

Review of current status of refractive lens exchange and role of dysfunctional lens index as its new indication

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Advances in phacodynamics and intraocular lenses (IOLs) has given second life to clear lens extraction (CLE) or refractive lens exchange (RLE) in recent years for the treatment of patients with high degrees of myopia, hyperopia, and astigmatism who are unsuitable for laser surgery. Furthermore, presbyopia treatment with RLE supplemented with multifocal or accommodating IOLs gives the dual benefit of correcting refractive errors with eliminating the need for cataract surgery. RLE should be consistent and effective for a good refractive outcome along with safety during the surgical procedure and in the postoperative period. Therefore, proper patient selection and accurate preoperative protocols for IOL power calculations and selection are important along with an appropriate choice of surgical procedure. Dysfunctional lens index is a new objective tool that helps surgeon to aid in diagnosing, counseling, and educating patients with dysfunctional clear lens. In this article, we give a brief overview about the application of RLE for individuals with presbyopia and refractive errors like myopia, hyperopia, and astigmatism who are not suitable for laser correction.

Key words: Dysfunctional lens index, refractive lens exchange, spectacle independence

Polish ophthalmologist, Vincenz (Wincenty) Fukala, was a pioneer in the field of clear lens extraction surgery. He performed his first clear lens extraction in the late 1700s, in patients with high myopia. His technique of clear lens extraction gained popularity and surgeons all over the world started performing this surgery in high myopes.^[1] However, the long-term complication of retinal detachment was unknown to him at that time, and thus with time this technique was abandoned by surgeons due to its complications. However, now with the advent of phacoemulsification with multifocal and accommodating intraocular lens (IOL), refractive lens exchange in patients with high myopia and presbyopia, is gaining momentum, as a refractive surgery to provide spectacle/contact lens independence.

Procedures such as laser *in situ* keratomileus (LASIK), small incision lenticule extraction (SMILE), and photorefractive keratectomy (PRK) which target the cornea for refractive correction have been in vogue since the last decade.^[2] However, with advances in technique and technology, lens surgery as a refractive surgery modality has also come to the forefront even in absence of cataract.^[2] Refractive lens exchange (RLE) is a procedure wherein the clear crystalline lens is replaced with intraocular lens for the correction of the refractive error.

Indications and Contraindications

Refractive lens exchange differs from the standard cataract surgery, with respect to the fact that this surgery is being

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performed on clear crystalline lens as opposed to a cataractous lens. There are three groups of patients on whom refractive lens exchange is mainly performed

1. Those with high refractive errors (myopia or hyperopia) with clear lens and abnormal ocular anatomy, who are not good candidates for corneal refractive surgery or phakic IOL implantation.
2. Those suffering from presbyopia, with normal ocular anatomy and clear lens, but demanding spectacle independence from presbyopic glasses.
3. Combination of the above-mentioned scenarios.

Patients with higher degrees of myopia, hyperopia, and astigmatism are poor candidates for keratorefractive procedures. RLE is a viable option in younger patients where the anterior chamber is too shallow and excludes the use of a phakic IOL or in high hyperopic individuals.^[3] Angle-closure glaucoma is more common in hyperopic eyes due to their small size and shallow anterior chamber. Therefore even moderate hyperopes can benefit from RLE. The removal of the clear crystalline lens with multifocal intraocular lens implantation allows for spectacle free clear vision across all distances.^[4]

Certain pre-existing ocular pathologies which may be considered as contraindications include corneal disease, age-related macular degeneration, diabetic retinopathy, risk factors for retinal detachment (advanced peripheral lattice degenerations, lacquer cracks) and ocular inflammatory

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diseases. These ocular pathologies can degrade the quality of the image formed and result in poor vision postoperatively.^[5] Several studies done on RLE have shown low risk of post-operative complications following the surgery.^[6,7] However, other studies have demonstrated that complications such as posterior capsular opacification, retinal detachment, and cystoid macular edema can occur.^[8,9]

Emergence of Dysfunctional Lens Index (DLI) as a Novel Indication for RLE

Dysfunctional lens syndrome (DLS) is a term to describe crystalline lens aging.^[10] This aging process happens in 3 stages. Stage 1 corresponds to presbyopia, starts from 40 years, and is associated with loss of accommodation and limited scattering of light. Stage 2 starting from 50 years, is associated with an increase in light scatter and early changes in the lens may be noted. Stage 3 is usually seen in those 65 years or older and is associated with obvious lens changes. However, this division is not rigid and there is an overlap of symptoms between stages.

The iTrace Visual Function Analyzer (Tracey Technologies, Houston, TX) is a ray-tracing aberrometry system that enumerates several parameters, including the Dysfunctional Lens Index (DLI).^[11] DLI is calculated based on 3 factors from the iTrace exam: 1) the internal higher order aberrations, 2) contrast sensitivity, and 3) pupil size dynamics. It is an objective metric that helps in decision making of appropriate time to consider a refractive lens exchange for the clinically appearing clear but dysfunctional lens. It is ranked as zero (very poor) to 10 (excellent). Dysfunctional Lens Index can be used as an objective tool that helps the surgeon to counsel their patients. Use of corneal tomography to evaluate the health of posterior cornea, will help in confirming the diagnosis of dysfunctional lens.

The representation of DLI on the iTrace is simple and patient friendly. It uses Snellen's E chart to showcase the quality of vision. Poor DLI score is represented by blurred and distorted 'E' which becomes well defined and clear as the DLI score improves [Fig. 1]. Poor DLI is an indicator of dysfunctional lens. Clear lens extraction in such cases may help in improving symptoms.

We did a small study to correlate DLI with quality of vision and lens density changes in presbyopes. In this prospective cross-sectional study done at a tertiary eye care centre, 158 eyes of presbyopes (40-60 years) with best-corrected distance and near visual acuity 20/20 and N6 were included. Lens densitometry was assessed using lens opacity classification system (LOCS III) by two independent masked observers and on scheinplflug imaging (Pentacam HR; Oculus Optikgerate, Germany). Ray tracing aberrometry (Itrace, Tracey Technologies, Houston, TX) was used to assess DLI, quality of vision parameters like Area under Curve for Modulation Transfer Function (MTF AUC), Strehl's ratio (SR) and internal aberrations. Correlations between lens density, dysfunctional lens index and quality of vision parameters were studied.

The mean age of study population was 57.92 years (range 40-70 years). The average score of DLI was 7.810 with a standard error of 0.168, Strehl's ratio was 0.204 with standard error of 0.012, Modulation Transfer Function (area under curve) was 7.617 with standard error of 0.273 and that of internal Higher Order Aberrations was 0.268 with standard error of 0.014. Among the 158 patients, 17 had DLI score of <5, 45 patients had score between 5-7 and 96 patients had score of >7.

In presbyopes, abnormal lens aberrations (DLI <5) and significant lens aberrations (DLI <7) were seen in 10.24% and 37.34%. DLI showed significant negative correlation with LOCS III grading ($r = -0.297$, $P = 0.0$), pentacam average density ($r = -0.229$, $P = 0.006$) but not with maximum density ($r = -0.148$, $P = 0.079$). There was a positive correlation between DLI and MTF AUC ($r = 0.382$, $P = 0.0$), SR ($r = 0.377$, $P = 0$) and negative with internal aberrations ($r = -0.730$, $P = 0$). [Fig. 2]

We found a significant positive correlation of DLI with MTF AUC and SR and negative with Internal HOAs, which means that DLI is also an indicator of the quality of vision. Since DLI correlated well with average density of lens obtained from Pentacam Nucleus Staging software but not with maximum density and PNS grading, it means we should rather be focusing on average lens density changes in presbyopic patients. Results similar to that of our study were illustrated by Faria-Correia *et al.*^[11] They showed that reduction in corrected distance visual acuity strongly correlated with DLI than LOCS or Pentacam grading. This emphasizes the fact that DLI is a reliable quality performance indicator of the crystalline lens.

There are patients who complain of reduced visual quality despite having normal visual acuity quantitatively. Also, patients who had corneal laser vision correction surgery in the past may complain that their correction has decreased with time. One of the aetiologies for this could be the increased internal higher order aberrations due to a dysfunctional lens.

The demand for refractive cataract surgery is on the rise. There is growing awareness among patients about the modalities of spectacle independence like excimer laser surgeries, phakic IOLs or multifocal IOLs. The era of evidence-based medicine requires objective metrics to quantify the nuclear opalescence. Due to the subjective nature of LOCS III and Pentacam Nucleus Staging software applied on the scheinplflug imaging that cannot yield quality of vision metrics of the lens, DLI can be one of the impartial indicators for refractive lens surgery. It can also be used to monitor the progression of cataract over subsequent visits.

Our study concluded that DLI is as an objective indicator of the lenticular quality of vision in presbyopia. This tool can be used as a biomarker for identifying and counselling patients having clear lens but exhibiting symptoms of dysfunctional lens syndrome. Limitation of our study is that it being cross-sectional, long-term follow-up of the patients to look for change in the DLI with time and increasing nuclear opalescence was not done.

Fig. 3 shows the case of a 42-year-old gentleman who had come to us to get rid of his glasses. His best-corrected visual acuity was 20/20 and N6. Both eyes showed crystalline clear lens but DLI on itrace showed significant impairment. After thorough counseling and explaining pros and cons, patient underwent refractive lens exchange with a multifocal intraocular lens. Fig. 4 shows a simplified algorithm for decision making in such cases.

Critical Steps in RLE

IOL power calculations

Calculating the IOL power for RLE is similar to IOL power calculations for cataractous eyes. However thorough counseling is of utmost importance due to the

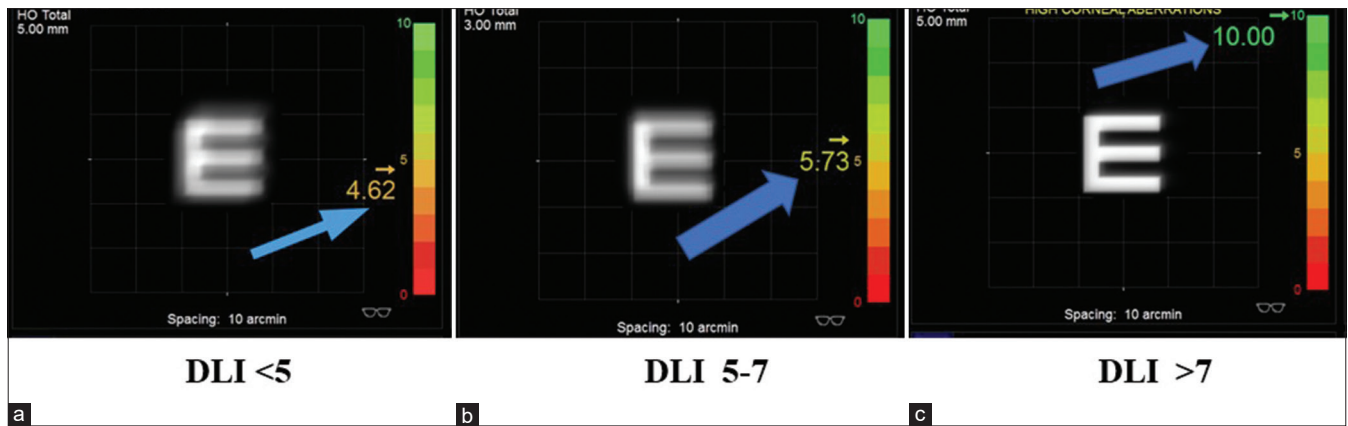


Figure 1: This is a representative image of different grades of dysfunctional lens index (DLI), where (a) DLI <5 suggests severely impaired lens function, (b) DLI between 5-7 means moderate impairment and (c) DLI>7 is considered normal

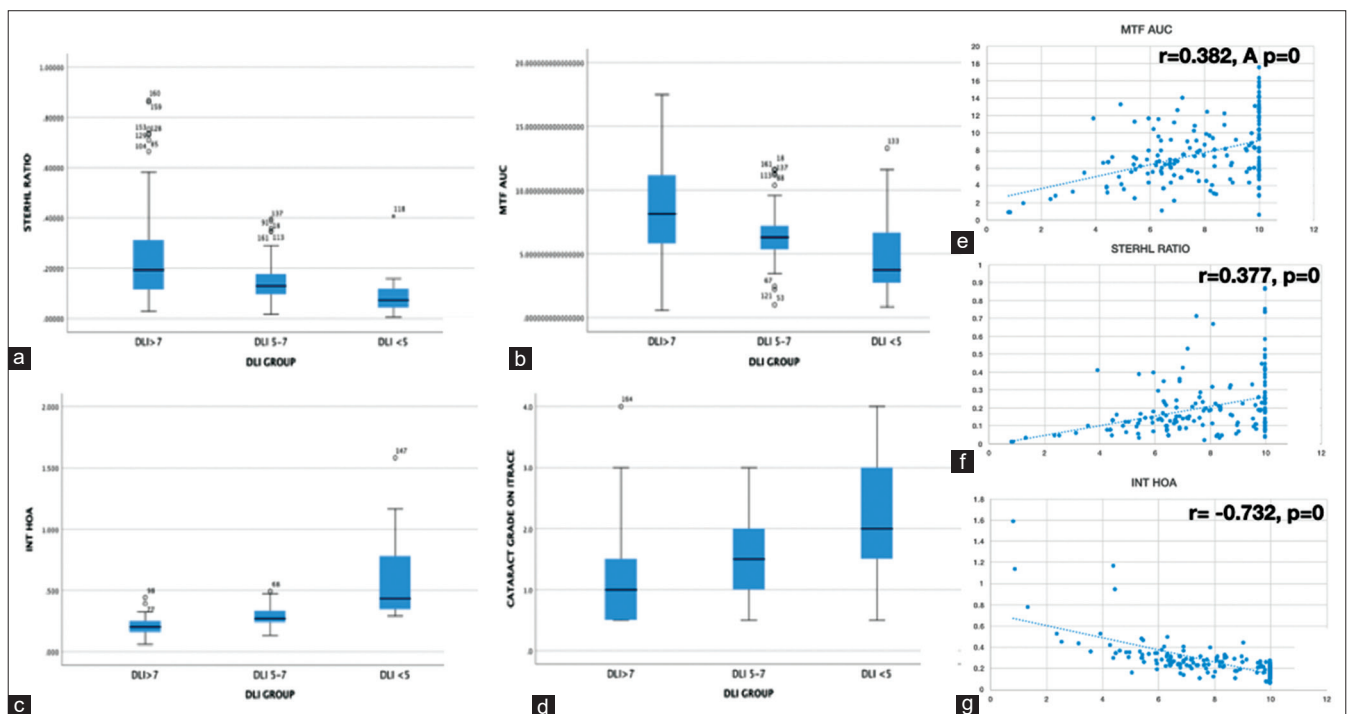


Figure 2: Shows the correlation between (a) Strehl's ratio, (b) modulation transfer function area under the curve (MTF AUC) (c) Internal higher order aberrations (HOA) and (d) cataract grading. Figures on the right show (e) positive correlation of dysfunctional lens index (DLI) with MTF AUC, (f) Strehl's ratio (SR) and (g) negative correlation with internal HOA

comparatively younger age of the patients. Informing the patients about loss of accommodation if monofocal lens is implanted and photic phenomenon if multifocal lens is implanted is a must.

Many studies have shown that for short eyes Haigis and Hoffer Q formulas gives good results whereas for long eyes Haigis and SRK/T formula gives the best results.^[12,13]

Alio *et al.* described a few fundamental technical principles, that the operative surgeon must ensure, while performing refractive lens exchange.^[14]

1. Since it is a refractive surgery, the aim should be minimal intraoperative manipulation with smallest possible, water tight clear corneal incisions (microincisions), inducing

minimal surgically induced astigmatism. Incisions should preferably be placed over steepest corneal meridian, with an aim to reduce any preexisting cylindrical component.

2. Minimal damage to intraocular structures.
3. Implantation of appropriate PCIOL in the bag, aiming for minimal to no posterior capsular opacification.

However, depending upon the ocular anatomy of the eye, the refractive surgeon has to modulate his surgical approach. The surgical approach in patient with high myopia is completely different than in the patient with high hyperopia.

Surgical pearls in high myopia

Deep anterior chamber, low scleral rigidity and chamber fluctuations in a myopic eye, make the surgery challenging for

surgeons. A temporal approach is always better in these eyes, as most of these eyes have significant astigmatism. It is not advisable to fashion a shorter main wound, as short wounds have poor healing capacity due to low scleral rigidity. The era of bimanual micro incisional surgery has revolutionized clear lens extraction surgery.

Fine *et al.* described a novel approach of bimanual micro incisional phacoemulsification by making 2 astigmatically neutral, 1.2 mm incisions with infusion being provided through a separate irrigating handpiece, and phacoemulsification and aspiration performed through a sleeveless phacoemulsification

needle. Use of microincisions improves chamber stability by decreasing unnecessary leakage of fluid, and loss of viscoelastic. It also decreases the risk of endophthalmitis. Most importantly it helps reduce the induction of surgically induced astigmatism.^[15]

Capsulorhexis in these patients should be fashioned, keeping in mind that it should have a 360 degree overlap over the optic, in the periphery to minimize the rate of PCO formation. It should be wide enough to allow later retinal examinations.^[16] Low bottle height should be maintained throughout the surgery to prevent excessive deepening of the anterior chamber. Sudden decompression of the chamber, while removing instruments out of the eye can be avoided by injection of viscoelastics from other sideport prior to removal of the instrument. Sudden decompression of anterior chamber could result in chamber fluctuations and ultimately unwanted vitreous traction in these patients.

Retropulsion syndrome with sudden deepening of anterior chamber is common in young myopes and can be avoided by upward tenting of the iris by a second instrument. Kelman-style curved phacoemulsification tip is very useful in a long eye with a deep anterior chamber. The aim of phacoemulsification in these patients is to emulsify the nucleus with minimal possible expenditure of ultrasound energy, while maintaining the integrity of the ocular structures. Supracapsular phacoemulsification is considered to be the preferred and safe approach.

Emara *et al.* in their study compared the supracapsular phacoemulsification technique with the endocapsular divide and conquer technique. Their study revealed that performing supracapsular phacoemulsification provides higher margin of safety from posterior capsule rupture, although marginal loss of endothelial cells was unavoidable, the difference in cell loss between two groups was not statistically significant.^[17]

Thus, a within the bag IOL placement, with a well-centered optic overlapping capsulorhexis with minimal anterior

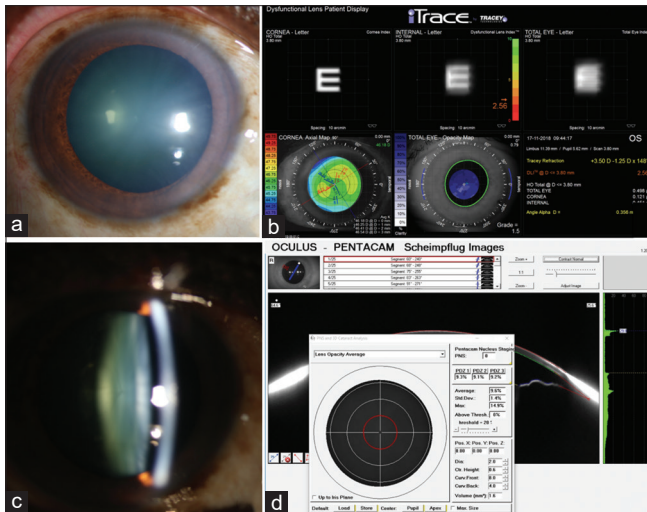


Figure 3: Shows a case of 42-year-old gentleman with clear lens (a) and (b) who had come for refractive correction. Dysfunctional lens index showed severe impairment of lens function (c). Pentacam nucleus staging did not reveal any density changes (d)

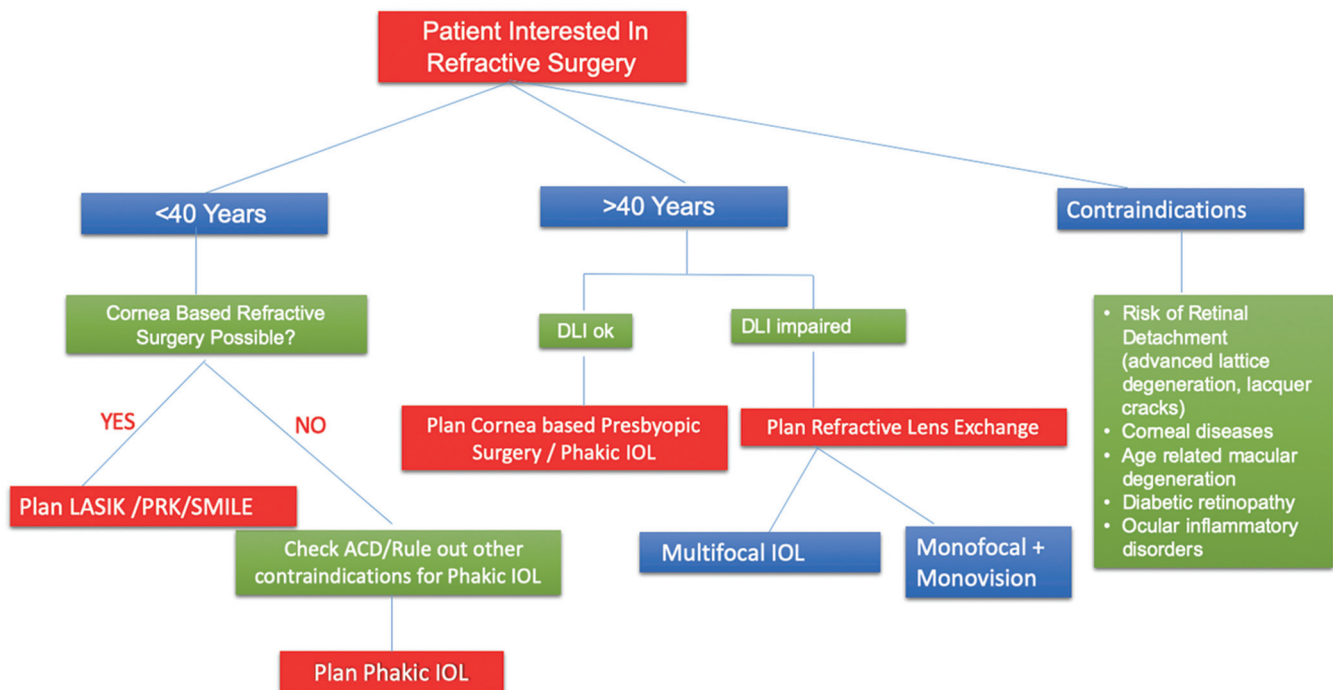


Figure 4: A simplified algorithm to ease the decision-making process during refractive correction

chamber fluctuation and thorough cortical wash is elemental in performing a successful refractive lens exchange surgery. Femtosecond laser can be used to make an accurately sized and centered rhexis along with fragmentation or chopping of nucleus. It can thus help reduce intraocular manipulations and reduce utilization of phaco energy.

Surgical pearls in high hyperopia

Refractive lens exchange in short eyes (AL < 21 mm) in hyperopes is a daunting task for every surgeon. Shallow anterior chamber, narrow angles, increased positive vitreous pressure and high risk of developing uveal effusion and expulsive choroidal hemorrhage make refractive lens exchange surgery in these patients challenging. Adequate use of dispersive viscoelastic to coat the endothelium prevents potential endothelial damage that can be caused by shallow anterior chamber. Higher bottle height during surgery can avert the positive vitreous pressure. Minimizing the chamber fluctuations can obviate expulsive choroidal hemorrhage.

IOL selection

Implantation of IOL after clear lens extraction is one of the most crucial steps in refractive lens surgery. The availability of foldable low power plus, minus, and zero power lenses have made it possible for refractive surgeons to always implant an IOL after clear lens extraction. Implanting an IOL in these patients, mitigates the development of posterior capsular opacification, as well as reduces the forward movement of vitreous and thus the risk of retinal detachment.^[18] A study conducted by the National Outcomes of Cataract Extraction, suggested that the probability of retinal detachment after phacoemulsification was less than 1% compared to ECCE, where the rate was 7%–8%.^[19] Frich *et al.* reported in their study that implantation of IOL reduces the incidence of retinal detachment in patients who undergo IOL implantation.^[20] The risk of retinal detachment in patients undergoing Nd Yag capsulotomy post IOL implantation is much lower than in aphakic patients undergoing Yag capsulotomy.

Multifocal IOLs

The advent of multifocal IOL was one of the prime factors which resulted in the resurgence of RLE surgery. Multifocal, multifocal toric lenses, accommodating lenses or monofocal lens with monovision are various options that the surgeon can provide patients undergoing RLE to achieve spectacle/contact lens independence after surgery.

Multifocal IOLs provide a wide range of vision by correcting near, intermediate, and distance visual acuity by distributing light into different foci for the same. This distribution of light energy occurs at the expense of contrast sensitivity. Historically, the array multifocal was the first multifocal lens implanted for patients undergoing refractive lens exchange. A small study conducted by Packer M *et al.* showed that more than 90% achieved an uncorrected binocular visual acuity of 20/30 and J4 and nearly 60%, of 20/25 and J3.^[21] Over the years, multifocal IOLs, underwent further development with the advent of bifocal refractive and diffractive IOLs followed by trifocal and trifocal toric IOLs. The bifocal IOLs provide excellent near and distance vision. However, intermediate vision is compromised by the distribution of light at near and distance foci. Trifocal IOL provides excellent near, distance and intermediate vision. However multiple studies have shown that trifocal IOLs have a poor modular transfer function as compared to bifocal

IOLs. A meta-analysis done by the Korean group, Yoon *et al.* compared the efficacy of trifocal IOL with bifocal diffractive IOL after RLE. They concluded that trifocal IOL provided superior intermediate vision than bifocal diffractive IOL with comparable near and distance vision without compromising visual quality. Patients with cylindrical error more than 0.75D cannot undergo multifocal IOL implantation. The option of implanting a toric multifocal IOL can be explored in such patients demanding spectacle independence. However, one of the major limiting factor in multifocal IOL implantation in these patients is the availability of the extended range IOL power.

Accommodative IOLs

Accommodating lenses are fashioned on the basis of normal physiological mechanism of accommodation. Most of these accommodative lenses are based on the principle of changing the axial position of the IOL. These lenses are either of the single optic or the dual optic variety. Eyeonics Crystalens (Eyeonics, Inc., Aliso Viejo, CA, USA) is a single optic silicone lens with hinges on its side plates. Most studies have not shown any significant difference between distance visual acuities of monofocal and crystalens. However, poor near and intermediate vision with crystalens have been reported by majority of the studies.^[22-24]

Synchrony AIOL (Visiogen, Inc.) is a dual-optic-based accommodating silicone IOL. The anterior IOL component has a higher plus power in addition of that required for emmetropia. The posterior IOL component has a minus power to return the eye to emmetropia. Upon ciliary muscle contraction the distance between the anterior and posterior component of the optic decreases & the anterior IOL component provides for near vision. Alio *et al.* in their study, on patients implanted with Synchrony, showed better visual acuity at several levels of defocus.^[23] However extensive research is required in the field of accommodating IOLs. One of the major drawbacks of accommodating IOL placed in the capsular bag is their action is dependent on the capsular bag. Capsular fibrosis and contraction leave these accommodating IOLs redundant.

In order to understand the visual performance of accommodative IOL compared to multifocal IOLs, Alio *et al.* divided the study subjects undergoing phacoemulsification into 3 groups based on the IOL implanted. The refractive multifocal provided the most comfortable distance and near vision with the diffractive multifocal group providing the early recovery of near vision. The least amount of postoperative visual phenomena were seen with accommodative IOL.^[25]

Monofocal IOL with Monovision

Monovision works on the principle of blur suppression and is mediated by the central nervous system. Using this approach, the dominant eye is completely corrected for distance and the non-dominant eye is corrected for near. This approach after RLE can be used for offering spectacle independence to patients where multifocal or accommodative IOL cannot be implanted. A preoperative trial can also be given to the patient by using contact lenses or high powered trial lens in spectacle frame. Thus, if tolerated well by the patient this can turn out to be a cost-effective approach in patients in whom multifocal IOLs are contraindicated or not available in extended range.

Complications

- Retinal detachment

Retinal Detachment (RD) is one of the most alarming and vision threatening complications of RLE. The incidence of retinal

detachment varies from 1.5% to 8% in patients undergoing RLE.^[26] Higher rates of retinal detachment were observed in patients who underwent ECCE in yesteryears for clear lens extraction. However with the advent of phacoemulsification, the rate of retinal detachment has reduced. Myopic patients are at higher risk of retinal detachment than the normal population.^[27] Undergoing RLE increases this risk by many fold. Higher rates of retinal detachment after RLE occur predominantly due to 2 causes (a) Preexisting peripheral retinal conditions like lattice degeneration, retinal holes, tears (very common in myopes) (b) Volumetric changes in vitreous occurring intraoperatively due to change in IOP, which may result in traction or vitreous degeneration.^[28] Numerous other risk factors like young age, greater axial length, higher refractive error, Nd Yag capsulotomy also increase the propensity of RD in these patients. Javit *et al.* reported a 3.9 fold increase in risk of RD post YAG capsulotomy in their study.^[29]

- **Posterior Capsular Opacification (PCO)**
PCO is one of the vision-impairing complications observed after RLE. Following certain intraoperative measures like thorough cortical clean-up, 360 degree overlining of capsulorrhexis edge on the IOL optic, implanting square-edged hydrophobic IOL, can avert PCO formation. Nd Yag Capsulotomy can be performed to clear PCO postoperatively. However, Nd Yag capsulotomy can increase the predisposition for retinal detachment.
- CNVM is very common in patients with lacquer cracks, or those with CNVM in fellow eyes undergoing RLE.^[30] However, no clear consensus has been reached upon the mechanism precipitating this condition.
- Cystoid macular edema is another common complication that can occur after RLE, especially in myopes, within weeks of undergoing RLE. Since RLE is an intraocular procedure, some risk of endophthalmitis always persists.

RLE vs Corneal Presbyopic Surgery

For patients of 40 years of age and beyond, loss of accommodation is an important consideration when planning a refractive surgery. Presbyopia can be corrected using either a dynamic approach or a static approach. Dynamic approach refers to restoring the accommodation by RLE/cataract surgery with accommodative IOL whereas static approach is focused on improving the depth of focus. This includes laser procedures which target the cornea. PresbyLASIK is a procedure wherein the excimer laser ablation of the cornea is done to achieve multifocality by inducing spherical aberrations. Various algorithms have been designed to determine the corneal zone to be ablated. SCHWIND eye-tech solutions have introduced software called PresbyMAX which ablates cornea such that the center has more positive asphericity.^[31] A study done to evaluate PresbyMAX ablation in patients with myopia, hyperopia, and emmetropia found that monocular contrast sensitivity was reduced in all groups but the binocular contrast sensitivity remained unaffected. There was a reduction in the uncorrected near vision for myopes while for hyperopes and emmetropes the near vision improved.^[32] Another study comparing PresbyMAX in myopes and hyperopes made a recommendation for multifocal contact lens usage for the patients prior to undergoing the procedure.^[33] Presbyond by Zeiss has an algorithm called laser blended vision which allows for monovision in the non-dominant eye. Studies by Reinstein *et al.* on this micro monovision protocol showed

that although the contrast sensitivity reduced slightly, the post-operative vision and patient acceptance of the procedure were excellent.^[34,35]

RLE vs Phakic IOL

Several factors need to be considered while choosing between RLE or pIOL for a patient. These include the age of the patient, patient expectations following the surgery and amount of correction that is needed.^[4] Several studies have been done to evaluate the risks and benefits of these procedures. In a study comparing RLE with pIOL for patients less than 40 years of age with high myopia of 12 dioptres and above, the best-corrected visual acuity (BCVA) was found to be similar in both the groups postoperatively. Intraocular pressure rise was found to be more for the pIOL group. The authors concluded that RLE is a good option in developing countries due to less financial burden as there is no need for a second surgery in future.^[36] Another study done for high myopes in 30–50-year age group found that pIOL implantation gave similar BCVA as RLE but was a more safer alternative as there was less risk of retinal complications with pIOL.^[37]

One of the major reasons for consideration of pIOL in younger individuals is the preservation of accommodation with a fast visual recovery and reversibility of the procedure.^[38] However, in uncooperative children with shallow anterior chamber or when pIOL implantation is considered risky, RLE is viable option. In a study done by Tychsen *et al.* to evaluate the effects of RLE in the pediatric age group with high myopia with neurobehavioral disorders, the functional vision was found to be improved significantly. RLE in pediatric age group can be considered for the following indications where corneal laser procedures are contraindicated:

- Ametropia bilaterally or when there is a high degree of anisometropia
- Absence of binocular single vision due to some congenital defects
- High refractive errors in children non-compliant to spectacle or contact lens use

Nowadays with the newer premium IOL's such as trifocal IOLs, extended depth of focus (EDOF) IOLs and accommodating IOLs, the fear of loss of accommodation for younger population undergoing RLE has drastically reduced and good functional vision across all distances can be achieved. The added advantage of not developing a cataract in future and having to undergo a second surgical procedure makes RLE a very attractive alternative.^[14]

Conclusion

RLE is a unique surgery providing refractive correction for a larger refractive range along with obviating the need for cataract surgery. Dysfunctional lens index is an effective tool that comes handy in educating and counseling patients with clear lens but with symptoms of dysfunctional lens syndrome. However, proper patient selection is critical for its success. Ensuring thorough preoperative evaluation and minimal intraoperative manipulation along with adoption of advanced surgical techniques like micro incisional bimanual phacoemulsification will ultimately pave the way for optimum visual outcomes. Nevertheless, it is essential to take into consideration the postoperative complications of this procedure and counsel the patient adequately about its risks and benefits to ensure success of this surgery.

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Conflicts of interest

There are no conflicts of interest.

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