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**Information for Patients
A GUIDE TO LENS OPTIONS**

MONOFOCAL, EXTENDED DEPTH OF FOCUS (EDOF) OR MULTIFOCAL LENSES

Cataract or lens replacement surgery successfully improves patients' vision by replacing the human lens with an artificial lens which lasts for the rest of your life. Unlike other devices (hip replacements etc.) a prosthetic lens will never wear out. The lens will continue to provide excellent vision provided you are not unfortunate enough to develop any other eye condition.

The NHS will only provide a basic lens implant (a standard monofocal non toric lens) and this works well for many patients and has the advantage to the NHS of being an affordable option. Privately, there are a wide range of more specialised lenses which offer the patient a greater visual outcome. These lenses basically fall into three categories.

Extended Depth of Focus (EDOF) lenses provide an excellent range of detail vision for middle to far distance. The lenses are designed with a range of advanced physical properties which means that the lens can produce a range of focus and reduces the likelihood that you will need glasses for intermediate and distance vision tasks. This means that tasks such as driving, golf, bird watching, astronomy and sports activities etc. will be much clearer. It also means that intermediate distance tasks (anything between one and five metres) is in much more focus than would otherwise be the case with a standard lens.

Multifocal lenses are the pinnacle of optical lens design in that they aim to achieve an excellent all round level of vision for both near and distance without any requirement for glasses post-operatively. Lens manufacturers produce a lens with a range of rings and different refracting areas within the lens, thereby allowing light from different distances to be selectively focussed for the task required. This is the only lens that can produce true spectacle freedom and with this lens the majority of patients are able to read effectively without glasses. This is the principal lens to choose if your objective is spectacle and contact lens freedom after your surgery.

There are some differences in what can be attained using either an EDOF or a multifocal lens. The multifocal lens slightly compromises the full clarity of far distance vision for a good unaided near vision. The EDOF lens cannot be relied upon to produce clear reading vision without glasses, although in some instances, for example places which are well-lit such as supermarkets, shops and in your own home, you may be able to read larger print or messages on your phone. Multifocal lenses differ very fundamentally in their design from so called multifocal contact lenses, which many patients will have tried prior to deciding to proceed with surgery. Unlike the contact lens variations, the multifocal intraocular lens does not require you to tip or elevate

your chin to see through any particular part of the lens, rather that it works in all positions of gaze. The near vision point for reading is usually around 30cm to 34cm and you need to keep this in mind if your objective is to see a computer screen clearly without glasses where such a device may sit further from your face than 33cm. If this is a particular objective, please discuss it with me before making a definite decision on which lens you want.

Multifocal lenses are not suitable for all patients if there are underlying eye conditions. This will be discussed in clinic.

Multifocal lenses do carry some slight disadvantages which are important to bear in mind in making your selection. The principal issue is the quality of vision in low lighting conditions or in pitch darkness. In these situations, the lens does not function quite as well as you would still require glasses for tasks such as reading if you are in a dim environment. Furthermore, bright oncoming lights, for example car headlights, are quite dazzling and you will notice that bright sources of light, for example streetlamps, have rings and diffraction patterns around them which are quite prominent. Most patients find these symptoms soften with time and become less obvious, but they do need to be borne in mind if you already suffer glare and are seeking surgery to be rid of this symptom. In this context, many patients opt for an EDOF lens to minimise their chance of glare and dazzle at night but accepting that reading glasses will be required for most near vision tasks.

Toric lenses aim to negate any pre-existing astigmatism you may have. Astigmatism is a difficult concept to understand but is a physical property whereby light is not accurately focussed through an optical system to produce a clear image. All forms of optical devices have some element of astigmatism and engineers are always trying to find the best corrective lens to deal with this phenomenon. For intraocular lenses it is possible to use a "Toric" lens and this has a high probability of reducing or even completely abolishing any astigmatism. The surgery to implant a Toric lens is exactly the same and it in no way affects the recovery period. It offers a greatly improved level of distance and near vision after your surgery.

Toric lenses are available in monofocal, EDOF or multifocal versions where required but they may possibly not have the full range of focus than non toric lenses have.

Toric, EDOF and **multifocal** lenses are grouped together as **premium**, meaning that these types of lenses require more specialised design and manufacture and cost more than a standard lens. For this reason, we offer a premium lens package and this is outlined in our guide to cataract / RLE prices, found in your folder.

We have a pricing plan which covers all premium lenses and for which we add in a number of other benefits that cover the cost and outcome of your surgery. We include up to 12 months unlimited post-operative care specifically relating to your cataract surgery. Furthermore, in the unlikely event that you did not achieve an optimal visual result with your premium lens, we arrange a laser refractive top up for you included in this premium uplift. This is rarely required but if needed we have a partnership with a refractive surgeon in Guildford who can provide the necessary treatment. We

are unable to finance any laser done elsewhere or any treatment that you may arrange separately, however.

All intraocular lenses that we use are manufactured by Johnson & Johnson in the USA. For any standard monofocal lenses we use the Tecnis lens. Premium lenses are available for both EDOF and multifocal options. The EDOF lens are termed Eyhance or Symphony, whilst the multifocal lens is called a Synergy. These two types of lenses come in a wide range of lens powers and once your pre-operative biometry scans are available, we can select the appropriate lens. Occasionally we use lenses from other manufacturers in specific situations where an alternative is required, and this includes lenses from the Hoya Corporation in Japan and Rayner lenses manufactured and designed here in the UK.

This is intended to be a general information document on lens types and designs but should you require any further information or a more detailed explanation do please let us know prior to the date of your surgery so that we have enough time to agree the correct lens for your particular circumstances.

To summarise:

Standard Monofocal	Reasonable distance vision. Will definitely need reading/computer glasses. Likely to need driving glasses. No astigmatic correction or multifocality.
EDOF Eyhance & EDOF Symphony	Excellent distance and middle vision. Will need reading glasses for smaller print. Clear night time vision. Toric option available.
Multifocal Synergy	Best all rounder. Good distance, middle and near vision. May occasionally need reading glasses for low light situations. Night time dazzle a feature: Some haloes and starburst effects Toric option available.