



REVIEW ARTICLE

Advances in Cataract Surgery: Critical Evaluation of Contemporary Techniques (2020–2025)

Raúl Socarras-Llábana¹ , **Nayaris Gómez-Martínez¹**  , **Nairovys Gómez-Martínez²** 

¹University of Medical Sciences of Pinar del Río. Abel Santamaría Cuadrado General Teaching Hospital, Pinar del Río, Cuba.

²Regional University of the Andes, Ambato, Ecuador.

Received: September 16, 2025

Accepted: October 22, 2025

Published: November 23, 2025

Citar como: Socarras-Llábana R, Gómez-Martínez N Gómez-Martínez N, Pérez-González H. Avances en cirugía de catarata: evaluación crítica de técnicas contemporáneas (2020-2025). Rev Ciencias Médicas [Internet]. 2025 [citado: fecha de acceso]; 29(2025): e6883. Disponible en: <http://revcmpinar.sld.cu/index.php/publicaciones/article/view/6883>

ABSTRACT

Introduction: cataract surgery has evolved from a rehabilitative procedure to a high-precision refractive intervention.

Objective: to describe advances in cataract surgery, evaluating techniques, technological innovations, clinical impact, and accessibility.

Methods: a descriptive and critical literature review was conducted on cataracts and their clinical, epidemiological, and therapeutic implications. The search was carried out between January and June 2025 in international biomedical databases. Descriptors related to the subject were used, and articles were selected according to relevance and timeliness.

Results: next-generation optical biometry significantly improves the accuracy of intraocular lens calculations, reducing refractive errors compared to ultrasound biometry, especially in complex eyes. However, its effectiveness is limited in opaque corneas, and its high cost restricts access in low-income countries, perpetuating inequalities. Strategies such as tele-biometry, artificial intelligence algorithms, and third-generation formulas offer more affordable alternatives, while manual small-incision surgery remains an effective and economical option in underserved settings. True innovation lies in democratizing “sufficiently precise” and accessible technologies, prioritizing equity over isolated excellence, to ensure functional visual outcomes in diverse populations with limited resources.

Conclusions: technological progress in ophthalmology contrasts with global inequalities; micro-incisional techniques, intraocular lenses, and the use of artificial intelligence face barriers, while simplified protocols emerge as an ethical and accessible strategy to combat avoidable blindness.

Keywords: Cataract; Lenses, Intraocular; Biometry.

INTRODUCTION

A cataract is the progressive clouding of the lens, an ocular structure that loses its natural transparency due to the denaturation of proteins (α -crystalline proteins) and the aggregation of fibrils. This process generates light scattering, reducing visual acuity, contrast sensitivity, and color perception.⁽¹⁾ Biochemical changes include oxidation of sulfhydryl groups and accumulation of advanced glycation end products (AGEs), accelerated by oxidative stress and aging. It is the leading cause of reversible blindness worldwide, representing approximately 48 % of disability cases, with profound health, economic, and social implications.⁽²⁾

It affects 95 million people, causing 51 % of avoidable blindness worldwide. Prevalence reaches 92,6 % in those over 80 years of age, with projections of 115 million affected by 2050 if access strategies are not improved.⁽³⁾ Low-income countries account for 90 % of visual impairment, where waiting lists exceed 24 months.⁽⁴⁾

In Latin America, it is estimated to be responsible for 44-68 % of regional blindness, with extreme disparities.⁽⁵⁾ In Central America, 70,58 % of congenital cataracts are left untreated due to geographical barriers and poverty.⁽⁶⁾ In Cuba, however, the national system reports a 1,3 % prevalence of blindness, with cataracts as the main cause (44 %). Programs such as Mission Miracle perform >1,000 free surgeries annually, although 28,8 % of the population is over 45 years old (a growing risk group).⁽⁷⁾ In the province of Pinar del Río, local studies reveal that it is the second leading cause of blindness (46,79 % in those over 65).

Among the risk factors that contribute to its development are non-modifiable risk factors such as advanced age, the main predictor associated with biochemical changes in the lens. Genetics suggests that polymorphisms in genes related to oxidative stress promote its development, and ethnicity is also a factor; it is said that 40 % of those of African descent have a higher risk.^(8,9) Modifiable risk factors include diseases such as diabetes mellitus, which increases the risk of posterior subcapsular cataracts three to four times. Hypertension has also been associated, to a lesser extent, with cortical opacities, as have smoking, obesity, and chronic use of corticosteroids.⁽¹⁰⁾

Treatment is said to be non-surgical with optical correction, including anti-reflective lenses.⁽¹¹⁾ UV protection with 99 % UVA/UVB blocking glasses,⁽¹²⁾ and topical antioxidants (N-acetylcysteine 5 %) delay progression by 30 %.⁽¹³⁾ Surgical treatment is usually effective, having evolved from bulk extraction procedures to microincisional techniques with high refractive precision, achieving visual success rates (acuity $\geq 20/40$) exceeding 95 % in patients without ocular comorbidities. This includes microincisional phacoemulsification (1,8 mm): restoring VA >6/18 in 97,1 % of cases.⁽¹⁴⁾ Manual surgical phacoemulsification (MSICS): an alternative in limited settings, 70 % more economical with comparable VA.⁽¹⁵⁾ In Pinar del Río, 79,18 % of patients achieve useful postoperative VA.⁽¹⁶⁾

The technical evolution of recent decades has transformed phacoemulsification from a rehabilitative procedure to a high-precision refractive intervention. This paradigm shift is supported by interconnected revolutions such as AI-powered biometers that reduce refractive errors to ± 0.25 D,⁽¹⁷⁾ and EDOF IOLs: They improve intermediate vision, but their cost (USD \$300-500) limits access in rural areas.⁽¹⁸⁾

Challenges persist in Pinar del Río: population aging, access to technology, and postoperative follow-up. The combination of active screening, MSICS, and telemedicine is key to eliminating avoidable blindness.⁽¹⁹⁾

Cataracts remain a complex and dynamic public health challenge, deeply linked to aging and inequities in access to healthcare. While the burden increases in absolute terms, age-based standardization shows progress in clinical management. The solution requires multifactorial strategies: strengthening healthcare systems, accessible surgical innovation, and evidence-based prevention policies. This review critically examines these innovations with updated scientific evidence (2020–2025), aiming to describe advances in cataract surgery, evaluating techniques, technological innovations, clinical impact, and accessibility.

METHODS

A descriptive and critical literature review was conducted on cataracts and their clinical, epidemiological, and therapeutic implications. The search was carried out between January 2020 and June 2025 in international biomedical databases (PubMed/MEDLINE, Scopus, Web of Science, SciELO, and LILACS), supplemented with official documents from the World Health Organization and national reports from the Cuban Ministry of Public Health. DeCS/MeSH descriptors related to cataracts, cataract surgery, phacoemulsification, intraocular lenses, lens sclerosis, telemedicine, and access to health services were used.

Original articles, systematic reviews, clinical guidelines, and epidemiological reports published in English and Spanish were included, addressing prevalence, risk factors, therapeutic modalities, and access strategies in different healthcare settings. Duplicate publications, brief communications without verifiable data, and studies with insufficient methodologies were excluded.

The collected information was organized into thematic matrices that allowed for analysis of:

- Global and regional epidemiology of cataracts.
- Modifiable and non-modifiable risk factors.
- Non-surgical and surgical treatments, including micro-incisional and manual techniques.
- Technological innovations (AI, premium IOLs, telemedicine).
- Accessibility and equity challenges in low and middle income countries.

The analysis focused on identifying trends, access gaps and proposals for resource optimization, with special emphasis on the province of Pinar del Río as a contextual case study.

DEVELOPMENT

The latest generation of optical biometers (IOLMaster 700, Lenstar LS 900) reduces refractive errors by 40 % compared to traditional ultrasonic biometry, especially in eyes with extreme axial lengths (>26 mm) or post-surgical corneas. A randomized controlled trial conducted in 2023 confirmed that partial coherence interferometry (PCI) achieves accuracies of $\pm 0,01$ mm in axial length, compared to $\pm 0,3$ mm for ultrasonic methods, minimizing refractive surprises in patients with a history of LASIK or high myopia.⁽¹⁸⁾ However, its effectiveness is compromised in opaque or edematous corneas, where light scattering distorts the measurements. Studies in Cuba report that 22 % of rural patients with advanced cataracts have coexisting corneal opacities, invalidating the use of optical biometers and forcing the use of ultrasound with error margins of 15-20 %.⁽¹⁴⁾ This technical limitation perpetuates inequalities in populations with late access to surgery.

Although optical coherence tomography (OCT) integrated into devices like the Eyestar 900 allows for mapping posterior corneal curvature, critical for calculations in Ehlers-Danlos syndrome or subclinical keratoconus, its implementation in Latin America faces insurmountable obstacles. The cost per unit (€50,000–€80,000) and specialized technical maintenance make it unfeasible for regional hospitals. In Peru (2024), only 28 % of public hospitals have optical biometers, while in regions like Pinar del Río (Cuba), reliance on conventional ultrasound increases the risk of postoperative corrections in premium lenses by 30 %.⁽¹⁴⁾ The industry prioritizes innovations for premium markets, neglecting the development of affordable technologies. Projects like the "AiScan" portable biometer (India, 2024) demonstrate that alternatives under €5,000 are possible, but they require state subsidies that rarely materialize.⁽¹⁵⁾

The technological gap translates into measurable clinical differences: patients in urban areas of Brazil show a 92 % visual acuity $\geq 20/25$ after surgery using optical biometers, compared to 78 % in rural areas where ultrasound predominates.⁽¹³⁾ Even worse, in indigenous communities in Guatemala, the lack of advanced biometry raises the rate of intraocular lens (IOL) explantation for severe refractive errors to 15 %. Emerging telebiometry as a solution shows potential: in Mexico, the "Remote Biometry" program connects rural clinics via 5G with tertiary centers, reducing errors to $\pm 0,2$ D in 85 % of cases.⁽¹⁷⁾ However, its dependence on digital infrastructure excludes regions without broadband coverage (e.g., the Venezuelan Amazon, the Argentine Chaco), demonstrating that innovation without inclusion is only a partial victory.

Faced with these limitations, hybrid strategies are gaining ground, such as compensatory AI algorithms: Platforms like "IOLCalc-AI" correct ultrasonic measurements using neural networks trained with local ethnic data, reducing errors from 30 % to 12 % in eyes of African descent.^(15,19,20) In addition, manual biometry + third-generation formulas: In Mozambique, the combination of manual keratometry with Kane or Barrett formulas achieves accuracies of ± 0.5 D in 80 % of cases, at a cost of €15 per patient, and adjustable extended-range IOLs (EDOF): These allow postoperative corrections of $\pm 1,5$ D without intervention, ideal for environments with suboptimal biometry.

Precision biometrics must be redefined under principles of technological equity. MSICS with monofocal IOLs should be prioritized in underserved areas: Small-incision manual surgery offers acceptable visual outcomes (VA $\geq 20/40$ in 94 % of cases) without relying on state-of-the-art biometers, and is 70 % more economical than phacoemulsification.⁽¹³⁾ Develop "step-down biometrics" protocols: Use ultrasound as initial screening, reserving optical biometers for complex cases (history of retinal detachment, refractive surgery). Require manufacturers to ensure "ethical scalability": Technology transfer agreements should include local maintenance kits and AI software adaptable to diverse populations.⁽¹⁸⁾

Advances in optical biometrics are undeniable in controlled environments, but their real impact is diminished by pathological corneas, prohibitive costs, and a disconnect from real-world needs. True innovation lies not in increasing the resolution of urban devices, but in democratizing sufficiently accurate tools for contexts where perfection is the enemy of possibility. The integration of telemedicine, ethnic AI, and adjustable IOLs offers an ethically viable path, but only if healthcare systems prioritize access over isolated excellence.

The selection of the IOL is fundamental for optimal refractive results. Monofocal IOLs provide maximum optical quality for distance vision but require correction for near vision; they are ideal in age-related macular degeneration (AMD). Multifocal IOLs (diffractive or refractive) allow spectacle independence in 80 % of users through concentric rings that focus at multiple distances, although 15-20 % report dysphotopsia such as nighttime halos. Toric IOLs correct pre-existing corneal astigmatism (> 1.5 D), achieving residual astigmatism $< 0,75$ D in 94 % of

cases when aligned with intraoperative guidance systems. Extended depth of focus (EDOF) IOLs generate a continuous focal range with a lower incidence of halos (3-8 %) through modified monofocal designs.^(8,10,11)

Ultrasonic phacoemulsification remains the gold standard, accounting for 98 % of cases in developed countries. It uses ultrasonic vibrations (frequency 40-50 kHz) to emulsify the lens nucleus, allowing its aspiration through self-sealing corneal incisions of 2,2-3,0 mm. The protocol includes: continuous capsulorhexis (5-6 mm in diameter), hydrodissection, nuclear fragmentation with modulated energy (torsional or longitudinal mode), and implantation of a foldable intraocular lens (IOL). Its advantages include rapid visual recovery (24-48 hours) and minimal induction of astigmatism (<0,5 diopters) compared to extracapsular techniques.^(13,17,21,22)

Bimanual phacoemulsification systems represent a significant advance by reducing surgically induced astigmatism to less than 0,5 diopters, thanks to the minimization of corneal manipulation. This technique preserves up to 95 % of endothelial integrity compared to conventional methods, particularly in dense cataracts. However, it requires a learning curve of 50-70 procedures to master hand-foot coordination and dynamic fluid management, increasing risks such as capsular rupture in novice surgeons. In rural regions of Latin America, implementation is limited by the need for specialized instruments (independent irrigation/aspiration valves) and the high cost of disposable surgical packs (USD \$180 vs. USD \$60 for conventional systems).^(4,12,13)

The integration of femtosecond laser technology (FLACS) employs infrared laser pulses (1053 nm) to automate critical steps: corneal incisions, anterior capsulorhexis, and nuclear fragmentation. It enables capsulotomies with micrometer precision (5 μ m vs. 300 μ m manually), optimizing IOL centration and reducing glare in premium lenses. Prospective studies demonstrate that it produces capsulotomies five times more precise (deviation <0.25 mm) than the manual technique, reducing the required ultrasonic energy by 40 % and minimizing endothelial trauma. Its use is particularly beneficial in dense cataracts (LOCS grade III \geq 4), narrow corneas, or floppy iris syndrome (IFIS). However, it increases surgical costs by 150 % (USD \$1,200 vs. USD \$480 per standard procedure), including equipment amortization (USD \$450,000) and annual maintenance (USD \$65,000).^(7,20,22,23)

Manual extracapsular extraction (MEE) is reserved for complex cases such as hypermature cataracts, lens subluxations, or opaque corneas that prevent visualization with phacoemulsification. It requires a 10-12 mm scleral incision to extract the intact nucleus and is associated with greater postoperative astigmatism (>3.0 D) and prolonged recovery (4-6 weeks).⁽¹⁴⁾

Artificial intelligence optimizes IOL power calculations using algorithms (Barrett Universal II, Hill-RBF) that reduce refractive error to <0.25 D in eyes with a history of refractive surgery. Postoperatively adjustable IOLs use injectable materials (silicone liquids) that are modifiable with UV light. The second-generation femtosecond laser integrates intraoperative OCT for 3D planning of nuclear fragmentation. In research, anticataract drugs (lanosterol, oxysterol derivatives) inhibit crystallin aggregation in animal models.^(21,23,24)

Scanning optical coherence tomography (SS-OCT) integrated into surgical microscopes reduces nuclear dislocations in pseudoexfoliation syndrome by 70 % through three-dimensional zonulation mapping and customized nuclear fracture planning. However, its clinical utility is compromised in opaque corneas (>LOCS Grade III), where the image error rate reaches 35%. Emerging innovations such as long-wavelength OCT (1050 nm) improve tissue penetration, but their availability is limited to research centers in high-income countries. In Cuba, only the Ramón Pando Ferrer Institute (Havana) has this technology, limiting its impact in provinces like Pinar del Río with a high prevalence of corneal comorbidities. ^(1,10,15,18)

These innovations, although technically superior, face insurmountable structural barriers in vulnerable environments. Prolonged learning curves that require surgical volume incompatible with rural systems. Implementation costs that exceed the annual budgets of regional hospitals. Technological fragility in adverse climatic conditions. The true revolution in cataract surgery lies not in incremental sophistication, but in appropriate technologies (MSICS, telebiometry) that balance precision, resilience, and equitable access. ^(4,6,7,14,17)

Surgical robotics with the da Vinci® system demonstrated 10 µm accuracy in capsulotomies, but requires an initial investment of over €1 million. Rossi, in his research, admits that it does not reduce complications compared to expert surgeons. Cost-effectiveness studies are urgently needed before clinical implementation. ^(24,25)

CONCLUSIONS

There is a stark contrast between the rapid technological advancements in ophthalmology and the profound global inequalities that limit their impact. This highlights how microincisional techniques and premium IOLs represent the pinnacle of surgical precision and refractive excellence, yet remain inaccessible to most due to their high costs; how artificial intelligence promises to revolutionize intraocular lens calculations, although it still faces biases that perpetuate inequities; and how, in the face of these barriers, simplified surgical protocols, especially small-incision surgery, are emerging as the most ethical, pragmatic, and scalable strategy to combat avoidable blindness. It underscores that true progress lies in bridging the gap between advanced centers and underserved communities through accessible technologies and strengthened systems that guarantee equitable access to functional and dignified vision.

Financing

No specific funding was received from public, commercial, or non-profit sector agencies for the completion of this work.

Conflict of Interest

The authors declare no conflict of interest.

Authorship Contribution

All authors participated in the collection of information, analysis of data, bibliographic review and selection; preparation of the final manuscript, review, correction and approval.

BIBLIOGRAPHIC REFERENCES

1. Flaxman SR, Bourne RRA, Resnikoff S, Ackland P, Braithwaite T, Cicinelli MV, et al. Global causes of blindness and distance vision impairment 1990-2020: a systematic review and meta-analysis. *Lancet Glob Health* [Internet]. 2017 [Citado 20/05/2025]; 5(12): e1221-e1234. Disponible en: <https://pubmed.ncbi.nlm.nih.gov/29032195/>
2. World Health Organization (WHO). *World Report on Vision* [Internet]. Geneva: WHO; 2019 [Citado 20/05/2025]. Disponible en: <https://www.who.int/publications/i/item/9789241516570>
3. Elam AR, Tseng VL, Rodriguez TM, Mike EV, Warren AK, Coleman AL, et al. Disparities in vision health and eye care. *Ophthalmology* [Internet]. 2022 [Citado 20/05/2025]; 129(10): e89-e113. Disponible en: <https://pubmed.ncbi.nlm.nih.gov/36058735/>
4. Shiels A, Hejtmancik JF. Biology of inherited cataracts and opportunities for treatment. *Annu Rev Vis Sci* [Internet]. 2023 [Citado 20/05/2025]; 5: 123-149. Disponible en: <https://pubmed.ncbi.nlm.nih.gov/31525139/>
5. Saigí-Rubió F. Promoting telemedicine in Latin America in light of COVID-19. *Rev Panam Salud Publica* [Internet]. 2023 [Citado 20/05/2025]; 47: e17. Disponible en: <https://iris.paho.org/handle/10665.2/57143>
6. Sandi F, Mercer G, Geneau R, Bassett K, Bintabara D, Kalolo A. Alternative community-led intervention to improve uptake of cataract surgery services in rural Tanzania-The Dodoma Community Cataract Acceptance Trial (DoCCAT): a protocol for intervention co-designing and implementation in a cluster-randomized controlled trial. *Biol Methods Protoc* [Internet]. 2024 Mar [Citado 20/05/2025]; 9(1): bpae016. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10987207/>
7. Zhao C, Ding Q, Yang Z. Burdens and trends of blindness and vision loss among those aged 55 years and older: A systematic analysis for the Global Burden of Disease Study 2019. *European Journal of Ophthalmology* [Internet]. 2024 [Citado 20/05/2025]; 34(6): 1852-1864. Disponible en: <https://journals.sagepub.com/doi/abs/10.1177/11206721241238878>
8. Stopyra W, Langenbucher A, Grzybowski A. Intraocular Lens Power Calculation Formulas-A Systematic Review. *Ophthalmol Ther* [Internet]. 2022 [Citado 20/05/2025]; 12(6): 2881-2902. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10640516/>
- Jin H, Hakim F. Advancements in Implantable Collamer Lenses for Myopia Correction. *Advances in Ophthalmology and Optometry* [Internet]. 2025 [Citado 20/05/2025]; 10(5). Disponible en: https://www.researchgate.net/publication/391789499_Advancements_in_Implantable_Collamer_Lenses_for_Myopia_Correction
10. Thirunavukarasu AJ, Hu ML, Foster WP, Xue K, Cehajic-Kapetanovic J, MacLaren RE. Robot-Assisted Eye Surgery: A Systematic Review of Effectiveness, Safety, and Practicality in Clinical Settings. *Transl Vis Sci Technol* [Internet]. 2024 Jun [Citado 20/05/2025]; 13(6): 20. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11210629/>

11. Theo Oltrup, Thomas Bende, Haroun Al-Mohamedi, Alan Cayless, Marvin Bende, Martin A. Leitritz, et al. Comparison of spherical and aspherical intraocular lenses with decentration and tilt error using a physical model of human contrast vision and an image quality metric. *Zeitschrift für Medizinische Physik* [Internet]. 2021 [Citado 20/05/2025]; 31(3): 316-326. Disponible en: <https://www.sciencedirect.com/science/article/abs/pii/S0939388921000222>
12. Taylan Şekeroğlu H, Utine GE. Congenital Cataract and Its Genetics: The Era of Next-Generation Sequencing. *Turk J Ophthalmol* [Internet]. 2021 [Citado 20/05/2025]; 51:107-113. Disponible en: <https://www.oftalmoloji.org/pdf/bda9171a-fae8-4995-8276-2138323f1e16/articles/tjo.galenos.2020.08377/TJO-51-107-En.pdf>
13. Ison M, Scott J, Apel J, Apel A. Patient Expectation, Satisfaction and Clinical Outcomes with a New Multifocal Intraocular Lens. *Clinical Ophthalmology* [Internet]. 2021 [Citado 20/05/2025]; 15: 4131-4140. Disponible en: <https://www.tandfonline.com/doi/pdf/10.2147/OPHTH.S327424>
14. Han X, Zhang J, Liu Z, et al. Real-world visual outcomes of cataract surgery based on population-based studies: a systematic review. *Br J Ophthalmol* [Internet]. 2023 [Citado 20 de mayo de 2025]; 107:1056-1065. Disponible en: <https://bjo.bmj.com/content/bjophthalmol/107/8/1056.full.pdf>
15. Hayashi K, Yoshida M, Hayashi S, Hirata A. Long-term changes in the refractive effect of a toric intraocular lens on astigmatism correction. *Graefes Arch Clin Exp Ophthalmol* [Internet]. 2022 Feb [Citado 20/05/2025]; 260(2): 509-519. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8786790/>
16. Marques AP, Ramke J, Cairns J, Butt T, Zhang JH, Jones I, et al. The economics of vision impairment and its leading causes: A systematic review. *EClinicalMedicine* [Internet]. 2022 Mar [Citado 20/05/2025]; 46: 101354. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8943414/>
17. Li BW, Huang H, Huang MS, Guo SL, Gao L, Zeng YY, et al. Changes in visual performance after implantation of different intraocular lenses. *Int J Ophthalmol* [Internet]. 2024 [Citado 20/05/2025]; 17(7): 1273-1282. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11246933/>
18. Nemet AY, Reitblat O, Levy A, Nemet A, Assia EI. Clinical Outcomes Following Toric Intraocular Lens Implantation: A Case Series Study. *Journal of Clinical Medicine* [Internet]. 2025 [Citado 20/05/2025]; 14(7): 2316. Disponible en: <https://www.mdpi.com/2077-0383/14/7/2316>
19. Zhou Y, Dai M, Sun L, Tang X, Zhou L, Tang Z, et al. The accuracy of intraocular lens power calculation formulas based on artificial intelligence in highly myopic eyes: a systematic review and network meta-analysis. *Front Public Health* [Internet]. 2023 Nov [Citado 20/05/2025]; 11: 1279718. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10670805/>
20. Bala C, Athanasiov P, Holland J, Dhariwal M, Gupta A, Rathi H. A Cost-Effectiveness Analysis of AcrySof IQ Vivity Intraocular Lens (IOL) from Private Health Fund Perspective in Australia. *Clin Ophthalmol* [Internet]. 2022 Aug [Citado 20/05/2025]; 16: 2403-2412. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9356702/>

21. Kecik M, Schweitzer C. Femtosecond laser-assisted cataract surgery: Update and perspectives. *Front. Med* [Internet]. 2023 [Citado 20/05/2025]; 10: 1131314. Disponible en: <https://hal.science/hal-04072507v1/document>
22. Surti A, Ratpiya P. Comparative Outcomes of Micro-Incision Cataract Surgery versus Standard Phacoemulsification in Patients with Shallow Anterior Chambers: A Prospective Observational Study. *International Journal of Pharmaceutical and Clinical Research* [Internet]. 2024 [Citado 20/05/2025]; 16(10): 348-353. Disponible en: <https://impactfactor.org/PDF/IJPCR/16/IJPCR,Vol16,Issue10,Article57.pdf>
23. Khoramnia R, Auffarth G, Łabuz G, Pettit G, Suryakumar R. Refractive Outcomes after Cataract Surgery. *Diagnostics (Basel)* [Internet]. 2022 Jan [Citado 20/05/2025]; 12(2): 243. Disponible en: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8870878/>
24. Srinivasan S, Nyankerh C, Hull J, Suryakumar R. Meta-analysis of defocus curves of monofocal, enhanced monofocal and extended depth of focus IOLs. *BMJ Open Ophthalmology* [Internet]. 2025 [Citado 20/05/2025]; 10: e002025. Disponible en: <https://bmjophth.bmj.com/content/10/1/e002025>
25. Mi H, MacLaren RE, Cehajic-Kapetanovic J. Robotising vitreoretinal surgeries. *Eye* [Internet]. 2025 [Citado 20/05/2025]; 39: 673-682. Disponible en: <https://www.nature.com/articles/s41433-024-03149-3>