**Femtosecond laser shows promise for standardised DSEK procedures**

**Let there be light – a brief history of femtosecond lasers**

**FEMTosecond** lasers derive their name from the fact that their pulses are measured not in billionths or even trillionths of seconds but in thousands of trillionths of seconds, or femtoseconds.

The ultra-short treatment time of the femtosecond laser means that very little energy is required to achieve photo disruption, which is essentially the cutting action of the laser. The exposure period is so short and the laser so precise that any tissue beyond several micrometers of the treatment area is completely unaffected.

American-based company IntraLase Corp. is the largest player in the ophthalmic femtosecond market. Since its first femtosecond laser was sold in 2001, the company has worked hard to build on its first-mover advantage. From its initial 10 kHz model, IntraLase has continued to develop faster iterations of the technology to today’s FS 60 kHz range.

The company claims that one in every four LASIK procedures in the US is currently performed using an IntraLase laser and over one million IntraLase procedures have now been performed worldwide. In September 2005, the IntraLase FS laser became the first laser to receive FDA approval for use in keratoplasty and penetrating keratoplasty procedures.

In a sure sign of the interest generated by the potential revenues in the femtosecond market, IntraLase was bought by AMO for approximately $800m in cash in January 2007. Although its market position is dominant, IntraLase is facing increasing competition from ambitious rivals eager to stake a claim in the growing market. Newer arrivals include the Femtosecond laser from German company 20/10 Perfect Vision, the Femto LDV from Swiss firm Ziemer Ophthalmics and also the VisuMax from Carl Zeiss Meditec.

The Femtosecond laser is approved in Europe, the US and Korea for “intracorneal and corneal cuts,” which includes not only LASIK flap preparation but also lamellar and penetrating keratoplasty and tunnel preparation for intrastromal corneal ring placement, according to 20/10 Perfect Vision.

The Femto LDV is also FDA-approved and is currently in the middle of clinical validation in Europe. Originally launched in October 2005 as the Da Vinci femtosecond laser, Ziemer was obliged to change its name last year because of trademark issues with the original name. In seeking to differentiate itself from its rivals, Ziemer has trumpeted the compact size and portability of its laser as a key distinguishing trait.

For the unveiling of the VisuMax femtosecond laser last year, Zeiss stressed the improved workflow efficiency arising from the use of the new laser in tandem with the company’s MEL-80 excimer laser. The two laser systems have a common data interface, and a swivelling bed can quickly move the patient from the FS laser to the excimer.

**The end of the excimer laser?**

Some analysts have predicted the demise of the excimer laser in the face of the growing popularity of femtosecond lasers. However, not all surgeons are so quick to write off the survival prospects of the excimer laser.