

# Abstracts

Edited by Dr. Tahir Mahmood

## **Early changes in corneal sensation, ocular surface integrity, and tear-film function after laser-assisted subepithelial keratectomy**

Winter JH, Vidic B, Schwantzer G, Schmut O.

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The past decade has seen changing trends in refractive surgery, with the evolution of several different procedures. Reshaping the anterior corneal surface by excimer laser photorefractive keratectomy (PRK) and laser in situ keratomileusis (LASIK) have shown considerable promise for the surgical correction of myopia.

In PRK, refractive surgical ablation is performed on the corneal surface after epithelial debridement. The disadvantage is that the epithelium is lost during this procedure, with potential problems of delayed improvement caused by epithelial defects, postoperative pain, and formation of stromal haze due to the healing process.

During LASIK, a hinged lamellar corneal flap is raised with a microkeratome followed by ablation in the stromal bed and repositioning of the flap. The rapid recovery, good visual acuity, and absence of pain in most LASIK patients have led to an increase number of procedures performed yearly. However, epithelial ingrowth, corneal-flap-related complications, and corneal ectasia are shortcomings of LASIK.

The purpose of this study was to investigate the changes in corneal sensation, ocular surface integrity, and tear-film function after laser-assisted subepithelial keratectomy (LASEK).

Laser-assisted subepithelial keratectomy was performed in 21 consecutive patients (37 myopic eyes). The patients were observed for subjective complaints of dry eye, corneal sensation, tear-film breakup time (BUT), Schirmer test without local anesthesia, and fluorescein and lissamin-green staining preoperatively and 1 week and 1, 3, and 6 months postoperatively.

The subjective score for dry-eye symptoms was not statistically significantly higher after the procedure.

Corneal sensation was reduced up to 1 month after LASEK ( $P<.05$ ). There were obvious decreases in BUT at 1 week and 1 month ( $P<.01$ ) and no significant changes in Schirmer test results. In fluorescein staining of the cornea, dots were more concentrated at 1 week ( $P<.05$ ). In lissamin-green staining, no significant changes were found at any follow-up examination.

The authors concluded that laser-assisted subepithelial keratectomy induced a short-term reduction in corneal sensation and affected the ocular surface and tear film slightly. Epithelial flap repositioning in LASEK may have a positive influence on tear-film and ocular-surface factors.

## **Effect of anterior capsule polishing on fibrotic capsule opacification: Three-year results**

Sacu S, Menapace R, Wirtitsch M, Buehl W, Rainer G, Findl O.

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The most frequent complication of modern cataract surgery is, mainly late, opacification of the lens capsule. It arises from 2 distinct causes: fibrosis of the capsule and proliferation of lens epithelial cells (LECs) on the capsule. Contact with the intraocular lens (IOL) optic causes the LECs of the anterior capsule undergo myofibroblastic transdifferentiation, resulting in fibrotic anterior capsule opacification (ACO). Fibrotic posterior capsule opacification (PCO) is caused by anterior LECs that have migrated onto the posterior capsule, where they cause whitening and shrink eye. Anterior capsule opacification and fibrotic PCO seal the lens capsule around the IOL optic (shrink wrapping). However, ACO may reduce the free optic zone by contracting (capsulorhexis phimosis) or retracting the capsulorhexis opening (buttonholing). The fibrotic PCO can compromise visualization of the peripheral retina and, when excessive, increases glare disability and decreases image brightness and visual acuity.

In recent years, it has become obvious that in the bag implantation of an IOL with a sharp edged optic

helps reduce PCO, especially, when circumferentially overlapped by a continuous curvilinear capsulorhexis (CCC). Removing the LECs from the lens capsule to reduce capsule opacification formation has also been under investigation.

The present study examined the long-term effect of anterior capsule polishing on the fibrotic component of capsule opacification (both ACO and fibrotic PCO) in eyes with round-edged silicone IOLs using a standardized slitlamp photographic technique. Two IOLs manufactured by different companies with a similar open-loop design were used to study the impact of the differences in the silicone optic material of the 2 lenses.

This randomized double-blind study comprised 104 eyes of 52 patients with bilateral age-related cataract. All patients received round-edged intraocular lenses (IOLs); 26 received an SI-40 IOL (Advanced Medical Optics Inc.) in both eyes, and 26 received a Silens6 IOL (Domilens) in both eyes. Both IOLs consist of different silicone material and have different haptic angulation. The SI-40 IOL has 13.0 mm open-loop poly methyl methacrylate (PMMA) haptics angulated by 10 degrees. The Silens6 IOL has 12.5 mm open-loop PMMA haptics with no angulation. In 1 eye, the anterior capsule was extensively polished. The anterior capsule was left unpolished in the contralateral eye, which acted as a control. Digital slitlamp photographs of the ACO and fibrotic PCO were taken with a standardized technique for 3 years postoperatively. The intensity of ACO was measured objectively (score 0% to 100%) using Adobe Photoshop software. Fibrotic PCO was graded subjectively (score 0 to 4).

The mean ACO was 17% in the polished eyes and 26% in the control eyes ( $P = .0001$ ). The mean fibrotic PCO score was 0.5 and 1.0, respectively ( $P = .0007$ ). The mean ACO was 15% in the polished SI-40 eyes and 26% in the control SI-40 eyes ( $P = .01$ ). It was 19% in the polished Silens6 eyes and 26% in the control Silens6 eyes ( $P = .003$ ). The mean fibrotic PCO score was 0.4 in the polished SI-40 eyes and 1.1 in the control SI-40 eyes ( $P = .0006$ ). It was 0.6 in the polished Silens6 eyes and 0.9 in the control Silens6 eyes ( $P = .08$ ).

The authors concluded that three years after surgery, eyes in which the anterior capsule was extensively polished had less ACO and fibrotic PCO with both round-edged silicone IOLs. In eyes with Silens6 IOLs, however, the reduction in fibrotic PCO was not significant.

### **Predicting cataract surgery results using a macular function test**

Vryghem JC, Cleynenbreugel HV, Calster JV, Leroux K.

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Potential vision tests can help determine whether patients with impaired vision caused by cataract may benefit from improved vision after surgery. It is important to determine whether the visual impairment is from the cataract alone or whether other ocular pathology exists that might affect the prognosis. Poor visual recovery after phacoemulsification is frequently linked to retinal or corneal pathology. Fundoscopy is difficult in cases of severe cataract and may lead to undiagnosed retinal disease, making prediction of visual recovery unreliable.

Various methods have been developed for predicting retinal acuity (ie, visual acuity determined by macular and optic nerve function) and for determining whether vision will improve after cataract surgery. Several are based on retinal qualitative indices. These include electroretinography, visual evoked potentials, color vision tests, blue-field entoptic tests, and B-Scan ultrasonography. Other potential vision tests are based on quantitative criteria and include pinhole techniques, laser or white-light interferometry, and potential acuity meter (PAM) assessment. The Guyton-Minkowski PAM (Mentor) and the Rodenstock laser interferometer are currently the most popular instruments for predicting postoperative visual acuity; they are reported to be useful and accurate. The newer potential acuity pinhole (PAP) test seems to be more accurate in predicting postoperative distance visual acuity than the PAM.

In this report, authors described the Vryghem macular function (VMF) test (Precision Vision), a simple and inexpensive method of measuring potential visual acuity in patients with cataract. The test uses a Parinaud near reading chart, a +8.0 diopter (D) trial lens, and a Heine ophthalmoscope. In a prospective study, we used the VMF test to measure the accuracy in predicting the visual outcome after cataract surgery.

The purpose of this study was to assess the predictive value of a macular function test in the preoperative evaluation of cataract patients.

This prospective study comprised 396 uneventful consecutive cataract procedures performed by 1 surgeon from September 2000 to February 2001. The best corrected visual acuity (BCVA) and the density and location of the lens opacities were recorded preoperatively. Macular function was assessed preoperatively using a Parinaud test at 12 cm with a hyperaddition of +8.0 diopters and extra illumination. The postoperative BCVA was compared with the results of the macular function test.

Of the 359 eyes (90.7%) that could read the Parinaud 1 line on the pre-operative hyperaddition test, 338 (94.2%) attained a final BCVA of 20/25 or better and 356 (99.2%), of 20/30 or better. Twenty-five eyes that could not read Parinaud 1 and presented with a dense nuclear or posterior subcapsular cataract also achieved a BCVA of 20/25 or better. Three eyes could read Parinaud 1 preoperatively but did not attain a BCVA of 20/30 or better postoperatively; 2 of the eyes had macular edema and 1, an opaque posterior capsule.

The authors concluded with the remarks that the results of this study suggest that this simple macular function test has a positive predictive value of 94.2% in predicting a visual outcome of 20/25 or better after cataract surgery. The sensitivity was 94.2% and the specificity, 32.4%. The negative predictive value was 32.4% and the positive predictive value for a BCVA of 20/30 or better, 99.2%.

#### **Incidence of and risk factors for residual posterior capsule opacification after cataract surgery**

Mootha VV, Tesser R, Quails C,  
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Posterior capsule opacification (PCO) is a common complication after cataract surgery with intraocular lens (IOL) placement. The reported incidence of PCO is as high as 50% with use of poly (methyl methacrylate) IOLs. Posterior migration of residual lens epithelial cells (LECs) from the anterior capsule is thought to be important in the pathophysiology of acquired PCO. Barriers to posterior migration of LECs include in-the bag IOL placement, maximum optic-capsule contact with angulated IOL haptics, and use of a square, trim cated-edged IOL. Soemmering's ring formation cause by proliferation of sequestered cortical cells is another important factor in the development of peripheral PCO. Performing meticulous cortical cleanup, using biocompatible IOLs

(acrylic and newer silicone materials) to reduce cell proliferation, and creating a small continuous curvilinear capsulorhexis with the capsule edge on the IOL surface are thought to reduce Soemmering' ring formation. Eliminating posterior capsule folds and minimizing anterior capsule LEC aspiration may also reduce PCO.

Posterior capsule plaque, or residual capsule opacity, at the time of cataract surgery has been noted by cataract surgeons since the advent of extracapsular cataract extraction techniques. Although surgical instruments to polish residual capsule opacities have been designed, there are few published studies of residual capsule opacity.

It is not known to what extent residual capsule opacity noted at the end of surgery will contribute to visually significant PCO over time.

The purpose of this study was to evaluate the incidence of and determine the risk factors for residual posterior capsule opacification (PCO).

This study evaluated 194 uneventful cataract surgeries. Immature cataracts were graded for nuclear sclerosis (NS), posterior subcapsular cataract (PSC), and anterior cortical spokes on a 1 to 4 scale. Preoperative Snellen best corrected visual acuity was converted to the logMAR scale. The posterior capsule was examined after polishing and was classified as clear or as having residual opacity. Those with residual capsule opacity were evaluated 6 weeks postoperatively for the presence of visually significant PCO.

The incidence of residual capsule opacity was 23% (44 eyes). Seven (54%) of 13 eyes with white mature cataract had residual capsule opacity. In contrast, 37 (20%) of 181 eyes with immature cataract had residual capsule opacity ( $P = .01$ ). In eyes with immature cataract, the mean preoperative logMAR acuity was  $+1.14 \pm 0.60$  (SD) in the residual capsule opacity group and  $+0.73 \pm 0.46$  in the clear group ( $P < .001$ ). In eyes with immature cataract, the adjusted odds ratio for each increasing grade of NS was 2.3 and of PSC, 1.8 ( $P = .002$  and  $P < .001$ , respectively). Eleven percent (5 eyes) of residual capsule opacities resulted in visually significant PCO 6 weeks postoperatively. All 5 opacities were centrally located at surgery.

The authors concluded with the remarks that the results indicate that aggressive polishing of peripheral or adherent residual capsule opacities is not advisable as only 5 eyes with central residual capsule opacities developed visually significant PCO.