Advancing cataract surgery through bladeless femtosecond laser technology

Approved by the US FDA in 2010, femtosecond laser cataract surgery is 100 per cent bladeless and represents a new wave of advancement in the field of cataract surgery. Manual phacoemulsification cataract surgery, on the other hand, has not changed much in more than 50 years — it is still performed by human hand and blades to cut the cornea, needles and forceps to tear the lens capsule inside of the eye. In this case, the cataract has to be manually sculpted inside the eye, requiring greater energy that causes more corneal endothelial cell loss and more inflammation to the eye. The traditional method is dependent on human’s estimation of depth and manual dexterity to prevent intra-operative complications. In advanced bladeless laser cataract surgery, a cold femtosecond laser replaces the human hand to make corneal incisions, the circular opening of the lens capsule, and breaks up the cataract — all in less than 60 seconds. With Artificial Intelligence programming abilities, the laser gives a higher precision, predictability, and reproducibility than manual phacoemulsification surgery. It uses real-time spectral domain optical coherence tomography (OCT) scans to accurately pre-program incisions at different levels within the eye, and then perform all these incisions in a bladeless fashion under total computer guidance. The laser’s ability to break up the cataract in just 30 seconds means that the cataract is removed with less energy inside the eye compared to manual phacoemulsification technique. This enables rapid visual recovery and is also more beneficial for the long term biomechanical strength of the cornea due to reduced corneal endothelial cell loss.

Benefits of 100 per cent bladeless laser femtosecond laser cataract removal and computer-guided intra-ocular lens implantation include:

- Precise femtosecond laser pulses are used, no sharp instruments involved
- An ultrasound tip removes the cataract fragments using minimal energy settings
- Computer-guided lens implantation system enables insertion of lens implant to near-perfect alignment and accurate centration
- This technology automates and safeguards some of the more challenging steps of surgery, offering better lens implant centration, greater precision for multifocal lens implant visual outcome and minimizing the chances of intra-operative complications caused by human errors.

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