±1.39 (11-14) months.

Results:
Fifteen eyes from 9 patients with mean age 26±4.69 years were included. Pre-operatively, mean SE was-22.89±3.04D(-16.5 to –28 D), decreased to -3.40±1.89D after ICL, reduced to -0.48±0.24D after correction with SMILE. Cylinder reduced from -2.88± 1.69D pre-op to -1.93±1.07D post ICL, and -0.38±0.24D post SMILE. CDVA significantly improved from 0.38± 0.22 to 0.068±0.09 LogMAR after SMILE (p=0.00). Mean UDVA at the end of follow-up was 0.15±0.09 LogMAR with all eyes achieving UDVA ≥0.3LogMAR. All eyes had gain in CDVA with 53% eyes gaining 2 or more lines. No complications were observed. No patient required spectacles, enhancement for improvement of vision.

Conclusions:
Bi-optics with SMILE following ICL implantation may be a valid option for extremely myopic patients resulting in significant improvements in visual acuity and high patient satisfaction. Financial disclosure of all authors - Dr. Sri Ganesh and Dr. Sheetal Brar are consultants for Carl Zeiss Meditec

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Laser-Assisted In Situ Keratomileusis Long Term Outcomes in Late Adolescence

Presenting author: Jorge Alio del Barrio, Spain

Purpose:
Evaluate the long term outcomes of myopic-LASIK in a late adolescent population (age ≥17 and under 20 at the time of surgery).

Setting:
Cornea, Cataract and Refractive Surgery Unit, Vissum (Miranza Group), Alicante, Spain.

Methods:
Monocentric retrospective case series study. Eyes with at least 3 years of follow-up time were included. Primary outcome measures were long term efficacy, safety and stability of the refractive error. Secondary outcome measure was the evaluation of the relation between the postoperative spherical aberration and the long term stability of the refractive error. 47 eyes (25 patients) were included. Mean follow-up was 9.23±3.16 years. Mean age at the time of surgery was 18.74±0.44 years.

Results:
With time, postoperative UDVA showed a mild but significant deterioration of 1-2 Snellen lines (p=0.012), in connection with a mild but significant myopization of the SE (mean increase of -0.43D; p=0.001), sphere (mean increase of -0.29D; p=0.004) and cylinder (mean increase of -0.16D; p=0.013). CDVA remained stable over time (p=0.04). Efficacy index decreased from 1.01 to 0.87 in the long term (77% UDVA≥20/32). Safety remained at 1.06. 66% and 74% of eyes presented a SE within ±0.50D and ±1.00D respectively. SE changed over 0.50D in 33% of eyes.

Conclusions:
Myopic-LASIK in late adolescence is safe and effective, but a mild myopic progression occurs. Despite presence of refractive stability is preferable, if necessary, myopic LASIK provides relatively good outcomes in the long term in this young population. No correlation could be detected between the SE and the postoperative spherical aberration. No cases of corneal ectasia were detected.

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Clinical outcomes of PresbyMAX monocular ablation profile in myopic presbyopia patients.

Presenting author: David Sung Yong Kang, Korea, Republic of

Purpose:
To investigate the clinical outcomes after presbyopia correction using the PresbyMAX monocular profile in myopic presbyopia patients.

Setting:
Department of Ophthalmology, Severance Hospital, Yonsei University College of Medicine, and Eyereum Eye Clinic, Seoul, South Korea.

Methods:
Ninety-two patients with myopic presbyopia received treatment with PresbyMAX monocular mode. Dominant eye received aberration-neutral LASIK, and non-dominant eye received a bi-aspheric PresbyMAX ablation profile. Visual acuity measurement, manifest refraction, slit-lamp examination, autokeratometry, corneal topography, and evaluation of corneal wavefront aberration were investigated preoperatively and at 1, 3, and 6 months after surgery.

Results:
At 6 months after surgery, 89% of subjects showed 20/20 or better binocular uncorrected distant visual acuity (UDVA), and all subjects showed 20/25 or better binocular UDVA. Seventy-five subjects (82 %) showed J1 or better binocular uncorrected near visual acuity (UNVA), and all subjects showed J2 or better binocular UNVA.

Conclusions:
Application of PresbyMAX monocular profile to myopic presbyopia patients showed effective and safe clinical outcomes. The PresbyMAX can be a treatment option for presbyopia patients.

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Comparison between the change in total corneal astigmatism and actual change in refractive astigmatism in transepithelial photorefractive keratectomy, laser in situ keratomileusis and femtosecond laser assisted laser in situ keratomileusis

Presenting author: Ivan Gabric, Croatia

Purpose:
To compare changes in astigmatism by refraction and total corneal astigmatism after tPRK, LASIK and FsLASIK.

Setting:
University Eye Hospital Svjetlost, Zagreb, Croatia

Methods:
Patients with a stable refraction (-0.75DS to -8.00DS, astigmatism ≤1.00DC) underwent tPRK, LASIK or FsLASIK without complication. Astigmatism was measured at both corneal surfaces over the central 3.2mm zone (approximately using Pentacam HRTM) at pre-and 3 months postop. Pentacam and refraction data were subjected to vector analysis to calculate the surgically induced changes in i) total corneal astigmatism (SIATCA) ii) any astigmatism by refraction (SIAR) and the vectorial difference (DV) between SIATCA and SIAR.

Results:
Reporting key findings ($p<.01$), there was a significant difference between mean SIATCA and SIAR powers after tPRK (75eyes) but not after LASIK (100eyes) or FsLASIK (100eyes). Mean (±sd,95% CIs) values for DV powers were, tPRK -1.13DC(±0.71, -1.29 to -0.97), LASIK -0.39DC(±0.23,-0.44 to -0.34), FsLASIK -0.55DC(±0.38,-0.62 to -0.47). The differences were significant. For the tPRK and FsLASIK cases, linear regression revealed significant associations between I) SIATCA (x) &DV (z) powers (tPRK $z=1.586x-0.179$, $r= 0.767$, $p<.01$; FsLASIK $z =0.442x-0.303$, $r =.484$,$p<.01$), II) sines of SIATCA (x1) &DV (z1) axes (tPRK, $z1=0.523x1+0.394$, $r=.650$,$p<.01$; FsLASIK $z1=0.460x1-0.308$, $r=.465$,$p<.01$).

Conclusions:
tPRK is more prone to unintended changes in astigmatism. The difference between SIATCA & SIAR after tPRK or FsLASIK is mediated by SIATCA. Photoablating deeper regions of the cornea narrows the gap between SIATCA & SIAR.

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Effect of preoperative tear film stability and osmolarity in the healing of corneal epithelium and ocular discomfort after a photorefractive keratectomy surgery.

Presenting author: Rafael Cañones-Zafra, Spain

Purpose:
To evaluate preoperative tear film stability and osmolarity and its effect on the healing of the corneal epithelium and the ocular discomfort after bilateral photorefractive keratectomy (PRK) surgery.

Setting:
Clinica Novovision Madrid, Spain

Methods:
A total of 32 eyes scheduled to have PRK to correct myopia were evaluated preoperative to obtain an automated assessment of tear film stability through non-invasive Keratograph® tear breakup time (NIKBUT) and its tear film osmolarity. Ocular surface was evaluated at post-op days 1, 4, 7 and at the 1 month, measuring the diameter of the de-epithelized cornea and the degree of fluorescein punctate staining using the Oxford scale. A Visual Analogic Scale (VAS) pain evaluation was performed by the patient at every post-op visit.

Results:
Preoperative mean of inicial and mean NIKBUT was 13.66+/-7.04 sec (2.68-25), and 16.57+/-60.8 sec (6.17-25) respectively. Mean preoperative tear film osmolarity was 304.7+/-9.9 mOsm/L (288-325). No statistically significant correlations were observed between these two tear film parameters and the diameter of the de-epithelized cornea, the ocular pain, and visual or refractive outcomes. Only a statistically significant correlation was observed between a higher preoperative mean NIKBUT and a less grade of punctate staining in day 7 post-op (p:0.05 r:0.33).

Conclusions:
The current study shows no correlation between preoperative tear film stability and osmolarity and the healing of the corneal epithelium, the ocular discomfort, and visual or refractive outcomes after a PRK surgery. Only a higher mean NIKBUT seems to have a significant additional benefit in fluorescein punctate staining grade in the Oxford scale at day 7 post-op.

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PP580

Repeatability and agreement of horizontal visible iris diameter/white-to-white measurements between optical biometry, optical coherence tomography, slit scanning elevation and Scheimpflug combination placido disc corneal tomographers

Presenting author: Alexander Boyle, New Zealand

Purpose:
To assess the agreement and repeatability of horizontal visible iris diameter (HVID) or white-to-white (WTW) measurements between four imaging modalities; combination slit scanning elevation/placido tomography, infrared biometry, combination dual rotating scheimpflug camera/placido tomography and swept source anterior segment optical coherence tomography (AS-OCT).

Setting:
Cross-sectional study at the University of Auckland Cornea and External Eye Disease Service.

Methods:
A prospective study of 35 right eyes of healthy volunteers were evaluated using the Orbscan IIz, IOL Master 700, Galilei G2, and DRI Triton OCT devices. The inter-device agreement and repeatability of HVID/WTW measurements for each device were analysed.

Results:
Mean HVID/WTW values obtained by the Orbscan, IOL Master, Galilei G2 and OCT were 11.77 ± 0.40 mm, 12.40 ± 0.43 mm, 12.25 ± 0.42 mm, and 12.42 ± 0.47 mm, respectively. All pairwise comparisons revealed statistically significant differences in mean HVID/WTW measurements ($p=<0.01$) except for the IOL Master 700 - DRI OCT Triton pair ($p=0.56$). Mean differences showed that the OCT produced the highest HVID/WTW values, followed by the IOL Master 700, Galilei G2 and Orbscan IIz, respectively. The limits of agreement were large on all device pairs. There was high repeatability for all devices (ICC ≥ 0.980).

Conclusions:
The four devices exhibit high repeatability, but should not be used interchangeably for HVID/WTW measurements in clinical practice.

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PP581

Refractive Outcomes of Cataract Surgery Following INTRACOR Femtosecond Laser Treatment for Presbyopia

Presenting author: Tadas Naujokaitis, Germany

Purpose:
The outcomes of cataract surgery after INTRACOR femtosecond laser treatment for presbyopia still need to be assessed. The aim of this case series is to present the refractive outcomes in patients who received the INTRACOR treatment followed by the cataract surgery with an intraocular lens (IOL) implantation.

Setting:
International Vision Correction Research Centre (IVCRC), Department of Ophthalmology, Ruprecht-Karls-University of Heidelberg

Methods:
In this case series of patients who were treated with INTRACOR and subsequently underwent a cataract surgery, 6 eyes of 4 patients were included. Biometry was performed using the IOL Master (Carl Zeiss Meditec). For cataract surgery, IOL power was calculated using Holladay 1 formula and post-INTRACOR biometry without any adjustments. Retrospectively, pre-INTRACOR biometry was used to perform IOL power calculation with Haigis, Hoffer Q, Holladay 1, Holladay 2 and SRK/T formulas. Examinations were performed ≥4 months after the cataract surgery and included subjective refraction, visual acuity, defocus curve, corneal topography, aberrometry and anterior segment OCT imaging.

Results:
Cataract surgery was performed 0.7 to 5.2 years after the INTRACOR treatment. At ≥4 months postoperatively, UDVA ranged from 0.08 to 0.60 logMAR (mean 0.40, SD 0.23) and CDVA ranged from -0.02 to 0.14 logMAR (mean 0.07, SD 0.05). All patients had a hyperopic refractive error (spherical equivalent +0.25 to +1.63 diopters, mean +0.85, SD 0.48). The prediction error ranged from +0.54 to +1.85 diopters (mean +1.12, SD 0.44) using the post-INTRACOR biometry and from -0.58 to +0.91 diopters (mean +0.25, SD 0.50) using the pre-INTRACOR biometry. No considerable differences were detected in performance of different IOL calculation formulas.

Conclusions:
This case series raises the issue of hyperopic outcomes of cataract surgery following the INTRACOR treatment. The central corneal steepening created with the INTRACOR treatment may influence the K value, leading to the underestimation of the IOL power. The use of pre-INTRACOR biometry could potentially improve the postoperative refractive outcomes and that needs to be assessed in further studies.

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PP582

Ocular biometry in children and adolescents from 4 to 17 years

Presenting author: Ralph Michael, Spain

Purpose:
To evaluate ocular biometry in a large paediatric population as a function of age and sex in children of European decent.

Setting:
Children were examined as part of the LIFE-Child study (Leipzig Research Centre for Civilisation Disease), a population-based study in Leipzig, Germany.

Methods:
Altogether 1907 children, aged between 4 to 17 years, were assed with the Lenstar LS 900. Data from the right eye was analysed for axial length, central corneal thickness, flat and steep corneal radii, aqueous depth, lens thickness and vitreous depth.

Results:
Axial length at 4 years was 0.63 mm shorter in girls but increased at the same rate as in boys until 14 years of age. Boys reached the same axial length as girls at 10 years. No change was observed for central corneal thickness. Corneal curvature in girls increased somewhat between 4 and 10 years, whereas it was constant in boys. Aqueous depth increased also at the same rate in girls and boys from 4 to 10 years. Lens thickness decreased from 4 to 11 years in girls and from 4 to 12 years in boys.

Conclusions:
Eye growth (axial length) in girls showed a lag of about 4 years compared to boys. Aqueous depth increase matches the lens thickness decrease from 4 to 10 years in girls and boys. Lens thickness minimum is reached at 11 years in girls and at 12 years in boys. All dimensions of the optical ocular components are closely correlated with axial length. This data may serve as normative values for assessment of eye growth in Central European children and will provide a basis for monitoring of refractive error development..

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Refractive

PP583

Tear film instability as a predictor of dynamic optical quality after cataract surgery

Presenting author: João Heitor Marques, Portugal

Purpose:
Aiming to improve visual results and patient satisfaction after cataract surgery, our purposes were to evaluate the tear film and its impact on dynamic optical quality and to find preoperative markers of good postoperative optical quality. Given that antibiotic and anti-inflammatory eye drops may influence the outcomes, patients were also evaluated 3 months after surgery when the effect of these eye drops had been washed out.

Setting:
Department of Ophthalmology, Centro Hospitalar Universitário do Porto, Porto, Portugal.

Methods:
This study included 70 patients (140 eyes) with need for bilateral cataract surgery and without other anterior segment abnormalities. One eye was compared before and 1 month after surgery and the fellow eye was compared 1 month and 3 months after surgery. Optical scatter index (OSI, HD Analyzer, Visiometrics ®) was dynamically measured 40 times in a 20 second period as a function of tear film stability. Minimum (minOSI), maximum OSI (maxOSI) and OSI amplitude (ampOSI) were considered in that period. Tear film osmolarity and basal tear flow using the Schirmer test I with anesthetic eye drops were also evaluated.

Results:
Mean age was 72.8±6.3 [57.5-85.0]. Preoperatively, minOSI was 4.7±3.3 [0.68-14.9] and maxOSI was 7.5±4.5 [1.43-17.0]. Significant changes from preoperative to month 1 were: minOSI, Δ=-2.5±3.4, p=0.001 and maxOSI, Δ=-2.8±5.5, p=0.001. There were no significant changes from month 1 to month 3 (p≥0.153 for all tests). At month 3, minOSI was 2.0±1.7 [0.5-9.4] and maxOSI was 3.7±2.8 [0.74-14.6]. In 41% of patients postoperative OSI interval crossed the preoperative one. There were no associations of preoperative tear osmolarity or flow with postoperative optical quality (p≥0.150 for all tests). Preoperative ampOSI correlated with postoperative maxOSI (r=0.328, p=0.009) and ampOSI (r=0.338, p=0.007).

Conclusions:
As expected, minimum OSI, that conveys the maximum optical quality after blinking, decreases significantly after surgery. However, a dynamic analysis revealed that postoperative optical quality drops as the eye dries and may reach maximum OSI values that, in some patients, are similar to preoperative ones. Automatically measured preoperative OSI amplitude does not seem to change after surgery and, unlike osmolarity or Schirmer, it may be a good predictor of postoperative optical quality. In conclusion, preoperative dynamic optical quality analysis can flag cases that particularly require tear film optimization together with cataract removal to obtain maximum optical quality and patient satisfaction.

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Refractive

PP584

Efficacy and safety after toric posterior chamber implantable collamer lens and toric iris-fixated foldable phakic intraocular lens for myopic astigmatism

Presenting author: Christophe Pinto, Portugal

Purpose:
To compare visual, refractive, and safety outcomes of toric posterior chamber implantable collamer lens (T-ICL) and toric iris-fixated foldable phakic intraocular lens (T-Artiflex) implantation for the correction of myopic astigmatism.

Setting:
Ophthalmology Department, Hospital de Braga, Portugal.

Methods:
This retrospective cohort study included 312 eyes of 312 subjects submitted to phakic intraocular lens implantation for myopic astigmatism. Two groups were defined: group 1 comprised 205 eyes that underwent T-ICL implantation; group 2 comprised 107 eyes that underwent T-Artiflex implantation. Safety, efficacy and predictability outcomes were evaluated preoperatively and at 12 months postoperatively. Refractive and corneal astigmatic vector analysis were performed by Alpins method.

Results:
One-year postoperatively, uncorrected visual acuity was 0.05±0.18 (T-ICL) and 0.10±0.16 logMAR (T-Artiflex), with efficacy indexes of 1.16±0.27 and 1.05±0.31 ($p<0.001$). Safety indexes were 1.28±0.30 and 1.21±0.31, respectively ($p=0.04$). Spherical equivalent was within ±0.5D of emmetropia in 165 (80.5%) and 88 (82.2%) eyes, respectively. Refractive astigmatic analysis showed an index of success of 0.28±0.33 (T-ICL) and 0.31±0.26 (T-Artiflex) ($p=0.07$). Surgically induced corneal astigmatism was 0.48±0.74D and 0.81±0.61D, respectively ($p<0.001$). Mean endothelial loss was 1.11% and 2.05%, respectively ($p=0.42$). Six (2.9%) eyes of T-ICL and one (0.9%) eye of T-Artiflex were surgically repositioned due to significant lens misalignment. No vision-threatening complications occurred.

Conclusions:
Both T-ICL and T-Artiflex showed high visual and refractive efficacy with good safety profile for the correction of myopic astigmatism. T-ICL showed better visual correction at 1-year evaluation. Vector analysis showed similar refractive astigmatic correction in both groups. However, T-Artiflex implantation revealed significantly higher surgically induced corneal astigmatism.

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Refractive

PP585

Functional outcomes after binocular implantation of a continuous-range-of-vision IOL in refractive lens exchange patients

Presenting author: Ramin Khoramnia, Germany

Purpose:
Clinical evaluation of a diffractive continuous-range-of-vision IOL, that combines bifocal and extended depth of focus technologies, regarding visual performance at different distances, contrast sensitivity under different lighting conditions and defocus curve.

Setting:
University Eye Clinic Heidelberg, Germany

Methods:
In an ongoing clinical study, bilateral implantation of the TECNIS Synergy IOL (Johnson & Johnson, New Brunswick, NJ) is performed in 56 eyes of 28 patients during a refractive lens exchange procedure. Postoperative follow-up at 3 months includes uncorrected (UDVA) and corrected (CDVA) distance visual acuity, uncorrected (UIVA) and distance corrected intermediate (DCIVA) visual acuity at 80 cm distance, uncorrected (UNVA) and distance corrected (DCNVA) near visual acuity at 40 cm distance. Defocus curve testing with distance correction and contrast sensitivity testing under photopic and mesopic conditions were also part of the 3 months follow-up visit.

Results:
UDVA and CDVA were -0.05 ± 0.06 and -0.12 ± 0.05 logMAR. UIVA and DCIVA were -0.08 ± 0.05 and -0.10 ± 0.04 logMAR, UNVA and DCNVA were 0.00 ± 0.07 and -0.03 ± 0.08 logMAR. The defocus curve revealed a visual acuity of ≥ 0.2 logMAR from +0.75 to -3.25 diopters. Photopic contrast sensitivity at spatial frequencies 3.0, 6.0, 12.0 and 18.0 was 1.65 ± 0.19, 1.72 ± 0.18, 1.41 ± 0.19 and 1.03 ± 0.19 log units. Mesopic contrast sensitivity at the same frequencies was 1.49 ± 0.19, 1.37 ± 0.22, 0.80 ± 0.37 and 0.37 ± 0.32.

Conclusions:
The TECNIS Synergy IOL provided very good distance, intermediate and near visual outcomes. A visual acuity of ≥ 0.1 logMAR is achieved from +0.50 to -3.00 diopters.

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Refractive

PP586

Visual and refractive outcomes after cataract surgery or refractive lens exchange with implantation of a trifocal IOL in eyes following radial keratotomy

Presenting author: Jérôme VRYGHEM, Belgium

Purpose:
To evaluate the visual and refractive outcomes after cataract surgery or refractive lens exchange with implantation of a trifocal IOL in eyes following radial keratotomy.

Setting:
Brussels Eye Doctors, Brussels Belgium.

Methods:
Since 2015, 29 post-RK patients (48 eyes) were enrolled to undergo cataract surgery or refractive lens exchange with implantation of a trifocal IOL. In 24 eyes a toric trifocal IOL was implanted (PhysIOL SA, Liège, Belgium). Monocular and binocular uncorrected (UDVA) and corrected (CDVA) distance visual acuity, binocular distance corrected intermediate visual acuity (DCIVA) at 100 cm and binocular distance corrected near visual acuity (DCNVA) at 40cm was evaluated 1M and 6M postoperatively. The postop-refraction was analyzed . The rate of laser touch-up was recorded. A questionnaire was submitted to the patients to evaluate satisfaction and side effects.

Results:
The mean age of the patients was 61.0 years. After 1 month, there was a follow-up rate of 100% (48 eyes). Mean postoperative spherical equivalent was -0.46D (range -4.75 to 2.0). 12 eyes had a femto-LASIK touch-up. After 6 months, there was a follow-up rate of 40% (19 eyes). The mean post-operative spherical equivalent was -0.63 (range -2.0 to 0.25) with 58% of eyes within +/- 0.50D. 5 extra eyes had a femto-LASIK touch-up. There was an increase in BCVA in 22% of patients (gained 2 lines+), there was a decrease in BCVA in 16% of patients (lost 2 lines).

Conclusions:
The average subjective patient's satisfaction was 75% after 1M and 80% after 6M. Extra examinations are scheduled to increase the follow-up rate.

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Refractive

PP587

A prospective, randomized comparative study of two commercially available trifocal IOLs in a Turkish patient population

Presenting author: Aylin Kilic, Turkey

Purpose:
To compare the effectiveness of two commercially available trifocal intraocular lenses intended for the correction of presbyopia

Setting:
Department of Ophthalmology Medipol Mega University Hospital Istanbul, Turkey

Methods:
This is a single-center, investigator-initiated, randomized clinical study of adults suitable for phacoemulsification cataract surgery or refractive lens exchange, with or without astigmatism correction. Patients were randomized 1-to-1 to receive bilateral implantation of either the AcrySof IQ PanOptix IOL (Alcon, Ft Worth Texas) (study lens) or the Trinova IOL (VSY Biotechnology GmBH, Leinfelden-Echterdingen, Germany) (control lens). The primary effectiveness endpoint is superiority of binocular distance corrected intermediate visual acuity at 60 cm (DCIVA), with secondary assessments including uncorrected distance, intermediate (60 cm) and near (40 cm) visual acuity, contrast sensitivity, defocus curves and visual disturbance assessment.

Results:
To date, 17 patients have been enrolled in the study lens arm and 19 in the control lens. Mean patient age was 53 years (40 to 60). Mean preoperative spherical equivalent (SE) was 1.05±2.50 D (+5.25 to -11 D) and mean cylinder was -0.48±0.43D (range -1.75 to 0 D). At 3-months, mean SE was 0.11±0.28D in the test group and -0.10±0.73D in the control group. Mean binocular logMAR UDVA was -0.03±0.11 (test) and 0.01±0.06 (control). Mean binocular logMAR UIVA was 0.04±0.04 (test) and 0.22±0.09 (control); binocular DCIVA 0.03±0.07 (test) and 0.13±0.11 (control) and binocular UNVA 0.02±0.04 (test) and 0.19±0.14 (control).

Conclusions:
The initial analysis of this comparative trifocal IOL study indicate very good refractive outcomes with the first patients achieving excellent intermediate, near and distance visual acuity in both groups; The initial results indicate superiority of the PanOptix IOL for the primary endpoint of improvement in DCIVA, with a greater improvement in binocular intermediate vision by over 1 line.

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Refractive

PP588

Initial experience with a new continuous-range-of-vision intraocular lens

Presenting author: Jan Venter, United Kingdom

Purpose:
To evaluate our initial experience with a new TECNIS Synergy ZFR00V premium IOL indicated for patients looking for an improved continuous-range-of-vision.

Setting:
Setting: Private Refractive Surgery (Optical Express) UK

Methods:
Outcomes of 93 presbyopic patients who underwent cataract surgery or refractive lens exchange with bilateral implantation of the TECNIS Synergy ZFR00V were reviewed. The age range of patients was 41 to 74 years, with pre-op refractive range of +5.25D to -5.25D and up to -2.25D of astigmatism. Postoperative clinical safety and efficacy outcomes up to 14 months following implant were analysed.

Results:
Mean postoperative binocular distance visual acuity was +0.01 logMAR (range -0.18 to +0.22); intermediate visual acuity was 0.23 logMAR (range 0.00 to +0.54); and near visual acuity was 0.16 logMAR (range -0.08 to +0.50). The mean gain of lines for distance visual acuity was 5, lines gained of intermediate was 4 and 4 lines of near visual acuity. Two patient eyes recorded a loss > 2 lines of BCDVA. No intraoperative or early postoperative adverse events related to the IOL have been noted.

Conclusions:
Initial results suggest this new continuous-range-of-vision IOL may be a good alternative for patients looking for meaningful gains in uncorrected visual acuities at distant, intermediate, and near ranges. A larger sample size and longer follow-up is warranted to better understand the comparative performance of this IOL

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PP589

Pain Alleviation with Oral Gabapentin after Trans-epithelial Photo-refractive Keratectomy Laser Surgery

Presenting author: Hamidreza Hasani, Iran, Islamic Republic of

Purpose:
To evaluate the effect of oral gabapentin on pain control in the first three days after trans-epithelial photorefractive keratectomy (T-PRK).

Setting:
Bina eye hospital

Methods:
This randomized clinical trial study was conducted on 88 patients who were candidates for T-PRK surgery. In group A, 44 patients received standard treatment including topical betamethasone, chloramphenicol, artificial tears and contact lens; but in group B including 44 patients, oral gabapentin (300mg daily) was added to standard treatment. Post op date 3 after surgery, patients were evaluated for duration of epithelial repair, pain, epiphora, burning sensation, photophobia and foreign body sensation.

Results:
43 patients (49%) were female and 45 (51%) were male. Numeric Scale of Pain showed that the severity of pain was 3.5±0.4 in group A, and 1.4±0.5 in group B, which the difference was significant (p=0.03). Also, there was no difference regarding the burning sensation (p=0.35), epiphora (p=0.24), foreign body sensation (p=0.44) and photophobia (p=0.19).

Conclusions:
Oral gabapentin decrease post TPRK surgery pain in the first three days after operation.

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PP590

Comparison of corneal aberrometry and keratometry with Scheimpflug tomography and Ray Tracing aberrometer

Presenting author: Zahra Ashena, United Kingdom

Purpose:
To assess the anterior corneal wavefront aberrations, keratometry and astigmatism vectors between Pentacam HR® tomographer (Oculus Optikgeraete GmbH; Wetzlar, Germany) and iTrace® aberrometer (Tracey Technologies Corp. Houston, TX)

Setting:
Sussex Eye Hospital, Brighton and Sussex University Hospital, Brighton, United Kingdom.

Methods:
100 eyes of 50 volunteers were scanned in mesopic light condition with Pentacam HR® and iTrace® between May and August 2020. The exclusion criteria consisted of any ocular pathology or corneal scarring, high refractive errors (spherical equivalent > ±3D), high refractive cylinders (> 1.5D) and history of previous ocular surgery including laser refractive surgery. Anterior corneal aberrations (spherical aberration (Z40), vertical coma (Z3-1), horizontal coma (Z3+1)), keratometry in the flattest (K1) and steepest meridian (K2), mean keratometric astigmatism, astigmatic vectors (J0 and J45), and pupil size in mesopic condition were measured.

Results:
There was a significant difference in Z40 (Pentacam®: +0.30µm± 0.11 and iTrace®: -0.03µm± 0.05; $p<0.01$) with no correlation between the devices ($r = -12$, $p= 0.22$). The devices were in complete agreement for Z3-1 ($p=0.78$) and Z3+1 ($p=0.39$) with significant correlation between the machines ($r= -0.38$, $p<0.01$ and $r= -0.6$, $p<0.01$). There was no difference in K1, K2 and mean keratometric astigmatism. J0 was negative with both machines (against-the-rule astigmatism) but there was no correlation between them. J45 was only negative with Pentacam® (more myopic oblique astigmatism) but there was a significant correlation between the machines. Pupil size was smaller with Pentacam® ($P<0.01$).

Conclusions:
Pentacam HR® and iTrace® cannot be used interchangeably. Corneal Z40 was significantly different between Pentacam HR® and iTrace® with more negative Z40 with iTrace® due to a larger corneal surface scan (7mm compared to 6mm with Pentacam HR®). iTrace® operates with lower illumination giving larger pupil size compared to Pentacam HR®, which uses intense blue light during measurement. No correlation was found for J0 compared to J45 between the machines. Pentacam HR® had a trend to record more negative J45 (myopic oblique astigmatism).

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PP591

Corneal wavefront assessment in myopic and hyperopic candidates to laser refractive surgery

Presenting author: David Smadja, Israel

Purpose:
Hyperopic corneas often appear with an asymmetric pattern on topography, although patients are not known to complain more of low visual quality. The goal of this study is to analyze corneal asymmetry metrics through corneal coma-like aberrations in both, myopic and hyperopic candidates, when centered on wavefront device standard location (pupillary center) or the patient's vertex (Purkinje centration).

Setting:
Ophthalmology Department, Hadassah Medical Center

Methods:
Retrospective case-control study using data from 100 myopic eyes and 40 eyes with hyperopia were included. Imaging and measurements were performed using the GALILEI Dual Scheimpflug Analyzer System. Corneal high order aberrations (CHOA), including vertical and horizontal coma like aberrations and spherical aberrations through a 6mm pupil size were extracted using the wavefront display platform. Values were then compared between the two corneal populations when calculated over the center pupil and the visual axis (purkinje image).

Results:
Significant differences were found between myopic and hyperopic corneas in coma like aberrations when calculated over the pupil center ($p < 0.05$). Significantly higher horizontal coma was found in hyperopic group as compared to myopic, respectively 0,48 +/- 0,1µ. and 0,18 +/- 0,1 RMS. This higher level of coma like aberrations decreased significantly in the hyperopic group (0,15+/-0,1µ RMS; $p < 0,05$) when maps where re-centered and calculated over the Purkinje image.

Conclusions:
Although apparent asymmetric pattern is common in hyperopic corneas, evaluation of coma-like aberrations over the Purkinje image instead of pupil center might help to better assess the optical symmetry of hyperopic corneas by being closer to the patient eye's optical system function, and rule out other possible cause of corneal asymmetry. In addition, it might have strong implications in laser refractive center ablation for hyperopic patients.

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PP592

Scleral Fixation of Akreos AO60 Intraocular Lens Using Gore-Tex Suture: An Eye On Visual Outcomes and Postoperative Complications

Presenting author: Mariana Leuzinger-Dias, Portugal

Purpose:
"In-the-bag" placement of an IOL is the holy grail for any cataract surgeon. However, in the absence of capsular integrity, alternative surgical options to place the IOL must be sought out. We aim to report the clinical outcomes and safety profile of ab externo scleral-fixated Akreos AO60 intraocular lens implantation using Gore-Tex suture.

Setting:
Department of Ophthalmology, Centro Hospitalar e Universitário de São João, Porto, Portugal.

Methods:
Single-center, Retrospective case series. Electronic clinical records of all patients submitted to scleral fixation of a Bausch and Lomb Akreos AO60 IOL were reviewed. Data concerning age, sex, laterality, pre- and postoperative best-available visual acuity, surgical indication and postoperative complications were collected. Considered outcomes were difference in best-available visual acuity and frequency of postoperative complications.

Results:
A total of 22 eyes from 21 patients were included. The mean age at time of surgery was 73,41+/-13,55 years. The mean follow-up period was 705,64 days (range 30-1431 days). Globally, the mean best available logMAR visual acuity improved from 1,42 preoperatively (0,22 decimal correspondent) to 0,46 postoperatively (0,55 decimal correspondent), this difference being statistically significant ($P<0.001$). Postoperative complications included ocular hypertension (27,3%; n=6), transient cornea edema (27,3%; n=6), cystoid macular edema (18,2%, n=4), self-limited hemovitreous (4,5%, n=1), self-limited hypotension (4,5%, n=1), and one case of late retinal detachment (4,5%). No suture related complications were observed namely iol displacements.

Conclusions:
There was a significant improvement in visual acuity after scleral fixation of Akreos AO60 intraocular lens using Gore-Tex suture, with a low ratio of relevant postoperative complications. Additionally, no suture related problems were recorded. As so, this seems to be a valuable alternative when "in-the-bag" placement of an IOL is not possible.

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PP594

Corneal Epithelial Thickness Evolution after Myopic Laser Corneal Refractive Surgery

Presenting author: Jorge Alió del Barrio, Spain

Purpose:
To evaluate the postoperative behavior of the corneal epithelium thickness after myopic femto-LASIK and SMILE by using a combined anterior segment OCT and placido disc topographer (MS39, CSO), and to detect relevant differences among both surgical techniques on this regard.

Setting:
Cornea, Cataract and Refractive Surgery Unit, Vissum (Miranza Group), Alicante, Spain

Methods:
Prospective, comparative, case series study. Visumax-500kHz as femtosecond laser (FS), and Amaris-750 as excimer laser were used for the correction of myopia with or without myopic astigmatism. All patients had complete visual and refractive examination preoperatively and at 1, 3 and 6 months postoperatively. Epithelial map measurements were performed using the MS39 at the same time points. Mean value of the epithelial thickness at the central area (diameter of 3 mm), and at the paracentral area (diameter of 3.0-6.0 mm) were analyzed.

Results:
77 LASIK-eyes were matched with 77 SMILE-eyes. Mean preoperative spherical equivalent (SE) was -3.92±1.67D for LASIK and -4.02±1.63D for SMILE; p=0.356. 1 month after surgery, corneal epithelium had increased significantly: +2.38µm at the central area (p<0.001), and +5.05µm at the paracentral area (p<0.001) for LASIK. After SMILE, +2.17µm at the central area (p<0.001), and +4.49µm at the paracentral central area (p<0.001). In both surgical techniques, corneal epithelial thicknesses remained stable thereafter without significant changes. No significant differences were found between LASIK and SMILE at the central epithelium thickness either preoperatively or at any postoperative time point (p>0.05).

Conclusions:
MS39 is able to detect a statistically significant increase in the central and paracentral cornea epithelial thicknesses after myopic laser vision correction with both SMILE and femtoLASIK techniques. Moreover, both surgical techniques show an equivalent epithelial thickening after surgery, without relevant differences between them.

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PP595

Initial outcomes with customized myopic LASIK, guided by automated ray tracing optimization: a novel technique

Presenting author: Ioanna Kontari, Greece

Purpose:
Safety and efficacy of a novel automated ray-tracing optimization in customization of excimer ablation in myopic LASIK part of a multi-center international study.

Setting:
Laservision.gr Clinical and Research Institute, Athens, Greece Multicenter international study RFP911-P001 by Alcon

Methods:
In a consecutive case series, 25 patients (50 eyes) undergoing femtosecond-laser assisted myopic LASIK were evaluated. The novel, artificial-intelligence platform, initially calculates the ablation profile based on a model eye for each case, based on interferometry axial length data. Low and high order aberrations calculation is performed by ray-tracing based on Wavefront and Scheimpflug tomography measurements, all from a single diagnostic device. Visual Acuity, refractive error, keratometry, topography, high order aberrations and contrast sensitivity were evaluated, over six months follow-up.

Results:
Change from pre- to 6 months post-operative: mean refractive error from -1 to -8 diopters (D) Refractive astigmatism from 0 to -4 D. TBA X % of eyes gained one line of vision and X % 2 lines. Pre- to post-operative high order aberrations average: RMSh changed from X um to X um. Contrast sensitivity improved X post-operatively.

Conclusions:
We report safe and effective preliminary outcomes with a novel excimer laser customization by ray tracing optimization, for myopic LASIK treatments, employing several independent up-till-now diagnostics and a customized eye model reference for each case. It bears the potential advantage through total eye aberration data and ray tracing refraction calculation to offer improved and more predictable visual outcomes.

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PP596

Trans-PRK in keratoconus for high order aberrations with ablation decentration in coma axis.

Presenting author: Luis Izquierdo Jr, Peru

Purpose:
To describe the visual and aberrometric results at 1, 3 and 6 months of patients with stable keratoconus who underwent surface ablation with trans-PRK technique for high order aberrations without correction of the sphero-cylindrical component with decentration of the ablation in the axis of the coma. The primary outcome is improvement in corrected distance visual acuity (CDVA).

Setting:
Instituto Oftalmosalud, Lima-Perú

Methods:
Prospective case series conducted between October 2020 to March 2020. Patients with stable keratoconus stages I to III (Amsler-Krumeich), minimum pachymetry 430 microns, CDVA worse than 20/20 and high-order aberrations greater than 1,00 microns were included. Trans-PRK was performed using the Amaris 1050 (Schwind eye-tech-solutions. Kleinostheim, Alemania), correcting high order aberrations, without sphero-cylindrical component, with a maximum consumption at the cone apex of 100 microns (µm), including ablation of epithelium and stroma. In all cases, decentration of the ablation was performed towards the axis of the coma. Follow-up was carried out at 1, 3 and 6 months.

Results:
The study included 25 eyes of 20 patients, the mean age at the time of surgery was 28 ± 7 (SD) years. The follow-up time was 7.6 ± two months. CDVA improved from 0.21 ± 0.05 LogMAR units at the baseline to 0.08 ± 0.04 LogMAR units in the last follow-up. Corneal high order aberrations decreased from 2.67 ± 1.06 µm to 2.11 ± 0.65 µm; coma decreased from 2.17 ± 1.07 µm to 1.75 ± 0.63. No patient presented a loss of CDVA lines. Until the moment of follow-up, no patient has shown signs of corneal ectasia.

Conclusions:
Trans-PRK for high-order aberrations is a safe option in stable keratoconus for improving CDVA and decreasing high-order aberrations. In all cases, there was an improvement in CDVA without signs of corneal ectasia.

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PP597

Performance Comparative of New Monofocal IOL with Enhanced Features for Intermediate Vision to Current Standard Monofocal Lens

Presenting author: David Teenan, United Kingdom

Purpose:
To compare the clinical and patient reported outcomes of a new TECNIS Eyhance ICB00 monofocal IOL with enhanced features for intermediate vision to a standard TECNIS ZCB00 monofocal intraocular lens

Setting:
Multi-Disciplinary Refractive Surgery Centre

Methods:
Data was reviewed on presbyopic patients who underwent cataract surgery or refractive lens exchange with either TECNIS Eyhance ICB00 monofocal, n=160 patients, or standard TECNIS ZCB00 monofocal IOL, n=1038 patients. Treatments were completed between October 2019 through March 2021. Patient age range was 40 to 85 years, with a preop refractive range of +6.00D to -11.00D sphere and up to -3.00D of astigmatism. Postoperative clinical safety and efficacy outcomes up to 12 months following implant were analysed.

Results:
Postoperative UCDVA was 0.00 logMAR and -0.01 logMAR for the ICB00 and ZCB00, respectively. UCDVA of 20/20 or better was achieved in 76.3% of ICB00 patients compared to 79.9% ZCB00 (p=0.2927). Postoperative UCIVA was +0.35 logMAR and +0.48 logMAR for ICB00 and ZCB00, respectively. ICB00 exhibited a mean gain of 7 lines UCDVA, while ZCB00 patients gained 8 lines. UCIVA gain was 6 and 5 lines for Eyhance ICB00 and ZCB00, respectively. Patient reported satisfaction was high for both cohorts at 92.0% and 89.8%, respectively (p>0.05). Reported difficulty with glare, halo or starburst was comparable between IOLs (p>0.05).

Conclusions:
The new TECNIS Eyhance ICB00 provides a safe and effective monofocal intraocular lens option. Performance is comparable to standard monofocal lens with some improvement to UCDVA and UCIVA within the first year. Patient reported satisfaction is also high postoperatively for TECNIS Eyhance ICB00. A larger sample size with longer follow-up is warranted.

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PP598

Selecting Patients for Laser Vision Correction - Automatic Ocular Surface Workup and Dynamic Optical Quality Analysis

Presenting author: João Heitor Marques, Portugal

Purpose:
After incorporating a complete and automatic ocular surface workup in candidates for LASER vision correction (LVC), our purpose was to show how this new approach changed patient's selection in our clinical practice. Our second purpose was to find correlations between patient´s habits or subjective complains and the objective analysis.

Setting:
Department of Ophthalmology, Centro Hospitalar Universitário do Porto, Porto, Portugal.

Methods:
This study included 33 consecutive candidates for LVC (n=66 eyes). Subjects underwent a questionnaire and biomicroscopy with fluorescein. The presence of visible punctate keratopathy (PK) was registered. Automatic ocular surface evaluation with IDRA® (SBM Sistemi) measured non-invasive tear break-up time (NIBUT, seconds), blink rate (BR, %), lipid layer thickness (LLT, %), loss area of the meibomian glands (MGL, %) and tear meniscus height (TMH, mm). Tear film osmolarity (OSM, mOsm/L) and basal tear flow using the Schirmer test I (BTF, mm) were also measured. Vision Break-Up Time (VBUT, seconds) was calculated with HD Analyzer® (Visiometrics).

Results:
Mean age was 32.3±5.4 years. Dry eye symptoms (n=38) were associated with reduced LLT (p=0.003); smoking (n=14) was associated with reduced BR (p=0.020) and screen time correlated with BTF (p=0.003) and VBUT (p=0.023). In eyes without symptoms or PK (n=28), outcomes ranged as follows: NIBUT [7.4-18.6]; BR [49-100]; LLT [15-100]; MGL [0-27]; TMH [0.16-0.55], BTF [2-35], OSM [284-331], VBUT [1-10]. We temporarily excluded for surgery 15% of eyes and changed the surgical plan in another 5% either due to low BTF, low NIBUT and/or high OSM. Most of the excluded eyes had no symptoms or PK (54% and 62%, respectively).

Conclusions:
Dry eye syndrome is complex and symptoms do not correlate perfectly with an objective evaluation. Even in patients without dry eye symptoms or changes visible on biomicroscopy, objective ocular surface measurements show large variability. Therefore, a purely clinical evaluation may not be enough to fully detect ocular surface disease. Incorporating automatic ocular surface analysis in the preoperative evaluation may contribute to enhance patient selection for LASER vision correction. Moreover, identifying patients that require ocular surface optimization beforehand may improve postoperative dry eye syndrome and patient satisfaction. In 20% of patients, objective ocular surface analysis changed our practice.

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Refractive

PP599

Correction Of Post Keratoplasty Refractive Error By 2 Step Femto-Lasik

Presenting author: Hazem Elnashar, Egypt

Purpose:
To show the different between correction of post keratoplasty refractive error by 2 step approach and 1 step approach

Setting:
the memorial institute for ophthalmic research

Methods:
A case series of 5 eyes (3 patients) underwent 2 step approach to correct post keratoplasty refractive error. The 1st step is to create the Lasik flap then reposit it without apply excimer laser , Aim of this step to cut all the adhesions between anterior corneal surface and stroma which lead to change in the refraction of the patient. The second step, usually this step done 6-8 weeks from 1st step, that we wait until new refraction become stable and apply excimer laser depending on the new refraction. Full examination was performed pre and post operative

Results:
The follow up period range from 6 months to 1 years. Only one intraoperative complication occurred in which perforation of the flap occurred during its elevation but finally can elevate the flap and complete operation. All eyes showed marked change in manifest refraction and k-reading after creation of flap so I wait for about 8 weeks until refraction become stable then apply excimer laser. the manifest cylinder change at least 3 degree between per and post creation of lasik flap and the change in manifest sphere was about 1 -3 degree .

Conclusions:
The use of Femto-lasik in correction of post keratoplasty refractive error is a safe and effective method. Doing the operation using 2 step approach gives more accurate results due to marked difference in refraction occurred after 1st step. Although Femto-lasik is a valuable tool in such cases, but sometimes it can't cut all adhesions which make the surgery a real challenge.

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Refractive

PP600

Surface ablation outcomes in high myopia with different epithelium removal techniques: comparison of alcohol-assisted and 2 different software of transepithelial PRK

Presenting author: Francesco D'Oria, Italy

Purpose:
To study the outcomes of alcohol-assisted PRK compared to transepithelial PRK (TranskPRK) using 2 different software, with or without Smart Pulse Technology (SmartSurfACE), in high myopia.

Setting:
Vissum Miranza. University Miguel Hernandez. Alicante. Spain

Methods:
Retrospective, consecutive, case series. High myopic eyes undergoing surface ablation. The main inclusion criteria were preoperative spherical equivalent above -5.50 diopters (D) and no other ocular surgeries. Mitomycin C (MMC) was used in all the surgeries. The outcomes were analyzed using the 6 months follow-up visit data.

Results:
135 eyes were included. 65 eyes had alcohol-assisted PRK, 32 TransPRK1 and 38 TransPRK2. The mean “all groups” preoperative sphere, cylinder, and spherical equivalent (SE) were -6±0.87, -1.13±1.03 and -6.57±0.69, respectively. The mean efficacy was 0.91±0.18 in alcohol-assisted PRK, 0.98±0.1 in TransPRK1 and 0.98±0.12 in TransPRK2 (p=0.027). The mean safety index was 0.99±0.05 in alcohol-assisted PRK, 1±0.06 in TransPRK1 and 0.99±0.08 in TransPRK2 (p=0.780). A final SE of ± 0.5 D was achieved in 96.9% of eyes in the TransPRK1 group and in 100% eyes in the TransPRK2 group compared to 73.8% in the alcohol-assisted PRK group (p<0.001).

Conclusions:
Surface ablation with the Amaris 500 excimer laser with a flying spot pattern and MMC use show adequate refractive outcomes in high myopia correction in the three groups. TransPRK with or without SPT achieved statistically significant better outcomes than alcohol-assisted PRK in terms of refractive predictability and efficacy.

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Refractive

PP601

Comparison between refractive change and keratometric change after small incision lenticule extraction.

Presenting author: David Sung Yong Kang, Korea, Republic of

Purpose:
To compare refractive and keratometric changes after small incision lenticule extraction

Setting:
Eyereum Eye Clinic

Methods:
At last follow-up, 1001 eyes (of 613 patients) were analysed. The dioptric correction has been assessed using equivalent approaches for refractive and keratometric changes.

Results:
Manifest refraction showed a systematic undercorrection, although the change in keratometries did not. Astigmatism was reduced both in refraction and keratometries (p<.00001). Positive SphAb has been induced (+0.10±0.09D, p<.00001) and the induction correlated to the attempted Seq correction with an induction of 0.06µm of SphAb per each diopter of aimed Rx SEq correction. Accordingly corneal oblateness has been induced (at a higher rate than that of an aberration neutral profile) (+0.4±0.3). There was an unexpected MRx undercorrection relative to the achieved change in average K-readings (-0.7±0.5D, p<.00001) (-0.3D intercept and -22% underestimation). This difference correlated to the induced corneal SphAb.

Conclusions:
Refractive correction shows an apparent undercorrection in MRx but not in K-readings. MRx changes do not seem to properly reflect K-readings changes after small incision lenticule extraction. SphAb and Oblateness have been induced at a moderate rate (similar but not less than that of modern excimer laser corrections). The induction of SphAb may be one of the reasons to explain the difference between changes in average K-readings and deviation from intended MRx.

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Refractive

PP602

Topography-guided LASIK - One-year outcomes of a prospective study

Presenting author: Edward Manche, United States

Purpose:
To evaluate outcomes of topography-guided LASIK in the treatment of myopia with and without astigmatism as part of a prospective study. Outcome measures include quality of vision and quality of life metrics, high contrast snellen acuity, low contrast snellen acuity (5 and 25%), safety, predictability, efficacy, HOA analysis, changes in epithelial thickness maps using anterior segment ocular coherence tomography (AS-OCT).

Setting:
University based academic refractive surgery clinic

Methods:
Sixty eyes of 30 consecutive myopic patients underwent topography-guided LASIK surgery using the Allegretto excimer laser system. Topography-guided treatments were captured and planned on the Contoura topolyzer system. Mean preoperative spherical equivalent refraction was -3.39 +/-1.80 diopters. Mean preoperative cylinder was and -0.66 +/- 0.75 diopters. Epithelial thickness maps were analyzed centrally, superiorly, inferiorly, nasally and temporally preoperatively and at postoperative months one, three, six and twelve.

Results:
At post-op month twelve, with 40 eyes of 20 patients available for follow-up, mean spherical equivalent refraction was -0.11 +/- 0.29 diopters. Mean cylinder was -0.31 +/- 0.31 diopters. At post-op month twelve, 90% of eyes had an UDVA of 20/20 and 70% of eyes had an UDVA of 20/16. No eyes lost more than 2 lines of corrected distance visual acuity at the twelve-month postoperative visit. There was progressive thickening of the central and paracentral corneal epithelium with progressive thinning of the peripheral corneal epithelium measured with anterior segment ocular coherence tomography over the twelve month postoperative time period.

Conclusions:
Topography-guided LASIK is safe, effective and predictable in the treatment of patients with myopia with and without astigmatism. Patients reported a high level satisfaction with the outcome of their LASIK surgery. Progressive changes in corneal epithelial thickness maps were seen between the pre-operative visit and the twelve-month post-operative month visit.

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Refractive

PP604

SMILE versus Wavefront-guided LASIK: One year outcomes

Presenting author: Edward Manche, United States

Purpose:
To compare outcomes between wavefront-guided LASIK and SMILE surgery in the treatment of myopia with and without astigmatism in a prospective, randomized eye to eye study. Outcome measures include quality of vision and quality of life metrics, high contrast snellen acuity, low contrast snellen acuity (5 and 25%), safety, predictability, efficacy and higher order aberration analysis.

Setting:
University based academic refractive surgical service

Methods:
Eighty eyes of 40 consecutive patients underwent wavefront-guided LASIK surgery in one eye and SMILE surgery in their fellow eye. Eyes were randomized according to ocular dominance. The mean pre-operative spherical equivalent refraction was -3.79 +/- diopters and -3.93 +/- 1.70 diopters in the wavefront-guided group and SMILE group respectively (p = 0.93).

Results:
At one year, with 70 eyes of 35 patients available for follow-up, mean spherical equivalent refraction was -0.11 +/- 0.17 diopters in the LASIK group and -0.15 +/- 0.17 diopters in the SMILE group (p = 0.73). At one year, 94% and 83% of eyes had an UDVA of 20/20 in the LASIK and SMILE groups respectively. Seventy-seven and 6% of eyes gained one or more lines of corrected distance visual acuity in the LASIK and SMILE groups respectively (p <; 0.05). There were no significant differences in the induction of HOA's between the two groups.

Conclusions:
Wavefront-guided LASIK and SMILE have similar clinical outcomes with excellent safety, efficacy and predictability in both groups. Wavefront-guided ASIK has faster recovery of uncorrected visual acuity, better 5 and 25% low contrast acuity and greater gains in corrected visual acuity compared to SMILE surgery.

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Refractive

PP605

Outcomes of PresbyMAX modified biaspheric excimer laser ablation profile for the correction of presbyopia

Presenting author: Masara Laginaf, United Kingdom

Purpose:
To assess the efficacy, safety and quality of vision after application of PresbyMAX monocular modified biaspheric excimer laser ablation profile for the treatment of presbyopia.

Setting:
Two surgeon, private practice, London, UK

Methods:
A retrospective study of 32 patients (n=32) undergoing FemtoLASIK for presbyopia was performed. Patients were treated to correct distance ametropias and presbyopic symptoms simultaneously. In all cases, the dominant eye was targeted for emmetropia with an aberration-free wavefront optimised ablation profile. The non-dominant eye was treated to target -1.19 Diopters of Myopia with a monocular modified biaspheric PresbyMAX addition of +1.50 Diopters adjusted for by refraction. Corrected and uncorrected distance and near visual acuity, refraction and quality of vision were assessed. Patients were followed up at one day, week one, 6 weeks and 3 months.

Results:
10 myopic and 22 hypermetropic patients with mean age of 52.7 years were identified. All patients achieved binocular uncorrected distance visual acuity (BUDVA) of 0.10 LogMAR or better, with 93.8% achieving BUDVA of 0.00 LogMAR or better. Mean BUDVA was 0.07 (SD 0.08) LogMAR. All patients achieved binocular uncorrected near visual acuity (BUNVA) of 0.4 LogMAR or better, with 90.6% achieving BUNVA of 0.2 LogMAR or better. Mean BUNVA was 0.13 (SD 0.11) LogMAR. All patients achieved satisfactory neuroadaptation within 6 weeks and no dysphotopsia. 72% of patients reported excellent quality of vision and 2 patients (6.3%) required an enhancement.

Conclusions:
This modification of a biaspheric ablation profile for presbyopia successfully achieves the appropriate balance between quality of vision and spectacle independence in presbyopic patients, with an excellent safety profile. Previous versions of this biaspehric profile have seen greater reports of quality of vision problems and reduction in UDVA. The results of this study support more widespread adoption of a lower PresbyMAX addition and greater myopic target in the non-dominant eye to optimise patient satisfaction.

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Refractive

PP606

10-year outcome of topography-guided transepithelial surface ablation for refractive myopia treatment

Presenting author: Giacomo Branger, Switzerland

Purpose:
To evaluate 10-year results in terms of efficacy, safety, and patient satisfaction in the refractive treatment of myopic eyes undergoing topography-guided transepithelial surface ablation using a 1KHz excimer laser.

Setting:
Tertiary referral center, Lucerne, Switzerland

Methods:
This retrospective study assessed preoperative visual and refractive data of 166 eyes of 106 patients (54% females) with a mean patient age of 36 (± 8.6) years 10 years after surface ablation for refractive myopia treatment. Risk for haze formation and loss of vision were evaluated. Patient satisfaction 10 years after the treatment was analysed using a non-validated questionnaire with regards to visual outcome, dry eye and visual symptoms.

Results:
Mean preoperative spherical equivalent (SE) was -4.23 (± 2.48) diopters (D). Uncorrected distant visual acuity (UCVA) after 10 years was ≥1.0 (Snellen) in 92% of the eyes. Manifest SE was within ± 1.0 D of the desired refraction in 86% of the eyes after 10 years. No haze was detected 10 years postoperatively. Mean quality of life improvement (QOL) was high (9.15 out of 10 points). Dry eye symptoms were reported by 35 out of 104 (34%) patients. Visual symptoms like halos or starburst were reported by 24 out of 101 (24%) and 12 out of 100 (12%) patients respectively.

Conclusions:
Topography-guided transepithelial surface ablation for myopia provided stable long term results in terms of UCVA and SE. Spontaneous resolution of postoperative haze was documented in all patients after 10 years. Patient satisfaction was high with only low rates of dry eye or visual symptoms such as halo or starburst.

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Refractive

PP607

The efficacy, safety and predictability in transepithelial photorefractive keratectomy versus Lasik/mPRK/LASEK/Smile – a meta-analysis

Presenting author: Alexandra Serfözö, Germany

Purpose:
The aim of this study was to compare the efficacy, safety and predictability of transepithelial photorefractive keratectomy (TransPRK) versus Lasik/mPRK/LASEK/Smile.

Setting:
Department of Ophthalmology, Saarland University Medical Center UKS, Homburg/Saar, Germany

Methods:
The design of this study is a meta-analysis and the data collection was retrospective. Relevant studies were collected from Medline and included when meeting the following predefined criteria: randomized controlled trials, comparison of TransPRK and Lasik/mPRK/LASEK/Smile in terms of efficacy, safety or predictability. The odds ratio (OR) estimates, risk ratio (RR) and 95% confidence intervals (CI) were derived from random-effects meta-analysis. Funnel plots were generated for each parameter.

Results:
Eleven studies with a total of 2753 treated eyes were included in the meta-analysis. The pooled estimated between TransPRK and Lasik/mPRK/LASEK/Smile were as follows: OR of the efficacy had a value of 1.41 CI=0.94-2.11, OR of the predictability was 1.39 CI=0.77-2.50, the RR of the safety was 1.06 CI=0.63-1.80. The funnel plots of the efficacy and predictability show a symmetric inverted funnel shape.

Conclusions:
This meta-analysis does not indicate statistically significant differences concerning efficacy, safety or predictability of the visual outcome between TransPRK and Lasik/mPRK/LASEK/Smile.

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Refractive

PP608

Ten years' experience in Implantable Collamer Lens (ICL) implantation in the Lebanese population

Presenting author: Nicole Mechleb, Lebanon

Purpose:
To evaluate and compare the long-term refractive and visual outcome and the risks related to Implantable Collamer Lens (visian ICL; STAAR Surgical, Monrovia, CA) in keratoconus and non keratoconus patients.

Setting:
Cornea and refractive surgery department at Beirut Eye and ENT Specialist Hospital (BESH), Lebanon.

Methods:
In this retrospective observational case series, we included all patients that received ICL implantation. We assessed corrected and uncorrected distance visual acuity (CDVA and UDVA), spherical equivalence, refractive astigmatism, and postoperative complications before surgery, 1 and 6 months, and 1, 3, 5 and 10 years after surgery. Safety, efficacy, and predictability at last follow-up were also evaluated.

Results:
A total of 236 eyes (140 patients) were included, of which 108 eyes had keratoconus, with a mean follow-up of 28.8±30.3 months. Mean spherical equivalence at presentation was respectively -5.41±4.57 diopters (D) and -11.10±6.58 in the keratoconus and non keratoconus groups, and -1.31±1.90 D and -0.46±1.62 D at the last follow-up. The safety and efficacy indices were respectively 1.06±0.18 and 0.95±0.20 in the keratoconus group and 1.08±0.16 and 1.00±0.15 in the non-keratoconus group. There was no significant statistical difference in safety(p=0.44). ICL has higher efficacy and predictability in non keratoconus group (p=0.03 and 0.009 respectively).

Conclusions:
According to our experience, ICL implantation provided good refractive outcomes, safety, and stability in all patients. Although efficacy and predictability were higher in non keratoconus patients, ICL remains a good surgical option for the treatment of keratoconus refractive errors.

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Refractive

PP609

Contrast Sensitivity and Outcomes including Vector Analysis of the Implantable Collamer Lens for Myopia up to -19.88D

Presenting author: Ryan Vida, United Kingdom

Purpose:
To report the outcomes of Implantable Collamer Lens (ICL) for treatment of myopic astigmatism.

Setting:
London Vision Clinic, London, UK

Methods:
This was a retrospective analysis of 157 consecutive ICL procedures using the V4c lens (STAAR Surgical). The EVO+ lens was used if available for the lens power required. ICL size was chosen based on posterior chamber imaging by VHF digital ultrasound, including sulcus diameter and crystalline lens rise. Standard outcomes analysis was performed using 12 month data where available otherwise 3 month data was used.

Results:
Data were available at 12-months in 74 eyes (47%) and 3-months in remaining 53%. SEQ was -11.03±3.69D (-3.01 to -19.88D) and cylinder -1.50±1.27D (0.00 to -6.67D). Preop CDVA was 20/20 or better in 62%. Postop UDVA was 20/20 or better in 75%. SEQ predictability was -0.16±0.42D. Change in SEQ 3-12months was -0.12±0.44D. Cylinder was ≤0.50D for 72% of eyes. Angle-of-error was within ±15° for 94% of eyes. There was 1-line gain in CDVA in 57% of eyes, 1-line loss in 4% and no eyes lost 2 or more. There was improvement in contrast at 3, 6, 12, and 18-cpd.

Conclusions:
ICL implantation is a safe and effective method for the treatment of myopia.

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Refractive

PP611

Implantable Collamer lens vaulting assessment using Anterior Segment Optical Coherence Tomography

Presenting author: Catarina Rodrigues, Portugal

Purpose:
To evaluate dynamic changes in vaulting under different lighting conditions using anterior segment optical coherence tomography in a group of patients implanted with phakic intraocular lenses.

Setting:
Observational, Cross-sectional study

Methods:
Enrollment of patients previously implanted with a phakic intraocular lens. All patients underwent dynamic anterior segment optical coherence tomography imaging under photopic, mesopic and scotopic conditions in order to evaluate the shifts between the phakic intraocular lens and anterior chamber structures under changing light conditions. Friedman test was used to compare the parameters measured under scotopic, mesopic and photopic conditions. A level of significance of 0.05 was considered.

Results:
29 eyes of 18 patients submitted to intraocular refractive surgery (phakic intraocular lens implant) were enrolled. Under photopic conditions the median vault was 0.32 mm (interquartile range [IQR] 0.18-0.55 mm), under mesopic conditions the median vault was 0.45 mm (IQR 0.22-0.65 mm) and under scotopic conditions the median vault was 0.46 mm (IQR 0.24-0.65 mm). A significant difference in vault value was found when compare photopic conditions with mesopic and scotopic conditions ($P < 0.001$).

Conclusions:
Vault can be significantly lowered by light-induced pupil constriction. This dynamism of the ICL inside the eye may lead to cases of low vaulting during miosis to have a potential impact on cataract formation. Future studies with larger series and long-term follow should determine the relevance of this findings in clinical practice.

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Refractive

PP612

A critical evaluation of longitudinal changes of astigmatism following implantation of toric implantable collamer lens (TICL)

Presenting author: Maja Bohac, Croatia

Purpose:
To compare changes in astigmatism by refraction and total corneal astigmatism after tPRK, LASIK and FsLASIK.

Setting:
University Eye Hospital Svjetlost, Zagreb, Croatia

Methods:
Patients with a stable refraction (-0.75DS to -8.00DS, astigmatism ≤1.00DC) underwent tPRK, LASIK or FsLASIK without complication. Astigmatism was measured at both corneal surfaces over the central 3.2mm zone (approximately using Pentacam HRTM) at pre-and 3 months postop. Pentacam and refraction data were subjected to vector analysis to calculate the surgically induced changes in i) total corneal astigmatism (SIATCA) ii) any astigmatism by refraction (SIAR) and the vectorial difference (DV) betweenSIATCA and SIAR.

Results:
Reporting key findings ($p<.01$), there was a significant difference between mean SIATCA and SIAR powers after tPRK (75eyes) but not after LASIK (100eyes) or FsLASIK (100eyes). Mean (±sd,95% CIs) values for DV powers were, tPRK -1.13DC(±0.71, -1.29 to -0.97), LASIK -0.39DC(±0.23,-0.44 to -0.34), FsLASIK -0.55DC(±0.38,-0.62 to -0.47). The differences were significant. For the tPRK and FsLASIK cases, linear regression revealed significant associations between I) SIATCA (x) &DV (z) powers (tPRK $z=1.586x-0.179$, $r= 0.767$, $p<.01$; FsLASIK $z =0.442x-0.303$, $r =.484$,$p<.01$), II) sines of SIATCA (x1) &DV (z1) axes (tPRK, $z1=0.523x1+0.394$, $r=.650$,$p<.01$; FsLASIK $z1=0.460x1-0.308$, $r=.465$,$p<.01$).

Conclusions:
tPRK is more prone to unintended changes in astigmatism. The difference between SIATCA & SIAR after tPRK or FsLASIK is mediated by SIATCA. Photoablating deeper regions of the cornea narrows the gap between SIATCA & SIAR.

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Refractive

PP613

Greek Ophthalmologists' perceptions regarding presbyopia and its therapeutic management.

Presenting author: Panagiota Ntonti, Greece

Purpose:
To determine Greek ophthalmologists' perceptions regarding presbyopia, their preferred means of examination and the therapeutic interventions they usually propose depending on the case.

Setting:
Department of Ophthalmology, University Hospital of Alexandroupolis, Greece.

Methods:
This was a cohort study that included 100 Ophthalmologists that practice in Greece either in public hospitals or privately. They were given structured questionnaires in the Greek language with the aim to evaluate their tendencies and preferences on the topic of presbyopia examination and its therapeutic management. The goal was to determine those preferences on common cases defined by patients' age, vision impairment and general everyday needs and activities. Only prerequisites for Ophthalmologists were adequate knowledge of the Greek language and engagement with adult population.

Results:
The majority were specialists evenly distributed among public and private practice. Most popular is Snellen chart for distance vision evaluation and Jaeger chart for near and intermediate. 15.3% omit intermediate vision evaluation. Vast majority prescribe presbyopia spectacles regardless of patient's distant refractive status, considering age the most important factor. 3.5% believes that surgery cannot treat presbyopia. Most Ophthalmologists would suggest LASIK before 55 years and clear lens extraction after 55. 20% regarded multifocal lenses a good solution for presbyopia treatment, while 5.9% believes that this is a different procedure than phacoemulsification. Fundus, tear film and patients' personality evaluation were important.

Conclusions:
Since presbyopia is a common condition affecting people of a productive age, there is a multitude of examination techniques such as digital and paper reading tests with varying degrees of accuracy. The choice between them is according to means available and the examiner's preferences. This also applies to therapeutic options as one can choose between reading glasses, contact lenses and surgical methods. Those are laser assisted and cornea oriented or involve crystalline lens replacement with a premium intraocular lens or the monovision technique. An important factor here, besides doctors' preferences is patients' needs and requirements.

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Refractive

PP614

Development and validation of a web-based application for defocus-curves assessment

Presenting author: Asli Perente, Greece

Purpose:
To investigate the level of agreement between the traditional defocus curves test and the Democritus Defocus Curves Test (DDECT) web application.

Setting:
Department of Ophthalmology, University Hospital of Alexandroupolis, Greece

Methods:
This is a prospective, comparative study. Pseudophakic patients were randomly recruited from our outpatient service in a consecutive-if-eligible basis. Their monocular visual acuity (VA) was measured using trial lenses of -3.00 D, -2.50 D, -1.75 D and -1.25 corresponding to the distances of 30 cm, 40 cm, 60 cm and 80 cm, respectively. Afterwards, the monocular VA of the same patients was estimated using DDECT at the aforementioned distances. Differences in VA between the two methods were compared with t-test and intraclass correlation coefficients (ICCs).

Results:
Forty patients responded to both examinations. No significant differences were detected between the two methods in all distances ($p<0.05$). ICCs between the two methods demonstrated good correlation that ranged from 0.734 to 0.851.

Conclusions:
Our results suggest high level of agreement between the traditional method for defocus curves testing and DDECT.

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Refractive

PP615

Comparison of toric contact lens (CL) models of lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) on patients comfort: a contralateral eye study.

Presenting author: Esra Vural, Turkey

Purpose:
To compare the new silicone hydrogel toric contact lens (CL) models of lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) with samfilcon A (Bausch and Lomb Ultra®) using the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) test.

Setting:
Health Science University, Kayseri City Training and Research Hospital, Department of Ophthalmology, Kayseri, Turkey

Methods:
Twenty-four patients between the ages of 20 and 31 who had no previous CL use history and no dry eye disease were included in this prospective study. Lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®)(group 1) and samfilcon A (Bausch and Lomb Ultra®) CLs with HydraGlyde moisture matrix (group 2) were inserted in the right and left eyes of the patients, respectively. All patients had complete ophthalmologic examinations and corneal topography with Scheimpflug-based tomography (Pentacam™, Oculus Inc., Lynnwood, WA, USA). After 2 and 4 weeks, CLs were compared with the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) test.

Results:
The mean cylindric value in group 1 and 2 were -1,34±0.64 D and -1.46±0.90 D, respectively (0.754). The mean Km value in group 1 and 2 were 44.34±1.04 D and 44.37±1.06 D (P=0.953) .The mean scores of CLDEQ-8, frequency and intense of discomfort, dryness, blurry vision, frequency of needing to blink eye, and removal of the CL were assessed. There was no statistically significant difference between two groups (P=0.103) at 2nd week but at 4th week there was a statistically significant difference in terms of dryness (p=0.002).

Conclusions:
Dryness and discomfort are the main reasons for CL cuts. Although toric lens of lotrafilcon B with HydraGlyde moisture matrix is superior to toric lens of samfilcon A in terms of the feeling of dryness at the end of the first month, longer-term studies with more patients are needed.

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Refractive

PP616

Comparison of Visual Tests for Contrast Sensitivity assessment in Pseudophakic Subjects

Presenting author: Ainhoa Molina-Martin, Spain

Purpose:
There has been a technologic transition in our clinics that pretend to abandon the more conventional printable charts and optotypes to evolve to electronic devices. These devices allowed for a higher versatility on patients' visual exam, unifying in the same instrument different tests and procedures, but evaluation of these procedures and how they correlate with conventional tests is still unknown. The aim of the present study was to evaluate differences in Contrast Sensitivity (CS) results obtained by two digital visual tests in pseudophakic subjects for near vision, and to compare this results with those obtained with CSV1000.

Setting:
Vithas Medimar International Hospital, Alicante, Spain.

Methods:
A total of 20 pseudophakic subjects with trifocal IOL implantation were examined. Contrast Sensitivity assessment by different tests was obtained in log units (logCS) and compared in those spatial frequencies in common between tests. CSV1000 was performed for distance vision. CS by electronic devices was performed in characterized displays for near vision by two previously developed CSF tests: Optitrain-CSF and Optopad-CSF. Correlation between CS results was also assessed.

Results:
Mean VA was -0,02±0,04 logMAR for distance, 0,01±0,05 logMAR for intermediate, and 0,04±0,09 logMAR for near vision. Comparison between digital tests for the spatial frequencies of 1.5cpd, 3cpd and 6cpd showed statistically significant differences ($p<0.001$), and no correlation was found between tests. Comparison of distance vision CSV1000 with near vision CSF-Optitrain showed differences for 3cpd ($p<0.01$), but not for 6cpd ($p>0.99$). Comparison of distance vision CSV1000 with near vision Optopad-CSF showed differences for 3cpd (p 0.027), 6cpd ($p<0.001$) and 12cpd ($p<0.001$). There was no correlation between CSV1000, CSF-Optitrain and Optopad-CSF results.

Conclusions:
Evaluation of CS is essential when evaluating pseudophakic subjects implanted with presbyopia correcting IOLs, but most of CS tests used by clinicians evaluate the performance in distance vision. Some spatial frequencies cannot be displayed in near vision due to the resolution required, but even evaluating the same spatial frequencies, results from different distances will differed in subjects implanted with trifocal IOLs, just because the light distribution. Even considering the same distance, differences in the size of stimulus, the mean luminance of the tests or the psychophysical method will affect the results. CS measures cannot be directly compared between tests.

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Refractive

PP617

What are we measuring when using electronic devices for Contrast Sensitivity assessment?

Presenting author: Ainhoa Molina-Martin, Spain

Purpose:
Use of clinical tests on electronic devices in clinical practice leads to the need of attending to aspects that are irrelevant with conventional tests such as the type of screen, its colour reproducibility or the use of the test in different devices. The aim was to evaluate differences on luminance reproduction between electronic devices, and to determine if individual luminance characterization should be performed on each device or global characterization based on a generic device is a feasible solution to ensure the correct reproduction for achromatic stimulus. Implications on reproduction of contrast sensitivity measurements will be discussed.

Setting:
Group of Optics and Visual Perception Lab. Department of Optics, Pharmacology and Anatomy. University of Alicante (Alicante, Spain).

Methods:
20 Galaxy Tab A devices with a Graphics Processing Unit of 8 bits were evaluated. Characterization of every screen was performed by measuring the variation on Luminance with the Digital Levels (DAC) and obtaining the curve-response for achromatic stimulus. Mean, maximum and minimum luminance, standard deviation (SD) and Coefficient of Variation (CoV) were obtained to assess differences between devices. The effect of differences in luminance on contrast reproduction between devices was analysed.

Results:
Variation of luminance with increasing DAC is observed in all devices following a gamma-function. Variations on the maximum luminance, and the gamma-exponent of the gamma-function, were observed in all devices. Comparison between devices showed that some of them have assumable variations on maximum luminance for a specific DAC level less than 1 cd/m2, whereas other devices differed by as much as 45 cd/m2. CoV vary from ~5 to 9%, and was higher for lower luminance values.

Conclusions:
Every device will reproduce the same software order with different luminance. We cannot assume that characterization of one device can be extrapolated to other devices even if they are from the same manufacturing batch. Every device used for clinical and research purposes should be individually characterized since it is the only way to ensure the correct reproduction of visual stimuli. The luminance difference between devices could imply changes in the contrast and/or the adaptative status of the eye. This variability could provide different interpretations or even diagnosis, when analysing the results obtained in different devices.

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PP618

Intraoperative aberrometry in surgical treatment of cataract with corneal astigmatism through toric intraocular lenses

Presenting author: Berta García Tomás, Spain

Purpose:
To compare the efficacy of intraoperative aberrometry (ORA) with standard ink marking techniques in the refractive results of patients with regular corneal astigmatism after cataract surgery with toric intraocular lens implantation.

Setting:
Oftalvist Clinics, Murcia

Methods:
A comparative and retrospective study cataract surgery was done in two groups of patients with regular corneal astigmatism. In the ORA Group (53 eyes), intraocular lens selection was determined after corneal topography, optical biometry and on-line calculator. In the operating room, an intraoperative aberrometer was used for final calculation and implantation guidance. In the INK Group (25 eyes), intraocular lens selection was done in a similar manner, but without intraoperative aberrometry. Main outcomes were: a) refractive postoperative astigmatism, b) postoperative sphere, c) uncorrected postoperative visual acuity, and d) percentage reduction of preoperative astigmatism.

Results:
Mean postoperative astigmatism was lower in the ORA Group than in the INK group (-0.29 ± 0.31 vs -0.75 ± 0.75) ($p<0.00005$). Mean postoperative sphere was lower in the ORA Group than in the INK Group (0.17 ± 0.19 vs 0.37 ± 0.052) ($p=0.001$). Mean uncorrected visual acuity was higher in the ORA Group than in the INK Group (0.91 ± 0.11 vs 0.68 ± 0.27) ($p<0.00005$). Mean percentage reduction in preoperative astigmatism was higher in the ORA Group than in the INK Group (85.3 ± 1.55 vs 72.54 ±3.27) ($p=0.0001$).

Conclusions:
Compared to standard ink marking techniques, intraoperative aberrometry obtains better refractive results in patients with regular corneal astigmatism after cataract surgery with toric lens implantation. Postoperative refractive astigmatism and sphere were lower. Uncorrected visual acuity was higher as well as the reduction of preoperative astigmatism.

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Refractive

PP619

Treatment of residual hypermetropic refraction on young patients after LASIK using human fresh corneal lenticule implantation with ReLex Smile Surgery

Presenting author: Faruk Semiz, Kosovo

Purpose:
This study aims to treat residual Hypermetropic Refraction on young patients after LASIK using Human Fresh Corneal Lenticule Implantation with ReLex Smile Surgery. LASIK (laser-assisted in situ keratomileuses) is a refractive surgery to correct myopia, hyperopia, and astigmatism. Yet approximately 30% of operated patients have symptoms like glare, halos, dry eyes, and especially residual hypermetropia refractive errors. Residual hypermetropia refractive errors are difficult to treat surgically; the current treatment refractive Lens Implantation - risks are similar to cataract surgery (endophthalmitis, loss of accommodation, etc.)

Setting:
Eye Hospital, Pristina – Republic of KosovoClinicalTrials.gov identifier (NCT number): NCT04793893

Methods:
The method used in Eye Hospital is treatment with implantation of human fresh corneal lenticule(min. -1.50D) taken from myopic patients in the post – LASIK patients with residual refractive error(min. +1.0D). The flap of LASIK is lifted, cleaned, and then the lenticule is gently inserted. Thelenticule is positioned according to the K2 values when astigmatism residual refractive error is present. In cases where astigmatism is not present, the lenticule is positioned in a central position under the flap.

Results:
Increase visual acuity by reducing residual hypermetropia refractive errors using ReLex Smile (human fresh lenticule implantation) after LASIK.

Conclusions:
Hypermetropic residual refraction (min.+1.0D) after LASIK is very common. Alex-Smile is a successful method, with implantation of human fresh corneal lenticule taken from myopic patients in post – LASIK patients with residual refractive error to increase visual acuity by reducing residual hypermetropic refractive error using Smile surgery

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PP620

SMILE in the correction of residual myopia after photorefractive keratectomy

Presenting author: Olesya Pisarevskaya, Russian Federation

Purpose:
To evaluate the structural and functional effect of correction of residual myopia by femtosecond extraction of the corneal lenticule through a small access in patients previously operated on by photorefractive keratectomy technology (PRK).

Setting:
-

Methods:
19 patients (19 eyes) after PRK with residual myopia in 1.55±0.42 diopters and moderate regular astigmatism not exceeding 1 dptr were included. Uncorrected visual acuity initially varied from 0.1 to 0.32. In 26% of cases, subepithelial corneal fibroplasia was detected: 4 eyes (1st degree), 1 eye (2nd degree). Mean age of patients was 35.3±5.4 years. Time interval between first PRK and the correction of residual myopia using the ReLEX SMILE technology was about 12.3±4.7 years. Changes in corneal parameters and visual functions were evaluated 1 day, 1 month, 3 and 6 months before and after surgery.

Results:
On day after the operation, uncorrected visual acuity in the distance (0.94 ± 0.11), target refraction ± 0.25 dptr was achieved in 98% of cases, cylindrical component ± 0.5 dptr in 96%. By 6 months, visual acuity (0.8 and higher) was obtained in 100% of cases, 1.0 and higher in 79 %, with a refraction ± 0.5 dptr in 99%. By OCT there were no signs of pronounced epithelial hyperplasia, densitometry values did not exceed the preoperative values. Indicators of corneal hysteresis, which decreased in the first day after surgery, were close to preoperative values in the long-term postoperative period.

Conclusions:
Clinical results of correction of residual myopia by femtosecond extraction of the corneal lenticule through a small access in patients previously operated on by PRK technology indicate that the proposed technology is highly effective and safe in cases of absence of fibroplasia or in the presence of opacities with densitometry density not exceeding 35 units. It was shown that corneal subepithelial fibroplasia of first and second degree with densitometry values not exceeding 35 units in patients after PRK is not an obstacle to the correction of residual myopia by femtosecond extraction of the lenticule through a small surgical access.

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Refractive

PP621

Corneal endothelial changes after laser-assisted in situ keratomileusis combined with high-fluence cross-linking

Presenting author: Mohamed Salah, Egypt

Purpose:
To evaluate corneal endothelial cells before and after laser-assisted in situ keratomileusis (LASIK) combined with accelerated, high-fluence collagen cross-linking (CXL) in myopic patients.

Setting:
Department of Ophthalmology, Faculty of Medicine, Minia University, Minia, Egypt

Methods:
In a prospective comparative nonrandomized interventional case series study, 60 myopic eyes of 30 patients (seven males and 23 females) with age ranged from 18 to 35 years were distributed into two groups. Group A included 30 eyes of 15 patients, treated by LASIK, whereas group B included 30 eyes of 15 patients treated by LASIK associated with high-fluence CXL. All patients were subjected to preoperative and 3- and 6-month postoperative evaluation of corneal endothelial profile using specular microscope.

Results:
Qualitative and quantitative analysis of the corneal endothelial cells comparing the two groups showed statistically significant changes in endothelial cell density (P=0.040) at 3-month follow-up after the procedure, which improved to reach a value close to preoperative values, with no significant changes between the two groups at 6-month follow-up (P=0.081). There was no significant change in polymegathism or coefficient of variation and in the percentage of hexagonal cells (pleomorphism) in each group and in comparing between the two groups at 3- and 6-month follow-up.

Conclusions:
LASIK with high-fluence CXL is safe and has no adverse effect on corneal endothelium.

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PP622

Comparison of the corneal topographic effective optical zone between small-incision lenticule extraction and femtosecond laser-assisted laser in situ keratomileusis for mild to moderate myopia

Presenting author: Gülay Yalçınkaya, Turkey

Purpose:
To compare the corneal topographic effective optical zone (EOZ) after small incision lenticule extraction (SMILE) and femtosecond laser-assisted laser in situ keratomileusis (F-LASIK) in myopic eyes.

Setting:
University of Health Sciences Beyoglu Eye Training and Research Hospital, Istanbul, TURKEY

Methods:
In this retrospective study, 56 eyes that underwent SMILE or F-LASIK for the treatment of mild to moderate myopia were enrolled. Pre- and postoperative 6th months uncorrected and best-corrected visual acuities (UCVA and BCVA, respectively), refractive errors, spherical equivalents, corneal thicknesses, and corneal high order aberrations were analyzed. The EOZ was measured at the 6th months using the tangential curvature difference map of the Scheimpflug tomography system. Mann-Whitney U test was used to compare parameters.

Results:
There were 29 eyes (23 female, 6 male) and 27 eyes (18 female, 9 male) in the SMILE and F-LASIK groups, respectively. The spherical equivalent of eyes refractive error was -4.59±1.09 and -4.06±1.04 in the SMILE and F-LASIK groups, respectively. The mean EOZs were 5.78±0.35 mm in the SMILE group and 5.20±0.30 mm in the F-LASIK group at six months postoperatively. The decreases in EOZ were significantly lower in the SMILE group than in the F-LASIK group at postoperative 6 months ($p<0.001$).

Conclusions:
EOZ was reduced in eyes treated with SMILE or F-LASIK for the correction of mild to moderate myopia. The decrease was higher in the F-LASIK group compared with the SMILE group.

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PP623

Evaluation of posterior corneal curvature changes after small incision lenticule extraction

Presenting author: Dr Ananth Doddaramegowda, India

Purpose:
Correct estimation of the corneal dioptric power will result in post-keratorefractive procedure emmetropia. The change in diotoric power is noted in both the anterior and posterior surfaces of the cornea post kreatorefractive procedures. The change in the posterior surface is largely unaccounted during the calculations targeting emmetropia. The study aimed to evaluate the changes occurring in the posterior surface of the cornea in eyes undergoing SMILE for correction of a mild, moderate, and high degree of myopia. It also aimed to evaluate the correlation between such changes and residual MRSE.

Setting:
Posterior corneal change is being implicated for residual MRSE post refractive surgery. A single centre prospective trial to observe changes following SMILE for a follow-up period of 3 months to study the changes in posterior corneal curvature in particip

Methods:
Minimum sample size was 225 eyes and with the institutional drop-out rate of follow-up taken into account, 280 eyes were recruited in the study. All the participants underwent preoperative evaluation and routine corneal topography with Orbscan IIz. A standard operative protocol for SMILE was maintained throughout the study period. The corneal topography with Orbscan IIz was done at 1-week, 1-month and 3-month follow-up. The posterior corneal curvature changes were assessed. Shapiro-Wilk test for the normalcy of data, ANOVA analysis for baseline comparison between the groups, paired t-test for comparing preoperative and postoperative changes in posterior corneal power changes were employed.

Results:
248 eyes of 124 participants were analysed while assigned into mild, moderate and high group based on the amount of MRSE. The posterior keratometric readings increased significantly among all the groups at the postoperative 1-week follow-up with p-value less than 0.001 in all three groups, which did not change significantly at 1-month and 3-month. Increase in the negative dioptric power of posterior surface is significantly related with higher residual MRSE in the mild myopia group (r=0.301, p=0.007), while correlation was not significant in moderate and high myopia group.

Conclusions:
This study systematically evaluates the changes in a mild, moderate, and high degree of myopia, and its correlation with the residual MRSE. The is a positive significant correlation between MRSE and an increase in negative dioptric power which may have an impact on the calculations for target emmetropia.

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PP624

Comparative Evaluation of the Corneal Densitometry and Objective Scatter Index Changes Following SMILE XTRA Versus SMILE

Presenting author: Siddharth Duggal, India

Purpose:
Comparative evaluation of the Corneal Densitometry changes and Objective Scatter Index (OSI) following SMILE XTRA versus Small Incision Lenticule Extraction (SMILE)

Setting:
Phaco-Refractive Department, Nethradhama Super Speciality Eye Hospital, Jayanagar, Bengaluru, Karnataka 560070

Methods:
This was a comparative, interventional, retrospective study which included 120 eyes which were divided into 2 groups which were age and Spherical Equivalent matched (n= 60 eyes in each group). GROUP A had patients who had undergone SMILE XTRA while GROUP B had patients who had undergone SMILE procedure. Visual acuity, Corneal densitometry and OSI was noted pre operatively, post operatively at 15 days and 3 months. Total Corneal densitometry was measured using Pentacam and Objective Scatter Index was noted using HD Analyzer.

Results:
Both groups were age and Spherical Equivalent matched (Group A=-6.94+/-1.11 and Group B=-6.72+/-1.22) and p & gt; 0.05. Pre operatively corneal densitometry in group A was 16.09+/-1.34 and in group B was 16.22+/-1.47,and p value was 0.07. Post-operatively at 3 months Uncorrected Visual Acuity in Group A was -0.05+/- 0.08 and in Group B was -0.08 +/- 0.1 at p value of 0.08. Corneal densitometry in Group A was 16.35+/- 1.5 and Group B was 16.7+/-1.11 at p value of 0.1. The OSI in Group A was 0.55+/-0.13 and in Group B was 0.75+/- 0.15 at p value of 0.06.

Conclusions:
In our experience, SMILE XTRA did not lead to significant haze or degrade the optical quality when compared to SMILE. However further studies with long term follow ups are required to confirm our preliminary findings.

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PP625

StreamLightTM Single-Step Transepithelial Photorefractive Keratectomy (PRK)

Presenting author: David Gunn, Australia

Purpose:
Transepithelial PRK was first described as a method of reducing post-operative pain and corneal haze and to speed visual recovery compared to conventional PRK. However, the initial two-step method of transepithelial PRK resulted in significant stromal dehydration, hyperopic shift, and inconsistent ablation of the peripheral epithelium. In recent years, there has been renewed interest in transepithelial PRK with the revised single-step method eliminating these issues. This study reports the 3-month safety and efficacy of a single-step, Transepithelial PRK using the StreamLightTM protocol.

Setting:
Private Ophthalmology clinic, Brisbane, Australia.

Methods:
In this retrospective single center consecutive case series, single-step transepithelial PRK was performed on 102 consecutive eyes, by a single surgeon. Epithelial and refractive ablation were performed using the Wavelight EX500 Excimer laser, with a 10 second interval between the two modes. The Alcon WaveLight Wavefront Optimised Profile nomogram was used for all eyes, except for those with hyperopia and mixed astigmatism where the Wellington Eye Clinic nomogram was used. Postoperative assessments were performed at 1 week, 1 month, and 3 months, including visual acuity and subjective refraction.

Results:
83 eyes completed 3-month follow up and were included in analysis. Preoperative spherical equivalent refractive error (SER) ranged from -7.50 to +3.00 D, and astigmatism from 0.00D to -4.00 D. By 3 months follow up, 94.1% of eyes had UDVA of LogMAR 0 or better, the mean SER was -0.05 ± 0.35D and the mean astigmatism was -0.36 ± 0.36D. 78 eyes (94.0%) were within ± 0.50D of the target sphere and 68 (81.9%) were within ± 0.50D the target astigmatic correction. Three eyes (3.6%) lost 1 line in CDVA and no eyes lost more than 1 line in CDVA.

Conclusions:
StreamLightTM transepithelial PRK is a safe and effective procedure utilizing the revised single-step method and eliminates the issues faced in the initial two step transepithelial PRK procedure. Good refractive predictability was found at three months follow up.

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PP626

Characterization of LASER-assisted in situ keratomileusis (LASIK) candidates with predicted PTA (Percent Tissue Altered) Index Larger than 40%

Presenting author: Yoav Nahum, Israel

Purpose:
To examine which patients that qualify for LASIK surgery as per commonly used dioptric and pachymetric safety limits, would have a predicted PTA (percent tissue altered) value of over 40%.

Setting:
Private Refractive Surgery Center

Methods:
Using Excel software we calculated the predicted RST+PTA values of 224 theoretical eyes with manifest-refraction-spherical-equivalent (MRSE) refractive error values of -1D to -14D, and pachymetry values of 450-600µm. RST and PTA values calculations were based on 110µm flap thickness, and 6.5mm treatment zone. We have filtered the results according to safety limits previously published by the Food and Drug Administration (FDA), American academy of ophthalmology (AAO) and European specialists as well as limits used in our institution. For each filtered list of patients we examined which patients would have a predicted PTA value of over 40% or over 47%.

Results:
Out of 224 theoretical eyes, 174 would have qualified for LASIK by FDA-based criteria of MRSE smaller than 14D, RST larger than 250 µm and a pachymetry value of more than 450 µm. Sixty-nine of these eyes (39.6%) had a PTA value of more than 40% and 28 (16.1%) had a PTA value of over 47%. Eyes with PTA values of more than 40% had MRSE as low as 5D. All eyes with a PTA value of over 47% had MRSE of 9D or more.

Conclusions:
When using common safety-limits, almost half of the patients can have PTA values of more than 40%. Almost all LASIK treatments which would result in PTA larger than 40% are of candidates with MRSE of 7D or more.

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PP627

Contralateral eye comparison of corneal wavefront-guided and aberration-free treatment in eyes undergoing laser in-situ keratomileusis

Presenting author: john Chang, Hong Kong

Purpose:
Corneal wavefront-guided (CW) and aberration-free (AF) treatments were both reported to be safe and effective in virgin eyes. AF treatment aims at removing the induced spherical aberration (SA) whereas CW additionally removes the preoperative higher-order aberrations (HOAs). Moreover, it has been suggested that it may not be necessary to correct all the preoperative HOAs in order to achieve a perfect visual quality. Our study aims to compare the safety, efficacy, and predictability of refractive and visual outcomes as well as postoperative corneal HOAs between partial CW and AF treatments in contralateral eyes.

Setting:
Hong Kong Sanatorium & Hospital, Hong Kong

Methods:
Twenty-eight subjects who underwent CW myopic laser in-situ keratomileusis (LASIK) with Amaris 1050RS excimer laser platform were retrospectively included. Under the selected optical zone, when one eye or both eyes of the patient possessed preoperative corneal primary coma; or corneal primary SA; or both; that were ≥0.25 D, the eye with greater primary coma or primary SA was treated with CW whereas the contralateral eye was treated with AF routinely. In the eyes treated with CW, only the corneal primary coma or/and corneal primary SA that were ≥0.25 D were treated.

Results:
There was no statistically significant difference in postoperative sphere, spherical equivalent refraction, and corrected distance visual acuity between CW eyes and their contralateral AF eyes ($p>0.05$ for all comparisons). Postoperative cylinder was statistically greater in CW eyes (CW=0.26 D; AF=0.18 D; $p=0.046$) but without clinical significance. The total HOA was smaller in CW eyes postoperatively (CW=0.45 µm; AF=0.49 µm; $p=0.016$). Postoperative SA was smaller in CW eyes treated with SA (CW=0.17 µm; AF=0.29 µm; $p<0.001$), whereas postoperative horizontal and vertical coma was similar between CW and AF in eyes treated with horizontal and vertical coma respectively ($P>0.05$ for both comparisons).

Conclusions:
Corneal wavefront-guided treatment yielded similarly good refractive and visual outcomes as compared to the AF treatment. Postoperative total HOA and SA were smaller in CW eyes than that in AF eyes.

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PP628

Corneal interface deposits after Smile treatments related to the use of a disposable lenticule dissector

Presenting author: Barbara Leyssens, Belgium

Purpose:
To describe interface glittering deposits immediate postoperative Smile surgery (Small incision lenticule extraction) after using a disposable lenticule separator.

Setting:
Smile is a corneal refractive treatment where the lenticule is blunt dissected by breaking stromal micro-bridges. Different shapes of instruments can be used: thin 0.4mm tip flap lifters, or curved spatulae with a blunt dissecting tip. Disposable single-

Methods:
The dissection of the lenticule is in most of the cases, a very short procedure, but causes minimal distortion and stress to the anterior stromal cap. In our Smile procedure we used disposable lenticule separators, spatulae-type with blunt dissecting tip. In this surgical protocol, there was no interface irrigation after lenticule extraction. In all cases immediate after surgery a slitlamp examination was performed to check the interface. The postoperative drop regimen consisted of topical steroids 6dd for the first week and 3dd in the following 2 weeks, topical antibiotics for 1 week and artificial tears for 3 weeks.

Results:
We found on slitlamp examination small sparkling dots in the corneal interface (figure 1,2,3) . Because it appeared immediately after the surgery, the possibility that rubbing the disposable instrument against the anterior corneal stroma could leave glittering particles, changed the surgical protocol to irrigation of the interface after the lenticule extraction. The glittering deposits were still present after irrigation in the interface. The next change in surgical protocol was the switch to reusable lenticule separators, with the same model of spatulae with a blunt dissecting tip. After this change, there were no more interface deposits seen, independent of interface irrigation.

Conclusions:
In the literature there is no reported case of immediate interface deposits after Smile. This is the first description by blunt dissection and rubbing of a disposable instrument intrastromally. In the postoperative follow ups to 12 m these glittering dots did not change in colour, magnitude or number. There was no correlation with the refractive outcome or the UCVA . No late onset keratitis or melting has developed and applation tonometry was normal. Further investigation in vivo should investigate how different materials of disposable instruments can release particles in the interface by blunt rubbing of the stroma during Smile procedures.

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PP629

Safety and precision of two different flap-morphologies created during low energy femtosecond laser assisted LASIK

Presenting author: Bulat Mudarisov, Germany

Purpose:
Currently, two possibilities to create LASIK flaps exist: a strictly horizontal (2D) cut similar to the microkeratome-cut and an angled cut with "step-like" edge (3D). The first possibility exists only in the low-energy FEMTO LDV Z8 laser and its predecessors. The 3D method creates a "lock-and-key-mechanism" potentially contributing to flap stability. The differences between the two morphologies might lead to differences in flap striae representation. The current study analyzes precision, safety, efficacy, as well as patient comfort level after applying two different LASIK flap morphologies created with a low-energy, high-frequency femtosecond laser device.

Setting:
Prospective, interventional, randomized, contralateral eye, single-center comparison study conducted from November 2019 to March 2020 in Hamburg vision clinic/ zentrumsehstärke, Hamburg, Germany.

Methods:
11 patients/ 22 eyes received low energy femtosecond LASIK treatment for myopia or myopic astigmatism on both eyes. Before treatment, the eyes were randomized (one eye was treated with a 2D, the other eye with a 3D method). The primary objective of this study was to compare flap thickness predictability between 2D and 3D flap geometry groups in patients who underwent 110 µm LASIK using swept source anterior segment-OCT 1 month postoperatively. Secondary objectives were comparisons of the postoperative flap planarity (AS-OCT), the intraoperative flap morphology (surgeon`s assessment) and the self-reported pain perceptions and visual experience of the patients.

Results:
Mean central flap thickness one month after surgery was 110.7µm (±1,6; 2D) and 111.2 µm (±1,7; 3D (p=0.365). We measured the flap thickness on 13 different points with no statistically significant differences between any of the measurement points within/ between both groups demonstrating good planarity of the flap. Despite not statistically significant, the surgeons recognized more opaque bubble layer in 3D flap-eyes (2D: 2/11; 3D: 5/11) during surgery and more patients reported "severe pain" in the 3D flap eye (2D: 2/11; 3D: 5/11) during the first hours after the treatment. Overall, safety- and efficacy index were 1.06 and 1.02, respectively.

Conclusions:
In this prospective, randomized, contralateral eye study, the low-energy femtosecond laser yielded predictable lamellar flap thicknesses and geometry at one month follow up. In addition to the objective flap thickness and flap planarity data, also the surgeons and patients subjective assessment displayed no significant differences between both flap geometries. Based on these results, both flap morphologies can be judged as equal regarding safety and efficacy.

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PP630

Confocal microscopy changes of keratocyte density and activation of keratocytes following Lasik surgery

Presenting author: Dr Isha Agarwalla, India

Purpose:
To analyse structural corneal stromal changes in the ultra-structure of cornea following Lasik using confocal microscopy to assess the keratocyte density in anterior and posterior stromal layers and activation of keratocytes.

Setting:
Sri Sankardeva Netralaya, Beltola, Guwahati.

Methods:
Prospective , Non-randomized, Observational Study

Results:
144 eyes of 72 patients had undergone LASIK surgery. The mean ablation depth was calculated by measuring the keratocyte density pre-operatively and post-operative 1 week, 1 month and 3 months. The anterior stroma included the highest population density of keratocytes in the stroma. Mean keratocyte density pre-operatively was 20660.82 cells/mm3 and in the post operative 1 week period the density was reduced to 19927.94 cells/mm3. However the keratocyte density increased in the 3rd post operative month. Keratocyte activation was noted in 79.2% of the patients, indicating the regenerative changes and healing changes.

Conclusions:
Regenerative changes were noted on studying the ultra-structure of cornea, thus indicating there were activation of keratocytes due to the insult caused due to Lasik surgery.

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PP631

Visian ICL toric phakic lens for correction of high myopia with moderate astigmatism - 2 years results

Presenting author: Mirko Jankov, Serbia

Purpose:
To present 2 year results for ICL toric phakic lens for correction of high myopia with moderate astigmatism.

Setting:
LaserFocus – Centre for Eye Microsurgery, Belgrade, Serbia

Methods:
Thirty eyes of twenty two young patients (14 males and 8 females) with mean age of 32 +/- 7 years (25 to 48) were enrolled in this prospective interventional case series. Preoperatively mean BDCVA was 0.65 +/- 0.27 (0.30 to 1.00) with mean preoperative myopia of -8.97 +/- 3.79 (-1.25 to -18.00) D, refractive astigmatism of -2.32 +/- 1.11 (-1.00 to -4.00) D and topographic astigmatism of -1.98 +/- 1.12 (-0.50 to -3.75) D. All patients have been implanted a toric EVO + Visian ICL phakic lens (with centraFlow) by STAAR Surgical.

Results:
All surgeries were uneventful. Mean UCDVA at 1m achieved preoperative BCDVA, while at 6 months safety index was 1.22, and efficacy index was 1.06. None of the eyes lost any lines of BCDVA, 13 maintained, 5 gained one line, while 2 eyes gained two or more lines of BCDVA. Myopia was reduced to -0.29 +/- 0.81 (+0.50 to -2.00) D, refractive astigmatism to -0.38 +/- 0.33 (0 to -0.75) D, while topographic astigmatism slightly increased -2.19 +/- 1.57 (-0.25 to -3.75) D ($p>0.05$). Vault at 6 months was 466 +/- 203 (194 to 720) microns.

Conclusions:
Toric EVO + Visian ICL phakic lens showed good predictability, safety and efficacy for correcting high myopia with moderate astigmatism.

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Refractive

PP632

Efficacy and Safety of Eyecryl Posterior Chamber Phakic Intraocular Lenses for The Treatment of High Myopia: 4-Year Results

Presenting author: ihsan çakır, Turkey

Purpose:
To evaluate the efficacy and safety of posterior chamber phakic intraocular lenses (Eyecryl) for high myopia treatment.

Setting:
University of Health Sciences Beyoglu Eye Training and Research Hospital, Istanbul,

Methods:
Patients treated with Eyecryl (Biotech Vision Care, Luzern, Switzerland) intraocular lens (IOL) implants with follow-up periods of more than four years were evaluated retrospectively. Pre- and post-operative fourth-year spheric equivalent (SE) of manifest refraction values, uncorrected and corrected distance visual acuities (UDVA and CVDA, respectively), and endothelial cell density (ECD) values were analyzed. Complications were evaluated.

Results:
Forty eyes of 20 patients were analyzed. Pre- and post-operative 4th year mean standard error (MRSE) was −13.03±3.13D and −0.72±0.88D, respectively. Pre- and post-operative 4th year UDVA was 1.57±0.21 and 0.26±0.20 logMAR ($p < 0.001$), respectively. The safety index (pre-and post-operative CDVA) was 1.68±0.96 ($p > 0.05$). The efficacy index (ratio of mean postoperative UDVA to mean pre-operative CDVA) was 1.23±0.86. The mean postoperative endothelial cell loss at four-years was 7.24%, and none of the patients had lost 25% of their pre-operative endothelial cells. No serious complications with the potential to affect CDVA were observed.

Conclusions:
Eyecryl posterior chamber phakic intraocular lenses are effective and safe for high myopia surgical treatment. However, the 4-year follow-up period is not sufficient to evaluate the safety profiles in terms of endothelial cells.

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PP633

Preliminary results of a posterior chamber phakic lens vault pilot study under different lighting conditions

Presenting author: German Bianchi, Argentina

Purpose:
To evaluate a posterior chamber phakic lens vault and its possible changes under different lighting conditions.

Setting:
Clínica de Ojos Dr Nano, Buenos Aires. Argentina.

Methods:
A prospective case-series study was performed on 44 eyes (22 patients) operated with a phakic lens IPCL V2.0, between January and December of 2018, under three different lighting conditions (mesopic/scotopic/photopic). The central vault was measured with an optic coherence tomograph. The results obtained one and 2 years after surgery were compared, and the differences between the scotopic and the photopic condition were evaluated. Demographic aspects were also evaluated, as well as lens characteristics, endothelial cell density, and central corneal thickness, as well as cataracts development.

Results:
The mean age was 37 ±9.7 years old; preoperative spherical equivalent: -8.4 ±3.5 D; anterior chamber depth: 3.46 ±0.28 mm. Endothelial cell density and central corneal thickness decreased 72.6 cells/mm² (p: 0.15) and 0.5 mm (p: 0.86), respectively. Two years after surgery, vault values were 582.6 ±192.4 mm (mesopic); 635.3±240.5 mm (scotopic), and 536.9 ±216 mm (photopic), with no statistically significant changes, when compared to results, obtained one year after surgery (p:0.27; 0.72; 0.92, respectively). The vault difference observed between the scotopic and the photopic condition was 98.4 ±48.4 mm, (p< 0.001). Two years after surgery, no cataracts were detected.

Conclusions:
The IPCL V2.0 phakic lens vault remained stable 2 years after surgery. Statistically significant differences were found when comparing the scotopic and the photopic lighting conditions. Cataracts, however, were not detected.

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PP634

Refractive and Visual Outcomes of a Double Treatment Protocol of Supracor Presbyopic LASIK in Hyperopic Eyes

Presenting author: Jérôme Pariselle, France

Purpose:
To evaluate the efficacy and safety of two consecutive presbyopic LASIK treatments in non-dominant eyes using the Supracor algorithm (Technolas Perfect Vision GmbH, Munich, Germany, part of Bausch + Lomb, USA) with a traditional single Supracor laser treatment in the dominant eye.

Setting:
Aliénor Laser Vision

Methods:
This retrospective single-unit study reviewed the clinical outcomes of 16 patients who underwent two consecutive regular Supracor presbyopic laser treatments in the non-dominant eye and a single regular Supracor laser treatment on the dominant eye. Patients were then followed at week 1, month 1 and month 6 to review uncorrected and corrected near and distance visual acuities as well as refractive outcomes.

Results:
In total 16 patients over 50-year old, 32 eyes, underwent laser treatment. Uncorrected near visual acuity improved significantly from a pre-operative baseline of 0.46 to -0.08 (logMAR) at month 6 ($p<0.001$). This improvement was superior to that of the dominant eye 0.46 to 0.28 (logMAR) ($p=0.076$). Uncorrected distance visual acuity improved in the non-dominant eye from 0.18 pre-operatively to 0.07 (logMAR) at 6 months ($p=0.027$). Spherical error changed from 0.48 D to -0.64 D at 6 months (target -0.25 D) in the non-dominant eye and 0.97 D to -0.25 D in the dominant eye.

Conclusions:
This study has demonstrated the long-term safety and clinical efficacy of a double (bump) treatment paradigm using Supracor presbyopic laser treatment. In comparison to a single treatment, double treatment offers improved refractive outcomes and long-term stability.

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PP635

Efficacy and safety in a multicentric study of pharmacological treatment for presbyopia

Presenting author: Giovanna Benozzi, Argentina

Purpose:
To evaluate the efficacy and safety of patients under the pharmacological treatment of presbyopia performed with the Benozzi's method.

Setting:
This is a pharmacological treatment with eye drops and a non-surgical option for presbyopic patients who do not wish to wear glasses for presbyopia.

Methods:
A non-randomized multicentric case-series retrospective study was settled with 10-year follow-up. Patients between 40 to 60 years old at baseline were included from 5 different centers of Argentina. All patients had 25/20 or better binocular uncorrected distance visual acuity (UDVA) and, Jaeger 2 or worse uncorrected near visual acuity (UNVA). All of the patients were treated with the Benozzi Method which consist in a worldwide patented preservative-free eye-drops formulation of pilocarpine and diclofenac. Data was considered in different groups according to their follow-up time and the main outcome was UNVA and UDVA. Side effects and patient's satisfaction were also assessed.

Results:
A total of 150 patients were included. At baseline, the mean UNVA for the different groups were ranged between J4.14 to J6.27 which was decreased to J1 to J1.53 ($P < 0.01$ for every group). The mean baseline UDVA has been ranged between 0.02 to 0.04 logMAR. After treatment were between 0.01 to 0.03, without a statistically significant improvement. Side effects were spontaneously resolved and subjective evaluation shows patients were satisfied.

Conclusions:
This study from 5 from different ophthalmic centers in Argentina showed that Benozzi's method for presbyopia treatment was effective and safety. It improves the UNVA without affecting the UDVA, maintaining their efficacy even after 10 years, in a population aged between 40 to 60 years old.

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PP636

Development of a Presbyopia Progression Classification System Based on Age and Near Visual Acuity

Presenting author: AnnMarie Hipsley, United States

Purpose:
To develop an objective method for tracking presbyopia progression based upon age and near visual acuity.

Setting:
Subjects were enrolled in a feasibility study and separated into 4 categories based upon disease progression.

Methods:
Patients over 40 years of age and demonstrating a loss of accommodative ability were enrolled. Visual acuity outcomes were assessed using the Early Diabetic Retinopathy Study (EDTRS) logMAR charts and wavefront aberrometry. Each patient was evaluated multiple times to assess visual acuity at near and aberrometry/topography to determine DLS.

Results:
We classified patients into 4 stages based on disease progression. Stage I Early Presbyopia (38-42 years): difficulty reading 20/40 (J5) or better at near using distance prescription for a length of time. Stage II Acute Presbyopia (43-48 years): reading add required to see 20/40 (J5) or better at near using distance prescription. Stage III Chronic Presbyopia (49-55 years): progressive increase of 0.25 D reading addition every year. Stage IV Stable Presbyopia (56+ years): inability to read 20/100 (J10) without full reading addition (+2.50D). These stages had good correlation with the stages in dysfunctional lens syndrome (DLS).

Conclusions:
As presbyopia treatments options increase, there is clinical value in the classification, prevalence and incidence of age-related accommodation decline using objective data linked to the progression of presbyopia. An objective measurement tool for tracking presbyopia progress based on age and near visual acuity was developed. This novel classification system has the potential for stage-related treatment interventions.

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PP637

Clinical Trial Results of Laser Scleral Microporation in Presbyopic Eyes

Presenting author: Robert Ang, Philippines

Purpose:
To evaluate the visual benefit of Laser Scleral Microporation (LSM) in presbyopic eyes

Setting:
Prospective study, single surgeon, single site in the Philippines

Methods:
Scleral microporations were created in critical zones in four quadrants using an Er:YAG laser to improve pliability & biomechanical efficiency of the accommodative apparatus for 14 patients. Patients were over 40 years of age with demonstrated loss of accommodative ability. Visual outcomes were assessed using the Early Diabetic Retinopathy Study (EDTRS) logMAR charts with and without correction at distance, 60cm and 40cm.

Results:
LSM provided improved uncorrected monocular UDVA, UIVA, UNVA from 0.02, 0.20 and 0.47 preoperatively to -0.03, 0.01 and 0.18 at 6 months respectively postoperatively. Distance corrected intermediate and near visual acuity (DCIVA, DCNVA) improved from 0.19 and 0.46 to -0.01 and 0.16 respectively postoperatively with no reduction in distance vision. Spherical equivalent of the manifest refraction was not significantly different from 0.16D (SD 0.28D) preoperatively to 0.29D (SD 0.22) six months postoperatively. Refractive power required to read letters at the logMAR 0.00 level dropped from 2.06D (mean) to 1.07D (mean) at 6 months post-operatively.

Conclusions:
Early clinical trial results suggest LSM to be a safe and effective procedure for restoring range of visual performance in presbyopes. Early results also suggest that LSM can improve intermediate and near visual acuity without touching the visual axis and without comprising distance vision. Data collection is ongoing.

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PP638

First Results with Presbyopia Excimer Laser Correction Inducing Higher Negative Spherical Aberrations in Blended Vision (PresbyEDOF)

Presenting author: David Lücht, Germany

Purpose:
The correction of presbyopia by inducing positive (Presbyond, CZM) and negative (PresbyMax, Schwind) spherical aberrations and blended vision has proven to be efficient. Although the amount of intrapersonal ametropia and optical approach in both is different.

Setting:
All surgeries were performed by one surgeon at the Breyer-Kaymak-Klabe Eye Surgery and Premium Eyes in Duesseldorf, Germany, member of the International Vision Correction Research Center (IVCRC.net).

Methods:
We changed the parameters in treating patients (n=18) with the PresbyMax (Schwind) by inducing targeting emmetropia in the sensoric far dominant eye and -1.5D in the sensoric near dominant eye. Furthermore, we raised the induction of negative spherical aberrations to an EDOF effect of 1.25D - 1.5D. All patients were retrospectively called in a chronological order and answered a questionnaire concerning everyday experience, subjective optical quality, subjective optical side effects and quality of life between 1-3 months after surgery.

Results:
In this real-life quality management-controlled investigation of a new surgical approach to correct presbyopia we achieved the following results: The everyday experience, subjective optical quality, subjective optical side effects and quality of life was clinically significant raised in all patients and all of them would recommend it to a friend.

Conclusions:
PresbyEDOF is an interesting alternative procedure of suitable excimer laser presbyopia correction in the treatment of patients without cataractogenous lenses.

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Restoration of Binocularity & Visual System Activity Following Laser Scleral Microporation

Presenting author: Olga Rozanova, Russian Federation

Purpose:
To assess binocularity using dynamic fusional ability in presbyopia and to evaluate a presbyopic surgical procedure which restores binocularity.

Setting:
Asian Eye Institute, Philippines, National Medical Center "S. Fyodorov Eye Microsurgery Federal State Institution", Irkutsk Branch, Russia

Methods:
Patients (n=22) essentially emmetropic patients without concomitant pathology were examined. Visual function under monocular and binocular conditions was investigated using ultrasound biomicroscopy, aberrometry, standard ETDRS charts, and pupillometry. Evaluation of the effects of the Laser Scleral Microporation (LSM) procedure on binocular fusion was also performed. Sixty healthy emmetropic patients were in control group.

Results:
The decrease of accommodation in presbyopia is accompanied by marked changes in the lens and ciliary muscle. This results in reduced near vision using the distance correction and required of an addition for reading. The shift of image focus zone in presbyopia is accompanied by suppression of binocular fusion. The degree of binocular summation is reduced. Results from a prospective single arm clinical trial are offered for 22 presbyopic patients over a 6 month follow up period following the LSM procedure. Reported results include Distance corrected intermediate and near visual acuity, add power, aberrometry, and area of binocular summation.

Conclusions:
Disintegration of binocular interaction may be one of the key mechanisms of reduced visual comfort after presbyopia formation. Monocular presbyopia treatments directly reduce binocularity. LSM is a binocular treatment which appears not only to restore accommodative function but also improve binocularity.

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PP640

Exploring the vision related quality of life: a qualitative study comparing patients' experience before and after cataract surgery with standard monofocal IOL and an enhanced monofocal IOL

Presenting author: Zoraida Del Campo, Spain

Purpose:
To explore quality of life (QoL) related with intermediate vision of patients before and after cataract surgery, and to provide evidence for the design of future scales that assess visual function related with intermediate distance.

Setting:
Service of Ophthalmology, Hospital de Sant Pau, Barcelona

Methods:
A qualitative research methodology based on thematic content analysis was used to explore vision-related QoL according to the experiences of patients with cataracts. Data were collected through twenty-two semi-structured interviews conducted with patients in the waiting list of cataract surgery (n=8), patients implanted with a standard aspheric monofocal intraocular lens (IOL) (n=7), and patients implanted with an enhanced monofocal lOL (TECNIS Eyhance) (n=7). The coding, aggregation and theme development was carried out using the Atlas.ti software.

Results:
Patients from waiting list reported difficulty in performing daily and meaningful tasks related with near (threading a needle, reading price tags), intermediate (using a computer or dialing numbers on a smartphone), and distant (recognizing faces, walking on uneven surfaces) visual ranges. Patients after surgery with standard monofocal IOL reported improvement in performing activities in the distant visual range, but also the need for better communication with clinical staff to adjust own expectations. Finally, patients implanted with enhanced monofocal IOL TECNIS Eyhance reported major satisfaction and improved visual function in performing daily living activities related with the intermediate visual range.

Conclusions:
Our exploratory study found that patients after cataract surgery with TECNIS Eyhance IOL reported a better performance of activities that require the intermediate vision. Further research aimed to develop scales assessing vision-related QoL in the intermediate visual range should prioritize outcomes according to the person's needs and preferences about daily and meaningful activities.

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PP641

Validation of Catquest-9SF questionnaire for Portuguese language and its application on cataract surgery outcome measuring.

Presenting author: Luís Bernardes, Portugal

Purpose:
Visual acuity and lens opacity have limitations in selecting and prioritizing patients for cataract surgery. The Catquest-9SF is a short questionnaire designed to measure patient self-assessed visual function in daily tasks, showing validity and reliability for assessing clinical visual outcomes after surgery. However, results are population and language specific, meaning Catquest-9SF must be validated in new populations before it is used systematically. The aim of this study is to evaluate the translated Catquest-9SF in a Portuguese population with cataracts subjected to surgical intervention.

Setting:
Unidade de Oftalmologia de Coimbra (UOC).

Methods:
A Portuguese translation of Catquest-9SF was self-administered by 520 pre-operative and 290 post-operative patients. The data were processed and Rasch model with Principal Component Analysis was used to test the relevant psychometric properties. Differential item functioning was assessed for demographic characteristics.

Results:
A total of 810 questionnaires were analyzed, 326 males and 484 females with a median age of 70 years (62, 77). Catquest-9SF had ordered response thresholds and presented no misfits (infit range 0.75-1.25 and outfit range 0,69-1,32). All items were unidimensional, with a raw variance of 0,72 and eigenvalue of 1,39. Person separation (3,19) and Person reliability (0,91) were adequate. Overall targeting was –1,23 but pre-operative targeting was -0,09, indicating that item difficulty was well suited to visual ability. The questionnaire was free of any significant differential item functioning with regards to age and gender.

Conclusions:
Catquest-9SF shows good psychometric properties in our population and provides an adequate and reliable tool for assessing visual function in patients seeking cataract surgery.

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PP642

Pre-operative dry eye signs and symptoms in patients presenting for laser vision correction, cataract and refractive lens exchange (RLE) surgery and the effect on refractive outcomes

Presenting author: Clare O'Donnell, United Kingdom

Purpose:
To assess whether pre-operative dry eye (DED) tests are associated with post-operative refractive and visual outcomes after laser vision correction and intraocular lens surgery

Setting:
Optegra Eye Hospitals, UK

Methods:
Pre-operative DED metrics were obtained with the Oculus K5M (Oculus®, Wetzlar, Germany) on one eye of 31, 25 and 44 healthy subjects attending for laser vision correction (LVC), cataract and refractive lens exchange (RLE) surgery, respectively. A bivariate correlation analysis was performed between the pre-operative DED metrics (ocular surface disease index questionnaire (OSDI), non-invasive keratograph breakup time (NIKBUT), tear meniscus height (TMH) and tear film osmolarity (OSMO)) and the post-operative refractive outcomes (unaided distance visual acuity (UDVA), corrected distance visual acuity (CDVA), spherical equivalent refraction (SEQ) and deviation from predicted post-operative refraction (DEV_PPOR)).

Results:
Significant correlations were found in all the subgroups when post-operative UDVA and CDVA were compared with pre-operative symptoms ($p = 0.021$, $p = 0.009$ and $p = 0.043$ for LVC, cataract and RLE subgroups, respectively). In the LVC subgroup, DEV_PPOR was significantly correlated with OSDI questionnaire (Pearson's correlation $r = 0.700$, $n = 9$, $p = 0.036$) while tear film osmolarity was negatively correlated with TMH (Pearson's $r = -0.365$, $n = 31$, $p = 0.043$). SEQ and UDVA in the RLE subgroup showed significant correlation with the pre-operative TMH ($p = 0.003$ and $p = 0.008$ respectively).

Conclusions:
A depleted tear film and resulting ocular symptoms pre-operatively are linked with less predictable refractive outcomes. Hence actively treating DED before refractive surgery would appear to be an appropriate management strategy to optimise clinical outcomes.

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PP643

Trifocal IOLs Implantation in Myopic Cataract Patients That Have Experienced Previous Laser Vision Correction

Presenting author: Gabriele Scaltrini, Italy

Purpose:
To evaluate visual performances of trifocal IOLs AT LISA tri 839 MP and AT LISA tri toric 939MP trifocal IOLs (Carl Zeiss Meditec AG - Jena - Germany) in patient that experienced previous laser vision correction

Setting:
Piovella Global Center for Ophthalmology - Monza - Italy

Methods:
Only eyes with regular cornea were included in this study: 43 eyes of 24 patients mean age: 57.67 ± 9.13 years. Preop SE was -0.87 ± 3,22 BCDVA 20/21.40 ± 3,18. Postop were measured: distance (5m) near (40cm) and intermediate (80 cm) VA, corneal topography and aberrometry, contrast sensitivity and defocus curve and quality of vision. Follow-up examinations were performed at day 1 2 7 30 90 180 360 and yearly

Results:
At six months BCDVA was 20/20,65 ± 2,51. SE was -0,20 ± 0,45.Residual astigmatism was 0,02 ± 0,42.83% of eyes after trifocal IOLs implantation achieved postop refractive results within ± 0.75 diopters

Conclusions:
Trifocal IOLs provided good visual performances also with patients that experienced laser vision correction decades ago. To be selected for surgery eyes biometry needed to be applied with no difficulties and have to demonstrate no significant differences related the perfect IOLs power also after multiple attempts

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PP644

Presbyopic Patient Outcomes with a Segmented Bifocal Intraocular Lens

Presenting author: David Teenan, United Kingdom

Purpose:
To evaluate and report on performance of the Lenstec SBL-2 Segmented Bifocal Lens in a large clinical setting.

Setting:
Multi Disciplinary Refractive Surgery Centre

Methods:
Presbyopic patients who underwent cataract surgery or refractive lens exchange with implantation of the Lenstec SBL-2 Segmented Bifocal Lens were included. Outcomes of 479 consecutively treated eyes from 245 patients were available for review. The age range of patients was 42 to 78 years. Up to 9.00 diopters of Hyperopia, and 11.75 diopters of Myopia was treated. Preoperative astigmatism ranged from 0 to 2.50 diopters.

Results:
Mean postoperative distance visual acuity was -0.02 logMAR (range -0.18 to +0.40 logMAR). Intermediate visual acuity was 0.29 logMAR (range 0.00 to 0.60 logMAR) and near visual acuity was 0.25 logMAR (range 0.00 to 0.70 logMAR). Patients gained an average of 4 lines of UCDVA, 4 lines for UCIVA, and 5 lines for UCNVA. Less than 5% of patients experienced severe difficulty with glare, halo or starburst. Patients reported being “Satisfied” or “Very satisfied” in 87.3% of treated cases, while 95.3% would recommend the treatment.

Conclusions:
Clinical and patient-reported outcomes suggest this segmented bifocal IOL is a good option for presbyopic patients interested in improving visual acuity at the distant, intermediate, and near range. Currently, the IOL exhibits low incidence of significant visual phenomena within the first year.

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PP645

Potential influence of topographic and biometric offset in the explantation of multifocal intraocular lenses.

Presenting author: Antonio Martínez-Abad, Spain

Purpose:
The aim of the study was to determine the topographic and biometric offset provided by Sirius and IOLMaster in cases of multifocal intraocular lens (IOL) explantation, as well as to establish the correlation between both devices and calculate the rate of anomalous deviations.

Setting:
1. Vissum Miranza, Alicante, Spain 2. Division of Ophthalmology, Miguel Hernandez University, Alicante, Spain

Methods:
This is a retrospective transversal study that includes patients implanted with different multifocal IOL designs and posteriorly explanted due to unsatisfactory visual performance. All patients underwent corneal topography by Sirius (CSO, Italy) and optic biometry by IOLMaster (Zeiss, Germany). The offset value provided by both devices was reported in the horizontal and vertical axes. It represents the deviation between the pupil center and the normal vertex of the cornea in cartesian coordinates. Mean coordinates and correlations between devices were established, as well as the rate of anomalous deviations (>0.05mm) was calculated.

Results:
The study included 75 eyes of 50 patients who underwent the explantation of various multifocal IOL models: ReSTOR SN6AD1 and IQ ReSTOR (Alcon), Acri.Lisa 366 and AT Lisa tri 839MP (Zeiss), LS-313 MF15 and MF30 (Oculentis), Miniwell (SIFI). Mean offset provided by Sirius was 0.01±0.26mm in X axis and 0.01±0.18mm in Y axis, and 0.06±0.45mm and 0.14±0.23mm respectively by IOLMaster. Correlation between devices was 0.774 for X axis and 0.270 for Y axis. The 41.94% of eyes presented an anomalous X offset by IOLMaster, while the rest of measurements were anomalous in less than 10% of eyes.

Conclusions:
Although the offset provided by topographic and biometric devices was generally low, the horizontal deviation by IOLMaster was more sensitive to detect anomalous deviations. However, the offset provided by both devices was significantly correlated in the horizontal axis suggesting that both measurements may be used in multifocal IOL indication.

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PP646

Rate of Post-LASIK and Post-PRK Keratoectasia in an Eye Specialist Hospital in Riyadh, Saudi Arabia; A Retrospective Study.

Presenting author: Tariq Almudhaiyan, Saudi Arabia

Purpose:
To determine the rate and clinical characteristics of post refractive ectasia among patient underwent laser in situ keratomileusis (LASIK) vs. photorefractive keratectomy (PRK).

Setting:
At a single eye institute, King Khaled Eye Specialist Hospital in Riyadh, Saudi Arabia.

Methods:
All patients who were diagnosed with post-refractive ectasia post LASIK and post PRK from the year 2014 to 2020 were reviewed retrospectively. Evaluation of age, gender, spherical equivalent refraction, intraocular pressure (IOP), pachymetry, topographic data, type of refractive surgery, presence of flap, and time to the onset of ectasia. Data were managed and coded using Microsoft Excel 2013® (Microsoft Corporation, Redmond, Washington, USA). Demographic outcomes presented as percentages and frequencies using a chi-square test for categorical outcomes and in means and standard deviation (SD) for Continuous variables. A (P-value) less than 0.05 will be considered statistically significant.

Results:
A total of 704 charts of ectasia were reviewed; of which 127 eyes were identified as post LASIK/PRK ectasia. Ectasia occurred after LASIK in 114 cases while 13 cases were after PRK (p-value >0.0001). Fifty-five ectasia cases were found in patients who underwent LASIK or PRK before or at the age of 30 years. LASIK group presented with a higher average k max of 54.04 compared to 51.58 in the PRK group. Mean central corneal thickness was 399 µm (ranges from 295-498) and 430 µm (ranges from 225-536) after LASIK and PRK, respectively (P-value 0.004).

Conclusions:
Post-PRK ectasia is significantly lower than post- PRK with a lenient clinical outcome compared to LASIK patients. Young age and male gender cindered a risk factor,

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PP647

The Demarcation Line and Biomechanics After Combining Different Corneal Cross-linking Protocols with Laser in Situ Keratomileusis and Transepithelial Photorefractive Keratectomy

Presenting author: Nanji Lu, China

Purpose:
To assess the effect of different simultaneous corneal cross-linking (CXL) protocols combined with femtosecond laser in situ keratomileusis (FS-LASIK-Xtra) and transepithelial photorefractive keratectomy (TransPRK-Xtra) on demarcation line (DL) and biomechanics.

Setting:
Eye Hospital of Wenzhou Medical University, Wenzhou, China.

Methods:
Two CXL protocols (low/high energy [LE/HE]:1.8/2.4 J/cm2) were performed in FS-LASIK-Xtra and TransPRK-Xtra. Patients were evaluated preoperatively and at 1 week and 1, 3 and 6 months postoperatively. The main outcome measures were the visual acuity, haze incidence, actual DL depth (ADD), and new dynamic corneal response parameters and the stress-strain index (SSI) from CorVis.

Results:
The study included 15 eyes undergoing FS-LASIK-Xtra-HE,15 eyes undergoing FS-LASIK-Xtra -LE, 15 eyes undergoing TransPRK-Xtra-HE, and 15 eyes undergoing TransPRK-Xtra-LE. At 1 month postoperatively, the mean ADD in FS-LASIK-Xtra-HE group at the central cornea was 142.80±63.89 µm, compared to 134.62±58.51, 164.00±56.14 and 134.07±56.08 µm respectively with FS-LASIK-Xtra-LE, TransPRK-Xtra-HE and TransPRK-Xtra-LE (P = 0.508). At 6 months postoperatively, 93% of FS-LASIK-Xtra-HE eyes achieved uncorrected distance visual acuity of 20/20 or better, compared to 93%, 87% and 100% respectively with FS-LASIK-Xtra-LE, TransPRK-Xtra-HE and TransPRK-Xtra-LE; no differences in new dynamic corneal response parameters and SSI were found in all groups.

Conclusions:
Prophylactic FS-LASIK-Xtra and TransPRK-Xtra with a total energy of 1.8/2.4 J/cm2 can achieve a high-level postoperative vision. The increase of total irradiation energy does not bring the difference in DL and corneal biomechanics. High irradiation energy is not recommended when the goal of performing Xtra procedures achieve.

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PP648

Successful treatment of refraction errors after Trifocal and Toric Trifocal IOL implantation with ReLex smile surgery

Presenting author: Njomza Hima-Musa, Kosovo

Purpose:
The purpose of this study is treatment of residual refractive errors after Trifocal and Toric Trifocal IOL Implantations using ReLex Smile surgery. Residual refractive errors (myopia 50% and hyperopia 30%) are the main problems in patients after these surgeries. The current common surgeries in treating residual refractive errors have the following risks: LASIK or PRK (epithelial ingrowth, corneal ectasia, irregular astigmatism, dry eye, visual aberrations, infectious keratitis) RLE (endophthalmitis, vitreous loss with posterior capsular rupture, retinal detachment) Our study is to investigate the effect of ReLex-Smile in treating the residual refractive errors after Trifocal and Toric Trifocal IOL implantation.

Setting:
Eye Hospital, Prishtina – Republic of Kosovo ClinicalTrials.gov identifier (NCT number): NCT04712318

Methods:
6 months after Trifocal and Toric Trifocal IOL Implantation on 100 eyes we used ReLex-Smile surgery for treatment of myopic residual refraction (min.-0.75D) using VisuMax femtosecond laser. The optical zone and cap diameter were 6.5 and 7.5 mm. After dissection of anterior and posterior planes, the lenticule was extracted through 120° superior 3.5 mm incision, marked with a sterile marker. 6 months after Trifocal and Toric Trifocal IOL Implantation on 30 eyes we used fresh corneal myopic lenticule implantation for treatment of hyperopic residual refraction (+0.75D) as allogenic implant taken from myopic patients (-1.0D) to be implanted on Pseudophakic patients.

Results:
Increase of visual acuity by reducing residual refractive errors after Trifocal and Toric Trifocal IOL implantation (myopia and hyperopia) using ReLex Smile surgery.

Conclusions:
ReLex Smile surgery in Pseudophakic patients with Trifocal and Toric Trifocal IOL is safe, effective, and successful treatment. At myopic residual refraction (min.-0.75D) ReLex-Smile is an effective method, since there is no flap and this prevents invasive damage to the anterior surface of the cornea contrary to the LASIK where flap is present and posing risk for epithelial ingrowth and dry eye. At hyperopic residual refraction we investigated the effect of fresh myopic corneal lenticule implantation as allogenic implant taken from myopic patients and implanted on Pseudophakic patients with residual hypermetropia refraction using VisuMax Femtosecond laser - Smile module surgery.

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Refractive

PP649

Comparison of corneal aberrations with swept-source anterior segment OCT and Placido disk-combined anterior segment OCT in regular eyes

Presenting author: Stefan Georgiev, Austria

Purpose:
To compare corneal aberrations in patients scheduled for cataract surgery between a swept-source OCT imaging system (ANTERION, Heidelberg Engineering GmbH, Heidelberg, Germany) and a Placido disc combined spectral-domain OCT (MS-39, CSO, Florence, Italy).

Setting:
Vienna Institute for Research in Ocular Surgery (VIROS). The study was performed at the Hanusch Hospital in Vienna.

Methods:
Prospective case series including 50 eyes of 50 patients scheduled for cataract surgery screening are evaluated. Correlations, differences, and agreement between corneal higher-order (HOA) aberrations is analyzed.

Results:
Patient recruitment is still ongoing. With a P value of less than 0.05 final data will include paired t tests, and Pearson r correlations for the root mean square error (RMS), 3rd order RMS, 4th order RMS, spherical aberration, coma, and trefoil. Additionally, mean differences with limits of agreement (± 1.96 standard deviation) are generated.

Conclusions:
In regular eyes, the functional equivalency of the swept-source anterior segment OCT and the Placido disk-combined anterior segment OCT is tested via the closeness of the calculated limits of agreement and correlations for aberrometric metrics.

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Refractive

PP650

Hyperopia and mixed astigmatism — a case for SMILE?

Presenting author: Olesia Ziiatdinova, Russian Federation

Purpose:
To demonstrate the ability of the ReLex SMILE procedure for hypermetropia and mixed astigmatism
To present the ReLex SMILE procedure with low energy laser parameters

Setting:
The SMILE software allows to plan for laser correction only myopia and minus or plus astigmatism
We should convert hypermetropia and minus astigmatism into myopia and plus astigmatism. It is possible to do with transposition rule: the mixed astigmatism i

Methods:
The study included 21 eyes. The age 20-37 years old Hypermetropia from +0.25 to +2.25 Diopters Astigmatism from 1.0 to 5.0 Diopters Mean pachymetry: 532 mkm Mean keratometry: 41,99 Diopters Laser settings for SMILE procedure:low energy 120 nJ (24) with dots distance 4.5 mm

Results:
All eyes in our study after ReLex SMILE procedure achieved preoperative BCVA Most of them (16 eyes) had one or two lines more in Snellen chart compared preoperative BCVA The refractive data six months after the ReLex SMILE: The average postoperative sphere was +/-0.25 diopters The average postoperative cylinder was 1.15 diopters

Conclusions:
The ReLex SMILE procedure is effective laser vision correction for hypermetropia and mixed astigmatism. For the possibility the ReLex SMILE for hypermetropia with mixed astigmatism we should use transposition rule to convert it to myopia and plus cylinder with 90 degrees changes. The low energy laser parameters allow to perform the ReLex SMILE without any complication and improve the first postoperative days quality of vision and shorter the recovery time.

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Refractive

PP651

Initial Experience with a New Monofocal Intraocular Lens

Presenting author: Sandro DiSimplicio, United Kingdom

Purpose:
To evaluate our initial experience with a new TECNIS Eyhance ICB00 monofocal IOL with enhanced features for intermediate vision.

Setting:
Multi Disciplinary Refractive Surgery Centre

Methods:
Outcomes of 161 eyes from 94 presbyopic patients who underwent cataract surgery or refractive lens exchange with bilateral implantation of the TECNIS Eyhance ICB00 were reviewed. The age range of patients was 43 to 81 years. Postoperative clinical safety and efficacy outcomes up to 12 months following implant were analysed.

Results:
The mean binocular distance visual acuity was -0.02 logMAR (range -0.18 to +0.52 logMAR) and the mean binocular intermediate visual acuity was 0.37 logMAR (range 0.00 to 0.80 logMAR). Mean gain in visual acuity lines was 8 for UCDVA and 6 for UCIVA. Less than 5% of patients experienced severe difficulty with glare, halo or starburst. Only 1 patient reported significant difficulties with tasks requiring intermediate vision (e.g. working on computer, cooking, fixing things around house). No intraoperative or early postoperative adverse events related to the IOL have been noted.

Conclusions:
Initial outcomes suggest this new monofocal IOL is a good alternative for patients with ocular pathology where a true multifocal or an extended depth of focus IOL might be contraindicated. Thus far, the IOL showed low incidence of visual phenomena within the first year.

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PP652

ReLEx SMILE laser correction technology for moderate and high astigmatism

Presenting author: Janek Masian, Russian Federation

Purpose:
Evaluate the results of using the ReLEx SMILE laser correction technology for moderate and high astigmatism correction in the St. Petersburg branch of the "Eye Microsurgery" MNTK named after academician S.N. Fedorov ".

Setting:
St. Petersburg branch of the "Eye Microsurgery" MNTK named after academician S.N. Fedorov ".

Methods:
Laser correction of moderate and high degree astigmatism using ReLEx SMILE technology was performed in 49 patients (67 eyes) with an astigmatic component from -2.75 to -5.0 diopters (D), aged 18 to 44 years (average age 30, 64±12 years), men - 22, women - 27. The follow-up period was from 1 to 3 months. The following indicators were determined: un-corrected visual acuity (UCVA), best corrected visual acuity (BCVA), cylindrical refractive components.

Results:
UCVA significantly increased from 0.02 ± 0.01 to 0.73 ± 0.27 on the 1st day after surgery and remained stable with a noticeable increase (0.81 ± 0.39) during follow-up after 1 and 3 months. In 10 patients, also increased BCVA on the 1st day after the surgery and remained stable by during the 3 months of observation, respectively, from 0.8 ± 0.2 to 1.01 ± 0.19. The astigmatic component of refraction decreased on the 1st day on average from -3.67 ± 1.33 to -0.04 ± 0.56, after 1 month (-0.11± 0.89) and remained stable by the 3rd month (-0.11± 0.91).

Conclusions:
ReLEx SMILE technology is an effective and predictable method of surgical correction for moderate and severe degrees of astigmatism. In the postoperative period, in a number of cases, the BCVA became higher than the previously corrected BCVA, which indicates that the surgical correction of astigmatism using ReLEx SMILE technology not only improves the quality of life by freeing the patient from the correction tool (glasses and soft contact lenses), but also surpasses the last capabilities for the BCVA.

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Refractive

PP653

Insertion of a third Intracorneal ring segment (ICRS) in a case of persistent deviated cone in a previously treated keratoconic cornea with two ICRS

Presenting author: Tarek Badawy, Egypt

Purpose:
To get the maximum benefit for the patient whose previous treatment with two ICRS was insufficient to treat his refractive condition.

Setting:
Eyoun Refractive Eye Center, Cairo, Egypt.

Methods:
A thirty one years old female patient with bilateral keratoconus who underwent Femto-assisted bilateral ICRS insertion two years before presenting to us with residual refractive error and high astigmatism in left eye with refraction (-7.0/-5.75x130) and best corrected visual acuity of (0.2). We decided to implant a third ICRS (160/300) using Femto laser assistance along the steepest meridian of the residual downward and temporally displaced cone. Occulus Pentacam was done preoperative and one month postoperative.

Results:
Our data clearly showed that after the insertion of the third ICRS in this patient, the refractive error significantly improved to be (-3.75/ -1.75x80) with unaided visual acuity of (0.8). In addition, the pentacam showed the desired flattening of the cone. Moreover, to the best of our knowledge, no reported study has evaluated the changes in the corneal topography after a third ICRS implantation in cases of keratoconus.

Conclusions:
In conclusion we have demonstrated that in cases of keratoconus, implanting a third ICRS, if two are not enough, is an option that could change the refractive outcome in a way that is satisfactory for the patient and surprising for the doctor.

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PP654

Evaluation of the anterior chamber parameters by Pentacam after toric Implantable Phakic Contact lens (IPCL) implantation in moderate to high myopia with astigmatism.

Presenting author: Mohamed Salah, Egypt

Purpose:
To assess the parameters of the anterior chamber (AC) and lens vault after toric IPCL in patients with moderate to high myopia with high astigmatism by Pentacam

Setting:
Department of Ophthalmology, Faculty of Medicine, Minia University, Egypt

Methods:
30 eyes with moderate to high myopia with high astigmatism were included in a prospective interventional case series study and were implanted with toric IPCL. Pentacam was done preoperatively, after 1 month, after 3 months and after 6 months of toric IPCL implantation for evaluation of the anterior chamber parameters as angle of the anterior chamber(ACA), depth of the anterior chamber (ACD) and volume of the anterior chamber (ACV). Also, the lens vault and IOP were evaluated.

Results:
The preoperative ACD was 3.3±0.1 which changed to 2.5±0.1 after 1 month and remained stable at 3 and 6 months postoperatively. The ACV was 198.06±25.02 preoperatively and reduced to 131.5±20.7, 131.8±21.4 and 131.5±20.2 after 1 month, 3 months and 6 months respectively. The ACA was 42.9±4.1 preoperatively and changed to 26.7±4.3, 26.4±4.2 and 26.7±4.9 after 1 month, 3 months and 6 months respectively. The vault was 458±126.2 after 1 month, 461±129.6 after 3 months and 464.6±130.6 after 6 months.

Conclusions:
Toric IPCL is a safe approach for treatment of high myopia with astigmatism and Pentacam is a safe tool for assessment of the AC parameters.

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PP655

ReLEx® SMILE technology in patients aged 16–17 years

Presenting author: Andrey Kachanov, Russian Federation

Purpose:
To study the possibilities of ReLEx® SMILE operation for the correction of myopia and myopic astigmatism in patients aged 16-17 years old.

Setting:
1 – St.-Petersburg branch of Sv. Fyodorov Eye Microsurgery Clinic, 2 – North-Western State Medical University named after I.I. Mechnikov, [3] – Saint-Petersburg State University, 4 – Baltic Technical University; 1 - 4 – St.-Petersburg, Russia.

Methods:
ReLEx® SMILE was performed on 36 eyes in 18 patients, of which 12 boys (66.7%) and 6 girls (33.3%), on the VISUMAX femtosecond laser platform (Carl Zeiss Meditec) to correct myopia and myopic astigmatism. The follow-up period was 6 months. Spherical component of refraction in the operated patients varied from –1.25 diopters to –10.0 diopters (–3.85 ± 2.18 diopters), while astigmatism was noted in the range from –0.25 to –0.75 diopters (- 0.28 ± 0.30 diopters).

Results:
Pre-op decimal UCVA was from 0.02 to 0.3, and CDVA was 1.0 and better in all cases. The day after ReLEx® SMILE, in all patients, the anterior segment of the eyes looked calm and intact, UCVA increased from 0.09 ± 0.06 to 1.10 ± 0.16 6 months after surgery ($p < 0.001$). The day after the ReLEx® SMILE operation, efficacy index was 0.97 ± 0.18 and increased by the end of 6 months of observation to 1.10 ± 0.18 ($p < 0.01$). Safety index at the end of the observation period was above 1.0.

Conclusions:
ReLEx® SMILE technology - a well-tolerated, safe, effective, stable and predictable operation in 16–17-years-old patients to correct myopia and myopic astigmatism. ReLEx® SMILE procedure is a promising and modern way to correct myopia in patients from 16–17 years of age, with a rapid recovery of UCVA and the absence of a superficial corneal flap.

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PP656

Effect of Age, Gender, Region, and Refractive Errors on Central Corneal Thickness Among Saudi Population; A Cross-Sectional Study

Presenting author: Albanderi Alhamzah, Saudi Arabia

Purpose:
To determine the average central corneal thickness (CCT) in healthy Saudi adults and to analyze the variations based on gender, age, region, and refractive errors.

Setting:
subjects between the ages of 20-40 who were randomly invited to participate at a gathering center in Riyadh, Saudi Arabia.

Methods:
A cross-sectional study of average CCT of subjects between the ages of 20-40 who were randomly invited to participate at a gathering center in Riyadh, Saudi Arabia. Volunteers were excluded if they had corneal or ocular pathology, a history of ocular surgery or trauma, and contact lenses wear within 7 days of data collection. CCT was measured using Scheimpflug tomography. Statistical analysis was performed to determine any association of CCT with age, gender, refractive error, and geographic location. A P value less than 0.05 was considered statistically significant.

Results:
A total of 379 subjects (755 eyes) with a mean age of 28.88 ± 5.77 years. More than half of the participants were females 244 (64.4%). The mean CCT was 544.32 ± 36.25µm (range, 447-654µm). CCT was statistically significantly influenced by age (P=0.0001) where CCT was significantly lower as age increases. Although there was no statistically significant relationship between CCT and regions, nor refractive errors. A tendency toward thinner cornea in participants from north and west regions (P>0.05) and among hyperopic eyes (P-value 0.06).

Conclusions:
The average CCT in the healthy adult Saudi population was comparable to the regional and global averages. There was a significant negative association between age and CCT, where CCT values decrease with older ages. Hyperopic eyes, north and west regions have a tendency to a thinner CCT

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PP657

Refractive Outcomes After Trans-PRK for The Correction of Hyperopia; Up to Six-years Follow-ups

Presenting author: Mohammed Taha, Saudi Arabia

Purpose:
To evaluate the refractive outcomes and patient-reported satisfaction of single-step photorefractive keratectomy (PRK) and transepithelial photorefractive keratectomy (TransPRK) for the correction hyperopia.

Setting:
in a private eye clinic in Riyadh, Saudi Arabia

Methods:
This study a retrospective descriptive cohort consecutively included 25 hyperopic eyes. Eyes with compound hyperopic astigmatism and mixed astigmatism that had undergone PRK and TransPRK treatment. Pre- and post-operative visual and refractive data, as well as patient's reported satisfaction, were analyzed from the year 2014 until the year 2020.

Results:
Out of 25 eyes included, 15 were males, and 15 undergone TransPRK. Hyperopic refraction ranges from +0.25 to +4.00 before treatment and ranges from Plano to +1.75 at the last follow-up. Twenty-eight percent of patients reported overall satisfaction while 24% were very unsatisfied. Satisfaction with quality of daytime vision without correction and quality of daytime vision with correction reported by only 20% and 8% while 20% and 36% were very unsatisfied. Quality of vision during driving at night was very poor in 20% of patients. Glare problems reported by 24% and 20% did not report glares.

Conclusions:
PRK and TransPRK showed regression after long-term follow-ups and acceptable patient satisfaction rates.

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PP658

Results correction of ametropia after ReLEX SMILE surgery by PRK.

Presenting author: Renat Sadrutdinov, Russian Federation

Purpose:
To study the effectiveness and safety of the PRK operation after ReLEx SMILE.

Setting:
Hospital. Ac.S.N. Fyodorov Federal State Institution “Eye Microsurgery Complex” of the Ministry of Health of Russian Federation, Novosibirsk branch”, address: 10 Kolhidskaya str., 630096, Novosibirsk, Russia.

Methods:
8 Patients (15 eyes) for the study group were selected after previous operation ReLEx SMILE (VISUMAX Carl Zeiss) with light myopia and myopic astigmatism. After 1 year, the PRK (Mel 90 Carl Zeiss) operation was performed.

Results:
In all patients high rates of uncorrected visual acuity were obtained. The cornea retained its transparency.

Conclusions:
PRK after ReLEx SMILE is a safe and effective method of correcting induced ametropia. The maximum visual results were obtained in most cases.

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PP659

Efficacy and safety index in eyes with Sub-Bowmans Keratomileusis and Femtosecond LASIK

Presenting author: Sonal Shah, India

Purpose:
To compare efficacy and safety index in eyes with Sub-Bowmans Keratomileusis (SBK) and Femtosecond LASIK and secondly to evaluate the predictive factors for safety and efficacy in LASIK surgery

Setting:
Isha Netralaya, Kalyan, India

Methods:
Retrospective study where medical records of subject who had undergone LASIK surgery (SBK and Femtosecond) for myopia between March 2019- August 2019, aged between 18-40 years, best corrected visual acuity (BCVA) 0.2logMAR or better and those who fulfill the LASIK criteria were included. Subjects with systemic disease, retinal disease, lost to follow up were excluded. Indices such as efficacy index= uncorrected visual acuity Post-LASIK/ BCVA Pre-LASIK and safety indices= BCVA Post-LASIK/ BCVA Pre-LASIK were compared between femtosecond and SBK LASIK (Two sample T test). Univariate and multivariate analysis was done to evaluate predictive factors for safety and efficacy of LASIK.

Results:
62 eyes of 32 patients and 58 eyes of 29 patients had undergone femtosecond and SBK LASIK respectively. Both the groups were matched for Pre LASIK: age, BCVA, refractive error, pachymetry, keratometry and tear break up time ($P>0.05$, Two sample t test). Two sample t test showed significant difference in efficacy index between femtosecond (Mean±SD: 1.03±0.1) and SBK LASIK (Mean±SD: 0.96±0.1) ($P=0.001$) where as safety indices were similar in both groups ($P=0.95$). Univariate and Multivariate analysis showed association of Pre-LASIK BCVA with safety and efficacy indices in both femtosecond and SBK LASIK groups ($P<0.05$).

Conclusions:
While both LASIK procedures showed similar safety, the femtosecond LASER achieved better efficacy. With our dataset pre-LASIK BCVA has correlated well with both efficacy and safety indices, however a larger sample with long term study could be helpful for more promising results in terms of predicting efficacy and safety indices for LASIK.

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PP660

Phakic intraocular lens explantation - a retrospective refractive analysis of the real-life in a reference center

Presenting author: João Leite, Portugal

Purpose:
To evaluate the refractive results of the eyes submitted to phakic intraocular lens (pIOL) explantation, between January 2019 and January 2021.

Setting:
Refractive Surgery Unit of Ophthalmology Department of Centro Hospitalar Universitário do Porto, Oporto, Portugal.

Methods:
Retrospective and observational review of clinical records from 29 patients (36 eyes) who underwent pIOL explantation between January 2019 and January 2021. Pre- and postoperative manifest spherical equivalent (SEQ), pre- and postoperative best corrected visual acuity (BCVA) and astigmatism induced by the procedure were evaluated, in patients without corneal decompensation or history of retinal detachment. Indication for explantation, mean survival time of pIOL and the need for subsequent surgeries were also evaluated.

Results:
Mean age at pIOL explantation was 52.83±7.47 years old; mean axial length was 29.7±2.5 mm; mean pIOL survival time was 16.36±4.84 years. All procedures were combined with cataract surgery. The indications for pIOL explantation were: cataract (47.22%), endothelial cell loss (ECL) (47.22%), trauma (2.78%) and cataract post pars plana vitrectomy (2.78%). Five eyes (13.89%), explanted due to ECL, needed corneal transplantation. All of these patients had been previously lost to follow-up. Mean preoperative and postoperative BCVA in logMAR were 0.35±0.28 and 0.14±0.14 respectively (p=0.000); mean SEQ reduced from −1.83±2.15 D to −0.46±0.64 D (p=0.001). Mean surgery-induced astigmatism was 1.45±1.06D.

Conclusions:
Phakic IOL explantation surgery is an effective and safe procedure. In this population, with mean axial length of 29.65mm, good refractive outcomes were achieved in most of the cases, with improvement of BCVA and reduction of SEQ. The percentage of endothelial decompensation highlights the need for strict surveillance in these patients, as all the cases occurred in patients that had been lost to follow-up.

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PP661

Clinical assessment of modern aspects of correction of high refractive errors with using phakic intraocular lens: EVO + VISIAN ICL, TICL.

Presenting author: NAZIM ZAYNUTDINOV, Uzbekistan

Purpose:
To evaluate initial clinical outcomes after implantation of spheric and toric phakic implantable collamer lens (ICL and toric ICL) to patients with high refractive errors (high myopia and myopic astigmatism) during next post-op 6 months period.

Setting:
Tashkent Institute of Postgaduate Medical Education Tashkent, Uzbekistan

Methods:
In this prospective, consecutive study of spheric ICL (VICM5) and toric ICL (VTICM5), models implantation had been investigated in two groups of patients with high myopic and myopic astigmatism who had contraindications for LASIK correction. In early stages of investigation the main clinical outcomes of this study were uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), ICL vault, intraocular pressure, endothelial cell count (ECC), and development of early any kind postop complications. Patients were evaluated at 1 day, 1 week, 1, 3 and 6 months post - operative period.

Results:
The mean age was 28.34 ± 6.64. The mean preoperative manifest spherical equivalent (MSE) was -9.85 ± 2.65 D and manifest cylinder (MC) was -3.19 ± 0.79 D respectively, which postoperative spherical refractive measures reduced to -1.18 ± 0.56 D and cylinder measures reduced to - 0.93 ± 0.39 D, IOP had strongly increased in five eyes (9.26%) during first week postop period. The mean IOP was 16.30 ± 1.85 mmHg preoperatively. The mean IOP has changed until 15.44 ± 1.76 mmHg during six months postop period.

Conclusions:
EVO + Visian ICL and toric ICL implantation are a safe, effective and alternative refractive surgery for correction of high refractive errors (high myopia and myopic astigmatism) for patients who have thin cornea and several contraindications for laser correction. Implantation of ICL models: VICM5 and VTICM5 show that patients have minimal residual refraction and low complications after surgery such as dry eye syndrome, halos, glare and irritations.

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PP662

Phacoemulsification with ICL in Situ Used As a Piggyback IOL in a Case of High Hyperopia

Presenting author: Supriya Sriganesh, India

Purpose:
To describe a unique method of biometric calculation and surgical technique of phacoemulsification and PCIOL implantation with an ICL in situ as a piggyback lens for a high hyperope with post – ICL anterior subcapsular cataract.

Setting:
Nethradhama Superspeciality Eye Hospital

Methods:
A patient with high hyperopia who underwent bilateral ICL implantation and later developed cataract in the left eye was taken up for cataract surgery. Phacoaspiration of the soft cataract was performed with the ICL in situ, without explantation, and a PCIOL of standard power was implanted in the left eye. When he later on developed cataract in his right eye, a new method of PCIOL power calculation was devised. A similar surgery was performed in the right eye by this method of IOL calculation done by taking into account the residual refractive error of the eye.

Results:
Following cataract surgery, the patient had a residual refractive error of +3.00D in the left eye – the eye which was operated first. He however had a minimal residual refractive error of -0.75 DC@10o in the right eye after cataract surgery for which the PCIOL power was calculated by the innovative method herein described.

Conclusions:
We elaborate in this report a new method of biometric calculation for a PICOL to be implanted with an ICL in situ as a piggyback lens, in patients with cataract post – ICL implantation. It is an efficient surgical technique and also reduces cost to the patient.

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PP663

A comparison of two foldable phakic intraocular lenses implanted in different anatomical compartments: Artiflex versus Eyecryl

Presenting author: Bulent Kose, Turkey

Purpose:
To compare refractive results and safety of Artiflex and Eyecryl phakic intraocular lenses (pIOL)

Setting:
Beyoglu Eye Research and Training Hospital, Istanbul, Turkey

Methods:
Medical records of patients who underwent implantation of Artiflex and Eyecryl pIOL were retrospectively reviewed. Patients with a follow up of 3 years were included in the study. Manifest refractive error, uncorrected and corrected visual acuities, intraocular pressure (IOP) and central endothelial cell density (ECD) were evaluated preoperatively and at 1-, and 3- years after surgery.

Results:
79 eyes (Artiflex group: 35 eyes; Eyecryl group: 44 eyes) were included in the study. Preoperative spherical equivalent (SE) of manifest refractive error was - 11.53±3.46 and -13.08±3.01 in Artiflex and Eyecryl groups, respectively. Three years after the efficacy index was 1.06±0.55 and 1.15±0.85; the safety index was in 1.32±0.49 and 1.46±0.95 in Artiflex and Eyecryl groups, respectively. SE, efficacy index, safety index UDVA, CDVA, IOP, and ECD were not significantly different between the groups during follow-up.

Conclusions:
Both foldable pIOLs were found safe and effective up to 3 years after implantation. Prospective longitudinal studies are needed to reveal and compare rates of cataract formation.

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PP664

Pilot Clinical Trial Results of Laser Scleral Microporation in Presbyopic Eyes

Presenting author: Mitchell Jackson, United States

Purpose:
To evaluate visual outcomes in presbyopic eyes following Laser Scleral Microporation (LSM).

Setting:
Subjects were enrolled in a multicenter study to evaluate the safety and efficacy of the Laser Scleral Microporation (LSM) to restore visual function and accommodation.

Methods:
An Er:YAG laser was used to create microporations in 4 quadrants on the sclera to improve pliability and biomechanical efficiency of the ciliary muscles in 5 critical zones. Patients were over 40 years of age and showed loss of accommodative ability. Visual outcomes were assessed using the Early Diabetic Retinopathy Study (EDTRS) logMAR charts at distance, 60cm, and 40cm. Goldman tonometry was used to measure intraocular pressure (IOP) before and after the procedure.

Results:
LSM provided improvement in both uncorrected and distance corrected intermediate and near visual acuity with no significant changes to distance vision. Early results demonstrated that patients enjoy significant improvement in their binocular UNVA/UIVA and DCNVA/DCIVA at 3 and 6 months postoperatively compared to preoperative VA. A reduction in intraocular pressure was also found following LSM procedure.

Conclusions:
Early clinical trial results suggest LSM to be a safe and effective procedure for restoring near visual function in presbyopes. Early results also suggest that LSM can improve intermediate and near visual acuity without touching the visual axis and without comprising distance vision. Data collection is ongoing.

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PP665

Clinical "Real World" Evaluation of Excimer Laser Correction of Presbyopia in an Emmetropic Population

Presenting author: Lena Beckers, Germany

Purpose:
Patients who never needed glasses in their life before reaching the presbyopic age are often annoyed and fastidious when they start being dependent of reading glasses or progressive glasses. Multifocal IOL implantation in this patient group with perfectly clear crystalline lenses is difficult to defend in the presence of a method that induces less complications and has fewer optical side effects: excimer laser surgery with blended vision. We wanted to find out how happy this patient group is in daily life after surgery and if we could fulfill their needs.

Setting:
All surgeries were performed by one surgeon at the Breyer-Kaymak-Klabe Eye Surgery and Premium Eyes in Duesseldorf, Germany, member of the International Vision Correction Research Center (IVCRC.net).

Methods:
Patients (n=18) being emmetropic or never wearing glasses in their entire life before they underwent presbyopia correcting Femto LASIK excimer laser surgery with blended vision (PRESBYOND, CZM) were retrospectively called in a chronological order and answered a questionnaire concerning everyday experience, subjective optical quality, subjective optical side effects and quality of between 1 - 3 months after surgery.

Results:
The everyday experience, subjective optical quality, subjective optical side effects and quality of life was clinically significant raised in all patients and all of them would recommend it to a friend.

Conclusions:
Knowing this is a clinical retrospective analysis using subjective parameters to evaluate "real world" effectiveness of excimer laser Femto LASIK blended vision with all its scientific imponderabilities it nevertheless confirmed our everyday approach to prefer laser vision correction over clear lens extraction.

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Refractive

PP666

Ocular Coherence Tomography of Laser Scleral Microporation for the Treatment of Loss of Visual Accommodation

Presenting author: Luca Gualdi, Italy

Purpose:
To evaluate and characterize treatment depth, pore size, consistency of Laser Scleral Microporation (LSM) Treatment using optical coherence tomography

Setting:
Ex vivo study

Methods:
Non-human eyes at presbyopic age underwent LSM treatment. The LSM procedure utilizes a 2.94um Erbium Yttrium Aluminum Garnet (Er:YAG) laser on the sclera in 4 oblique quadrants to reverse age-related ocular rigidity, reduce biomechanical stiffness, and improve efficiency of the ciliary muscles. A pattern of microporations in 5 critical zones of anatomical and functional significance was created using the laser combined with intraoperative OCT. Optical coherence tomography (OCT) was used to assess the micropore size, depth, and consistency characteristics.

Results:
OCT-guided YAG laser treatment was utilized to control the size and depth of micropores in non-human eyes. Varying sizes and depths were created to asses efficacy. Target depth was achieved with accuracy and precision, and micropore depth was consistent throughout the pore matrix.

Conclusions:
Novel OCT-guided depth control enhances precision of scleral micropore creation during the LSM procedure.

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Refractive

PP667

The influence of tear film properties on visual quality and ocular surface index post cataract surgery

Presenting author: Ana Marta, Portugal

Purpose:
To evaluate the influence of tear film properties on visual quality and ocular surface index in the late post-surgical visual function

Setting:
Ophthalmology Department of Centro Hospitalar Universitário do Porto, Oporto, Portugal

Methods:
We included 80 eyes (49 patients), who underwent phacoemulsification cataract surgery with intraocular lens implantation. The late post-surgical evaluation (1-3 months after surgery) included: visual quality index (VQI), tear film stability (TFS), objective scattered index (OSI), Modular Transfer Function (MTF) and vison break-up-time (VBUT) analyzed with HD Analyser®; the Schirmer test (ST); the osmolarity measured by TearLab®; the non-invasive break-up-time (NIBUT), blink rate (BR), lipid layer thickness (LLT), tear meniscus height (TMH) and loss area of the meibomian glands (LAMG) measure by IDRA® Ocular Surface Analyser; the ocular surface index (OSDI); and presence of superficial punctate keratopathy (SPK).

Results:
VQI was strong correlated with TFS ($r=0.719$, $p<0.001$), OSI ($r=0.960$, $p<0.001$) and MTF ($r=-0.730$, $p<0.001$). The TMH was the only tear film parameter evaluated by IDRA® Ocular Surface Analyser correlated with VQI ($r=0.295$, $p=0.027$). The ST, osmolarity, and SPK didn´t influence ($p>0.05$) VQI. The TMH was also the only tear film parameter evaluated by IDRA® Ocular Surface Analyser correlated with OSDI grade ($r=-0.278$, $p=0.026$). OSDI grade was also correlated with SPK ($r=0.329$, $p=0.004$) and osmolarity ($r=0.243$, $p=0.037$).

Conclusions:
The tear film changes gained importance in the evaluation of visual function and visual symptoms. After cataract surgery, many patients complain of poor vision quality despite the good refractive outcome or even worsening of their dry eye symptoms. Our study shows the influence of TMH either on VQI and either on OSDI grade after cataract surgery, being a good predictor of visual quality and visual symptoms.

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PP670

3 Years' experience running myopia control clinic for children

Presenting author: john bolger, United Kingdom

Purpose:
Myopia is increasing in its prevalence and severity. WHO predicts that as many of 50% of the world population will be myopic by 2050. We were keen to provide myopia control measures to affected children to support them and their families. After nearly 3 years we have begun to have meaningful results to analyse.

Setting:
My iClinic is an independent ophthalmic hospital in London with specialisms in refractive and paediatric ophthalmology.

Methods:
Only recently have there been any effective interventions that can slow the rate of progression. For almost the last 3 years we have been providing Myopia control clinic to children with myopia. The measures employed include the dispensing of Atropine eye drops, advise on lifestyle and the use of optical devices that eliminate peripheral hyperopic defocus. We have monitored the children's axial length, refractive error, pupillometry, choroidal thickness, corneal status, reading and close work habits, screen time, method of refractive correction as well as family history of myopia. We can now begin to see some promising results.

Results:
Children who fully adopt all the myopia control measures succeed in greatly slowing down the rate of axial elongation. Using a single anti myopia measure is much less effective . Peripheral hyperopic defocus elimination appears to be a strong protector against progression. Myopia control is a worthwhile and effective intervention in children with myopia.

Conclusions:
Myopia control measures are effective. Children with myopia should be given the opportunity to reduce their risk of visual impairment later in life. More clinics are needed and easier access to myopia control measures should be a priority for the entire ophthalmic community

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PP671

Long Term Corneal Epithelial Thickness After Myopic PRK

Presenting author: Hamilton Moreira, Brazil

Purpose:
To understand corneal epithelial remodelling after PRK through OCT epithelial maps

Setting:
Medicos de Olhos S.A. - Private Hospital Based Research Faculdade Evangélica do Paraná Mackenzie - University Based Research

Methods:
Corneal OCT exams were performed in 7 patients who underwent bilateral Myopic PRK with more than one year follow up. Results were compared to an age matched , normal control group.

Results:
We found no difference in central corneal epithelial thickness, but variation from center to peripheral cornea 5 and 7 mm were higher in PRK operated patients.

Conclusions:
OCT is an increasing useful technology to better understand corneal impact under different refractive techniques. Even after one year following PRK, corneal epithelial remodelling in an issue. The impact on fine refractive results and its relationship with dry eye must be addressed with future studies.

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PP672

Outcomes of ICL, femtosecond-assisted LASIK and PRK for correction of hyperopia

Presenting author: ABDULAZIZ ALSHEHRI, Saudi Arabia

Purpose:
To evaluate the outcomes of ICL, femtosecond-assisted LASIK and PRK for treatment of hyperopia.

Setting:
Tertiary eye center, Saudi Arabia

Methods:
All patients with hyperopia managed by ICL (Gr 1), LASIK (Gr 2) and PRK (Gr 3) in 2014 to 2019 were reviewed for safety and efficiency, predictability, complications and spherical equivalent (SE) pre-operatively then at one and 12 months after surgery. Exclusion criteria: Patients found to have eye pathologies in the cornea, lens, optic nerve, or retina Patients who underwent previous refractive or intraocular surgery

Results:
Total of 99 hyperopic eyes, management Gr 1, Gr 2 and Gr 3 included 26, 57 and 16 eyes respectively. Mean pre-operative manifest refraction spherical equivalent (MRSE) was +5.13D, +3.15D D, +2.39D for Gr 1, Gr 2 and Gr 3 respectively. One year after surgery, mean MRSE was -0.23D, +0.34D and +0.08D respectively (p=0.065). The safety index was 1.0 and efficacy index was 0.89 in all groups. The predictability for achieving ±1.0 D SE was 95.8%, 92%, and 93.3% in Gr 1, Gr 2 and Gr 3 respectively. Peripheral faint corneal haze was noticed in PRK group (P = 0.05).

Conclusions:
All three procedures had excellent visual gain and stable refraction at one year after surgeries with low complication rates. They seem to be safe, efficient and predictable procedures. Hyperopia grade seems to influence the selection of refractive surgery.

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PP673

80,0 microns ultrathin flap FemtoLASIK with VISUMAX for the correction of high myopia

Presenting author: Andrey Kachanov, Russian Federation

Purpose:
To study the results of 80.0 microns ultrathinflap femto-laser assisted LASIK (FemtoLASIK) with VISUMAX for the correction of high myopia (supermyopia).

Setting:
1 – St.-Petersburg branch of Sv. Fyodorov Eye Microsurgery Clinic, 2 – North-Western State Medical University named after I.I. Mechnikov, [3] – Saint-Petersburg State University, 4 – Baltic Technical University; 1 - 4 – St.-Petersburg, Russia.

Methods:
We used FemtoLASIK to correct supermyopia with a spherical component ranged from -8.5 D to -14.0 D and astigmatism (cylinder) from -0.5 D to -5.5 D in 44 eyes (22 patients, including 12 females and 10 males). Minimal residual stromal thickness was up to 280.0 microns to avoid post-op corneal ectasia. We created ultrathin flap (80,0 microns at par) in all cases by using femtosecond laser system VISUMAX (Carl ZEISS Meditec). Follow-up period was up to 6 months.

Results:
All 44 eyes were included in our study. Decimal uncorrected distance visual acuity (UCVA) was 0.04 ± 0.03 preoperatively, 0.82±0.15 day 1, and 0.85 ± 0.14 month 6. There was no loss of corrected distance visual acuity (CDVA) lines. Mean ultrathin flap (just below Bowman layer) thickness measured at 1 day with anterior-segment OCT examination was 75.0 ± 7.2 microns. Ultrathin flap FemtoLASIK with VISUMAX was safe, effective, and reproducible procedure for high myopia correction.

Conclusions:
Femto-LASIK with ultrathin 80.0 microns flap is especially beneficial for patients with high myopia and relatively thinner cornea, since allows by cutting out ultrathin and uniform superficial flap to maintain the biomechanics of the cornea, sufficient residual stromal thickness (up to 280.0 microns) and save corneal tissue for effective excimer laser ablation.

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PP674

Femtosecond-Lasik outcomes in a cohort of patients with mixed astigmatism

Presenting author: Shafiq Rehman, United Kingdom

Purpose:
To report on the outcomes of Femtosecond-LASIK for eyes with preoperative mixed astigmatism.

Setting:
Optegra Eye Hospitals, UK

Methods:
A retrospective audit of clinical outcomes of consecutive patients following Femtosecond-LASIK for the correction of mixed astigmatism between March 2018 and February 2021 was conducted. Data audited were recorded in an electronic medical record typically at 3 months post-operatively. Inclusion criteria were LASIK eyes with preoperative astigmatism in which one of the corneal meridians was myopic and the other hyperopic and with a targeted post-operative spherical equivalent refraction (SEQ) between 0.00D to -0.75D. Procedures were excluded from the analysis if they were enhancement procedures, amblyopic cases or had been followed up for less than one week.

Results:
Preliminary results from 20 eyes with mixed astigmatism and a mean preoperative cylinder of -2.33 ± 1.03 D (range: -1.00 to -5.25) were obtained. All surgeries were uncomplicated. Postoperatively, the mean cylinder was -0.40 ± 0.40 D (range: 0 to -1.50) and the mean SEQ -0.03 ± 0.37 D. Postoperatively, 80% of eyes achieved 20/20 or better without correction and 90% had a SEQ within ±0.50D of predicted target. The arithmetic mean was 2.26 D for the surgically induced astigmatism vector and 0.95 for the correction index. No eyes lost two or more lines of best corrected visual acuity.

Conclusions:
Visual and refractive results were of a very good standard after surgery with an almost optimal surgical outcome showing improvement in uncorrected distance visual acuity. Vector analysis found a 5% under correction in magnitude of refractive cylinder which could potentially be reduced by applying an optimised nomogram.

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PP675

Outcome and vector analysis in a large sample of eyes treated for myopia and myopic astigmatism in Small-incision lenticule extraction and Femtosecond laser-assisted in situ keratomileusis

Presenting author: Zhou Jihong, China

Purpose:
To compare the efficacy, stability, and predictability of small incision lenticule extraction (SMILE) and femtosecond laser-assisted in situ keratomileuses (FS-LASIK) for myopia and myopic astigmatism correction by vector analysis.

Setting:
Beijing Aier-Intech Eye Hospital, China.

Methods:
The retrospective study included myopia and myopic astigmatism, with sphere equivalent (SE) -0.88D to -14.0D, and astigmatism -0.25D to -5.75, had SMILE or FS-LASIK.1793 eyes of 1793 patients were recruited, 926 eyes in the SMILE, and 867 eyes in FS-LASIK. Preoperative and postoperative refractive outcomes were recorded at 1day,1week, 1, 3, 6 months. Visual and refractive outcomes were evaluated during a 6-month follow-up. Cylinder data were estimated by vector and correlation analysis. A generalized linear mixed model was used to compare the results of the two groups.

Results:
The mean preoperative spherical equivalent (SE) was -5.46±1.75D (from -1.13 to -12.00 in SMILE, -6.04±2.23 D (from -0.88 to -14.88) in FS-LASIK. Six months after surgery, 96% of eyes in SMILE and 93% of eyes in FS-LASIK achieved UDVA equal to or better than 20/20. SE was -0.23±0.58D in SMILE and -0.10±0.60D in FS (P=0.00). Vector analysis showed comparable target-induced astigmatism (Px=0.242, Py=0.157), surgically induced astigmatism vector (Px=0.011, Py=0.00), difference vector (Px=0.002, Py=0.000), and correction Index (P=0.026), the magnitude of error (P =0.000), and index of success (IS) (P=0.000) between groups.

Conclusions:
SMILE and FS-LASIK is a predictable and safe technique for the correction of myopia and myopic astigmatism. Myopia and astigmatic correction in SMILE were a slight under-correction than FS-LASIK and may be adjusted to enhance.

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Refractive

PP676

A New Topography Integrated Wavefront Guided Aberrometer Used in LASIK Treatment of a Wide Range of Myopia

Presenting author: David Teenan, United Kingdom

Purpose:
To analyse the clinical safety and efficacy along with patient reported outcomes of iDesign 2.0 in LASIK correction of varying levels of Myopia.

Setting:
Multi Disciplinary Refractive Surgery Centre

Methods:
Outcomes of 3703 patients with a preoperative myopia range of -0.50D to -11.00D, and up to -5.50D of astigmatism. Patients underwent laser vision correction procedures using iDesign 2.0 between May 2019 and February 2021. Monocular and binocular UCDVA scores, manifest refraction, and patient reported outcomes were recorded 1 day, 1 month and 3 months post operatively. Clinical assessments, including any complications, were recorded in the electronic medical record then extracted.

Results:
The total number of patients included was 3703 (7268 eyes), with pre-op refractive range of -0.50D to -11.00D with up to -5.50D of astigmatism. One month postoperatively, 90.0% had MSE within 0.5D of emmetropia. Additionally, 95.8% of patients had monocular UCDVA of 6/6 or better and 99.8% had 6/12 or better; 99.0% patients had binocular UCDVA of 6/6 or better and 100% had 6/9 or better. 0.1% had a loss in BCDVA of > 2 lines. 96.4% of patients reported very satisfied or satisfied.

Conclusions:
iDesign 2.0 provides a highly safe and effective treatment option for visual correction of myopia. Postoperative visual gains in UCDVA were significant with 99.0% reaching 20/20 or better by month 1. Patient reported satisfaction was also high at 96.4%. Complication rates were low and only 0.1% of patients recorded a loss of >2 lines BCDVA.

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Refractive

PP677

How and to what extent therapeutic contact lens variants affect keratoconus progression?

Presenting author: Murat KAŞIKÇI, Turkey

Purpose:
Evaluation of keratoconus (KC) progression in patients using rigid gas-permeable contact lens (RGPCL), hybrid contact lens (HCL) and scleral contact lens (SCL) by using reliable topographical indices and comparing data with age- and gender-matched KC patients not using CLs

Setting:
This original article was conducted in Mugla Training and Research Hospital, Eye Diseases Department. Mugla / Turkey

Methods:
This observational single-centred study included 120 eyes of 60 KC patients, 30 of whom were using one of the three CLs [RGPCL-10 patients, 20 eyes; HCL-10 patients, 20 eyes; and SCL-10 patients, 20 eyes) and a control group (30 patients, 60 eyes) of KC patients not using CLs due to intolerance. After a detailed ocular examination, parameters, including Km anterior, Km posterior, K max, corneal thickness (Corneal central, apex and thinnest CT), corneal volume (CV), anterior chamber volume (ACV) and anterior chamber depth (ACD) were measured during baseline, 3rd, 6th and 12th months using the Pentacam® HR Scheimpflug imaging device.

Results:
All patients showed significant positive changes in all KC progression parameters. Compared to non-CL users, CL users were statistically significant change in K max, which is a measure of KC progression. There was minimal significant difference between CL users and non-CL users in anterior, posterior keratometry and CT values. RGPCLs users had significant changes in central CT, thinnest CT and ACD parameters. SCL users had more stable KC progression than other CLs for the thinnest CT along with significant changes in K max and pachymetry and ACV values. HCL users had significantly more stable K max and pachymetry values.

Conclusions:
The use of therapeutic CLs led to a positive effect on KC stabilization. Stabilizing corneal deformity and slowing KC progression through regular use of appropriate CLs may ultimately prevent subsequent visual acuity decrement, therefore benefiting KC patients from visual rehabilitation by either completely eliminating or delaying possible corneal transplantation.

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Refractive

PP715

Urrets-Zavalia syndrome after ICL implantation

Presenting author: Doris Fraenkel, Germany

Purpose:

Nowadays, posterior chamber phakic intraocular lenses (pIOLs) represent an attractive therapeutic option for the correction of higher refractive errors, especially in myopic patients. However, certain anatomical and refractive conditions must be fulfilled. We describe the case of a 33-year-old patient diagnosed with Urrets-Zavalia syndrome after implantation of an Implantable Collamer Lens (ICL).

Setting:

This case was observed at the Department of Ophthalmology, Saarland University Medical Center in Homburg/Saar (UKS), Germany.

Methods:

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Results:

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Conclusions:

-

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PP716

Optical Changes and Apparent Emmetropization in a Patient with a Peripheral Unilateral Lens Coloboma

Presenting author: Elishai Assayag, Israel

Purpose:

To describe the optical changes caused by a subtle, peripheral isolated lens coloboma and their possible impact on emmetropization.

Setting:

Ophthalmology clinic, Shaare Zedek Medical Center, Jerusalem, Israel

Methods:

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Results:

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Conclusions:

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PP717

Keratoconus in a patient with Pseudoxanthoma elasticum

Presenting author: Reyhaneh Abrishamchi, Switzerland

Purpose:

To report a case of Pseudoxanthoma elasticum (PXE) that displayed clinical and tomographical signs of keratoconus.

Setting:

ELZA Institute, Dietikon/Zurich, Switzerland

Methods:

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Results:

-

Conclusions:

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PP718

Lasik with double cut and neglected epithelial ingrowth

Presenting author: Hams Samy, Egypt

Purpose:

To report a case of neglected central epithelial ingrowth for 10 years and its management steps

Setting:

Watany Eye Hospital

Methods:

-

Results:

-

Conclusions:

-

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Refractive

PP719

The CorNeat keratoprosthesis: first-in-human implantation

Presenting author: Irit Bahar, Israel

Purpose:

The CorNeat keratoprosthesis is a synthetic corneal implant designed to treat corneal blindness by utilizing a polymeric scaffold for bio-integration, consequently assimilating synthetic optics within ocular tissue. The purpose of this case report is to describe the first-in-human implantation of this novel keratoprosthesis.

Setting:

The procedure took place at the Ophthalmology Department of the Rabin Medical Center, a tertiary referral center in Israel.

Methods:

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Results:

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Conclusions:

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PP720

Repeated high-fluence accelerated corneal cross-linking for a treatment-resistant fungal keratitis

Presenting author: Emilio Torres-Netto, Switzerland

Purpose:

To report a case of fungal keratitis resistant to standard-of-care antimicrobial treatment following repeated high-fluence accelerated corneal cross-linking for infectious keratitis (PACK-CXL).

Setting:

Pallas Kliniken, Olten, Switzerland.

Methods:

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Results:

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Conclusions:

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PP721

Dry Eye in Corneal Transplant: a fateful association

Presenting author: Eugenia Moix Gil, Spain

Purpose:
To present a severe complication of a 64-year-old woman with dry eye and bilateral keratoplasty due to keratoconus.

Setting:
Observational retrospective descriptive case report of daily practice.

Methods:
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Results:
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Conclusions:
-

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PP722

Autologous penetrating keratoplasty as an alternative in patients with a single functional eye.

Presenting author: Fausto Gonzalez-Ramos, Mexico

Purpose:

To report the clinical features and management of a case of a patient with corneal opacity following bacterial keratitis in a single functional eye.

Setting:

Asociación para Evitar la Ceguera en México I. A. P. Mexico City, Mexico

Methods:

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Results:

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Conclusions:

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PP723

Corneal perforation in severe bilateral inflammatory ectasia associated with hidradenitis suppurativa

Presenting author: Clare Quigley, Ireland

Purpose:

Description of a novel case: progressive corneal ectasia resulting in corneal perforation in a young woman with severe hidradenitis suppurativa

Setting:

Royal Victoria Eye and Ear Hospital, Dublin, Ireland

Methods:

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Results:

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Conclusions:

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Refractive

PP724

Wearing cosmetic lenses : a story that ends badly about a case

Presenting author: Amina Abounaceur, Morocco

Purpose:

The use of non-corrective colored contact lenses has become a common cosmetic device in the general population. As a result, basic contactology hygiene rules are often neglected leading to potentially catastrophic eye complications. Corneal abscesses with or without endophthalmitis following contact lens wear are a rare but very serious complication that threatens visual function. The severity of the disease cornea detached depends on both the germ, of the state in underlying cornea and time of the support.

Setting:

Highlight the danger inherent in this type of lens , by reporting the case of a severe corneal abscess complicated by endophthalmitis , which occurred after wearing a cosmetic contact lens , which unfortunately ended in evisceration.

Methods:

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Results:

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Conclusions:

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PP725

Acanthamoebic keratitis: therapy or early keratoplasty

Presenting author: Alexey Titov, Russian Federation

Purpose:

To evaluate the effectiveness of early penetrating keratoplasty in comparison with conservative therapy in the aggressive course of acanthomoebic keratitis. Clinical example.

Setting:

Saint Petersburg branch of S. Fyodorov Eye Microsurgery Federal State Institution.

Methods:

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Results:

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Conclusions:

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PP726

Epithelial ingrowth following small incision lenticule extraction

Presenting author: Hillary Kimberly Osorio Landa, Mexico

Purpose:

To report a case of epithelial ingrowth after small incision lenticule extraction (SMILE) successfully treated with meticulous irrigation of 20% alcohol at the interface for 20 seconds.

Setting:

Cornea and Refractive Surgery Department at the Asociación para Evitar la Ceguera en México, I.A.P. Mexico City, Mexico

Methods:

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Results:

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Conclusions:

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PP727

The treatment of acanthamoeba keratitis after corneal refractive surgery: a case series and literature review

Presenting author: Nanji Lu, China

Purpose:
To report the treatment of three cases with acanthamoeba keratitis (AK) after laser vision correction (LVC), and compare these with the existing literature.

Setting:
Aidi Eye Hospital, Chengdu, China.

Methods:
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Results:
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Conclusions:
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Refractive

PP728

Clinical case: Neurotrophic keratopathy on the background of Wallenberg syndrome.

Presenting author: Maggie Ezugbaya, Russian Federation

Purpose:

To demonstrate the importance of collecting both ophthalmological history and information on the patient's general condition to identify concomitant systemic diseases, since neurotrophic keratopathy is a condition that often requires a collaboration of several medical specialists.

Setting:

Ophthalmology Department. Academician I.P. Pavlov First Saint Petersburg State Medical University of the Ministry of Healthcare of Russia.

Methods:

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Results:

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Conclusions:

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Refractive

PP729

Blind trust is dangerous especially when myopia become worse after LASIK!!

Presenting author: Tarek Badawy, Egypt

Purpose:
Incorrect data entry during LASIK eye treatment will lead to an unpleasant surprise that's to say, you should revise your data on the machine before proceeding into treatment.

Setting:
Eyoun Refractive Eye Center, Cairo, Egypt.

Methods:
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Results:
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Conclusions:
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