

## Presbyopic Intraocular Lenses – Managing Unhappy Patients

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### Abstract

We describe a system for improving patient satisfaction with presbyopic intraocular lenses (IOLs). Pre-operative education to set realistic expectations for the pros and cons of various IOL options are described. Each presbyopic IOL in widespread use in the US is then described in turn. Finally we lay out the seven Cs for improved patient satisfaction with presbyopic IOL surgery. The seven Cs are: consecutive treatment, cylinder and residual refractive error, capsular opacification, cystoid macular oedema, cornea and ocular surface disease, centration and circumference of the pupil relative to the IOL.

### Keywords

Cataract surgery, presbyopia, premium intraocular lenses, multifocal intraocular lenses, dry eye

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### Pre-operative Education

There are several important steps that should be taken to dramatically increase post-operative success with presbyopic intraocular lens (IOL) cataract surgery. In general, all cataract surgery and specifically premium IOL surgery require careful patient selection and counselling, along with precise surgical technique. The best candidates for multifocal or accommodative IOLs and the cases that less experienced surgeons should begin with are hyperopes and higher myopes, who have more significant cataracts and minimal astigmatism and are motivated to reduce their dependence on spectacles for near and distance. Emmetropes and especially low myopes may feel that their distance or near vision with a presbyopic IOL was preferable prior to surgery and should be counselled accordingly. Patients do best with bilateral multifocal or accommodative IOL implantation and usually have the second cataract surgery performed within one month of the first surgery. Multifocal IOL implantation requires the same surgical technique as conventional monofocal cataract surgery. However, the optics of these presbyopic lenses requires precise centration, necessitating a well-centred capsulorrhexis and good zonular integrity in order to achieve optimal visual results. Accurate biometry with advanced technology such as the IOL Master and LensStar and control of astigmatism are also essential to maximising outcomes and the lens constant must be carefully personalised to the individual surgeon. For this reason tracking postoperative results is imperative to refine surgical outcomes. Post-operative astigmatism needs to be reduced to half a diopter (D) or less. For patients with astigmatism greater than this, limbal relaxing incisions, laser *in situ* keratomileusis (LASIK) or photorefractive keratectomy (PRK) may be required and the patient should be told about this prior to surgery.

Patient understanding of acceptable and expected surgical outcomes are also imperative for the achievement of optimal results. Patients

with unrealistic expectations for visual improvement and patients with excessive complaints about spectacles or contact lenses may not be candidates for multifocal IOLs. In addition, patients whose occupation requires significant night driving and those who complain of excessive glare and halo at night may not be ideal candidates for multifocal IOLs. Topical non-steroidal anti-inflammatory drugs (NSAIDs) should be used perioperatively to decrease the risk of cystoid macular oedema and improve retinal function.<sup>1</sup>

The first step to any refractive procedure is to determine what the patient's visual requirements are. Asking the patients to complete a questionnaire like the one shown below which was described by Steven Dell is very helpful for this purpose. It is important to understand the differences between the various presbyopic IOLs in order to tailor the IOL choice to the needs of the individual patient. The key features of the three presbyopic IOLs in most common use are listed below:

### ReSTOR Intraocular Lens®

On the ReSTOR® IOL, the central 3.6 mm of the lens surface consists of 12 apodised diffractive optic rings with the 4 D add and nine rings with the 3 D add. The periphery of the lens is a traditional distance refractive optic. The optical profile for the ReSTOR lens provides an equal distribution of energy between the two primary images at near and far for pupils up to 3.6 mm, but as the pupil becomes larger, more of the light goes to the far lens power; the concept being that near tasks generally require more illumination and the pupil constricts for near tasks with the accommodative reflex. Distance tasks, particularly while driving at night, benefit from the distance-dominant periphery of the lens when the pupil is larger. The 3 D add enables better vision at intermediate distances while the 4 D add provides better near vision with less emphasis on intermediate vision. Both lenses have aspheric optics to improve contrast sensitivity.

### Tecnis® Multifocal Intraocular Lens

The Tecnis® multifocal IOL has a diffractive posterior surface with all of the light split 50:50 between distance and near independent of pupil size. The near portion is a +4.00 D add. The anterior surface gives the lens its aspheric properties, while the entirely diffractive posterior surface affords the recipient visual acuity (VA) that is pupil-independent. The Tecnis multifocal provides improved near vision for patients with larger pupils and patients who wish to read in dim illumination where pupil dilation is expected.

### Crystalens®

This is the only accommodating IOL currently approved for use by the FDA. The advantage of this lens is that glare and halos at night are less likely than with multifocal IOLs. However, less near vision is normally achieved and these lenses give between 0.5 – 1.5 D of accommodation or pseudo-accommodation and are useful for intermediate vision. Patients receiving the Crystalens® must be counselled that they will usually require a mild monovision or spectacles to be able to read at near. In addition, these lenses are more refractively unpredictable and enhancements are more commonly required than with other IOLs.

### Pre-operative Expectations

The next step in dealing with presbyopic IOL patients is to set realistic expectations preoperatively. Always talk to patients before surgery about common concerns such as glare, halo, quality of vision, residual refractive error and the need for enhancements. Chair time spent with these patients before surgery pays dividends later on. When you tell a patient they may have glare and halo after they have a multifocal IOL, they have an expectation. If they are not told about glare and halo preoperatively it is perceived as a complication.

When a patient returns following cataract surgery and is unhappy, our technicians are instructed to perform a refraction, topography and optical coherence tomography (OCT) prior to the surgeon evaluating the patient. With this information, the ophthalmologist is able to walk into the room and give the patient an informed opinion as to why they might be unhappy and suggest solutions immediately. Our goal is to never allow the patient to become angry with the surgeon as this disrupts the doctor-patient relationship. Our patients who are unhappy know that we are working with them to try and resolve their problems.

### Management of the Unhappy Post-operative Patient – The Seven Cs

There are seven different causes of unhappy patients after presbyopic IOL implantation which should be looked for in any patient who is not completely satisfied following presbyopic IOL cataract surgery.

#### Consecutive Treatment

We expect patients to not be fully functional until the second IOL is placed and we warn patients about this preoperatively. When implanting presbyopic IOLs, tell the patients they will be dissatisfied with their visions after only one eye has been operated on. The importance of having both eyes completed is critical for the success of the procedure along with providing for an adequate neuroadaptation period. However, in the rare circumstance that the patient is extremely unhappy following surgery on the first eye, we do not recommend operating on the second eye until the first surgical result has been optimised. The second IOL choice may be predicated on the patient's response to the first surgery.

### Cylinder and Residual Refractive Error

Presbyopic IOL patients are incredibly sensitive to small refractive errors, and the surgeon must be willing and able to treat these small refractive errors. Any astigmatism greater than 0.5 D in a symptomatic patient should be treated. Limbal relaxing incisions can be useful for less than 1.5 D of cylinder and for more than 1.5 D of cylinder surface ablation or LASIK provides more accurate results. For patients with high cylinder it is reasonable to debulk the refractive error with an LRI and then fine tune with the excimer laser.

### Capsular Opacification

These patients are extremely sensitive to any opacification of the posterior capsule. The loss of contrast sensitivity and the glare created by the multifocal IOL is made worse by any capsular opacity. Depending on the patient's complaint and mesopic/scotopic pupil size, multifocal IOL patients may require a larger capsulotomy than normal. An important consideration is that once the posterior capsule is opened it makes a safe IOL exchange more difficult. It is important to be sure that the capsule is the problem before proceeding. We commonly tell patients that when we 'break' the posterior capsule they 'buy' the IOL.

### Cystoid Macular Oedema

Patients who have conventional cataract surgery with no risk factors and no capsular breakage, have up to a 70 % chance of having macular thickening on OCT<sup>1</sup> and a 12 % chance of having visually significant CME without the use of a topical NSAID.<sup>2</sup> In addition, the loss of contrast sensitivity associated with a multifocal IOL is made much worse by CME.<sup>3</sup> Once you lose the normal architecture of the retina, that visual quality is degraded for life. Snellen visual acuity will improve, but contrast sensitivity will be permanently reduced. The best way to look for CME after cataract surgery is with OCT. In addition, OCT is a very effective screening tool preoperatively for epiretinal membranes and lamellar macular holes. Multifocal IOL patients will not tolerate the lenses if they have significant maculopathy. We recommend using a topical NSAID four times a day for three days preoperatively and continue it for 4–6 weeks postoperatively to help prevent CME.

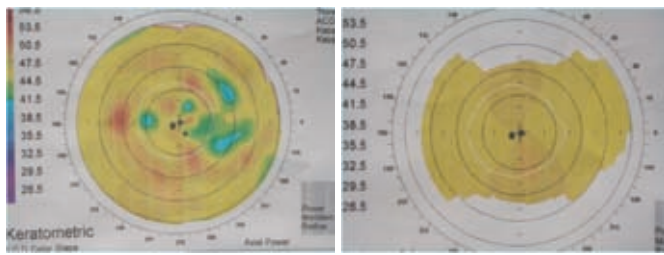
### Corneal and Ocular Surface Disease

Vision starts with the tear film and the tear film is the most important refracting surface of the eye. The concept of stressing the visual system also applies to ocular surface disease which is a common problem in presbyopic patients. Even mild disruption of the tear film impact greatly on quality of vision. Patients without dry eye receiving bilateral multifocal IOL implantation had significantly improved mesopic and scotopic contrast sensitivity in the eye that received topical cyclosporine than eyes that received only an artificial tear. In addition, these patients were more satisfied with the eye that received topical cyclosporine.<sup>5</sup> When evaluating the tear film do not neglect the meibomian glands. New treatments with oral nutritional supplements such as Theratears Nutrition, hot compresses and topical azithromycin have dramatically improved lid function. A more regular tear film with a more regular ocular surface improves quality of vision.

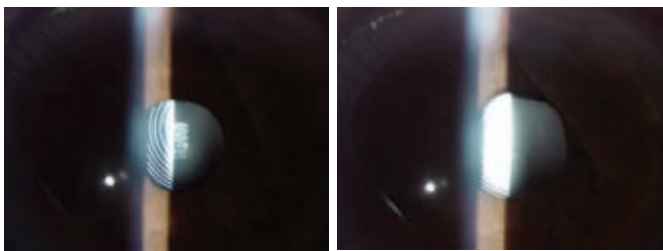
### Centration of the Intraocular Lens Relative to the Pupil

It is important to look for the centration of the IOL behind the pupil. The pupil and the centre of the capsular bag often do not coincide so the lens will appear decentered (see *Figure 2*). In these situations in a symptomatic patient we do an argon laser iridoplasty. We place four spots in the iris midperiphery in the

**Figure 1: Topography Before and After the use of Topical Cyclosporine 0.05 %**



**Figure 2: Intraocular Lens Not Centred Under Pupil Before and After Argon Laser Iridoplasty**



direction we want to pull the pupil. We perform an iridoplasty with a treatment of 500 mW power and 500  $\mu$ m diameter spot size for a duration of half a second. We do this when a patient complains of glare and halo or when we are going to perform an excimer laser enhancement. We want to centre the IOL on the pupil so we are not ablating the patient off the visual axis or off the centre of the lens. It is important to remember that although interventional these procedures may spare a symptomatic patient the need for an IOL exchange.

### Circumference of the Pupil Relative to the Intraocular Lens

This is important in patients who have had a ReSTOR IOL. If patients are complaining of poor reading vision with this lens then they require constriction of the pupil to increase the proportion of

light being handled by the +3.00 or +4.00 central reading add. This can be done by prescribing topical brimonidine or pilocarpine. If the patients complain of poor distance vision then they may benefit from dilation of the pupil to increase the proportion of light being handled by the distance dominated periphery of the lens which can be done either pharmacologically or with 360 degrees of midperipheral argon laser iridoplasty.

### Patient Management

Patients who are unhappy following presbyopic IOL implantation require attention to detail from a surgical, pharmacological and psychological perspective. Most importantly, these patients should never feel abandoned and we emphasise that we will always work with them to solve their problems but that this may take time. Patients are also told that in a worst case scenario an IOL exchange for a monofocal IOL is almost always an alternative.

We always attempt to expedite treatment as soon as it is safe for the patient. Commonly limbal relaxing incisions can be performed as soon as two weeks following surgery. Patients who require LASIK or PRK are treated as soon as one month following multifocal IOL surgery and at four months following Crystalens implantation. With the Crystalens we always perform a posterior capsulotomy prior to an excimer laser enhancement as the capsulotomy may change the refractive error. Additionally, we do not charge our patients for refractive enhancement unless they are refractive outliers and we document this with the patient prior to cataract surgery. We have found that asking an unhappy patient to pay for additional surgery does not support the doctor patient relationship.

### Conclusion

In conclusion, there are many things we can do to improve visual outcomes in patients with presbyopic IOLs. It is important to investigate and treat organic problems first before assuming that neuroadaptation will resolve all of the issue. With attention to residual refractive error, the ocular surface, CME, the posterior capsule, pupil centration and circumference over the IOL the unhappy presbyopic IOL patient can be converted to the happy post-operative patient. ■

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