

**NEW:
with Central
Topography**



Starting your workflow with more insights
ZEISS IOLMaster 700 with Central Topography



We make it visible.

- 1** Introduction
- 2** Corneal Topography
- 3** ZEISS IOLMaster 700 with Central Topography
- 4** EQ Mobile Connectivity
- 5** Key Messages

Starting your workflow with more insights

ZEISS IOLMaster 700 with Central Topography



With no changes in workflow,
the ZEISS IOLMaster 700 now measures
Central Topography

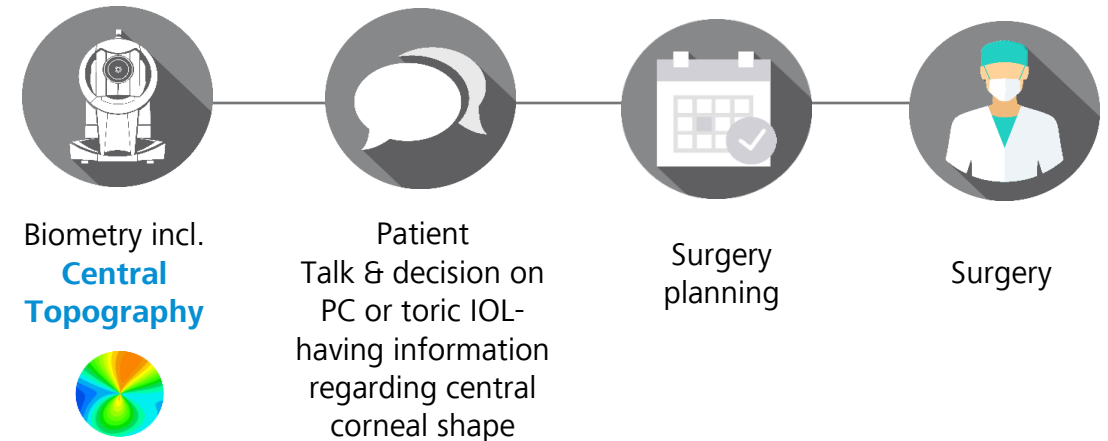


Starting your workflow with more insights

ZEISS IOLMaster 700 with Central Topography



- Central Topography provides information on central corneal shape - **right from the start!**
- It gives central corneal shape information **before** deciding on the IOL and consulting the patient
- Surgeons have a more comprehensive data at hand right away ...
- ... without extra hardware
- ... with no change in workflow
- ... without additional measurement
- ... easy and intuitively



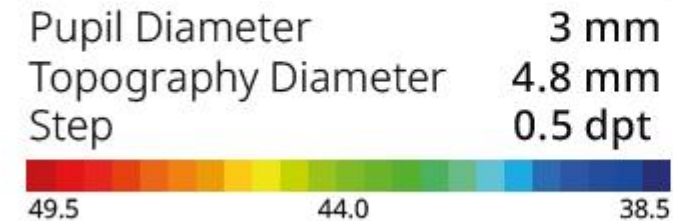
Starting your workflow with more insights

ZEISS IOLMaster 700 with Central Topography



- An important part of the preoperative evaluation of the cataract patient is evaluation of corneal topography
- Regardless of IOL type but especially for toric & multifocal IOLs
- Corneal irregularities in the central optical zone are regarded as visually relevant
- With no changes in workflow, the ZEISS IOLMaster 700 now measures central corneal topography.
- It provides **anterior and total axial power maps, designed to detect visually relevant corneal irregularities.**

Total Power Map

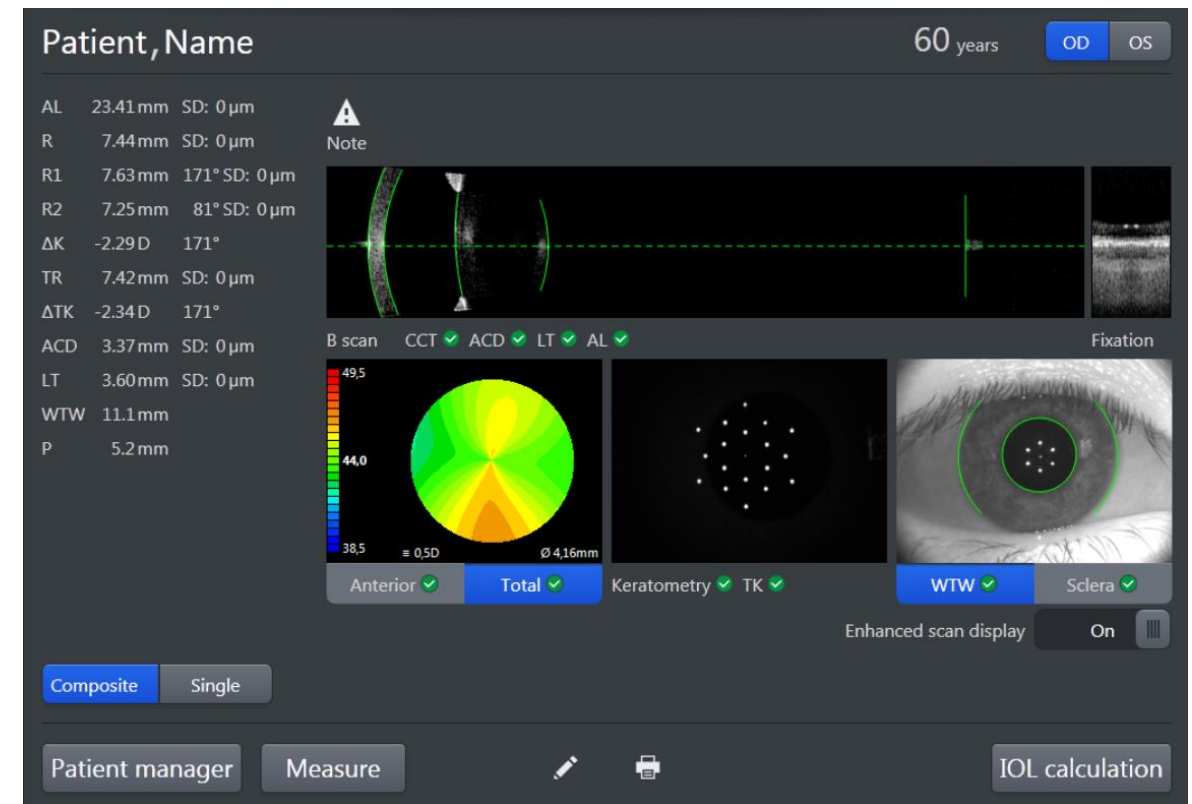


Getting Central Topography without additional measurements

No change to existing workflow



- Central Topography is integrated in the ZEISS IOLMaster 700 standard measurement.
- < 45 sec for both eyes
- Including Biometry, Total Keratometry, and Central Topography



Starting your workflow with more insights

ZEISS IOLMaster 700 with Central Topography



Your benefits at a glance



Integrating **topography** in your daily biometry routine without changing your workflow or hardware



Detecting **visually relevant corneal asymmetries**



Reading **central cornea** shape information easily and intuitively



What do surgeons say?



"Scaling and hues of the ZEISS IOLMaster 700 with Central Topography are optimized for easy and intuitive cornea checks."

"I am amazed at how much information we get from Central Topography."

Douglas D. Koch, Houston, TX, USA

- In this presentation, several leading ophthalmic surgeons **provide insight on how to nail refractive outcomes in cataract surgery**. They detail new surgical technologies and techniques (including Central Topography), and offer guidance on making treatment decisions.

https://www.healio.com/ophthalmology/education-lab/2020/05_may/zeiss-surgical-symposium/nailing-refractive-outcomes-in-cataract-surgery

- Presenting Faculty**



Eric Donnenfeld, MD
OCLI Vision
Garden City, NY
Moderator



Cynthia Matossian, MD
Matossian Eye Associates
Pennington, NJ
Moderator



Ike Ahmed, MD
Omega Ophthalmics
Toronto, Canada



Ed Hu, MD
Illinois Eye Center
Peoria, IL



Douglas Koch, MD
Baylor College of Medicine
Houston, TX



Yuri McKee, MD
East Valley Ophthalmology
Mesa, AZ



Rolando Toyos, MD
Toyos Clinic
Germantown, TX

ADDITIONAL PRELIMINARY TEST FOR CATARACT REFRACTIVE SURGERY : INCREMENTAL ACCURRACY IN PATIENT OUTCOME

To view all webinars: <https://www.gotostage.com/channel/ophthalmic-surgery-webinar-recordings>

————— **23 JUNE 2020 | 12:00 PM (GMT+2)** —————

- DRY EYE MANAGEMENT AND •
ITS IMPACT ON BIOMETRIC MEASUREMENT
- INFLUENCE OF TOPOGRAPHY ON YOUR OUTCOMES •
- CASE PRESENTATIONS •
- Q&A •



PROF. DR. MICHAEL LAWLESS
Consultant Ophthalmic Surgeon,
Vision Eye Institute, Australia



DR. HAN BOR FAM
Senior Consultant,
Tan Tock Seng Hospital, Singapore

- **ULIB will no longer be maintained.**
- **ULIB constants have been moved to the IOLCon.** (www.IOLCon.org)
- **IOLCon is a database independent of ZEISS.**
- IOLCon allows:
 - manufacturers to provide their IOL constants and specifications,
 - hosts the ULIB constants, and
 - offers constant optimization.
- With ZEISS IOLMaster 700 SW1.90, IOLCon can now be transferred to the IOLMaster via an automated export/import function (USB).



ZEISS IOLMaster 700 with Barrett True-K with TK

Clinical results



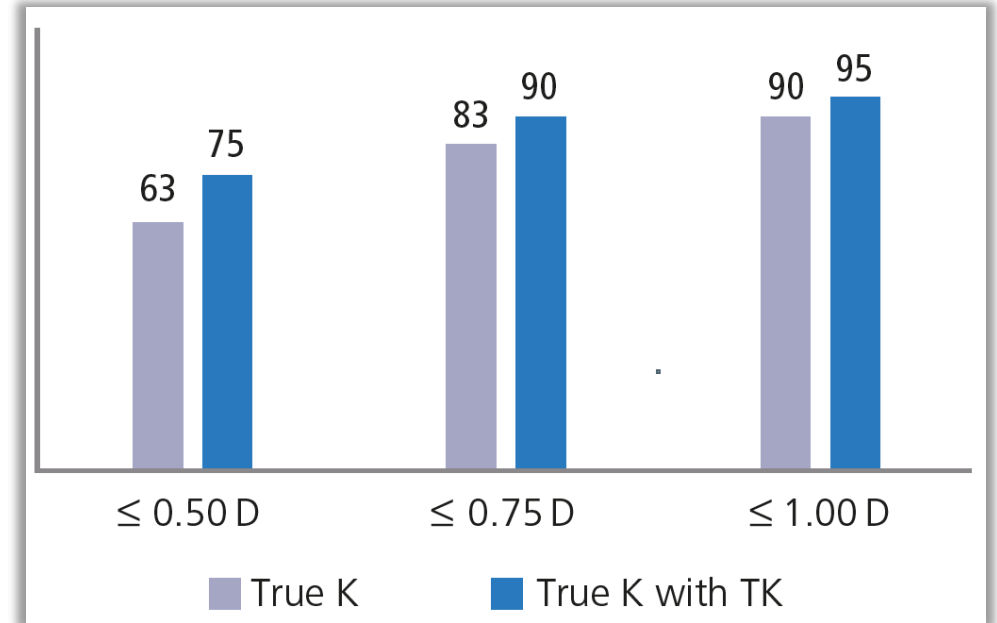
New:

Total Keratometry in Intraocular Lens Power Calculations in Eyes With Previous Laser Refractive Surgery

Michael Lawless^{1 2}, James Y Jiang³, Chris Hodge^{1 2 4}, Gerard Sutton^{1 2}, Timothy V Roberts^{1 2}, Graham Barrett^{5 6 7}

- “The Barrett True K (TK) provided the lowest mean refractive prediction error and variance for both prior myopes and hyperopes undergoing cataract surgery.”
- “The Barrett True K (TK) exhibited the highest percentages of eyes within $\pm 0.50D$, $\pm 0.75D$ and $\pm 1.00D$ of the refractive prediction error compared to other formulae **for prior myopic patients.**”
- “**Accuracy** of IOL power calculations in post-laser eyes can be **improved** by the addition of posterior corneal values as measured by the IOLMaster 700.”

Lawless M, Jiang JY, Hodge C, Sutton G, Roberts TV, Barrett G. Total keratometry in intraocular lens power calculations in eyes with previous laser refractive surgery [published online ahead of print, 2020 Apr 12]. *Clin Exp Ophthalmol*. 2020;10.1111/ceo.13760. doi:10.1111/ceo.13760. <https://pubmed.ncbi.nlm.nih.gov/32279436/>



In post-myopic LASIK eyes, Barrett True K with TK improved the outcome prediction compared to Barrett True K with classic K's within $\pm 0.5 D$ by $>12\%$ ($p = 0.04$)

ZEISS IOLMaster 700 with Central Topography

Feature Overview



1

Starting your workflow with more insights.
ZEISS IOLMaster 700 with Central Topography.

2

Data access anywhere
ZEISS IOLMaster 700 with ZEISS EQ Mobile.

3

Getting 12% more post myopic LASIK patients within 0.5D.
ZEISS IOLMaster 700 with Barrett True K with TK Formula.

4

Accessing the latest up to date IOL constants
ZEISS IOLMaster 700 with IOLCon import.

Plus
upgrade to
WIN 10

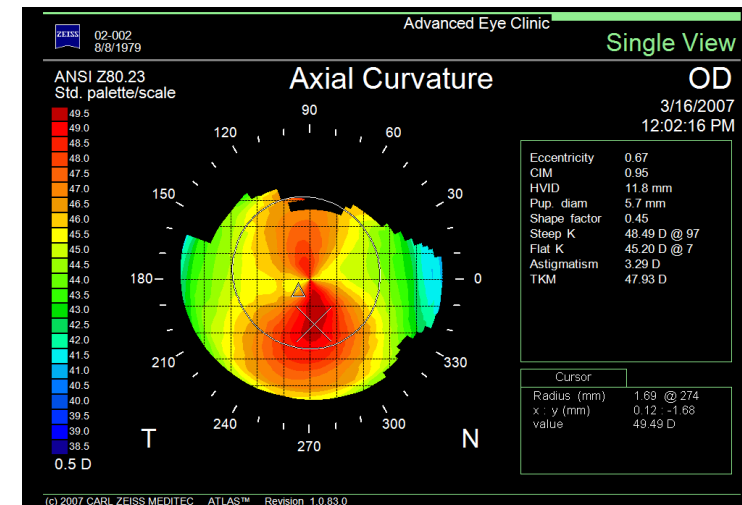
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A non-invasive medical imaging technique for mapping the surface curvature of the cornea, providing a detailed description of various curvature and shape characteristics of the cornea.

- Prior to this technology, the standard of care for measuring corneal curvature was the manual keratometer, which measures approximately 3mm of the cornea.
- The advantage of corneal topography is the ability to measure a wider area of the cornea and is able to quantify irregular astigmatism, which cannot be done with a manual keratometer.



Source: Carl Zeiss Media Database



Source: ZEISS ATLAS 9000 Topographer

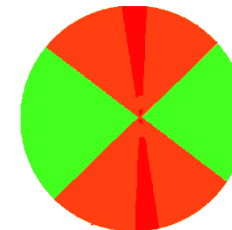
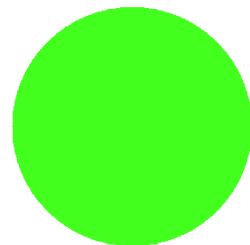
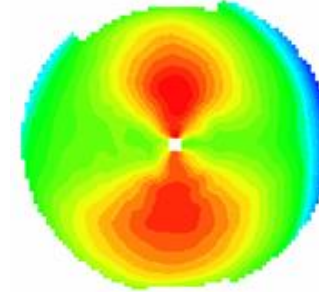
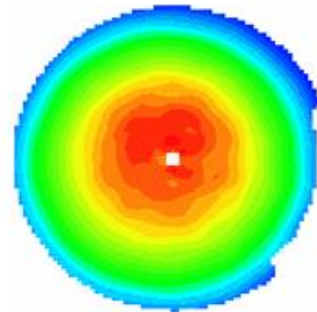
80% of all corneas: Standard cases – Keratometry works

Topography

Round

Regular Astigmatism

Keratometry



Spheric

Toric



20% of all corneas: Special cases – additional topography

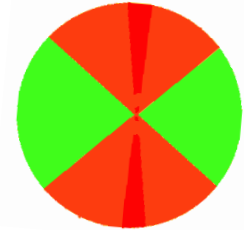
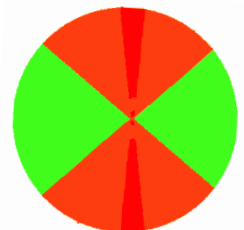
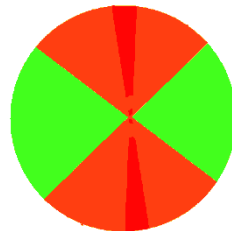
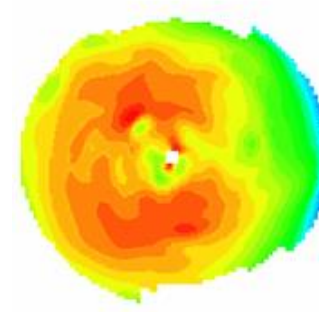
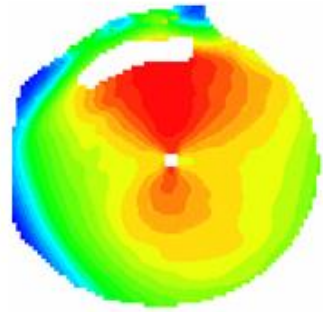
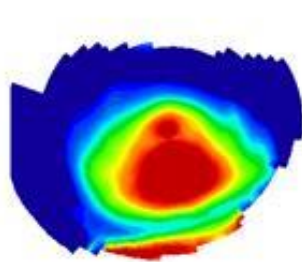
Topography

Keratoconus

**Irregular
Astigmatism**

Keratoplastic

Keratometry



Toric

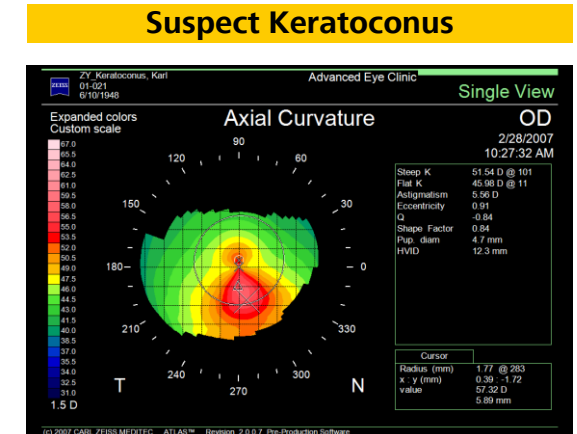
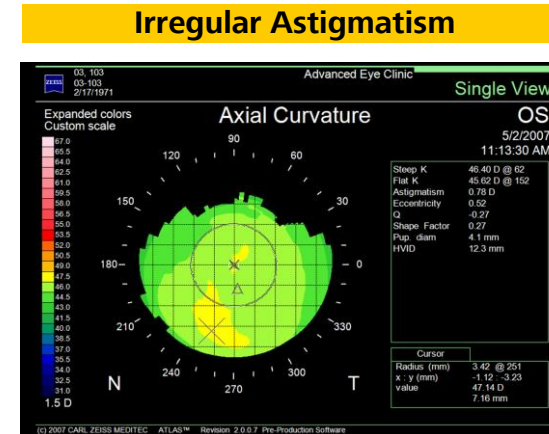
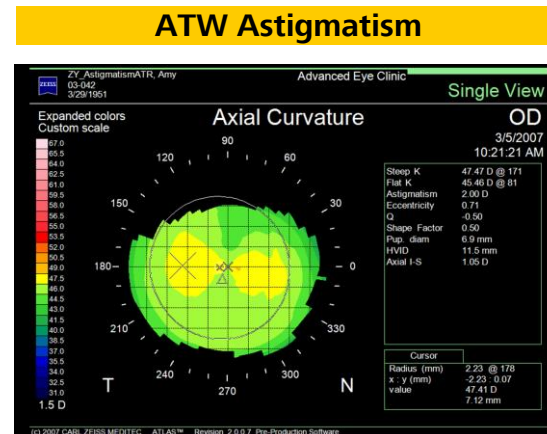
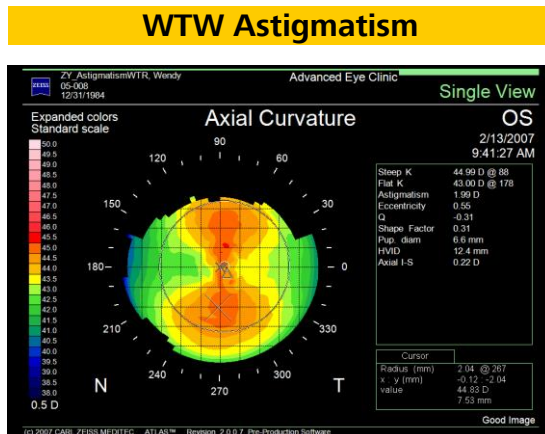
Toric

Toric



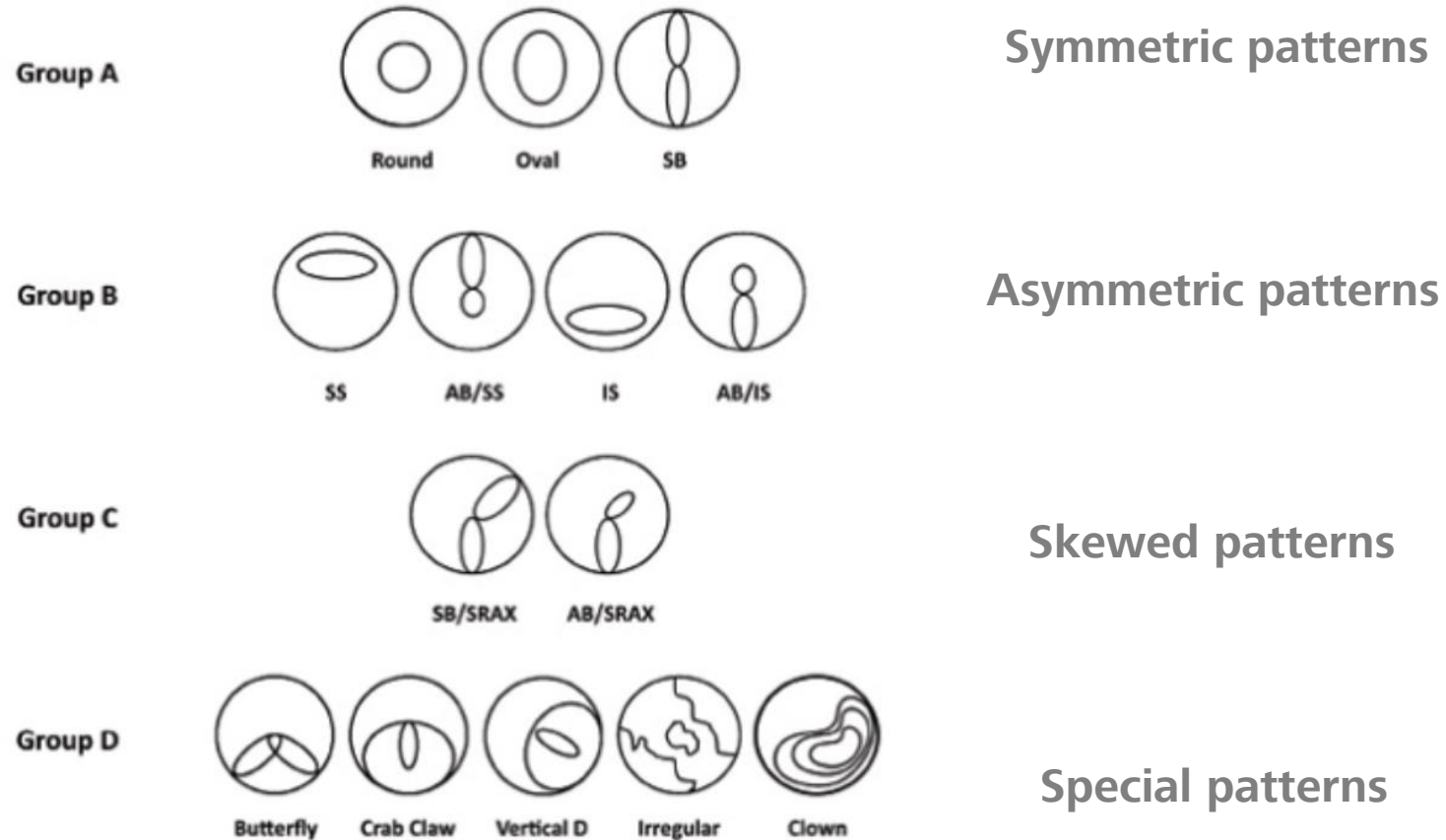
Corneal topography is most commonly used for the following purposes:

- Detect irregularities of the cornea (ie. irregular astigmatism or pathologies).
- Important for premium IOLs (ie. toric and multifocal IOLs) → Determine if the astigmatism is 'regular' or 'irregular' to know if patient is a good candidate (standard keratometers cannot make this determination).
- **Regular astigmatism:** principle meridians are 90 degrees away from each other (eg. WTW, ATR)
- **Irregular astigmatism:** axes not 90 degrees from each other



Corneal Topography

Corneal patterns – what do they mean?



Abbreviations:

SB = symmetric bowtie; SS = superior steep;

AB/SS = asymmetric bowtie superior steep; IS = inferior steep; AB/IS = asymmetric bowtie inferior steep;

SB/SRAX = symmetric bowtie with skewed radial axis index; AB/SRAX = asymmetric bowtie with skewed radial axis index

Source: Dr. Han Bor Fam

Corneal Topography

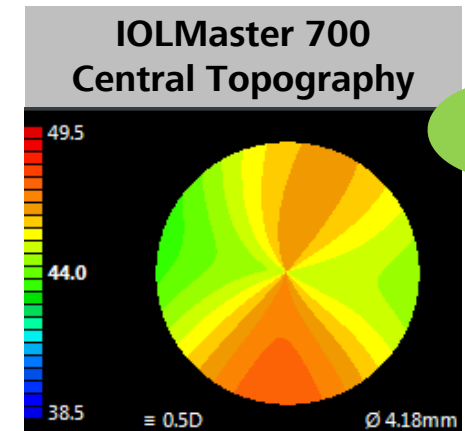
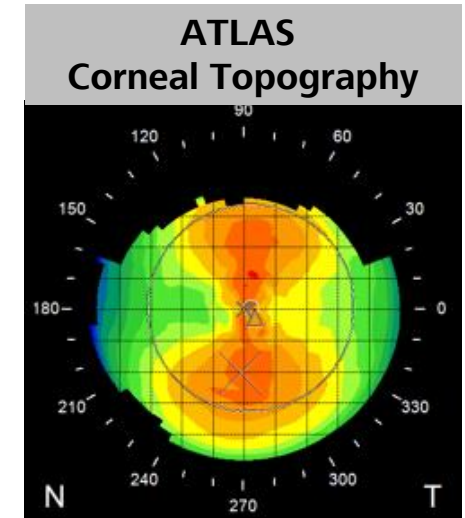
Colored maps – what do they mean?



Corneal topographers measure surface curvatures then presents the information in the form of a **colored map**.

- **BLUE** - Cool colors = FLATTER curvature or BELOW average height.
- **GREEN** - Medium colors = NORMAL curvature or AVERAGE height.
- **RED/ORANGE** - Hot colors = Steeper curvature or above average height.
- **BLACK** - NO information = Lid, lash, lack of tear film or severe pathology.

Intermediate colors - white, aqua, yellow and orange are transition areas on the cornea

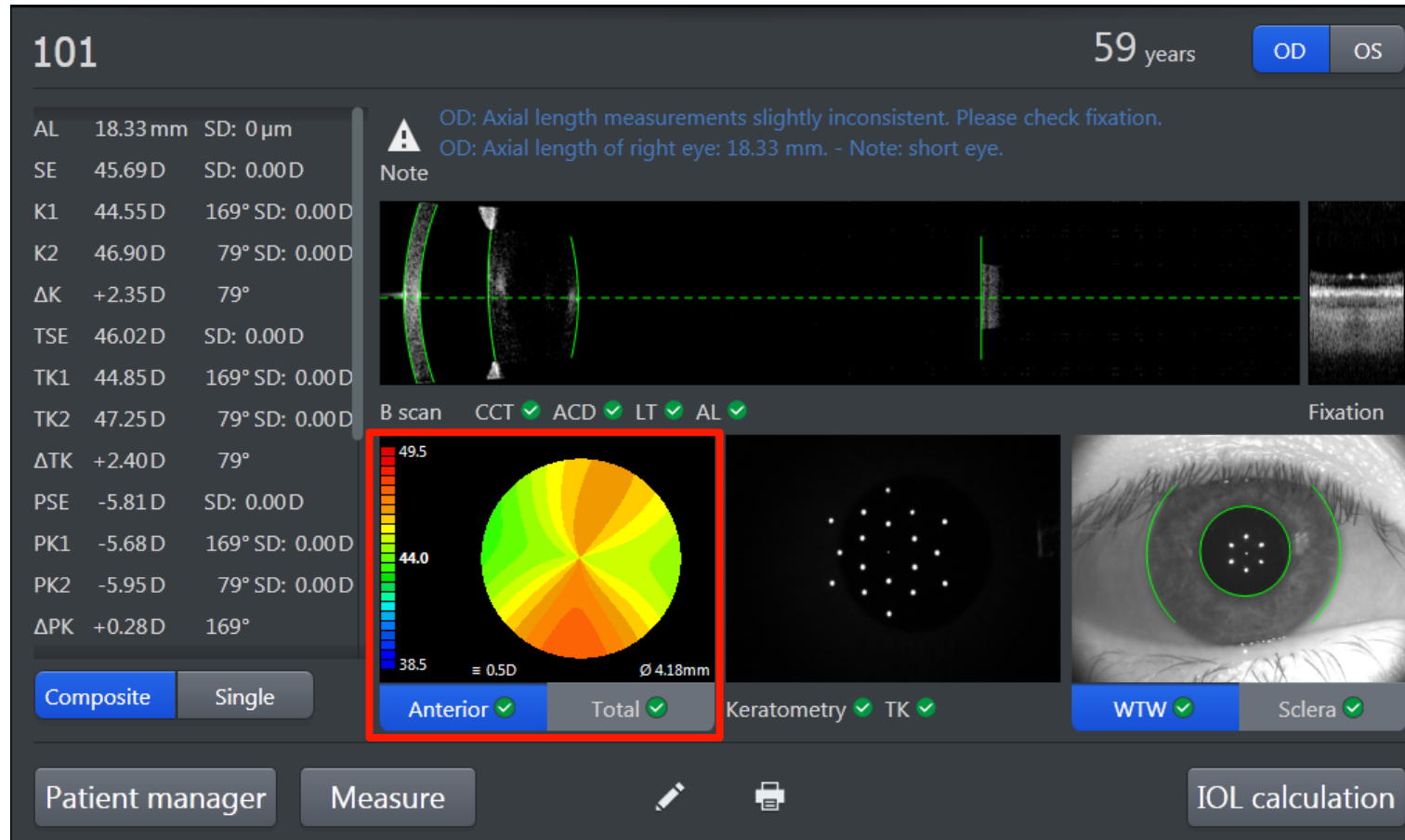


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ZEISS IOLMaster 700 with Central Topography

Anterior and Total axial power maps



1. The **anterior axial power map** represents total corneal power, assuming a fixed ratio of anterior to posterior curvature and normal corneal thickness.

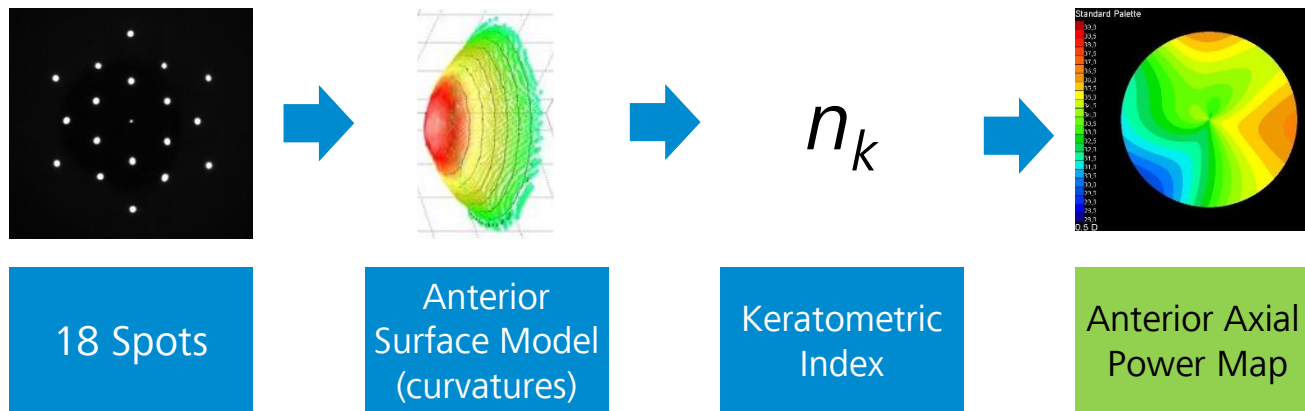
2. The **total axial power map** represents total corneal power, replacing assumptions about the posterior corneal surface and pachymetry with measurements

Generally, axial maps:

- Simple way of describing the overall shape of the cornea
- Displays astigmatism (regular or irregular)
- Most common, intuitive map to understand

Providing central anterior axial power maps

Using 18 telecentric spot locations

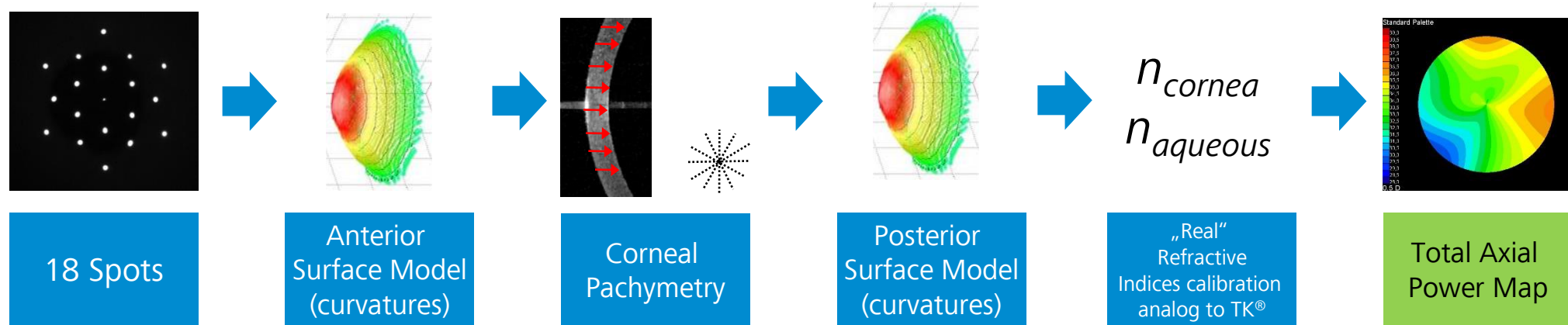


Measurement of the *anterior corneal curvature* or power

- The IOLMaster 700 Telecentric Keratometry directly measures surface slopes on 18 spot locations.
- This results in high independence from system misalignment.
- Every spot is a fully individual and independent measurement (no skew error as Placido!)
- The measured curvatures (r) are converted to powers (D) via the chosen keratometric index.
- Thus, the anterior axial power map represents total corneal power, assuming a fixed ratio of anterior to posterior curvature and normal corneal thickness.

Providing central total axial power maps

Using 18 telecentric spot locations and SWEPT-Source OCT



Measurement of the **total corneal curvature or power**

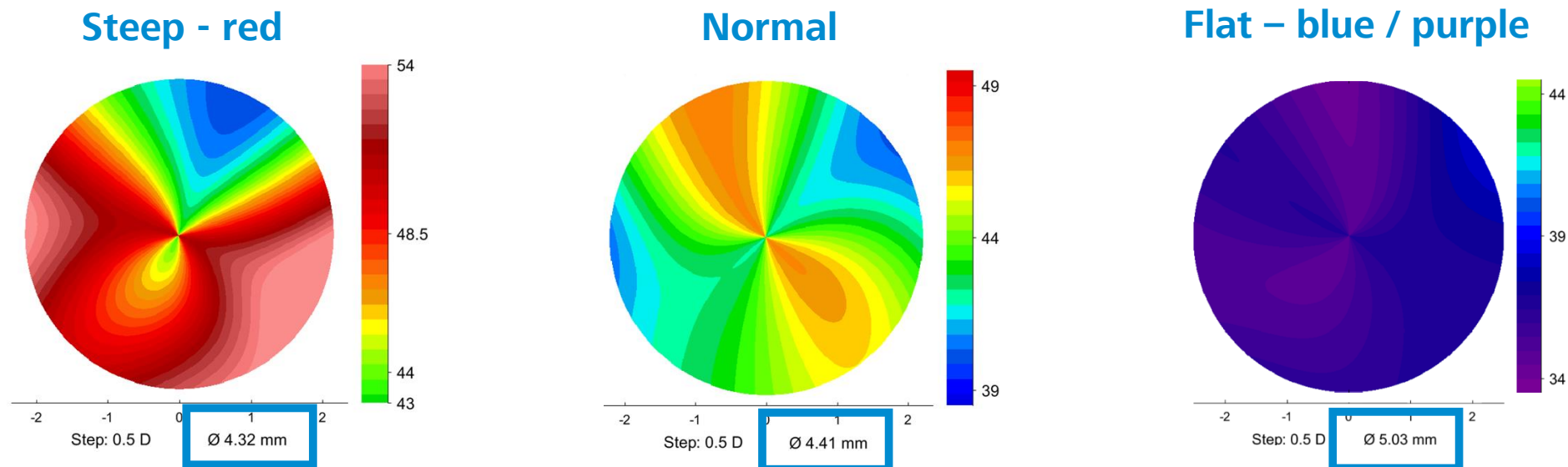
- Additionally to the anterior surface model, pachymetry and posterior surface curvatures are measured by SWEPT-Source OCT in 6 meridians.
- The measured curvatures (r) are converted to powers (D) via the refractive indices of the cornea and the aqueous, including corneal thickness.
- Thus, the total axial power map represents total corneal power, replacing assumptions about the posterior corneal surface and pachymetry with measurements.

Scaling and hues of the ZEISS IOLMaster 700 with Central Topography are optimized for easy and intuitive cornea checks

Co-Developed with Douglas D. Koch and Li Wang, Houston



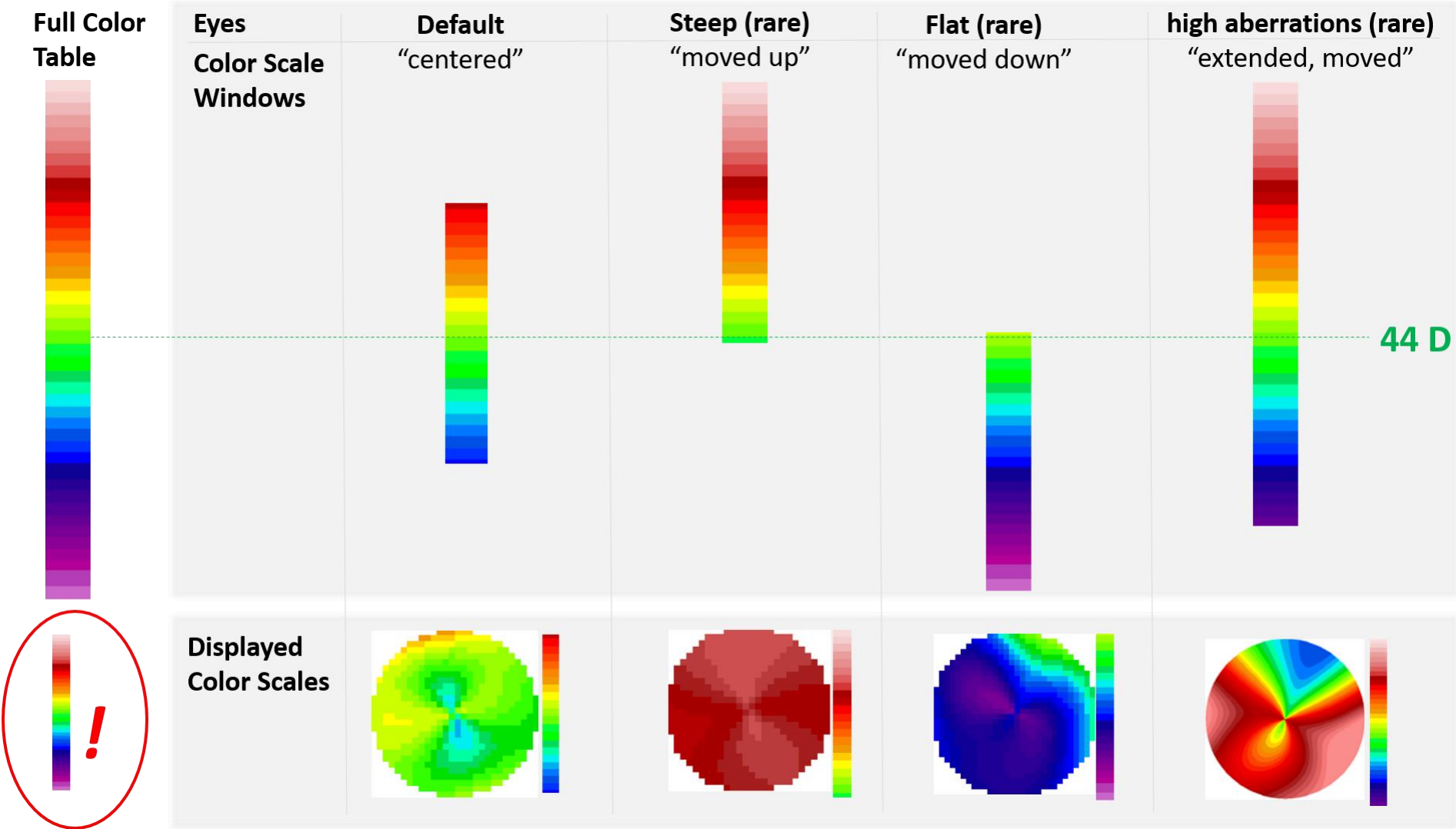
- **Extended Color Scale (based on ISO 19880)***
- 34 D to 54 D range; 0.5 D step s; 41 colors
 - Default color scale window: 39 .. 49 D (10 D range, 21 colors)
 - Extreme cases color scale window moved up/down on very steep/flat corneas (>49 D / <39 D)
 - Color scale window extended on highly aberrated corneas (>10 D range → >21 colors)
 - **Green always 44 D and always displayed**
- Diameter of analysis is displayed



*According to ISO 19980 standard, the hue changes monotonically from green to red and shall change monotonically from green to blue.

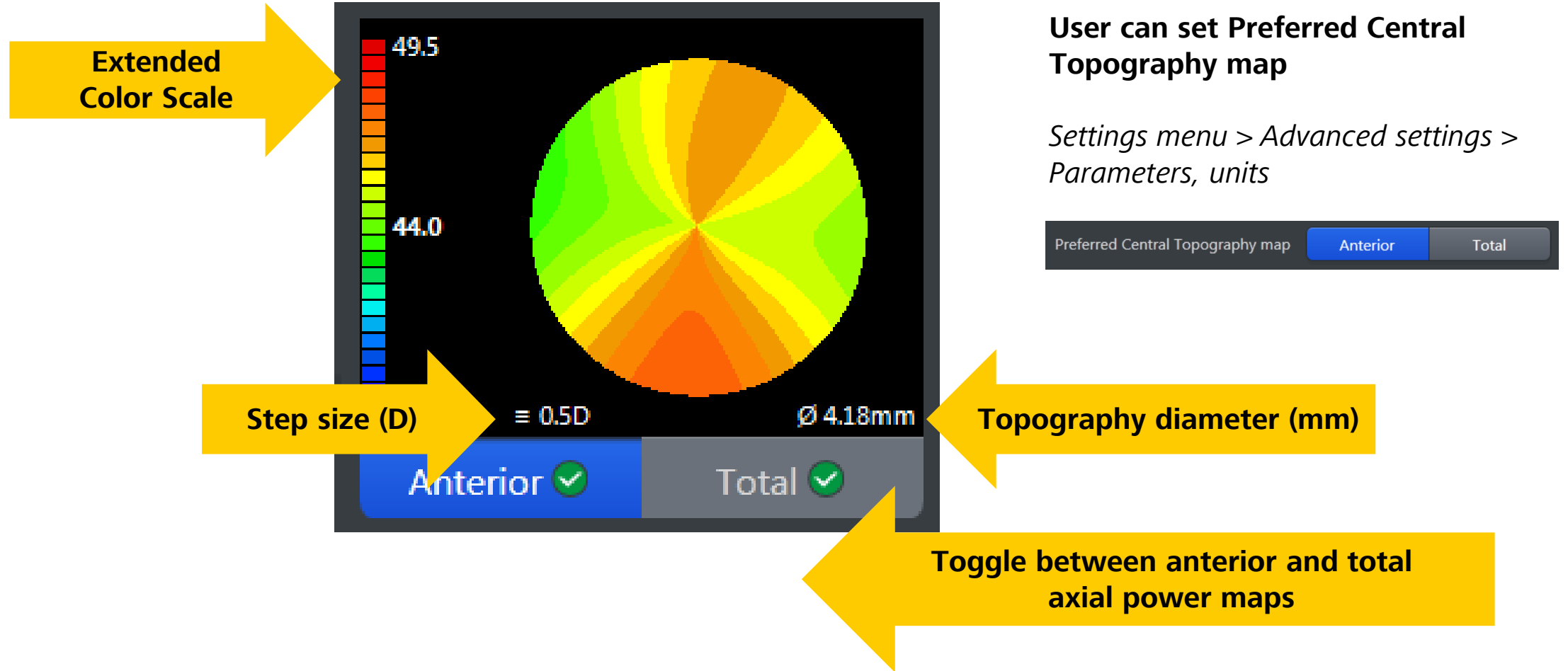
In extreme cases color scale window automatically adjusted

For corneas $>49\text{ D}$ / $<39\text{ D}$



ZEISS IOLMaster 700 with Central Topography

Anterior and Total axial power maps



ZEISS IOLMaster 700 with Central Topography

Keratometry & Central Topography Overview

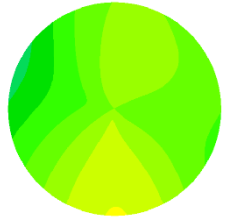


Device	ZEISS IOLMaster 700
Keratometry	Anterior, posterior and Total Keratometry (TK)
Telecentric Keratometry	•
Topography	Anterior and total
Method of topography	3-zone Keratometry (18 LED) and SS-OCT
Diameter of Topography	3.4 – 5.4mm for corneal radii of 6 – 11mm
Pupil diameter	•
Topography maps	Anterior and total axial power map
Color scale	34D to 54D range; 0.5D steps; 41 colors; Green always 44D and always displayed; steps and colors can't be changed

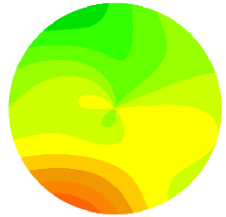
Telecentric
Keratometry +
SS-OCT based
topography
→ **Reals Ks,
not Sim Ks**

Starting your cataract workflow with more information

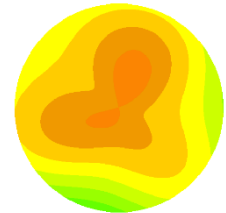
ZEISS IOLMaster 700 with Central Topography



Cases of
Regular Astigmatism



Cases of
Irregular Pathological Astigmatism



Cases of
Irregular post LVC Astigmatism

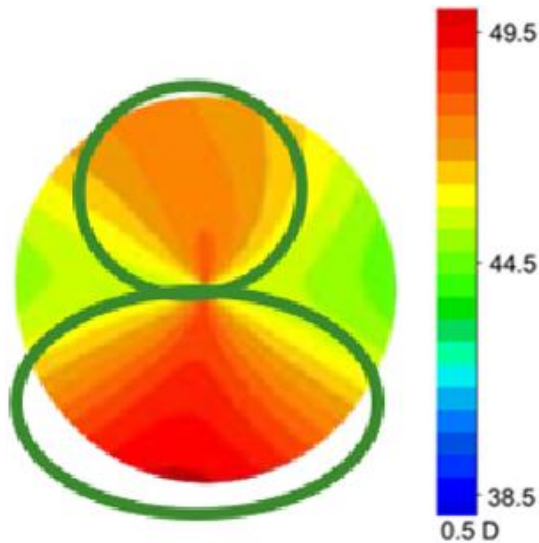
More cases in the
**ZEISS IOLMaster 700
Central Topography
Compendium**

Comparing Central Topography to a dual-Scheimpflug / Placido device

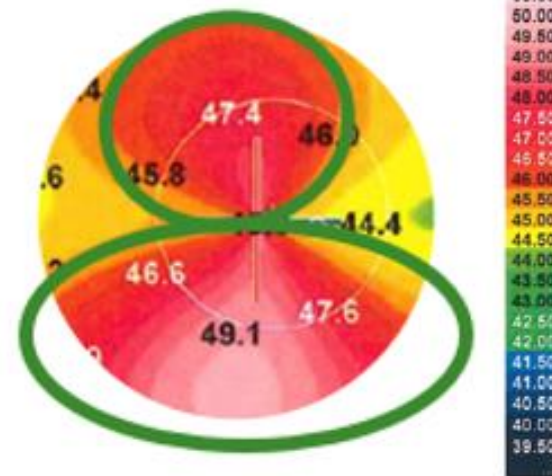
ZEISS IOLMaster 700 vs. Ziemer Galilei G4



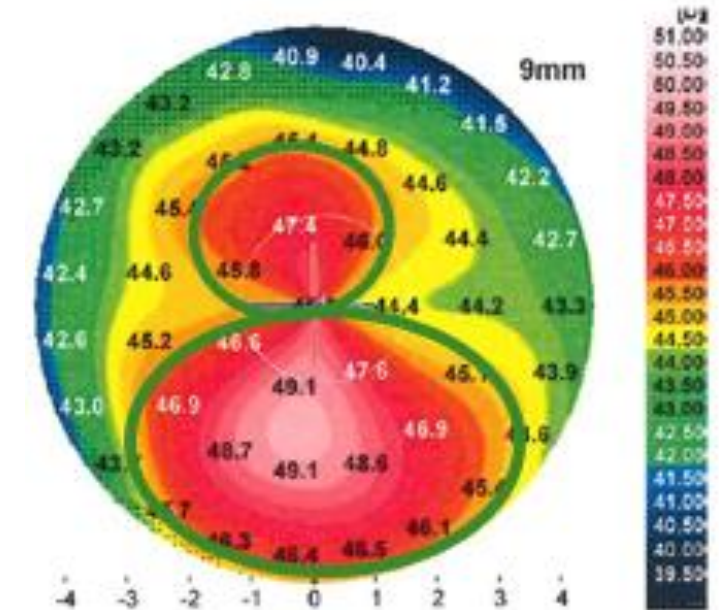
Approx. 4 mm Diameter
ZEISS IOLMaster 700



Approx. 4 mm Diameter
Galilei G4



9mm Diameter
Galilei G4



DOCTOR'S CONCLUSION: Great comparability

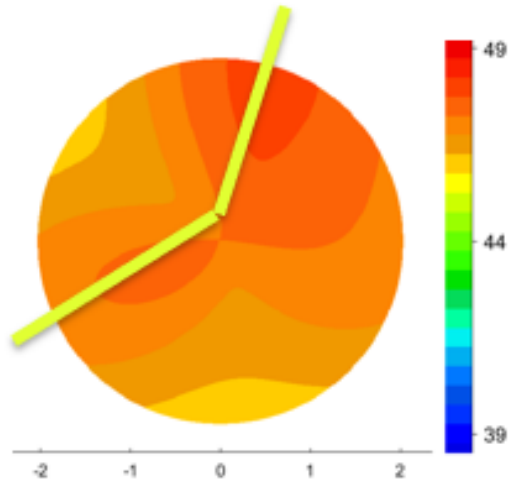
- **Irregular astigmatism**, inferior steepening ("lazy-eight") visible on both devices
- **Same decision for toric or multifocal IOL**

Comparing Central Topography to a dual-Scheimpflug / Placido device

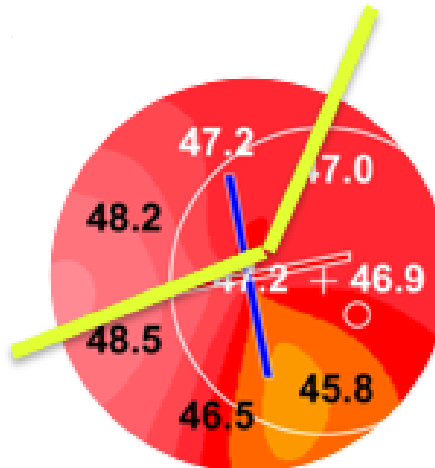
ZEISS IOLMaster 700 vs. Ziemer Galilei G4



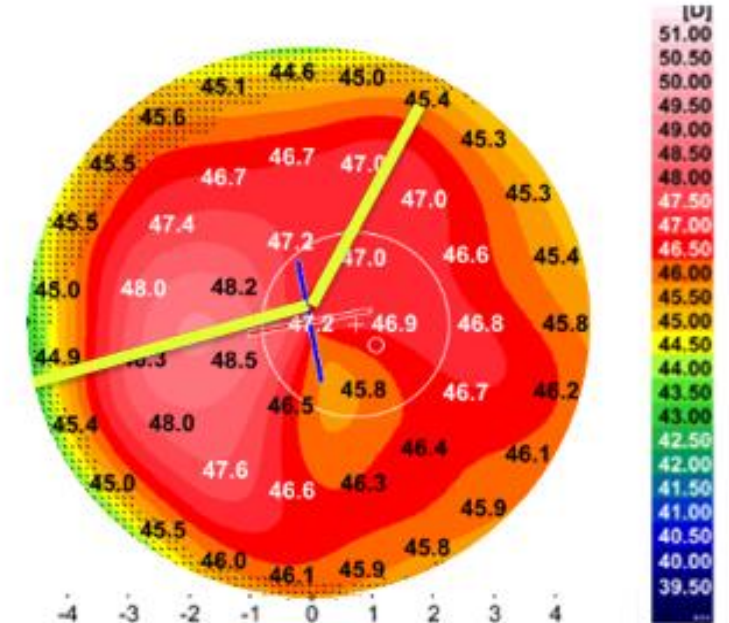
Approx. 4 mm Diameter
ZEISS IOLMaster 700



Approx. 4 mm Diameter
Galilei G4



9mm Diameter
Galilei



DOCTOR'S CONCLUSION: Good comparability

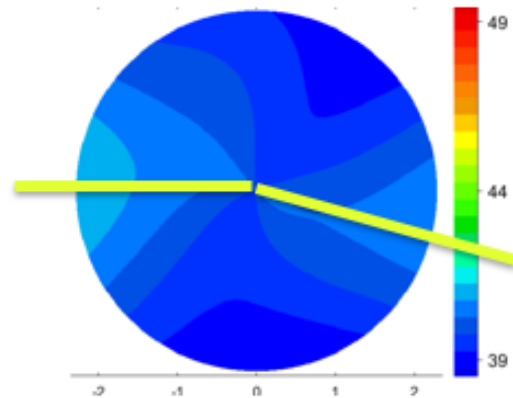
- **Irregular astigmatism** on central topography, shape of Central Topography from ZEISS IOLMaster 700 is similar to the Galilei map
- No straight meridians: irregular
- Steep and irregular: Be careful!
- **Same decision for toric or multifocal IOL**

Comparing Central Topography to a dual-Scheimpflug / Placido device

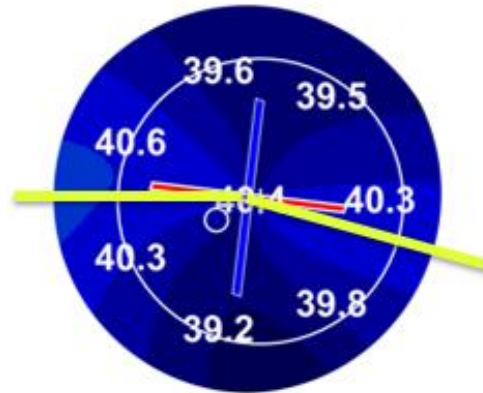
ZEISS IOLMaster 700 vs. Ziemer Galilei G4 – Case report: previous myopic LASIK/PRK



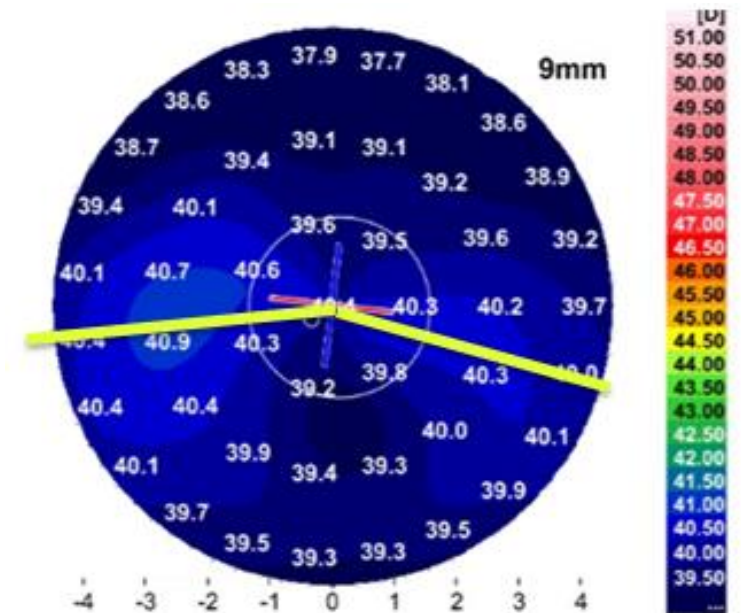
Approx. 4 mm Diameter
ZEISS IOLMaster 700



Approx. 4 mm Diameter
Galilei G4



9mm Diameter
Galilei



DOCTOR'S CONCLUSION: Good comparability

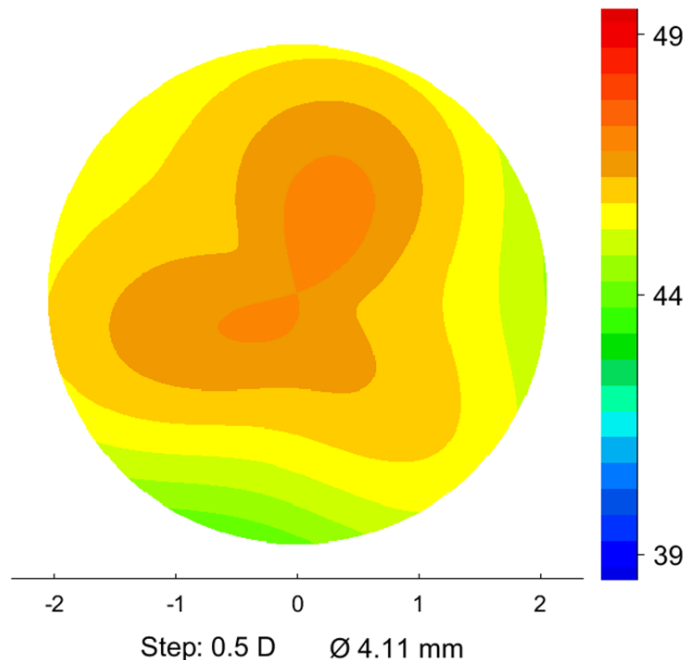
- **Flat cornea, irregular and against-the-rule astigmatism**
(Blue color, meridians not straight, "lying eight")
- Flat, ATR and meridians not straight both are a warning in itself to check further
- **Same decision for toric or multifocal IOL**

Comparing Central Topography to a dual-Scheimpflug / Placido device

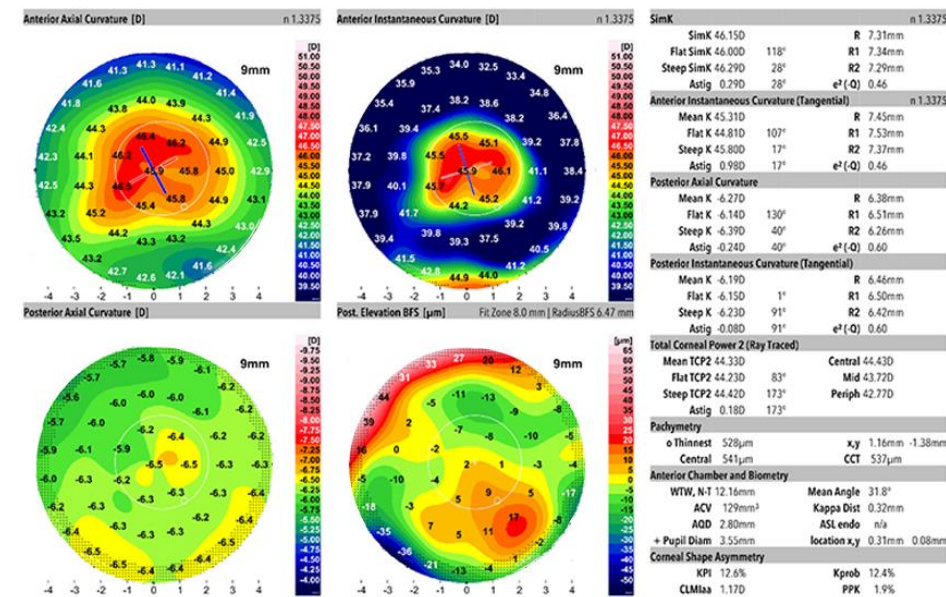
ZEISS IOLMaster 700 vs. Ziemer Galilei G4 – Case report: previous hyperopic LASIK/PRK



ZEISS IOLMaster 700



Galilei G4



DOCTOR'S CONCLUSION: Good comparability

- Central steep cornea on central topography
- Overall shape similar to the Galilei map
- Galilei shows peripheral flattening
- IOLM K astigmatism: 0.38 D @ 15° | Galilei SimK astigmatism: 0.29 D @ 28°



Data Source and interpretation: Li Wang & Douglas D. Koch, USA

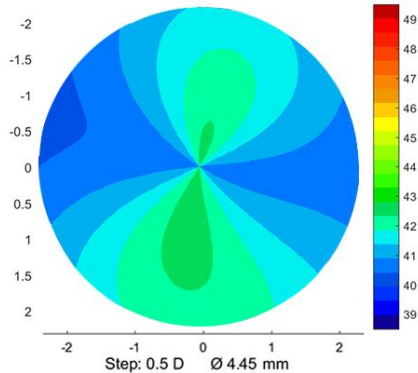
Corneal information you can trust

ZEISS IOLMaster 700 with Central Topography

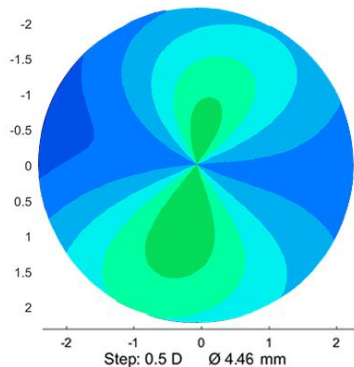


Subject 1
IOLMaster 700

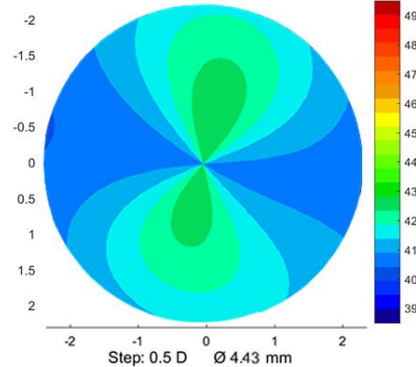
Measurement 1



Measurement 2

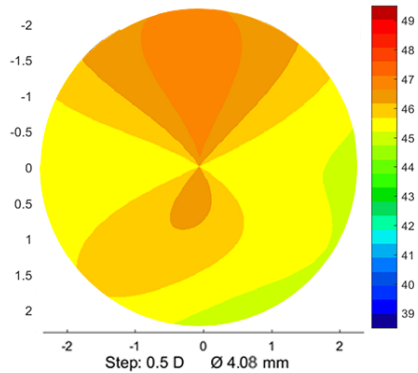


Measurement 3

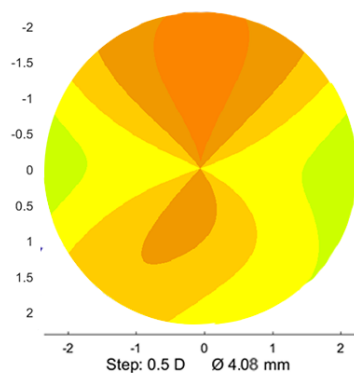


Subject 2
IOLMaster 700

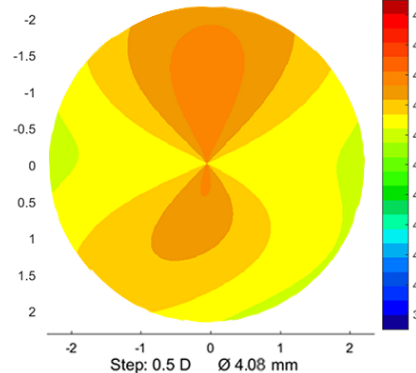
Measurement 1



Measurement 2



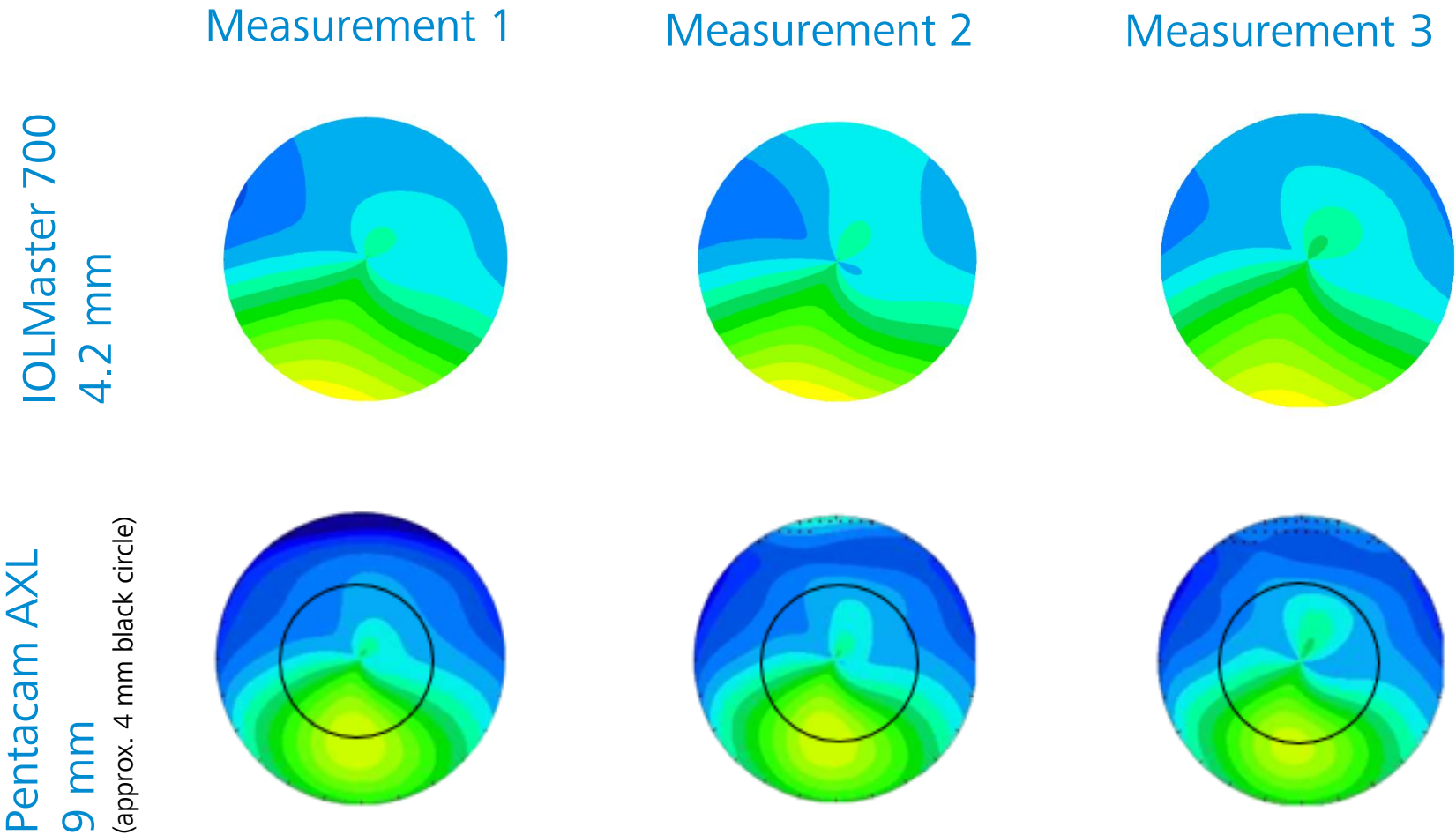
Measurement 3



Data Source: ZEISS

Corneal information you can trust

ZEISS IOLMaster 700 with Central Topography vs. Pentacam AXL



Data Source: ZEISS

The ZEISS IOLMaster 700 is indicated to aid clinicians with IOL selection. While clinicians may find Central Topography feature to be helpful in their decision-making process, topographers should be used as primary devices for topographical decisions. The information presented in this presentation was an opinion of Dr. Douglas D. Koch (clinician). Douglas D. Koch has a contractual or other financial relationship with Carl Zeiss Meditec AG and its affiliates and has received financial support for consulting activities.

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ZEISS EQ Mobile

A FORUM and cloud based software solution including a mobile app for iPhone and iPad



What is ZEISS EQ Mobile:

ZEISS EQ Mobile provides a flexible and secure data transfer to ZEISS CALLISTO eye via the cloud-based ZEISS EQ Mobile app

- Replace paper and USB sticks
- Streamline your cataract refractive workflow

Benefits

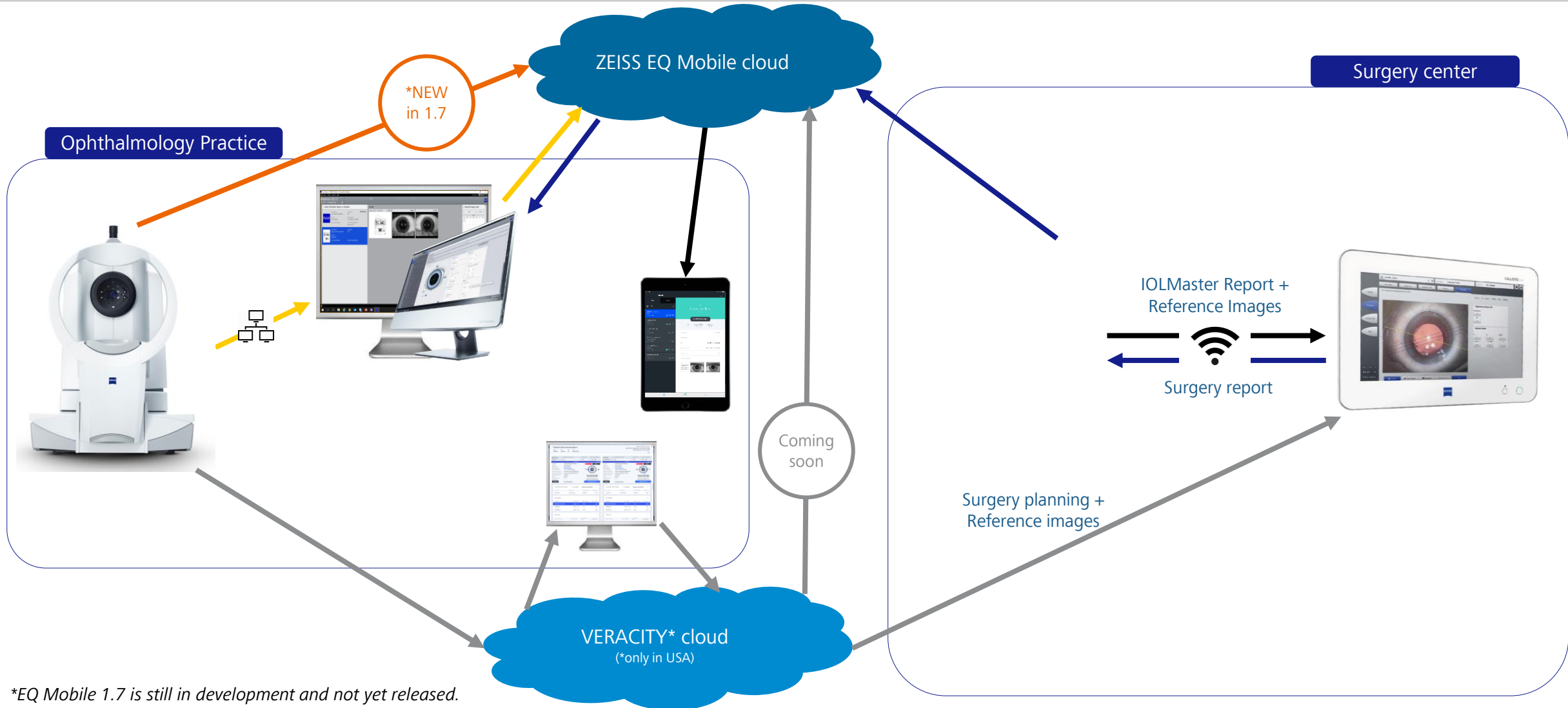
1. **Secure astigmatism management workflow** via cloud connectivity
2. **Peace of mind and increased safety.** Surgical data becomes automatically available where and when needed
3. **Avoid critical workflow events during the surgery** by automatic inclusion of comprehensive surgical planning via the cloud and allowing digital IOL confirmation in the OR
4. **Facilitated surgical documentation** by automated surgery reports

Features

1. **Flexible and secure data access** on iPad and iPhone – anywhere, anytime, independent of the location of surgery
2. **Easy wireless data transfer** to/from ZEISS CALLISTO eye in the OR via ZEISS EQ Mobile cloud
3. **Digital IOL confirmation** via QR/barcode scan for ZEISS IOLS or photo documentation for non-ZEISS IOLS
4. **Surgery report** from ZEISS CALLISTO eye, transferred back to ZEISS FORUM

ZEISS EQ Mobile Connectivity

Supporting different use cases within the ZEISS Cataract Suite with/without ZEISS FORUM



**EQ Mobile 1.7 is still in development and not yet released.*

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Starting your workflow with more insights

ZEISS IOLMaster 700 with Central Topography



Your benefits at a glance



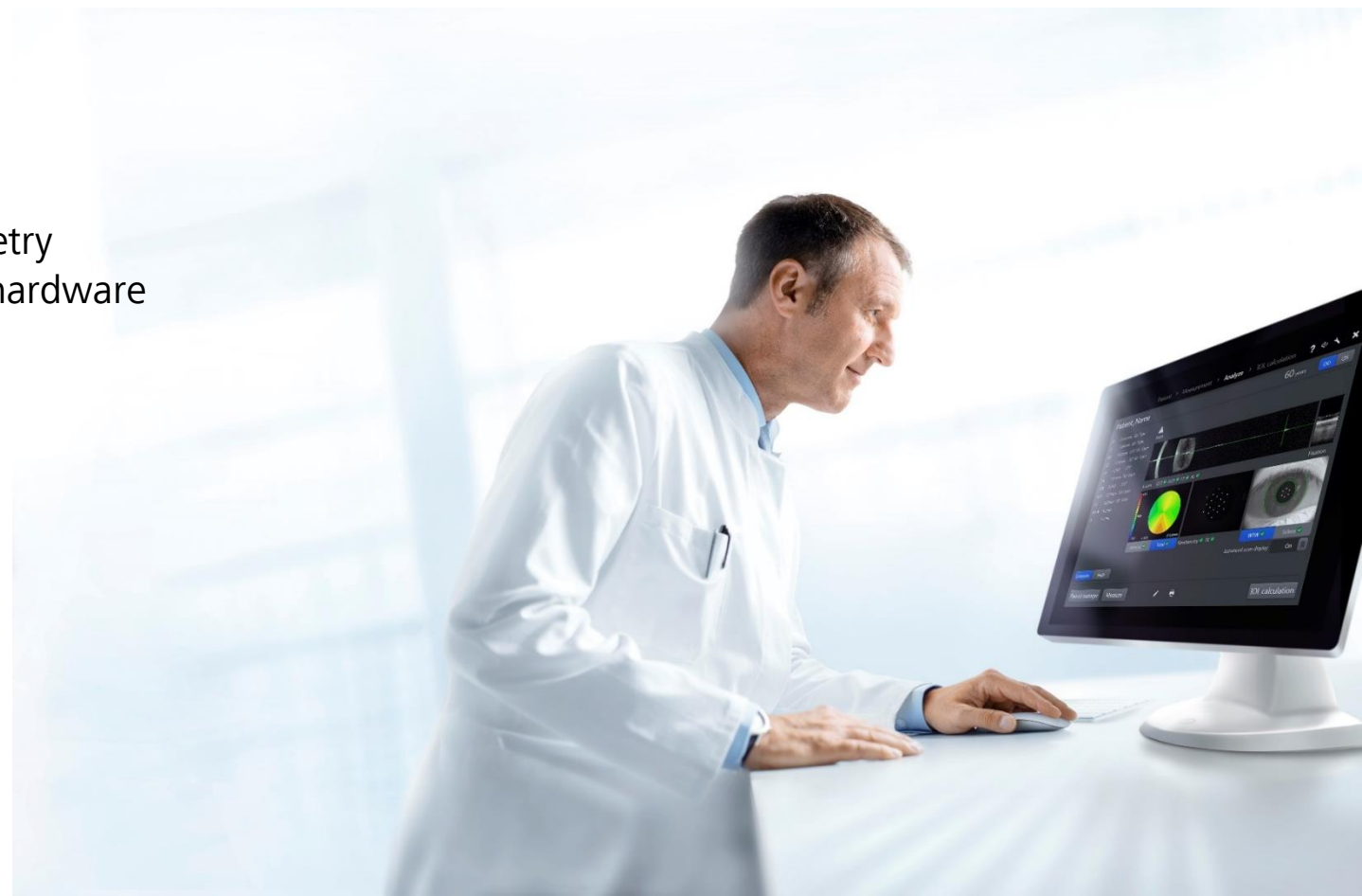
Integrating **topography** in your daily biometry routine without changing your workflow or hardware



Detecting **visually relevant corneal asymmetries**



Reading **central cornea** shape information easily and intuitively



ZEISS IOLMaster 700 with Central Topography

Feature Overview



1

Starting your workflow with more insights.
ZEISS IOLMaster 700 with Central Topography.

2

Data access anywhere
ZEISS IOLMaster 700 with ZEISS EQ Mobile.

3

Getting 12% more post myopic LASIK patients within 0.5D.
ZEISS IOLMaster 700 with Barrett True K with TK Formula.

4

Accessing the latest up to date IOL constants
ZEISS IOLMaster 700 with IOLCon import.

Plus
upgrade to
WIN 10



Seeing beyond