



Multifocal Intraocular Lenses: Solutions for the Unhappy Patient

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10.1 Introduction

Whilst the use of multifocal IOLs has increased very greatly in the past decade as more and varied designs come onto the market and increasing patient awareness and surgeon enthusiasm has driven demand, not every patient is happy with the result. This may, for example, be because of a suboptimal visual acuity result for either near or distance or due to the effects of the IOL design causing intolerable dysphotopsias. Very often these problems will be due to inadequate understanding by the patient of what is actually possible. This chapter will review the major causes of patient unhappiness and suggest solutions.

10.2 Avoiding Problems by Adequate Preoperative Discussions and Ocular Measurement

After having carried out a full ophthalmic examination to make sure that there are no comorbidities like tear film deficiency or macular problems which will not only compromise the visual result but are contraindications for multifocal IOL use, time needs to be spent talking through what your

patients are about to experience. Many of the issues which appear as a problem for these patients after their surgery would not occur with time spent in discussion prior to surgery. This includes an assessment by the surgeon and ancillary staff as to the character, patient's needs, lifestyle, and expectations. It may be that unreasonable expectations for a visual outcome or a particularly obsessive nature will be a contraindication for the use of these lenses. Never promise full spectacle independence but say that there is a good chance that a lot of the time glasses will not be needed. There are a number of useful questionnaires available to try to assist in this personality assessment.

From the surgeon's point of view, a well-developed knowledge of the characteristics of each style of lens they plan to use is mandatory. Do they, for example, give good distance vision at the expense of better reading vision like the Restor +2.5 (Alcon, USA) add or the Comfort lens (Oculentis, Germany) with a + 1.5 add? Will reading require good light for the lens to work like most diffractive IOLs but most particularly the PanOptix (Alcon, USA) add with a central diffractive area? In my practice we go to great lengths to emphasize such issues. All patients need to understand that whichever IOL is used a compromise will need to be made as the available light is divided and some lost. There is simultaneous vision between near and distance resulting in a second blurred image which patients need to

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learn to ignore. This becomes even more important when trifocal lenses like the Fine Vision (Physiol, Belgium) or the Lisa Tri (Zeiss, Germany) are being considered. In the past, most multifocal IOLs were actually bifocal and the relatively poorer intermediate vision available needed to be emphasized. There are now a number of newer trifocals including those from Rayner in the UK, Care Group in India and VSY in Turkey. All diffractive IOLs will lead to haloes at night and patients need to know this in advance and preferably get some idea of what this means by a simulation. Many patients with cataracts will have been aware of these anyway. Patients should be informed that this phenomenon is a function of the design of the lens and that the vast majority of people get used to them very quickly. I also emphasize that when driving at night it is important to look at the near side kerb where the dipped headlight beam falls.

Patients should have a clear idea of the process and time frame of adaptation to their new lenses. Although most patients will be comfortable with their near and distance vision within a week some may take much longer, up to several months. I say to all my patients that they will be happy quicker if they do not try to deconstruct every aspect of their vision because this will lead to a much slower neural adaptation and potential dissatisfaction. All of the multifocal lenses available have a fixed reading distance which has a limited range on either side of the sweet spot. Patients need to realize that finding the focal length at an early stage postoperatively will lead to a quicker adaptation to their new visual status. I emphasize that from day one they should try to find this distance and try to place whatever they are reading in the same position until it becomes second nature. The same is true of intermediate distance with trifocal IOLs. But both of these will blend as time goes on as part of the neural adaptation. One reason I like to carry out same day surgery is that there is no opportunity to compare eyes and also because of the enhancement to a vision of binocular implantation from day one. Certainly, there are advantages of doing the surgery to both eyes in close temporal proximity even if not on the same day.

Optimisation of A constants and careful biometry with an optical device like the IOL Master or Lenstar will help to avoid refractive surprises. The Zeiss Lisa Tri has been optimized for the Haegis formula but whichever formula is used the surgeon must optimise from their refractive outcomes. Using the calculator on Dr. Warren Hill's website makes this a simple exercise. The Hill-RBF calculator and the Barrett suite are now generally recommended for the most accurate calculations. If it is not possible to use an optical device for biometry it is preferable to use immersion A scan as this is more accurate than using the direct contact method.

It is critical that the corneal characteristics are also assessed. Using topography and aberrometry will not only pick up corneal abnormalities like forme fruste keratoconus and coma which will be contraindications for multifocal IOL implantation but using a Scheimpflug device like the Pentacam enables the surgeon to determine the posterior corneal power. The Barrett True-K formula has proven very useful. This last has been shown to be important in determining the amount of cylindrical error requiring correction by a toric IOL of any sort. With a multifocal IOL astigmatism of 0.5 dioptres or more should be corrected. With very small amounts of cylinder limbal relaxing incisions may be a better option than a toric lens especially if done with the precision of the femtosecond laser.

Having made the patient aware of what they should expect from their new lens and given them a fully informed consent form to sign it is now time to arrange their surgery. Be aware that despite the best efforts of you and your staff to prepare your patients for their surgery and recovery they will forget most of what has been told them. It is thus very important that you give patients written information about their lenses. Most companies will have some patient literature available but you may wish to create your own.

When the time comes for surgery, apart from the obvious need to make a central capsulorhexis overlapping the IOL, making every effort to place a toric lens accurately is even more important when using a multifocal. Even small inaccuracies of placement will result in degradation of the image for the patient.

10.3 Why Are Patients Unhappy?

Let us assume in the first instance that the surgery has gone well, the lenses are implanted as expected and the patient has come for their first postoperative visit. Despite all that you and your staff have told them they are not happy. At this point it is important to try and assess what is disturbing them. What are the potential problems?

- Distance vision less than expected.
- Distance vision “waxy”.
- Reading vision less than expected.
- Inability to read in poor light.
- Poor intermediate vision.
- Dark shadow in the temporal field.
- Glare and haloes at night.
- Poor night vision.
- Foreign body sensation.

Let us consider these in turn.

- Inability to see clearly down the chart beyond 20/40 or 6/12. This is due to two issues either the biometry has been inaccurate or a toric lens has not been correctly placed or has shifted position. These patients will generally require some remediation and this will be discussed below.
- The patient has a comorbidity in the eye which was not picked up preoperatively. For example, in cataract patients, a preretinal membrane may not have been visible through the lens opacity. An OCT is recommended for all patients for MFIOLs. In the presence of an epiretinal membrane referral to a vitreoretinal surgeon is required. A poor tear film is often missed and can have a profound effect on the vision with multifocal IOLs. Checking tear osmolarity and break up time preoperatively even when patients are asymptomatic is a useful exercise which can avoid later disappointment. Dosing with lubricants may improve things considerably.

10.4 Distance Vision Less Than Expected or “Waxy”

I normally see my patients at one week postoperatively for their first visit by which time the effects of the surgery on ocular tissues are normally mostly gone. By this stage the patient should be getting a fair idea of their distance vision. Complaints of poor distance vision at this point generally fall into three categories:

- Failure to adapt to the presence of both near and distance vision at the same time. Patients report that they can see a long way down the chart but somehow it seems blurred. This is generally more of a problem in diffractive multifocals like the Restor or Tecnis than zonal refractive lenses like the MPlus. If the spherical correction is accurate, i.e. less than 0.5 dioptres from desired outcome, patients will generally adjust pretty quickly and learn to ignore the blur and concentrate on the clear image. Although some may always complain that their vision seems “waxy”.

10.5 Reading Vision Less Than Expected and Poor in Low Light

One of the main reasons that patients opt for a multifocal IOL is to be able to read without glasses. Thus when they cannot even in good light they are not happy. This may occur for several reasons.

- At one week postop however one of the commonest reasons for less than expected reading vision is that the reading material is not being held in the optimal position. A little time spent demonstrating that reading is actually good when the right position is used generally solves the problem particularly when the patient has shown you that they have good unaided distance vision.
- It may be that the reading addition is not sufficient for the patient to resolve small print. Often this is because the lens has been chosen for distance and intermediate vision according to the patient’s claimed needs. The spherical

correction is not correct. This will mean that if myopic the reading distance may be too close or too far if the patient has ended up hyperopic. As for distance vision a toric lens may be malpositioned. Solutions for this will be discussed below.

- As above ocular comorbidity may be present and will need to be dealt with as before.

Reading in poor light is generally not very good with most multifocal lenses. When patients complain of this they need to be reminded that they were told this before surgery. I normally suggest the use of the flashlight on a mobile phone if they need to read for short periods. For extended reading using a good halogen or LED light works very well.

Early and seemingly minimal posterior capsular changes can with MFIOLs lead to loss of reading vision and such patients will need a capsulotomy much sooner than in a monofocal implant. A wide capsular opening is essential here to enable the IOL to function properly again.

10.6 Poor Intermediate Vision

As already stated most multifocal IOLs were in the past in fact bifocals but whilst some with lower adds have good intermediate vision for most it is much poorer than near or distance. Happily the availability of trifocal MFIOLs has really eliminated this as an issue.

10.7 Dark Shadows or Flickering Lights in the Temporal Field

The shadow is a common complaint in the early postoperative period due to a negative dysphotopsia, but there may also be a positive change in the temporal visual field as in shards of light. There are many theories as to why these occur but no clear answers. The good news is that these usually disappear with time. Some say that it is when the anterior capsule covering the edge of the IOL opacifies others that the patient adapts. Others still say that it is the anterior capsule itself which causes

the problem. It may be due to a space between the edge of the lens and the iris allowing stray light to create an internal reflection from the sharp edge of the IOL. Another theory says that when the pupil is small, a penumbra is created in the nasal field of vision which is seen as a dark arc. In some patients it can persist because either they are unable to adapt to it or it just has not got better. In any event they complain bitterly leading to frequent office visits. Solutions will be discussed below.

10.8 Glare and Haloes

Inherent in the design of all MFIOLs whether they are diffractive or refractive is the likelihood of some unwanted optical effects like glare and haloes. However, some designs have been shown to have more problems in this regard than others. Diffractive designs, due to the concentric rings on their surface that enable near, intermediate, and distance vision to be achieved, will inevitably create haloes at night. The use of apodisation and an aspheric base lens does lessen the effect considerably but despite this patients will complain. The good news is that in the vast majority of cases time will allow them to adapt. However, if they feel they cannot manage then lens exchange has to be considered. Make sure that no one has tried to improve the situation by carrying out a YAG capsulotomy as this will make any lens exchange much more hazardous. As above, a trial for the patient of loss of reading vision can help them to decide if it is a worthwhile price for getting less visual problems at night. It is important to distinguish between glare which may occur with any IOL for some patients and issues relating to their MFIOL. Unfortunately even after lens exchange patients may still be troubled by unwanted glare. If lens exchange is contemplated it is important to have warned the patient that there may be surgical complications which could worsen their vision and that they may still have some symptoms. I believe most patients will adapt in time and as a result only 2 of my nearly 800 patients with MFIOLs have had lens exchanges. Only one of those was for glare and haloes. In younger patients where the entry pupil

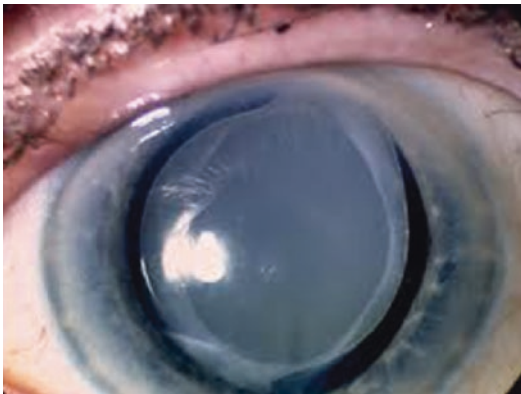


Fig. 10.1 Opacification of a hydrophilic IOL

at night is large haloes may be a problem. Here the use of a mild miotic at night like brimonidine can be helpful. Finally in IOLs made of a hydrophilic acrylic, opacification of the optic (Fig. 10.1) can induce haloes. This has been found most often in MFIOLs from Oculentis due to packaging and manufacturing issues. It is said these have now been resolved but it is something to bear in mind as this takes years to develop.

10.9 A Structured Approach to Provide Solutions for the Unhappy Patient

When the unhappy patient returns to see you it is best to have clear and logical approach to help both you and them. For the patient, their problem seems to them very real and they want a solution. Often as we have seen above this will be very obvious and straightforward. However, spending time listening to the complaints is very important in maintaining the patient's trust in you to deal with their issues as well as your understanding of how to make things better. Members of your staff need to know that this patient is not happy and thus be supportive.

- Less than hoped for far vision.
- Less than hoped for near vision.
- Less than hoped for intermediate vision.
- Dysphotopsias whether negative or positive.
- Glare and haloes.

Many of these issues have already been referred to but it is useful at this stage to review solutions.

10.10 Distance Vision Issues

With modern optical devices for biometry refractive surprises are not a common problem but with MFIOLs small errors of refraction can diminish the effectiveness of the lens. Normally being within 0.5D of intended refraction should ensure a good result. Many patients will tolerate up to 1D of spherical error but at this level especially with diffractive IOLs haloes at night are likely to be more troublesome and awareness of a second blurred image. Distance vision may also be affected by failure to correct astigmatism fully. Increasingly there are devices to help the surgeon place the lens more accurately in the correct meridian but the corneal measurements are still not completely accurate. If the residual astigmatism is less than 0.5D, patients will normally be happy.

What solutions can be offered to patients to enhance their distance vision? The need to do this depends partly on the degree of refractive error but also on the patient's expectation as far as spectacle independence is concerned. Thus whilst some will accept a situation which means that for many tasks they do not need glasses others will deem this unacceptable. Often this latter group has had unrealistic expectations from the outset despite preoperative discussions. It is important that this has been documented.

A number of patients implanted with diffractive MFIOLs initially have difficulty, even with a good refractive result, complaining that their vision seems not clear or "waxy". Almost all of these patients, given time, will adapt. Do not consider any action for at least 6 months. A problem may be here that only one eye has been implanted and the patient is hesitant to have a similar lens in the second eye. One of the reasons I like to do same day surgery for both eyes is that with both eyes open this visual effect is much diminished. However, another solution is to use a lens in the second eye which has less effect on distance vision like an MPlus or Restor +2.5 add.

Finally, a good tear film is essential for MFIOLS to work properly. This is much more critical than with monofocal IOLs. This ideally should be picked up at preoperative examination and the patient advised accordingly. Checking tear film break up time and performing preoperatively a Schirmer test and tear osmolarity is very useful. If a patient with less than ideal tear film still wishes for an MFIOL; lubricants will be required.

Here is an algorithm for correction of postop refractive errors:

- Counselling to assess the patients' attitude with assurances, and if required, of solutions.
- Offer glasses for occasional use such as in driving or watching movies. For many people being able to do most things around the house without glasses is a good result.
- Offer contact lenses because with full distance correction reading glasses usually are not needed. This may work for people who previously wore contact lenses.
- Surgical solutions to include excimer laser, piggyback sulcus lenses, toric lens adjustment.
- The advantage of excimer laser or piggybacking is that you are correcting a known error. Lens exchange unless the reason for the refractive error is a recognized lens error is not advised.

10.11 Near Vision Problems

The commonest difficulty that patients experience with their near vision is their failure to understand the limited range of focus that MFIOLS generally provide. Patients need to learn to find their ideal reading distance which may be different from that which they had preoperatively. We emphasize this preoperatively and especially in the immediate postoperative period. Once that has been dealt with the importance of good lighting with most MFIOLS must be highlighted. Making patients aware in advance of surgery of the capabilities of the proposed lens they are receiving helps greatly in

avoiding disappointment. Some lenses like the Restor +2.5 and the Lentis Comfort lens will give good distance and intermediate vision but only poor reading. Despite all of this some patients are not satisfied and this is generally due to residual refractive error either spherical or cylindrical. A myopic error may mean the reading distance is too close and the opposite if the patient is left hyperopic. As above tear film is also very important. If the poor reading is due to the actual lens design the simplest solution really is reading glasses about which the patient has probably been warned anyway. It is possible that a patient would ask for different IOL with a stronger reading addition but great care needs to be taken in this situation. The patient may swap their better reading vision for less clear distance vision. If the refractive error is either due to incorrect spherical power or failure to correct astigmatism the solutions mentioned above for distance vision can be utilized.

10.12 Poor Intermediate Vision

One of the drawbacks until recently with MFIOLS is that they were actually bifocal with two distinct peaks on the defocus curve. As stated above there are now trifocal IOLs available that offer better intermediate vision but the available light now needs to be divided into three ways. Finding out in advance if intermediate rather than near vision is more important preoperatively is helpful. This opens up a range-extended depth of focus (EDOF) IOLs like the Symphony (J and J. USA) or Lara (Zeiss, Germany).

10.13 Negative and Positive Dysphotopsias

As already mentioned dysphotopsias are a common complaint in the early postoperative period. Fortunately for most patients the reassurance that these will pass or seem to disappear will be sufficient. However, some patients will be extremely disturbed by these phenomena. The cause is not by any means fully understood nor is it possible

to predict which patients will have problems. Both negative and positive dysphotopsias may have the same root cause. There is a general feeling that the sharp edge of a hydrophobic acrylic IOL is more likely to produce a problem but there are many theories as to why. Miotics may help with positive dysphotopsias but do not with negative ones. In patients that insist on some remedial action after allowing time for adaptation or resolution there are two courses of action. The IOL can be removed and replaced with one of a different design and material. Often this may mean that they lose their multifocal lens in favour of a monofocal with a round edge. A trial for the patient by placing a -3 lens in front of them when they try to read will remind the patient what it is like not to have an unaided reading vision. A better alternative is to implant sulcus lens like the Rayner Sulcoflex. This has a 6.5 mm optic and a round edge it fills the space behind the iris and redirects the light away from the sharp edge of the multifocal lens. The Sulcoflex IOL can also be used to correct any residual refractive error if present. It has also been suggested that in fact prolapsing the IOL optic out of the capsular bag can help.

10.14 Glare and Haloes

MFIOLs by virtue of their complex designs are highly likely to produce some unwanted visual phenomena as we have seen already. These include glare and haloes (Fig. 10.2). It is not unusual for any patient having lens implant surgery whether mono or multifocal to experience some photophobia in the immediate postoperative period. There is greater light scatter with MFIOLs which may make this more prominent but it generally passes. Haloes are normally associated with MFIOLs because of their design whether diffractive or refractive. Patients should be made aware in advance of surgery that they will see this. Again almost all patients adapt to this and do not find that there is a permanent problem. Some patients feel a relief of these symptoms when driving at night whilst the cabin light is on, causing a reduction in pupil size and hence a relief of glare and haloes. The later designs of the lens have made haloes less obvious. However, some patients find these intolerable and for them lens exchange is probably the only option. It is important that no one carries out a YAG laser capsulotomy which makes lens



Fig. 10.2 Various types of positive dysphotopsia

exchange surgery much more difficult and potentially hazardous. Remember to have a trial with each potential lens exchange patient of what losing their unaided reading vision will mean.

10.15 In Summary

Multifocal IOLs of whatever design are a compromise with which most patients manage admirably provided that they have been suitably counselled in advance of their surgery and are motivated to do so for spectacle independence. However, when the biometry has not yielded the desired result or the toric lens has not adequately corrected astigmatism the visual result may be suboptimal and patients are unhappy. Visual phenomena due to lens design and individual patient perception may also lead to patient dissatisfaction. By taking a measured and rational approach and making the patient understand that there are, in most cases, solutions which may be simply time or adjunctive surgery long term unhappiness may be averted.

Compliance with Ethical Requirements Richard Packard declares that he has no conflict of interest. No human or animal studies were carried out by the author for this chapter.

Further Readings

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