Guest Editorial

Changing Paradigms in Cataract Surgery to optimize refractive Outcomes (Adapted from Ramzan Ali Syed Award Lecture)

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Cataract surgery in Pakistan has undergone a remarkable transformation over the past four decades, reflecting global advancements and local adaptations in surgical technique and intraocular lens (IOL) technology. From the early days of intracapsular cataract extraction (ICCE) with 8-0 sutures to the modern era of femtosecond laser-assisted cataract surgery (FLACS), the journey has been marked by continuous evolution, driven by both technological innovation and the changing expectations of patients. This 'Ramzan Ali Syed Name Lecture' traces the trajectory of cataract surgery in Pakistan, highlighting key milestones, current realities, and the promise and pitfalls of premium IOLs in meeting the complex demands of contemporary patients. Until 1980s, cataract surgery in Pakistan was a relatively basic technique of intracapsular cataract extraction (ICCE), using 8-0 sutures.[1] This was soon followed by a transition to extracapsular cataract extraction (ECCE), a step forward enabled by the advent of intraocular lenses (IOLs). The first real exposure to modern cataract surgery techniques came in 1988, when Pakistani surgeons observed Dr. Richard Packard performing phacoemulsification with IOL implantation in England, a moment that left a lasting impression. Pakistan itself began phacoemulsification techniques around 1985–86, gradually progressing to femtosecond laser-assisted cataract surgery (FLACS) in more recent years.[1] The evolution of IOLs brought its own set of challenges and milestones. Initially, IOL implantations were done without any biometry, even in advanced centers in the UK, relying instead on the patient's spectacle prescription, quite different from modern standards. Early biometry devices, introduced by companies like Alcon, marked a significant improvement.

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In 1978, Kai-yi Zhou implanted the first foldable silicone intraocular lens (IOL) into human eyes.[2] Surgeons quickly embraced these lenses, and foldable silicone IOLs rapidly became dominant in the market throughout the 1980s. By 1989, AMO introduced the PhacoFlex SI-18, the first commercially available three-piece silicone IOL designed for use with small-incision clear corneal phacoemulsification. In 1997, AMO also brought to market the first FDA-approved multifocal IOL, the Array, featuring a silicone optic. This lens held a leading position in the multifocal IOL sector for many years. Patient expectations have shifted dramatically as well; once content with simply improved vision, patients now demand complete spectacle independence.[3]

Today, cataract surgery is as much about preoperative evaluation as the surgery itself. Surgeons must consider the patient's history, ocular surface health, lifestyle, personality traits, and visual needs. The armamentarium now includes contrast sensitivity testing, dry eye assessments, retinal OCT, corneal topography, and higher-order aberration (HOA) analysis. Informed consent has taken on heightened importance, reflecting the high cost and elevated expectations associated with premium IOLs.

Modern biometry and IOL calculations have come a long way, with swept-source OCT biometers like the IOL Master 700 and Argos setting new standards of precision.[4] Yet, despite these advances, prediction errors still persist due to variability in keratometry, axial length, anterior chamber depth, lens position, surgical technique, and postoperative healing. Meta-analyses consistently show that effective lens position (ELP) remains the largest source of refractive error, contributing around 35% of the total variability.

Refractive surprises and limitations of current technology continue to frustrate even the most experienced surgeons. No IOL calculation method is entirely foolproof, which is why lens constant optimization and personalization have become

increasingly emphasized. Ruling out ocular surface disease, posterior corneal astigmatism, epiretinal membranes, and maculopathy before committing to premium IOLs has become standard practice.

The premium IOL era has been marked by both promise and pitfalls. Multifocal and extended depth of focus (EDOF) lenses, like the PanOptix and Symfony, have delivered on their promise of spectacle independence but also introduced new challenges: glare, halos, and reduced contrast sensitivity affect up to a quarter of patients, and issues like neuroadaptation and night vision complaints persist.[5] Dissatisfaction lingers despite technological advances, often requiring postoperative enhancements such as Femto-LASIK touch-ups.

This has led to a notable "U-turn" in the field, with a resurgence of interest in enhanced monofocal IOLs. These lenses, including models like the Rayner EMV and Everlast, offer extended depth of focus with fewer photic phenomena, making them an attractive option for many patients. A mini-monovision approach, targeting emmetropia in the dominant eye and a slight myopic shift in the fellow eye, has proven effective in providing functional near and intermediate vision without the drawbacks of multifocals.[6]

In developing settings like Pakistan, cost remains a significant barrier. Premium IOLs and even enhanced monofocals are prohibitively expensive for many, limiting their widespread adoption. Nonetheless, ongoing clinical trials show promising results, particularly for intermediate visual improvement. Femto-laser assisted cataract surgery has been introduced at several centers in Pakistan using platforms like Alcon and Ziemer. FLACS offers more precise capsulotomies, reduced use of ophthalmic viscosurgical devices (OVDs), improved IOL centration, and potentially better ELP predictability, but at a high cost.[7]Literature suggest no clear superiority in visual outcomes compared to conventional phacoemulsification, although the enhanced precision is undeniable.[8]

Astigmatism management has emerged as a critical factor in achieving refractive success. Accurate correction of astigmatism greater than 1 diopter is essential, with options including femto-assisted arcuate keratotomies (LRIs), toric IOLs guided by intraoperative marking systems like Verion, and on-axis incisions or Limbal Relaxing Incisions for lower levels of astigmatism. Despite remarkable technological progress, many patients still require postoperative enhancements and experience dysphotopsia. Careful patient selection, thorough evaluation, clear expectation setting, and customized IOL choices remain the pillars of modern cataract surgery. Even a satisfied trifocal IOL recipient may voice concerns, underscoring the need for ongoing refinement in both technology and patient communication.

REFERENCES

1. **Malik A.** Evolution of Cataract Surgery in Pakistan over the Past Four Decades. 2025;**41(2):**116-118. Doi: 10.36351/pjo.v41i2.2019.
2. **Kretz F, Scholtz S, Auffarth G.** A brief history of IOL materials. The Ophthalmologist. 2014 May 19. Available from: https://theophthalmologist.com/issues/2014/articles/may/a-brief-history-of-iol-materials. Accessed June 1, 2025
3. **Botta J, Barsam A, Dmitriew A, Zaldivar R, Wiley WF, Windsor S**. Factors influencing outcome satisfaction after cataract surgery: patient-reported insights from the RayPro database. BMC Ophthalmol. 2024;**24(1):**528. Doi: 10.1186/s12886-024-03800-3.
4. **Gupta A, Singh P.** Intraocular Lens Power Calculation. [Updated 2022 Dec 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-.Available from: https://www.ncbi.nlm.nih.gov/books/NBK589643/. Accessed June 1,2025
5. **Salerno LC, Tiveron MC Jr, Alió JL.** Multifocal intraocular lenses: Types, outcomes, complications and how to solve them. Taiwan J Ophthalmol. 2017;**7(4):**179-184. Doi: 10.4103/tjo.tjo_19_17.
6. **Kelava L, Barić H, Bušić M, Čima I, Trkulja V.** Monovision Versus Multifocality for Presbyopia: Systematic Review and Meta-Analysis of Randomized Controlled Trials. Adv Ther. 2017;**34(8):**1815-1839. Doi: 10.1007/s12325-017-0579-7.
7. **Abell RG, Kerr NM, Vote BJ.** Femtosecond laser-assisted cataract surgery compared with conventional cataract surgery. Clin Exp Ophthalmol. 2013;**41(5):**455-462. Doi: 10.1111/ceo.12025.
8. **Pichardo-Loera NS, Corredor-Ortega C, Castro-Monreal MA, Massaro-Corredor MG, Pérez-Vázquez JF, Gonzalez-Salinas R.** Femtosecond laser-assisted cataract surgery versus conventional phacoemulsification: A meta-analysis of randomized controlled trials. Eur J Ophthalmol. 2024;**34(5):**1458-1468. Doi: 10.1177/11206721241229129.