

Intraocular lens (IOL) Options



Monofocal intraocular lenses

These are the most commonly used IOLs and will provide clear vision for either distance or near vision, depending on what strength of implant is used. The options for monofocal IOLs are as follows.

1) Monovision

This is the option I most commonly recommend with monofocal IOLs. The aim of a monovision correction is to leave the dominant eye (this will be determined in clinic) in focus for distance viewing and then leave the non-dominant eye slightly short-sighted, approximately -1.50 diopters, so you can read magazine / newsprint at 40-50cm, use a mobile phone and use a tablet or computer without glasses. However, for more prolonged periods of close work and for reading fine print reading glasses will be required and you may also need glasses for driving at night.

This table sums up the Pros and Cons of monovision

Pros	Cons
Cost-effective	Loss of some stereopsis / 3D vision
Good monocular quality of vision	Risk of eyestrain caused by unequal refractive errors
Much less glare and haloes compared to multifocal IOLs	Limited intermediate vision at 2-4m range
Better option if a patient goes on to develop macular degeneration, or other conditions which reduce contrast sensitivity	Need spectacles for night driving and prolonged reading

- 2) Both eyes are left in focus for distance viewing.
 - 95% of patients will not require glasses for driving, watching the television or playing sport
 - glasses will be needed for all close work, reading and using a computer.

- 3) Both eyes are left short sighted (-3.00 diopters)
 - 95% of patients will not require glasses for reading or close work, but they will need glasses for driving and watching the television
 - I only recommend this option for patients who already have this type of prescription and are not concerned about having to wear glasses for distance viewing.

Multifocal Intraocular lenses

Broadly speaking multifocal IOLs can be grouped into the Extended Depth of Focus IOLs and the Trifocal IOLs.

The aim of these multifocal IOLs is to make patients as independent of their glasses as possible, **however it is impossible to restore the quality of vision you would have had in your 30s or 40s** and each multifocal IOL involves some compromises. Multifocal IOLs should only be considered for patients who set a high priority on being less dependent on their glasses.

I do not recommend Multifocal IOLs if you have any signs of macular degeneration, glaucoma, very dry eyes or any other conditions that could reduce your contrast sensitivity.

All multifocal IOLs will cause some halos and glare, especially for night driving, but the degree to which this bothers patients is highly variable. Most patients adjust to these symptoms over a 2-3 month period but some patients still find these symptoms troublesome in the long-term.

Extended Depth of Focus IOLs

EDOFs provide an extended range of vision rather than distinct points of focus, with very good distance and intermediate vision. By adjusting the strength of the IOL in the second eye (mini-monovision) 90% of patients can read magazine print, use a mobile phone or tablet without the need for glasses. These IOLs are ideal for patients who are seeking functional vision for most daily tasks.

However, you will need to wear a pair of +1.00 to +2.00 reading glasses for fine print or prolonged periods of close work, especially in dim light.

Although EDOF lens such as the Symphony IOL cause less marked halos and glare than Trifocal IOLs, 1 in 30 patients is significantly troubled by these symptoms.

Trifocal IOLs

There are a wide range of trifocal IOLs. These IOLs have three points of focus, one in the distance, one for intermediate vision (+1.75 add) and one for close work (+3.50 add). Trifocal IOLs offer better unaided near vision than EDOF IOLs and so are better suited to patients who put a high priority on good unaided near vision.

However, the different dioptic powers and diffractive rings in these IOLs there is a **higher incidence of halos and starburst effects compared to EDOF and Monofocal IOLs.**

This table summarises the pros and cons of EDOF, trifocal and monovision options

	EDOF	Trifocal	Monovision
Distance	✓✓✓	✓✓	✓✓
Intermediate	✓✓✓	✓✓	
Near	✓✓	✓✓✓	✓
Halos / glare	+	++	Almost none
Cost	Extra £400+ Per eye	Extra £400+ per eye	

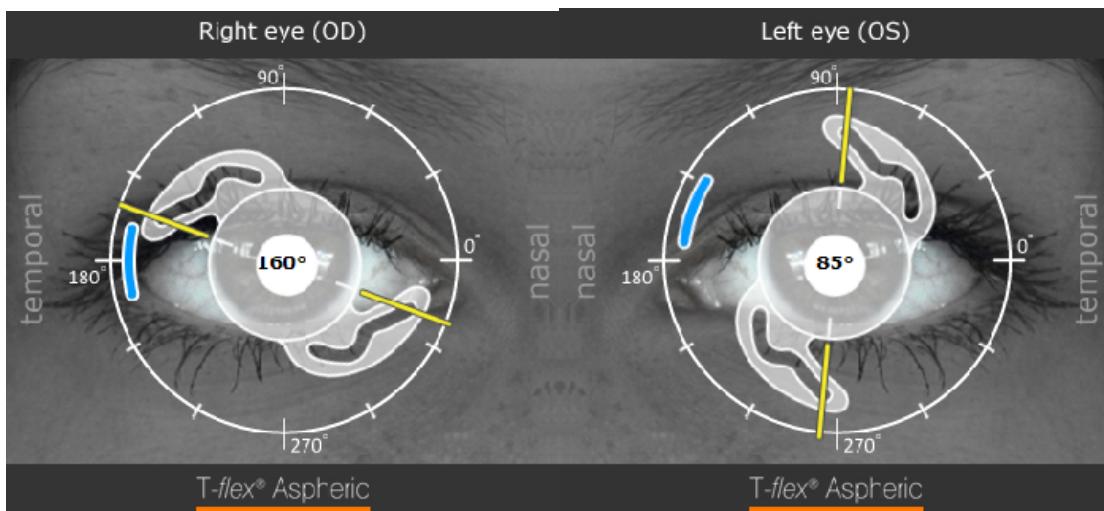
Managing astigmatism

Astigmatism is primarily caused by the cornea being more curved in one meridian than another. In some patients the lens also contributes to the degree of astigmatism.

For any of the IOL options mentioned above clear vision without glasses will only be possible if any pre-existing astigmatism is corrected and this is particularly the case for multifocal IOLs.

The degree of astigmatism will be determined pre-operatively using biometry +/- corneal topography. For patients with more than 1.00 diopters of astigmatism I recommend the use of a Toric IOL to correct this.

Toric IOLs can be monofocal or multifocal and need to be aligned in the capsular bag in a specific orientation to correct the astigmatism. Prior to surgery the cornea is marked with a felt-tip marker to indicate how the IOL should be aligned.



Toric IOLs are very successful at reducing pre-existing astigmatism, but it is not possible to guarantee that the astigmatism will be completely eliminated, as even a 5 degree rotation of the IOL in the initial post-operative period will reduce the effectiveness of the implant.

No surgeon can guarantee that every patient will have perfect unaided vision with any of these IOL options, but in 95% of cases it is possible to achieve the refractive target we are aiming for.

For those patients who still have a residual refractive error treatment options include laser refractive surgery to correct the residual refractive error or the use of a secondary "piggy back" IOL.