

Lens Implant Options for Cataract Surgery

As well as improving your vision cataract surgery is an opportunity to change your spectacle prescription and how you use or need glasses afterwards. It is worth thinking carefully about the sort of tasks you use your eyes for and how well spectacles have worked for you up until now. When we are using our eyes we can divide tasks into three broad categories:

- Far vision: this covers tasks and activities beyond 3 metres or so and includes driving, getting around generally, recognising friends across the street, most sporting activities and watching TV.
- Intermediate vision is used for tasks at about 1 to 2 metres. This includes most social interaction, computer work, reading music and some sports.
- Near vision: this is for activities performed at 30 to 50 centimetres such as reading a book, using a laptop or tablet computer and many handicrafts.

Most people spend the majority of their time looking at things in the middle distance and beyond (far vision), and comparatively little time reading or doing other near or intermediate vision tasks. In addition most people, by the time they need cataract surgery, have started to need to wear spectacles for reading and using the computer even if they don't need them for distance.

One lens implant may suit you better than another depending on your personal balance of how you use your eyes at the various distances. This information summarises the main lens implant choices that are available to you, but it is important to remember that the choice is always a compromise between different aspects of vision – at the moment there is no lens implant available that gives every person perfect vision at all distances under all circumstances.

Your eye specialist will discuss the options with you to help you decide. Please feel free to ask questions!

Important

Irrespective of which lens implant you choose for your cataract operations there is always an element of unpredictability in the outcome of the surgery. This is because people's eyes are subtly different and we cannot measure all of the variation between individuals that might affect the outcome. Furthermore healing or scarring after an operation can also vary and give unexpected results. Overall we get between 90 and 95% of people close to what we intend, but this does mean that, despite our best efforts and intentions, some people do still need spectacles for the best possible vision. In a small number of cases further surgery or laser treatment may be required to improve the outcome.

As for any operation cataract surgery carries a small risk of something going wrong during the procedure, and in some cases this may mean that it is not possible to implant your first choice lens implant. If this happens it may be necessary for the surgeon to choose the "next best" option during the operation, or to leave the eye without a lens implant so that an alternative can be chosen in consultation with you and implanted at a further operation.

Monofocal Lens Implants

Monofocal lens implants are "fixed focus" lens implants that give good vision at one particular distance. They are the commonest type of lens that people choose for cataract surgery because they give predictable results and high quality vision afterwards. Monofocal lens implants give good vision at one particular distance, but objects closer or further away will be increasingly out of focus and you will need put spectacles on to see clearly at those other distances.

Depending on how you use your eyes you can choose where to set the focal point, and there are several options:

1. Monofocal lenses for far vision in both eyes

Implanting a monofocal lens optimised for far vision in both eyes will provide good vision without spectacles for driving and so on but, because the lens is fixed focus, you will almost certainly need to wear glasses to read and use a computer (i.e. near and intermediate vision). Despite not "needing" spectacles for distance some people choose to wear bifocal or multifocal glasses after surgery simply for convenience – the top section of the lens simply has no optical power.

If you are accustomed to using reading spectacles or bifocals/multifocals and you are happy to continue doing so after your cataract surgery, then using monofocal lens implants for far vision is probably the most predictable option for you. This is the commonest choice that people having cataract surgery make.

2. Monofocal lenses for near vision in both eyes

Another potentially useful, although less common, option is to put monofocal lenses optimised for near vision in both eyes. This means that you would be able to read and perform other near vision tasks without glasses, but you almost certainly would require spectacles for distance vision. Again you could choose to have bifocal or multifocal spectacles, but you may not need to wear them around the house or when reading.

Some people have just the “right” amount of short-sightedness so that they can read and perform other near vision tasks without the need for glasses, although they usually need spectacles to see well in the distance. If you are in this group monofocal lens implants for near vision in both eyes is a good choice because it can be difficult to learn to use reading glasses if you are not accustomed to using them. On the other hand if you do tasks or activities that rely on good distance vision, especially where glasses are a nuisance (e.g. sailing, bush-walking in the rain, swimming, diving etc), or if you simply don't like wearing glasses, then option 1 is still a very good choice.

3. Monofocal lenses for monovision

Because most people have two eyes we can use a different monofocal lens implant in each eye to give vision at different distances. This is called monovision and the main advantage is that it can reduce your need for spectacles. Some contact lens wearers may have already experienced this with one eye set up for distance vision and one eye for reading.

With monovision the brain chooses which eye to use depending on what you are giving attention to, and there is no conscious effort when switching from distance to near viewing. When you compare the two eyes, say when looking in the distance, there will be a noticeable difference between them, but remember that we're giving each eye a different job and most people keep both eyes open most of the time!

There are two main types of monovision:

- **“Full” monovision** is where we set up one eye to see well for far vision and the other for near. You would have a distance vision eye and a reading vision eye, and full monovision gives a high degree of spectacle independence. The main drawback is that some people find that they can't get used to the asymmetry between the eyes (known as anisometropia). If this happens then spectacle correction of the imbalance is often also troublesome and the only solution is another operation. Full monovision lens implants work best for people who have had a successful experience of it with contact lenses.

- **“Mini” monovision** is where we set up one eye for far vision and the other for intermediate tasks. This is useful for things like driving (the distance eye sees down the road and the intermediate eye the dashboard), computer work, social interactions and some sports. With mini-monovision the difference between the eyes is much less, so the risk of troublesome anisometropia is reduced, and usually can be helped with spectacles if necessary. With mini-monovision you will probably still need glasses for reading, especially small print or in low light.

With monovision, especially full monovision, it is preferable to set up your dominant eye for distance and your non-dominant eye for near or intermediate. Once cataracts have developed it can be difficult to work out which is your dominant eye, but your optometrist may have assessed this previously, or you may know from your own experience, e.g. when shooting (either a camera or gun!). If we can't confidently work out which is your dominant eye then full monovision should definitely be avoided. With mini-monovision it is usually less of a problem but occasionally if we set your eyes up the wrong way round (known as crossed-dominance) you might find the vision uncomfortable and need to either have spectacle correction or further surgery.

The final potential disadvantage of monovision is that it can impair depth perception, because the eyes are set at different focal lengths. For most people this is not a noticeable problem, but if you do any tasks or hobbies that require fine judgement of depth or distance (e.g. fine needlework/embroidery, watch-making, soldering etc) then you could find these activities more difficult afterwards.

Extended Depth Of Focus Lenses

As described above a monofocal lens implant has its focus at a fixed point, but other lens implant designs give more flexibility. The “Symphony” lens implant is an extended depth of focus lens implant and is designed to give sharp vision over a continuous range of distances, usually from about arm's length out to far distance. Because everything is in focus over this wide range of distances you will probably not need glasses at all for the majority of day-to-day tasks.

With the Symphony lens most people have some ability to read at near as well, although this is usually limited to “spot reading” (e.g. checking a packet in the supermarket, reading a menu etc.), and may require good light. About 30% of people do not need reading glasses at all, but most need some help with prolonged or more

demanding reading situations, although these may just be off-the-shelf magnifying reading glasses.

With Symphony lenses it is usually best to set up both eyes symmetrically, although a version of monovision is also possible to enhance reading vision if it is important to you to not need reading glasses. With these lenses depth perception is usually unaffected because there is a range of overlap of the vision of the two eyes.

Symphony lenses do have a downside, however. The lens is etched with a series of concentric rings, which allows it to give vision over a range of distances, but when the pupil enlarges in the dark or at night these rings can become apparent in your vision, usually as haloes around point light sources such as oncoming headlights.

For most who notice haloes they tend to become less troublesome over time, although it can take 3 to 6 months. If the haloes are a nuisance we can try using eye drops to limit the pupil size in the dark, and this may help the haloes although it can also make the vision darker overall. Unfortunately a minority continue to find that the haloes interfere with their night vision and we sometimes have no choice but to remove the Symphony lens implant and replace it with a monofocal. Because of the potential problems with night vision Symphony lenses may be best avoided by those who are dependent on driving at night, or who need good quality night vision (e.g. night-time sailing, astronomy etc).

If you are keen to gain a high degree of freedom from glasses after cataract surgery and you do not really need high quality night vision, or are prepared to accept the low risk of troublesome haloes, then Symphony lenses are an excellent option.

Multifocal Intraocular Lenses

Multifocal Intraocular lenses are a good option for a select group of patients undergoing cataract surgery. The general principle with intraocular lens selection is the right type of lens for the right type of eye and patient i.e Multifocal intraocular lenses are not for every patient.

As their name suggests multifocal intraocular lenses provide the ability to see at varying focuses. This is typically for near such as reading a book, middle distance such as a computer screen and far distance such as driving. The benefits of being spectacle independent are considerable in some, but not all patients. Not reaching for reading glasses has its potential advantages.

Pre-operative evaluation and selection of the right patient to receive a multifocal intraocular lens is paramount to gaining a good outcome, however there is no definitive test to help decide that a patient should receive a multifocal implant.

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Typically, the patients who receive these implants should have “regular eyes apart from the cataracts”. That is low levels of astigmatism, a regular cornea (the front surface of the eye), a good quality tear film, and a normal optic nerve and macula. Patients who have previously used multifocal spectacles without any issues are also potential good candidates. Those patients who are long sighted (Have a + in front of your spectacle prescription and need glasses for distance **AND** near) and highly short sighted (Have a – in front of your spectacle prescription and need to wear these glasses for distance **AND** near) are also potential good candidates providing other parameters are also favorable.

The main reasons so much effort goes in the pre-operative evaluation and appropriate selection of patients who receive a multifocal implant are multiple and they are due to the potential significant side effects or drawbacks from this type of lens:

1. Reduced quality of vision – there are multiple images created by the intraocular lens that your brain needs to adapt and ignore to avoid confusion
2. Not being able to get a clear image
3. Taking a considerable period of time to adapt to the lens (Sometimes 6 months)
4. Still requiring reading glasses
5. Haloes around lights which can be disturbing when driving at night
6. A slim chance that the intraocular lens needs to be removed if a patient doesn't adapt to the lens well (Less than 1%)

In summary, a multifocal Intraocular lens can be a great option in the right patient and can produce a very satisfiable result. It is worth noting the potential drawbacks and if a patient isn't suited to the lens through pre-operative checking they are best avoided.

Other Lens Options

There are numerous other multifocal or bifocal lens implant designs on the market, which have other advantages and disadvantages.