ZEISS IOLMaster 700
with Central Topography

Including clinical cases
Introducing the ZEISS IOLMaster 700 with Central Topography
The IOLMaster® 700 from ZEISS with Central Topography provides important insights on the central corneal shape to detect visual relevant irregularities, which cannot be accomplished by keratometry alone.

Central Topography is integrated into the standard biometry measurement of the ZEISS IOLMaster 700, with the advantage that surgeons do not need an additional hardware to their current ZEISS IOLMaster 700.

The total power map (from anterior AND posterior surface of the cornea) supplements the known biometric analysis of ZEISS IOLMaster 700.

“It is remarkable how much clinically relevant corneal information we can get from the Central Topography on the IOLMaster 700.

Michael Lawless, MD, Australia
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What is Central Topography?

Generally a corneal topography feature is an important non-invasive tool to visualize corneal shape characteristics as a decisive advantage to aid in IOL selection as it allows a clinician to preliminarily visualize corneal asymmetries.*

Central Topography of the ZEISS IOLMaster 700 provides anterior and total axial power maps based on its telecentric measurement principle and SWEPT Source OCT.

Central Topography provides visually relevant information on central corneal shape that cannot be detected with keratometry alone, e.g. information on corneal irregularities and overall shape

*Please note that Central Topography is not intended to replace a topographer

At a glance
ZEISS IOLMaster with Central Topography provides important insights on the central corneal shape, which cannot be accomplished by keratometry alone.
Start your workflow
with more insights

Central Topography is designed to provide you with more insights when you start your workflow and before you decide on the IOL and consult with your patient. It is integrated into the standard biometry measurement of the ZEISS IOLMaster 700, with the advantage that surgeons do not need any additional hardware to their current ZEISS IOLMaster 700. The full biometry measurements including Central Topography can be obtained in less than 44 seconds for both eyes.

Central Topography allows easy reading of central corneal shape information. The scaling and hues have been developed in cooperation with Douglas D. Koch, MD, and Li Wang, PhD, USA.

Successful implementation of toric and multifocal IOLs requires regular corneal curvature within the central zone. Central Topography provides central corneal shape information and detects visually relevant corneal asymmetries before deciding on the IOL and consulting the patient.

At a glance
Central Topography is easy to use without interrupting the cataract workflow.
What is the technology behind Central Topography?

The ZEISS IOLMaster is the only biometer using a unique distance-independent telecentric measurement principle with SWEPT Source OCT. It provides robust and precise corneal curvature measurement at each of the 18 measured spots. This existing feature enables repeatable and reliable keratometry as well as anterior and total central topography values.

- Anterior curvature is directly converted into local refractive power using the corneal keratometric index as chosen by the user
- The anterior surface model is combined with corneal thickness measurements from SWEPT Source OCT technology to create a posterior surface model
- Anterior and posterior surface model are used to create a total axial power map

![Diagram of 3-zone Telecentric Keratometry, Anterior Surface Model (curvatures), SWEPT Source Corneal Pachymetry, Posterior Surface Model (curvatures), “Real” Refractive Indices calibration analog to TK®, and Total Axial Power Map.]

Using its 18 measurement points ZEISS IOLMaster 700 combines a unique telecentric measurement principle with SS-OCT to create a total axial power map.

Keratometry measures corneal curvature and builds a surface model from the available measuring points. ZEISS IOLMaster 700 is the only biometer creating a Central Topography using 3-zone Telecentric Keratometry data.

At a glance

ZEISS IOLMaster 700 with Central Topography combines keratometry data from the 3-zone Telecentric Keratometry with data of the corneal thickness measurement of the SWEPT Source OCT to create a total power map from the anterior and posterior corneal surface.
What is the benefit of Central Topography?

Central Topography provides details on the central corneal shape, right at the beginning of your workflow which allows you to optimize your clinical decision-making for IOL selection.

The main benefits:

- Add Central Topography to biometry and keratometry
- Gain additional valuable insights on central corneal shape, taking anterior and posterior power into account
- Detect visually relevant corneal irregularities
  - No extra measurement
  - No extra time: complete biometry measurement including Central Topography for both eyes in <44 sec*
  - No extra hardware
  - Easy interpretation

*depending on experience of operator and eye conditions

Wang et al. (including D. Koch) (Wang et al.) compared Central Topography maps to topographic maps from a Placido-dual-Scheimpflug Topographer. This study included 105 eyes with various corneal conditions such as regular/irregular corneas, previous corneal refractive surgery and keratoconus or pellucid marginal degeneration. In 68.6–89.5 % similar overall shape was observed which leads to the same decision for premium IOL selection in 75.2–97.1 % of cases.
Clinical cases

The following overview of clinical cases includes a 9 mm topography map (Dual-Scheimpflug / Placido device and Scheimpflug device) and a 4 mm extract of this map to evaluate the comparability of the ZEISS IOLMaster 700 Central Topography. The interpretation was performed by Douglas D. Koch, MD, USA, Li Wang, MD, PhD, USA, Giacomo Savini, MD, Italy and Michael Lawless, MD, Australia.

Case 01
Regular Astigmatism – With-the-rule Astigmatism

**Scaling and hues of the ZEISS IOLMaster 700 with Central Topography are optimized for easy and intuitive corneal evaluation.**

Douglas D. Koch, MD, USA

**Dr. Koch’s & Dr. Wang’s interpretation:**
- Normal range of power, meridians straight
- Minimal color differences, low amount of astigmatism
- Same decision for toric or multifocal IOL

**Dr. Koch’s & Dr. Wang’s conclusion:**
Excellent comparability
**Clinical cases**

**Case 02**

**Regular Astigmatism – With-the-rule Astigmatism**

Dr. Koch’s & Dr. Wang’s conclusion:
- Excellent comparability, however this one has some differences between the two; note the inferior steepening on Central Topography

Dr. Koch’s & Dr. Wang’s interpretation:
- Central Topography, overall shape similar to the Dual-Scheimpflug/Placido device map
- Same decision for toric or multifocal IOL

**Case 03**

**Regular Astigmatism – Against-the-rule Astigmatism**

Dr. Koch’s & Dr. Wang’s conclusion:
- Excellent comparability

Dr. Koch’s & Dr. Wang’s interpretation:
- Against-the-rule astigmatism on Central Topography, overall shape similar to the Dual-Scheimpflug/Placido device map
- Same decision for toric or multifocal IOL
**Case 04**  
**Regular Astigmatism – Oblique Astigmatism**

*Dr. Koch’s & Dr. Wang’s interpretation:*  
- Regular oblique astigmatism on Central Topography, overall shape similar to the Dual-Scheimpflug/Placido device map, both images show mild superonasal steepening  
- Same decision for toric or multifocal IOL

*Dr. Koch’s & Dr. Wang’s conclusion:*  
Good comparability

**Case 05**  
**Pellucid Marginal Degeneration**

*Dr. Koch’s & Dr. Wang’s interpretation:*  
- Against-the-rule astigmatism on Central Topography, overall shape similar to the center of Dual-Scheimpflug/Placido device map  
- Same decision for toric IOL, possible different decision on multifocal IOL

*Dr. Koch’s & Dr. Wang’s conclusion:*  
Central Topography misses mild inferior steepening
Clinical cases

Case 06
Irregular Pathological Astigmatism

Dr. Koch’s & Dr. Wang’s conclusion:
Good comparability

Dr. Koch’s & Dr. Wang’s interpretation:
- Irregular astigmatism on Central Topography,
  overall shape similar to the Dual-Scheimpflug / Placido device map
- Same decision for toric or multifocal IOL

Case 07
Irregular Pathological Astigmatism

Dr. Koch’s & Dr. Wang’s conclusion:
Good comparability

Dr. Koch’s & Dr. Wang’s interpretation:
- Irregular astigmatism on Central Topography,
  overall shape similar to the Dual-Scheimpflug / Placido device map
- Same decision for toric or multifocal IOL
Case 08
Irregular Pathological Astigmatism

Dr. Koch’s & Dr. Wang’s conclusion:
- Good comparability

Dr. Koch’s & Dr. Wang’s interpretation:
- Irregular astigmatism on Central Topography, shape of Central Topography is similar to the Dual-Scheimpflug/Placido device map
- No straight meridians: irregular
- Steep and irregular: Be careful!
- Same decision for toric or multifocal IOL

Case 09
Irregular Astigmatism – Post Penetrating Keratoplasty (PKP)

Dr. Lawless’ conclusion:
- Good comparability

Dr. Lawless’ interpretation:
- High amount of astigmatism
- Inferior steepening
- Scheimpflug device map looks similar
Clinical cases

Case 10
Irregular Astigmatism – Post Penetrating Keratoplasty (PKP)

ZEISS IOLMaster 700 anterior axial power map

Dr. Lawless’ interpretation:
- Irregular Astigmatism on anterior axial power map with inferior steepening
- Suspected Keratoconus

Dr. Lawless’ conclusion:
Full Topography contains further useful information about periphery

Scheimpflug device anterior axial power map

Scheimpflug device anterior axial power map

Step: 0.5 D

ø approx. 4 mm

ø approx. 4 mm

ø approx. 9 mm

Case 11
Irregular Astigmatism – Mild Dry Eye Disease

ZEISS IOLMaster 700 anterior axial power map

Dr. Lawless’ interpretation:
- Small irregularity on anterior axial power map
- Superiorly steep
- Central and paracentral irregularity of Scheimpflug device map
- Scheimpflug device measurement not necessary for further decisions

Dr. Lawless’ conclusion:
Good comparability

Scheimpflug device anterior axial power map

Scheimpflug device anterior axial power map

Step: 0.5 D

ø approx. 4 mm

ø approx. 4 mm

ø approx. 9 mm
Case 12
Irregular Astigmatism

Dr. Lawless’ conclusion:
Good comparability

Dr. Lawless’ interpretation:
- Irregular Astigmatism with flat radii on Central Topography
- Scheimpflug device map shows more or less the same
- Additional Topography measurement isn’t necessary

Case 13
Irregular Astigmatism – Pellucid Marginal Degeneration (PMD)

Dr. Savini’s conclusion:
Good comparability

Dr. Savini’s interpretation:
- Irregular astigmatism on anterior axial power map
- Flattening of the vertical meridian
- Placido device map looks similar
Clinical cases

Case 14
Irregular Astigmatism – Pellucid Marginal Degeneration (PMD)

Dr. Savini’s interpretation:
- Irregular Astigmatism on anterior axial power map with inferior steepening
- Flattening of the vertical meridian
- Placido device map looks similar

Dr. Savini’s conclusion:
Good comparability

Case 15
Irregular Post LVC Astigmatism – Post Myopic LASIK/PRK

Dr. Koch’s & Dr. Wang’s interpretation:
- Flat cornea, irregular and against-the-rule astigmatism (Blue color, meridians not straight, “lying eight”)
- Flat, ATR and meridians not straight
  Both are a warning in itself to check further
- Same decision for toric or multifocal IOL

Dr. Koch’s & Dr. Wang’s conclusion:
Good comparability
Case 16
Irregular Post LVC Astigmatism – Post Myopic LASIK

Dr. Koch’s & Dr. Wang’s interpretation:
- Central flat cornea on Central Topography
- Overall shape similar to the Dual-Scheimpflug/Placido device map; showing superior decentration

Dr. Koch’s & Dr. Wang’s conclusion:
Good comparability

Case 17
Irregular Post LVC Astigmatism – Post Hyperopic LASIK/PRK

Dr. Koch’s & Dr. Wang’s interpretation:
- Central steep cornea on Central Topography
- Overall shape similar to the Dual-Scheimpflug/Placido device map
- Dual-Scheimpflug/Placido device map shows peripheral flattening

Dr. Koch’s & Dr. Wang’s conclusion:
Good comparability
Clinical cases

Case 18
Irregular Post LVC Astigmatism – Post Hyperopic LASIK

**Dr. Lawless' interpretation:**
- Steep cornea and a bit irregular Astigmatism
- Scheimpflug device map tells more or less the same
- Irregularity can be caused by tear film or LASIK

**Dr. Lawless' conclusion:**
Good comparability

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Case 19
Irregular Post LVC Astigmatism – Post Hyperopic LASIK

**Dr. Lawless' interpretation:**
- Irregular Astigmatism
- Decentered hyperopic ablation when just looking at anterior axial power map
- Scheimpflug device map gives roughly the same information

**Dr. Lawless' conclusion:**
Good comparability
ZEISS IOLMaster 700 is intended to aid clinicians with IOL selection. While clinicians may find Central Topography helpful in their decision-making process, topographers should be used as primary devices for topographical decisions. The information presented in this guide was an opinion of Dr. Douglas D. Koch (clinician), Dr. Giacomo Savini (clinician) and Dr. Michael Lawless (clinician). Douglas D. Koch and Dr. Michael Lawless have a contractual or other financial relationship with Carl Zeiss Meditec AG and its affiliates and have received financial support.