Intraoperative Correction of Astigmatism with a Laser Cataract Surgery Suite

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Femtosecond laser-assisted cataract surgery (FLACS) is being adopted in the last few years. Recent articles discuss the potential advantages of using this emerging technology including opportunity for zero ultrasound surgery, improved capsulorhexis circularity, reduction of endothelial cell loss, and more accurate and predictable intraoperative correction of astigmatism.

Speaking about the particular benefits of the Catalys® Precision Laser System, Burkhard Dick MD, PhD, Germany, said that it also stands out from the competition based on its personal interface, imaging system and speed.

The Catalys® system features a non-applying liquid optics personal interface that is available in two sizes (14.1mm and 12mm), causes minimal increase in intraocular pressure (10mmHg), and has a wide aperture that is optimised for corneal incisions.

The Catalys® proprietary high-resolution, 3-D SD OCT imaging technology provides live streaming, tilt compensation for all incisions, and the ability to customise the capsulotomy by scanning the capsule. Capsulotomy creation takes <1 second, which is faster than any other femtosecond laser, said Dr Dick.

He also reviewed results of a series of prospective, randomised, intrastromal individual trials showing benefits of cataract surgery using the Catalys® system compared with standard phacoemulsification for minimising postoperative corneal oedema, endothelial cell loss, capsular bag shrinkage, and inflammation.1-4

Dr Dick’s analyses also showed use of the Catalys® laser practically eliminated the need for ultrasound energy.3 He reported that in a consecutive series of 1,200 eyes, 91 per cent of cases were completed with zero ultrasound, and that percentage rose to 97 per cent in an analysis including only the last 100 cases that also benefited from optimisation in a variety of surgical techniques (Figure 1). Subgroup analyses showed that use of the laser for lens fragmentation significantly reduced effective phacoemulsification time in all grades of cataract (Figure 2).

Correction of Astigmatism with the Catalys®

The importance of having a tool for precisely treating astigmatism during cataract surgery is highlighted by recognition that three-fourths of patients have a visually significant level of pre-existing astigmatism, Dr Dick said.

“The Steep Meridian Registration Technology (SMRT) of the Catalys® laser increases the ease and precision of astigmatic correction and makes great technology even better,” he stated.

SMRT represents an integrated method for measuring and displaying the steep meridian of astigmatism to guide accurate placement of arcuate incisions, and, as a new capability of the laser, toric IOL alignment incisions (Figure 3).

“Catalys® system with SMRT eliminates ink markings and the need for another device to measure astigmatism, which is necessary with other laser systems. By fully integrating the diagnostic and treatment steps, the Catalys® laser makes astigmatic correction with arcuate incisions or toric IOLS more accurate and more efficient,” said Dr Dick.

He reported that in a feasibility trial, SMRT was able to determine the steep meridian in 97 per cent of eyes, showed good agreement with data from other measurement technologies, and received high comfort ratings from patients.

Dr Dick also noted that a study by William Culbertson MD established that anterior penetrating arcuate incisions made with the Catalys® laser were highly accurate in terms of minimal deviation from intended axis, length, and optical zone diameter.8

References