CASE STUDY: IOLMASTER 700 IN EXTREME CATARACT

HISTORY
Two patients presented at the DLT Ophthalmic Diagnostic Center with “extreme cataract,” which is a common definition in Latin America for very dense nuclei, including brunescent, rubra, nigra and white cataracts. Case 1 was the right eye of a 64-year-old female with a dense white intumescent cataract. The patient mentioned that visual loss was more pronounced in the right eye and this situation did not allow her to perform her usual activities anymore. The situation had worsened progressively over the past 6 months.

There was no history of any ocular pathology in the patient’s medical records. Uncorrected visual acuity was finger counting at 2 m in the right eye. Intraocular pressure was within the normal range in both eyes.

Bio-microscopy showed a normal anterior segment with posterior vitreous detachment with “sineresis vitrea” and attached retina.

BIOMETRY
After performing immersion biomicroscopy with the new IOLMaster 700, it was possible to measure axial length in both patients due to the advanced imaging options of this new device.

In case 1, the IOLMaster 700 measurement revealed an axial length of 23.49 mm. The 6 measurements had a standard deviation of 27 µm.

In case 2, the IOLMaster 700 measurement revealed an axial length of 33.14 mm. The standard deviation of all 6 measurements was 17 µm.

The IOLMaster 700 measurements were confirmed by the immersion biometry A and B scans.

OUTCOME
Case 1 was operated using “slow motion” phacoemulsification. Trypan blue was used for staining the anterior capsule to perform a proper capsulorhexis. The IOL power for a monofocal IOL was calculated with the Haigis formula, targeting a postoperative refraction of -0.25 D. Two weeks after surgery the patient’s post-operative examination revealed that the IOL was well centered in the capsular bag. Uncorrected visual acuity had improved to 20/20 (decimal 1.0). The IOLMaster 700 measurement revealed an axial length along 6 different meridians.

DISCUSSION
The IOLMaster 700 performs 6 radial scans to optimize the axial length measurement. The SWEPT Source OCT technology allows scans of the entire eyeball, from the cornea to the retina. This enables the surgeon to visualize and recognize the different structures along the entire visual axis. The possibility of visual verification of which structures of the eye have been de facto measured facilitates the interpretation of the measurement and avoids the complex allocation of angle peaks of the A-scan and the difficult identification of the right signal peaks.

Once these measures have been taken, the OCT image should be carefully analyzed on the screen of the IOLMaster 700 to check the correct placement of the calipers at the posterior surface of the lens and to verify the visibility of the foveal pit as a sign of proper fixation. Once these measures have been taken, the OCT image should be carefully analyzed on the screen of the IOLMaster 700 to check the correct placement of the calipers at the posterior surface of the lens and to verify the visibility of the foveal pit as a sign of proper fixation.

We believe that our observations are important for future measurements in “extreme cataracts.” The high tissue penetration power of the IOLMaster 700 OCT might also be helpful in eyes with opaque media such as in cases of vitreous hemorrhage, especially in diabetic patients, which we encounter in our everyday practice.

CONCLUSION
With the IOLMaster 700 the SWEPT Source OCT technology has been brought into the field of biometry for the first time. Major advantages compared to the previous systems include the possibility of detecting unusual eye geometries and poor fixation patterns. This should allow more accurate IOL power calculations and result in a significant improvement of the refractive outcomes. The SWEPT Source OCT technology has the additional advantage of extremely fast data acquisition with the ability to measure the axial length along 6 different meridians.

Figure 1. White intumescent cataract
(Case 1)

Figure 2. Stilt lamp image of the Cataracta rubra eye (Case 2)

Figure 3. IOLMaster 700 OCT image with measurement calipers.

The IOLMaster 700 OCT image shows the foveal pit, the patient fixation is correct. If the foveal pit is not visible, the measurement should be repeated.

Our first measurements with the IOLMaster 700 are very encouraging. It is important to properly instruct the patient to fixate the fixation light. The room lighting should be dimmed when measuring eyes with very dense cataracts.

A large pupil size during the measurement is important for 2 reasons:
• the wider area of the scan improves the penetration ability of the IOLMaster 700
• it helps the patient to detect the fixation light.