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Research Article

Comparing Quality of Life Post Myopic Astigmatic Refractive Surgeries: FS-LASIK vs ICL

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Abstract*— *Background: This study aims to compare the postoperative outcomes of femtosecond laser-assisted in situ keratomileusis (FS-LASIK) and implantable collamer lens (ICL) implantation in improving visual acuity, contrast sensitivity, and quality of life (QoL) in patients with myopia or myopic astigmatism.
Methods: A prospective, interventional, and observational study was conducted at a tertiary eye care center in Surat, India, involving 120 eyes of 60 patients (30 in each group). Preoperative and postoperative assessments included demographic data, visual acuity measurements (both uncorrected and best corrected), contrast sensitivity, and QoL evaluations using the Quality-of-Life Impact of Refractive Correction (QIRC) questionnaire.
Results: Both FS-LASIK and ICL significantly improved visual acuity postoperatively, with average uncorrected visual acuity (UCVA) improving from 1.4 ± 0.22 logMAR to 0.1 ± 0.13 logMAR in both groups. The mean spherical equivalent reduced significantly, with FS-LASIK achieving -0.52 ± 0.32 D and ICL achieving -0.87 ± 0.40 D after surgery. Contrast sensitivity also improved in both groups, although no significant differences were observed between them. QoL assessments indicated that both groups experienced significant postoperative improvements, with the ICL group reporting slightly higher QIRC scores (59.34 ± 9.477) compared to FS-LASIK (56.39 ± 8.42).
Conclusion: Both FS-LASIK and ICL are effective surgical options for correcting myopia, resulting in substantial improvements in visual acuity, contrast sensitivity, and QoL. While both procedures significantly enhance patient satisfaction and visual independence, the ICL group exhibited marginally superior QoL outcomes. Further long-term studies are warranted to evaluate the durability of these benefits and to better understand the influence of patient-specific factors on treatment outcomes.

Keywords: Myopia, refractive surgery, FS-LASIK, ICL, quality of life, QIRC
Abbreviations: ICL: Implantable collamer Lenses, VRQOL: vision-related quality of life, QIRC: Quality-of-Life Impact of Refractive Correction

1. Introduction

Myopia, widely recognized as a prevalent refractive error, poses a significant challenge to individuals' quality of life, influencing their daily activities and overall well-being [1]. Traditionally, corrective measures such as glasses and contact lenses provide temporary relief from the symptoms of myopia; however, there is a growing interest in refractive surgeries that offer more permanent solutions. Myopia is classified into two main categories: low to moderate degrees (≤ -6.00 diopters) and high myopia (> -6.00 diopters), each presenting unique treatment considerations and options [2]. Both ICL and FS-LASIK are designed to correct myopia effectively, yet they employ different methodologies. ICL involves the surgical insertion of a lens behind the iris, which adds power to the eye's optical system, while FS-LASIK reshapes the cornea using laser technology. This fundamental difference plays a crucial role in the visual outcomes experienced by patients post-procedure.

Because of its effectiveness and short recovery times, corneal refractive surgeries like femtosecond laser-assisted in situ keratomileusis (FS-LASIK) have become popular among patients with low to moderate myopia. Nonetheless, the use of FS-LASIK is limited in scenarios of significant myopia or among patients with thin corneas because of the related risk of postoperative complications, including ectasia [3].

An emerging alternative, the implantable collamer lens (ICL) implantation, offers a corneal-independent solution capable of correcting a broader spectrum of refractive errors, including high myopia [4]. While the safety and visual outcomes of both FS-LASIK and ICL have been subjects of numerous studies, there remains a critical gap in the exploration of how these

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surgical interventions affect patients' overall quality of life (QoL) [5]. Current literature has primarily focused on visual acuity and patient satisfaction, with limited comparative analyses investigating QoL outcomes following these procedures [6][7]. This study is significant because it addresses the existing gap in literature regarding the comprehensive impact of FS-LASIK and ICL on patients' QoL following myopia correction. While both procedures are effective in restoring visual acuity, their broader impact on daily functioning, emotional well-being, and overall life satisfaction remains underexplored. By thoroughly comparing the QoL outcomes across a range of parameters, this study seeks to provide patients and healthcare providers with valuable insights into the long-term benefits and potential drawbacks of each procedure. These insights are crucial for helping patients make informed decisions about which surgical option is most suitable for their lifestyle and refractive needs, especially given the distinct methods and applications of FS-LASIK and ICL. The results of this research could contribute to improved patient care, guiding clinical recommendations and patient-centered decision-making in refractive surgery.

2. Related Work

In recent years, numerous studies have compared the clinical outcomes and refractive stability of Implantable Collamer Lens (ICL) implantation and Femtosecond Laser-Assisted Laser In Situ Keratomileusis (FS-LASIK) for the correction of high myopia.

"Comparison of Visual Outcomes Between ICL Implantation and FS-LASIK in High Myopia Correction" [8]
Problem Statement: High myopia poses challenges for refractive surgery due to the limitations of corneal thickness and the potential for postoperative complications. Determining the most effective and safe surgical option is crucial for patient outcomes.
Objectives: To evaluate and compare the uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), safety index, and efficacy index between ICL implantation and FS-LASIK in patients with high myopia over a one-year postoperative period.

"Long-Term Refractive Stability After ICL Versus FS-LASIK Procedures" [9]
Problem Statement: Refractive stability is a key factor in the long-term success of myopia correction surgeries. Fluctuations in vision can affect patient satisfaction and quality of life.
Objectives: To assess the refractive stability of patients undergoing ICL implantation compared to those receiving FS-LASIK, by monitoring spherical equivalent changes over one year.

"Optical Quality Assessment Using OQAS After High Myopia Correction" [10]
Problem Statement: Beyond visual acuity, optical quality factors like modulation transfer function (MTF) and objective scatter index (OSI) influence patient satisfaction, especially under low-contrast conditions.
Objectives: To objectively evaluate and compare the optical quality of the eye after ICL implantation and FS-LASIK using the Optical Quality Analysis System (OQAS).

"Safety Profiles of ICL Implantation Versus FS-LASIK" [11]
Problem Statement: Safety is a paramount concern in refractive surgeries. Understanding the risks associated with each procedure helps in making informed clinical decisions.
Objectives: To compare the safety indices and incidence of postoperative complications between the two surgical methods in high myopia patients.

"Higher-Order Aberrations Post ICL and FS-LASIK Surgeries" [12]
Problem Statement: Surgical correction of myopia can induce higher-order aberrations, affecting night vision and overall visual quality.
Objectives: To measure and compare the induction of higher-order aberrations in patients after ICL implantation and FS-LASIK, analyzing their impact on visual performance.

The collective findings from these studies indicate that both ICL implantation and FS-LASIK are effective and safe procedures for correcting high myopia. However, ICL implantation often demonstrates superior outcomes in terms of refractive stability and optical quality. Patients undergoing ICL tend to achieve better UDVA and CDVA, with higher safety and efficacy indices compared to those who have FS-LASIK.
ICL implantation is associated with less induction of higher-order aberrations and better preservation of corneal integrity since it does not involve corneal tissue removal. The optical quality assessments using OQAS show that ICL provides better MTF cutoff frequencies and Strehl ratios, indicating higher visual quality.
On the other hand, FS-LASIK remains a popular choice due to its non-invasiveness and rapid visual recovery. While it may induce more corneal changes, advancements in femtosecond laser technology have improved its safety profile.

Previous research supports the conclusion that while both ICL implantation and FS-LASIK are viable options for high myopia correction, ICL implantation offers advantages in terms of clinical outcomes and refractive stability. These findings provide a foundation for the present study, which aims to further compare these procedures using objective optical quality metrics.

3. Experimental Method/Procedure/Design

Study Design
This hospital-based, prospective, interventional, and observational study aimed to compare the quality of life (QoL) outcomes between patients undergoing femtosecond laser-assisted in situ keratomileusis (FS-LASIK) and implantable collamer lens (ICL) implantation for myopic or myopic astigmatic correction.

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Study Population
The study included 120 eyes from 60 patients, with 60 eyes (30 patients) in each treatment group (FS-LASIK and ICL). Participants were consecutively recruited from the ophthalmology department at a tertiary eye care center in Surat between October 2023 and May 2024.

Data Collection
A comprehensive medical history and thorough ophthalmological examination were conducted for each participant by trained optometrists. The preoperative data collected included demographic information such as age, gender, and medical history. Visual acuity was measured through best-corrected visual acuity (BCVA) and uncorrected visual acuity (UCVA), while refractive error was assessed using manifest refraction. Intraocular pressure (IOP) was measured with a non-contact tonometer (NCT, Topcon Computerized Tonometer), and corneal topography was evaluated to assess the health of the cornea.

To assess the impact of the surgical interventions on QoL, the **Quality-of-Life Impact of Refractive Correction (QIRC)** questionnaire was administered both preoperatively and one month postoperatively. Responses were analyzed using a Rasch-weighted QIRC score, generated using an Excel spreadsheet from http://www.pesudovs.com/konrad/questionnaire.html, with detailed instructions for scoring provided.

The inclusion criteria for the FS-LASIK group consisted of patients with spherical myopia up to -7.00 D and astigmatism up to -5.00 D. For the ICL group, patients with myopia up to -18.00 D and astigmatism up to -5.00 D were included. All participants had stable refraction (± 0.5 D) and suitable corneal topography for at least one year before surgery. Patients were between 18 and 35 years of age, with no restrictions on gender or race.

The exclusion criteria for the FS-LASIK group included patients with corneal thickness below the institution's defined threshold, specifically those with a residual stromal bed thickness less than 300 μm. For the ICL group, patients with an anterior chamber depth (ACD) of less than 3.00 mm or an endothelial cell density of ≤2000 cells/mm² were excluded [7]. Additional exclusion criteria for both groups included a history of iritis, uveitis, diabetic retinopathy, cataracts, glaucoma, or pregnancy.

The study obeyed to the tenets of the Declaration of Helsinki, and informed consent was obtained from all participants. Ethical approval was granted by the Institutional Ethics Committee.

The surgical techniques involved two procedures:
For ICL implantation, the procedure was performed by a single experienced surgeon. A 2.8 mm clear corneal incision was made to insert the ICL lens into the posterior chamber. The lens was positioned using a manipulator, after which the viscoelastic material was removed, and the incision self-sealed. Postoperative care included the administration of topical antibiotics and steroids.

For FS-LASIK, topical anesthesia was administered, and a corneal flap with a thickness of 90-100 μm was created using a femtosecond laser (IntraLase FS Laser). The cornea was then reshaped through excimer laser ablation, guided by an active eye-tracking system (VISX-STAR, S4-IR, Advanced CustomVue). Postoperative treatment involved the use of antibiotics, anti-inflammatory drops, and lubricating eye drops.

Postoperative evaluations were conducted one month after surgery and included assessments of uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA), as well as refractive error and any complications. Additionally, quality of life (QoL) was evaluated using the Quality-of-Life Impact of Refractive Correction (QIRC) questionnaire.

Statistical Analysis
Data analysis was performed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize patient demographics and clinical characteristics. Independent t-tests were applied to compare QIRC scores and other continuous variables between the FS-LASIK and ICL groups. Statistical significance was set at $p < 0.05$, and results were presented as mean ± standard deviation.

4. Results and Discussion

Demographic and Baseline Parameters
The baseline demographic data, including age and gender, were comparable between the FS-LASIK and ICL groups, as shown in Table 1. The mean age was 25.5 ± 4.39 years in the FS-LASIK group and 25.82 ± 5.64 years in the ICL group, with no statistically significant difference between the two groups ($p = 0.4796$). The gender distribution also showed no significant difference ($p = 0.3796$).

Preoperative and Postoperative Spherical Equivalent
There was a statistically significant difference between the two groups in terms of preoperative spherical equivalent. The ICL group had a higher degree of myopia (-8.64 ± 3.45 D) compared to the FS-LASIK group (-6.94 ± 3.13 D), with a p-value of 0.0019. Postoperatively, both groups showed significant reductions in spherical equivalent, indicating successful refractive correction. The FS-LASIK group achieved a postoperative spherical equivalent of -0.52 ± 0.32 D, while the ICL group had a slightly higher value of -0.87 ± 0.40 D, with a significant difference between the groups ($p = 0.0164$).

Visual Acuity and Contrast Sensitivity
Both groups experienced significant improvements in uncorrected visual acuity (UCVA) and contrast sensitivity (CS). Preoperatively, the FS-LASIK group had a mean UCVA of 1.15 ± 0.22 logMAR, which improved to 0.1 ± 0.14 logMAR after surgery. Similarly, the ICL group improved from 1.4 ± 0.22 logMAR preoperatively to 0.1 ± 0.13 logMAR postoperatively. Although both groups exhibited substantial improvements, the difference between groups was not statistically significant ($p = 0.1748$ for UCVA before surgery, $p = 0.4142$ for BCVA after surgery).

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For contrast sensitivity, the FS-LASIK group showed an increase from 1.85 ± 0.212 preoperatively to 2.0 postoperatively, while the ICL group improved from 1.775 ± 0.1388 to 1.975 ± 0.05363 postoperatively. Despite these improvements, the differences between the groups were not statistically significant (p = 0.1332 for preoperative CS, p = 0.2095 for postoperative CS).

Table 1: Demographic and Pre & Postoperative parameters in eyes that experienced "FS-LASIK and ICL implantation"

	Mean ± Standard Deviation (Range)		
Parameter	FS-LASIK **(n=30 patients)**	ICL implantation **(n=30 patients)**	***P* Value***
Male/female (no. of patients)	11/19	12/18	0.3796
Mean Age (y)	25.5 ± 4.39	25.82 ± 5.64	0.4796
Spherical equivalent (D) before surgery	-6.94±3.13	-8.64±3.45	0.0019
Spherical equivalent (D) after surgery	-0.52 ± 0.32	-0.87 ± 0.40	0.0164
UCVA before surgery (Log MAR)	1.15±0.22	1.4±0.22	0.1748
BCVA after surgery (Log MAR)	0.1±0.14	0.1±0.13	0.4142
C.S. before surgery	1.85±0.212	1.775±0.1388	0.1332
C.S. after surgery	2±0	1.975±0.05363	0.2095
	**For continuous variables, a two-sample t test was done to measure significance. For categorical variables, a chi-square test was utilized. All expectations were met for these respective tests.*		

BCVA: Best corrected visual acuity (LogMAR), CS: Contrast Sensitivity, UCVA: Uncorrected visual acuity (LogMAR)

The study compared key demographic, clinical, and postoperative outcomes between patients undergoing femtosecond laser-assisted in situ keratomileusis (FS-LASIK) and implantable collamer lens (ICL) implantation for myopia or myopic astigmatism correction. The main findings of the study are summarized below:

Table 2: Comparison of mean ± SD QIRC scores of myopic astigmatic patients pre and 1-month post of Femtosecond LASIK and ICL surgery.

No.	**Questions**	**OBSERVATION TIME PERIOD**			
		Preoperative		**1 Month Post Operatively**	
		Femtosecond LASIK (n=30)	**ICL Implantation (n=30)**	**Femtosecond LASIK (n=30)**	**ICL Implantation (n=30)**
Total score		36.66±13.74	34.35±12.64	56.39±8.42	59.34±9.477
Total score (Q1 to Q13)		58.41±3.59	54.03±6.14	60.47±3.59	58.67±4.68
Total score (Q14 to Q20)		28.08±17.92	28.40±3.04	56.24±5.05	63.36±3.02
1	Driving in glare conditions	55.87±9.20	49.69±11.58	57.93±5.85	55.36±7.40
2	Eyes feeling tired or strained	55.32±13.13	52.75±12.44	60.99±6.94	59.96±7.40
3	Unable to use non-Rx sunglasses	31.47±8.59	29.41±8.78	56.19±2.82	56.71±0.00
4	Having to think about …before doing	0.00±0.00	0.00±0.00	30.47±0.00	31.5±5.64
5	Not being able see on waking	33.05±7.20	28.42±0.00	59.32±0.00	59.32±0.00
6	Unaided vision for swimming	37.66±8.26	34.06±5.63	63.92±0.00	63.92±0.00
7	Trouble with spectacles …for gym …	36.63±12.44	27.85±7.78	55.17±0.00	53.35±5.13
8	The initial and ongoing cost to buy	46.58±12.22	42.95±12.57	51.22±13.29	50.22±13.65
9	The cost of unscheduled maintenance	41.57±11.24	38.48±12.62	46.20±14.01	46.72±14.25
10	Increasingly reliant upon	38.16±6.64	34.56±0.00	63.91±4.71	63.86±6.32
11	Vision not as being as good as could	38.87±9.20	38.87±8.26	65.14±0.00	64.62±2.82
12	Medical complications from	48.67±12.92	42.49±13.66	55.37±8.04	54.85±9.20
13	UV protection	60.95±10.33	58.38±12.65	63.01±8.78	61.98±10.06
14	That you have looked your best	29.97±5.26	30.55±5.97	59.82±12.72	65.50±15.4
15	Think others see you the way want	34.59±6.54	34.02±5.97	57.95±11.06	67.84±11.98
16	Complimented/ flattered	39.58±5.97	39.51±7.20	67.99±8.25	76.26±11.52
17	Confident	30.00±7.76	26.55±4.38	56.42±11.33	67.24±10.26
18	Happy	30.97±8.78	33.85±8.28	58.36±11.16	67.75±8.57
19	Able to do things you want to	17.20±7.69	18.28±9.38	45.82±14.43	58.67±9.92
20	Eager to try new things	26.18±7.20	26.25±5.97	52.67±15.34	61.23±13.31

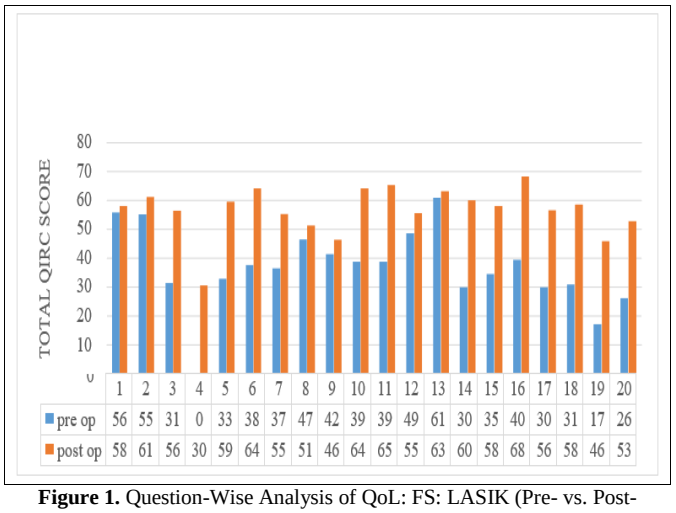

Figure 1. Question-Wise Analysis of QoL: FS: LASIK (Pre- vs. Post-Operative)

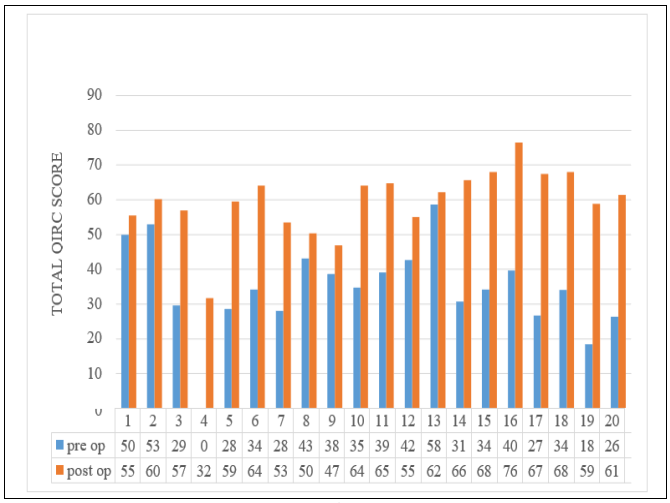

Figure 2. Question-Wise Analysis of QoL: ICL (Pre- vs. Post-Operative)

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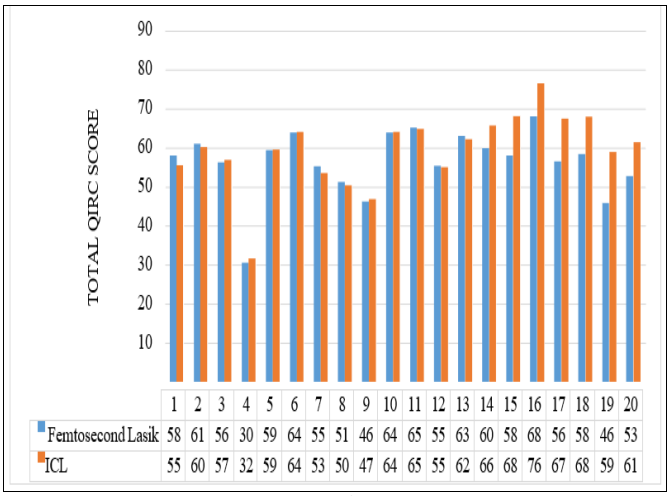

Figure 3. Question-Wise Comparison of Post-Operative QoL: FS-LASIK vs. ICL

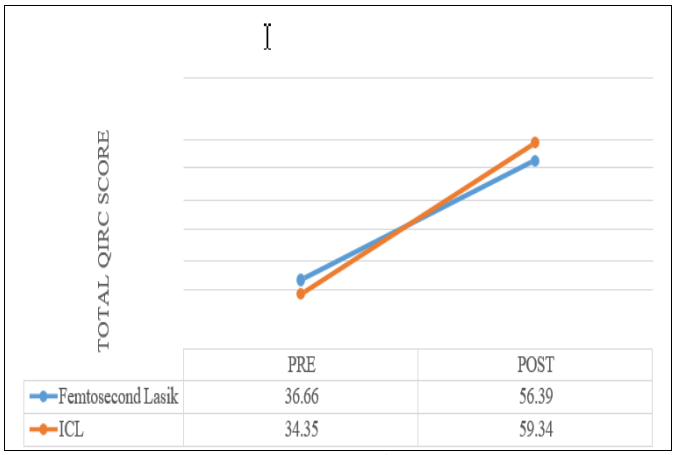

Figure 4. Mean QIRC score Comparison of Pre & Post-Operative QoL: FS-LASIK vs. ICL

Quality of Life (QoL) Assessment

The QIRC questionnaire revealed significant improvements in QoL scores for both groups postoperatively. In the FS-LASIK group, the mean QIRC score increased from 28.08 ± 17.92 preoperatively to 56.24 ± 5.05 postoperatively. In the ICL group, the QIRC score rose from 28.40 ± 3.04 to 63.36 ± 3.02. Although both groups reported improvements in QoL, the ICL group had slightly higher postoperative QIRC scores, indicating greater satisfaction with the overall visual outcomes and quality of life, as shown in Table 2.

Postoperative Quality of Life (QoL) Differences

The results also highlight specific improvements in the functional and emotional scales of the QIRC questionnaire. For example, in terms of functional outcomes, both groups experienced significant improvements in areas such as driving in glare conditions, unaided vision for swimming, and the ability to wear non-prescription sunglasses. On the emotional scale, both groups reported increased confidence, happiness, and eagerness to try new things after surgery. However, the ICL group consistently scored higher in both functional and emotional domains, particularly in emotional aspects such as self-confidence, satisfaction with appearance, and reduced dependence on corrective aids, as shown in Table 2.

The results suggest that both FS-LASIK and ICL are effective in improving refractive outcomes, visual acuity, and quality of life in myopic patients. However, the ICL group exhibited slightly higher QoL scores, particularly in the emotional and functional domains. This may be attributed to the ICL procedure's ability to correct higher degrees of myopia and its independence from corneal thickness, allowing patients to experience greater visual freedom and satisfaction. Additionally, the reduction in postoperative complications in the ICL group, such as ectasia, may contribute to the enhanced quality of life observed.

Summary of Key Findings:

Both FS-LASIK and ICL effectively corrected refractive errors, with a significant reduction in spherical equivalent post-surgery ($p < 0.05$).

Significant improvements were noted in UCVA and contrast sensitivity for both groups, although no significant differences were found between the groups postoperatively.

Postoperative QoL, as measured by the QIRC questionnaire, improved in both groups, with the ICL group reporting slightly higher scores.

Emotional and functional aspects of QoL were better in the ICL group, suggesting that patients may experience greater overall satisfaction with ICL due to enhanced visual independence and fewer complications.

These results emphasize that while both FS-LASIK and ICL are viable options for myopia correction, ICL may offer superior QoL outcomes, especially for patients with higher degrees of myopia.

Discussion

Refractive errors, including myopia, hypermetropia, and astigmatism, profoundly impact the quality of life for millions of individuals worldwide. Traditionally, glasses and contact lenses have been used to manage these conditions, but the increasing popularity of refractive surgeries offers patients more permanent solutions. Among these surgical options, femtosecond laser-assisted in situ keratomileusis (FS-LASIK) and implantable collamer lens (ICL) implantation have emerged as effective alternatives for correcting moderate to high myopia. This study aimed to compare the postoperative outcomes of these two procedures, focusing on visual acuity, contrast sensitivity, and quality of life (QoL) improvements.

The demographic findings showed that the FS-LASIK group had a higher proportion of females (62%), while the ICL group predominantly comprised males (62%). This gender disparity may be influenced by sociocultural factors, where females may prefer FS-LASIK due to cosmetic concerns, while males may opt for ICL based on its long-term stability and the ability to correct higher degrees of myopia. These results are consistent with previous studies, such as those by Huiyi Du et al. [5], which found similar gender-based preferences in refractive surgery patients. However, further research is needed to better understand the underlying reasons for these gender-based differences and their potential influence on treatment selection.

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In terms of visual acuity, both FS-LASIK and ICL demonstrated significant postoperative improvements. Preoperatively, the mean uncorrected visual acuity (UCVA) was comparable between the two groups (1.4 ± 0.22 logMAR), and both groups improved to a mean UCVA of 0.1 ± 0.13 logMAR postoperatively. These results are consistent with studies like Rui-na Wang et al. [8] and Yuhao Ye [9], which found that both procedures effectively corrected refractive errors and provided patients with excellent visual outcomes. The study by Abdel Rahman et al. [10] highlighted that ICL implantation may be particularly beneficial for patients with high myopia, offering better long-term vision correction and stability compared to FS-LASIK. This suggests that ICL may be the preferred option for individuals requiring more robust and lasting vision improvement.

Contrast sensitivity also improved significantly for both groups, with no statistically significant difference between them. FS-LASIK patients saw an increase from 1.85 to 2 log units, while ICL patients improved from 1.775 to 1.975 log units. The improvement in contrast sensitivity is likely linked to better overall visual quality, which plays a crucial role in day-to-day activities such as night driving or navigating low-light environments. Studies like Yuhao Ye's [9] further support the idea that ICL may provide slightly better contrast sensitivity, especially in non-dominant eyes at low spatial frequencies, compared to FS-LASIK. However, more research is required to fully elucidate the exact mechanisms behind these improvements.

Regarding quality of life (QoL), both procedures showed marked improvements in QIRC scores, reflecting enhanced visual function, emotional well-being, and overall satisfaction post-surgery. While both groups experienced significant gains in QoL, the ICL group had marginally higher postoperative QIRC scores (59.34 ± 9.477) compared to the FS-LASIK group (56.39 ± 8.42), although the difference was not statistically significant. These findings align with previous research by Huiyi Du et al. [5], which showed comparable QoL outcomes between different refractive surgeries. The slightly better QoL reported by ICL patients may be attributed to the procedure's ability to eliminate higher degrees of refractive error, especially in patients with larger pupils and high myopia. Studies such as that by H. Kobashi et al. [11] further support this, suggesting that phakic IOL implantation, like ICL, offers superior long-term vision-related QoL compared to LASIK in myopic patients.

One of the strengths of the current study is the comprehensive use of the **QIRC questionnaire**, which is a validated instrument that effectively measures QoL outcomes across various domains. The QIRC's ability to differentiate between patients who wear glasses, contact lenses, or have undergone refractive surgery highlights its sensitivity in capturing changes in QoL. Both FS-LASIK and ICL patients reported improvements in self-confidence, satisfaction with visual outcomes, and reduced anxiety over potential complications, reinforcing the importance of QoL assessments in evaluating the success of refractive surgeries.

5. Conclusion and Future Scope

Both FS-LASIK and ICL were highly effective in improving refractive outcomes and enhancing the quality of life (QoL) in myopic patients, as demonstrated by significant improvements in uncorrected visual acuity (UCVA), contrast sensitivity, and QIRC scores postoperatively. While both procedures led to substantial QoL improvements, patients undergoing ICL implantation reported slightly higher scores, particularly in emotional and functional domains, suggesting greater satisfaction with visual independence and overall well-being. These findings indicate that ICL may offer an advantage in treating patients with higher degrees of myopia, where its ability to provide excellent visual outcomes without depending on corneal thickness is particularly beneficial.

However, the difference in QoL between the two groups was not statistically significant, emphasizing that both FS-LASIK and ICL are viable options for improving visual outcomes and patient satisfaction. The reduced dependence on refractive aids, such as glasses and contact lenses, contributed significantly to patients' increased confidence and ability to perform daily tasks.

While this study provides valuable insights into the short-term effects of FS-LASIK and ICL on quality of life (QoL), further research is necessary to assess the long-term durability of these improvements. Future studies should focus on several key areas:
Long-term follow-up: This should include the assessment of visual outcomes, refractive error correction, and QoL over extended periods, beyond one year, to better understand the longevity of the benefits provided by each procedure.
Complication rates: Monitoring potential postoperative complications is especially important for FS-LASIK. This would help provide a clearer comparison of the safety profiles of FS-LASIK and ICL.
Patient-specific factors: Research should explore how individual characteristics such as age, lifestyle, and degree of myopia influence the success and satisfaction with each treatment. This would support the development of personalized recommendations for patients considering refractive surgery.
Cost-effectiveness analysis: Evaluating the long-term economic impact of both FS-LASIK and ICL, considering factors such as the need for re-treatments, maintenance costs, and overall patient satisfaction, will provide additional insights into the broader implications of these procedures.

Data Availability
The data supporting the findings of this study are available upon reasonable request from the corresponding author. All relevant data, including demographic information, visual acuity measurements, and quality of life assessments, can be accessed for further analysis and review.

Conflict of Interest
The authors declare no conflicts of interest related to this study. There were no financial or personal relationships that

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could be perceived as influencing the work reported in this paper.

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None

Authors' Contributions
All authors contributed significantly to the study. Dr. Chetna Patel was responsible for the study design and methodology. Ms. Saloni Desai conducted the data collection and statistical analysis. Dr. Ankit Varshney interpreted the results and wrote the manuscript. All authors reviewed and approved the final version of the manuscript.

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