

# Femtosecond Assisted Corneal Surgeries

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# WaveLight® Refractive Suite



# FS200

- FLAPS
- FS assisted Keratoplasty
- ICRS Tunnels and Pockets
- AK



Flap Cutting



Intracorneal Ring Segments



Lamellar Keratoplasty



Penetrating Keratoplasty



Self-Sealing Keratoplasty



# FS Assisted Keratoplasty

- The advent of femtosecond laser has provided more control and precision in corneal surgery with minimal collateral damage.
- FS Laser has enabled us to dissect cornea with great precision in various shapes like mushroom shape, top hat
- Improved wound integrity and create more surface area for healing
- Improves tissue alignment and distribution
- Requires less suture tension for alignment of tissue
- Has superior biomechanical strength?
- Earlier suture removal
- Faster visual recovery
- Pre-cut donor tissue



FS assisted PKP

# PKP profiles

TREATMENT DETAILS

Diameter Top

8.00

mm

Diameter Bottom

8.00

mm

Thickness

800

µm

Height

400

µm

Angle

90

°

Offset

0

µm

☐ Lamellar Cut

Anterior

Posterior

PREVIEW

Cross Section



Thinnest Pachy. 560 µm

TREATMENT DETAILS

Diameter Top

8.50

mm

Diameter Bottom

7.50

mm

Thickness

900

µm

Height

300

µm

Angle

90

°

Offset

0

µm

☐ Lamellar Cut

Anterior

Posterior

PREVIEW

Cross Section



Thinnest Pachy. 560 µm

TREATMENT DETAILS

Diameter Top

7.50

mm

Diameter Bottom

8.50

mm

Thickness

900

µm

Height

300

µm

Angle

90

°

Offset

0

µm

☐ Lamellar Cut

Anterior

Posterior

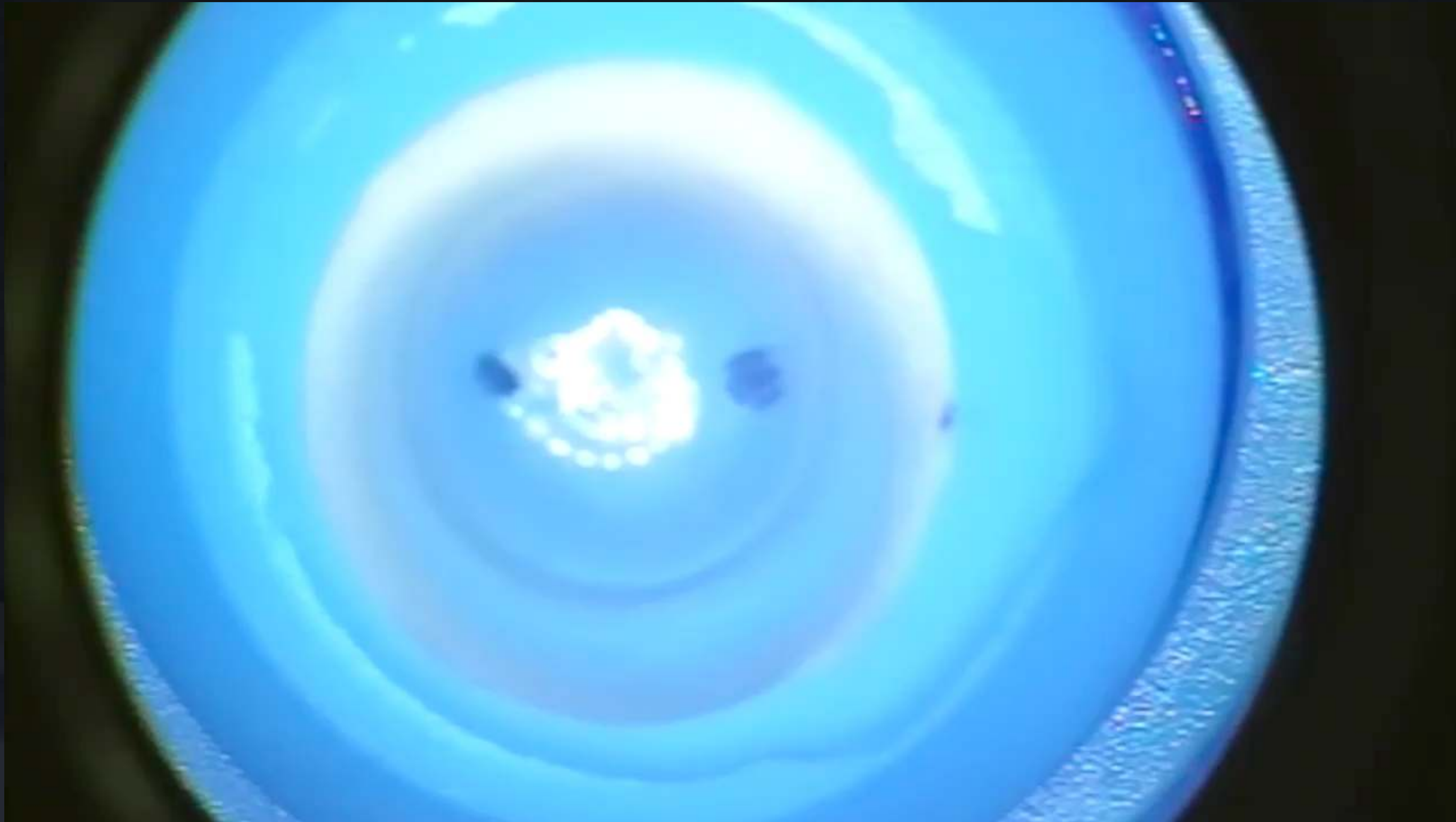
PREVIEW

Cross Section



Thinnest Pachy. 560 µm

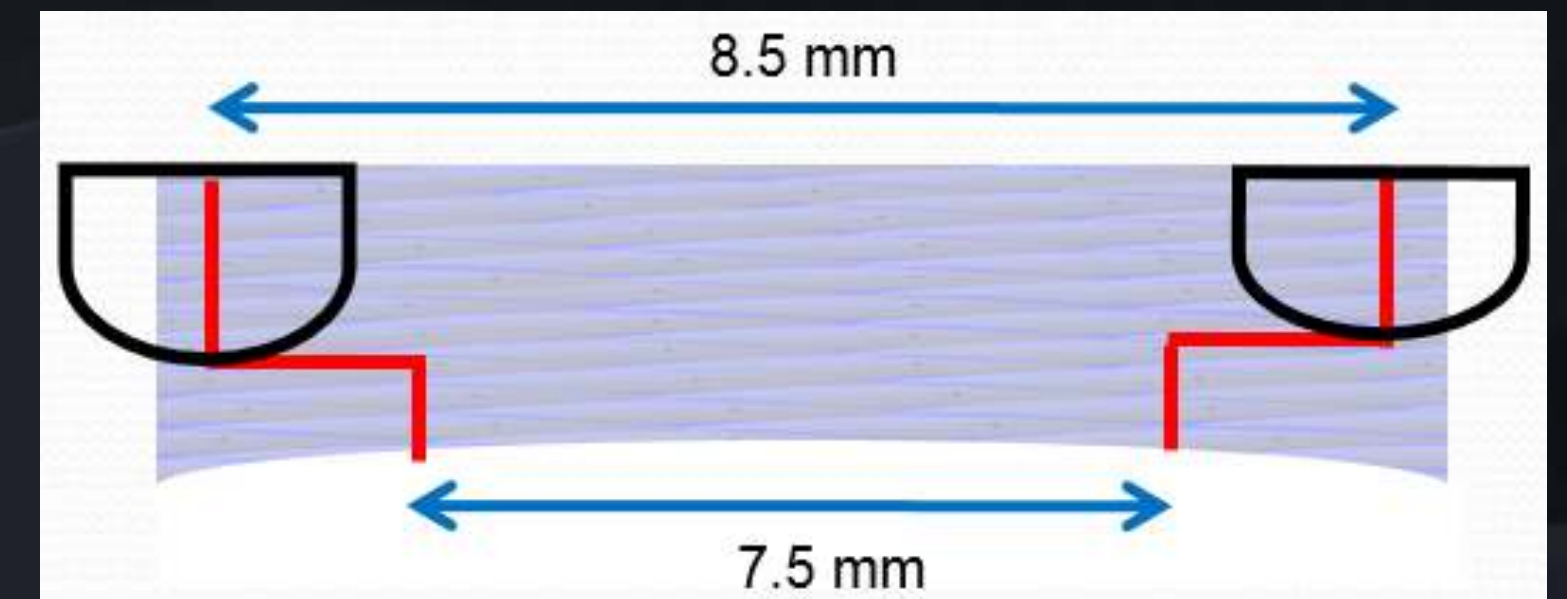
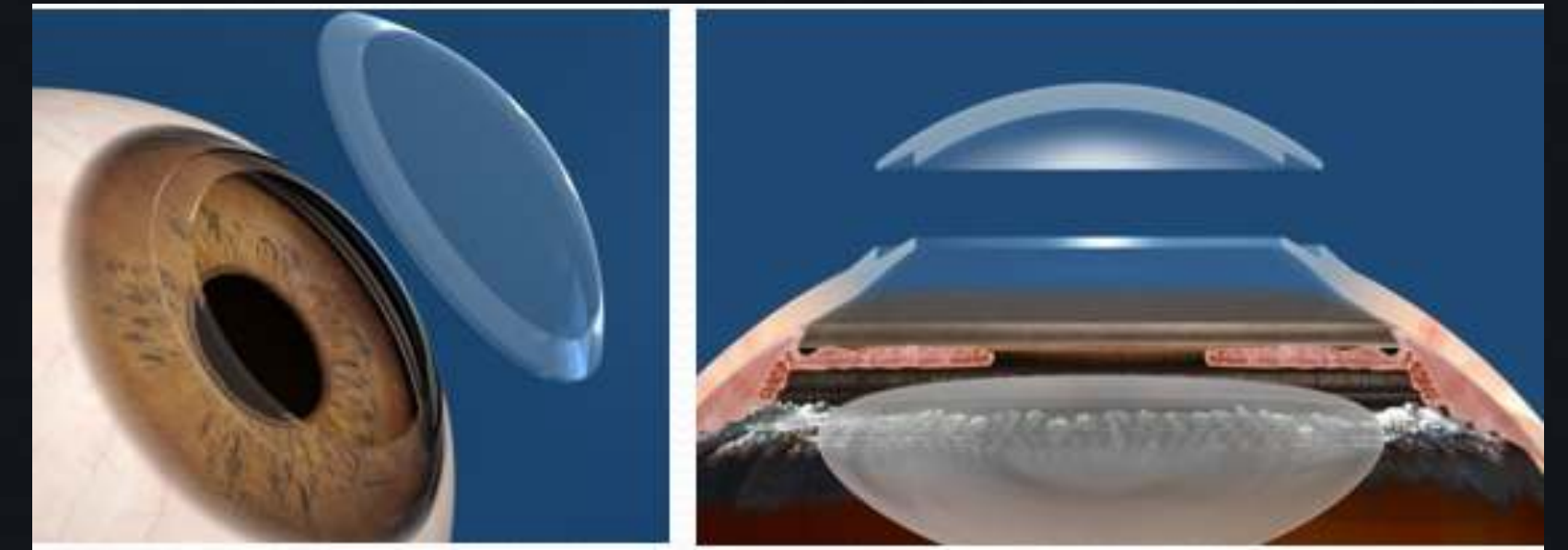
# FS Assisted PKP





# Mushroom

- Mushroom graft for KC
  - Preserves most host endothelium
  - Sutures in periphery→less suture induced astigmatism
- Graft size = Host size (no size disparity)
- Commonly use size:
  - Anterior diameter: 8.5 mm
  - Posterior diameter: 7.5 mm
- Modified suturing technique
  - Sutures superficial (up to anterior lamellae only)





# Mushroom shaped PKP

**TREATMENT DETAILS**

Diameter Top8.50mm

Diameter Bottom7.50mm

Thickness900μm

TOP

BOTTOM

Height300μm

Angle90°

Offset0μm

Anterior

Posterior

☐ Lamellar Cut



Thinnest Pachy.560μm

**TREATMENT DETAILS**

Diameter Top8.50mm

Diameter Bottom7.50mm

Thickness900μm

TOP

BOTTOM

Height300μm

Angle90°

Offset80μm

Anterior

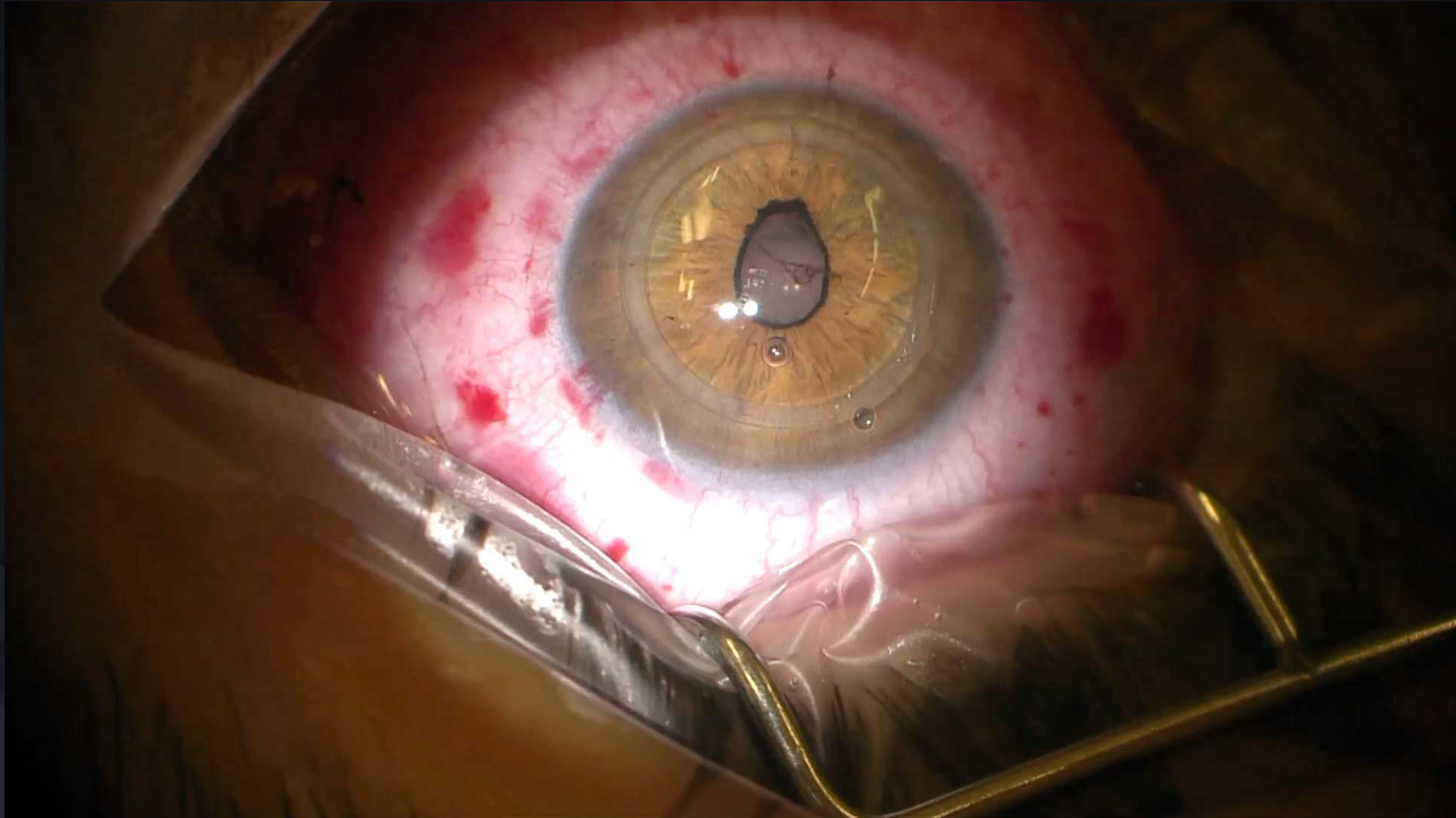
Posterior

☐ Lamellar Cut



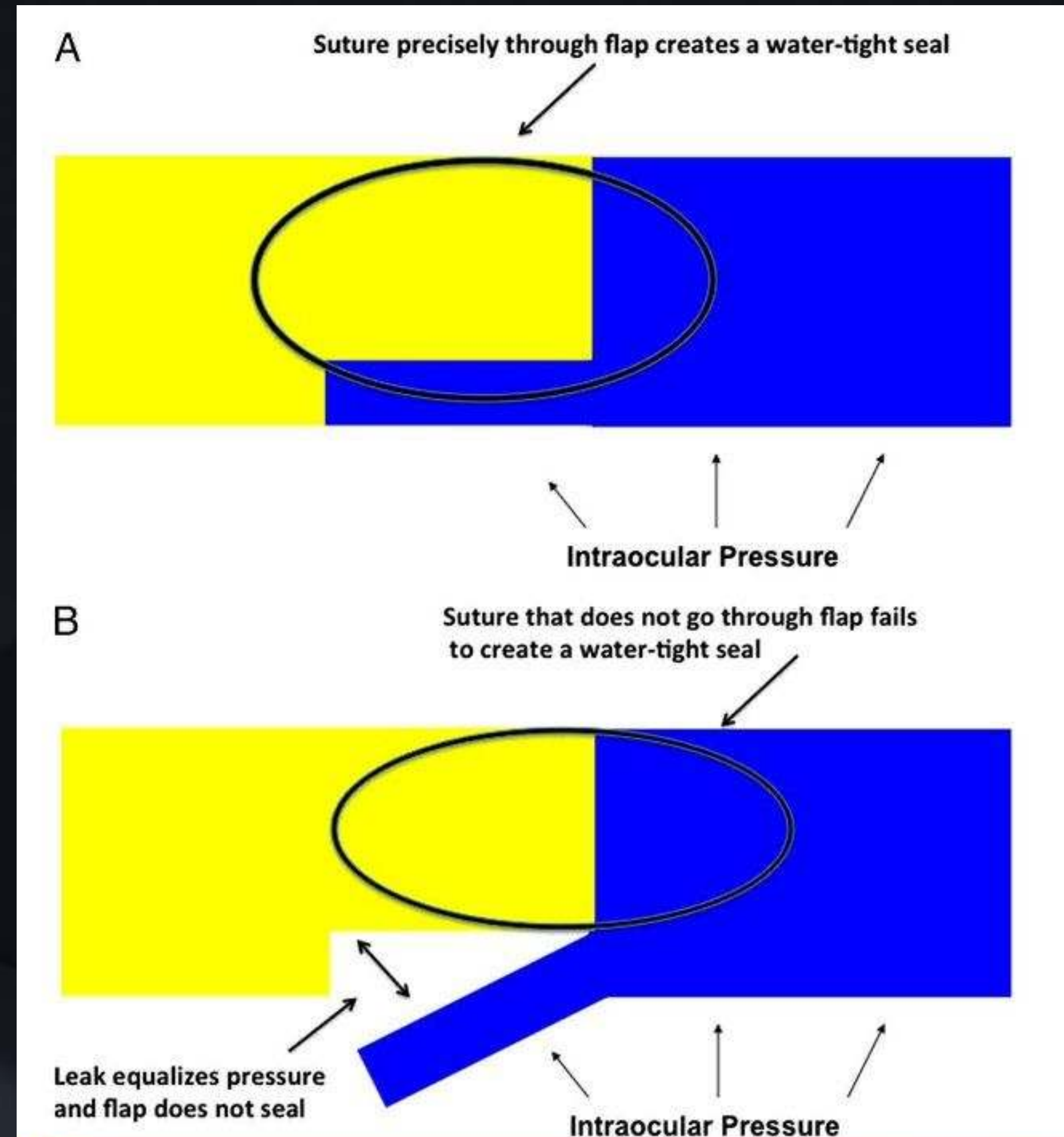
Thinnest Pachy.560μm

# Mushroom shaped PKP



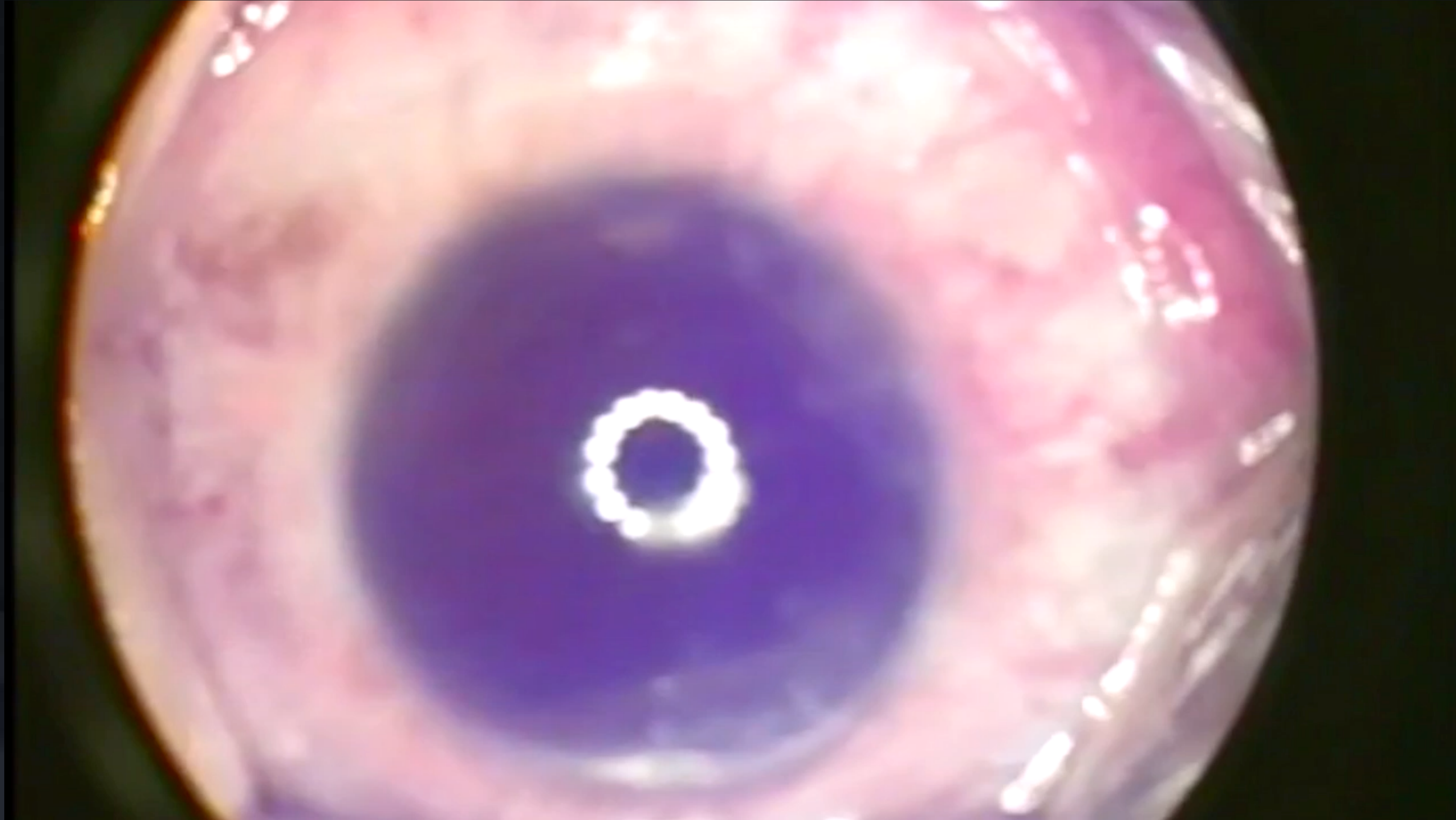


# Top Hat shape





# FS LASIK After KP



# Superficial Anterior Lamellar Keratoplasty (SALK)

TREATMENT DETAILS

Diameter Top

8.50 ▼

mm

Diameter Bottom

7.50 ▼

mm

Thickness

900 ▼

μm

Height

250 ▼

μm

Angle

90 ▼

°

Offset

0 ▼

μm

☒ Lamellar Cut

Anterior

Posterior

TOP

600 ▼

μm

90 ▼

°

0 ▼

μm

BOTTOM

250 ▼

μm

90 ▼

°

0 ▼

μm

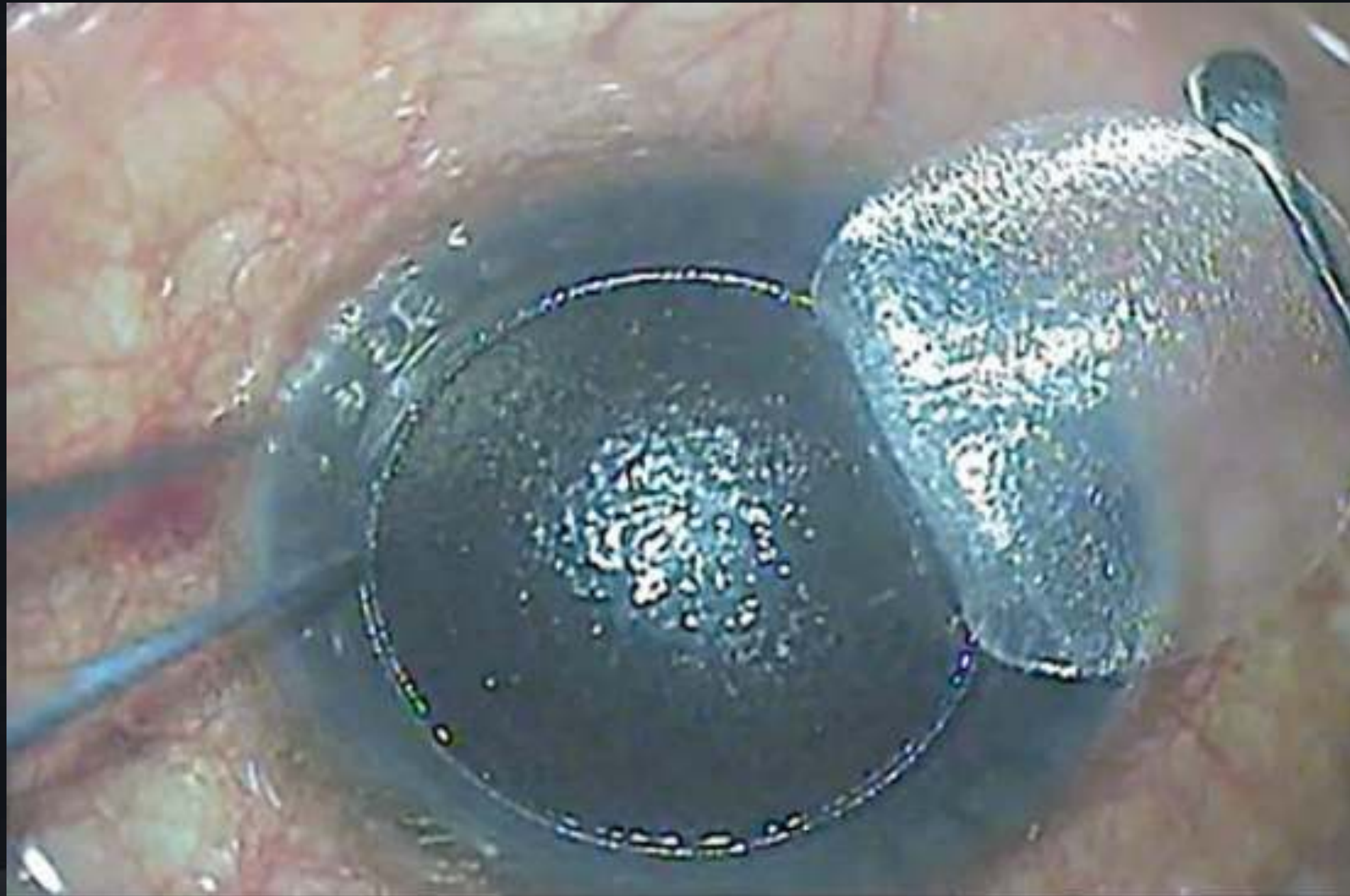
PREVIEW

Cross Section





# Superficial Anterior Lamellar Keratoplasty (SALK)





# Superficial Anterior Lamellar Keratoplasty (SALK)

- The diseased epithelium and superficial stroma of the host cornea are removed.
- A thin, donor corneal is then sutured or glued into the prepared bed.
- Conditions treated include:
  - Corneal opacities from trauma
  - Superficial Corneal degenerations and dystrophies
  - Opacities resulting from previous refractive surgery
  - Flap/Interface abnormalities

# SALK

TREATMENT DETAILS

Diameter Top

8.50 ▼

mm

Diameter Bottom

7.50 ▼

mm

Thickness

900 ▼

μm

Height

250 ▼

μm

Angle

90 ▼

°

Offset

0 ▼

μm

☒ Lamellar Cut

Anterior

Posterior

TOP

600 ▼

μm

90 ▼

°

0 ▼

μm

BOTTOM

600 ▼

μm

90 ▼

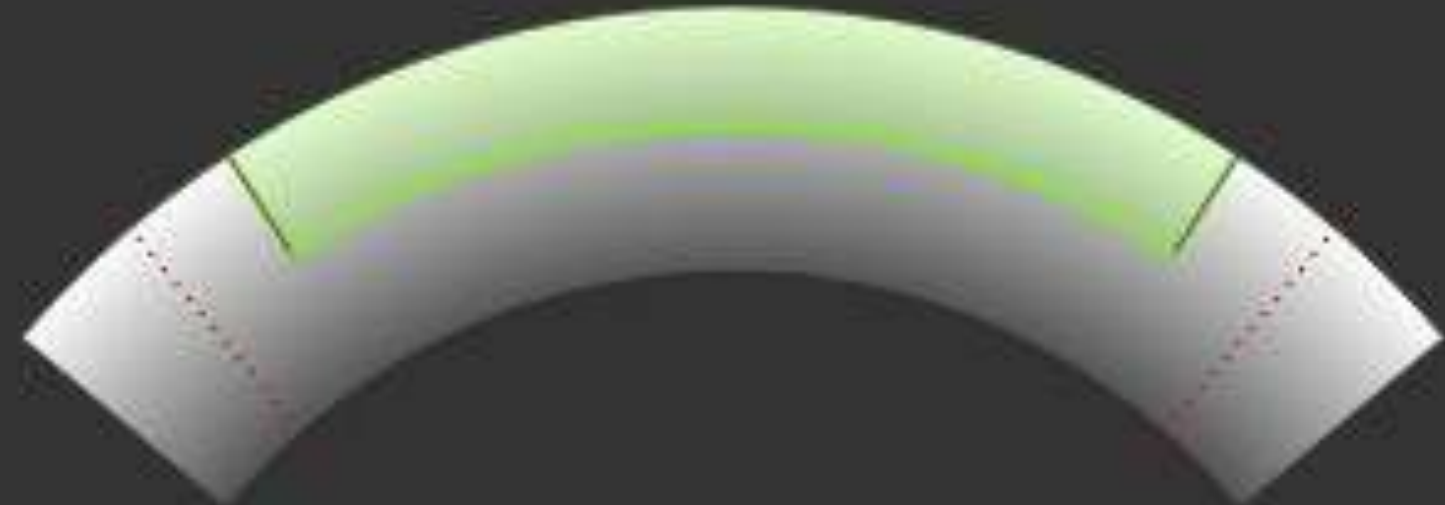
°

0 ▼

μm

PREVIEW

Cross Section

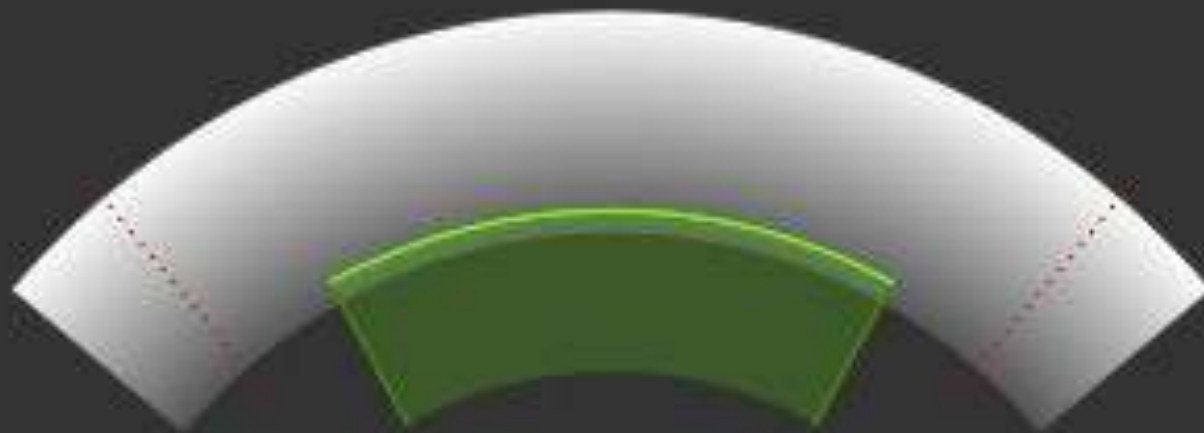




# SALK



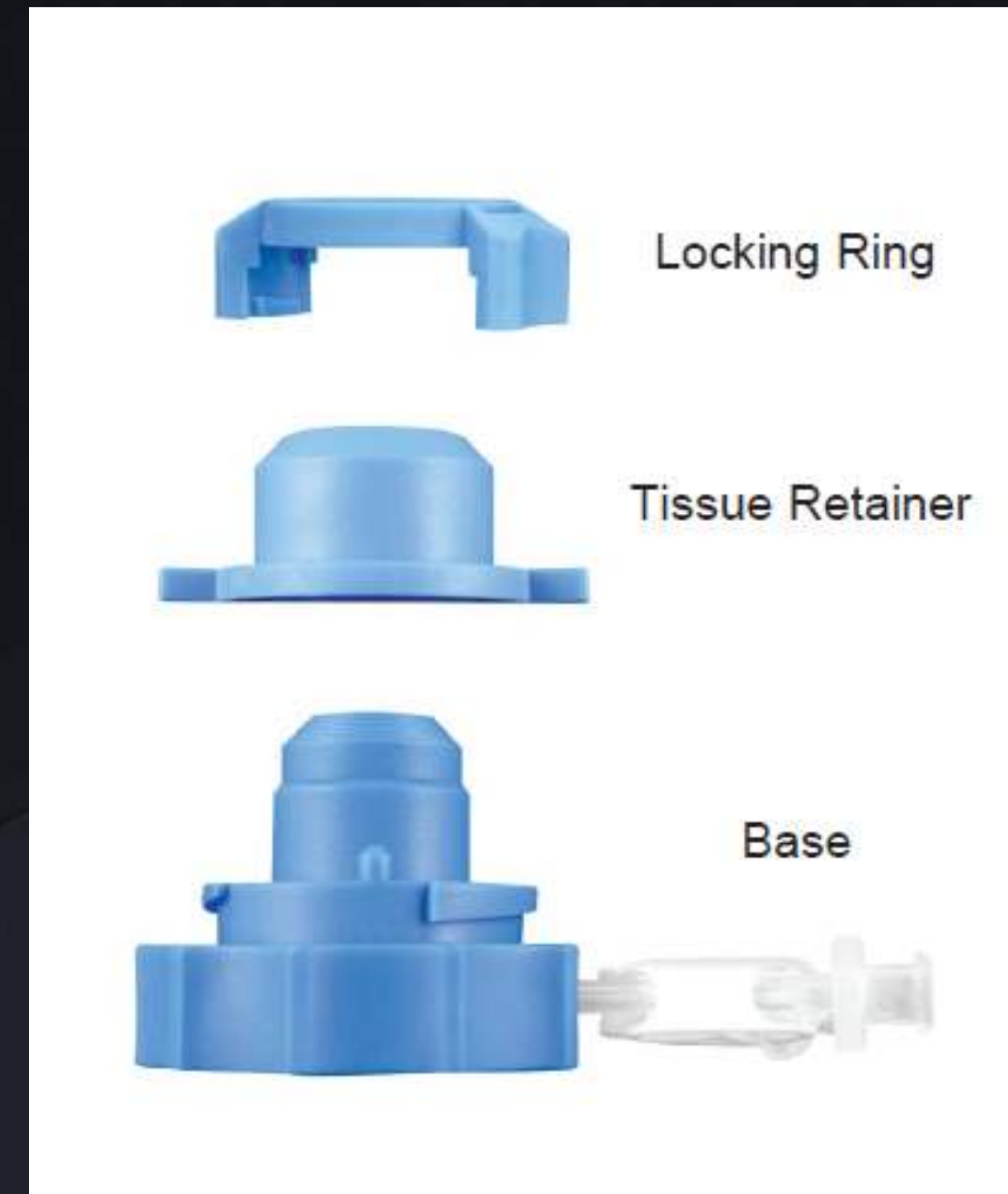
# DESAK

| TREATMENT DETAILS                                |           | PREVIEW                                                                              |  |  |
|--------------------------------------------------|-----------|--------------------------------------------------------------------------------------|--|--|
| Diameter Top                                     | 8.50 ▼ mm |  |  |  |
| Diameter Bottom                                  | 7.50 ▼ mm |                                                                                      |  |  |
| Thickness                                        | 900 ▼ μm  |                                                                                      |  |  |
| Height                                           | 250 ▼ μm  |                                                                                      |  |  |
| Angle                                            | 90 ▼ °    |                                                                                      |  |  |
| Offset                                           | 0 ▼ μm    |                                                                                      |  |  |
| <input checked="" type="checkbox"/> Lamellar Cut | Anterior  | Posterior                                                                            |  |  |
|                                                  |           | Thinnest Pachy. 560 ▼ μm                                                             |  |  |

# Graft Preparation



# Barron artificial Chamber





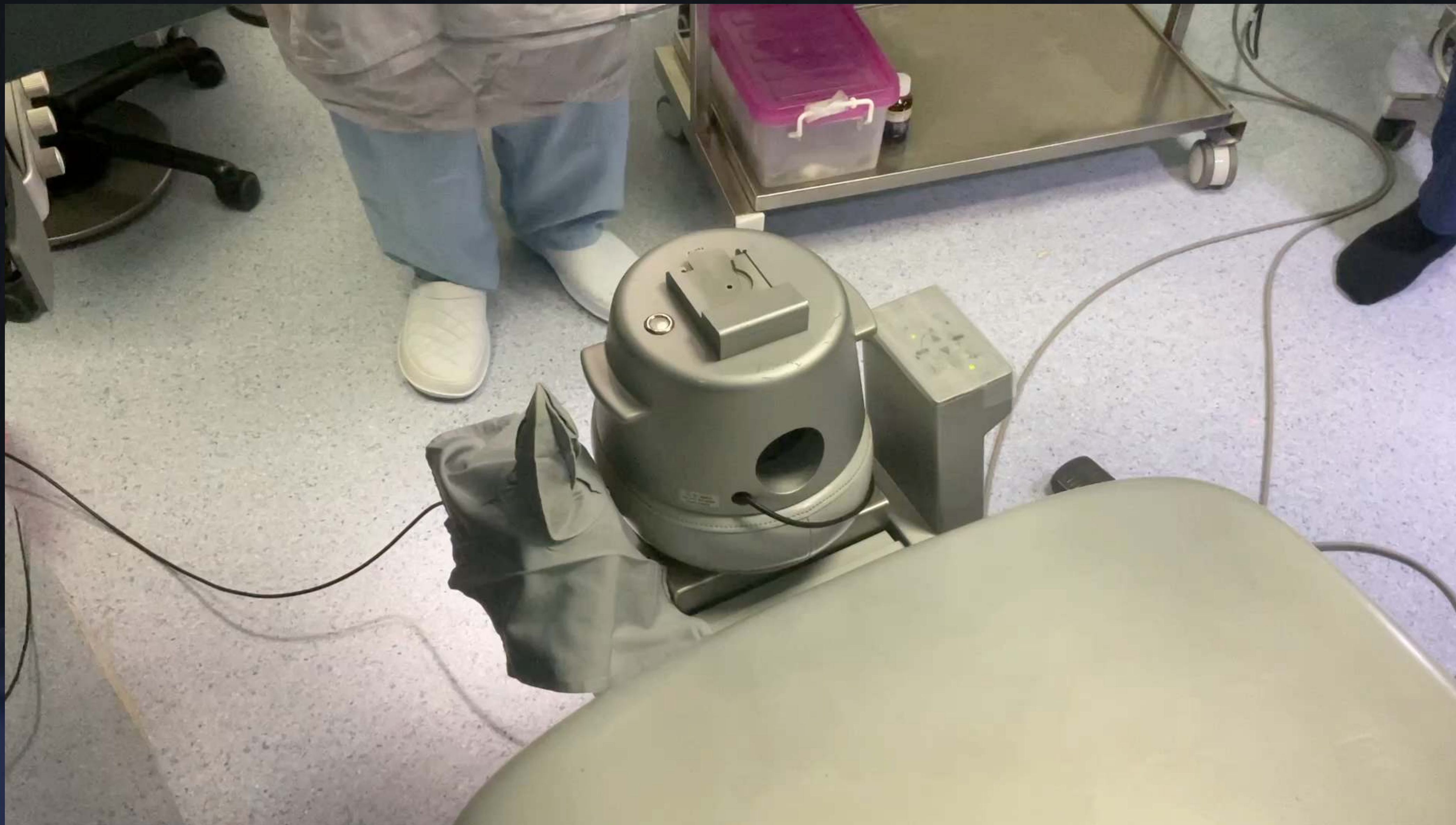




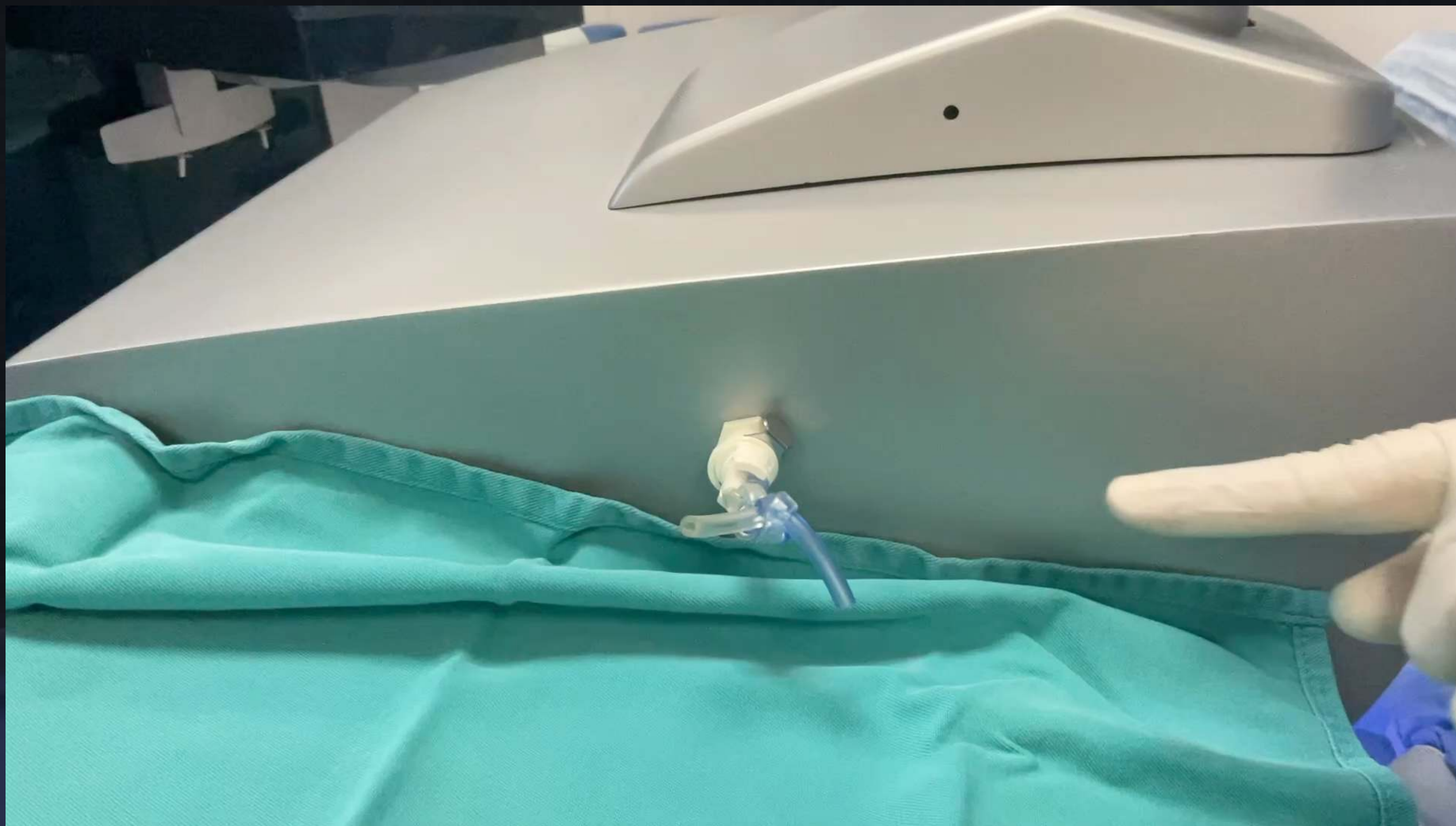




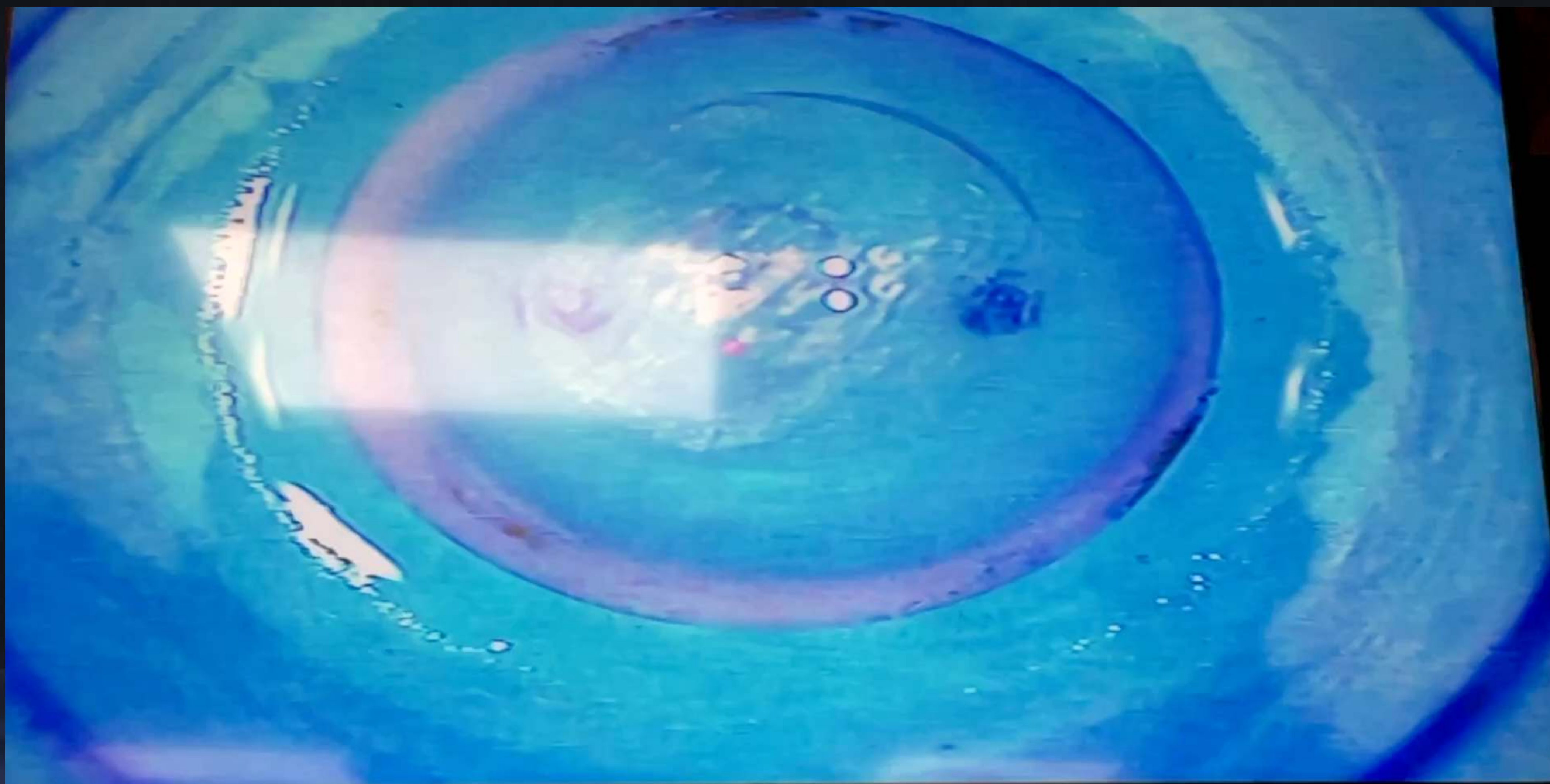














Planning F7

**Treatment F8**

Documentation F9

Setup F10

Laser F11



### TREATMENT DETAILS

#### TARGET ENERGY

Top/Bed Cut **1.50**  $\mu\text{J}$

Bottom/Side Cut **1.50**  $\mu\text{J}$

#### OFFSET

X-Offset **0.00** mm

Y-Offset **0.00** mm

Kerato. **7.70** / --- mm / ---  $\mu\text{m}$

Top **230**  $\mu\text{m}$  ( **0**  $\mu\text{m}$ ) / **90** °

Bottom ---  $\mu\text{m}$  ( ---  $\mu\text{m}$ ) / --- °

### CONTROLS



Applanation Cone

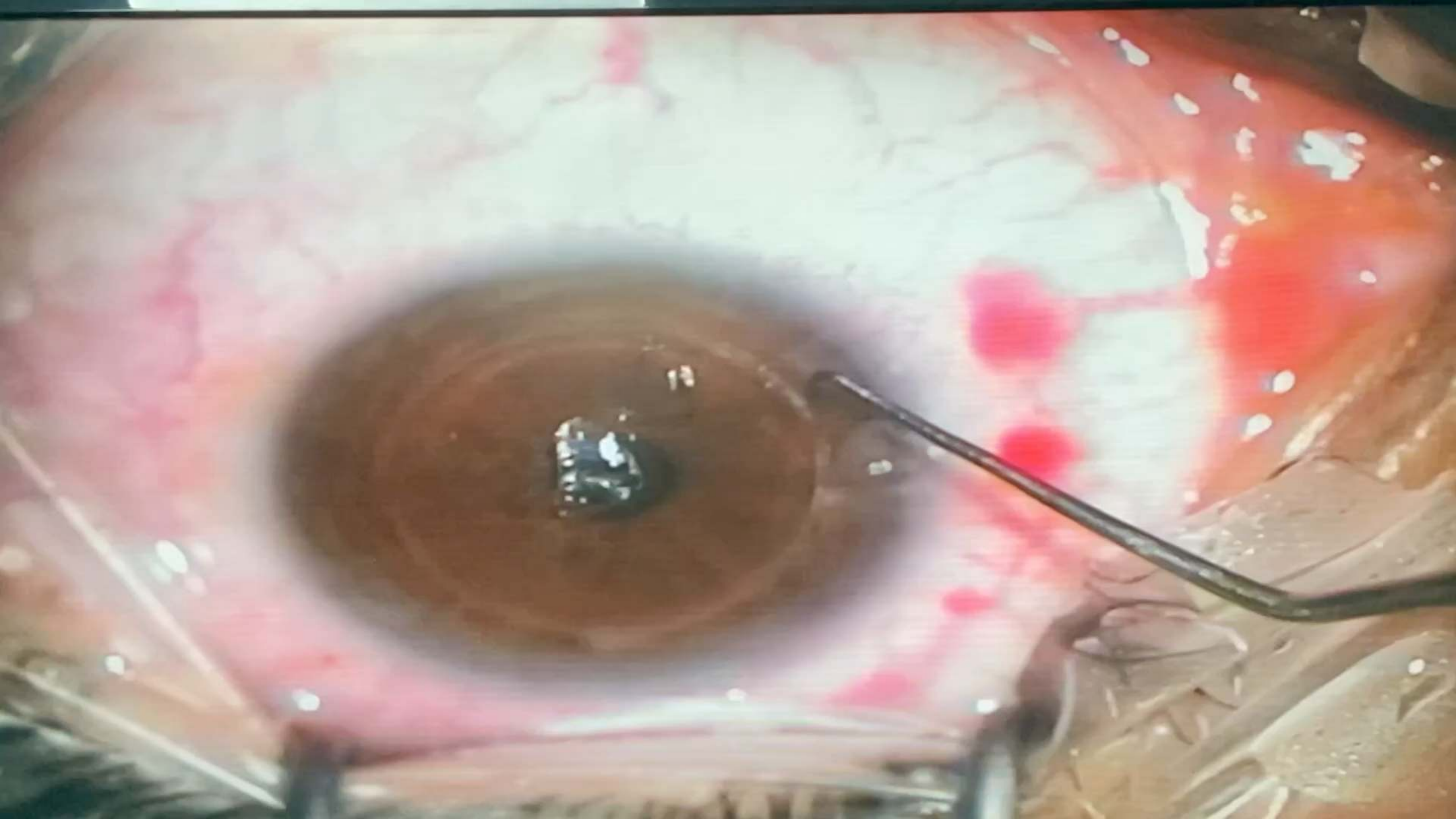
Suction 1

Eye Contact

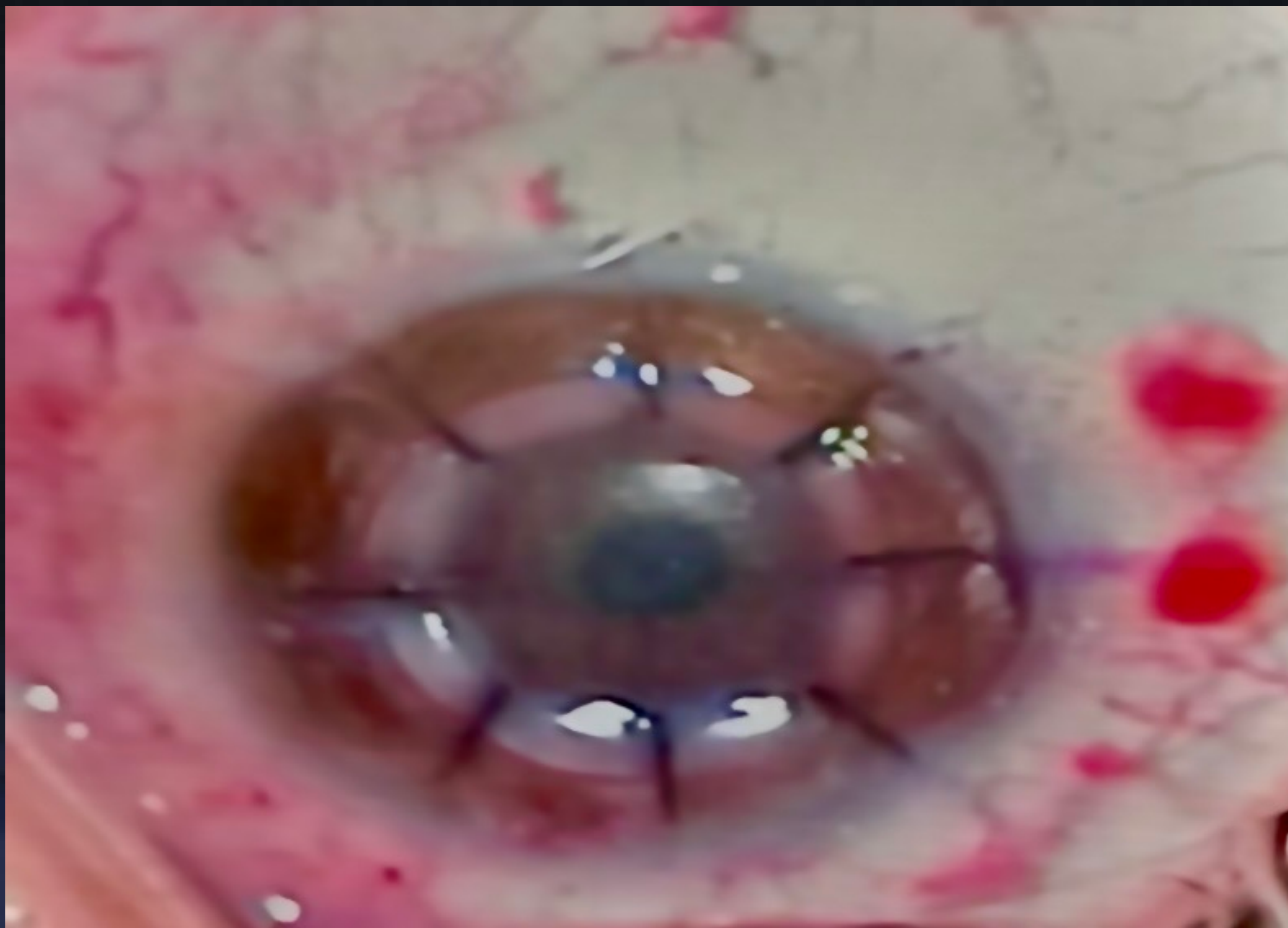
Suction 2













FS assisted ICRS

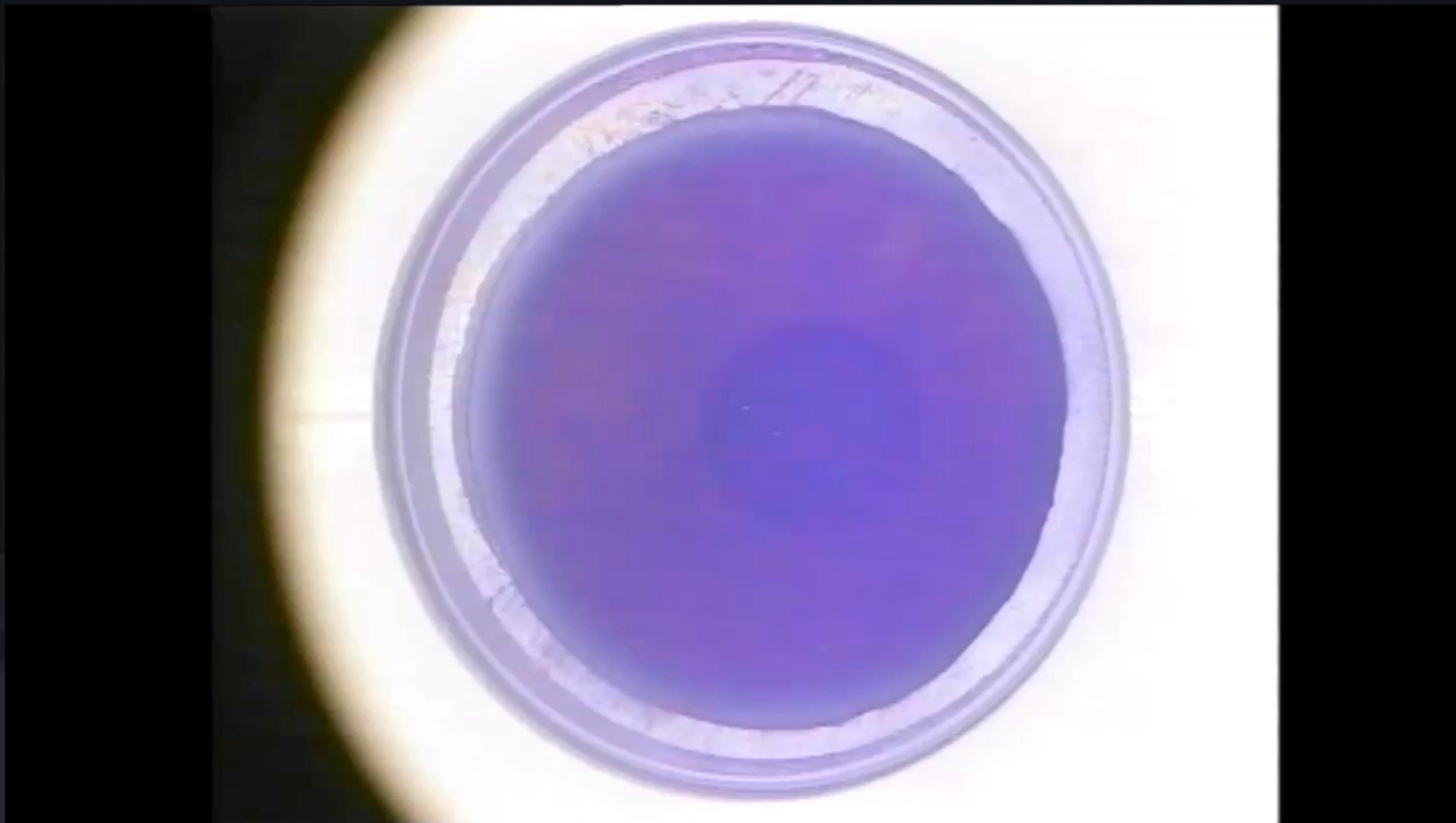
**GAME  
CHANGER**

# FS assisted ICRS





Post CXL

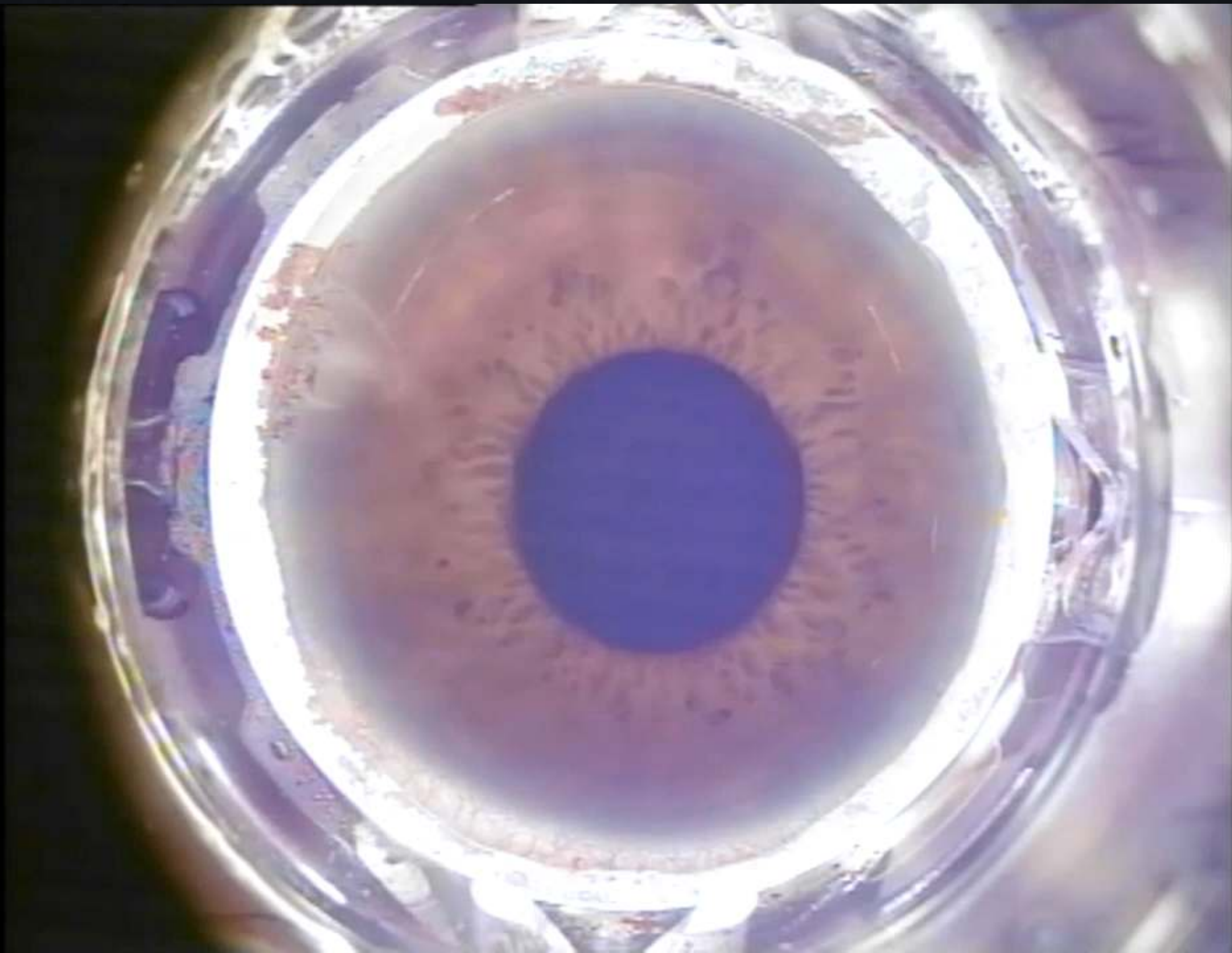


# ICRS for Post LVC Ectasia

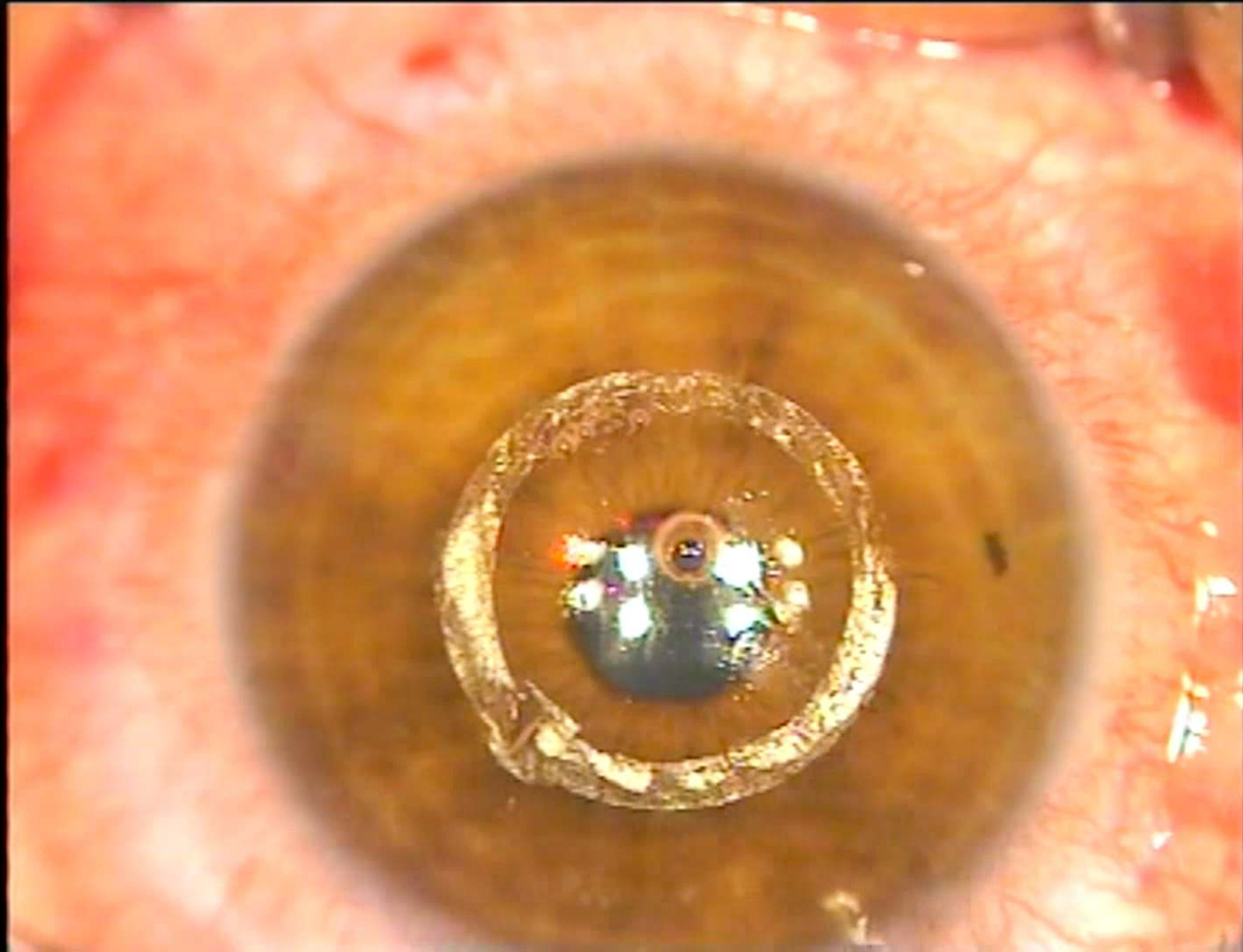




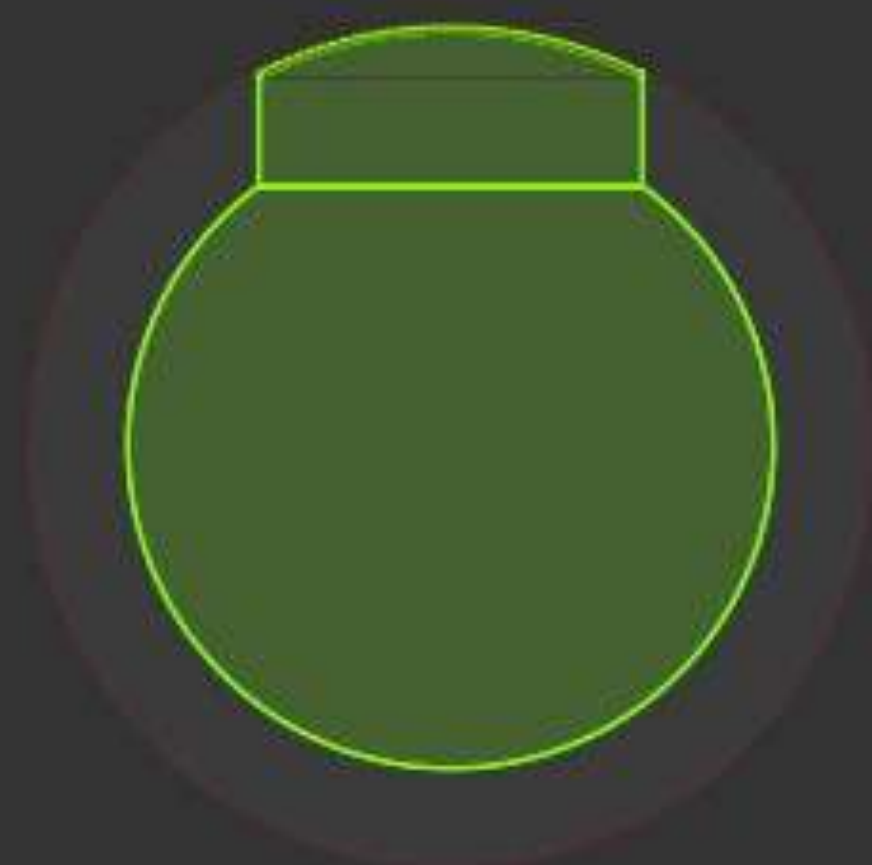
Air bubble







# Pocket

| 01                                                                                                                                                                                                                                                                                                                                                | 02                                                                                                                                                                                                         | 03 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|                                                                                                                                                                                                                                                                                                                                                   | <p>PACHYMETRY</p> <p>20.08.2025 10:37:36 s 690 t 612 c 560 n 672 i 650</p>                                                                                                                                 |    |
| <p>TREATMENT DETAILS</p> <p>Pocket Diameter <input type="text" value="8.0"/> mm</p> <p>Pocket Depth <input type="text" value="300"/> <math>\mu\text{m}</math></p> <p>Incision Width <input type="text" value="5.0"/> mm</p> <p>Incision Position <input type="text" value="90"/> °</p> <p>Inclination Angle <input type="text" value="70"/> °</p> | <p>PREVIEW</p> <p>Cross Section</p>  <p>Thinnest Pachy. <input type="text" value="560"/> <math>\mu\text{m}</math></p> |    |



AK

01

02

03

PACHYMETRY

20.08.2025 10:37:36 s 690 t 612 c 560 n 672 i 650

s 690

t 612

c 560

n 672

i 650

µm

TREATMENT DETAILS

INCISION 1

☒ INCISION 2

Diameter 7.0 mm

Position 98 278 °

Arc length 70 °

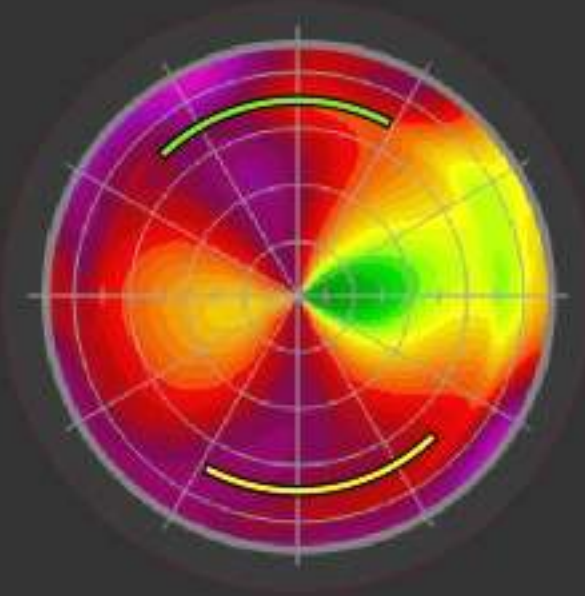
Depth 400 µm

(= % of Pachy) 65 %

Offset Top 100 µm

PREVIEW

Cross Section



Thinnest Peripheral Pachy. 612 µm

01

02

03

PACHYMETRY

20.08.2025 10:37:36 s 690 t 612 c 560 n 672 i 650

s 690

t 612

c 560

n 672

i 650

µm

TREATMENT DETAILS

INCISION 1

☒ INCISION 2

Diameter 7.0 mm

Position 98 278 °

Arc length 70 °

Depth 400 µm

(= % of Pachy) 65 %

Offset Top 100 µm

PREVIEW

Cross Section



Thinnest Peripheral Pachy. 612 µm

# Take-Home Message

- Femtosecond laser = game changer in corneal surgery
- Provides unmatched precision and reproducibility
- Minimizes tissue trauma → safer procedures
- Enables customized surgical planning
- Promotes faster recovery & better visual outcomes
- Versatile tool: supports refractive, therapeutic & transplant surgeries
- Sets the new gold standard in modern corneal surgery



*Thank You*