

Staar[®] Implantable Contact Lens (ICL)

Over the past few years clinical trials of intraocular ‘implantable contact lenses’ have been underway. Starr ICL's are made partly from collagen – the fibre that is the basic building block of the eye. At present, there is only fairly short-term follow-up data available on patients who have had these lenses inserted, but the biocompatibility of the ICL seems good. ICL's can be used to correct both myopia (from -3D to -18D) and hypermetropia (from +1.5D to +18 D). A new toric ICL to correct astigmatism has recently been introduced.

Since the range of optical defects correctable by ICL's overlaps with that which can be achieved with Artisan lens implantation, or by LASIK, for some people there may be a choice between the treatments, decided upon by the following factors:

LASIK advantages:

Easily adjusted optical outcome and effective correction of astigmatism.

Possibly less risk of severe adverse complications as the surgical procedure does not penetrate the eye.

Cheaper than ICL surgery.

LASIK disadvantages:

The quality of the optical correction with LASIK may not so good as that achieved by an ICL especially in high degrees of myopia or hypermetropia. This is partly because the final optical surface created may be less regular than that of a manufactured lens, due to irregularities in the laser treatment and the wound healing process.

LASIK can only be performed over a relatively small optical zone especially when attempting to correct very high optical defects. The small optical zone size can lead to relatively poor visual performance with poor contrast sensitivity, especially in low light conditions.

LASIK causes irreversible changes to the corneal structure, and if too much corneal tissue is removed the cornea may undergo ectasia leading to poor vision and loss of correction.

If needed, fitting of contact lenses may be difficult or impossible post-operatively, due to the irregular shape of the cornea.

ICL advantages:

Potentially reversible.

Extremely rapid visual rehabilitation.

Good quality correction of spherical and astigmatic optical defects.

Because the ICL is flexible, it can be inserted through a very small corneal incision. Thus the creation of the surgical incision itself is unlikely to cause any change in corneal shape or create any astigmatism. In comparison, Artisan lenses, because they are rigid, require a considerably larger corneal incision through which to introduce the lens, and this is more likely to adversely affect the final optical outcome.

No change in ease of contact lens correction post-operatively, should this is needed.

ICL disadvantages:

Intraocular lens implantation carries an extremely small but unavoidable risk of introduction of infection into the eye. This is an extremely serious complication which can lead not only to loss of vision, but even loss of the eye.

Intraocular surgery also carries the risk of damage to other structures in the eye, such as the lens, the iris, and the trabecular meshwork, giving potential complications of cataract, glaucoma, iritis, and also possible retinal complications such as cystoid macular oedema, and retinal detachment.

Intraocular surgery causes some irreversible loss of corneal endothelial cells. Although the cell loss does not seem to be progressive, loss of these cells diminishes the functional reserve of the cornea, and could ultimately contribute to corneal failure due to endothelial cell depletion. The optical outcome can only be adjusted by replacement of the ICL or additional surgery such as LASIK.

The long term acceptability of ICL's has not been established and there remains the possibility that ICL's implanted in young adults now, will need to be explanted at some point in the future, and such further surgery would add to the risk of potential complications.

Due to the close proximity of ICL's to the lens and iris, complications such as cataract, pigment dispersion and glaucoma may possibly be more frequent than with Artisan lens implantation.

Because of the risk of complications such as glaucoma, insertion of an ICL makes regular long term follow-up is advisable.

Although ICL surgery does not usually change the physical appearance of the eye, distortion of the pupil has been described as a rare complication.

ICL surgery is more expensive than LASIK.

ICL Surgery

In the normal eye the front part (anterior segment) is filled with aqueous fluid which circulates from the ciliary body, through the pupil, to the trabecular meshwork in the angle between the iris and the cornea. When an ICL has been inserted in position between the natural lens and the iris, it can impede the flow of aqueous fluid to some extent. To avoid problems from this, a couple of small openings (iridotomies) are created in the iris to allow some of the aqueous fluid to by-pass its normal route through the pupil. The creation of the iridotomies is done with a YAG laser – an invisible infra-red laser beam which vaporises the iris tissue. This simple and painless procedure is carried out under local anaesthesia typically a week or so before the ICL surgery.

The insertion of the ICL is also generally carried out under local anaesthetic. Drops are put into the eye to dilate the pupil and anaesthetise the cornea. A small incision (3mm) is made at the edge of the cornea, and the ICL is injected into the eye and carefully placed over the natural lens. A drug solution is then injected into the eye to constrict the pupil. After the operation antibiotic drops are given to help prevent infection and steroid drops to suppress inflammation. Visual recovery is rapid, with functional vision virtually straight away and stabilisation of refraction within a few weeks.

