



Instituto de  
Oftalmología  
A v a n z a d a

## IOA Technique

### MARKING THE AXIS OF ASTIGMATISM FOR THE IMPLANT OF A TORIC INTRAOCULAR LENS

#### Introduction

Cataract surgery is the most widely performed ophthalmologic surgical procedure. Besides eliminating the opacity of the crystalline lens, current cataract surgery also seeks to achieve perfect vision.

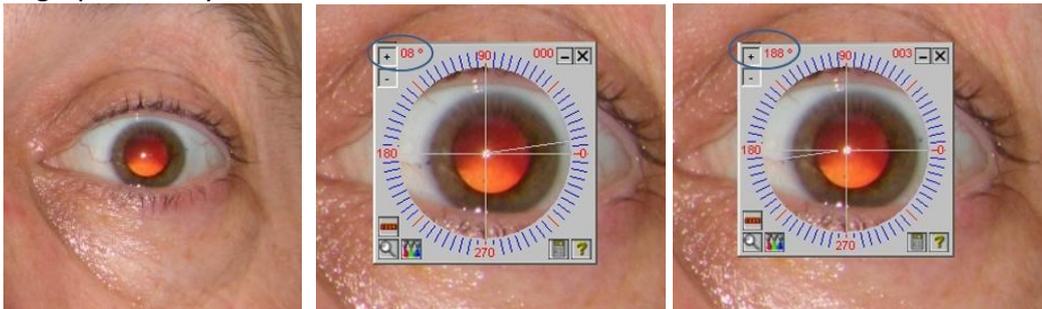
Until recently, the pursuit of emmetropia in patients with astigmatism (around 30% of the population) was infeasible since the only intraocular lenses available on the market were designed to correct myopia or hyperopia. However, with the new toric lens designs now available, a patient's cataract, myopia, hyperopia and astigmatism can all be corrected by means of a simple, safe operation followed by a rapid recovery. Today's main challenge is making sure that the astigmatism-correcting intraocular lens (IOL) is precisely aligned on the patient's axis of corneal astigmatism. The slightest variation will mean that the patient will develop a postoperative astigmatism on a different axis to that of the preoperative astigmatism.

To determine the optimal position for accurate IOL alignment, several methods have been proposed in which ink marks are placed on the corneal limbus. In some of these systems, corneal marks are placed under monocular vision (occluding one eye) to avoid the convergence produced when the patient fixates on a near target, or most often under the slit lamp with no fixed viewing position. However, none of these methods consider the possibility of cyclotorsion in situations of monocular vision as has been described <sup>(1,2)</sup>. On the other hand, if the marks are made binocularly, the convergence produced when the patient views a near object is not corrected.

The marking method proposed here minimizes these errors by having the patient sitting or standing while adopting a normal head position. The marks are made at a distance at which there should be no convergence in bilateral viewing conditions, avoiding possible monocular cyclotorsion. As added benefits, this is a simple, easily reproducible procedure that may be conducted in the surgery or preparation room.

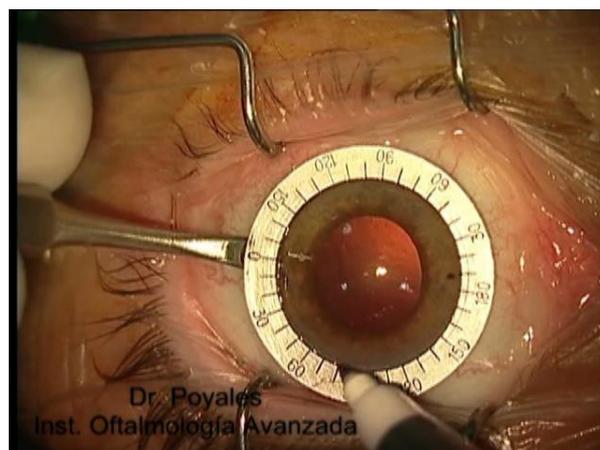
## Technique

During the preoperative preparation of the patient, two marks are placed at the limbus using a fine-tipped gentian violet marker (*Devon Skin Marker, Fine Tip 151*) on the horizontal axis (0-180°) at 9 and 3 o'clock. Next, a photograph is taken of the patient standing 2.5 m from the camera. The camera used is a Coolpix P90 (*Nikon*), with a 26.0 – 624.0 mm lens (at 35 mm), a CCD of 12.10 effective MP and a 24x (optical) / 4x (digital) zoom. The camera is placed on a tripod and connected to a bubble level to ensure the photograph is perfectly aligned. The camera lens is positioned at eye level. The optical zooming option allows us to simultaneously photograph both eyes.



The photograph is then exported to a computer equipped with software that enables precise angle measurements. We use the Scale 2.0 package (*Software R. Sgrillo©, Brazil*). On the photograph, the angle the corneal marks form with the horizontal line that transects the corneal reflex is measured. This gives the exact position of the marks and their angular difference with respect to the “real” 0-180 line.

Next, with the patient lying down, using the Méndez ring and taking as reference the previous marks made, we mark the axis to be aligned with the IOL's index marks considering the angle difference observed in the photographic measurements.



After surgery, another photograph is taken and the preoperative and postoperative images compared to confirm the IOL index marks are on the precise intended axis.

