

## How to deal with corneal problems

BARCELONA Dr. José L. Güell, director of the Cornea and Refractive Surgery Unit in the Instituto Microcirugía Ocular of Barcelona and President of EuCornea in his talk will present strategies how to deal with corneal complications.

### How often do corneal complications after refractive surgery occur?

**Güell:** Refractive surgery – laser surgery techniques as well as refractive intraocular surgery – has proved to be a safe and successful method of correcting refractive errors and making patients independent of visual aids. The complication rates are low. Taking a look to the peer reviewed published literature, for example, microstriae or folds range from 0.2 to 1.8%, epithelial ingrowth from 1 to 10%, infections from 0.02 to 1.5% or acute-chronic endothelial cell loss from 0.8 to 35%. But still in rare cases patients suffer from complications like secondary irregular astigmatism.



**EuCornea President**  
José L. Güell

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### How would you define a "risky eye"?

**Güell:** Surgeons should be aware of the risk of a corneal complication in eyes with subnormal topography (for example irregular astigmatism or keratoconus fustre) if they want to perform refractive laser surgery. For the intraocular refractive surgery a low number of endothelial cells (lower than 2000/mm<sup>2</sup>), the depth of the anterior chamber, signs of uveitis and problems with the crystalline lens are indicators for a "risky eye".

### What are the main complications you have to deal with?

**Güell:** In my practice as a reference center, these are secondary irregular astigmatism and the loss of endothelial cells.

### What strategies will you present?

**Güell:** After explaining which are the different strategies to deal with irregular astigmatism, such as topoguided excimer ablation or intracorneal ring segments implantation, I will focus on the indications for different techniques of corneal transplantation, especially the indications for Deep Anterior Lamellar Keratoplasty (DALK) and Penetrating Keratoplasty (PK). After the implantation of phakic IOL the loss of corneal endothelial cells is a problem that we have to deal with increasingly often, usually because of suboptimal indications. Here, Descemet Membrane Endothelial Keratoplasty (DMEK) and sometimes Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) are good techniques to help the patients.

**Sat. 05.10. 14.00-16.00**  
ESCRS/EuCornea Symposium: Refractive surgery in risky corneas: is it really safe for the patient?  
Main lecture hall

# How to calculate and align toric IOLs

15 to 30 percent of the patients would benefit from the correction of astigmatism

CASTROP RAUXEL/D 77.2% of spectacle prescriptions in Germany are toric whereas only 2.1% of the implanted IOL are. About 15 to 30% of patients would clearly benefit from a toric IOL.



**Peter Hoffmann**

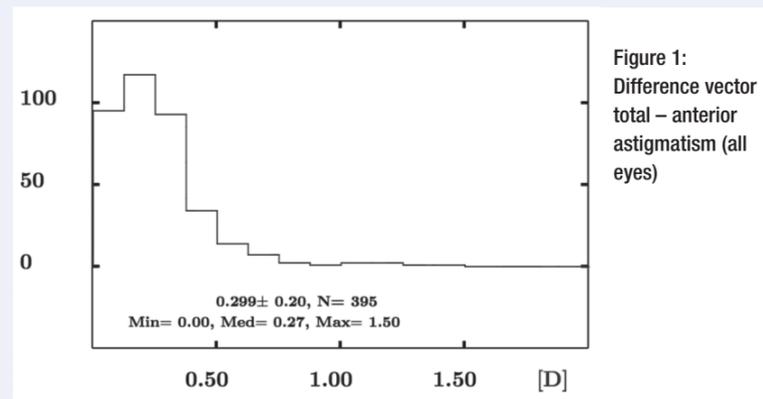
**W**hen planning and executing a toric IOL (TIOL) procedure, three problems arise.

1. There is no clearly defined target cylinder.
2. How can surgeons determine the "best" target cylinder? (Which device should the surgeon use? How is the cylinder to be calculated?)

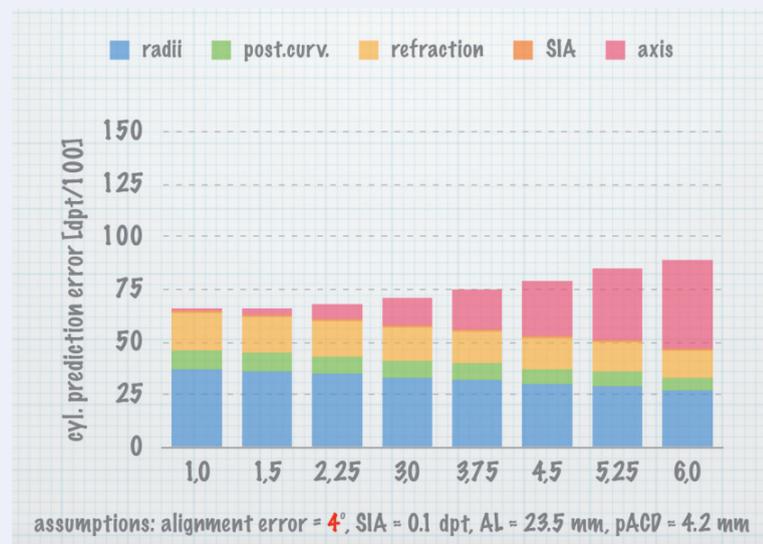
3. How is the TIOL aligned in the eye?

### Total cylindrical power vector

A keratometric measurement like IOLMaster or Lenstar delivers an apparently distinct cylindrical vector. When looking at a topography/tomography of the cornea, it becomes obvious that the astigmatism varies with the size of the optical zone, it's hemimeridians are mostly not symmetrical or not orthogonal. Furthermore, it is dependent on the posterior corneal curvature which is not measured by the keratometer.



**Figure 1:**  
Difference vector total - anterior astigmatism (all eyes)



**Figure 2:** Good surgical technique

Therefore, a distinct "one and only" target astigmatism does not exist.

Therefore, it is better to use a total cylindrical power vector including the posterior curvature as a target vector or import the raw data into a ray-tracing software.

The posterior curvature does modify the total cylindrical power by approx. 0.3 D on average (Figure 1). It can only be measured by Scheimpflug photography or Anterior Segment OCT (AS-OCT). When comparing an AS-OCT (Casia SS-1000) to a trusted autokeratometer (Lenstar), a hybrid Placido/Scheimpflug device (TMS-5), a Placido topographer (TMS-4) and a Scheimpflug tomographer (Pentacam HiRes) it delivered the most precise

noise) and the target cylinder with the devices mentioned above.

Figure 2 shows the influence of various errors on the result of TIOL implantation. It can be clearly seen that in TIOL of up to 4 D of cylinder power the effect of a 4° misalignment is much smaller than the measurement errors.

### Avoid SIA

When executing the procedure, surgically induced astigmatism (SIA) should be avoided. If induced, it's influence cannot be anticipated precisely and will spoil the calculation. To avoid SIA, the incision should be kept very small, placed as far away from the apex as possible (temporally) and preferably posterior-limbal or even scleral.

For the implantation of the toric IOL various marking techniques do exist. When aligning the lens manually a mean positioning error of 4° can be achieved with a thorough technique. We prefer the Gerten marker combined with the Neuhann AK marker (Geuder AG, Germany). With the use of digital aids like iris imaging or intraoperative wavefront aberrometry, the mean positioning error further reduced to ~ 2°. However, in the vast majority of toric patients, the clinical impact will be small because measurement errors play a much larger role.



**Figure 3:** Streak retinoscopy for checking TIOL alignment on the table

prediction of the refractive cylinder (difference vector between anticipated and achieved cylinder =  $0.42 \pm 0.25$  D). The hybrid system comes second.

The smaller the target astigmatism, the harder it is to get the measurement right. The relative influence of the posterior curvature is much larger in eyes with small amounts of cylinder. This is particularly important for toric-multifocal patients.

The Pentacam suffers from a lot of measurement noise whereas keratometer and Placido systems cannot measure the posterior surface. Therefore, a hybrid system or AS-OCT is particularly suitable for the task of determining the target cylinder.

At the moment, we would therefore recommend to calculate the spherical IOL power with keratometric data (less

mean positioning error further reduced to ~ 2°. However, in the vast majority of toric patients, the clinical impact will be small because measurement errors play a much larger role. If high-tech equipment is not available, streak retinoscopy (Figure 3) can be used to check the correct TIOL alignment. The larger the cylindrical correction, the easier a misalignment can be detected and corrected immediately.

**Wed, 09.10. 11.00-13.00**  
Symposium: Treating astigmatism with cataract surgery  
Auditorium

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## Where to go after a long scientific day

Suggestions for restaurants in Amsterdam

**AMSTERDAM** After a long day full of discussions about surgical techniques and skills it may be a good idea to prolong the discussion with some friends and colleagues in a nice restaurant.

Damrak 93 NL - 1012 LP Amsterdam  
Tel.: +31 (0) 20 5550666  
www.restaurantderoodeleeuw.nl

### Haesje Claes

Here you feel the mood of Amsterdam: Haesje Claes is situated in the historical center of Amsterdam, across from the Amsterdam Museum. The restaurant occupies six epic buildings, in which the original architectural features such as little steps, corridors and hallways all have been preserved. The menu offers a variety of fish and meat dishes but also the traditional dutch "stampot" with mashed potatoes, vegetables, sausage and bacon.

**H**ere are a few suggestions that might help to spend an agreeable evening.

### De Roode Leeuw

Traditional dutch food in a nice warm atmosphere can be found in the „red lion“. Here you can enjoy mussels with french fries as well as a fish soup from Volendam but also a pork filet or lamb chops.

Spuistraat 275 NL - 1012 VR Amsterdam  
Tel.: +31 (0) 20 6249998  
E-mail: info@haesjeclaes.nl  
www.haesjeclaes.nl

### Christophe

Good classical cuisine in a traditional building right next to the Leliegracht is what you get at Christophe. The restaurant also offers special "Boat Boxes" for the picnic during a boat ride along the canals of Amsterdam.

Leliegracht 46 NL - 1015 DH Amsterdam  
Tel.: +31 (0) 20 6250807  
E-mail: info@restaurantchristophe.nl  
www.restaurantchristophe.nl

### Keizersgracht 238

The Keizersgracht 238 claims to be the best grill restaurant in Amsterdam. It offers beautiful views over the 400 year old canals of the city. The atmosphere is casual, but with enough class for a formal dinner. The menu combines products from the Netherlands with food from other continents, classical grill specialties and seasonal dishes not to mention a selection of fine wines.

Keizersgracht 238 NL - 1016 DZ Amsterdam  
Tel.: +31 (0) 20 5235282  
E-mail: info@keizersgracht.nl  
www.restaurantkeizersgracht238.nl