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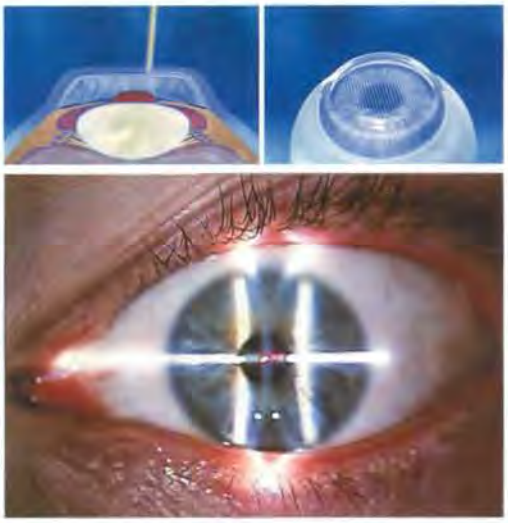
FEMTOLASERS IN OPHTHALMOLOGY TO CORRECT VISION AND CATARACT



Ophthalmology is experiencing a paradigm shift: new femtosecond laser technology creates surgical possibilities that were impossible five years ago.

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As a specialist for the cornea and the human optics, my refractive and cataract patients often ask me: "Will you use a laser to operate my eyes?" Until now, the answer has been "yes" for vision correction and "no" for cataract surgery, but with the introduction of a new generation of lasers in late 2012, it is "yes" for both – with unprecedented precision in cataract surgery.

Lasers are in clinical use in ophthalmology since the 1980s. In general, a laser can be seen as a high-precision knife treating the surface of a tissue. The best-known laser in our field is the excimer laser used to reshape the cornea to correct myopia, hypermetropia, astigmatism and, to a certain extent, even presbyopia. In 2006, femtosecond lasers were introduced, delivering light pulses of an extremely short duration in the order of 10-15 seconds, and with levels of precision in the sub-micrometer (1000 µm = 1 mm) range. What makes this type of laser so valuable is the fact that the laser can deliver its energy WITHIN the tissue. Thus, the surgeon can perform cuts and ablations in the depth of a tissue – or an eye. Currently, the femtosecond laser is used in two fields: refractive laser surgery since 2008 and cataract surgery since 2012.

In refractive laser surgery, we use the femtosecond laser in the most crucial surgical step: preparation of a corneal lamella of 0.1 mm thickness during LASIK. Prior to the femtosecond laser, blades were used to perform this cut. The laser is by far more precise than any blade can be, and also greatly reduces the risk of cutting errors.

In cataract surgery, the clouded lens is removed and replaced with an artificial intraocular lens. The last quantum leap in cataract surgery was the introduction of ultrasound technology to remove the lens in 1967. Ever since, the instruments and techniques have been refined but not revolutionized. Until now, cataract surgery was greatly dependent on the skill set of the surgeon because the thinnest structures needed to be cut in a controlled, precise manner. The femtosecond laser is a real revolution in cataract surgery because it controls the crucial parts of the surgery and even the most experienced surgeon is no match for the precision of a laser. This paradigm shift will reduce the risk of complications and enable the surgeon to implant special lenses that correct both far and near vision. ▮

Since its creation in 1878, the Geneva University Eye Clinic has been a cantonal, national and international reference in the field of modern clinical ophthalmology and research.

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