# Trabalho publicado pelo Dr Roberto Pinto Coelho na revista internacional Journal of Cataract and Refractive Surgery(JCRS) onde nova técnica para cirurgia de catarata foi publicada foi a mais lida no primeiro semestre 2012

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1. Capsulorhexis rescue after peripheral radial tear-out: Quick-pull technique

May 2012

Roberto Pinto Coelho | Jayter Silva Paula | José Mello Rosatelli Neto | André Marcio Vieira Messias

We describe a technique to rescue the continuous curvilinear capsulorhexis (CCC) in cases in which complete radial tears make it impossible to use normal traction forceps. A circumferential path and rapid movement are applied in the plane of the anterior capsule in the direction of the center pupil. This technique was used in 50 cases. In 47, the CCC could be completed; in 3, it could not and surgery was continued with low-parameter phacoemulsification. No other intraoperative complications occurred.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

2. Evidence-based guidelines for cataract surgery: Guidelines based on data in the European Registry of Quality Outcomes for Cataract and Refractive Surgery database

June 2012

Mats Lundström | Peter Barry | Ype Henry | Paul Rosen | Ulf Stenevi

In March 2008, the European Registry of Quality Outcomes for Cataract and Refractive Surgery (EUREQUO) commenced. This 3-year project was cofunded by the European Union (EU) and the European Society of Cataract & Refractive Surgeons (ESCRS). The ESCRS became the lead partner in the project with 11 national societies as associated partners. The aims of the project were to improve treatment and standards of care for cataract and refractive surgery and to develop evidence-based guidelines for cataract and refractive surgery across Europe. Surgeons from all participating societies contributed to the database, which contained data on 820 000 cataract surgeries in November 2011. The present guidelines are based on data entered from January 1, 2009, to August 28, 2011 (523 921 cataract extractions). The guidelines include only those steps in the cataract surgery process that can be analyzed by the database.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

3. Comparison of stromal hydration techniques for clear corneal cataract incisions: Conventional hydration versus anterior stromal pocket hydration

June 2012

Mark D. Mifflin | Krista Kinard | Marcus C. Neuffer

Anterior stromal pocket hydration was compared with conventional hydration for preventing wound leak after 2.8 mm uniplanar clear corneal incisions (CCIs) in patients having routine cataract surgery. Conventional hydration involves hydration of the lateral walls of the main incision with visible whitening of the stroma. The anterior stromal pocket hydration technique involves creation of an additional supraincisional stromal pocket overlying the main incision, which is then hydrated instead of the main incision. Sixty-six eyes of 48 patients were included in the data analysis with 33 assigned to each studygroup. The anterior stromal pocket hydration technique was significantly better than conventional hydration in preventing wound leak due to direct pressure on the posterior lip of the incision.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 4. Anatomy and physiology of the cornea

March 2011

Derek W. DelMonte | Terry Kim

The importance of the cornea to the ocular structure and visual system is often overlooked because of the cornea's unassuming transparent nature. The cornea lacks the neurobiological sophistication of the retina and the dynamic movement of the lens; yet, without its clarity, the eye would not be able to perform its necessary functions. The complexity of structure and function necessary to maintain such elegant simplicity is the wonder that draws us to one of the most important components of our visual system.Financial DisclosureNeither author has a financial or proprietary interest in any material or method mentioned.

## 5. Visual outcomes and corneal changes after intrastromal femtosecond laser correction of presbyopia

May 2012

Nardine Menassa | Anna Fitting | Gerd U. Auffarth | Mike P. Holzer

PurposeTo assess the effect of intrastromal femtosecond laser presbyopia treatment on uncorrected near visual acuity (UNVA) and corneal integrity over an 18-month period.SettingDepartment of Ophthalmology, International Vision Correction Research Centre, University of Heidelberg, Heidelberg, Germany.DesignClinical trial.MethodsThe UNVA (at 40 cm), corneal pachymetry, and true net power were evaluated preoperatively and 1, 3, 6, 12, and 18 months after femtosecond intrastromal presbyopic treatment (Intracor). Endothelial cell density (ECD) was measured preoperatively and 3, 6, and 12 months postoperatively. Data were analyzed with the Wilcoxon test at a P=.01 level of significance.ResultsThe median UNVA improved significantly from 0.7 logMAR preoperatively to 0.4 logMAR, 0.2 logMAR, 0.2 logMAR, 0.3 logMAR, and 0.2 logMAR at 1, 3, 6, 12, and 18 months, respectively (all P<.001). The median corneal true net power increased significantly by 1.1 diopters (D) to 0.7 D, 0.8 D, 1.0 D, and 0.9 D, respectively (all P<.001); pachymetry showed no significant thinning postoperatively. There was no significant difference in ECD between preoperatively and

postoperatively.ConclusionsIntrastromal femtosecond presbyopic treatment yielded a significant and stable gain of UNVA and corneal steepening without significant loss of endothelial cells or corneal thinning up to 18 months postoperatively. No significant regression of visual acuity or further corneal steepening occurred during the follow-up period.Financial DisclosureDr. Auffarth and Dr. Holzer received lecture and consulting fees from Technolas Perfect Vision GmbH. No author has a financial or proprietary interest in any material or method mentioned.

## 6. Prevention, diagnosis, and management of acute postoperative bacterial endophthalmitis

September 2011

Mark Packer | David F. Chang | Steven H. Dewey | Brian C. Little | Nick Mamalis | Thomas A. Oetting | Audrey Talley-Rostov | Sonia H. Yoo

This distillation of the peer-reviewed scientific literature on infection after cataract surgery summarizes background material on epidemiology, etiology, and pathogenesis, describes the roles of surgical technique and antibiotic prophylaxis in prevention, and discusses diagnostic and therapeutic interventions in cases of suspected endophthalmitis.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 7. Suture fixation of iris-claw intraocular lens

May 2012

Amandeep S. Rai | Devesh K. Varma | Iqbal Ike K. Ahmed

We report a technique to surgically manage the damaged haptic of an iris-claw intraocular lens (IOL). An 89-year-old woman initially presented with a subluxated posterior chamber IOL that was exchanged for an Artisan iris-claw IOL. The IOL had been enclavated nasally and temporally, but it deenclavated nasally 4 weeks postoperatively. During surgery to reposition the IOL, 1 haptic of the nasal claw was seen to be damaged. It was sutured to the iris with 10-0 polypropylene using a CIF-4 needle. The postoperative outcome was good.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 8. Visual simulation through different intraocular lenses in patients with previous myopic corneal ablation using adaptive optics: Effect of tilt and decentration

May 2012

David Madrid-Costa | Caridad Pérez-Vives | Javier Ruiz-Alcocer | César Albarrán-Diego | Robert Montés-Micó

PurposeTo evaluate visual quality differences between intraocular lenses (IOLs) in patients with previous myopic laser ablations and assess the impact of IOL decentration and tilt on visual quality.SettingUniversity of Valencia, Burjassot, Spain.DesignCohort study.MethodsAn adaptive optics visual simulator was used to simulate the wavefront aberration pattern of 1 aberration-correcting IOL (Acrysof IQ SN60WF), 1 aberration-free IOL (Akreos Adapt AO), and 1 spherical IOL

(Triplato) under 5 IOL situations: centered, 0.2 mm and 0.4 mm decentered, and 2 degrees and 4 degrees tilted in eyes with simulated low or high myopic laser corneal ablations. Monocular distance visual acuity at 100%, 50%, and 10% contrast were measured.ResultsTen eyes of 10 patients were evaluated. When the IOLs were centered, the aberration-correcting IOL provided the best visual quality results in both groups. When the IOLs were misaligned, there was a decrease of visual quality with all simulated IOLs except the aberration-free IOL in the high myopia group. In the misaligned situations, all simulated IOLs obtained comparable visual quality results in both groups.ConclusionsThe results suggest that in patients with previous myopic laser corneal ablation, aberration-correcting IOLs should be implanted. The decrease in visual quality when these IOLs are decentered or tilted demonstrates the importance of accurate implantation of these IOLs.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 9. Keratoconus

June 2012

Emanuel S. Rosen

## 10. Effects of a blue light–filtering intraocular lens on driving safety in glare conditions

May 2012

Rob Gray | Warren Hill | Brooke Neuman | Diane Houtman | Richard Potvin

PurposeTo evaluate whether the previously established benefit of blue light–filtering intraocular lenses (IOLs) when driving in glare conditions is maintained in patients previously implanted with a blue light–filtering toric IOL.SettingDepartment of Applied Psychology, Arizona State University, Mesa, Arizona, USA.DesignComparative case series.MethodsThe study comprised patients with a blue light–filtering toric IOL (test IOL) or an ultraviolet (UV)-only filtering nontoric IOL (control IOL). All patients had good visual acuity and a valid driver's license. While wearing best spherocylindrical correction, patients performed left-turn maneuvers in front of oncoming traffic in a driving simulator. The safety margin was defined as the time to collision less the time taken to turn at an intersection with oncoming traffic. Measures were repeated with a glare source simulating low-angle sun conditions (daytime driving).ResultsOf the 33 evaluable patients, 18 had a test IOL and 15 had a control IOL. In the presence of glare, patients with test IOLs had significantly greater safety margins (mean 2.676 seconds ± 0.438 [SD]) than patients with control IOLs (mean 2.179 ± 0.343 seconds) and significantly lower glare susceptibility ($P<.05$). In no-glare and glare conditions, patients with test IOLs had significantly lower glare susceptibility than patients with control IOLs.ConclusionThe blue light–filtering toric IOL produced a significantly greater reduction in glare disability than the UV-only filtering nontoric IOL and increased the ability of drivers to safely execute left turns in low-sun conditions.Financial DisclosureDr. Houtman is an employee of Alcon Laboratories, Inc. No other author has a financial or proprietary interest in any material or method mentioned.

## 11. Corneal collagen crosslinking in progressive keratoconus: Multicenter results from the French National Reference Center for Keratoconus

December 2011

Dalal Asri | David Touboul | Pierre Fournié | Florence Malet | Caroline Garra | Anne Gallois | François Malecaze | Joseph Colin

PurposeTo report refractive, topographic, and biomechanical outcomes, efficiency, and safety of corneal collagen crosslinking (CXL) 1, 3, 6, and 12 months after treatment.SettingNational Reference Centre for Keratoconus, Bordeaux and Toulouse, France.DesignCase series.MethodsThis retrospective uncontrolled double-center study comprised eyes with progressive keratoconus. Uncorrected distance visual acuity, corrected distance visual acuity (CDVA), corneal pachymetry, endothelial cell count, and corneal hysteresis and corneal resistance factor were evaluated at baseline and at 1, 3, 6, and 12 months.ResultsOne hundred forty-two eyes were enrolled in the study. At 6 months, the CDVA had stabilized in 53 eyes (48.1%), improved in 36 eyes (32.7%), and decreased in 18 eyes (16.3%). At 12 months, the CDVA had stabilized in 31 eyes (47.6%), improved in 26 eyes (40.0%), and decreased in 8 eyes (12%). At 6 months, keratoconus progression had stopped in 51 eyes (49.03%) and the maximum keratometry (K) value had decreased by more than 1.0 diopter (D) in 37 eyes (35.5%); it continued to progress in 16 eyes (15.3%). At 12 months, keratoconus progression had stopped in 42 eyes (68.8%) and the maximum K value had decreased by more than 2.0 D in 13 eyes (21.3%). The complication rate with loss of vision was 3.5%.ConclusionsUltraviolet-A light associated with riboflavin CXL is an efficient procedure to stabilize and improve progressive keratoconus. The results reinforce previous studies highlighting the efficacy and safety of the procedure. A large prospective randomized clinical trial is needed.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 12. Phakic intraocular lenses Part 2: Results and complications

December 2010

Thomas Kohnen | Daniel Kook | Merce Morral | Jose Luis Güell

The second part of a review of phakic intraocular lenses (pIOLs) addresses results and complications with current pIOL models. Phakic IOLs demonstrate reversibility, high optical quality, potential gain in visual acuity in myopic patients due to retinal magnification; correction is not limited by corneal thickness or topography. With proper anatomical conditions, pIOLs also show good results in hyperopic patients. Toric pIOL designs enable spherocylindrical correction. Complications are rare and primarily related to pIOL position and type. The main complications of angle-supported anterior chamber pIOLs are glare and halos, pupil ovalization, and corneal endothelial cell loss; of iris-fixated anterior chamber pIOLs, chronic subclinical inflammation, corneal endothelial cell loss, and dislocation or pupillary block glaucoma; and of posterior chamber pIOLs, anterior subcapsular cataract formation, pigment dispersion, and luxation or pupillary block

glaucoma. No causative relationship between pIOL implantation (of any pIOL type) and retinal detachment has been established.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 13. Resident experience with toric and multifocal intraocular lenses in a public county hospital system

May 2012

M. Allison Roensch | Justin W. Charton | Preston H. Blomquist | Nalini K. Aggarwal | James P. McCulley

PurposeTo study the outcomes of toric and multifocal intraocular lens (IOL) implantation performed by resident surgeons.SettingParkland Health and Hospital System, Dallas, Texas, USA.DesignCase series.MethodsPatients seen between July 2008 and May 2011 and meeting inclusion criteria (including >1.0 diopter [D] of astigmatism in toric group and <0.75 D astigmatism in multifocal group) were offered implantation of the study IOLs. Major outcomes were uncorrected distance visual acuity (UDVA) and corrected distance visual acuity (CDVA) and, for the multifocal IOL, near visual acuity. Residents were surveyed about their knowledge regarding these IOLs.ResultsSeventy-nine eyes of 60 patients received an Alcon Acrysof toric IOL. Eighteen eyes of 10 patients received an Alcon Acrysof Restor IOL. In the toric group, 57% of eyes achieved a postoperative UDVA of 20/25 or better and 90% achieved 20/40 or better. The CDVA was 20/25 or better in 92% of eyes. The mean refractive cylinder was 1.69 D preoperatively and 0.38 D postoperatively. In the multifocal group, 78% of patients achieved a UDVA of 20/25 or better and 94% achieved 20/40 or better. All patients had a CDVA of 20/25 or better. Near vision was Jaeger 3 or better in 94%. The survey showed that residents have a strong comfort level with preoperative and surgical techniques for premium IOLs after their experience in the residency setting.ConclusionResidents in public county hospitals can be taught to use premium IOLs with good success rates, comparable to those in other published studies.Financial DisclosureDr. McCulley is a consultant to Alcon Laboratories, Inc., and Dr. Aggarwal is on the speaker's bureau for Alcon Laboratories, Inc. No author has a financial or proprietary interest in any material or method mentioned.

## 14. Macular morphology assessed by optical coherence tomography image segmentation after femtosecond laser–assisted and standard cataract surgery

June 2012

Zoltán Z. Nagy | Monika Ecsedy | Illés Kovács | Ágnes Takács | Erika Tátrai | Gábor Márk Somfai | Delia Cabrera DeBuc

PurposeTo evaluate and compare thickness changes in the retinal layers in the macula with optical coherence tomography (OCT) segmentation software after femtosecond laser–assisted phacoemulsification (study group) and conventional phacoemulsification (control group).SettingDepartment of Ophthalmology, Semmelweis University, Budapest,

Hungary.DesignCase-control study.MethodsTotal retinal thickness of the macula was evaluated using Stratus OCT 4 to 8 weeks postoperatively. The OCT images were segmented using OCT retinal image analysis software. Regional thickness data in the central area, inner rings, and outer rings were obtained and absolute and relative thicknesses of the individual retinal layers in the 2 study groups compared. Relative thickness was calculated as the ratio of the retinal layer to the total retinal thickness.ResultsAll surgeries were uneventful. Statistically significant differences were found in absolute outer nuclear layer thickness and relative outer nuclear layer thickness in the inner and outer macular rings between the 2 groups. After adjusting for effective phaco time in multivariate modeling, type of surgery showed a significantly lower relative outer nuclear layer ratio in the inner retinal ring (0.26 with 95% confidence interval [CI], 0.25-0.27 versus 0.28 with 95% CI, 0.27-0.29; P=.03) and in the outer retinal ring (0.27 with 95% CI, 0.25-0.28 versus 0.29 with 95% CI, 0.28-0.31; P=.02) in the study group.ConclusionAfter cataract surgery, macular edema was detectable mainly in the outer nuclear layer in both groups but was significantly less using the femtosecond laser platform.Financial DisclosureDr. Nagy is a consultant to Alcon-LenSx Lasers, Inc. The University of Miami and Dr. Cabrera DeBuc hold a pending patent used in the study (U.S. patent 61/139,082) and have the potential for financial benefit from its future commercialization. Drs. Ecsedy, Kovács, Takács, Tátrai, and Somfai have no financial or proprietary interest in any material or method mentioned.

## 15. Long-term effect of phacoemulsification on intraocular pressure using phakic fellow eye as control

May 2012

Ta C. Chang | Donald L. Budenz | Anthony Liu | Won I. Kim | Tam Dang | Chan Li | Andrew G. Iwach | Sunita Radhakrishnan | Kuldev Singh

PurposeTo investigate the long-term effect of phacoemulsification on intraocular pressure (IOP) in patients with ocular hypertension and open-angle glaucoma.SettingThree multispecialty ophthalmology practices and one glaucoma specialty group.DesignRetrospective comparative case series.MethodsReview of medical records of patients with open-angle glaucoma or ocular hypertension who had had unilateral phacoemulsification (without other prior or concurrent ophthalmic procedure) with the fellow eye remaining phakic at least 3 years postoperatively.ResultsPreoperatively, the IOP in the surgical and fellow eyes in the 29 patients was 15.66 mm Hg ± 3.33 (SD) and 15.64 ± 4.23 mm Hg (P=.98), respectively. Postoperatively, it was 13.56 ± 2.04 mm Hg and 14.92 ± 2.85 mm Hg, respectively, at 4.5 months (P=.06); 14.88 ± 3.20 mm Hg and 15.27 ± 3.19 mm Hg, respectively, at 1 year (P=.67); 14.16 ± 2.61 mm Hg and 14.95 ± 2.79 mm Hg, respectively, at 2 years (P=.37); and 14.68 ± 3.44 mm Hg and 14.68 ± 2.68 mm Hg at 3 years (P=1.00), respectively. There was no significant difference in the mean number of IOP-lowering medications used in the surgical eyes (1.96 ± 1.40) and fellow eyes (2.08 ± 1.44) postoperatively (P=.77).ConclusionsIn a cohort of ocular hypertensive and

glaucoma patients, uncomplicated phacoemulsification had no significant IOP-lowering effect compared with the phakic fellow eye for up to 3 years postoperatively. There was also no difference between the mean number of postoperative IOP-lowering medications used in the surgical and fellow eyes.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 16. Patient subjective visual function after corneal collagen crosslinking for keratoconus and corneal ectasia

April 2012

Nneka O. Brooks | Steven Greenstein | Kristen Fry | Peter S. Hersh

PurposeTo assess subjective visual function after corneal collagen crosslinking (CXL).SettingCornea and refractive surgery subspecialty practice.DesignProspective randomized controlled clinical trial.MethodsPatients completed a subjective questionnaire regarding visual symptoms administered preoperatively and 1 year after CXL. Patients ranked self-reported symptoms of photophobia, difficulty night driving, difficulty reading, diplopia, fluctuations in vision, glare, halo, starburst, dryness, pain, and foreign-body sensation on a scale from 1 to 5. Possible associations of symptoms with changes in corrected distance visual acuity (CDVA) and maximum keratometry were also analyzed.ResultsOne hundred seven eyes of 76 patients had CXL for keratoconus (n = 71) or ectasia (n = 36). The mean preoperative to 1-year postoperative changes in night driving (3.2 ± 1.5 [SD] to 2.8 ± 1.5), difficulty reading (3.1 ± 1.5 to 2.9 ± 1.3), diplopia (2.5 ± 1.3 to 2.1 ± 1.2), glare (3.1 ± 1.4 to 2.7 ± 1.2), halo (2.9 ± 1.4 to 2.5 ± 1.3), starbursts (2.6 ± 1.5 to 2.4 ± 1.4), and foreign-body sensation (1.8 ± 1.1 to 1.6 ± 0.9) were statistically significant. There were no associations between the change in any symptom and changes in CDVA. There was a weak association between the change in night driving, pain, and foreign-body sensations and the change in maximum keratometry.ConclusionsAfter CXL, patients noted subjective improvement in visual symptoms, specifically night driving, difficulty reading, diplopia, glare, halo, starbursts, and foreign-body sensation. These subjective outcomes corroborate quantitative clinical improvements seen after CXL.Financial DisclosureDr. Hersh is medical monitor for Avedro, Inc. No author has a financial or proprietary interest in any material or method mentioned.

## 17. Diffuse lamellar keratitis after laser in situ keratomileusis with femtosecond laser flap creation

June 2012

Fernando H. de Paula | Christian G. Khairallah | Leslie M. Niziol | David C. Musch | Roni M. Shtein

PurposeTo identify possible associations with the development of diffuse lamellar keratitis (DLK) after laser in situ keratomileusis (LASIK) with femtosecond laser flap creation.SettingUniversity-based academic practice, Ann Arbor, Michigan, USA.DesignCase-control study.MethodsMyopic LASIK was performed between October 2006 and December 2010 using an Intralase 60 kHz

femtosecond laser for flap creation. Preoperative clinical characteristics, treatment parameters, and intraoperative and postoperative complications were recorded. Statistical comparisons were made using t, chi-square, and Fisher exact tests and repeated-measures logistic regression to adjust for inter-eye dependency.ResultsThe study enrolled 801 eyes (419 patients). Ninety-nine eyes (12.4%) of 70 patients developed DLK; most cases comprised mild flap interface inflammation and were treated with a routine postoperative antiinflammatory regimen. Twenty-two eyes (2.7%) required more than 1 week of antiinflammatory treatment. There was a statistically significant increase in the incidence of DLK with larger flap diameter (P=.0171), higher side-cut energy (P=.0037), and higher raster energy (P=.0033). Patients with DLK were less likely to achieve corrected distance visual acuity of 20/20 or better 1 day postoperatively (P=.0453). The difference in acuity was no longer present at 1 week. There were no significant associations between the incidence of DLK and preoperative refractive error, flap thickness, ablation depth, or other treatment parameters.ConclusionsDiffuse lamellar keratitis after LASIK with femtosecond laser flap creation tended to be mild with little effect on visual acuity. Higher energy level for flap creation and larger flap diameter were associated with an increased risk for DLK.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 18. Visual simulation through different intraocular lenses using adaptive optics: Effect of tilt and decentration

June 2012

David Madrid-Costa | Javier Ruiz-Alcocer | Cari Pérez-Vives | Teresa Ferrer-Blasco | Norberto López-Gil | Robert Montés-Micó

PurposeTo analyze visual quality differences between intraocular lenses (IOLs) and assess the impact of IOL decentration and tilt on visual quality.SettingUniversity of Valencia, Valencia, Spain.DesignCohort study.MethodsThe crx1 adaptive optics visual simulator was used to simulate the wavefront aberration pattern of 2 commercially available aspheric aberration-correcting IOLs (Acrysof IQ SN60WF and Tecnis ZA9003) and 2 spherical IOLs (Akreos Adapt and Triplato) in 5 situations: centered, decentered 0.2 mm and 0.4 mm, and tilted 2 degrees and 4 degrees. Monocular distance visual acuity at 100%, 50%, and 10% contrast and the depth of focus were measured.ResultsTen eyes of 10 patients were evaluated. When the IOLs were centered, there were no differences in visual acuity between the 4 IOLs at any contrast. The aberration-correcting IOLs were more sensitive to tilt and decentration than the spherical IOLs; Tecnis ZA9003 IOL was the most sensitive to decentration and the Acrysof IQ SN60WF IOL was the most sensitive to tilt. Higher residual spherical aberration slightly improved depth of focus and the tolerance to defocus.ConclusionsThe results in this study suggest that the aspheric aberration-correcting and spherical IOLs provided comparable visual quality when centered in eyes in which the corneal higher-order aberrations are those of the average of the human cornea. Tilt and decentration of the IOLs had an impact on visual quality, with aberration-correcting IOLs having a greater effect

than the spherical IOLs.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 19. Effects of steep meridian incision on corneal astigmatism in phacoemulsification cataract surgery

April 2012

Chang Rae Rho | Choun-Ki Joo

PurposeTo evaluate surgically induced astigmatism (SIA) when the clear corneal incision is located on the preoperative steep meridian of the corneal astigmatism in phacoemulsification cataract surgery.SettingSeoul St. Mary's Hospital, Seoul, South Korea.DesignComparative case series.MethodsPatients with preoperative corneal astigmatism greater than 0.50 diopter (D) were evaluated. The corneal incision meridian was chosen by rounding the steep corneal meridian to the closest 10 degrees. All incisions were enlarged to 3.0 mm before intraocular lens implantation. Patients were grouped according to incision location (temporal, superotemporal, superior). Preoperative keratometric data were compared with data collected 2 months postoperatively. Polar value analysis was used to analyze the SIA. The Hotelling trace test was used for comparison of intraindividual changes.ResultsThe study evaluated 95 patients (30 eyes temporal incision, 32 eyes superotemporal incision, 33 eyes superior incision). Two months postoperatively, the combined mean polar values for SIA changed significantly in the temporal group (Hotelling T2 = 0.418; P=.008), superotemporal group (Hotelling T2 = 1.078; P<.001), and superior incision group (Hotelling T2 = 1.175; P<.001). The SIA was 0.28 @ 79, 0.40 @ 85, and 0.46 @ 92, respectively.ConclusionsChoosing the corneal incision based on the preoperative steep meridian significantly decreased keratometric astigmatism at the temporal, superotemporal, and superior locations. Thus, it is desirable to place the corneal incision on the steep meridian in eyes with corneal astigmatism higher than 0.50 D.Financial DisclosureNeither author has a financial or proprietary interest in any material or method mentioned.

## 20. Transepithelial corneal collagen crosslinking: Bilateral study

February 2012

Massimo Filippello | Edoardo Stagni | David O'Brart

PurposeTo evaluate the efficacy of transepithelial collagen crosslinking (CXL) in patients with bilateral progressive keratoconus.SettingOutpatient ophthalmic clinic.DesignCohort study.MethodsPatients with a history of bilateral progressive keratoconus were recruited. The worst eye was treated with transepithelial CXL, while the fellow eye was left untreated as a control. Transepithelial CXL was performed by applying an enhanced riboflavin solution (riboflavin 0.1%, dextrane T500 with trometamol [Tris-hydroxymethyl aminomethane] and EDTA [ethylenediaminetetraacetic] sodium salt) on the intact corneal epithelium for 30 minutes before irradiation with ultraviolet A (370 nm at 3 mW/cm2) for 30 minutes. Follow-up was 18 months in all eyes.ResultsThe study enrolled 20 patients. Transient hyperemia and mild foreign-body

sensation occurred in 8 eyes (40%) after treatment; both resolved after 24 hours. In treated eyes, there were statistically significant improvements in uncorrected and corrected visual acuity and topography-derived keratometry, cone apex power, and higher-order aberrations (P<.05). In untreated control eyes, there was a general trend toward worsening of these parameters. No complications were reported.ConclusionsTransepithelial CXL treatment appeared to halt keratoconus progression, with a statistically significant improvement in visual and topographic parameters. The treatment was safe and well tolerated. Its noninvasive nature makes it potentially useful in cases in which epithelial debridement is ideally avoided, such as pediatric cases, uncooperative patients, and thin corneas with thicknesses nearing 380 µm.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 21. Modified technique for removal of Soemmerring ring and in-the-bag secondary intraocular lens placement in aphakic eyes

May 2012

Dilraj S. Grewal | Surendra Basti

We describe modifications to previously described techniques for evacuation of Soemmerring ring during secondary intraocular lens (IOL) implantation in aphakic eyes following previous pediatric cataract surgery. A new anterior capsulotomy is initiated using a cystotome to incise the anterior capsule close to its attachment to the posterior capsule. A curved microscissor is used to cut circumferentially, completing the capsulotomy, and a dispersive ophthalmic viscoelastic device (OVD) is used to viscoexpress Soemmerring ring material from the capsular bag. A 2-handed maneuver is used to manually divide the Soemmerring ring. Finally, slow-motion phacoemulsification is used to emulsify and remove the pieces. Viscoexpression of fragments of Soemmerring ring is done if there is a posterior capsulotomy. The residual capsular bag is filled with OVD and a foldable 3-piece IOL injected into the bag and dialed in. This technique allows complete evacuation of Soemmerring ring and placement of a secondary IOL in the capsular bag.Financial DisclosureNeither author has a financial or proprietary interest in any material or method mentioned.

## 22. Corneal collagen crosslinking for keratoconus and corneal ectasia: One-year results

January 2011

Peter S. Hersh | Steven A. Greenstein | Kristen L. Fry

PurposeTo evaluate 1-year outcomes of corneal collagen crosslinking (CXL) for treatment of keratoconus and corneal ectasia.SettingCornea and refractive surgery subspecialty practice.DesignProspective randomized controlled clinical trial.MethodsCollagen crosslinking was performed in eyes with keratoconus or ectasia. The treatment group received standard CXL and the sham control group received riboflavin alone. Principal outcomes included uncorrected (UDVA) and corrected (CDVA) distance visual acuities, refraction, astigmatism, and topography-derived outcomes of maximum and average keratometry (K) value.ResultsThe UDVA improved

significantly from 0.84 logMAR ± 0.34 (SD) (20/137) to 0.77 ± 0.37 logMAR (20/117) (P = .04) and the CDVA, from 0.35 ± 0.24 logMAR (20/45) to 0.23 ± 0.21 logMAR (20/34) (P<.001). Fifteen patients (21.1%) gained and 1 patient lost (1.4%) 2 or more Snellen lines of CDVA. The maximum K value decreased from baseline by 1.7 ± 3.9 diopters (D) (P<.001), 2.0 ± 4.4 D (P = .002), and 1.0 ± 2.5 D (P = .08) in the entire cohort, keratoconus subgroup, and ectasia subgroup, respectively. The maximum K value decreased by 2.0 D or more in 22 patients (31.0%) and increased by 2.0 D or more in 3 patients (4.2%).ConclusionsCollagen crosslinking was effective in improving UDVA, CDVA, the maximum K value, and the average K value. Keratoconus patients had more improvement in topographic measurements than patients with ectasia. Both CDVA and maximum K value worsened between baseline and 1 month, followed by improvement between 1, 3, and 6 months and stabilization thereafter.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned. Additional disclosure is found in the footnotes.

## 23. Glistenings and surface light scattering in intraocular lenses

August 2010

Liliana Werner

Glistenings are fluid-filled microvacuoles that form within the intraocular lens (IOL) optic when the IOL is in an aqueous environment. They are observed in all types of IOLs but have been mainly associated with hydrophobic acrylic IOLs. Experimental and clinical studies suggest the various hydrophobic acrylic IOLs on the market exhibit different tendencies toward glistenings. Factors influencing glistening formation include IOL material composition, manufacturing technique, packaging, associated conditions such as glaucoma or those leading to breakdown of the blood–aqueous barrier, as well as concurrent use of ocular medications. Although the impact of glistenings on postoperative visual function and the evolution of glistenings in the late postoperative period remain controversial, IOL explantation has rarely been reported. The phenomenon of surface light scattering has also been described in association with hydrophobic acrylic IOLs. Its mechanism of formation is controversial but may be related to long-term phase separation water near the IOL surface, although not seen as microvacuoles.Financial DisclosureThe author has no financial or proprietary interest in any material or method mentioned.

## 24. Visual function through 4 contact lens–based pinhole systems for presbyopia

May 2012

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PurposeTo evaluate the effects of different contact lens–based artificial pupil designs on visual performance.SettingUniversity of Valencia, Burjassot, Spain, and University of Manchester, Manchester, United Kingdom.DesignComparative case series.MethodsPresbyopic patients were

evaluated using 4 artificial pupil designs in the nondominant eye. Binocular uncorrected distance visual acuity (UDVA), binocular corrected distance visual acuity (CDVA), binocular uncorrected near visual acuity (UNVA), binocular distance-corrected near visual acuity (DCNVA), defocus curve, binocular distance, and near contrast sensitivity under photopic and mesopic conditions, and stereoacuity were measured after contact lens fitting.ResultsThe mean UDVA and CDVA ranged from 0.04 ± 0.05 (SD) to −0.01 ± 0.04 logMAR and from −0.02 ± 0.05 to −0.05 ± 0.03 logMAR, respectively. The UNVA and DCNVA ranged from 0.37 ± 0.11 to 0.42 ± 0.20 logMAR and from 0.35 ± 0.17 to 0.38 ± 0.12 logMAR, respectively. The difference in binocular distance contrast sensitivity was statistically significant between the pinhole systems and the control group (distance-corrected patients without pinhole lens) for 6 cycles per degree (cpd), 12 cpd, and 18 cpd; for near vision, differences were also significant for 3 cpd at the 2 luminance levels ($P<.05$). Stereoacuity values for near vision were not significantly different between the 4 pinhole systems ($P>.05$).ConclusionsSoft contact lens apertures provide good visual acuity at distance, functional intermediate vision, and poor near visual acuity and stereoacuity. An improvement in visual performance with decreasing pupil diameter was not found.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

## 25. Higher-order aberrations and visual function in pseudophakic eyes with a toric intraocular lens

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PurposeTo compare higher-order aberrations (HOAs) and visual function in eyes with a toric intraocular lens (IOL) and eyes with a nontoric IOL.SettingHayashi Eye Hospital, Fukuoka, Japan.DesignCase-control study.MethodsEyes that had phacoemulsification were enrolled in 1 of the following 3 groups: (1) preoperative corneal astigmatism of 1.00 diopter (D) with a toric IOL (toric group), (2) astigmatism of 1.00 D or more with a nontoric IOL (high-astigmatism group), and (3) astigmatism less than 1.00 D with a nontoric IOL (low-astigmatism group). Ocular and corneal HOAs were measured using a wavefront analyzer. Photopic and mesopic visual acuities at high- to low-contrast visual targets were measured using a contrast sensitivity tester.ResultsThe mean ocular and corneal total HOAs and 3rd-order aberrations in the toric and high-astigmatism groups tended to be greater than in the low-astigmatism group; HOAs and 3rd-order aberrations at 3 months and HOAs at 6 months were significantly different ($P\leq.0403$). The mean corrected visual acuity did not differ significantly between groups. However, photopic low-contrast visual acuity (LCVA) and mesopic high- to low-contrast visual acuity was significantly worse in the toric and high-astigmatism groups than in the low-astigmatism group ($P\leq.0210$).ConclusionPostoperatively, ocular and corneal HOAs were greater in eyes with a toric IOL and in eyes with high preexisting corneal astigmatism than in eyes with low preexisting

astigmatism, which impaired photopic LCVA and mesopic visual acuity.Financial DisclosureNo author has a financial or proprietary interest in any material or method mentioned.

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