Journal Highlights

NEW FINDINGS FROM THE PEER-REVIEWED LITERATURE

Ophthalmology

Selected by Russell N. Van Gelder, MD, PhD

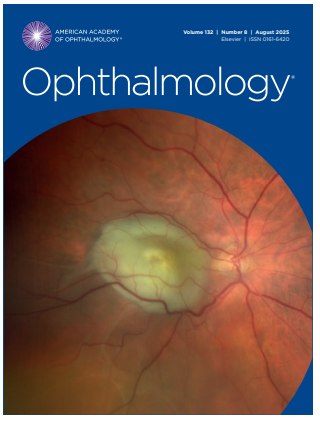
Cataract Increases the Risk of Fracture

August 2025

Although the relationship between cataract surgery and fall risk has been studied, there is no conclusive evidence of a specific link between cataract and fracture risk. Better understanding of this relationship may have key implications for management strategies. In a comprehensive analysis, **Gallo Afflitto et al.** estimated bone fracture risk for phakic individuals and compared their risk with that of pseudophakic people and those without cataract. They found that cataract raised the risk of fracture and that cataract extraction lowered the risk by more than 25%.

This systematic review and meta-analysis adhered to PRISMA guidelines and entailed searching Embase, PubMed, Web of Science, and CINAHL from their inception through May 2024. Qualifying for the analysis were prospective, retrospective, and survey studies of adults with data on fracture risk. Studies were evaluated with the Joanna Briggs Institute Prevalence Critical Appraisal Tool, and frequentist inference meta-analysis and Bayesian network meta-analyses were conducted. Primary outcome measures were odds ratios (OR) and hazard ratios (HR) of fractures for individuals with and without cataract. Secondary outcomes included absolute fracture risk.

Altogether, 16 articles (11 in quantitative synthesis) were analyzed, representing 4,713,458 people and 284,811 fractures. The certainty of evidence ranged from low to moderate. Among phakic individuals with cataract, the HR for fracture was 1.51 ($P = .0152$) relative to individuals without cataract.



Bayesian network meta-analyses indicated that fracture risk was higher for people with cataract than for phakic individuals without cataract (OR, 3.0; HR, 1.1) or pseudophakic individuals (OR, 1.7; HR, 1.28). Relative to phakic individuals with cataract, fracture risk was 27% lower for pseudophakic individuals; one less fracture event was expected for every eight patients who underwent cataract surgery. The pooled absolute risks of fracture per 100 individuals were 6.11 for phakic people with cataract, 4.90 for phakic people without cataract, and 5.31 for pseudophakic people.

According to the researchers, their meta-analysis is the first comprehensive synthesis of evidence linking cataract to fracture risk, implying that the benefits of cataract surgery extend beyond visual improvement to include fracture mitigation. Some drawbacks of the study are high heterogeneity of the included articles, reliance on observational data that could not establish causality, frequent use of self-reported diagnoses, and challenges in retrieving laterality data from EHRs.

IRIS Registry Study of Factors Linked to RD After Pediatric Cataract Surgery

August 2025

Although retinal detachment (RD) after cataract surgery is rare among children, those affected by it can experience debilitating long-term consequences. To improve surgical outcomes and guide postoperative care, it is crucial to identify the risk factors associated with RD. **Altamirano et al.** analyzed IRIS Registry data to measure the incidence of RD diagnosis and repair occurring within five years after pediatric cataract surgery, with the objective of identifying potential predictors of this condition. They noted a surprisingly high (3.8%) cumulative incidence of RD diagnosis over an eight-year period and identified significant risk factors for RD, including Hispanic ethnicity, persistent fetal vasculature, and a history of ocular trauma.

Included in the study were all children (<18 years old) in the IRIS Regis-

SUMMARIES BY LYNDA SEMINARA, RYAN CHASTAIN-GROSS, ANDREW COX, JUDY MAJEWSKI, AND CHRISTOS EVANGELOU.

try who underwent cataract surgery at a participating U.S. ophthalmology practice from 2013 through 2020. Cataract surgery and RD repairs were determined by CPT codes, and potential risk factors for RD were derived from ICD data. The study's primary outcomes were cumulative incidences of RD diagnoses and RD that required surgery within five years following cataract surgery. The rates of RD diagnosis and repair were estimated by Kaplan-Meier analysis, and hazard ratios (HRs) were determined from multivariable Cox regression models.

All told, data were analyzed for 7,407 children (53% male; 49% White non-Hispanic). The median age at surgery was 11 years, and the median follow-up time was 1.6 years. The cumulative incidence of RD diagnosis within five years of cataract surgery was 3.8% (95% CI, 3.1%-4.5%); that for RD repair was 1.6% (95% CI, 1.2%-2.0%). Elevated risk of RD diagnosis within five years of cataract surgery was linked to persistent fetal vasculature (HR, 3.26; 95% CI, 1.58-6.71; $P = .001$), premature retina (HR 2.73; 95% CI, 1.36-5.48; $P = .005$), ocular trauma history (HR, 2.22; 95% CI, 1.39-3.57; $P < .001$), aphakia (HR, 2.10; 95% CI, 1.43-3.10; $P < .001$), and Hispanic ethnicity (HR, 1.71; 95% CI, 1.15-2.54; $P = .008$). Risk factors for RD repair were similar, with a trend toward greater risk among children with degenerative high myopia.

Many of these findings corroborate those of previous research. However, unlike prior studies, RD risk was not higher for boys. The authors urge further investigation of the relationship between RD and Hispanic ethnicity, as well as greater vigilance in the management of children with aphakia or a history of trauma to expedite RD detection and treatment.

The authors concluded that mining robust databases such as the IRIS Registry may help uncover risk factors for rare complications and guide their management—from preoperative decision-making through postoperative monitoring. The large sample size is a strength of this study. Limitations include the potential for selection bias and coding errors.

Ophthalmology Glaucoma

Selected by Henry D. Jampel, MD, MHS

RNFL Changes: Comparison of Spectralis and Cirrus OCT

July/August 2025

OCT devices measure retinal nerve fiber layer (RNFL) thickness with high reproducibility, which is vital for detecting glaucoma progression. Despite the similarities of OCT devices, thickness measurements from different devices are not directly comparable, making it difficult to accurately monitor progression when different devices are used on the same patient. **Mohammadzadeh et al.** compared RNFL thickness rates of change for Spectralis and Cirrus OCT and found that Spectralis detected faster rates of change and a larger proportion of significantly negative rates of change.

The study included 94 eyes (94 patients) with central damage, moderate glaucoma, or advanced glaucoma. All participants had at least two years of follow-up and at least four pairs of OCT scans. Spectralis and Cirrus scans were performed in the same session, and a bivariate longitudinal Bayesian model was applied to compare RNFL rates of change between the two imaging platforms, both globally and in 12 clock-hour sectors. Primary outcome measures were rates of change, longitudinal variances, and proportions of significant negative and positive slopes.

The mean baseline 24-2 visual field mean deviation of the study group was –8.2 dB, and the median follow-up time was 4.5 years. Global RNFL rates of change were significantly faster with Spectralis OCT (–0.70 vs. –0.45 µm/year with Cirrus OCT; $P < .001$). Sectoral rates also were significantly faster with Spectralis OCT in five of the 12 clock-hour sectors. The average residual variance, reflecting measurement noise, was significantly smaller with Spectralis, both globally and in 11 sectors. Moreover, Spectralis identified a higher proportion of eyes with significant negative RNFL rates of change, globally and in eight sectors.

These findings suggest that Spectralis OCT is more sensitive than Cirrus OCT for detecting structural glaucomatous progression, possibly due to its higher resolution, ability to manually correct segmentation errors, and greater dynamic range of measurements. The authors emphasized the importance of consistently using the same device to monitor progression. A limitation of their study is the potential for minor issues relating to image quality.

Ophthalmology Retina

Selected by Andrew P. Schachat, MD

ILM Flaps Improve Outcomes for Large Macular Holes

August 2025

Achieving optimal anatomic and visual outcomes following surgery for large macular holes can be challenging. Although conventional internal limiting membrane (ILM) peeling is effective in some cases of idiopathic full-thickness macular hole (iFTMH), the success rate is lower for holes >500 µm. **Tzoumas et al.** analyzed data from outcome studies of ILM peeling, with and without flaps, and found that flap usage resulted in significantly better anatomic and visual outcomes for patients with large macular holes.

The study was a systematic review and meta-analysis of individual participant data from 13 randomized controlled trials, representing 792 eyes that underwent surgery for iFTMH. Each trial involved comparing conventional ILM peeling with various ILM flap techniques; there were no exclusions relating to hole size or symptom duration. The main outcome measures were macular hole closure rates and VA at six months postoperatively (or the nearest time point). Subgroup analyses were conducted to explore variations in outcomes by hole size, symptom duration, ILM flap type, and tamponade choice. Adjustments were made for key covariates such as age, sex, hole size, lens status, and pre-op VA.

The analysis revealed that ILM flaps significantly improved both outcomes relative to standard ILM peeling. Primary closure was achieved in 91.4% of eyes with flaps versus 73.9% with

peeling alone; the adjusted odds ratio was 4.80 ($P < .001$), and the relative risk was 1.26. Post-op VA improvement in the flap group was approximately seven ETDRS letters better than with peeling alone. The anatomic and visual benefits were most pronounced for larger holes (>500 µm). The findings of subgroup analyses were consistent for different flap techniques, symptom durations, and tamponade agents, and there was no significant difference between flap subtypes. Flap efficacy for smaller holes (<400 µm) and very large holes (≥900 µm) is less certain due to the relatively limited data sets for these sizes.

This study highlights the potential of ILM flaps to improve iFTMH closure rates and post-op VA, particularly for patients with large holes. The investigators recommend research focused on long-term outcomes, such as late reopening and patient-reported measures. They acknowledged limitations of their study, including the lack of a hole size threshold for trial enrollment and the low overall proportion of holes <400 µm and ≥900 µm.

American Journal of Ophthalmology

Selected by Richard K. Parrish II, MD

Multiple Factors Drive Spaceflight Refractive Shifts in Astronauts

August 2025

Astronauts may experience vision changes during long-duration space missions, and hyperopic shifts are a hallmark of spaceflight-associated neuro-ocular syndrome (SANS). To better understand these refractive changes and their causes, **Svoronos et al.** studied ocular biometry and refraction findings for astronauts who spent extended time aboard the International Space Station. They found that multiple biometric factors contribute to refractive changes and established a basis to understand how extended spaceflight might affect the vision of astronauts during missions to Mars and beyond.

For this work, the researchers analyzed preflight and postflight measurements obtained from 29 astronauts (56 eyes) whose average time spent in space was 189.5 ± 60.1 days. Cycloplegic refraction and IOLMaster 500 biometry were used to measure changes in spherical equivalent (SE), axial length, anterior chamber depth, and corneal curvature. IOL power formulas were applied to calculate the contribution of each biometric parameter to overall refractive changes. Relationships between baseline refraction, flight duration, optic disc edema markers, and refractive outcomes were explored.

The average hyperopic shift was +0.12 D in SE ($P = .02$), which resulted from a decrease of 0.09 mm in axial length ($P < .001$). This decrease was mitigated by a 0.09-mm shortening of the anterior chamber depth ($P < .001$) that contributed a myopic shift of –0.15 D. Changes in corneal curvature were variable and contributed minimally (–0.06 D) to the overall predicted refraction.

Individual outcomes differed considerably. Although 48.2% of eyes exhibited a hyperopic shift, 37.5% had no measurable change in SE, and 14% experienced a myopic shift. Baseline refraction was a significant predictor of refractive changes postflight ($P = .034$). Individuals with myopia had a hyperopic shift or no change, whereas those with hyperopia could have shifts in either direction. These data highlight the complexity of spaceflight-induced ocular changes and the limitation of relying solely on average data.

There was no significant link between refractive changes and the severity of optic disc edema or the duration of spaceflight, but there was a trend toward greater hyperopic shifts with longer missions. Additional research would be needed to clarify duration-dependent effects, particularly for planned multiyear missions to Mars.

Drawbacks of the study include the relatively small sample (common with spaceflight research), the use of assumed rather than measured lens-thickness values, and the lack of in-flight measurements. The timing of postflight timing measurements (within six days of return) may not have captured peak in-flight changes.

Findings of this study challenge conventional understanding of SANS-associated refractive changes, said the authors. Rather than causing universal hyperopic shifts, spaceflight may drive eyes toward emmetropia. This research supports the notion that personalized approaches involving baseline refraction may be more effective than universal hyperopic corrections.

Safety of Pegcetacoplan Versus Avacincaptad Pegol for GA

August 2025

Before FDA approval of pegcetacoplan and avacincaptad pegol in 2023, therapeutic agents for geographic atrophy (GA) were lacking. Both of these intravitreal treatments target key components of the complement pathway. Pegcetacoplan inhibits C3, and avacincaptad pegol targets C5; both actions prevent growth of atrophic lesions by reducing complement-mediated inflammation. Despite the promising efficacy of these agents in clinical trials, severe ocular adverse events (AEs) have occurred, such as new-onset neovascular age-related macular degeneration (AMD), intraocular inflammation, ischemic optic neuropathy, and elevated IOP. This prompted **Kailani et al.** to explore the safety profiles of these two agents in real-world settings. They found that pegcetacoplan was linked to more AEs than avacincaptad pegol, but data for the latter agent were less certain.

For this population-based pharmacovigilance study, the investigators combed the FDA Adverse Event Reporting System (FAERS) database for reports of AEs deemed related to either medication, from inception of their use through December 2024. They conducted disproportionality analyses to compare reporting odds ratios (RORs) for specific drug-AE combinations.

The number of patients with an AE secondary to pegcetacoplan or avacincaptad pegol was 752 and 80, respectively. The ocular AEs that were disproportionately overreported for pegcetacoplan included hemorrhagic occlusive retinal vasculitis (ROR, 4,606), intraocular injection complication (ROR, 2,552), retinal occlusive vasculitis (ROR 2,352), anterior segment hemor-

rhage (ROR, 1,767), choroidal neovascularization (ROR, 1,328), bacterial endophthalmitis (ROR, 1,260), and iris neovascularization (ROR, 1,248). AEs that were disproportionately overreported for avacincaptad pegol included choroidal neovascularization (ROR 1,169), vitritis (ROR, 782), dry AMD (ROR, 684), and cystoid macular edema (ROR, 445). The lower proportion of AEs with avacincaptad pegol suggests greater uncertainty of the findings relative to those for pegcetacoplan.

This work underscores the need for ongoing safety monitoring for both agents. The authors recommend research to identify high-risk subgroups and explore predictive biomarkers for adverse therapeutic responses, which "could improve risk stratification and support the development of personalized treatment strategies," they said.

Limitations of the study include the possibility of reporting biases, duplicate or incomplete reports, variability of AE definitions, and the voluntary nature of FAERS reporting. The fact that pegcetacoplan has multiple treatment indications (whereas avacincaptad pegol is solely for GA), coupled with the inability to distinguish systemic and intravitreal use of this drug, likely increased the overall denominator of AE reports used in ROR calculations.

JAMA Ophthalmology

Selected by Brenda L. Bohnsack, MD, PhD

Influence of Pandemic on Childhood Astigmatism

May 2025

When virtual schooling became the norm during the COVID-19 pandemic, many children spent lengthy periods doing intensive near work on computers. Consequently, the rates of childhood myopia grew in many regions, as did the incidence of refractive astigmatism (RA), possibly as a byproduct of myopia. Although researchers in Hong Kong were quick to explore RA trends before and during the pandemic, data on astigmatism rates after lifting of COVID-19 precautions are sparse. To address this gap, **Kam et al.** looked at changes in the prevalence of RA, corneal astigmatism (CA), and related corneal parameters since the prepandemic era, using data from the Hong Kong Children Eye Study. They noted significant increases in the prevalence and severity of RA and CA during the study period—associations that were sustained regardless of myopia presence, parental astigmatism, or sociodemographics.

Participants were Chinese schoolchildren (6-8 years of age) who had comprehensive ocular exams at one of two academic medical centers in Hong Kong from 2015 to 2023. Astigmatism was measured with optical biometry and an autorefractor after cycloplegia, and parents provided lifestyle and environmental information. The main outcomes were annual prevalence rates of RA and CA. Regression analyses were performed to identify potential links between the pandemic and the risks and magnitude of RA and CA.

A total of 21,655 children were enrolled (52.9% male; mean age, 7.31 years). In 2015, the prevalence rates of RA and CA ≥1.0 D were 21.4% and 59.8%, respectively. In 2022-2023, once the pandemic restrictions had expired, the respective rates increased to 34.7% and 64.7%. The magnitude of mean cylindrical power for both RA and CA also rose gradually during this time. All changes were observed for both sexes.

After adjustments for myopia, parental astigmatism, and sociodemographics, with 2015-2019 serving as the reference period, the COVID-19 pandemic was associated with a 20% increase in RA risk (OR, 1.20; $P < .001$) and a 26% increase in CA risk (OR, 1.26; $P < .001$). It also influenced the magnitude of RA and CA, which increased 0.04 D ($P < .001$) and 0.05 D ($P < .001$), respectively.

The observed increases in the prevalence and severity of RA and CA during the pandemic support findings of previous studies, but astigmatism changes in the present study were delayed relative to myopia rates. The findings also shed light on the corneal component, which may take time to develop.

Drawbacks of the study include limited generalizability of the results (most participants were of Han ethnicity) and possible variability in COVID-19 restrictions and levels of adherence. *(Also see related commentary by Jonathan R. Morse, BA, MPH; Jeremy D. Keenan, MD, MPH; and Julius T. Oatts, MD; in the same issue.)*

AI Enhancement of Ophthalmology Notes for Nonophthalmologists

May 2025

Ophthalmology's specialized terminology may be difficult to understand by those outside the field, hindering communication and possibly affecting patient care. Large language models (LLMs) may boost comprehension and have been implemented successfully in various medical settings; however, their utility in clinical practice is uncertain. **Tailor et al.** evaluated the use of LLM-generated plain language summaries (PLS) integrated into standard ophthalmology notes (SON) to see if understanding by nonophthalmology clinicians and other professionals could be improved. They found that nonophthalmologists preferred the PLS/SON combo to SON alone.

This randomized study was performed at a tertiary care center and contained two parallel arms: one with PLS notes plus SON, and the other with SON only. Participants were ophthalmologists, nonophthalmology clinicians, and other nonophthalmology professionals. Ophthalmologist-generated notes were gathered from patient encounters. The main outcome measure was survey responses of nonophthalmologists on note clarity and satisfaction. Secondary outcomes included feedback from ophthalmologists.

Most nonophthalmologists (85%) preferred PLS/SON to SON alone. They reported that PLS enhanced diagnostic understanding (+9 percentage points), satisfaction with note detail (+21.5 percentage points), and clarity (+23 percentage points). The addition of PLS reduced the comprehension gap between clinicians who were comfortable and uncomfortable with the terminology from 26.1% to 14.4%. PLS helped to preserve meaning and improve readability while maintaining strong semantic fidelity with the original notes.

Most ophthalmologists (90%) rated PLS as highly accurate and reflective of their findings, diagnoses, and management plans. The PLS error rate was 26% according to ophthalmologists' review; 84% of the errors were deemed low risk, and none posed a risk of severe harm.

Findings of this study highlight the potential of LLM-generated PLS to improve interdisciplinary communication. The authors urge research on broader applications, error reduction, and assessment of clinical outcomes. Limitations of this study include the single-site design and the subjectivity of survey responses. *(Also see related commentary by Patrice M. Hicks, PhD, MPH; Rithambara Ramachandran, MD, MSc; and Paula Anne Newman-Casey, MD, MS, in the same issue.)*

Other Journals

Selected by Prem S. Subramanian, MD, PhD

Contraceptive Counseling Before Referral for IIH Treatment

Journal of Neuro-Ophthalmology
Published online May 15, 2025

Idiopathic intracranial hypertension (IIH) typically affects overweight women of childbearing age. Given the female preponderance, it has been posited—but not proven—that IIH has a hormonal etiology. This has led to debate about the role and suitability of hormonal contraception in people with IIH. Although data suggesting a link between IIH and hormone-based contraception are lacking, some women with IIH have been advised by health care providers to discontinue birth control pills. **Snyder et al.** aimed to determine the frequency and content of contraception-related advice given to patients with IIH. Their survey of premenopausal women revealed that 10% of those using oral contraception at the time of IIH diagnosis were counseled to stop using it before seeing a neuro-ophthalmologist.

The survey was distributed to women (18-50 years of age) who had been counseled about IIH and hormonal contraception. Depending on their responses, additional questions were posed. Altogether, the investigators attempted to contact 230 people, and the response rate was 37% (n = 85). Twenty-four of those who responded declined to participate further; hence, the study cohort comprised 61 women.

Nearly half of those surveyed reported taking a form of hormonal contraception at the time of IIH diagnosis. Nearly one in four had been counseled by a health care provider regarding IIH and contraception. One in 10 respondents who used oral contraception at the time of IIH diagnosis recalled a provider's advice to cease its use before visiting a neuro-ophthalmologist. Most of this advice came from neurologists; none of it was from ophthalmologists or optometrists.

According to the study authors, counseling against the use of oral contraceptives in patients with IIH is not appropriate. Stopping these medications puts patients at risk of pregnancy, which can then complicate the management of IIH. The authors said that, to date, "there is no evidence that convincingly establishes hormonal contraception, of any form, as a causative factor for the development of IIH," and they cited studies supporting this viewpoint. Suggestions to the contrary have been from studies with significant flaws, they said.

Limitations of the present study include the relatively small sample size and the potential for recall bias. Biases could be mitigated by prospective research, said the authors. They acknowledged that future work also should address sources of misinformation found in online forums geared to patients with IIH.

Eye Injuries From Pellet Weapons During Protests in Bangladesh

Torture
Published online May 16, 2025

During mass protests, law enforcement agencies may employ crowd-control weapons such as pellet guns, which can cause severe ocular trauma. Use of these weapons has raised concerns about the intersection of public safety measures and the preservation of sight among civilians. **Islam et al.** explored the scale and impact of eye injuries sustained during the 2024 student-led protests in Bangladesh, which initially were limited to job quota reform but later evolved into broad antigovernment demonstrations. The investigators found variation in the number of cases of severe eye injury, depending on the reporting source, but even the lowest incidence was sufficient to suggest a public health crisis.

The study involved analyzing secondary data from multiple sources, including hospital records, government reports, and media documentation, collected in July and August 2024. Treating facilities included the National Institute of Ophthalmology and Hospital (NIOH), Lions Eye Institute, Bangladesh Eye Hospital, and the ophthalmology department of Dhaka Medical College Hospital. Main outcomes were visual results, the quantity of eye injuries, and the number of patients who lost vision in at least one eye.

According to government reports, 647 people sustained severe eye injuries during the protests. However, hospital data showed a higher number: 1,300 patients with eye injuries were admitted to hospitals in Dhaka. At NIOH alone, 856 patients received treatment for eye injury. All told, 382 individuals lost vision in one eye, and 19 lost it in both eyes. Retinal hemorrhage was the most common pathology leading to vision loss. More than 200 vitreoretinal surgeries and approximately 40 corneal transplants were performed, but donor shortages led to limited options for treatment. Most of the affected individuals were young men.

These findings emphasize the serious impact of pellet weapons on ocular health during civil demonstrations, said the authors. They stressed the need for immediate medical intervention and long-term rehabilitation services. Moreover, they encouraged research focused on primary data collection and longitudinal follow-up, which should boost understanding of the long-term physical, psychological, and economic burdens associated with these injuries.

Study drawbacks include potential underreporting and the reliance on secondary data.