EXCELSIUS
MEDICAL

Q&A- MICRON M7

Excimer refractive laser Micron M7

Questions and Answers

What makes our excimer laser system so different?

Our Micron M7 is an excimer laser which is operated with fully automated positioning using robotic arms, bringing the laser to the eye. It has currently the smallest overall footprint of refractive lasers in the market. Also, it has outstanding economic features.

Why are we using robotic arms?

Most lasers are using a movable bed with complicated mechanics, which is also increasing the footprint of the laser. A patient finds the movement during surgery disturbing and uncomfortable. To overcome both, the bed has been fixed and the Microscope and the Laser Applicator are being moved towards the patient's eye. Further advantage of the robotic arms is the large open space above the patient preventing claustrophobic feelings, giving the surgeons the maximum work space for surgery preparation and completion as well as easy exit for the patient after surgery.

Why is the Laser Applicator that close to the eye?

Precise centration of the eye is very important. The closer you can move the scanner, illumination and eye tracking to the eye, the better minimum movements and disturbances can be detected and corrected (e.g. compare aiming a rifle at a target from 10 m or 100 m away – which one will be more precise?).
Further, the UV light used for refractive surgery is very sensitive to environmental influences (e.g. disinfectants, humidity, particles, pollution). By reducing the distance between the eye and the laser applicator to 3 cm than compared to other systems (around 25 cm) this influence has been greatly eliminated.

What is the "Auto Centration" feature?

We have coupled the robotic arms with our eye tracking system. This means that our whole optical setup can be centered to the pupil by the push of a button. This eliminates lengthily tedious X, Y, Z adjustments of the patient with a traditional patient bed. Even during treatment, the auto centration can be repeated any time as soon as the patient's eye moves out of the eye tracking range.

What makes our beam delivery so special?

The whole beam path from beginning at the laser head through to the patient's eye has been optimized for maximum energy efficiency. The laser head has been designed to deliver an extremely homogeneous beam which makes external homogenizing optics obsolete, also allowing for the use of small diameter optics which are very cost efficient. A combination of a nitrogen and vacuum protected beam path allows for minimized transition losses and maximized optics protection.

Thoughts on eye torsion (changing the cylindrical axis form sitting to laying of patient)?

The M7 uses a red line projector on the 0° and 180° meridian. If needed, the doctor can use ink marks on the sclera to line up. This compensates cyclotorsion. Advantage of this method is that there are no disturbances after the microkeratome cut (iris

recognition) or suction marks on the sclera (scleral recognition) interfering with the procedure.

Why do we think that smoke plume removal is so important?

We use a very dedicated plume suction system to remove the debris during the surgery. This device is located very close to the corneal plane to remove the smoke where it has the highest density. This is important as the debris would negatively influence the laser energy the most at that area.
Further, the efficiency of the plume removal is as high as there are no noticeable smells during the ablation process, which would disturb patient and personnel.

What is the laser speed?

Our laser has a repetition rate of 600 Hz.

What is the ablation depth per diopter in myopia on a 6 mm optical zone?

For a 6 mm optical zone, the ablation depth is around 13,5 microns, including a 1 mm transition zone.

Duration of -5 D (sphere alone) if OZ = 6 mm & TZ = 7 mm?

For -5 diopters at 6 mm optical zone and 7 mm transition zone the surgery takes 13 seconds (~2,6 s/D), making the Micron M7 one of the fastest lasers in the industry.

Could you please explain parallel scanning?

We convert the laser scanning beam from a point laser source divergence scanning to a parallel scanning that laser beam incidence is always perpendicular to the cornea apex plane. All competitors are using point laser source divergence scanning method. Advantage of the parallel scanning is the more uniform energy density at the periphery of the corneal curvature and less sensitivity to a defocused treatment.