Newsmaker Interview //

20 YEARS OF LASIK

Celebrating LASIK surgery

LESS STRESS

Complications have become far less frequent and promise of vision improvement far outweighs the risks

Prof Michael Knorz MD is the medical director of the FreeVis LASIK Center in Mannheim, Germany. He introduced LASIK to Germany in 1993 and established the first German LASIK Centre at the University Eye Clinic Mannheim. His main areas of research are cataract and refractive surgery, concerning which he has presented many research papers and has had numerous original articles published in peer-reviewed journals. He also has the distinction of having undergone LASIK himself in 1999.

Prof Knorz was interviewed by contributing editor of EuroTimes, Roibeard O'hEineachain

Q: Much has changed since the early days of laser refractive surgery. Tell us a little about your early experiences, what were you thinking as you began your first LASIK surgery?

LASIK was far more stressful to the surgeon than it is today. When I started, all I had was the automated corneal shaper (ACS) without a mechanical stop. I had to stop right in time, or the hinge would be either too big or I would get a free flap. What intrigued me from the first day was the lack of pain and the fast visual recovery, the "wow" factor that made my patients smile.

Q: What has changed in your practice over the years?

When I started performing LASIK first in 1993 it was mainly for higher myopes. I treated patients from -6.0 D all the way up to -29.0 D, and, later on, hyperopes from +3.0 D to +9.0 D. Most patients were happy despite many complications, mainly poor vision at night and huge haloes as well as some glare. We have since learned that the upper limit is about -8.0 D of myopia and about 3.0 D or +4 .0 D of hyperopia. I do not use LASIK outside this range anymore.

Q: Has your relationship with patients changed as the technology has changed? How do you balance the promise of vision improvement versus the potential risks?

What has changed significantly is that complications have become far less frequent. I am now using all-laser-LASIK, using the IntraLase iFS femtosecond laser and the VISX Star S4 excimer laser, and the rate of complications is extremely low. Today the promise of vision improvement far outweighs the risks.

Q: What is your current approach? Tell us about your pre-op work-up, which laser and keratome, etc.

My current system is the so-called iLASIK suite from AMO. I perform wavefront measurements in all my patients, with a capture rate of about 99 per cent. I start with a femtosecond laser flap (IntraLase iFS laser) with a diameter of 8.5mm (9.0mm in hyperopic corrections) and a thickness of 100µm and a superior hinge. I then perform wavefront-guided ablations with the VISX Star S4 excimer laser, based on the wavefront measurements.

The main reason I like to use wavefront-guided ablations in everybody is that they allow me to use iris registration, which means that I can treat the astigmatism exactly on axis and without decentrations, since the eyetracker will compensate for the pupil shift. The second reason is that higher-order aberrations are minimised, but this is only important in eyes with a lot of higher-order aberrations.

I do not use intraoperative pachymetry because the thickness of the femtosecond laser flap is very predictable, much more so than with a mechanical microkeratome.

Q: What influence do you think these various technical improvements have had on LASIK-related complications?

With the use of a femtosecond laser, flap-related complications have virtually disappeared. Furthermore, modern corneal topography and the knowledge about suspicious topographic patterns have made corneal ectasia a rarer complication. In addition, the old ablation algorithms induced large amounts of spherical aberration, which in turn caused night vision problems. Moreover, with modern aspheric ablation algorithms and wavefront-guided ablations, night vision problems have become very rare.

Q: What technology looks the most interesting to you? Is thin-flap, wavefront guided all-laser LASIK setting the bar high for future improvements in technology?

Mechanical microkeratomes will disappear, they are not precise enough and carry too many complications. And fully customised ablations will become even more prominent, because they minimise coma and other higher-order aberrations, in addition to just the spherical aberration.

Q: Does LASIK have a role, primary or adjunct, in the treatment of presbyopia? What about intrastromal ablation via all-femtosecond correction, INTRACOR ablation, etc?

Yes, the most frequent LASIK technique for presbyopia used today is monovision LASIK, which leaves the non-dominant eye about -1.25 D myopic. At least 50 per cent of presbyopic patients can tolerate this. Modified ablation algorithms such as ablations which induce negative spherical aberration may also play a role in the future.

Intrastromal procedures such as INTRACOR also create negative spherical aberration and as such improve depth of field, which in turn improves near vision. INTRACOR has the advantage that it does not create an external wound in the cornea, which means that infection cannot occur.

Q: What would you imagine refractive surgery will be able to offer patients 10 years from now?

I think we will be able to offer some truly accommodating IOLs, although the range of accommodation will still not be perfect. Laser surgery will still be dominated by LASIK with a femtosecond laser, and eye tracking devices will track rotation on the X, Y and Z axis, as well as tilt. Wavefront-guided systems combined with topography will be used to perform fully customised ablation in everybody. Finally, toric phakic IOLs will correct higher myopes and hyperopes.

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