

The constant evolution of cataract surgery

It is more effective than ever but not available to many who need it

Cataract surgery is possibly the world's oldest surgical procedure, introduced to Europe from India by the armies of Alexander the Great. It is now the most frequently performed surgical procedure in the Western world. Few operations have changed so much in recent years. Although phacoemulsification (ultrasonic cataract removal) was introduced more than 30 years ago in the United States, improvements in instruments and surgical technique have now made it the procedure of choice for all routine cataract surgery. Over 85% of all cataract surgery in the United States and the United Kingdom is performed using phacoemulsification.¹

The essential difference between the two techniques lies in the removal of the nucleus of the lens, which is the firm central portion of the cataract. In extracapsular cataract extraction the nucleus is removed in one piece through a 9-10 mm incision, whereas in phacoemulsification the nucleus is ultrasonically fragmented and aspirated through an incision of about 3 mm. Intraocular lenses, invented by Ridley in 1949 at St Thomas's Hospital in London, are now available in foldable designs that can take advantage of this small wound. The incision can be constructed to be a self sealing valve, which usually eliminates the need for suturing and minimises wound related problems such as leakage or prolapse of the iris. There is less postoperative inflammation with phacoemulsification, and visual rehabilitation takes 1-3 weeks compared with the 2-4 months required for extracapsular cataract extraction, which is now only indicated in the few patients who have extremely hard lens nuclei.

For an experienced surgeon a routine phacoemulsification procedure takes about 15 minutes and is suitable for day case surgery under local anaesthesia. Over 90% of patients achieve a refracted postoperative acuity of 6/12 (20/40) or better, and sight threatening complications are rare.² Retinal detachment occurs in around 0.1% of eyes and is more common in highly myopic eyes. The incidence of endophthalmitis (intraocular infection), which can be devastating, is about 0.2%. Phacoemulsification requires expertise as it is easy to rupture the lens capsule. This can cause problems because the normal support for the lens implant is lost. Loss of vitreous gel can occur, predisposing the patient to postoperative inflammation, macular oedema, or retinal detachment. Of greatest concern is the loss of the lens nucleus into the vitreous gel, which typically necessitates surgical removal by a vitreoretinal specialist and can result in poorer vision for the patient.

The better visual results achieved using phacoemulsification has transformed cataract surgery from an operation to restore vision to a refractive procedure in which the surgeon manipulates the surgical parameters to provide the patient with the best possible vision both with and without spectacles. The small incision induces minimal postoperative astigmatism (change in the spherical curvature of the cornea). Pre-existing astigmatism can be corrected by manipulating the incision,

making additional incisions in the cornea, or by implanting a special astigmatic intraocular lens. The surgeon selects an intraocular lens that will leave the eye with the desired refraction after surgery; in most patients the choice will be to leave the eye emmetropic (that is, the patient will be able to see into the distance without glasses). About two thirds of patients with normal eyes can expect to have postoperative unaided visual acuity of 6/12 (20/40) or better. Multifocal intraocular lenses can provide patients with good unaided near vision as well as with good unaided distance vision. However, they can reduce contrast and produce problems with glare and haloes, particularly at night, so selecting appropriate patients is crucial. Most surgeons still prefer to use a monofocal intraocular lens, although this means that patients will have to use glasses for reading.

Lens epithelial cells are inevitably left behind after surgery and by two years after surgery about 25% of patients will develop opacification of the posterior lens capsule as a result of metaplasia and proliferation of these cells into the visual axis. This proliferation will cause symptoms similar to those experienced before cataract surgery. Although opacification can be treated easily with laser capsulotomy there are problems in identifying these patients; there is a small risk of ophthalmic complications with the laser treatment; and the procedure is expensive. Recent research shows that the design of the intraocular lens can help prevent opacification of the posterior lens capsule, and in the future this complication should become less common.³

Studies of outcomes have shown that the patient's quality of life improves after cataract surgery but there is a problem in providing the service to those who need it. As the population ages and the results of surgery improve, more potential patients stand to benefit from surgery. In the United Kingdom many health authorities purchase fewer than two surgeries per thousand people aged 65 and over. A recent publication proposed that this should increase to 3.2 surgeries per thousand.⁴ Few operations give such an improvement in health,⁵ and it can only be hoped that this procedure will become more easily available to those whose lives it can improve so dramatically.

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