

Intraocular Lens Exchange: Indications, Comparative Outcomes by Technique, and Complications

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Purpose: To describe the indications, outcomes, and complications associated with intraocular lens (IOL) exchange.

Patients and Methods: To determine the relative frequency of postoperative complications between techniques for all patients undergoing IOL exchange from May 1, 2014 through August 31, 2020.

Results: IOL exchange was performed in 511 eyes of 489 patients (59.7% men; mean age: 67.0 ± 13.9 years, median time from cataract procedure to IOL exchange: 47.5 months). Mean uncorrected visual acuity significantly improved from 20/192 Snellen equivalent (logMAR 0.981) preoperatively to 20/61 (logMAR 0.487) at last follow-up ($P < 0.001$). Overall, 384 eyes (78.7%) met their desired refractive outcome within ±1.0 diopter (D). The most frequent complication was cystoid macular edema (CME) (n=39, 7.6%). Iris-sutured technique was associated with significantly greater frequency of subsequent IOL dislocation (10.3%) than 4-point scleral sutured (0%, $P = 0.002$), anterior chamber IOL (ACIOL, 1.5%, $P = 0.01$), and 2-point scleral sutured (0%, $P = 0.03$) techniques. Yamane scleral-fixation technique was associated with significantly greater frequency of developing IOL tilt (11.8%) than ACIOL (0%, $P = 0.002$), 4-point scleral sutured (1.1%, $P = 0.01$), 2-point scleral sutured (0%, $P = 0.04$), and iris-sutured (0%, $P = 0.04$) techniques.

Conclusion: IOL exchange significantly improved uncorrected visual acuity and more than three-quarters of eyes met the refractive goal. Certain techniques were associated with complications, including subsequent dislocation associated with iris-sutured technique and IOL tilt associated with Yamane scleral-fixation technique. This information may help guide surgeons in deciding between procedural techniques for individual patients during IOL exchange preoperative planning.

Keywords: intraocular lens, dislocation, Yamane, techniques, cataracts, complications

Introduction

Cataract removal and insertion of an intraocular lens (IOL) is a common and frequent procedure that is safe and effective in over 95% of patients.^{1,2} Under certain circumstances however, patients may require replacement or exchange of an IOL. IOL exchanges have been documented for a variety of clinical reasons, including partial (ie subluxation) or total dislocation and uveitis–glaucoma–hyphema (UGH) syndrome.³ In a prior retrospective study examining IOL exchanges, other common indications found included incorrect IOL power, anterior vitreous prolapse, and intraocular inflammation.^{4,5} Furthermore, IOL exchanges are commonly carried out when refractive outcomes or visual disturbances affect patient satisfaction.⁶

When possible, the optimal location to place a secondary IOL is the capsular bag, followed by the ciliary sulcus. In the absence of capsular or sulcus support, several techniques have been developed for the insertion and/or exchange of a so-called secondary IOL, including placement of anterior chamber IOLs (ACIOLs), iris-sutured IOLs, scleral sutured

IOLs, and scleral-fixated IOLs. Recently developed techniques of sutured or sutureless scleral fixation may experience postoperative complications including, but not limited to, fractures,⁷ suture erosions,⁸ and lens opacifications.⁹

As such, the purpose of the current study was to analyze the indications, outcomes, and complications of IOL exchanges among a variety of techniques and IOL models at a tertiary ophthalmic referral center.

Materials and Methods

The institutional review board at the University of Miami Miller School of Medicine approved the current study, which adhered to the tenets of the Declaration of Helsinki and conformed to the data protection and privacy regulation requirements of the United States Health Insurance Portability and Privacy Act. The need for patient consent was waived by the Institutional Review Board due to the retrospective nature of the study. This study included patients at Bascom Palmer Eye Institute that underwent IOL exchange between May 1, 2014 through August 31, 2020. Patients were identified using current procedural terminology (CPT) code 65920, 66682, 66825, 66985, and 66986. Each surgical case was reviewed for details of the procedure and IOL used. Patients who had IOL placement after being rendered aphakic eye or had repositioning (ie refixation) of the lens with no exchange were excluded. The following data were collected: gender, date of birth, eye laterality, significant ocular disease history in eye of interest, time between original IOL implant and exchange, original and exchanged IOL model, original and exchanged IOL implantation technique as described in the procedure note, original and exchanged suture (if applicable), concurrent procedures performed with exchange, and pre-operative uncorrected visual acuity (UCVA) in both eyes. For unidentified IOL types, the pathology report determined whether the IOL was one-piece or three-piece. Post-operative data included UCVA collected at 3 months, 1 year, and final visit in both eyes as well as complications and time between exchange and onset of the complication. Uncorrected visual acuity was converted to logMAR for statistical analysis. Counting fingers, hand motions, light perception, and no light perception were given values of 1.9, 2.3, 2.7, and 3.0, as previously described.^{10,11}

Statistical analyses were performed using IBM SPSS software. Descriptive statistics were used for finding the mean and standard deviation of the subject's age, population characteristics, years until IOL exchange, UCVA in logMAR (preoperative and postoperative), time for when complications occurred, and time for when subjects returned to the operating room due to a significant complication. The frequencies of techniques, complications, and prior ocular history were calculated. Comparisons were made between IOL techniques and their most frequent complications by two proportion z-tests.

Results

Study Population

IOL exchange was performed in 511 eyes of 488 patients. Three-hundred and five (59.7%) patients were men. Mean patient age was 67.0 ± 13.9 years. Prior ocular history for the study population included glaucoma (n=119, 23.3%), pars plana vitrectomy (PPV) (n=96, 18.8%), retinal detachment (RD) (n=85, 16.6%), complex cataract surgery (n=40, 7.8%), dry eye syndrome (DES) (n=34, 6.7%), UGH syndrome (n=29, 5.7%), and macular degeneration (n=27, 5.3%), amongst others (Table 1). The mean time of follow-up following IOL exchange was 18.6 ± 14.7 months (median: 14 months).

Precipitating Reason Prior to Exchange

The mean length of time between the initial cataract procedure and IOL exchange was 83.3 ± 114.1 months (median: 47.5 months). The most common precipitating reasons for exchange were IOL dislocation (n=285, 46.6%), IOL subluxation (n=52, 8.5%), UGH (n= 35, 5.7%), refractive error (n=24, 3.9%), broken haptic (n=22, 3.6%), and corneal edema (n=18, 3.0%) (Table 2). Of note, 42 eyes had a multifocal lens inserted following cataract extraction, including Alcon AcrySof ReSTOR (n=23, 54.8%) and Tecnis Symphony Toric multifocal lens (n=8, 19.0%), and accounted for 26.6% of eyes with visual distortions (refractive error, floaters, dysphotopsia, astigmatism) reported prior to exchange.

Table 1 Baseline Characteristics of Patients Undergoing Intraocular Lens Exchange

Patients	488
Eyes	511
Male:Female	305 (60%):206 (40%)
Age for CE/IOL, mean	59.8 ± 15.4 years
Age for Exchange, mean	67.0 ± 13.9 years
Prior Ocular History	n (%)
Glaucoma	119 (23.3%)
PPV	96 (18.8%)
RD	85 (16.6%)
Complex Cataract History	40 (7.8%)
DES	34 (6.7%)
UGH	29 (5.7%)
Macular Degeneration	27 (5.3%)
ERM	24 (4.7%)
CME	22 (4.3%)
PVD	16 (3.1%)
OHTN	12 (2.3%)
MH	12 (2.3%)
PEX	9 (1.8%)

Abbreviations: CE/IOL, cataract extraction with intraocular lens; PPV, pars plana vitrectomy; RD, retinal detachment; DES, Dry Eye Syndrome; UGH, uveitis–glaucoma–hyphema; ERM, epiretinal membrane; CME, cystoid macular edema; PVD, posterior vitreous detachment; OHTN, ocular hypertension; MH, macular hole; PEX, pseudoexfoliation syndrome.

Table 2 Indications for Intraocular Lens Exchange

	Count	Percentage
Dislocation	285	46.6%
Subluxation	52	8.5%
UGH	35	5.7%
Refraction Error	24	3.9%
Broken Haptic	22	3.6%
Corneal Edema	18	3.0%
Vitreous Prolapse	14	2.3%
Haptic Erosion	13	2.1%

(Continued)

Table 2 (Continued).

	Count	Percentage
Trauma	12	2.0%
IOL Opacification	11	1.8%
Astigmatism	11	1.8%
Anisometropia	10	1.6%
Positive Dysphotopsia	10	1.6%
Floater	9	1.5%
Halos	8	1.3%
Corneal Decompensation	8	1.3%
Bullous Keratopathy	7	1.2%
Negative Dysphotopsia	7	1.2%
IOL Tilt	6	1.0%
Failed Corneal Graft	6	1.0%
Retained Lens	4	0.7%
Recurrent Hyphema	3	0.5%
VH	3	0.5%
Iritis/Inflammation	3	0.5%
Other*	21	3.4%
Total	611**	

Notes: **Other** represents a list of indications including: anterior capsular phimosis, choroidal detachment, chronic uveitis, endophthalmitis, iridocyclitis, keratoconus, pseudoexfoliation, pseudophakodonesis, and zonular weakness. **Indicates that there may be more than one precipitating reason for an intraocular lens exchange.

Abbreviations: UGH, uveitis–glaucoma–hyphema; IOL, intraocular lens; VH, vitreous hemorrhage.

Replacement Intraocular Lens Technique and Suture for Exchange

Out of 511 eyes, the most common technique for exchange was ACIOL technique (n=136, 26.6%), followed by ciliary sulcus placement technique (n=105, 20.5%), 4-point scleral sutured technique (n=92, 18.0%), capsular bag technique (n=78, 15.2%), 2-point scleral sutured technique (n=43, 8.4%), iris-sutured technique (n=29, 5.7%), Yamane scleral-fixation technique (n=17, 3.3%), and glued technique (n=12, 2.3%). Of the sutured techniques (n=164), the most common suture employed for IOL exchange was expanded polytetrafluoroethylene (ePTFE) (n=96, 58.5%), followed by polypropylene (n=65, 39.6%) and polyamide (n=3, 1.8%).

Visual Acuity Outcomes

The mean UCVA acuity prior to IOL exchange was logMAR 0.981 ± 0.771 (Snellen: 20/192). Postoperatively, mean UCVA significantly improved to 0.507 ± 0.507 (Snellen: 20/64), 0.485 ± 0.551 (Snellen: 20/61), 0.482 ± 0.566 (Snellen: 20/61), and 0.487 ± 0.631 (Snellen: 20/61) at 3 month, 6 month, 12 month, and last-follow-up time-points, respectively ($P < 0.001$, between preoperative and each follow-up UCVA). Of note, 2-point scleral sutured technique had a greater improvement in UCVA from preoperative to final examination (logMAR: -0.838 ± 0.616) than iris-sutured technique

(logMAR: -0.310 ± 0.912). There were no other significant differences in preoperative UCVA, postoperative UCVA, or change in UCVA between the other techniques. Three hundred and eighty-four eyes (78.7%) achieved a postoperative spherical equivalent within ± 1.0 diopter (D) of the targeted refractive outcome. There were no significant differences between achieving targeted refraction between the techniques examined.

Complications Following Exchange

The mean length of time between the IOL exchange and first documented postoperative complication was 172.8 ± 334.5 days (median: 52.0 days). Out of the 511 eyes, the most frequent complication following IOL exchange was cystoid macular edema (CME) (n=39, 7.6%, mean occurrence time was $198.3 \text{ days} \pm 407.3$ after exchange, median: 80.5 days), followed by corneal edema (n=36, 7.1%, $63.1 \text{ days} \pm 121.7$, median: 5.5 days), elevated intraocular pressure (IOP) (n=27, 5.3%, $38.4 \text{ days} \pm 62.7$, median: 7.0 days), epiretinal membrane (ERM) (n=22, 4.3%, $271.2 \text{ days} \pm 506.4$, median: 72 days), vitreous hemorrhage (VH) (n=19, 3.7%, $31.6 \text{ days} \pm 76.6$, median: 9.0 days), hyphema (n=12, 2.4%, $14.7 \text{ days} \pm 28.7$, median: 2.5 days), and glaucoma (n=12, 2.4%, $485.7 \text{ days} \pm 168.5$, median: 480.0 days) (Table 3).

Table 3 Complications Following Intraocular Lens Exchange

	Count	Percentage**
CME	39	7.6%
Corneal Edema	36	7.1%
Elevated IOP	27	5.3%
ERM	22	4.3%
DES	19	3.7%
VH	19	3.7%
Hyphema	12	2.4%
Glaucoma	12	2.4%
Photopsia/Astigmatism	11	2.2%
PCO	10	2.0%
Dislocation	10	2.0%
Ocular HTN	9	1.8%
IOL tilt	6	1.2%
Inflammation/Keratitis	6	1.2%
Blepharitis	6	1.2%
Dermatochalasis	5	1.0%
Astigmatism	5	1.0%
UGH	4	0.8%
Bullous Keratopathy	4	0.8%
Subluxation	4	0.8%
PVD	4	0.8%

(Continued)

Table 3 (Continued).

	Count	Percentage**
Iritis	3	0.6%
Scleritis/Conjunctivitis	3	0.6%
Positive Photopsia	3	0.6%
Negative Photopsia	3	0.6%
Other*	41	8.0%

Notes: **"Other" represents a list of complications including: corneal abrasion, corneal cyst, corneal hypotony, endophthalmitis, foreign body, Fuchs' corneal dystrophy, haptic erosion, iris tear, loose haptic, macular hole, neovascular glaucoma, posterior vitreous detachment, *Pseudomonas* ulcer, and suture breakage. **Indicates the percentage out of the total number of eyes included in the study (n=511).

Abbreviations: CME, cystoid macular edema; IOP, intraocular pressure; ERM, epiretinal membrane; DES, Dry Eye Syndrome; VH, vitreous hemorrhage; PCO, posterior capsular opacification; HTN, hypertension; IOL, intraocular lens; UGH, uveitis-glaucoma-hyphema; PVD, posterior vitreous detachment.

Complications by Technique

Table 4 illustrates postoperative complications for IOL exchange stratified by technique. When comparing complications between techniques, Yamane scleral-fixation technique had a greater frequency of developing IOL tilt (11.8%), detected on slit lamp examination, than ACIOL (0%, $P = 0.002$), 4-point scleral sutured (1.1%, $P = 0.01$), 2-point scleral sutured (0%, $P = 0.04$), and iris-sutured (0%, $P = 0.04$) techniques. Iris-sutured technique had a greater frequency of developing subsequent dislocation (10.3%) than 4-point scleral sutured (0%, $P = 0.002$), ACIOL (1.5%, $P = 0.01$), and 2-point scleral sutured (0%, $P = 0.03$). There were no other significant findings found between techniques.

Table 4 Common Complications Following Intraocular Lens Exchange by Technique

Techniques	Count (% of Total Patients)	Complications (% Within Technique)
ACIOL	136 (26.6%)	CME (9.6%)
		Corneal edema (7.4%)
		ERM (5.1%)
Ciliary Sulcus Placement	105 (20.5%)	CME (8.6%)
		Elevated IOP (7.6%)
		Corneal edema (5.7%)
4-point Scleral Sutured	92 (18.0%)	Corneal edema (10.9%)
		CME (8.7%)
		Elevated IOP (7.6%)
Capsular Bag	78 (15.2%)	DES (9.0%)
		PCO (2.9%)
		ERM (5.1%)

(Continued)

Table 4 (Continued).

Techniques	Count (% of Total Patients)	Complications (% Within Technique)
2-point Scleral Sutured	43 (8.4%)	Elevated IOP (9.3%)
		VH (7.0%)
		CME (4.7%)
Iris-Sutured	29 (5.7%)	Corneal edema (13.8%)
		Dislocation (10.3%)
		ERM (6.9%)
Yamane	17 (3.3%)	IOL tilt (11.8%)
		DES (11.8%)
		Hyphema (5.9%)
Glued	12 (2.3%)	Corneal edema (16.7%)
		CME (16.7%)
		VH (8.3%)

Abbreviations: ACIOL, anterior chamber intraocular lens; CME, cystoid macular edema; ERM, epiretinal membrane; IOP, intraocular pressure; DES, Dry Eye Syndrome; PCO, posterior capsular opacification; VH, vitreous hemorrhage; IOL, intraocular lens.

When comparing these techniques to placement of an exchanged IOL in the capsular bag, capsular bag placement had a significantly lower frequency of developing CME (1.3%) compared to ACIOL (9.6%, $P = 0.01$) and 4-point scleral sutured (8.7%, $P = 0.03$) techniques.

Reoperations Following Intraocular Lens Exchange

Twenty-one eyes underwent additional procedures after IOL exchange. The mean length of time between IOL exchange and return to the operating room was 528.2 ± 612.6 days (median: 229.0 days). Out of these 21 eyes following IOL exchange, the most frequent technique that required additional procedures after experiencing complications was 4-point scleral sutured ($n=6$, 28.6%), followed by ACIOL ($n=5$, 23.8%), iris-sutured ($n=5$, 23.8%), 2-point scleral sutured ($n=2$, 9.5%), ciliary sulcus placement ($n=2$, 9.5%), and capsular bag ($n=1$, 4.8%). A total of 14 eyes (2.7%) required repeat IOL exchange (tertiary IOL) (Table 5). Of the other 7 eyes, complications requiring return to the operating room included secondary glaucoma ($n=3$), VH ($n=2$), RD ($n=1$), and neovascular glaucoma ($n=1$).

Discussion

The current study highlights lens dislocations and visual complaints as common indications for IOL exchanges. In a prior study of 57 eyes, the most frequent indication for IOL exchange was lens dislocation/decentration (45.6%).⁴ This finding was similar to the current study that reported dislocation, followed by subluxation, as the most frequent indications for IOL exchange. While practice patterns have changed over time, explanations may include the inadequate support of the intraocular lens by the capsular bag or ciliary sulcus due to the operation or prior pathology, poor IOL fixation, or zonular rupture.^{4,12,13} Another common reason for IOL exchanges in the current study included subjective visual complaints following initial lens placement. Davies and Pineda reported 109 eyes requiring IOL exchange, with most frequent indications for exchange due to patient dissatisfaction of asthenopia, glares or halos, and visual distortions.³ The current study's cohort presented with comparable percentages and results that found patients requesting exchange for refractive errors, glares or halos, and astigmatism. Although these symptoms may occur in any IOL placement, one explanation for these findings include the advent of multifocal PCIOLs.⁹ In the current study, over a quarter of the eyes with visual

Table 5 Subsequent Intraocular Lens Exchange

Patient	Age	Pre-Op UCVA	1st IOL Exchange Type	1st IOL Exchange Technique	Suture for 1st IOL Exchange	Reason for Reoperation	No. of Days Until Reoperation	2nd IOL Exchange Type	2nd IOL Exchange Technique	Suture for 2nd Exchange IOL	Final UCVA
1*	49	20/500	Alcon MA60BM	Iris-sutured	PROLENE	Dislocation	63	Akreos AO60*	4-point scleral-sutured	GORE-TEX	20/50
2	50	20/20	Tecnis PCB00	PCIOL	None	Glare/halos and dysphotopsia	66	Alcon MA50BM	Sulcus IOL	None	20/15
3	58	20/30	Alcon MA60	2-point scleral-sutured	PROLENE	VH	86	Alcon MTA3U	ACIOL	None	20/20
4	63	20/400	EnVista MX60	4-point scleral sutured	GORE-TEX	Dislocation	136	Alcon MTA3UO	ACIOL	None	20/150
5	55	3/200	Alcon MA50BM	Iris-sutured	PROLENE	Subluxation	142	Alcon MTA3U0	ACIOL	None	20/400
6	40	20/40	Alcon MA50BM	Iris-sutured	PROLENE	Dislocation secondary to WMS	150	Alcon MTA3UO	ACIOL	None	20/40
7	59	20/50	Alcon MA50BM	Iris-sutured	PROLENE	Multiple dislocations	308	Akreos AO60	4-point scleral-sutured	GORE-TEX	20/30
8	77	20/100	Alcon MTA3UO	ACIOL	None	Multiple dislocations	392	Alcon CZ70BD	2-point scleral-sutured	GORE-TEX	20/100
9	76	20/150	Alcon MA60	4-point scleral sutured	PROLENE	Dislocation	475	Alcon MTA3	ACIOL	None	20/20
10	49	20/500	Akreos AO60	4-point scleral sutured	GORE-TEX	Dislocation	589	Alcon MA50BM	Glued	None	HM
11	76	20/25	Alcon MA50BM	PCIOL	None	Ruptured globe, VH, dislocation	901	Alcon MTA3	ACIOL	None	HM
12	55	20/80	Alcon MTA3	ACIOL	None	Dislocation	1127	Alcon MTA4	ACIOL	None	20/20
13	75	20/40	Alcon MA60AC	Sulcus IOL	None	UGH, dislocation, VH	1747	Akreos AO60	4-point scleral-sutured	GORE-TEX	20/20
14	60	20/200	Alcon MTA3	ACIOL	None	Pseudo-phakic corneal edema	1892	Alcon CZ70BD	2-point scleral-sutured	PROLENE	20/80

Notes: *Indicates another subsequent dislocation following exchange requiring another IOL.

Abbreviations: IOL, intraocular lens; UCVA, uncorrected visual acuity; PCIOL, posterior chamber intraocular lens; ACIOL, anterior chamber intraocular lens; VH, vitreous hemorrhage; WMS, Weill–Marchesani syndrome; UHG, uveitis-glaucoma-hyphema syndrome; HM, hand motions.

distortions and refractive errors as the indication for IOL exchange had a multifocal lens. Although recent studies have shown functional visual benefits from multifocal lenses, it should be noted that they also carry potential disadvantages including a decreased contrast sensitivity, stereoacuity, glare disability, and photic phenomena.¹⁴

While IOL exchange is a valuable treatment option when indicated, postoperative complications may occur, and an IOL in the capsular bag is still preferable to other secondary IOL options when possible given the superior safety profile. A previous study found that IOL exchange patients commonly develop complications secondary to chronic inflammation, such as prior cystoid macular edema, pseudophakic bullous keratopathy, and uveitis–glaucoma–hyphema syndrome.¹⁵ However, the majority of these complications were treated with conservative medical therapy.¹⁵ Previous studies have reported comparable postoperative findings following IOL exchange. In one study of 56 eyes undergoing IOL exchange, the most common complications encountered were CME (17.8%), hyphema (15.8%), glaucoma (10.9%), and PCO (8.9%).¹⁶ The current study reported similar findings, but also found an elevated incidence of corneal edema and ERM development.

Importantly, certain complications were more likely to occur with certain IOL exchange techniques. For example, the most common complication after Yamane scleral-fixation technique was IOL tilt, which may be due to several factors including IOL haptic truncation/trimming, IOL types, needle size, and uses of Yamane IOL stabilizer.¹⁷ Additionally, prior studies have shown that scleral-suturing using ePTFE is more significantly associated with ocular hypertension and corneal edema.¹⁸ In a review of 735 eyes with glued IOLs, the study found eventual complications including need for IOL repositioning (2.2%), haptic repositioning (1.0%), and IOL explantation (0.4%).¹⁹ In another study that examined 82 eyes that underwent scleral fixated IOL placement, the most common complication was ocular hypertension (30.5%), followed by CME (7.3%), suture breakage (6.1%), and leakage of corneal wound requiring resuturing (1.2%).²⁰ Of note, the current study also found a small subset of patients requiring further operations for various indications, including wound leakage as a result of predominately sutured IOL exchanges. Although sutured IOL exchange carries the risk of suture erosion leading to recurrent dislocations, sutureless techniques may also cause adverse events. In one study that examined 234 eyes, it was found that the incidence of corneal decompensation was greater with ACIOL (3.5%) than with scleral-fixated IOL (0.9%).²¹ Similarly, this finding of corneal decompensation was also found in two cases in the current study leading to ACIOL technique for IOL exchange (ie pseudophakic corneal edema in both cases). Collectively, surgeons should be aware of these complications following secondary and tertiary IOL.

Overall, IOL exchange, regardless of technique, showed significant improvements in uncorrected vision, with over three-quarters of eyes undergoing IOL exchange achieving a refractive outcome within a diopter of preoperative target refraction. Multiple smaller studies have observed similar rates of achieving targeted refractive outcome following IOL exchange. Leysen et al reported that out of 128 eyes undergoing IOL exchange 67.9% achieved the targeted refraction five weeks after surgery.²² In a similar study of 22 eyes that had IOL exchange, 86% of the eyes had a postoperative refraction within ± 1.0 D of target and a significant improvement in UCVA of 20/40 or better in 95% of eyes. Additionally, the current study found no difference in refractive outcome between techniques, but noted a significant difference in final UCVA between 2-point scleral sutured and iris-sutured techniques. One explanation for these findings may be due the postoperative complications following the iris-sutured technique. In the current cohort, iris-sutured techniques had a greater chance of future dislocation, which may have affected final improvement in UCVA.

The current study has several limitations, including its retrospective nature, incomplete reporting of the initial cataract extraction with IOL placement history, surgeon variability, lack of technique uniformity, and the exclusion of the small percentage of the charts not identifying the type, technique, or suture used during surgery. While the sample size is greater than other similar reports in the literature, an even larger cohort would allow more definitive conclusions about differences between technique complications and outcomes. In the future, a database or registry derived study population may allow for better comparative analysis.

In conclusion, IOL exchange was overall successful when employed, with reasonably satisfactory visual and refractive outcomes regardless of technique employed. While certain complications after IOL exchanges were more likely to occur in certain techniques, there was a relatively low rate of complications. This information may aid surgeons in creating an individualized IOL exchange plan for patients.

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Disclosure

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