

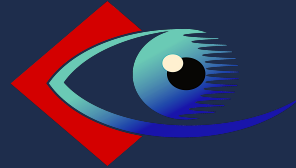
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INTERNATIONAL CONGRESS OF THE

EGYPTIAN OPHTHALMOLOGICAL SOCIETY

EOS 2023



Lenticule extraction with the Schwind Atos , preliminary
experience and management of difficulties



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Phaco & Refractive surgeon

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New lasers on the market

- VisuMax 800 (Zeiss)
- Z8 (Ziemer)
- ATOS (Schwind)
- ELITA (J&J) - no CE mark



VisuMax 800



ATOS
Schwind



Z8 Ziemer



ELITA
J&J



Why is lenticule extraction increasingly popular?

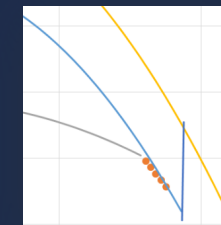
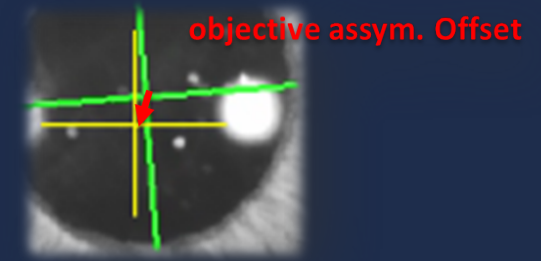
- painless surgery and postop.
- high precision
- visual rehabilitation almost equal to lasik
- less invasive than lasik
- better corneal biomechanical stability than lasik
- less dry eye than lasik
- no flap related complications
- wide optical zone
- only one laser for the procedure





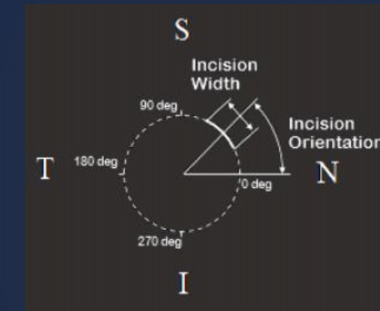
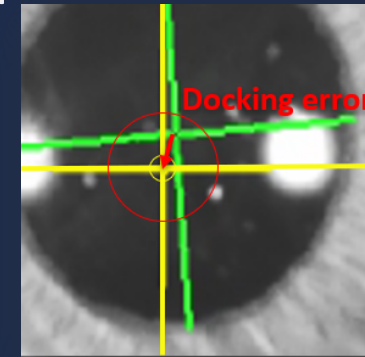
The Newest Femto Lenticular Extraction Machine launched recently with the following features:

- intelligent eye tracking with cyclotorsion compensation
- Link to the Tomography MS39 Scheimpflug camera for cyclotorsion
- Curved patient interface with integrated suction tubing
- Tissue saving lenticular shape with a transition zone instead of a pedestal
- Flap cutting sequence from out to in.



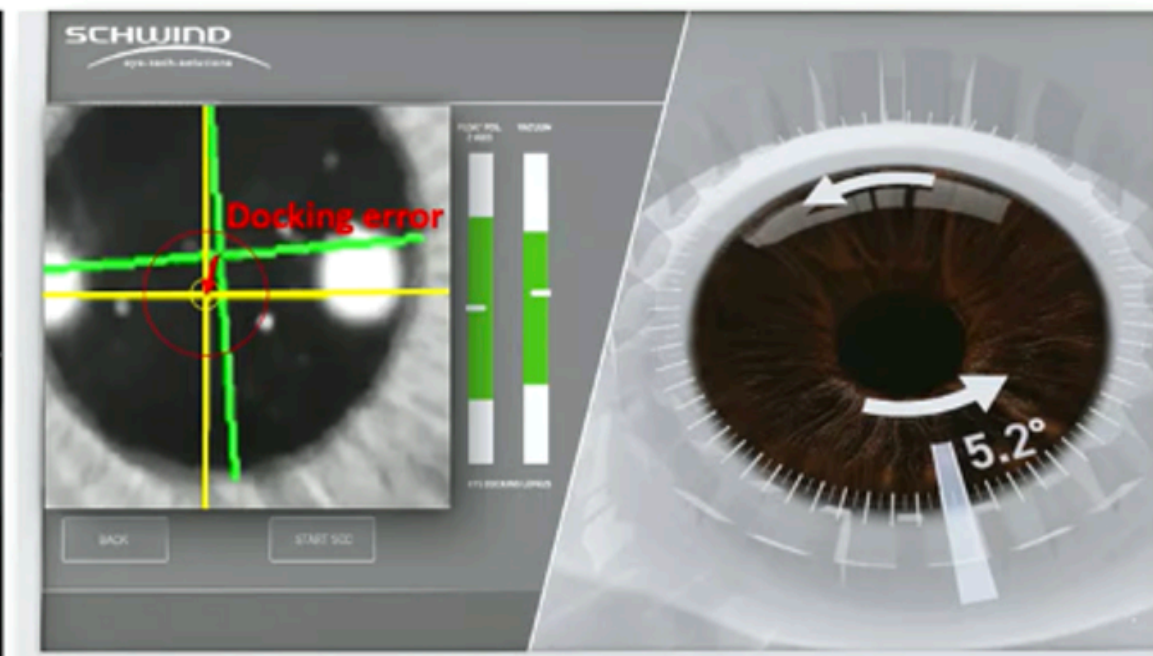
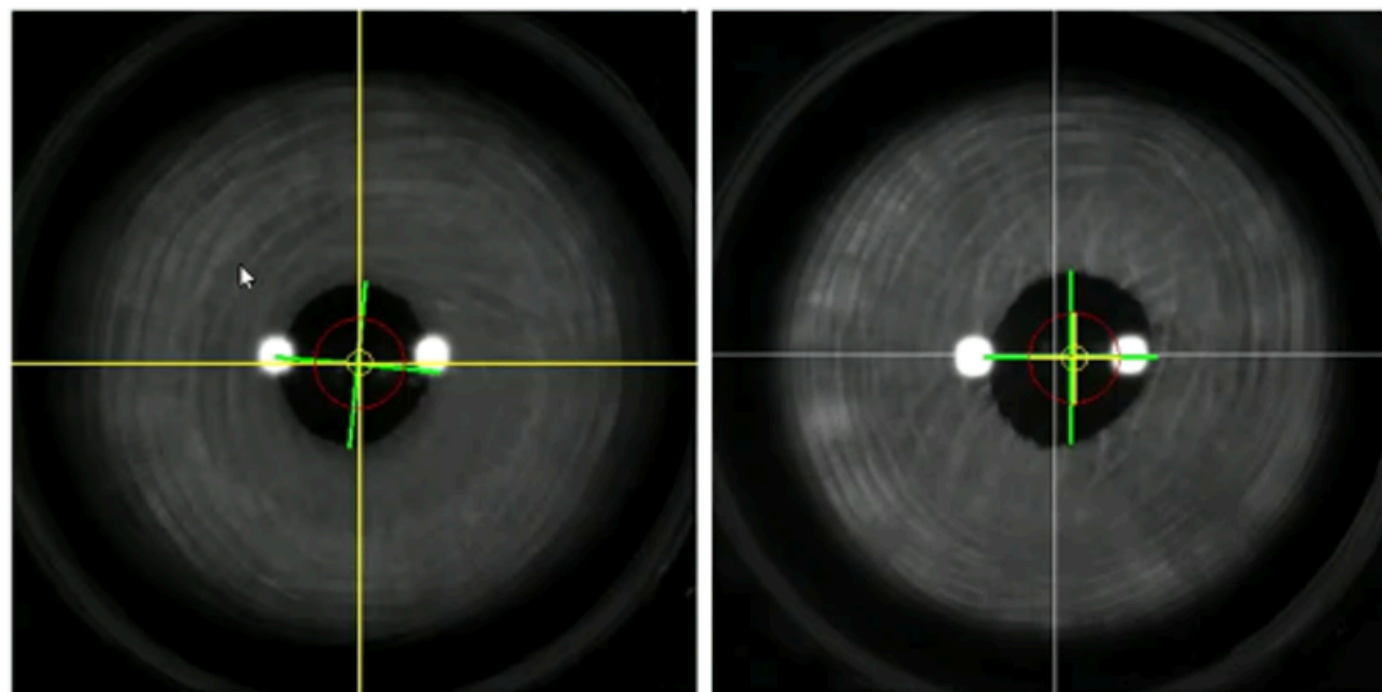


- Shortening of the Laser treatment time from 18 to 10 second
- Optimisation of the centration with guidance of the red and yellow circles which indicate the relevant areas of focussing
- Improvements in the graphical user interface
- Flap cutting sequence adjusted to reduce the OBL creation
- Import of personalized data (name, k-reading, corneal vertex, pachymetry...) from the MS39 scheimpflug system is possible





Centration/cyclorotation



Smallest docking error, if **green crosshair** = **yellow crosshair**
Radius **yellow ring** = 200 μm Radius **red ring** = 700 μm



- Shorting of the treatment preparation time by >10 sec
- Shortening of the treatment time down to 15-18 sec for SmartSight lenticule and 8-10 sec for flaps
- Individual parameters for anterior and posterior cut which allows for more precise adjustment of the separation
- Reduced vacuum limit down to 220 mmHg of suction
- Link to the MS-39

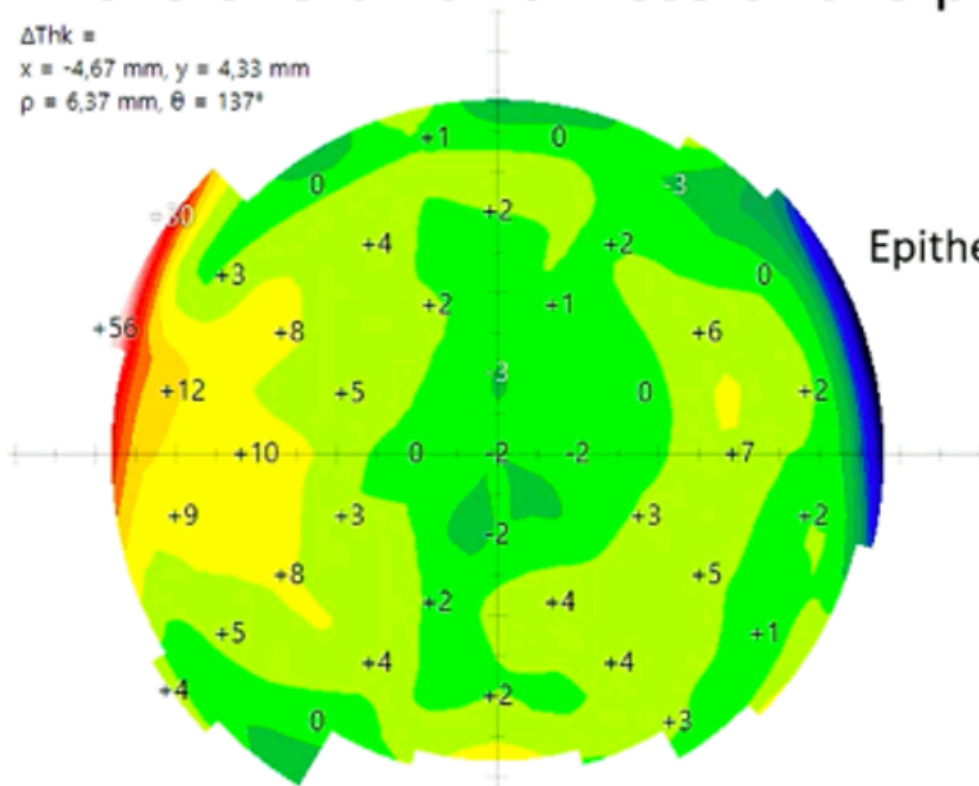


SCHWIND ATOS – Anatomy of the lenticule

No minimum lenticule thickness

-> the overall thickness of the periphery is zero

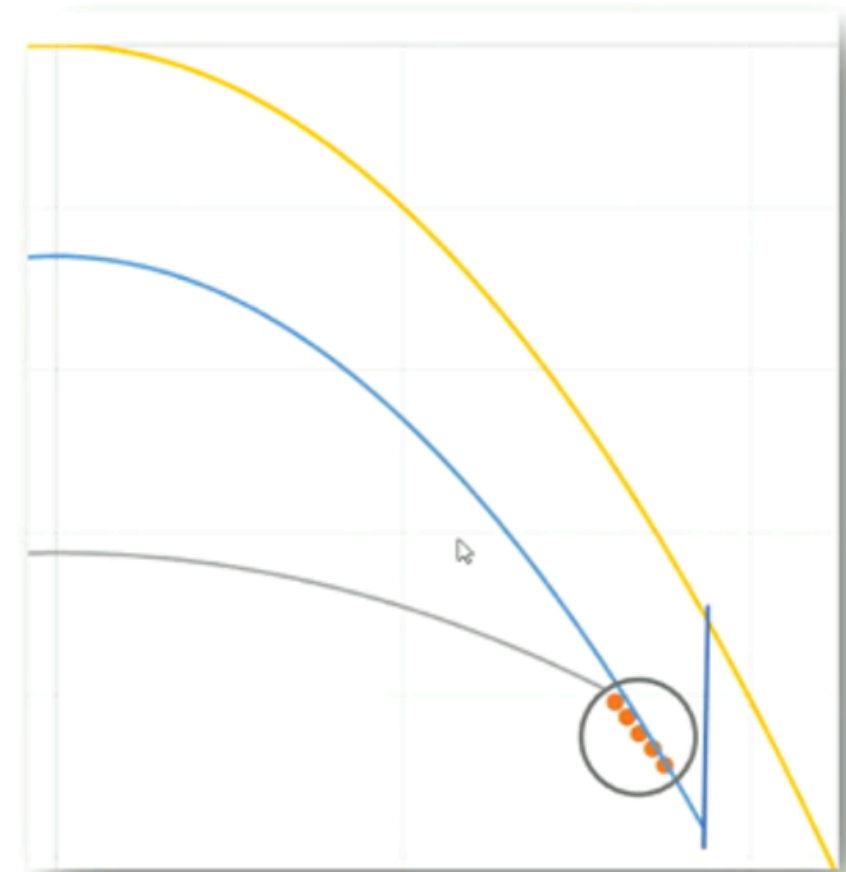
$\Delta Thk =$
 $x = -4,67 \text{ mm}, y = 4,33 \text{ mm}$
 $\rho = 6,37 \text{ mm}, \theta = 137^\circ$



Epithelial remodelling

Difference (A-B)

www.eyelaser.at



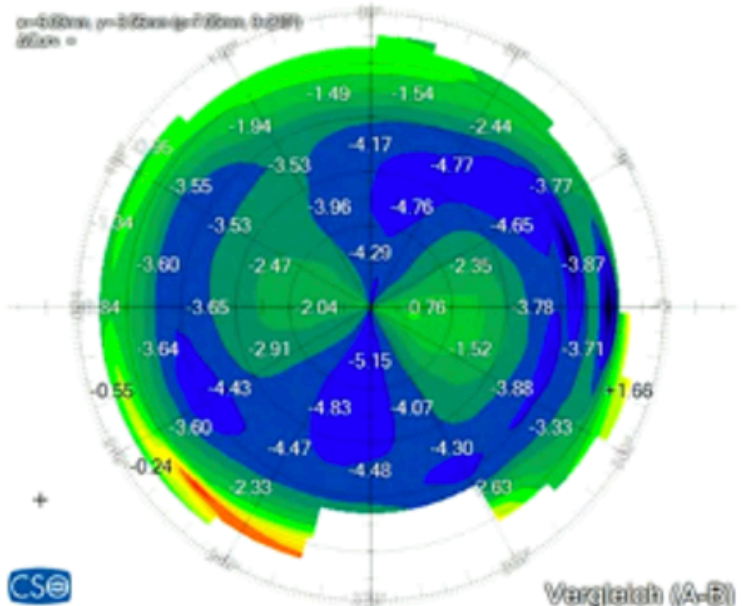
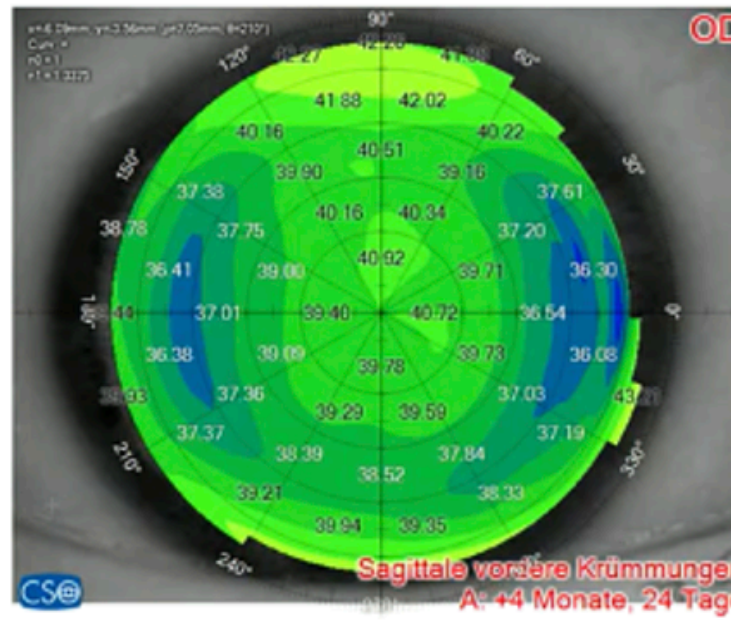
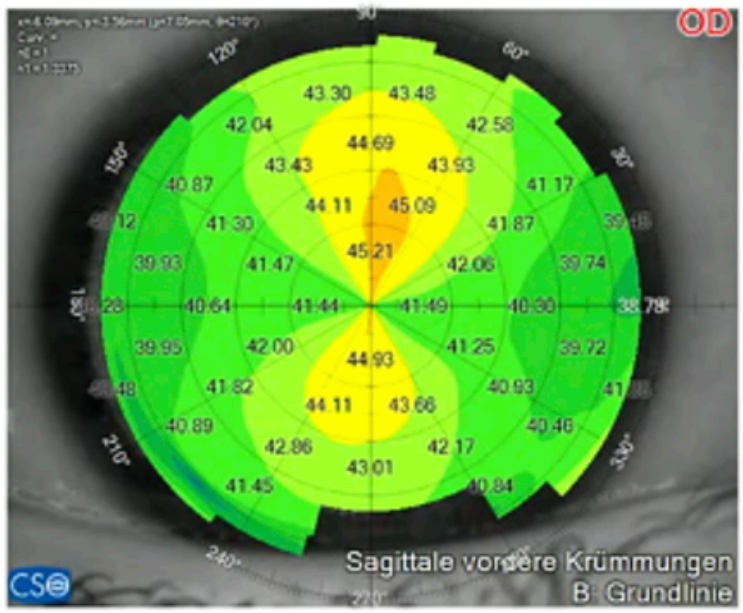


Case high astigmatism

Pre-op:

Jo, Ga, 36 y, OD

Rx -2,00/-4,5/170° = 1,0



Hornhautdicke
ΔOCT = -124 μm

Keratometrie (Vorderfl.)
Smk
ΔKAVG = 3.49 dpt
ΔAsti = +2.88 dpt x 77°

Keratometrie (Rückfl.)
Meridiane: Ø = 3 mm
ΔKAVG = 0.09 dpt
ΔAsti = +0.01 dpt x 90°

Refraktive Analyse
Ø = 7 mm
ΔKAVG = -4.97 dpt
ΔAsti = +3.01 dpt x 167°
ΔC(4.0) = 0.51 μm



Case high astigmatism

Jo, Ga, 36 y, OD

Rx -2,00/-4,5/170° = 1,0

Lenticule Parameters

Optical Zone:	7,5 mm
Total Zone:	8,3 mm
Max. Thickness:	150 µm
Cap Thickness:	140 µm

Refraction

VD:	12,0 mm		
	<u>Sphere</u>	<u>Cylinder</u>	<u>Axis</u>
Manifest:	-2,25 D	-4,25 D	172 deg
Target:	0,00 D	0,00 D	172 deg
Laser:	-2,25 D	-4,25 D	172 deg

Incision Parameters

Incision Width:	2,8 mm
Incision Orientation:	135 deg
Incision Angle:	135 deg
Cap Diameter:	9,0 mm

Pupil Data

Diameter:	3,5 mm
Offset:	0,30 mm / 175 deg





Case high astigmatism

Pre-op:

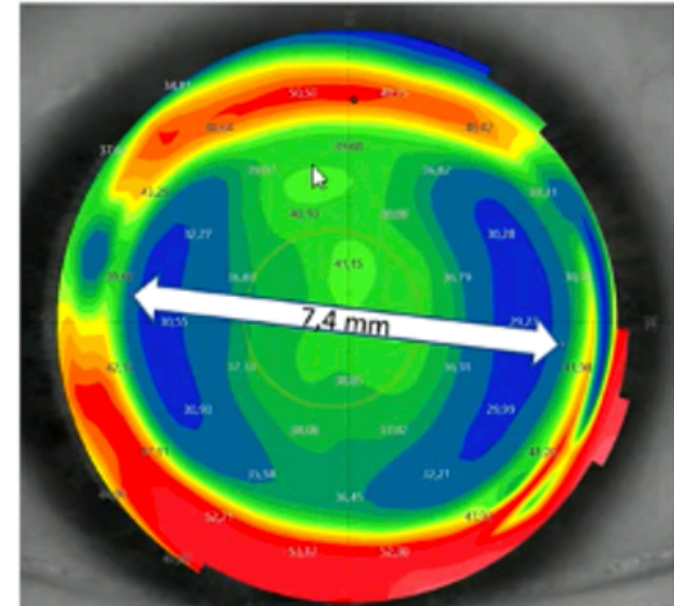
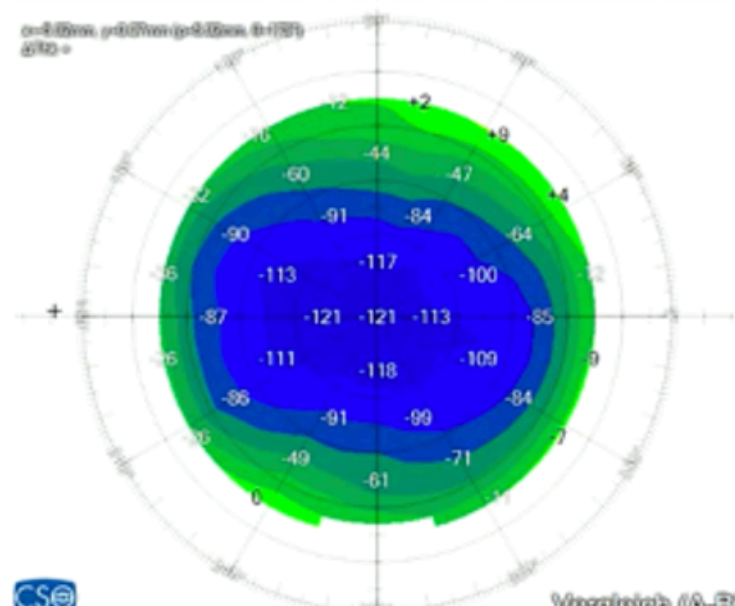
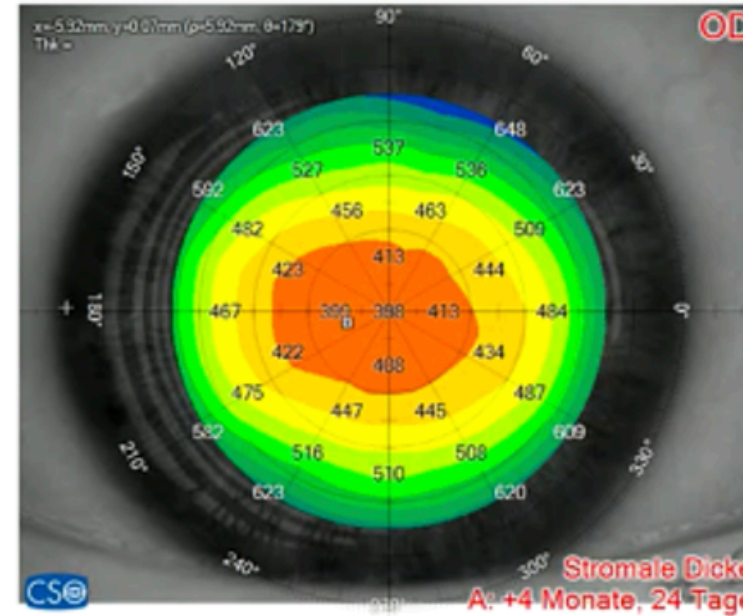
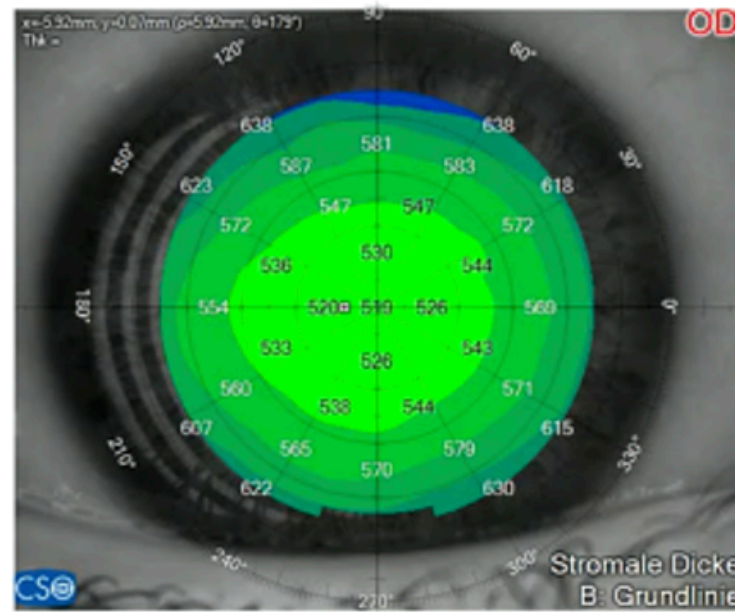
Jo, Ga, 36 y, OD

Rx -2,00/-4,5/170° = 1,0

Post-OP 6 months

- Vsc 0,9

- Rx -0,25/0/0° = 1,0





Pre-op

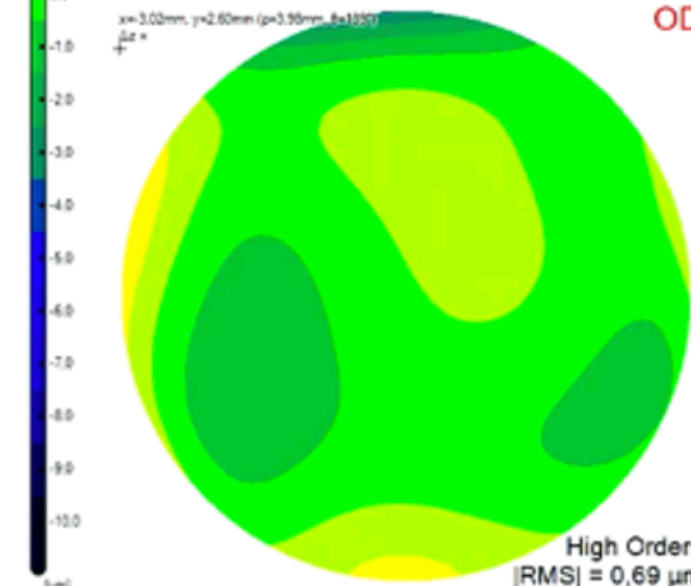
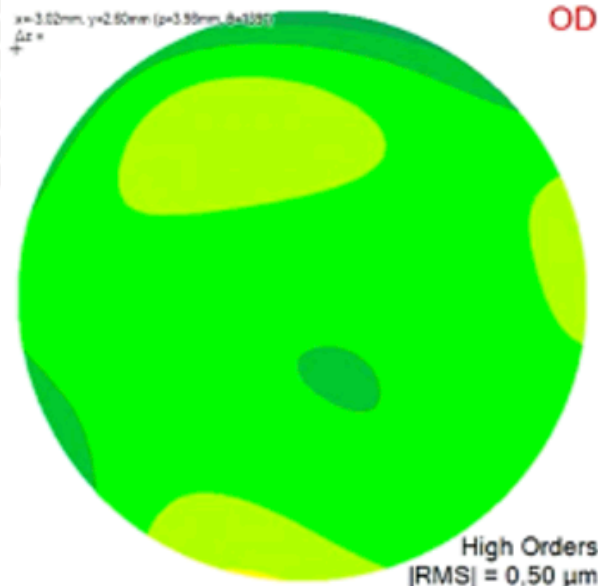
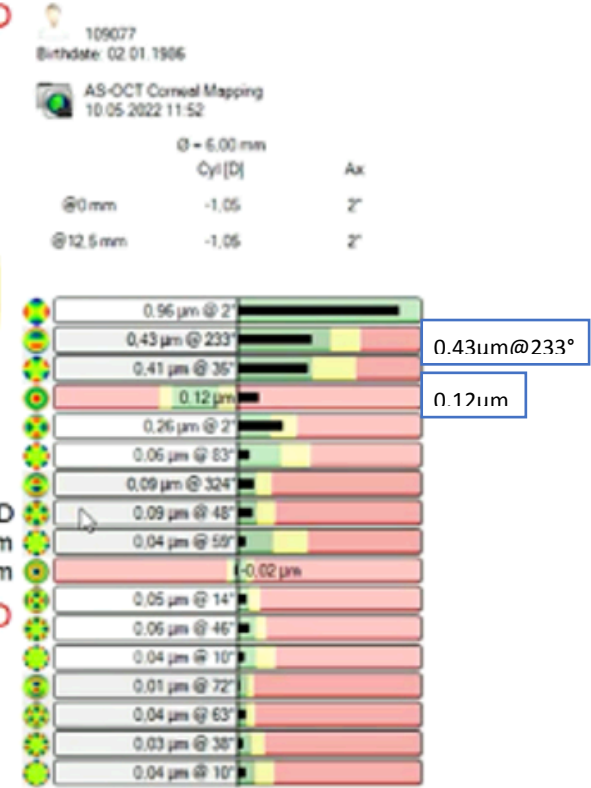
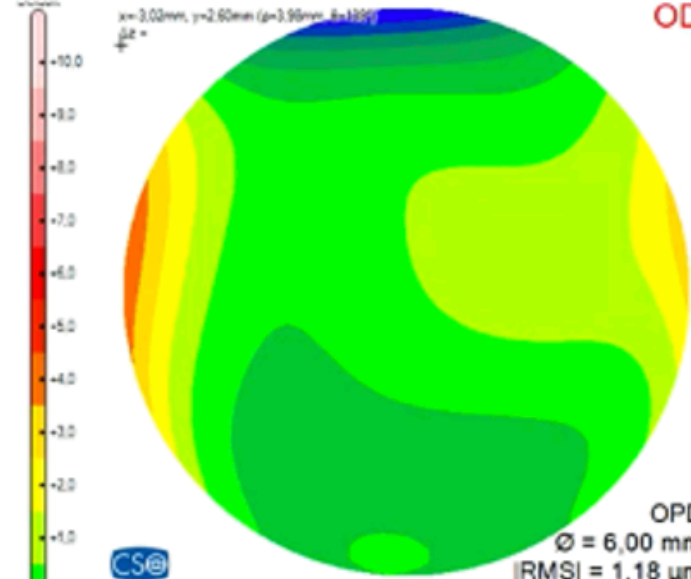
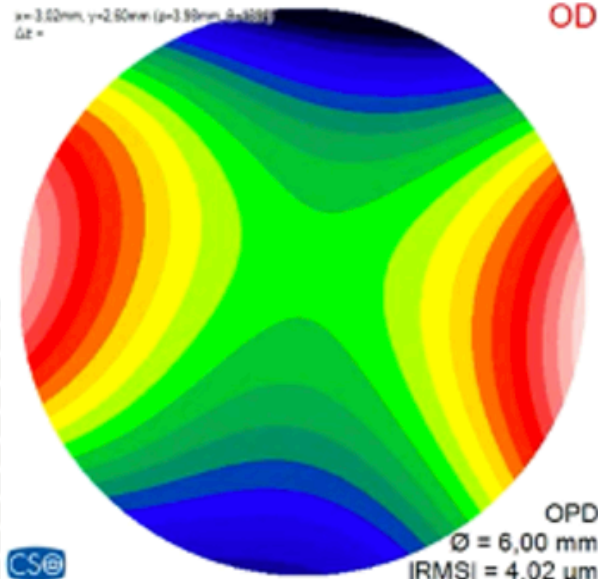
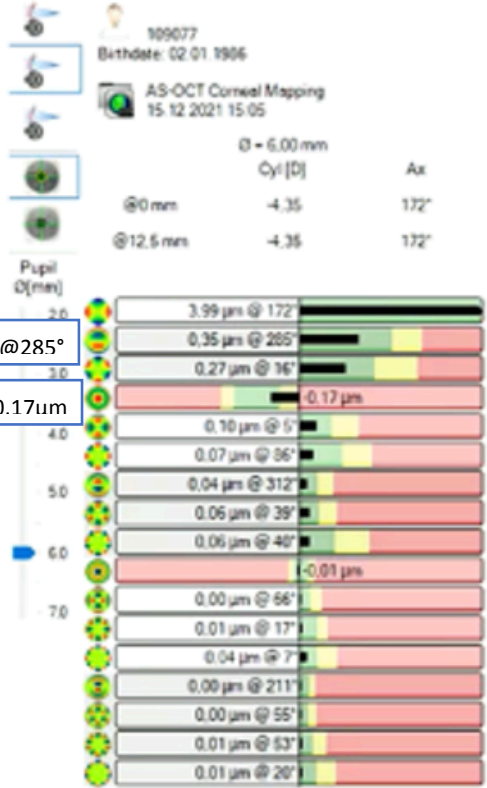
Post-op

OD

OD

OD

OD



0.35µm@285°
-0.17µm

0.43µm@233°
0.12µm



Outlook into the future

- Easier flap transition
- Conversion of a cap (lenticule) to LASIK flap, in order to complement TransPRK as current touch-up and complication management procedure
- Expand the application range with additional treatment options, e.g.:
 - intrastromal corneal ring segment
 - keratoplasty function
 - hyperopic lenticules
 - presbyopia-correcting



Management of Difficulties

Suction Loss Generally treated by

1.PRK

2.Creating Lasik (opening the flap)

3.changing the nomogram of Lenticular extraction

A.changing the cup thickness

B. Changing the Optical Zone

4.Using Same nomogram of lenticular extraction

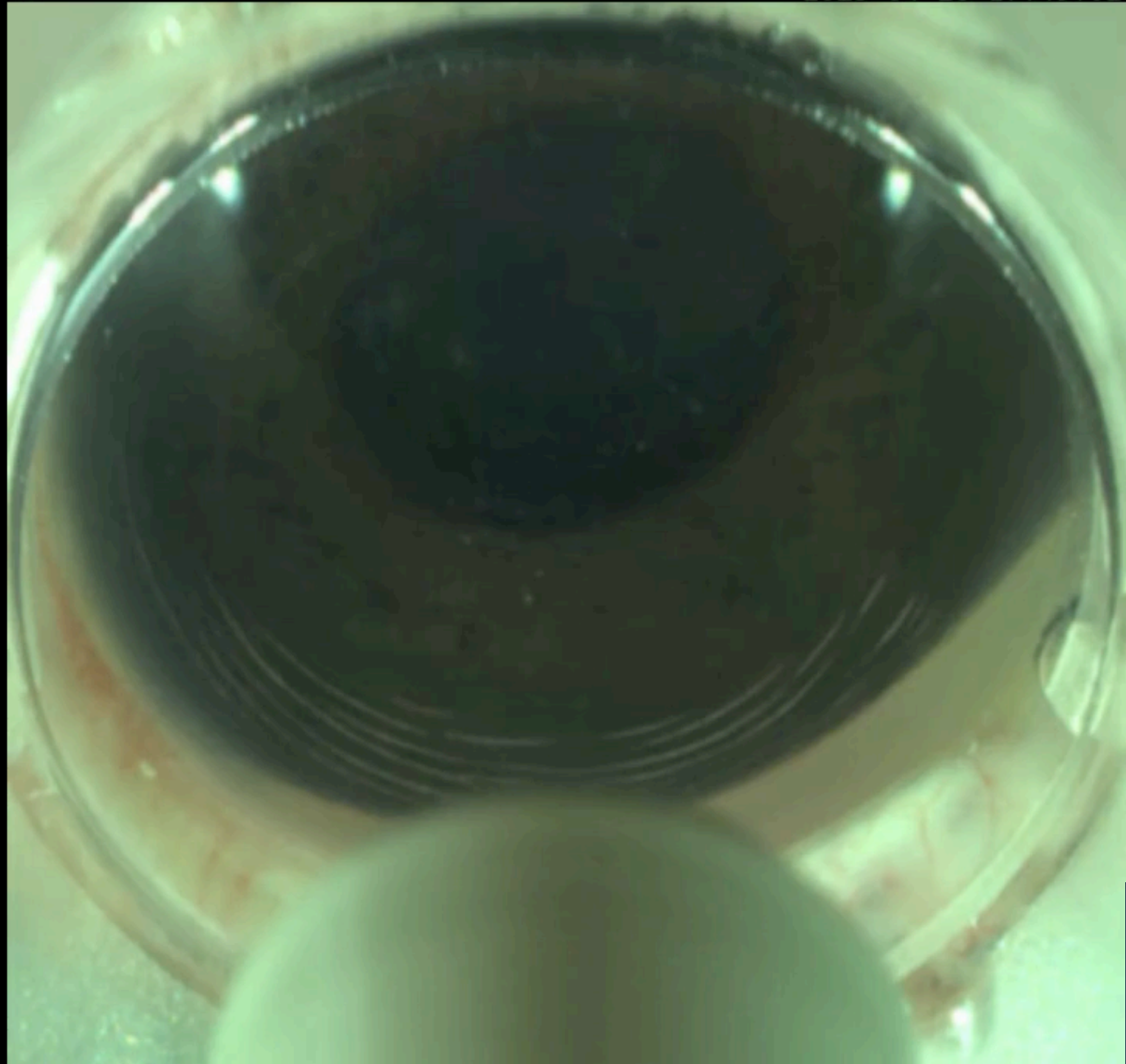
What in the pipeline treatment of suction loss

- The machine will start again from the point that we end with

EOS 2023

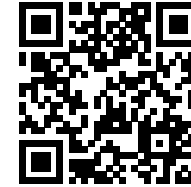


Suction Loss





Last Name:
First Name:
Patient ID:
Gender:
Date of Birth: (YYYY-MM-DD)
Planning Date: 2023-04-26 10:10:06 (YYYY-MM-DD) (HH:MM:SS)
Eye: OD



Lenticule Parameters

Optical Zone: 7,0 mm
Total Zone: 7,8 mm
Max. Thickness: 154 µm
Cap Thickness: 120 µm

Incision Parameters

Incision Width: 3,0 mm
Incision Orientation: 110 deg
Incision Angle: 120 deg
Cap Diameter: 8,8 mm

Refraction

VD: 12,0 mm
Sphere Cylinder Axis
Manifest: -7,25 D -1,25 D 16 deg
Target: 0,00 D 0,00 D 16 deg
Laser: -7,25 D -1,25 D 16 deg

Pupil Data

Diameter: 6,1 mm
Offset: 0,23 mm / 160 deg

Cornea Pre-OP

Pachymetry: 625 µm
K1: 42,32 D @ 18 deg
K2: 43,32 D @ 108 deg
Toricity: 1,00 D @ 108 deg

Cornea Post-OP

Pachy/CRST: 471 µm / 351 µm
K1: 36,41 D @ 130 deg
K2: 36,32 D @ 40 deg
Toricity: 0,09 D @ 130 deg

Laser Parameters

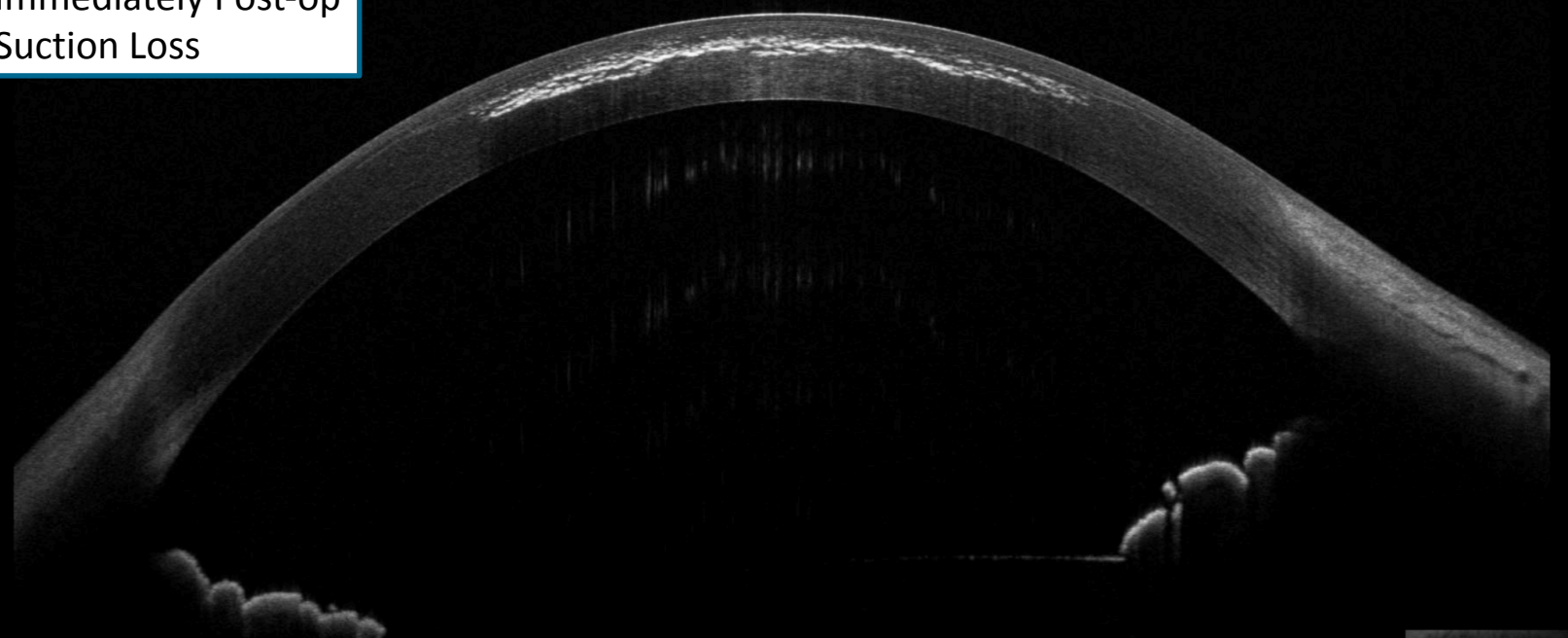
Vacuum Level: 250 mmHg
Spot Distance Track Distance Energy Level
Posterior Cut: 4,1 µm 2,6 µm 90 nJ
Anterior Cut: 4,4 µm 2,6 µm 90 nJ
Edge Cut: 4,2 µm 1,2 µm 95 nJ

Comment



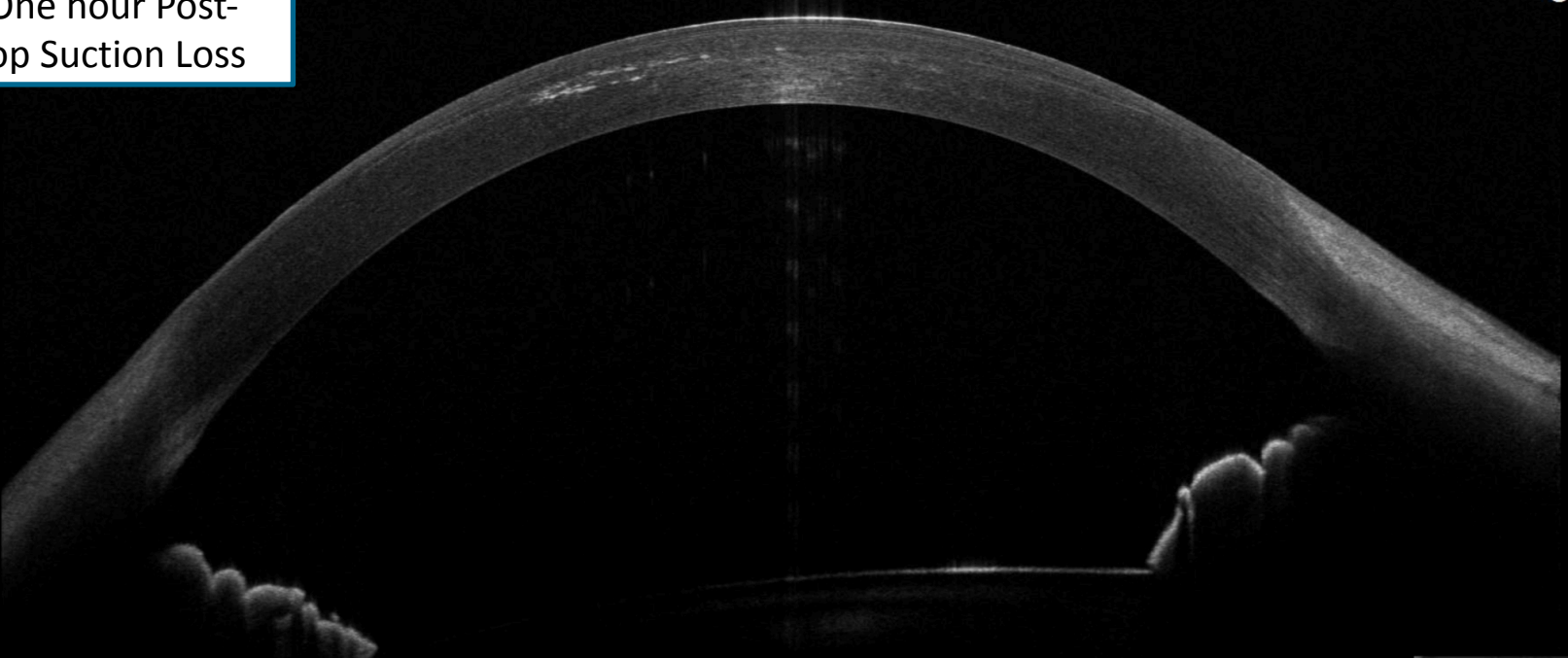
Immediately Post-op
Suction Loss

OD



One hour Post-op
Suction Loss

OD

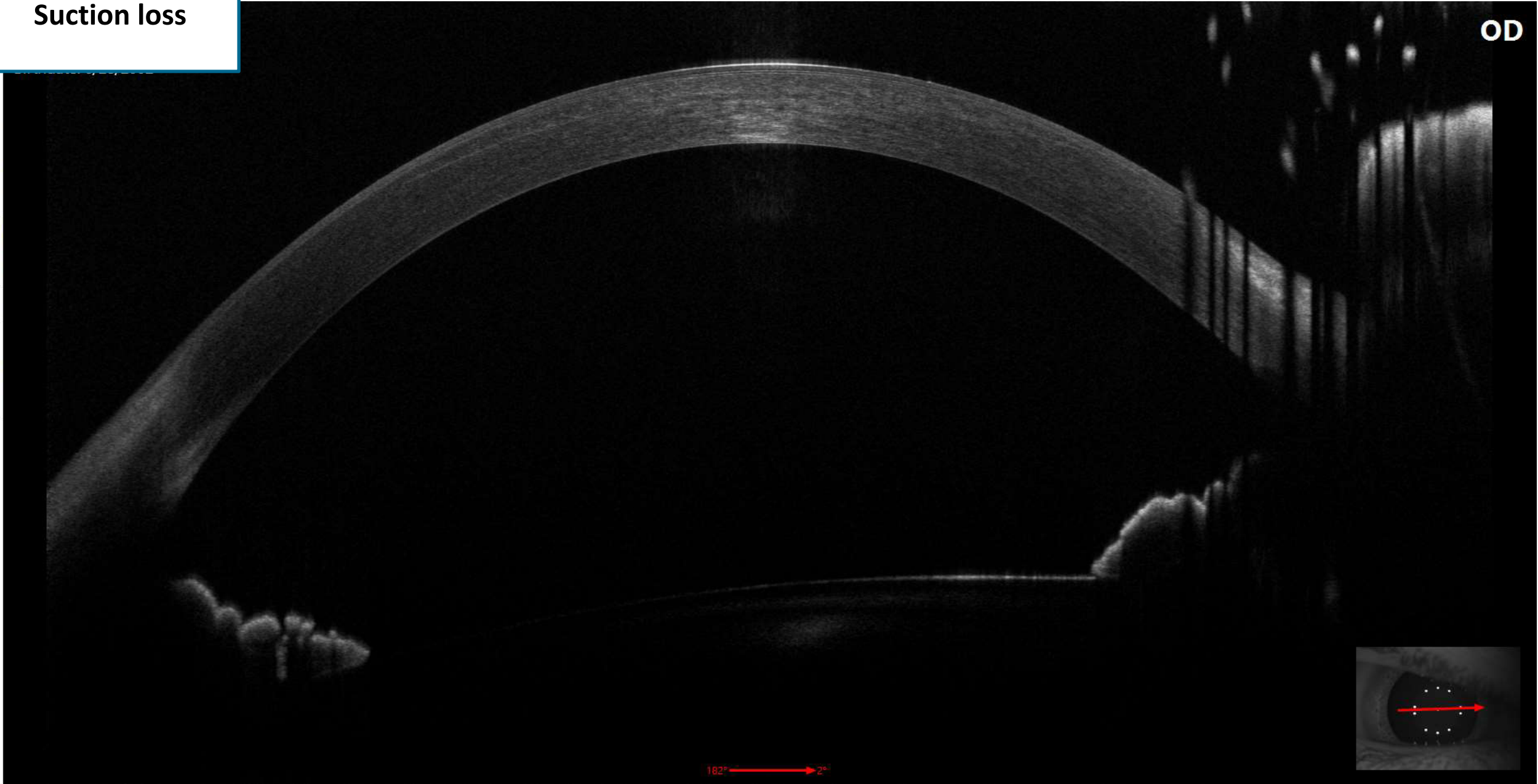




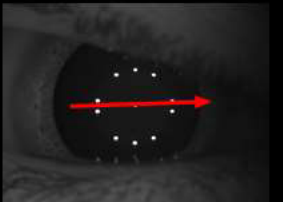
One day post-op

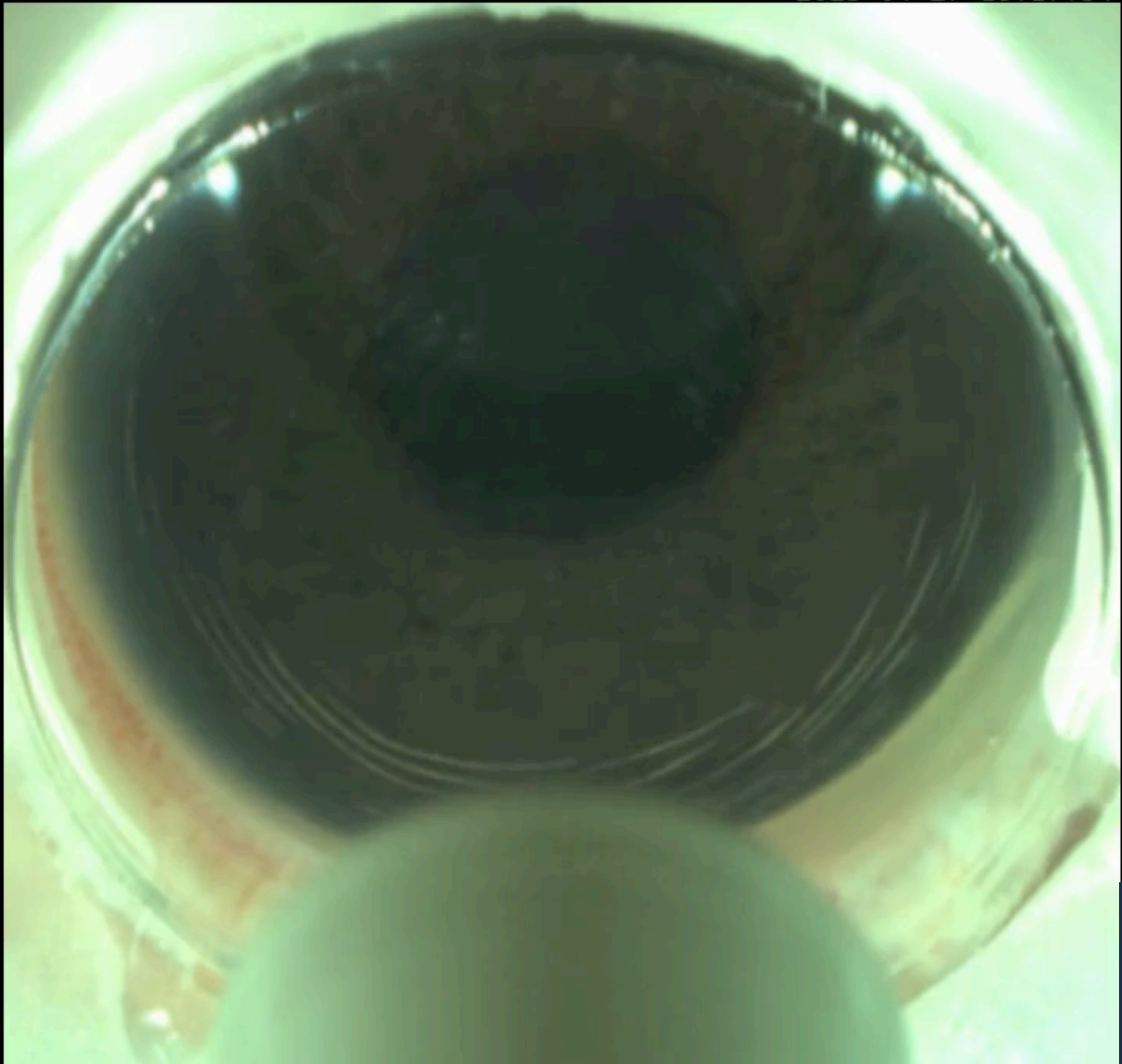
Suction loss

OD



182° → 2°





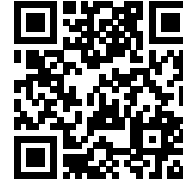


Last Name:
First Name:
Patient ID:
Gender:
Date of Birth:

(YYYY-MM-DD)

Planning Date: 2023-04-26 18:53:22
(YYYY-MM-DD) (HH:MM:SS)

Eye: OD



Lenticule Parameters

Optical Zone: 7,0 mm
Total Zone: 7,8 mm
Max. Thickness: 154 µm
Cap Thickness: 120 µm

Refraction

VD: 12,0 mm
Sphere Cylinder Axis
Manifest: -7,25 D -1,25 D 16 deg
Target: 0,00 D 0,00 D 16 deg
Laser: -7,25 D -1,25 D 16 deg

Cornea Pre-OP

Pachymetry: 625 µm
K1: 42,32 D @ 18 deg
K2: 43,32 D @ 108 deg
Toricity: 1,00 D @ 108 deg

Laser Parameters

Vacuum Level: 250 mmHg

	<u>Spot Distance</u>	<u>Track Distance</u>	<u>Energy Level</u>
Posterior Cut:	4,1 µm	2,6 µm	90 nJ
Anterior Cut:	4,4 µm	2,6 µm	90 nJ
Edge Cut:	4,2 µm	1,2 µm	95 nJ

Comment

Incision Parameters

Incision Width: 3,0 mm
Incision Orientation: 110 deg
Incision Angle: 120 deg
Cap Diameter: 8,8 mm

Pupil Data

Diameter: 6,1 mm
Offset: 0,23 mm / 160 deg

Cornea Post-OP

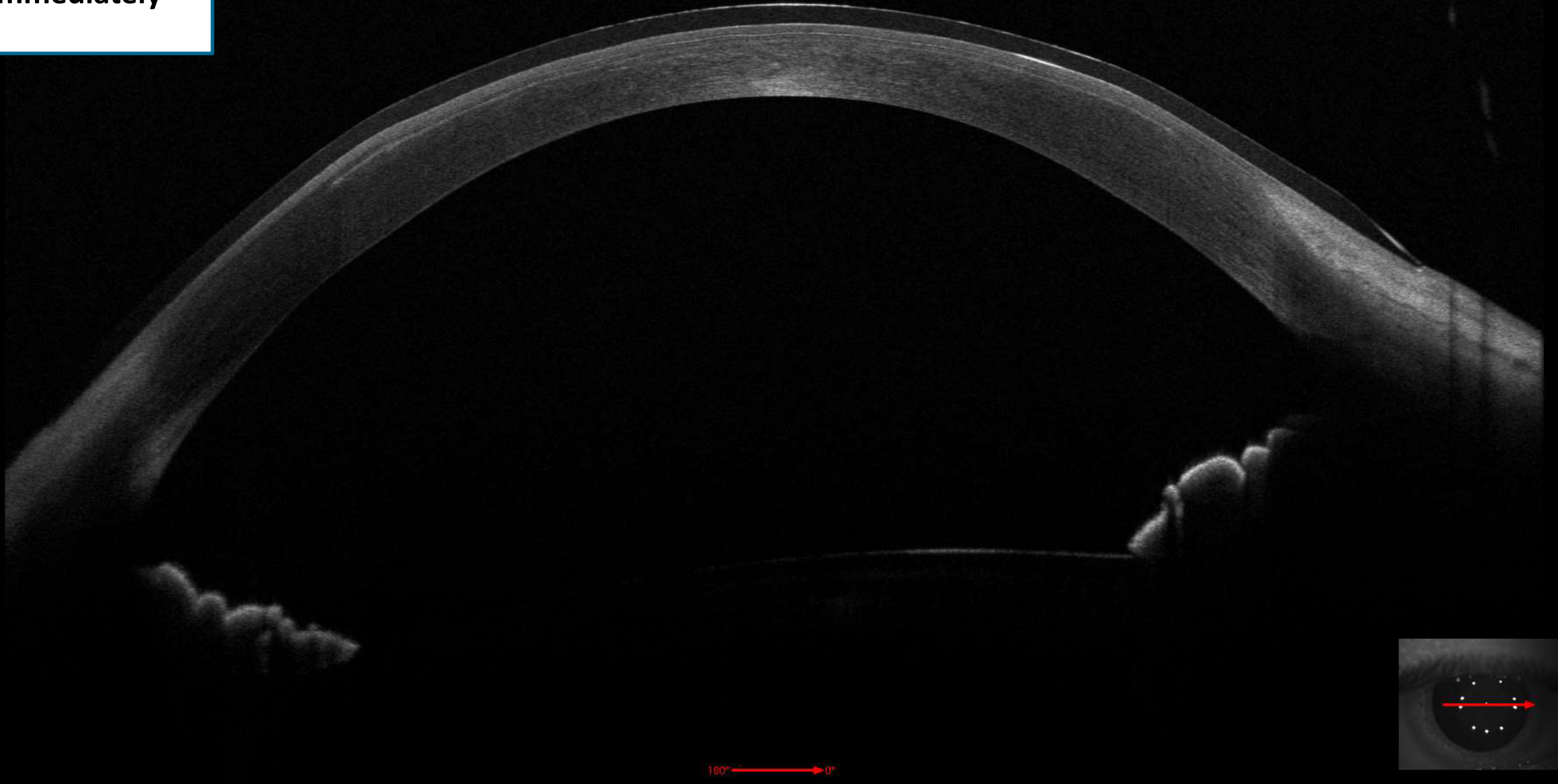
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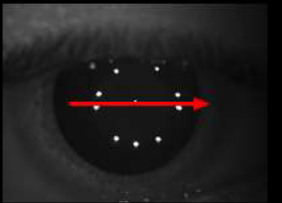


OD

Post-Op
Immediately



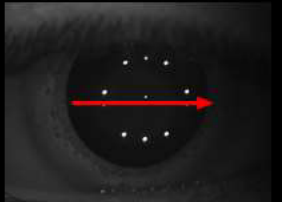
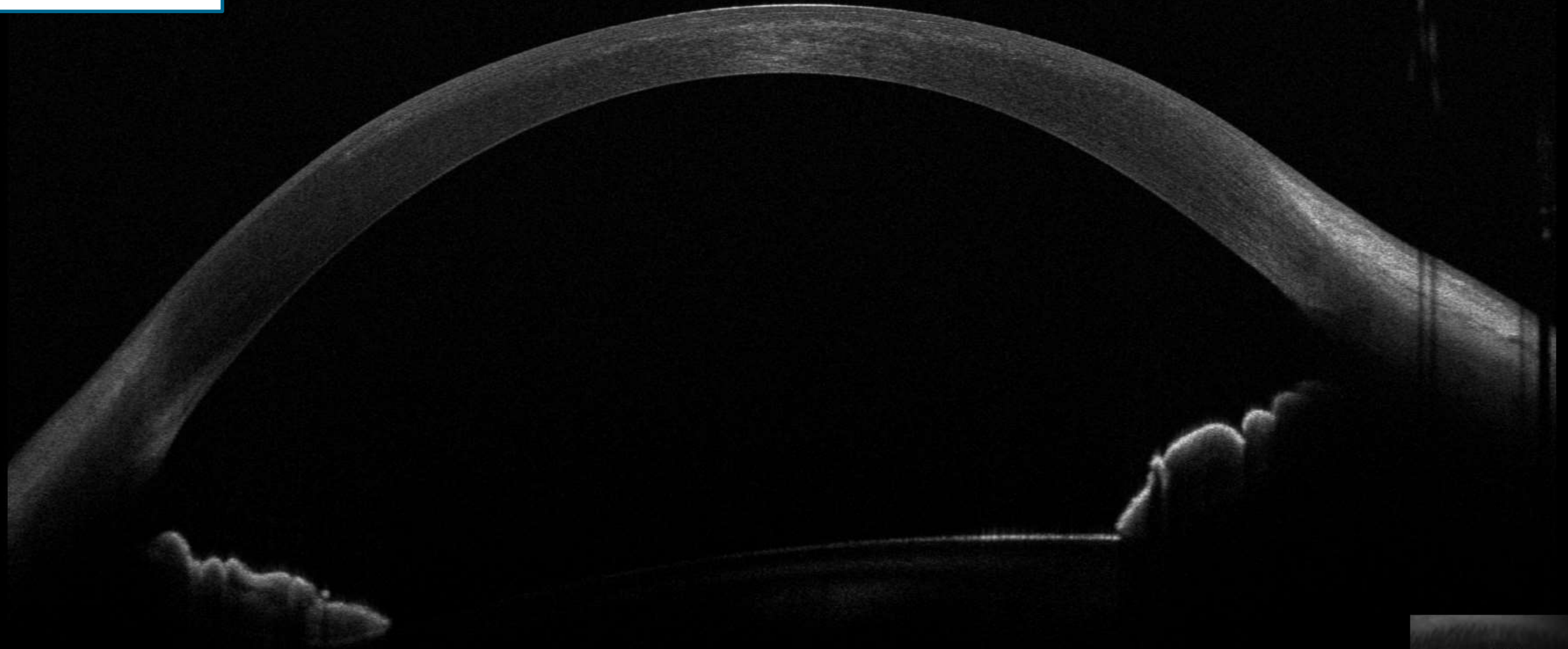
180° → 0°





3 Days
Post-Op

OD



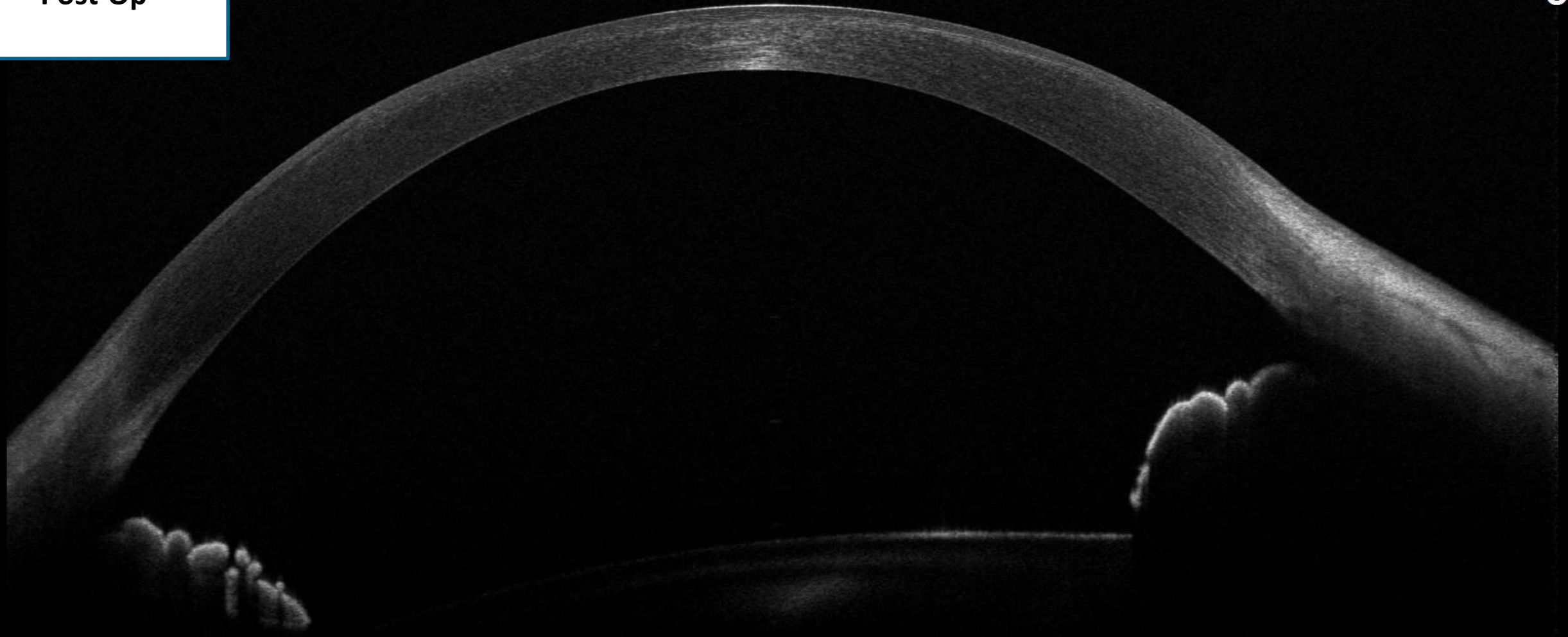
180° → 0°

20 Days

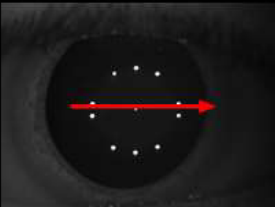
Post-Op



OD



180° → 0°





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