

Cataract treatment sans blades

Cataracts affect more than 80 per cent of Singaporeans over 60 years old, and cataract surgery is one of the most common procedures done here.

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Conventional treatment involves surgically removing the cloudy lens and replacing it with an implant known as an intraocular lens (IOL). The eye surgeon uses a blade to make two very small incisions on the cornea (one main port and one side port). Using forceps, he or she creates an opening in the front of the lens capsule to access and remove the lens. The cataract is separated manually and the lens is emulsified with high-frequency ultrasonic energy, then removed through a fine tube before the IOL is inserted.

New bladeless laser surgery

A laser that painlessly vaporises cataracts in a fraction of a second is set to revolutionise treatment by making cataract surgery bladeless. This surgery uses femtosecond laser technology which firsts 'maps' the eye in 3D with an optical coherence tomographer (OCT). This helps the surgeon customise and perform the entire procedure with unparalleled accuracy.

Femtosecond lasers emit optical pulses of extremely short duration (as short as one-quadrillionth of a second) and these ultra-short yet intense bursts of near-infrared light pulses allow tissue to be cut more precisely with negligible heat. This technology has already been used widely in refractive surgery (Lasik) and looks set to revolutionise cataract surgery as well.

During surgery, the computer-guided femtosecond laser makes openings in the eye (cornea incisions) that can be programmed to be a precise shape. The femtosecond laser is able to create a perfect, round opening in the front of the lens and break up the lens into pieces. The dissolved cataract is subsequently removed with phacoemulsification. All this is done with an image-guidance system that provides real-time 3D and high-resolution images of the eye.

A multitude of benefits

Apart from being more precise and predictable, these new lasers also mean better patient outcomes. The circular opening created by the femtosecond laser are more architecturally round and perfectly centred; studies have shown that this is very important in keeping the IOL well-positioned and stable. The surgical outcomes are also more predictable. Moreover, the laser reduces the amount of ultrasound energy used during phacoemulsification, reducing risk of complications and injury. The image-guidance system also increases accuracy and allows customisation. While most people are suitable for bladeless cataract surgery, those who are not include those with cornea disease, glaucoma or eyes which cannot tolerate or cooperate with the suction system to stabilise the eye before the laser.



Correcting vision

During cataract surgery, new and different types of IOLs can also now be inserted to correct the various types of refractive errors. This new approach is more aptly called cataract refractive surgery.

The most common type of IOL is placed behind the iris within the lens capsule (the elastic bag where the natural lens used to be). The IOL acts just like the natural lens to focus light onto the back of the eye (the light-sensitive retina). Conventionally, monofocal IOLs provided a set focal point, usually for distance vision. This means cataract surgery patients, while being able to see clearly within a range, will require glasses for reading. The surgeon may choose to insert an IOL in one eye for near vision and an IOL in the other eye for distance vision. This technique requires adaptation, since each eye will then be oriented towards different needs.

Multifocal IOLs, or advanced technology IOLs, are a newer type of lens that treats multiple focal points and reduces or eliminates the need for eyeglasses or contact lenses after cataract surgery. This is possible through highly specialised optics that divide light and focus it on more than one point to provide a range from near to far eyesight. Some IOLs can also correct astigmatism and minimise the need for distance vision glasses after surgery.

No single lens works best for everyone. The eye surgeon will determine the most appropriate option for the patient. With appropriate IOL selection, high-precision bladeless cataract refractive surgery has become a reality!



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