Stromal hydration of clear corneal incisions after cataract surgery may be useful in reducing wound leak and decreasing the risk of postoperative endophthalmitis.

**Objective:** To evaluate the effect of stromal hydration on the architecture of clear corneal incisions immediately after cataract surgery using anterior segment optical coherence tomography (AS-OCT).

**Design:** Prospective, comparative clinical study.

**Participants:** 30 patients undergoing routine phacoemulsification were enrolled in this study.

**Methods:** Patients were randomly divided into 2 groups, one that received stromal hydration of the corneal incision at the conclusion of surgery and another that did not receive stromal hydration. A standardized technique of cataract surgery was performed using 2 paracentesis incisions created with a 15° blade and a 2.75-mm clear corneal incision created with a steel keratome. Within 1 hour after surgery, patients underwent imaging of the corneal incision using AS-OCT. In addition, clinical examination was repeated following imaging in order to verify wound integrity using the Seidel test.

**Results:** No clinical or demographic differences existed between patients in the 2 groups. The mean clear corneal incision length was significantly longer in patients who received stromal hydration (1.69 vs 1.51 mm; \( P < 0.05 \)). The IOP was higher in the stromal hydration group than in the no-hydration group (20.9 vs 15.8 mm Hg, respectively), suggesting less loss of aqueous fluid from the incision after surgery. Localized detachment of Descemet's membrane was more likely with stromal hydration than without stromal hydration (63% vs 25%, respectively).

**Conclusions:** Stromal hydration has significant effects on the architecture of clear corneal incisions during the early postoperative period after cataract surgery and may improve wound integrity.

**Reviewer's Comments:** This study offers suggestive evidence that stromal hydration has beneficial effects on reducing the likelihood of wound leak after phacoemulsification. The procedure is simple, and, since it may offer a benefit, I believe it is useful to perform. Perhaps the most important message in this article is the importance of verifying the integrity of the wound at the conclusion of surgery. If any question of a wound leak exists, then a suture should be placed in order to minimize the risk of postoperative endophthalmitis. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Cataract Surgery Technique, OCT, Stromal Hydration

Print Tag: Refer to original journal article
Incisional Leakage May Lead to Anterior Chamber Instability in Phacoemulsification

Anterior Chamber Instability Caused by Incisional Leakage in Coaxial Phacoemulsification.

Liyanage SE, Angunawela RI, et al:


Anterior chamber instability during phacoemulsification can result from excessive incisional leakage.

**Objective:** To evaluate the amount of incisional leakage during phacoemulsification, and to assess the effect of the second instrument on incisional leakage.

**Design:** Prospective comparative clinical study.

**Participants:** 105 patients undergoing phacoemulsification were enrolled.

**Methods:** The amount of total irrigating fluid used during phacoemulsification, as well as the amount aspirated by the machine during surgery, allowed the calculation of the amount of incisional leakage. This parameter was measured in each patient and was compared between 2 surgeons; one surgeon kept the second instrument in the eye throughout surgery, and the other removed the second instrument after nuclear fragmentation. The proportional amount of incisional leakage to total irrigating fluid volume was compared between surgeons.

**Results:** The mean percentage of incisional leakage was 67%. In cases performed with the chopper remaining in the eye throughout the procedure, 75% incisional leakage was seen. In contrast, only 59% incisional leakage was found when the chopper was removed after nuclear fragmentation.

**Conclusions:** Incisional leakage is greater when the second instrument is left in the anterior chamber throughout the phacoemulsification procedure.

**Reviewer's Comments:** The important message of this paper is to be aware that incisional leakage can be significant and can lead to anterior chamber instability during phacoemulsification. Although the second instrument causes some additional wound gape through the paracentesis and greater incisional leakage occurs, removing the second instrument from the eye prior to completion of phacoemulsification eliminates the possibility of protection of the posterior capsule with the second instrument. Although I recommend leaving the second instrument in the eye throughout the procedure, in cases of anterior chamber instability due to excessive incisional leakage, removal of the second instrument may be helpful. Most importantly, it is important to minimize wound gape during the procedure, and to minimize incision length with the appropriate selection of instruments for the creation of the corneal incisions. In addition, maximizing the bottle height relative to the level of the patient's eye can also improve anterior chamber shallowing when excessive incisional leakage occurs. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Cataract Surgery, Incisional Leakage

Print Tag: Refer to original journal article
Don't Implant Single Piece Foldable Acrylic IOL in Ciliary Sulcus


Chang DF, Masket S, et al:


Pigment dispersion, persistent inflammation, and hyphema are commonly reported complications associated with sulcus fixation of single-piece acrylic foldable IOLs.

Objective: To describe complications resulting from sulcus fixation of single-piece acrylic posterior chamber IOL, and to evaluate the appropriateness of their use when capsular support is inadequate for in-the-bag fixation.

Design: Retrospective, noncomparative clinical case series.

Participants: A consecutive series of 30 patients referred for the management of complications relating to single-piece IOL implantation within the ciliary sulcus during a 3-year period.

Methods: Medical records were reviewed to document demographic information, clinical findings, and the nature of complications related to the initial cataract surgery in which sulcus fixation of a foldable single-piece acrylic posterior chamber IOL was implanted in the ciliary sulcus. Details of surgical interventions required to manage these cases were also documented.

Results: Complications related to sulcus fixation of single-piece acrylic IOL included pigment dispersion with or without elevated IOP, glare symptoms related to decentration of the IOL, intraocular hemorrhage, and chronic inflammation with or without cystoid macular edema. Many patients experienced multiple complications; 93% of eyes required surgical intervention to manage the IOL-related complication. IOL exchange with or without vitrectomy was performed in 83% of cases. Improvement in the mean best-corrected visual acuity was noted in most cases, with improvement to 20/20 in the majority of patients.

Conclusions: Single-piece acrylic IOLs are designed exclusively for fixation within the capsular bag and should not be placed within the ciliary sulcus.

Reviewer’s Comments: My own clinical experience agrees entirely with the findings of this study. I have personally treated numerous patients who have been referred with secondary glaucoma and/or hyphema related to improper fixation of single-piece acrylic foldable posterior chamber IOL. When capsular fixation is inadequate for in-the-bag placement of one of these lenses, an alternative IOL design such as the 3-piece foldable acrylic IOL with thin haptics designed to fit within the ciliary sulcus is necessary. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Intraocular Lens, Complications, Sulcus Placement

Print Tag: Refer to original journal article
Symptoms related to decentration of multifocal IOL can often be successfully managed with pharmacologic dilation of the pupil using a mild mydriatic or brimonidine.

**Objective:** To evaluate the causes of patient dissatisfaction after cataract extraction with implantation of a multifocal IOL.

**Design:** Retrospective clinical case series.

**Methods:** Medical records were reviewed of a consecutive series of 42 eyes of 32 patients who presented for evaluation and management of visual symptoms after multifocal IOL implantation at a single institution. Of these patients, 95% reported blurred vision (either at distance or near), and 46% reported photic phenomena, with many patients reporting both symptoms.

**Results:** Principal causes of blurred vision included refractive error, which most frequently occurred in the form of residual corneal astigmatism. Patients who complained of blurred vision with a refractive cause had a mean cylinder of 1.50 D compared with 0.50 D in other patients. Blurred vision and photic phenomena were caused in a significant number of cases by posterior capsule opacity, which was successfully managed with YAG laser capsulotomy. Other causes of photic phenomena included IOL decentration, which was successfully managed with the use of cyclopentolate or brimonidine and, in 1 case, with argon laser iridoplasty. Eighty-eight percent of patients noted improvement in their symptoms with conservative therapeutic measures; 7% of patients underwent IOL exchange with resolution of their symptoms.

**Conclusions:** A variety of causes of blurred vision and photic phenomena are seen as causative factors in dissatisfied patients after multifocal IOL implantation. Careful evaluation and management with conservative measures result in improvement of symptoms in the majority of cases, with few eyes requiring IOL exchange.

**Reviewer's Comments:** It is important to note that patient selection for multifocal lens implantation is critical in order to avoid dissatisfied patients. Patients whose primary complaint is glare or halos, particularly if their visual acuity is good, may experience little improvement or even worsening of these symptoms with a multifocal lens. With proper patient selection, attention to management of astigmatism, and accurate biometry, few patients will experience difficulties with visual symptoms after multifocal lens implantation. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: IOL Design, Cataract Surgery

Print Tag: Refer to original journal article
While patient satisfaction is high after pseudophakic monovision, only 25% of patients are totally spectacle independent.

**Objective:** To evaluate the visual outcomes in patient satisfaction after bilateral cataract extraction with pseudophakic monovision.

**Design:** Prospective interventional clinical case series.

**Methods:** 26 patients with ametropia in 1 eye after cataract surgery were prospectively enrolled in this study. Eligible patients were informed of the option of pseudophakic monovision and elected to participate. A modest target for postoperative myopia was selected, between -1 D and -1.5 D. Postoperative evaluation included measurement of distance and near visual acuity, contrast sensitivity, and stereopsis. In addition, patient satisfaction with the procedure and the degree of spectacle independence was evaluated 3 to 4 months after surgery.

**Results:** The mean degree of anisometropia between the distance and near eyes was 1.16 D. Uncorrected distance visual acuity was 20/30 or better in 96% of patients, and 92% achieved J4 or better on corrected near acuity. Visual acuity and contrast sensitivity measured monocularly was good in all patients. A high degree of patient satisfaction was reported, with a mean postoperative satisfaction score of 9.5. All patients reported satisfaction of 8 of 10 or better; 26% of patients were completely independent of spectacles after surgery, while 1 patient remained totally dependent on spectacles for both distance and near work.

**Conclusions:** Pseudophakic monovision with a modest refractive target achieves good visual function and high level of patient satisfaction in the majority of patients.

**Reviewer’s Comments:** For patients who are not good candidates for multifocal IOL, particularly those for whom glare or other photic phenomena may be problematic, pseudophakic monovision may be a good alternative to multifocal IOL when reduction of spectacle dependence is desired. However, patients must be aware that the majority of patients continue to require reading glasses for some near tasks, and total spectacle independence is rare. In addition, aiming for higher degrees of anisometropia than that reported in this study carries with it some risk of loss of contrast sensitivity, stereoaucity, or other symptoms related to anisometropia. (Reviewer—Scott D. Smith, MD, MPH).

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Keywords: Cataract Surgery, Patient Satisfaction, Visual Function

Print Tag: Refer to original journal article
Approximately 50% of patients who do not have a pre-existing posterior vitreous detachment developed one within 1 month after phacoemulsification.

**Objective:** To determine the incidence of posterior vitreous detachment after uneventful phacoemulsification with implantation of a posterior chamber IOL.

**Design:** Prospective, interventional clinical case series.

**Methods:** A consecutive series of 188 eyes of 188 patients (mean age, 77.2 years) undergoing cataract surgery were included in this study. All patients underwent comprehensive preoperative ophthalmic examination, which included B-scan ultrasonography to determine the presence or absence of a pre-existing posterior vitreous detachment. Following surgery, all patients underwent a similar comprehensive examination 1 week, 1 month, and 1 year later. The results of this examination allowed the determination of new-onset posterior vitreous detachment in patients who did not have one prior to surgery.

**Results:** 30.9% of patients had no evidence of posterior vitreous detachment before surgery. Postoperatively, 20.7% of eyes developed a new-onset posterior vitreous detachment within 1 week after surgery. An additional 31% developed posterior vitreous detachment within 1 month after surgery, and another 6.9% developed a posterior vitreous detachment by the 1-year timepoint.

**Conclusions:** The occurrence of posterior vitreous detachment after uneventful cataract surgery is high.

**Reviewer's Comments:** New-onset posterior vitreous attachment can lead to the development of peripheral retinal tears that, in turn, can lead to retinal detachment. Rhegmatogenous retinal detachment is a well-known complication of cataract surgery, and patients with clinical signs or symptoms of new-onset vitreous detachment should undergo a complete retinal examination in order to determine whether peripheral retinal break is present. Paying careful attention to signs and symptoms of posterior vitreous detachment following cataract surgery, particularly since it occurs so often, is important to determine the presence of peripheral retinal pathology and to treat it before development of the much more serious complication of a retinal detachment. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Cataract Surgery, Complications, Posterior Vitreous Detachment

Print Tag: Refer to original journal article
Is Eye Growth Affected by Congenital Cataract Surgery With IOL?

Changes in Axial Length Growth After Congenital Cataract Surgery and Intraocular Lens Implantation in Children Younger Than 5 Years.

Hussin HM, Markham R:


Ocular growth after congenital cataract surgery with IOL implantation appears to follow the same pattern as ocular growth in normal eyes.

**Objective:** To evaluate changes in axial length following unilateral or bilateral congenital cataract removal and IOL implantation in children <5 years of age.

**Design:** Prospective, comparative clinical study.

**Methods:** 18 children with unilateral congenital cataract and 18 children with bilateral congenital cataracts scheduled for surgical removal with IOL implantation were enrolled. Those with a history of ocular inflammation or trauma, aniridia, or persistent hyperplastic primary vitreous or congenital glaucoma were excluded. All children underwent preoperative evaluation including measurement of axial length by ultrasound biometry. Follow-up examination allowed the measurement of change in axial length over time. A control group of 18 healthy children presenting for treatment of minor eye conditions such as allergic conjunctivitis also underwent axial length measurement, and this group was age- and sex-matched to children at the time of final follow-up.

**Results:** No significant difference was seen in the mean axial length or in the change in axial length over time between cataract and non-cataract eyes in children who underwent unilateral cataract surgery. In addition, the mean axial length and change in axial length in both eyes of children who underwent bilateral cataract surgery were similar to both eyes of children who underwent unilateral congenital cataract surgery. No difference was found in either of these 2 groups between mean axial length in operated or unoperated eyes and normal eyes of the healthy control group.

**Conclusions:** No significant differences in axial length or change in axial length over time were found between eyes that undergo congenital cataract surgery with IOL implantation and normal eyes in children <5 years of age at the time of surgery.

**Reviewer's Comments:** This study indicates that a normal pattern of ocular growth can be anticipated after congenital cataract surgery with IOL implantation. This is important because it demonstrates that these eyes follow a predictable growth pattern, similar to normal eyes, which may be useful in improving the predictability of the proper IOL power to use to achieve emmetropia at the time the child reaches maturity. Although accurate nomograms for estimating ocular growth based on a child's age may not be readily available, this study suggests that the development of such nomograms will be important in improving the predictability of postoperative refractive error, taking into account ocular growth and patient age at the time of congenital cataract surgery. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Congenital Cataract, IOL Implantation

Print Tag: Refer to original journal article
What Are the Effects of Thyroid Status on Graves Ophthalmopathy?

Euthyroid and Primarily Hypothyroid Patients Develop Milder and Significantly More Asymmetrical Graves Ophthalmopathy.

Eckstein AK, Lösch C, et al:

Patients with TED, who are euthyroid or hypothyroid, experience less severe TED and more asymmetric orbital involvement than patients who are hyperthyroid at presentation.

Background: Patients with thyroid eye disease (TED) are systemically hyperthyroid 90% of the time. Is there a clinical difference in TED dependent upon thyroid status?

Objective: To assess clinical findings and levels of thyroid antibodies between euthyroid/hypothyroid patients and hyperthyroid patients with TED.

Design: Retrospective, observational case series.

Participants: 182 patients from a single center in Germany.

Methods: Patients were included if they had thyroid stimulating hormone (TSH) receptor antibody (TRAb) and thyroid peroxidase antibody (TPO Ab) levels within 6 months of TED onset, initially presented within 12 months of TED onset, and had at least 1 year follow-up. The TSH and fT4 levels within 6 months from TED onset determined the group assignment for each patient. Patients with mild to moderate TED were given oral corticosteroids tapered over 6 weeks. Severe TED was treated with IV corticosteroids for 3 days with an oral taper for 6 weeks. If the TED worsened after steroids, patients were treated with irradiation. Patients were seen every 6 to 12 weeks until 6 months of inactivity or completion of surgical therapies. TRAb and TPO Ab levels were checked at baseline and then at regular intervals.

Results: There were 143 hyperthyroid, 28 euthyroid, and 11 hypothyroid patients with TED. The following characteristics were not significantly different between each group: >70% of the patients were women; the median age was approximately 50 years; and, >50% smoked. The clinical activity score before corticosteroid treatment was significantly higher in the hyperthyroid group (5.2) compared to the euthyroid/hypothyroid group (3.9). The severity, measured by NOSPECS scores, was significantly higher in the hyperthyroid group (5.7) than the euthyroid/hypothyroid group (4.4). Patients who were euthyroid/hypothyroid were more likely to have at least 3 mm of proptosis difference (23% vs 5%). Hyperthyroid patients were more likely to develop optic neuropathy (7% vs 0%). The prevalence of abnormal levels of TRAb and TPO Ab were lower in the euthyroid/hypothyroid group (75% vs 95%).

Conclusions: Patients with TED who are euthyroid or hypothyroid experience a different clinical course than if they were hyperthyroid at presentation. They have less severe and less active disease, but are more likely to have asymmetrical proptosis.

Reviewer's Comments: We have always known that patients with TED can be hypothyroid, euthyroid, or hyperthyroid. However, we can counsel patients who are hypothyroid or euthyroid that they will likely enjoy a less severe course. The negative antibodies in this study highlight the need for a better diagnostic test for TED among those who have normal or low thyroid function. (Reviewer-Michael S. Lee, MD).

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Keywords: Graves, Thyroid, Thyroid Eye Disease, Hypothyroid, Hyperthyroid, Euthyroid

Print Tag: Refer to original journal article
What Are the Roles of OCT and VEP in Optical Neuritis?

Optical Coherence Tomography Is Less Sensitive Than Visual Evoked Potentials in Optic Neuritis.

Naismith RT, Tutlam NT, et al:

Neurology 2009; 73 (July 7): 46-52

VEPs are more sensitive than OCT to detect eyes with a history of mild ON.

**Background:** Optical coherence tomography (OCT) and visual evoked potentials (VEP) can be abnormal in an eye with a history of optic neuritis (ON).

**Objective:** To study retinal nerve fiber layer (RNFL) and VEP latencies in a group of patients with ON.

**Design:** Prospective, cross-sectional, observational study.

**Participants:** 65 patients with a history of ON.

**Methods:** Subjects had to have a history of ON at least 6 months prior to enrolment; patients with other ocular pathology were excluded. Each patient underwent an OCT using minimum signal strength of 5. The authors used the age-matched data built into the Stratus OCT to determine thinning of the RNFL. The upper limit of normal for VEP P100 latencies for their laboratory was 112.9 msec.

**Results:** 96 eyes of 65 patients were included. Overall, the RNFL was thinned in 60% of subjects and the VEP was abnormal in 81% of subjects ($P=0.002$). If a patient had mild to moderate visual loss acutely (20/100 or better), the RNFL was thinned in only 27%, while the VEP was abnormal in 77% ($P=0.002$). If visual loss was initially severe (20/200 to 20/400), the RNFL was thinned in 77% and VEP was abnormal in 88% ($P=0.14$).

Eyes with normal recovery of acuity showed thinner RNFL (80 microns) than unaffected eyes (97 microns). However, OCT could not distinguish between mild (61 microns), moderate (51 microns), severe (50 microns), and profound (50 microns) final visual acuity. VEP could not distinguish final visual acuities either. Three days of IV glucocorticoids did not affect the final RNFL whether stratifying for initial visual acuity or not.

**Conclusions:** VEPs are more sensitive at detecting a previous remote attack of ON than OCT. Neither test can distinguish between mild and profound final visual acuity.

**Reviewer's Comments:** OCT did not show thinning of the RNFL in patients with mild ON and good visual recovery, but VEP did. The difference here is that OCT shows a structural outcome compared to VEP, which shows a functional outcome. This is good to keep in mind if you are seeing a patient who noted mild visual loss and mild pain with eye movement several months ago, but did not come in for an evaluation. The RNFL may very well be normal, but the VEP may show prolongation of the P100 latency. (Reviewer-Michael S. Lee, MD).

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Keywords: Optic Neuritis, OCT, VEP
Assessing saccadic accuracy into an area of field loss can identify patients with functional visual field defects.

**Background:** When a patient has nonorganic visual-field loss, it generally presents as concentric or hemianopic field loss. Since perimetry requires patient cooperation, it requires that the practitioner test the patient in a surreptitious fashion. 

**Objective:** The authors observed saccadic accuracy among patients with true and functional visual-field loss.

**Design:** Prospective, observational, case-controlled series.

**Participants:** 31 patients with and without true visual-field loss from a single center in Switzerland.

**Methods:** Informed consent was not obtained because of the low risk and short observation period of this study. Nonorganic visual-field loss was defined as a normal neuro-ophthalmic examination, normal neuroimaging or electrophysiologic testing, and spiralling or tunnelling on kinetic perimetry. True visual-field loss was defined as field loss with a corresponding structural lesion that adequately explained the perimetry. An unmasked examiner held 2 red bottle caps 30° laterally from fixation and asked the patient to look at 1 of them. As the patient looked at one target, the position of the other target was moved using wrist movement alone. An observer masked to the diagnosis and perimetry observed for either a single, accurate saccade to the target or a multi-step, inaccurate searching movement toward the target. If the observer decided a true defect were present, he had to classify it as quadrantic, hemianopic, or globally constricted.

**Results:** There were 16 functional visual-field loss patients (mean age, 41 years) with tunnel visual fields to 10°. Ten patients had brain MRIs and 11 underwent visual evoked potential (VEP) and electroretinogram (ERG) testing. There were 15 true visual-field loss patients (mean age, 40 years). Twelve had hemianopic or quadrantic defects and 3 had concentric visual-field constriction. The mean visual acuity was 20/30 in the organic group and 20/50 in the nonorganic group. All of the organic visual-field loss patients showed at least 2 saccades in the area of visual field loss and accurate saccades toward the normal visual field area. The masked observer correctly identified the visual field loss pattern in all patients. Fourteen (87%) of the nonorganic patients showed accurate saccades.

**Conclusions:** Assessing saccades to a kinetic peripheral target within an area of field loss can help diagnose functional visual-field loss at the bedside.

**Reviewer's Comments:** Remember that functional visual-field loss patients can mimic searching saccades when looking peripherally. Also keep in mind that if the examiner moves his arm instead of his wrist, even the organic visual field loss patients may recognize the change in location of the peripheral target. I have the patient look at my pen tip and then rotate the pen up and down without moving my arms. (Reviewer-Michael S. Lee, MD).

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Keywords: Visual-Field Restriction, Organic, Nonorganic, Saccade Testing

Print Tag: Refer to original journal article
Based on the available evidence, there is no difference in recurrent stroke among patients with and without a PFO.

**Background:** A patent foramen ovale (PFO) is a congenital defect between the right and left atrium that exists in up to 25% of normal individuals. Almost 25% of strokes are considered idiopathic. Many believe that PFO in a patient with idiopathic stroke is causative, and that PFO closure may prevent future stroke.

**Objective:** To estimate the rate of recurrent cerebral ischemia among patients with cryptogenic stroke with and without a PFO.

**Design:** Meta-analysis of the literature.

**Methods:** The authors used the following combination of search terms in Medline and Embase for articles in any language from 1950 to 2008: stroke, cerebrovascular accident, ischemic attack, transient, foramen ovale, patent, embolism, paradoxical, crossed embolism, heart atrium septum defect, patent foramen ovale, cohort study, case control study, retrospective study, incidence, prognosis, mortality, follow-up, and risk. The bibliographies of key articles were reviewed to identify any other studies. A study was included if relative risk (RR) of recurrent stroke among PFO and non-PFO groups was reported. Studies looking at endovascular and surgical PFO closure were excluded unless they contained a medically treated control group. Other studies were excluded when they mixed cryptogenic and noncryptogenic stroke or if the study did not report recurrent stroke rates. The authors extracted data on outcomes and calculated incidence rate of recurrent events per 100 person-years along with confidence intervals.

**Results:** The literature search identified 685 articles initially. Of those, 608 were excluded after initial abstract review. An additional 46 were excluded because they were uncontrolled surgical studies. After full text review, 16 more articles were excluded leaving 15 for the meta-analysis. Four studies contained almost 1100 patients with PFO and a non-PFO control group. The other 11 studies included almost 1500 patients with no control group. The pooled RR of recurrent stroke (0.8) and recurrent stroke or TIA (1.1) was not elevated for patients with PFO compared to non-PFO controls. The pooled rate of recurrent stroke or TIA was 4.0 events per 100 person-years, and the pooled rate of recurrent stroke alone was 1.6 events per 100 person-years.

**Conclusions:** The RR of recurrent ischemia is not elevated among patients with medically treated cryptogenic stroke who have a PFO compared to those without a PFO.

**Reviewer's Comments:** If you see a patient with a retinal artery occlusion and the workup yields a PFO, this study suggests that the risk of recurrent ischemia is the same whether the patient had a PFO or not. This suggests that the PFO may be an incidental discovery instead of the cause. The low rate of recurrence argues against closure unless there are other extenuating circumstances. (Reviewer-Michael S. Lee, MD).

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Keywords: PFO, Stroke, Tx, TIA, Workup, Management

Print Tag: Refer to original journal article
The regularly spaced application of laser spots in the cornea from the femtosecond laser can result in the perception of rainbow glare after LASIK.

**Objective:** To report the incidence and the factors associated with rainbow glare (radiating colors around white lights at night) after LASIK with flap creation using a 60 kHz femtosecond laser.

**Design:** Prospective clinical case series.

**Participants/Methods:** A consecutive series of 260 patients who underwent LASIK with flap creation using a femtosecond laser was included in the study. Parameters used during flap creation included 60-kHz frequency, flap thickness between 90 and 100 μm, spot/line separation of 8 μm, and raster energy between 0.8 μJ and 1.1 μJ. Each patient was interviewed at the time of follow-up examination or contacted by telephone to inquire about the perception of rainbow glare.

**Results:** Of the 260 patients included, successful contact was made with 256. Rainbow glare, described as being between 4 and 12 bands of color around a white light, was reported by 5.8% of patients. The presence of rainbow glare was not associated with patient age, gender, or other preoperative or postoperative factors such as refractive error. Symptoms were reported more frequently among those treated with a higher raster energy (11.6% vs 4.1%). The more frequent occurrence of symptoms in patients treated shortly before laser service calls suggests that misalignment of the laser increased the likelihood of this effect.

**Conclusions:** Rainbow glare can occur following LASIK with flap creation using the femtosecond laser.

**Reviewer's Comments:** The regular spacing of laser applications by the femtosecond laser is responsible for the strange optical phenomenon that leads to rainbow glare. Patients should be made aware during the informed consent process that this and other types of optical effects can result and that use of the laser can lead to glare and/or halos around lights after the procedure. (Reviewer-Scott D. Smith, MD, MPH).
In patients undergoing LASIK with flap creation using the femtosecond laser, the use of brimonidine is associated with a higher risk of dislocation of the corneal flap.

**Objective:** To investigate the effects of brimonidine on subconjunctival hemorrhage and flap-related complications of LASIK.

**Design:** Prospective, comparative interventional clinical study.

**Participants/Methods:** A consecutive series of patients who were scheduled to undergo bilateral LASIK were enrolled in this study. Treatment was performed with the use of the femtosecond laser for corneal flap formation. One eye of each patient was randomly assigned to receive 1 drop of brimonidine 0.2% approximately 5 minutes before surgery. The development of subconjunctival hemorrhages was recorded for each patient 30 minutes after surgery using a standardized severity scale, ranging from 0 to 12. In addition, follow-up examination allowed determination of development of flap dislocation.

**Results:** 136 eyes of 68 patients were included in the study. A statistically significant difference in the subconjunctival hemorrhage severity score was seen between eyes treated with brimonidine and contralateral untreated eyes (brimonidine, 2.2 and controls, 7.6; \( P < 0.001 \)). However, the development of flap dislocation was significantly more common in brimonidine-treated eyes (10.4% vs 0.0%; \( P = 0.02 \)).

**Conclusions:** Brimonidine reduces the development of postoperative subconjunctival hemorrhage in patients undergoing LASIK with a femtosecond microkeratome. However, its use increases the risk of flap dislocation following surgery.

**Reviewer's Comments:** Flap creation with the femtosecond laser requires a longer period of suction on the eye and thus increases the risk of subconjunctival hemorrhage. Constriction of blood vessels with brimonidine may reduce the likelihood of such subconjunctival hemorrhages, but may not be a good idea due to the increased risk of postoperative flap dislocation with the use of this drug suggested by the results of this study. This is believed to occur as a result of the drug altering normal adhesion between the corneal flap and the underlying stromal bed. (Reviewer-Scott D. Smith, MD, MPH).

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**Keywords:** Femtosecond LASIK, Perioperative Brimonidine, Flap Dislocation

**Print Tag:** Refer to original journal article
Resolution of Anterior Segment Imaging Improved With SD-OCT

Anterior Segment Imaging: Fourier-Domain Optical Coherence Tomography Versus Time-Domain Optical Coherence Tomography.

Wylegala E, Teper S, et al:


Spectral-domain anterior segment OCT allows for higher resolution imaging than older, time-domain OCT instruments.

**Objective:** To compare anterior segment images obtained with time-domain (TD) anterior segment optical coherence tomography (OCT [TD-OCT]) and spectral-domain OCT (SD-OCT).

**Design:** Prospective, comparative clinical study.

**Participants/Methods:** Healthy volunteers, as well as patients with anterior segment disease, were recruited to participate in this study. Anterior segment imaging was performed in each patient using TD-OCT and SD-OCT imaging devices. Measurements of the central corneal thickness, as well as parameters of the anterior chamber angle were obtained with each device. Three images of each eye were performed with each device. Statistical comparison of the results from each device was then performed.

**Results:** 30 healthy volunteers and 17 patients with anterior segment disease participated in the study. A high correlation was found between measurements obtained with each of the devices in both groups of participants. Visualization of a greater degree of detail of the corneal structure was possible with SD-OCT due to its higher resolution. In patients with Fuchs dystrophy, visualization of corneal guttae was possible with SD-OCT, but not with TD-OCT. Visualization of lattice lines in eyes with lattice dystrophy of the cornea was also possible with SD-OCT.

**Conclusions:** A high degree of correlation in angle and corneal thickness measurements is seen between TD-OCT and SD-OCT. However, greater resolution of the corneal structure is possible with SD-OCT due to its higher resolution.

**Reviewer's Comments:** Anterior segment imaging has various applications, including anterior segment biometry for selection of phakic IOLs, evaluation of the cornea for stromal and endothelial disease, imaging of the corneal flap following LASIK, and quantitative analysis of the anterior chamber angle for the detection of angle closure. As the resolution of this type of imaging increases, it will play an even larger role in the diagnosis and management of anterior segment disease and glaucoma. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Anterior Segment Imaging, Coherence tomography, Fourier-Domain, Time-Domain

Print Tag: Refer to original journal article
**Objective:** To evaluate the effect of epinephrine added to the irrigating fluid on intraoperative pupil size during cataract surgery in patients who had received topical preoperative nonsteroidal antiinflammatory drug (NSAID) eye drops.

**Design:** Prospective, randomized, masked, clinical study.

**Methods:** 207 patients scheduled for cataract surgery were enrolled in this study. All patients were prescribed topical NSAID eye drops to be used for 2 days prior to surgery. Preoperative pupillary dilation was accomplished with phenylephrine 2.5% and cyclopentolate 1%. During surgery, patients were randomly assigned to have epinephrine 1:1000 added to the irrigating fluid. Preoperative and postoperative measurement of the pupil size allowed the determination of the effect of adding epinephrine to the irrigating fluid on pupil size during surgery.

**Results:** The mean pupil size was similar between groups at the beginning of surgery. The mean reduction in pupil size during surgery was significantly greater in eyes that did not have epinephrine in the irrigating fluid (0.33 mm vs 0.05 mm; \( P < 0.05 \)). Further statistical analysis demonstrated that the effect of epinephrine was greater in eyes that had a smaller pupil diameter at the beginning of surgery.

**Conclusions:** The addition of epinephrine to the irrigating fluid reduces intraoperative pupillary constriction, particularly in eyes with a smaller pupil diameter at the beginning of surgery.

**Reviewer's Comments:** Although numerous techniques have been developed to manage small pupils during cataract extraction and other intraocular surgical procedures, we should not neglect to use simple pharmacologic techniques to avoid small pupils through pharmacologic intervention before and during surgery. Topical NSAIDs and the addition of epinephrine to the irrigating fluids are both simple ways to minimize the risk of intraoperative pupillary constriction and are particularly important when the pupil size is considered borderline after pupillary dilation with anticholinergic and sympathomimetic drops. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Cataract Surgery, Preoperative Diclofenac, Pupil Size, Adrenaline

Print Tag: Refer to original journal article
Topical NSAID treatment appears to decrease capsular contraction and posterior capsule opacification following phacoemulsification.

**Objective:** To evaluate the efficacy of the topical application of a nonsteroidal anti-inflammatory drug (NSAID) for the prevention of capsular contraction and posterior capsule opacification following lens extraction.

**Design:** Animal study.

**Methods:** Lens extraction was performed by phacoemulsification in both eyes of 15 albino rabbits. After lens extraction was completed, implantation of a posterior chamber IOL was performed, with the lens placed in the capsular bag. The animals were divided into 3 treatment groups after surgery. One eye of rabbits in the first group received the topical NSAID, diclofenac; the second group received the topical NSAID, bromfenac, while the third group received the topical steroid, betamethasone. The study drug was applied twice daily for 14 days after surgery. The contralateral eye of each animal received only topical antibiotics. Anterior capsular contraction was assessed by capturing images of the anterior segment with a Nidek EAS-1000 anterior segment analyzer. This allowed determination of the proportional area of the anterior capsular opening relative to the IOL optic size. Posterior capsule opacification was assessed by performing histological evaluation of the lens capsule after enucleation.

**Results:** The area of capsular opening decreased less in eyes treated with a topical NSAID than in eyes treated with the topical steroid or in control eyes. Similarly, posterior capsule opacification due to the growth of lens epithelial cells was less in NSAID-treated eyes than in steroid-treated eyes and control eyes.

**Conclusions:** Topical NSAID treatment appears to decrease capsular contraction and posterior capsule opacification following phacoemulsification.

**Reviewer's Comments:** Although further research in humans is needed, this animal study suggests that the suppression of postoperative inflammation with topical NSAIDs may be an effective means of reducing subsequent capsular contraction and posterior capsule opacification. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Posterior Capsule Opacification

Print Tag: Refer to original journal article
Patients with more prominent signs of inflammation, such as eyelid swelling, pain and vitreous opacity, are more likely than those with less prominent findings of endophthalmitis to have positive vitreous cultures.

**Objective:** To describe the clinical findings of patients with culture-proven endophthalmitis and to compare these findings to those of patients suspected of endophthalmitis who do not have positive cultures.

**Design:** Analysis from a prospective clinical trial of prophylaxis for acute post-cataract surgery endophthalmitis.

**Methods:** Data for this study were derived from the European Society of Cataract & Refractive Surgeons (ESCRS) study of the prophylaxis of endophthalmitis with intracameral injection of cefuroxime. Patients with postoperative hypopyon were suspected of having acute infectious endophthalmitis and underwent treatment that included intraocular injection of antibiotics after obtaining a vitreous specimen for cultures. Patients with positive cultures were compared with regard to clinical characteristics, signs, and symptoms to those who did not show bacterial growth from the vitreous specimens.

**Results:** 29 patients developed suspected endophthalmitis in the study. In patients with culture-proven infection, eyelid swelling and pain were statistically significantly more common than in those with negative cultures. Eyelid swelling occurred in 63% of culture-positive cases and in 11% of culture-negative cases. Pain was reported in 90% of culture-positive cases and in 56% of culture-negative cases. In addition, dense vitreous opacities were more commonly seen in culture-positive cases (72% vs 29%).

**Conclusions:** Signs and symptoms of severe inflammation are more commonly seen in association with culture-proven endophthalmitis than in those with negative cultures.

**Reviewer's Comments:** Patients suspected of having endophthalmitis following cataract surgery and who have more prominent signs of inflammation, including eyelid swelling, pain and vitreous opacities, may have a more aggressive causative organism that is easier to culture from vitreous specimens. In addition, some patients with postoperative hypopyon who do not show positive results on cultures may have a sterile cause of inflammation. However, all patients with hypopyon during the early postoperative period must be considered to have an infectious etiology, since the consequences of failing to treat infectious endophthalmitis promptly with intraocular antibiotics can be devastating. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Cataract Surgery, Complications, Endophthalmitis, Infection, ESCR Study

Print Tag: Refer to original journal article
Patient Satisfaction Higher With Bilateral Apodized Diffractive Multifocal IOLs

Visual Outcome Comparison of Unilateral Versus Bilateral Implantation of Apodized Diffractive Multifocal Intraocular Lenses After Cataract Extraction: Prospective 6-Month Study.
Cionni RJ, Osher RH, et al:

J Cataract Refract Surg 2009; 35 (June): 1033-1039

Nearly 80% of patients report spectacle independence after bilateral implantation of apodized refractive multifocal IOLs.

Objective: To compare patient satisfaction and report of spectacle independence in patients who undergo cataract surgery with implantation of an apodized diffractive multifocal IOL in either one or both eyes.

Design: Prospective comparative clinical study.

Participants/Methods: Patients undergoing cataract surgery who elected to have a multifocal apodized diffractive IOL (AcrySof ReSTOR) were enrolled in the study. Patients fell into 3 categories depending upon the status of the other eye: (1) bilateral multifocal IOL of the same design; (2) unilateral multifocal IOL with phakic contralateral eye; or (3) unilateral multifocal eye with contralateral monofocal IOL. Patients underwent postoperative assessment that included evaluation of their degree of spectacle independence, as well as their level of satisfaction with their vision following surgery. These outcomes were compared between the 3 groups.

Results: 75% of patients with unilateral implantation of the multifocal IOL reported satisfaction with the procedure. In contrast, 92% reported overall satisfaction if bilateral multifocal IOLs were implanted. In addition, a higher proportion of patients with bilateral multifocal IOLs reported spectacle independence (77% vs 65% with contralateral monofocal IOL and 56% with contralateral phakic eye).

Conclusions: Bilateral implantation of an apodized diffractive multifocal IOL is associated with higher patient satisfaction and spectacle independence.

Reviewer’s Comments: Although high levels of patient satisfaction were reported, it is important to note that selection of patients for implantation of this type of multifocal IOL is important. Glare symptoms are more common after implantation of this type of IOL than with a monofocal IOL, and screening of patients for their degree of concern about glare or other visual disturbances and their level of desire for spectacle independence is important before recommending this type of lens. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Intraocular Lens Design, Patient Satisfaction

Print Tag: Refer to original journal article
Image Quality of Aberration-Free IOLs Less Affected by Decentration and Tilt

**Effect of Decentration and Tilt on the Image Quality of Aspheric Intraocular Lens Designs in a Model Eye.**

Epping T, Scholz K, et al:

J Cataract Refract Surg 2009; 35 (June): 1091-1100

In cases where IOL centration and tilt are less certain, use of an aberration-free (rather than a spherical or aberration-correcting design) may cause less visual distortion.

**Objective:** To compare the effect of decentration and tilt on image quality of different types of aspheric and spherical IOLs.

**Design:** Laboratory investigation.

**Methods:** A model eye was constructed, with the crystalline lens replaced by 6 different designs of IOLs, and the effect of decentration and tilt on image quality was investigated. One spherical IOL and 5 aspheric IOLs were evaluated, with some of the aspheric lenses being aberration-correcting designs and others aberration-free designs. The IOL power used was +22.0 diopters for each lens. The anterior chamber depth was set in each case to the specified depth for each individual IOL, and the retinal position was adjusted to provide optimal focus. The effect on image quality of decentration up to 1.00 mm and tilt up to 5° was investigated for each lens.

**Results:** Aberration-correcting aspheric IOLs were the most sensitive to the effect of decentration and tilt, and varied between different lenses of different design. Aberration-free aspheric IOLs were the least sensitive to decentration and tilt. Both aspheric designs provided better image quality under these testing conditions than the spherical IOL design.

**Conclusions:** IOL decentration and tilt degrade the image quality the least with aberration-free aspheric IOLs.

**Reviewer's Comments:** Modern IOL design has incorporated aspheric lens design. Some models are designed to eliminate spherical aberration of the lens itself (aberration-free IOLs), while others are designed to eliminate not only spherical aberration of the lens, but also of the cornea (aberration-correcting IOLs). Both of these types of aspheric IOLs improve image quality in comparison to spherical IOL designs. When tilt and decentration are absent, the aberration-correcting IOLs provide the best image quality. However, the aberration-free lenses are more robust to image degradation with decentration and/or tilt and may be a better choice in cases of less certain stability, such as in cases of zonular weakness, or when the lens is placed in the ciliary sulcus. Each surgeon should be aware of the optical design of the IOLs that are available to him or her and be able to select the most appropriate lens for the individual case.  (Reviewer-Scott D. Smith, MD, MPH).

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**Keywords:** Aspheric IOL Designs, Decentration, Tilt, Image Quality

**Print Tag:** Refer to original journal article
Intraoperative Retinoscopy Helps Determining IOL Power in Eyes With Silicone Oil

*Intraoperative Retinoscopy for Intraocular Lens Power Estimation in Cases of Combined Phacoemulsification and Silicone Oil Removal.*

Patwardhan SD, Azad R, et al:


Biometry and IOL power calculation can be unreliable in eyes with silicone oil. Intraoperative retinoscopy performed after removal of the silicone oil may be useful in improving IOL power calculation.

**Objective:** To evaluate the utility of intraoperative retinoscopy in estimating intraocular lens (IOL) power in eyes with silicone oil undergoing cataract surgery.

**Design:** Prospective, consecutive, interventional, clinical case series.

**Participants/Methods:** 12 patients who had undergone previous vitreoretinal surgery with placement of intraocular silicone oil and who required cataract surgery at a single referral center were included in this study. Patients with retinal detachment or who were undergoing other procedures, such as epiretinal membrane, at the time of cataract surgery were excluded. After removal of the cataract by standard phacoemulsification and removal of the silicone oil by pars plana vitrectomy, refractive error in the aphakic eye was estimated by performing intraoperative retinoscopy. Using a simple formula that has been previously reported, the emmetropic IOL power was calculated. Postoperative comparison of the desired and actual refractive error was determined.

**Results:** 83% of patients had a postoperative refractive error between +0.00 and -1.00 diopters. The remaining 17% of patients had refractive error between +0.25 and +1.00 diopter.

**Conclusions:** The use of intraoperative retinoscopy allows adequate estimation of IOL power in patients undergoing silicone oil removal combined with cataract surgery.

**Reviewer’s Comments:** Estimation of axial length by ultrasound biometry can be less accurate in eyes with silicone oil due to variability in the speed of sound in different types of oil. After removal of silicone oil, measurement of refractive error by retinoscopy and the use of a simple formula for estimating IOL power based on this measurement allows accurate IOL power calculation, and may be a useful technique to employ when managing these patients. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: IOL Power Calculation, Intraoperative Retinoscopy

Print Tag: Refer to original journal article
A prior Nd YAG laser posterior capsulotomy increases the risk of vitreous loss during IOL exchange surgery.

**Objective:** To investigate the clinical outcomes of IOL exchange and to identify factors associated with complications during this procedure.

**Design:** Prospective, interventional, clinical case series.

**Methods:** All cases of IOL exchange performed during a 5-year period at a single referral center were prospectively enrolled in this study. Preoperative evaluation included determination of the clinical problem necessitating surgery. The performance of prior neodymium:YAG (Nd:YAG) laser posterior capsulotomy was also recorded. The occurrence of intraoperative complications, including the need for anterior vitrectomy, was documented. Follow-up examination allowed the determination of visual outcomes and the postoperative refractive error.

**Results:** 128 eyes of 113 patients were included in the study. Reasons for requiring IOL exchange included opacification of the implant (31%), IOL dislocation (18%), capsular phimosis (14%), and the remainder were caused by a variety of problems including corneal decompensation, chronic inflammation, and refractive error due to incorrect IOL power calculation. Capsular fixation was possible in only 45% of cases following IOL exchange. The need to perform vitrectomy was significantly greater if a YAG posterior capsulotomy had been performed previously (49% vs 10%; \( P = 0.001 \)).

**Conclusions:** IOL exchange commonly requires vitrectomy when previous YAG capsulotomy has been performed.

**Reviewer's Comments:** If there is a possibility that IOL exchange will be required in cases of unexpected refractive error or patient dissatisfaction with a multifocal IOL, it is best to delay YAG capsulotomy until after the lens exchange is performed. IOL exchange can be a straightforward procedure, particularly if it is done within the first several weeks after cataract surgery before extensive capsular contraction has occurred. However, if YAG capsulotomy has been previously performed, it is more difficult to remove the IOL from the bag without leading to complications. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: IOL Exchange, Surgery, Outcomes