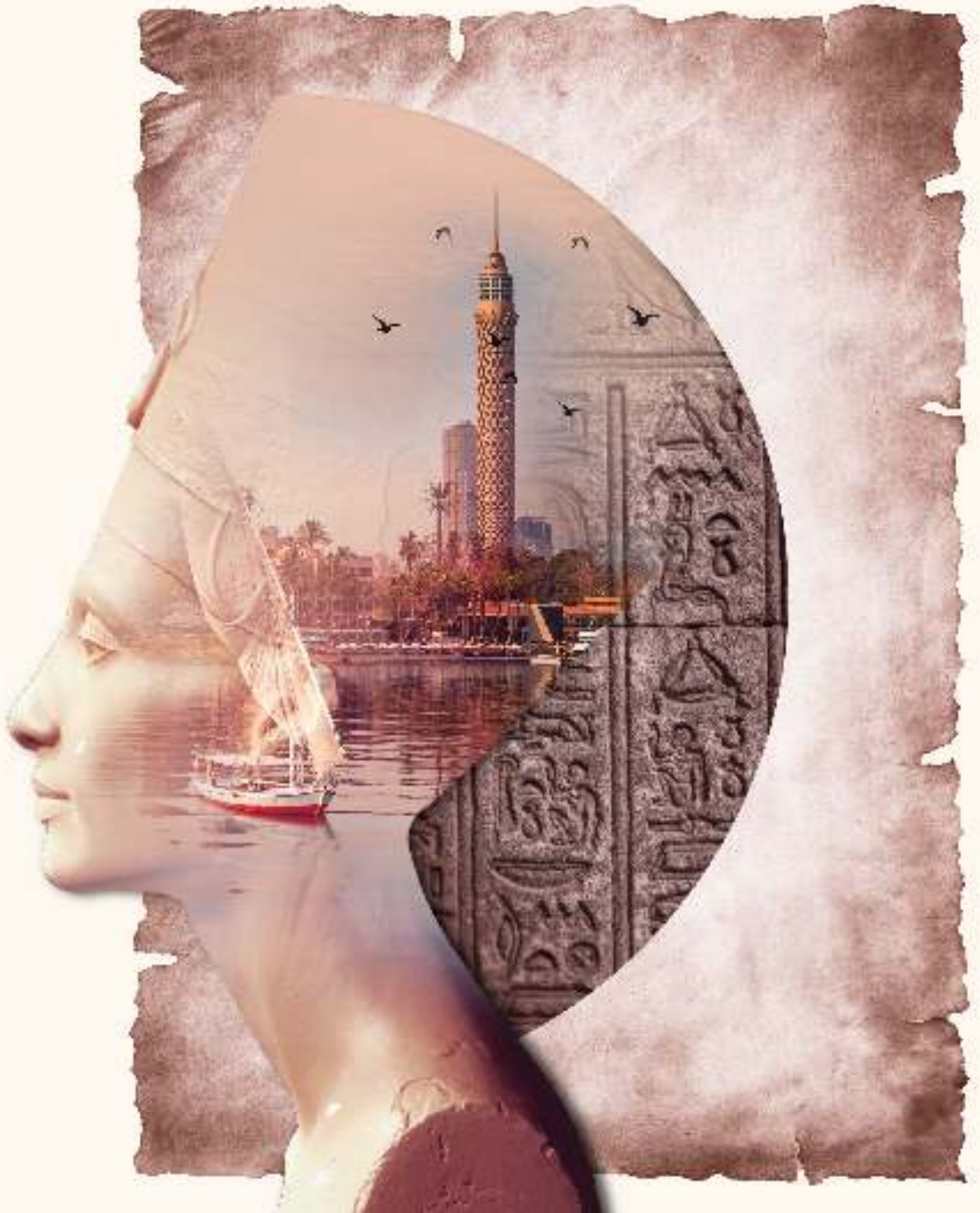
INTERNATIONAL CONGRESS OF THE
EGYPTIAN
OPHTHALMOLOGICAL SOCIETY

EOS 1902

In collaboration with: MEACO

Rehabilitation of Unresolved Corneal Problems

Descemetorhexis and ROCK inhibitors



Dr. José Lamarca
UIC Barcelona
UVIC

BARRAQUER

Historical Background of DSO

- Descemetorhexis without endothelial keratoplasty (DSO) emerged in the early 2010s as a response to the lack of tissue donor and the risks associated with donor grafts and chronic immunosuppression.

- Macsai et al. (2015) published the first clinical series demonstrating successful corneal clearance without grafting in Fuchs dystrophy.

- Source: Macsai MS et al. Cornea. 2015;34(8):873–880.

Rationale for Development

- The recognition that peripheral corneal endothelium retains the ability to migrate and repopulate damaged areas led to the concept of removing only the diseased central zone without replacing it.
- Source: Borkar DS et al. Ophthalmology. 2016;123(2):247–252.
- Peripheral endothelial cells exhibit limited mitotic activity and enhanced migratory capacity. R
- ROCK inhibitors such as ripasudil potentiate this regenerative response by modulating cytoskeletal tension and promoting adhesion and proliferation.
- Source: Okumura N et al. Invest Ophthalmol Vis Sci. 2012;53(10):6066–6072.

Minimum Endothelial Cell Density for DSO

- A minimum peripheral ECD of 1000–1200 cells/mm² is recommended to ensure sufficient regenerative capacity post-DSO. Specular microscopy and endothelial maps help assess cell distribution preoperatively.
- Source: Wacker K et al. Am J Ophthalmol. 2019;205:109–122.

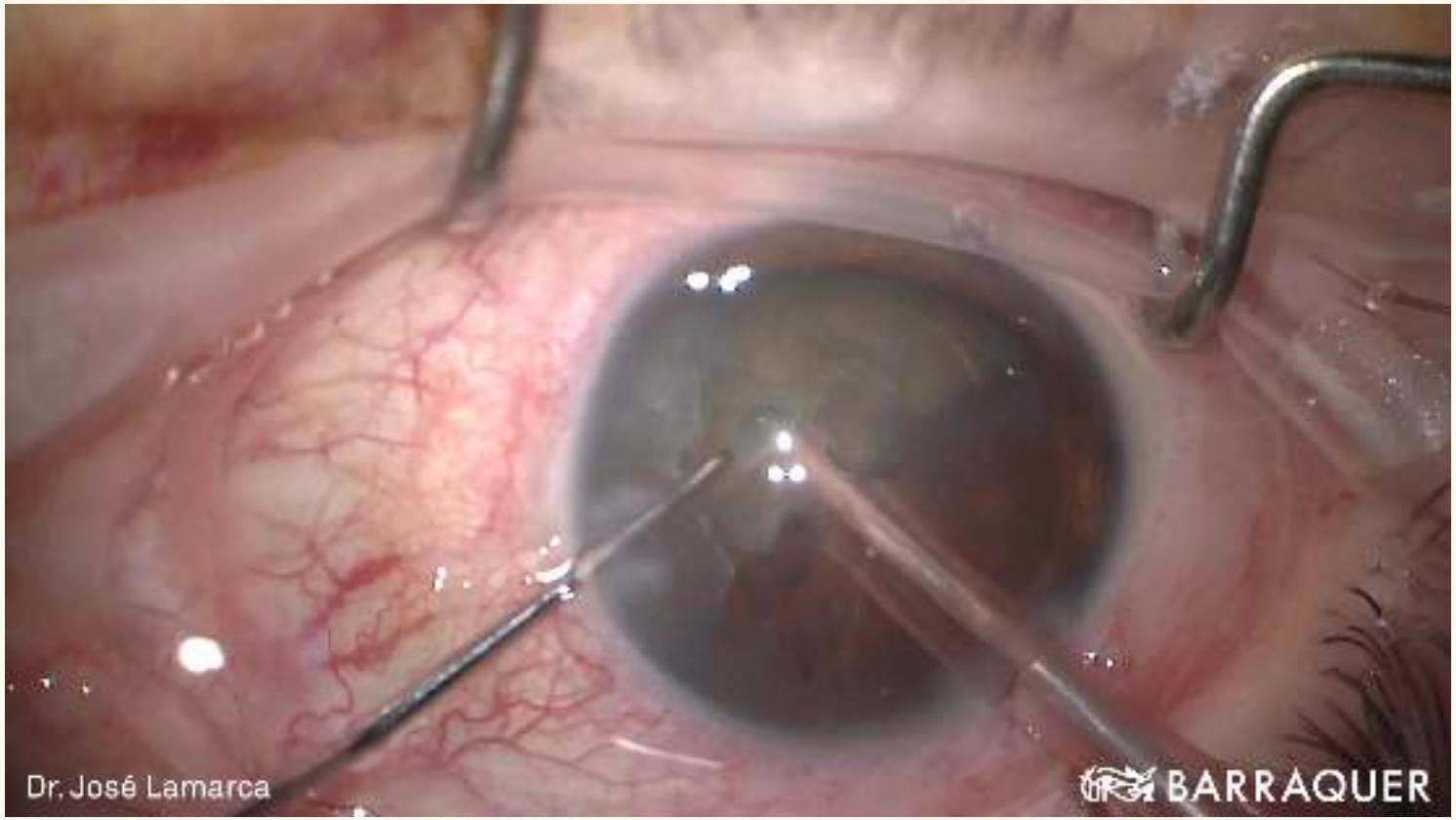
When to Choose DSO vs. DMEK

- DSO is indicated in Fuchs dystrophy with central guttae, clear periphery, and ECD >1000 cells/mm². DMEK is preferred in diffuse guttae, low ECD, or failed prior surgery. DSO offers no rejection risk, lower cost, and avoids long-term steroid use.
- Source: Wacker K et al. Am J Ophthalmol. 2019;205:109–122. Macsai MS. Eye Contact Lens. 2020;46(2):S46–S49.

Surgical Technique of DSO

- Under topical or peribulbar anesthesia, a 4–6 mm central descemetorhexis is created using blunt dissection with a Sinskey hook or reverse stripper. No graft is implanted. Viscoelastic may be used. The anterior chamber is reformed and no endothelial tissue is replaced.

- Source: Borkar DS et al. Ophthalmology. 2016;123(2):247–252.



Descemetorhexis Size and Centering

- Standard diameters range from 4 to 6 mm. Larger diameters (>6 mm) are associated with delayed recovery and greater risk of failure. Centering should align with the visual axis and zone of confluent guttae, typically guided by retroillumination and AS-OCT.
- Source: Macsai MS, Shiloach M. Cornea. 2015;34(8):873–880.

Mechanism of Action of Ripasudil

- Ripasudil inhibits Rho-kinase, relaxing actin-myosin tension in endothelial cells. This enhances cellular adhesion, migration and mitosis. It also modulates the extracellular matrix and suppresses inflammatory pathways.
- Source: Koizumi N et al. Sci Rep. 2016;6:28102.

Ripasudil Posology and Duration

- Ripasudil 0.4% is typically prescribed as 1 drop 4 to 6 times daily for 3 months postoperatively.
- Treatment duration may be extended based on repopulation rate assessed via specular microscopy or AS-OCT.
- It is safe for long-term use.
- Ripasudil should be tapered or discontinued if signs of central edema persist beyond 3 months or if no improvement in visual acuity is observed. Consider DMEK rescue if corneal thickness remains >650 µm or BCVA <20/40 at 12 weeks.

- Source: Borkar DS et al. Ophthalmology. 2016;123(2):247–252.

Visual Outcomes After DSO with Ripasudil

- BCVA improvement to ≥20/25 achieved in 80–85% of successful DSO cases by 3 months. Time to visual recovery shorter with ripasudil (median 6–8 weeks). CCT normalizes progressively.
- Source: Wacker K et al. Am J Ophthalmol. 2019;205:109–122.

Complications Associated with Ripasudil

- Most common adverse events are transient hyperemia and mild irritation.
- Discontinue if epithelial defects persist beyond 2 weeks or if there is anterior chamber reaction.
- No significant intraocular toxicity reported.
- Source: Okumura N et al. Cornea. 2018;37(6):730–735.

Evidence: DSO With vs. Without Ripasudil

- Studies show DSO with ripasudil significantly accelerates endothelial repopulation (mean 6–8 weeks vs. 12–16 weeks without).
- Final visual outcomes are similar, but ripasudil reduces time to clearance and improves ECD in central cornea.

- Source: Macsai MS. Eye Contact Lens. 2020;46(2):S46–S49.

Long-Term Durability of DSO

- Studies with >24 months of follow-up report stable corneal clarity and endothelial cell density after successful DSO. No progressive endothelial failure observed in compliant patients with proper selection criteria.

- DMEK grafts show long-term survival in 90–95% at 5 years, whereas DSO success depends on initial ECD and response to therapy. With adjunctive ripasudil, 2-year data suggest comparable durability in mild to moderate cases.

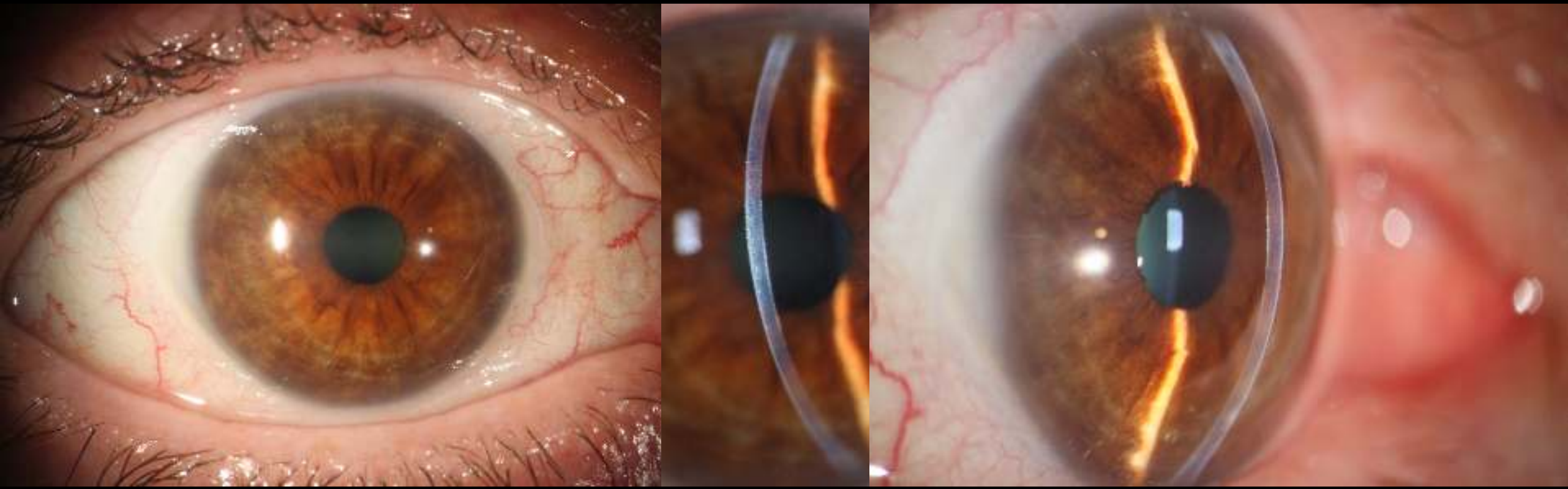
- Source: Macsai MS. Eye Contact Lens. 2020;46(2):S46–S49.7–252.

Economic Impact: DSO vs. Transplant

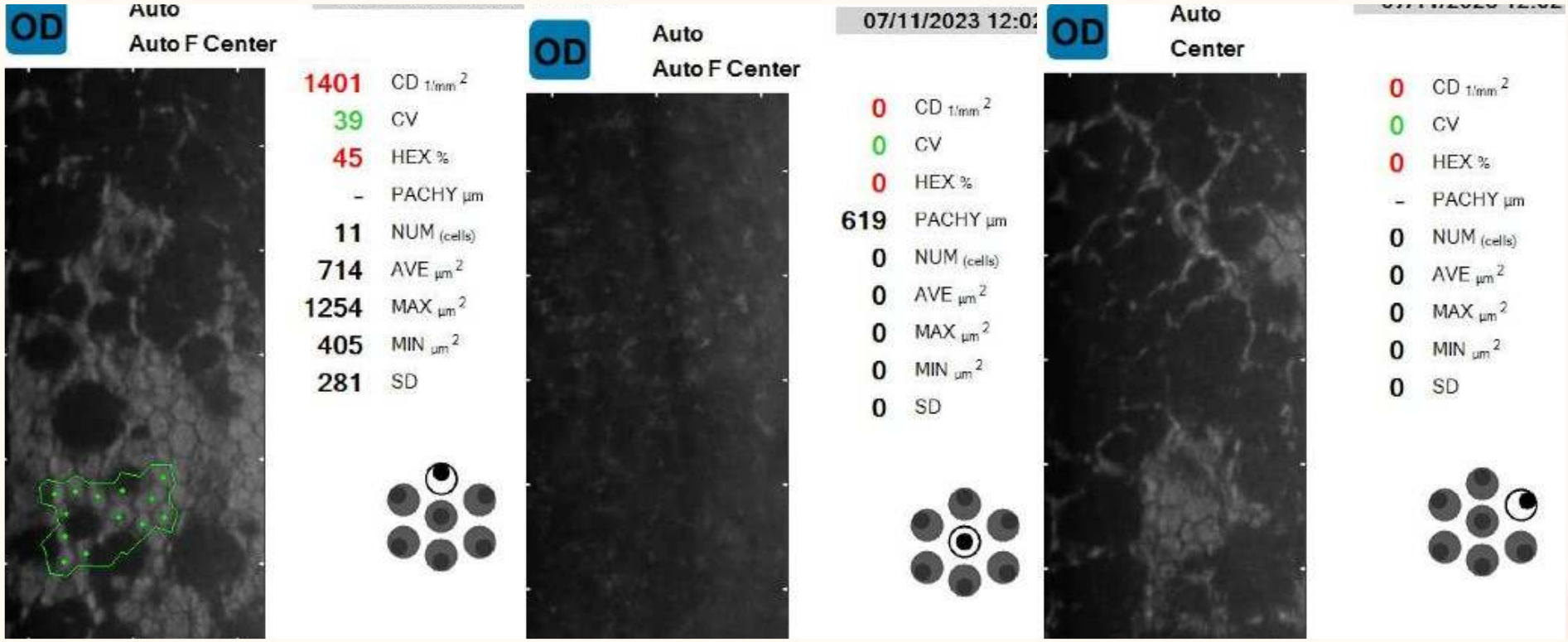
- DSO eliminates the need for donor tissue, storage, transportation, surgical prep, and immunosuppressive therapy. One study estimated a 40–60% cost reduction per case vs. DMEK/DSAEK when successful.
  - Source: Saad A et al. Cornea. 2021;40(2):163–169.

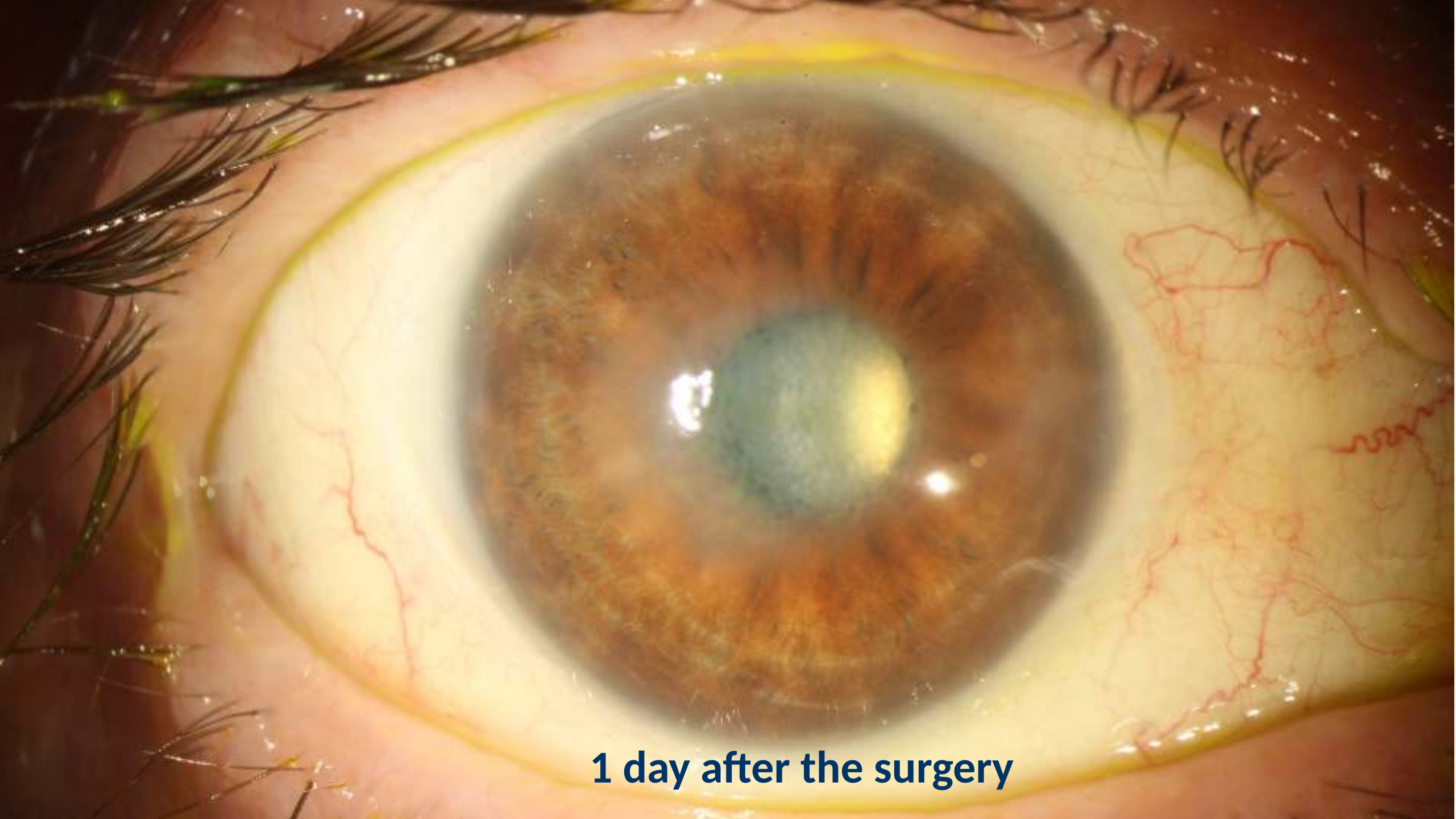
- Although ripasudil represents an added pharmaceutical cost (~€70–90/month), the overall procedure remains more cost-effective by avoiding graft and OR time. Insurance coverage varies by region.
  - Source: Koizumi N et al. Invest Ophthalmol Vis Sci. 2020;61(4):29.

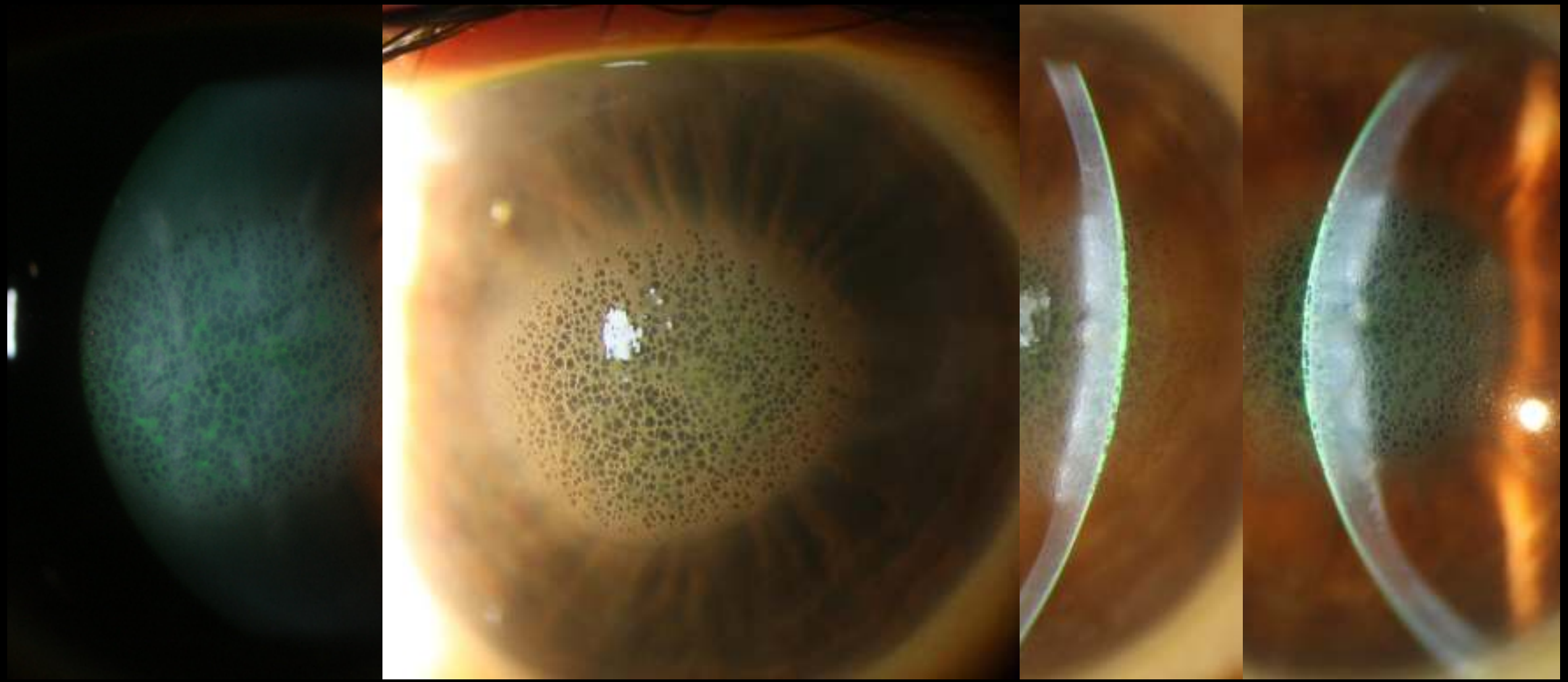
#1 70y/o Preop BCVA 0,45

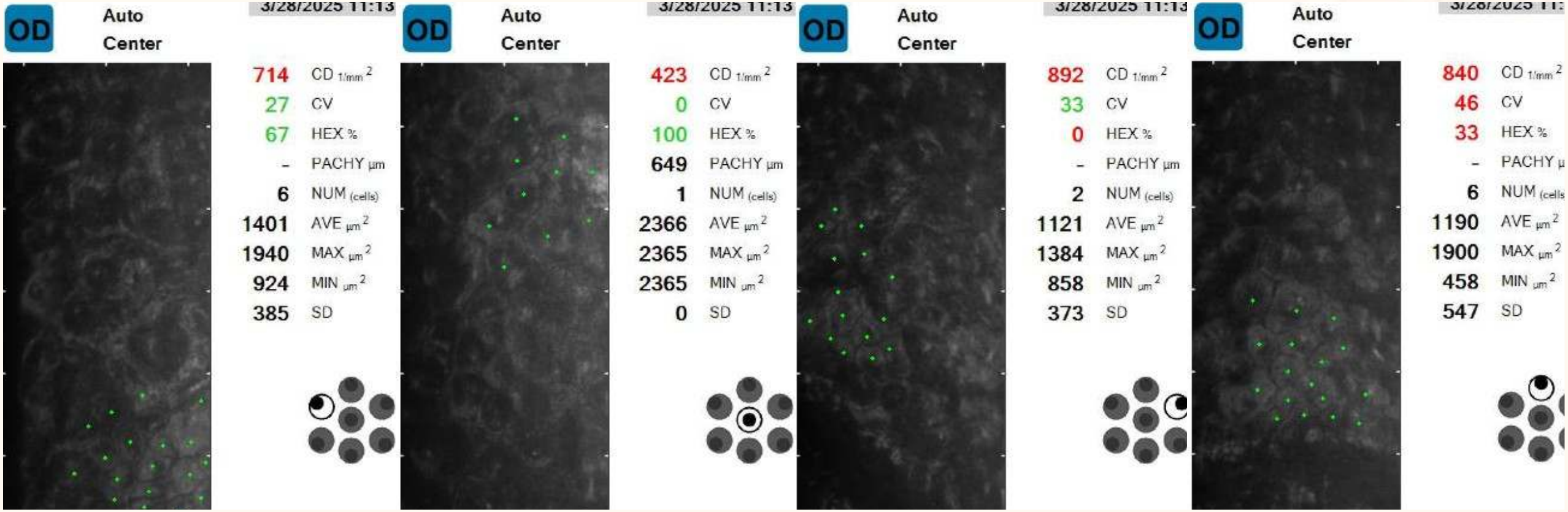


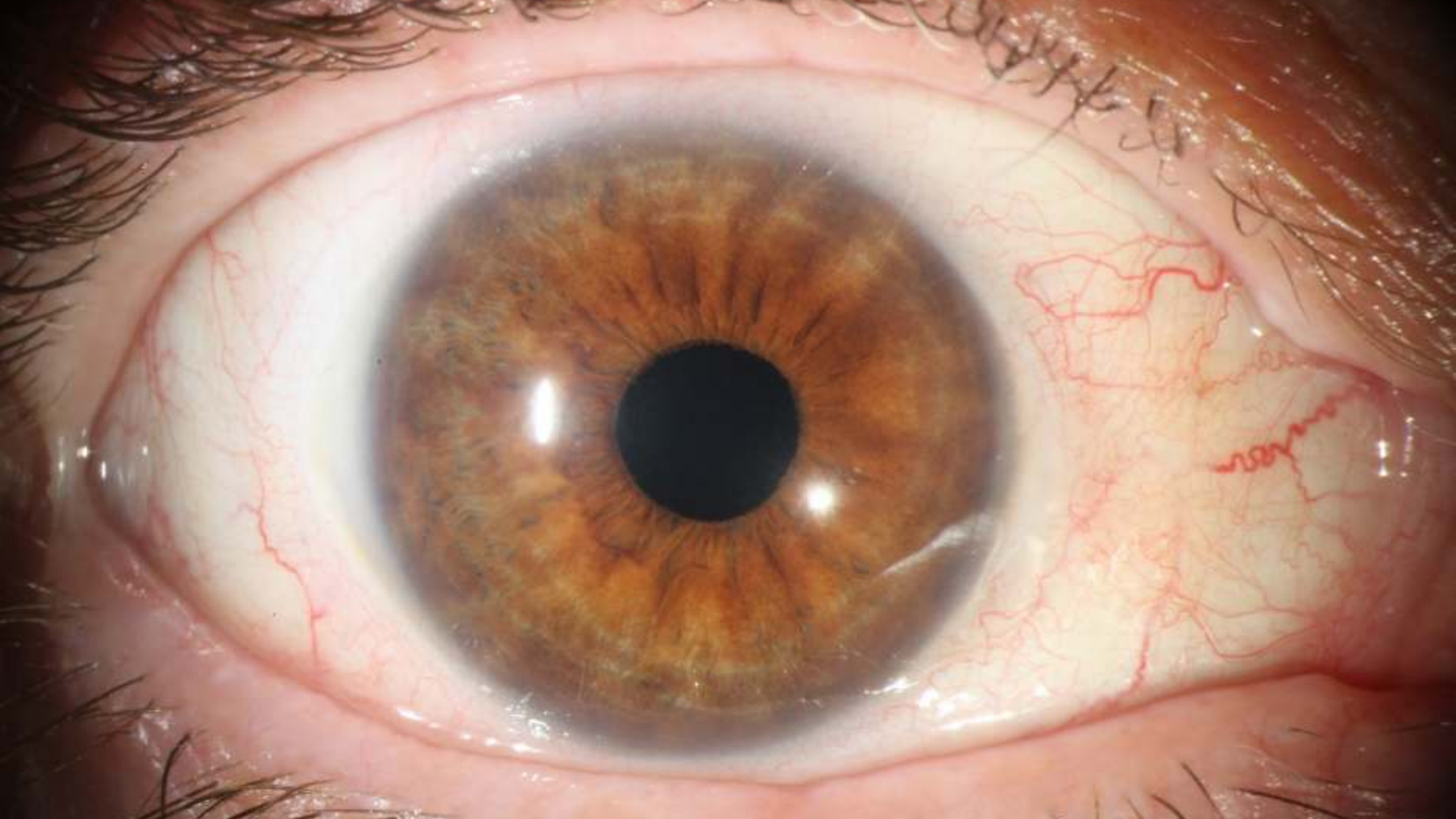
#1 70y/o Preop BCVA 0,45

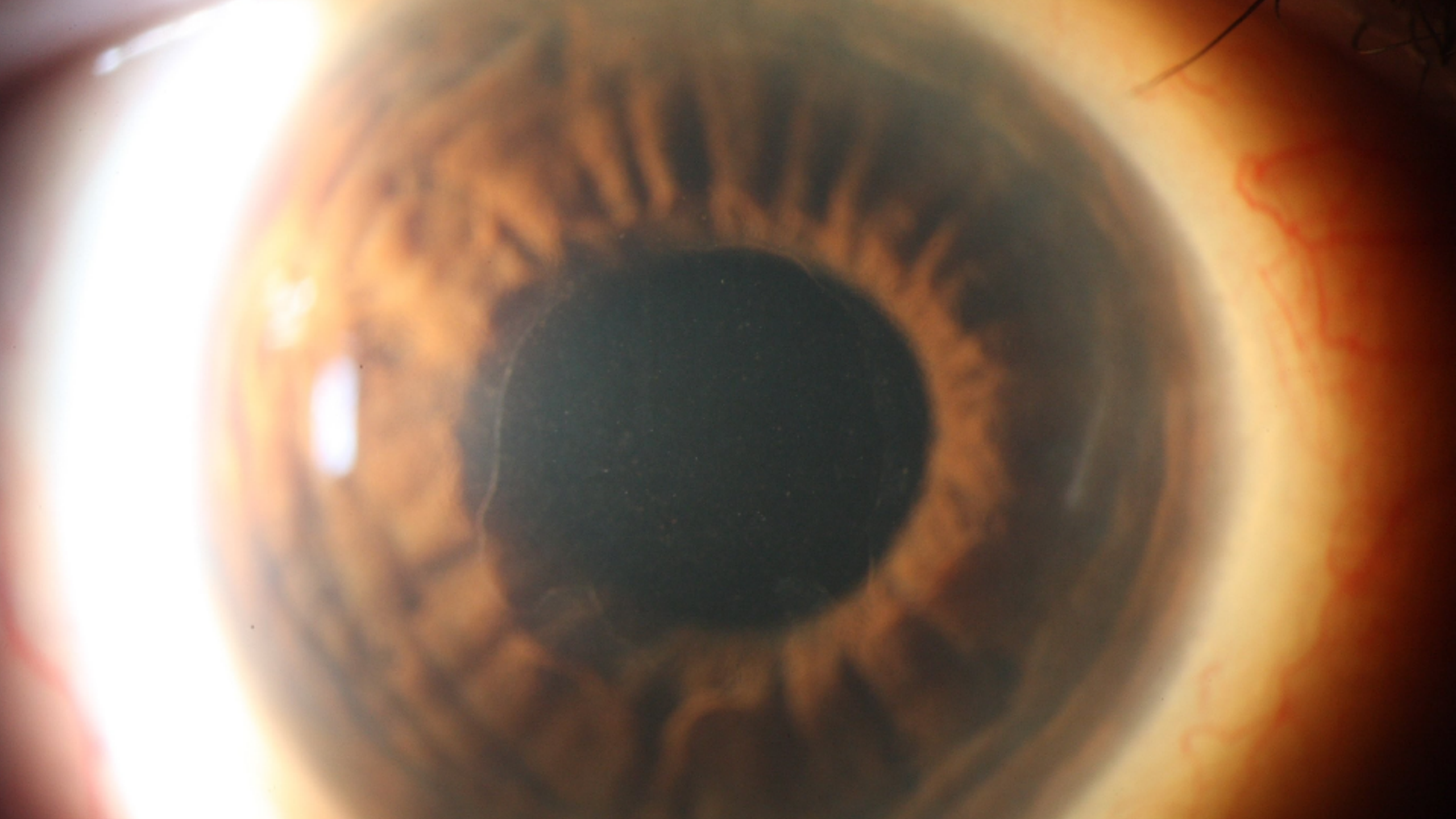


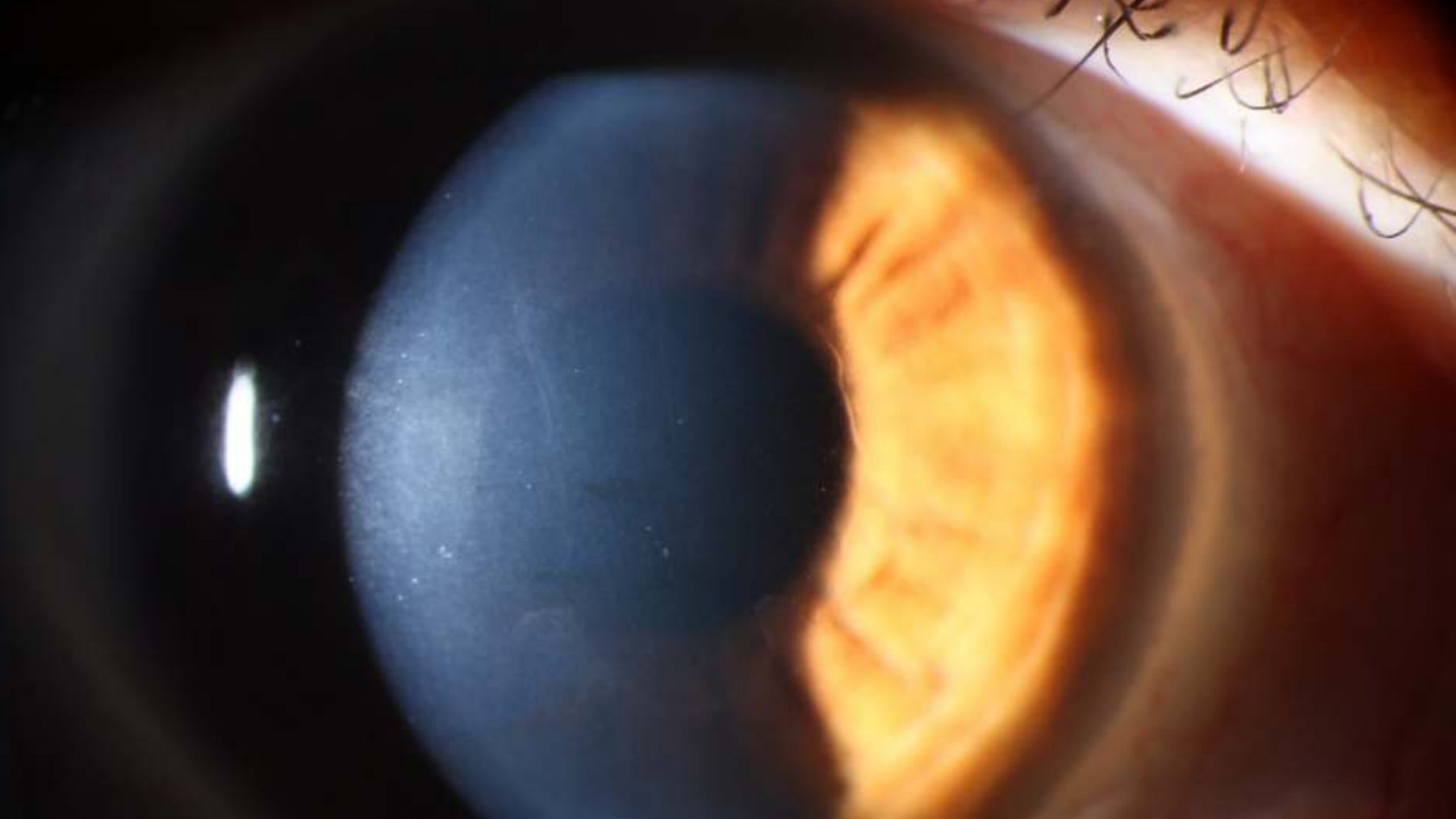

1 day after the surgery

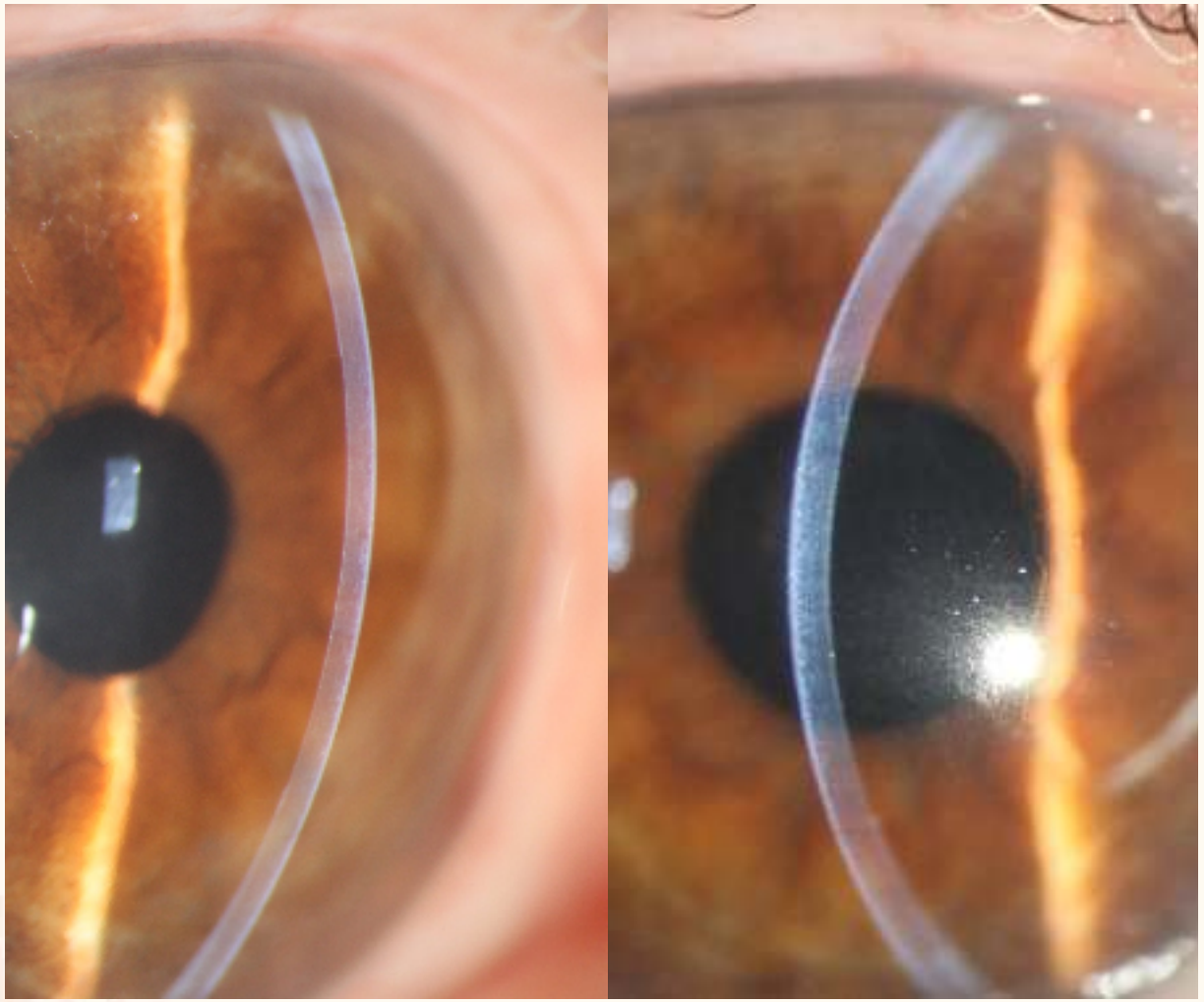



OD
Auto
Center
3/28/2025 11:13
714 CD 1/mm 2
27 CV
67 HEX %
– PACHY µm
6 NUM (cells)
1401 AVE µm 2
1940 MAX µm 2
924 MIN µm 2
385 SD
OD
Auto
Center
423 CD 1/mm 2
0 CV
100 HEX %
649 PACHY µm
1 NUM (cells)
2366 AVE µm 2
2365 MAX µm 2
2365 MIN µm 2
0 SD
OD
Auto
Center
892 CD 1/mm 2
33 CV
0 HEX %
– PACHY µm
2 NUM (cells)
1121 AVE µm 2
1384 MAX µm 2
858 MIN µm 2
373 SD
OD
Auto
Center
840 CD 1/mm 2
46 CV
33 HEX %
6 NUM (cells)
1190 AVE µm 2
1900 MAX µm 2
458 MIN µm 2
547 SD

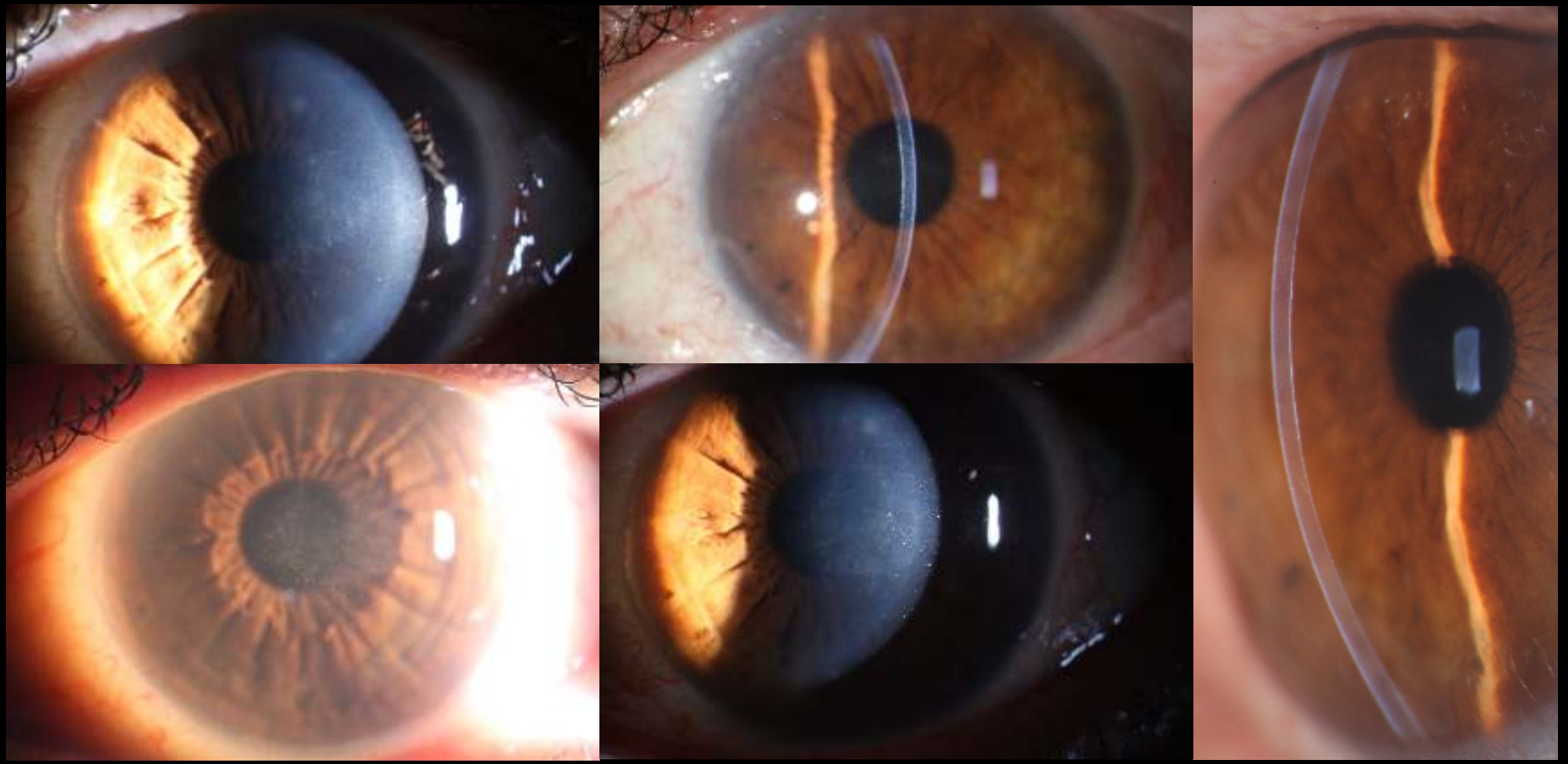




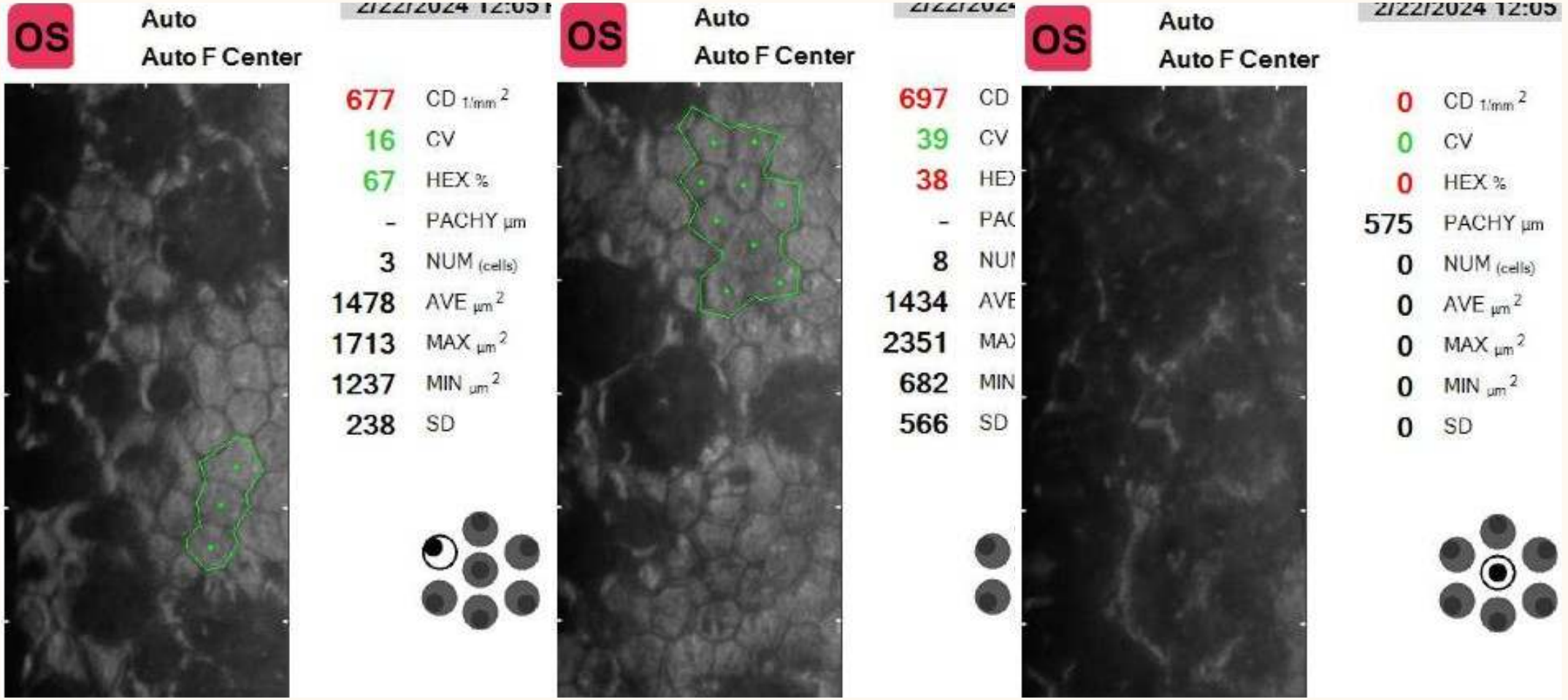


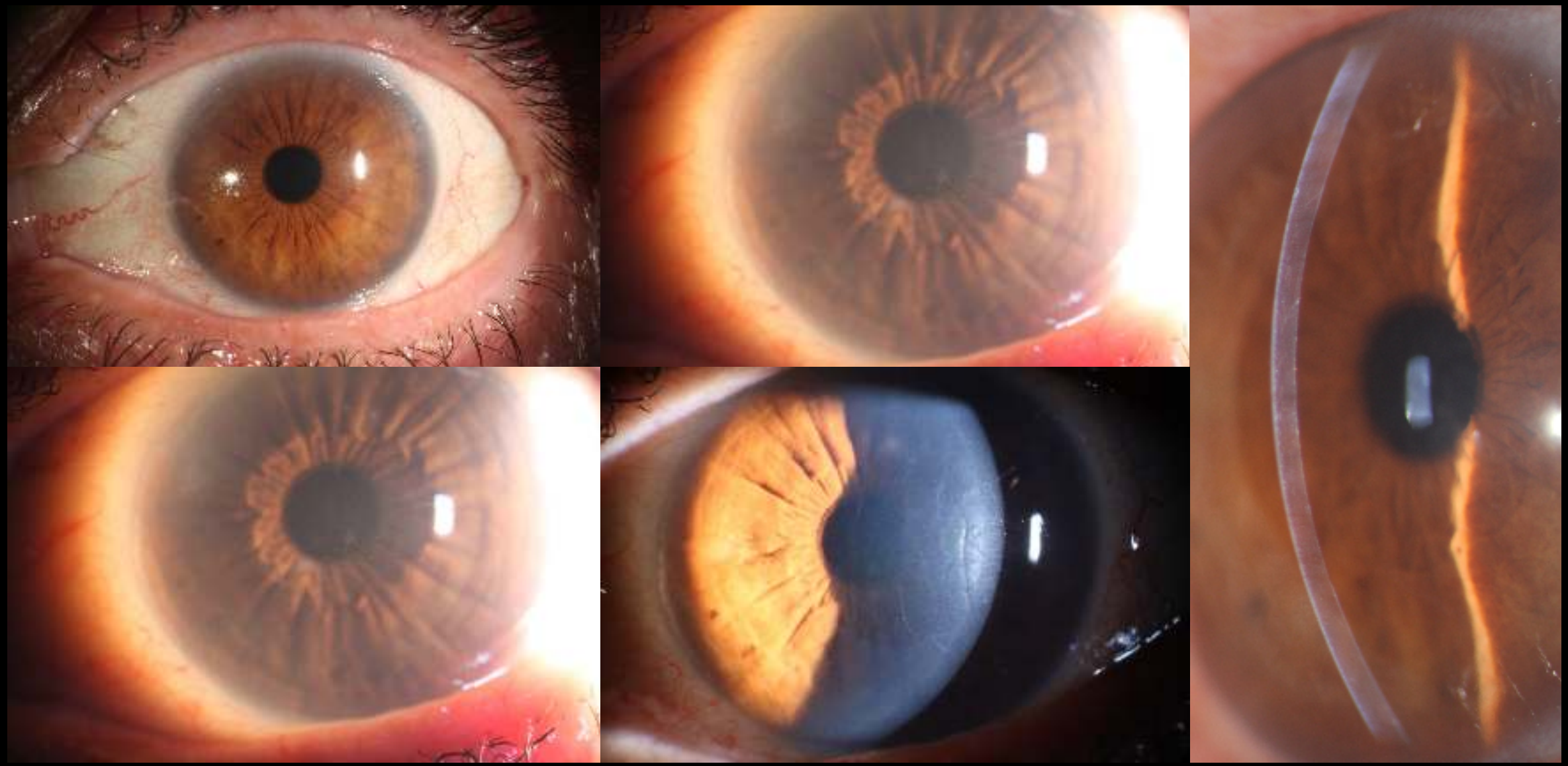


#1 ripasudil stopped BCVA 0,85

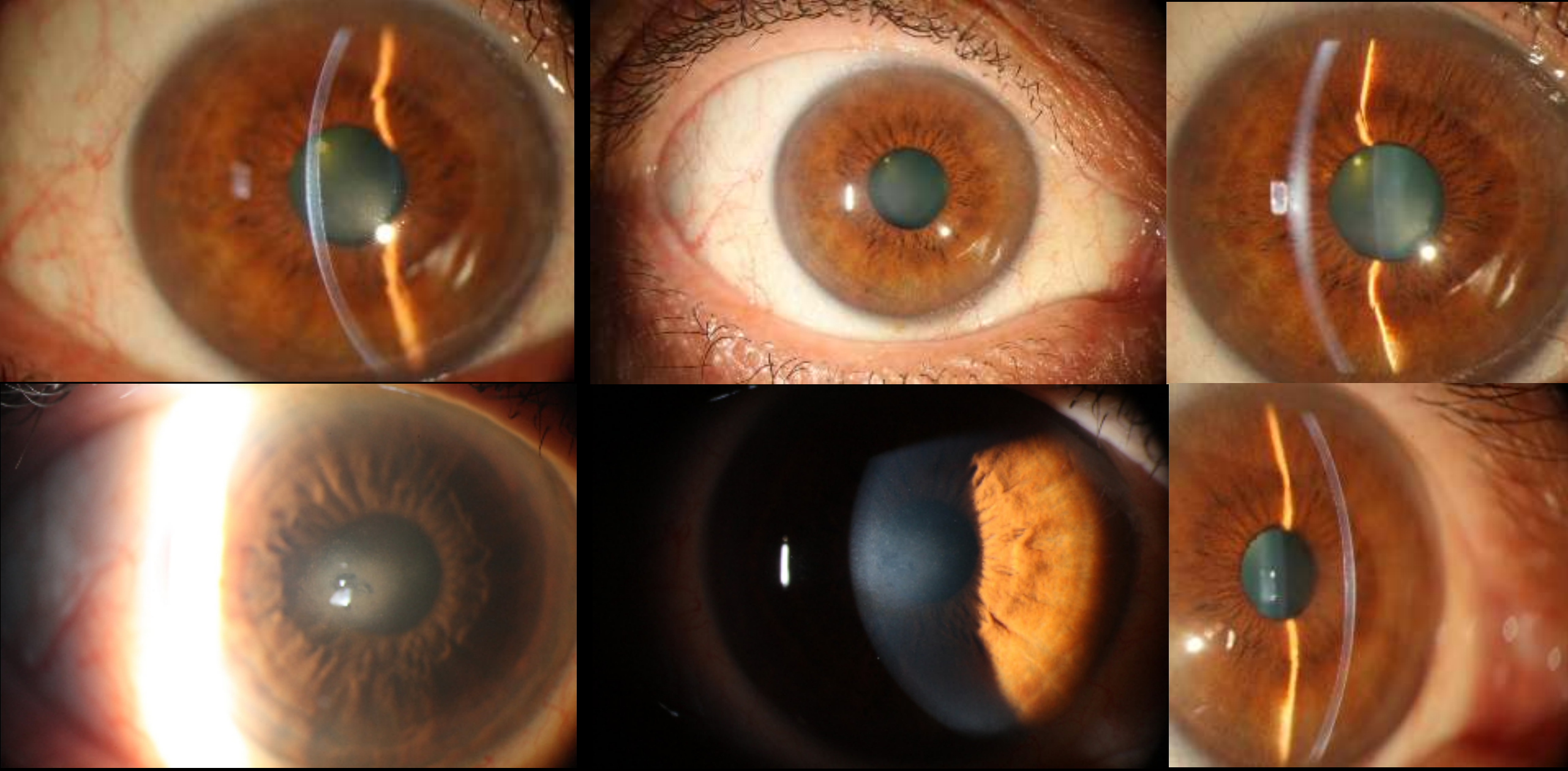


#2 70y/o Preop BCVA 0,45

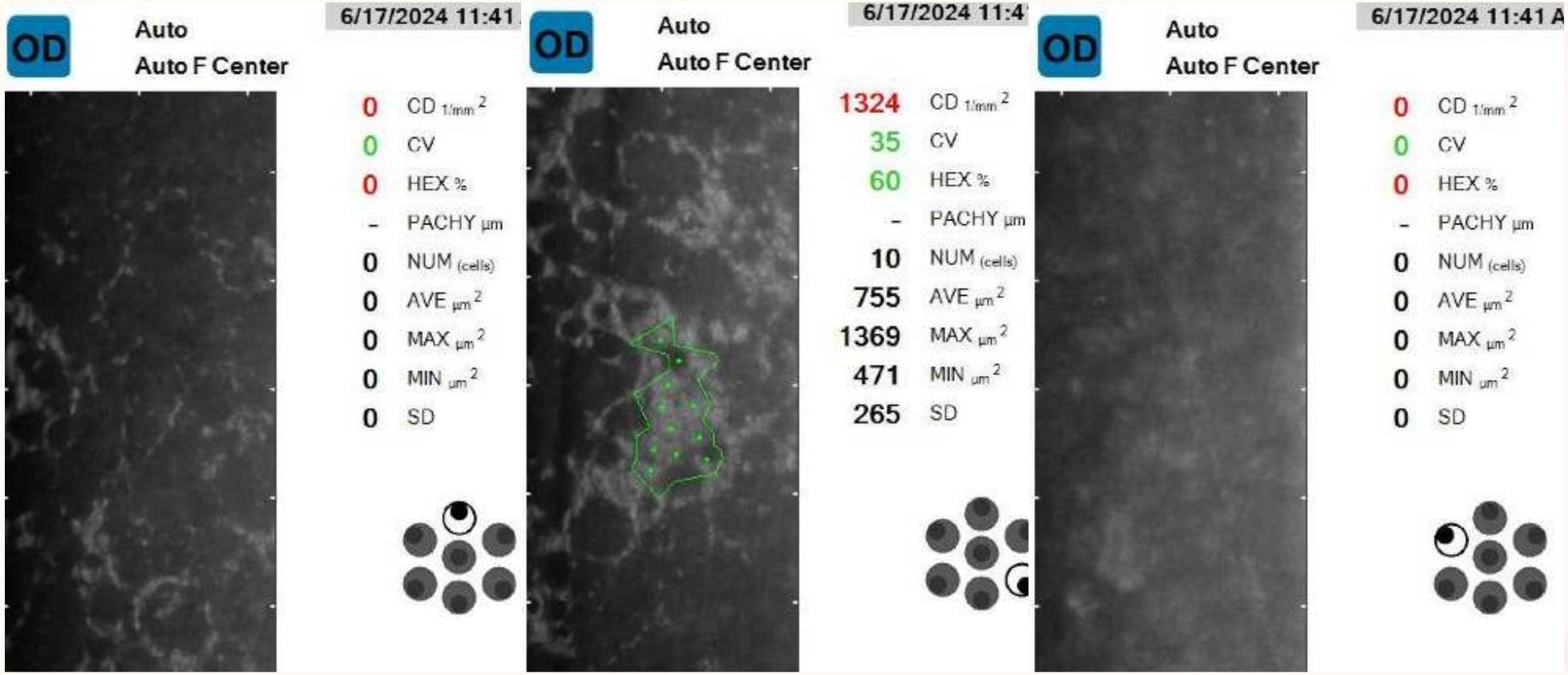

OS
Auto
Auto F Center
677 CD 1/mm 2
16 CV
67 HEX %
– PACHY µm
3 NUM (cells)
1478 AVE µm 2
1713 MAX µm 2
1237 MIN µm 2
238 SD
OS
Auto
Auto F Center
697 CD
39 CV
38 HE
– PA
8 NU
1434 AV
2351 MA
682 MIN
566 SD
OS
Auto
Auto F Center
2/22/2024 12:05
0 CD 1/mm 2
0 CV
0 HEX %
575 PACHY µm
0 NUM (cells)
0 AVE µm 2
0 MAX µm 2
0 MIN µm 2
0 SD

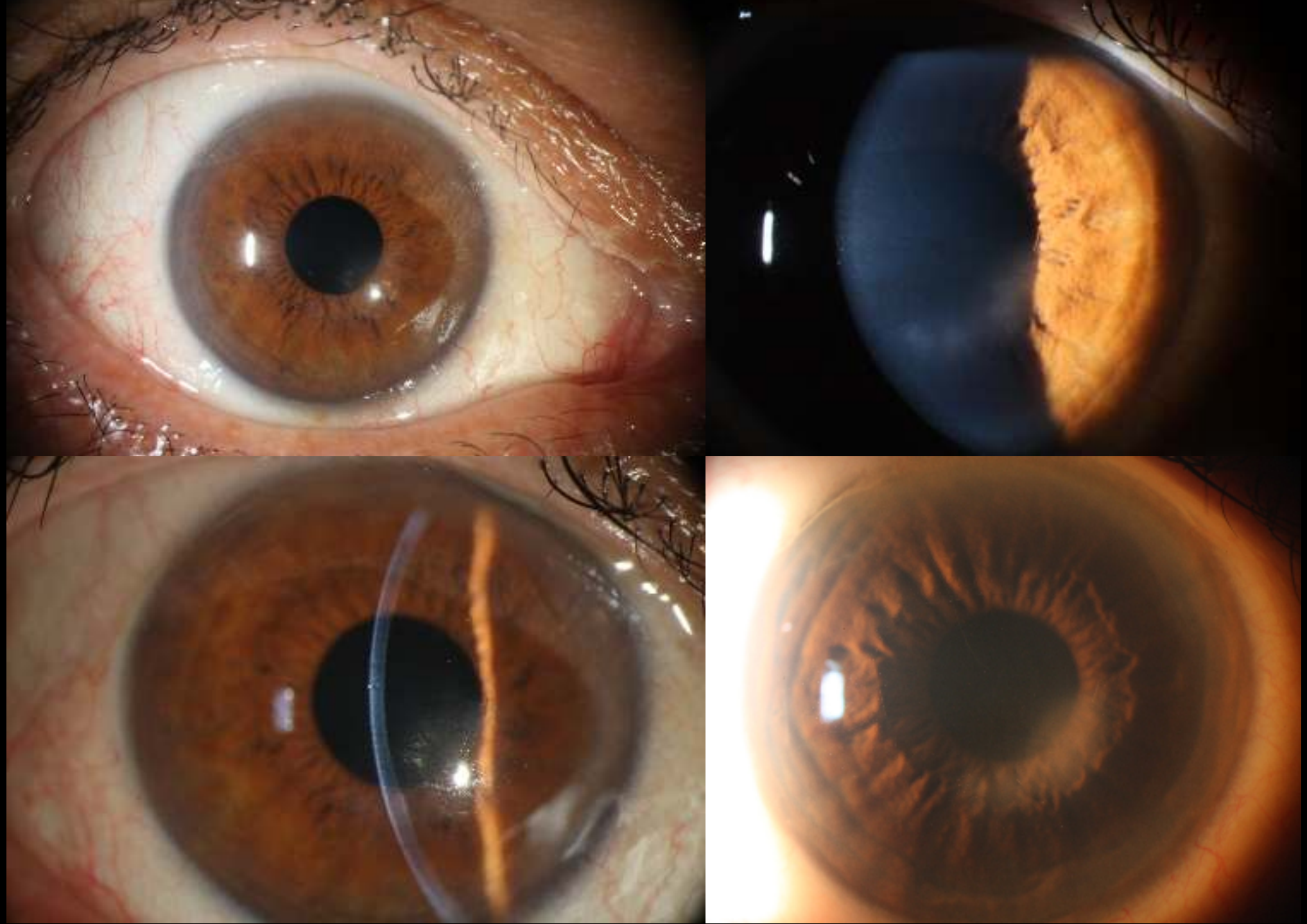


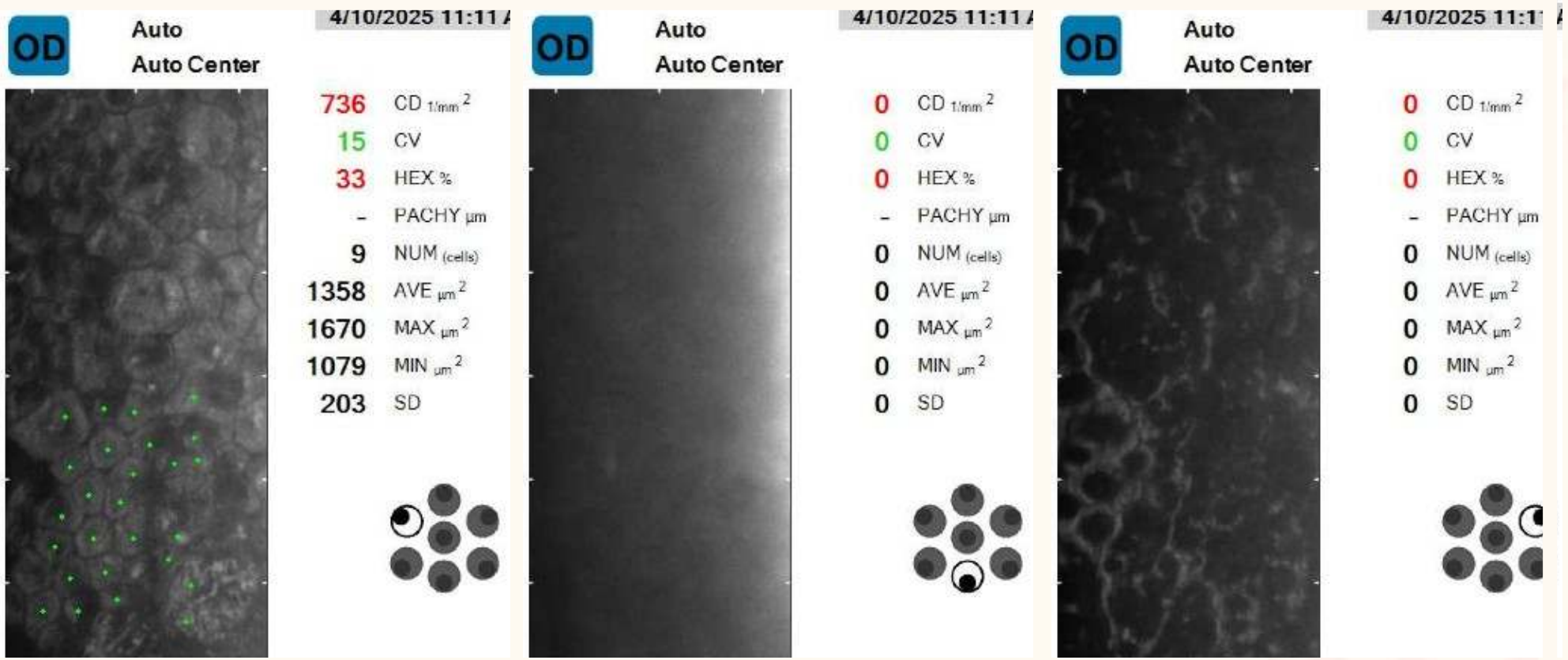
#2 Ripasudil stopped BCVA 0,65



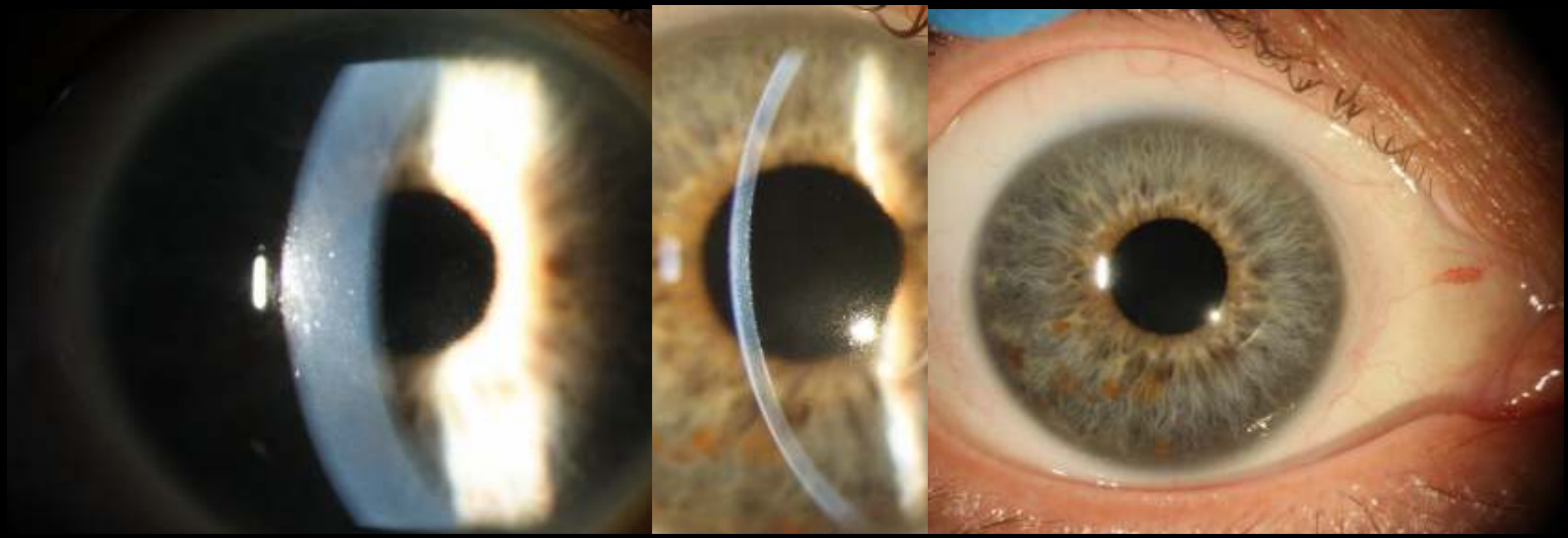
#3 62y/o Preop BCVA 0,05


OD
Auto
Auto F Center
6/17/2024 11:41
0 CD 1/mm 2
0 CV
0 HEX %
- PACHY µm
0 NUM (cells)
0 AVE µm 2
0 MAX µm 2
0 MIN µm 2
0 SD
OD
Auto
Auto F Center
6/17/2024 11:4
1324 CD 1/mm 2
35 CV
60 HEX %
- PACHY µm
10 NUM (cells)
755 AVE µm 2
1369 MAX µm 2
471 MIN µm 2
265 SD
OD
Auto
Auto F Center
6/17/2024 11:41 A
0 CD 1/mm 2
0 CV
0 HEX %
- PACHY µm
0 NUM (cells)
0 AVE µm 2
0 MAX µm 2
0 MIN µm 2
0 SD

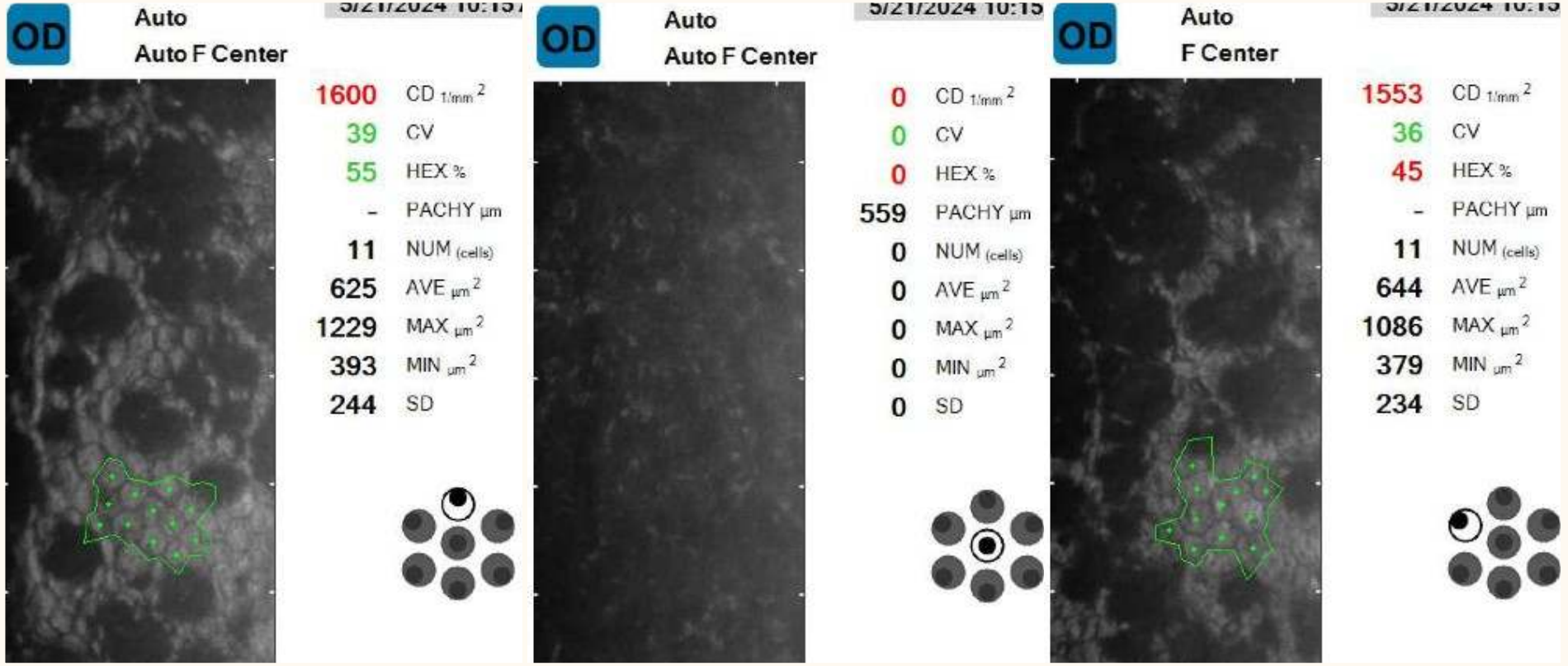


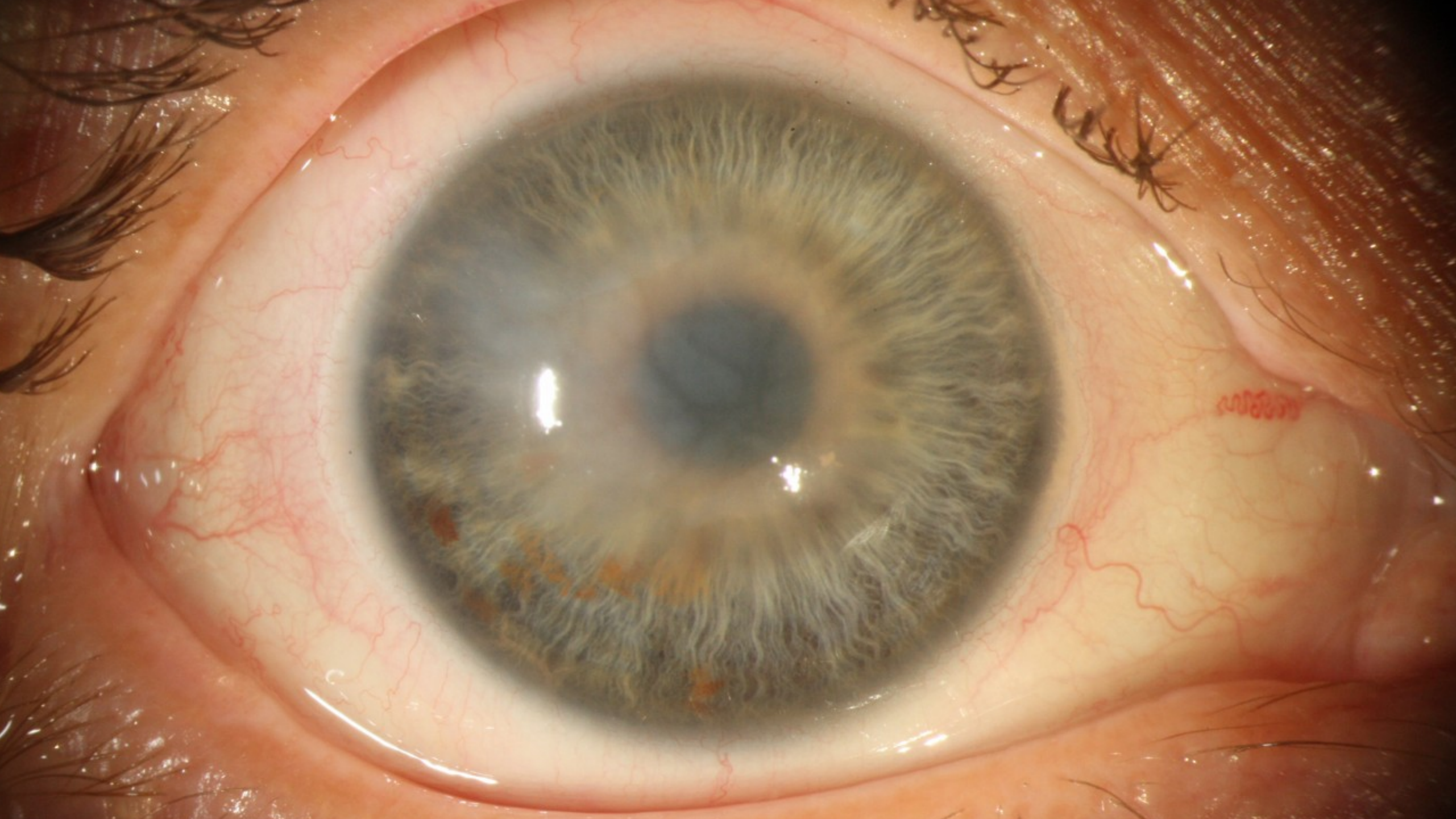


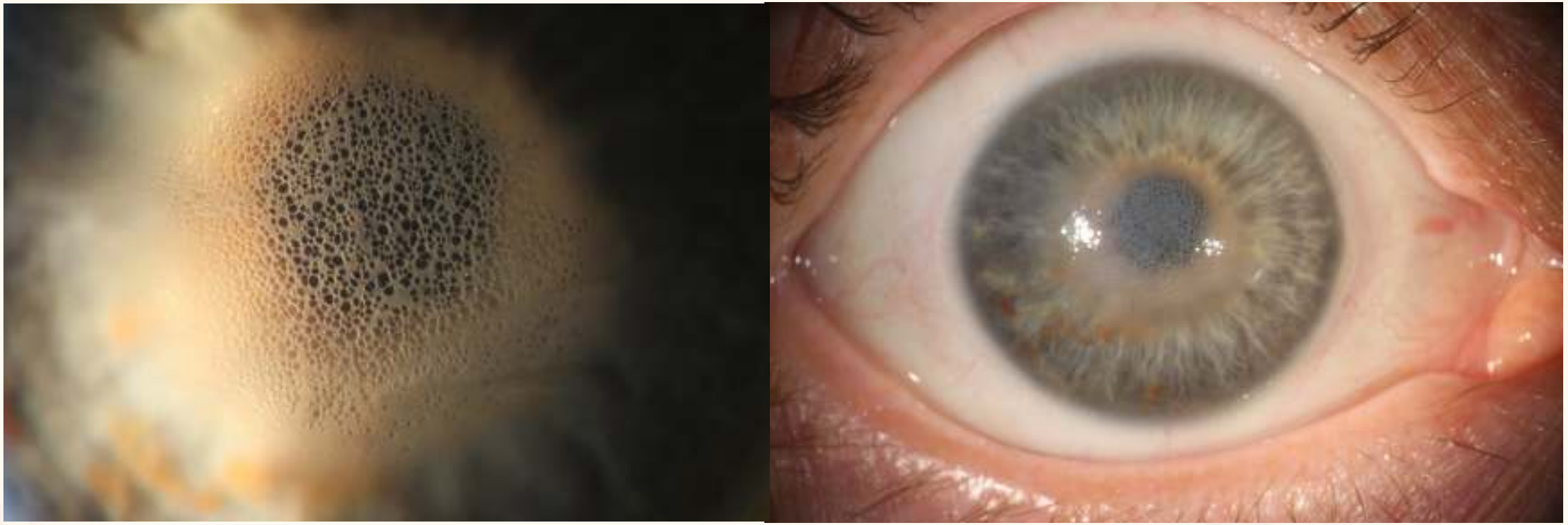
#3 Ripasudil stopped BCVA 0,5 (AMD)

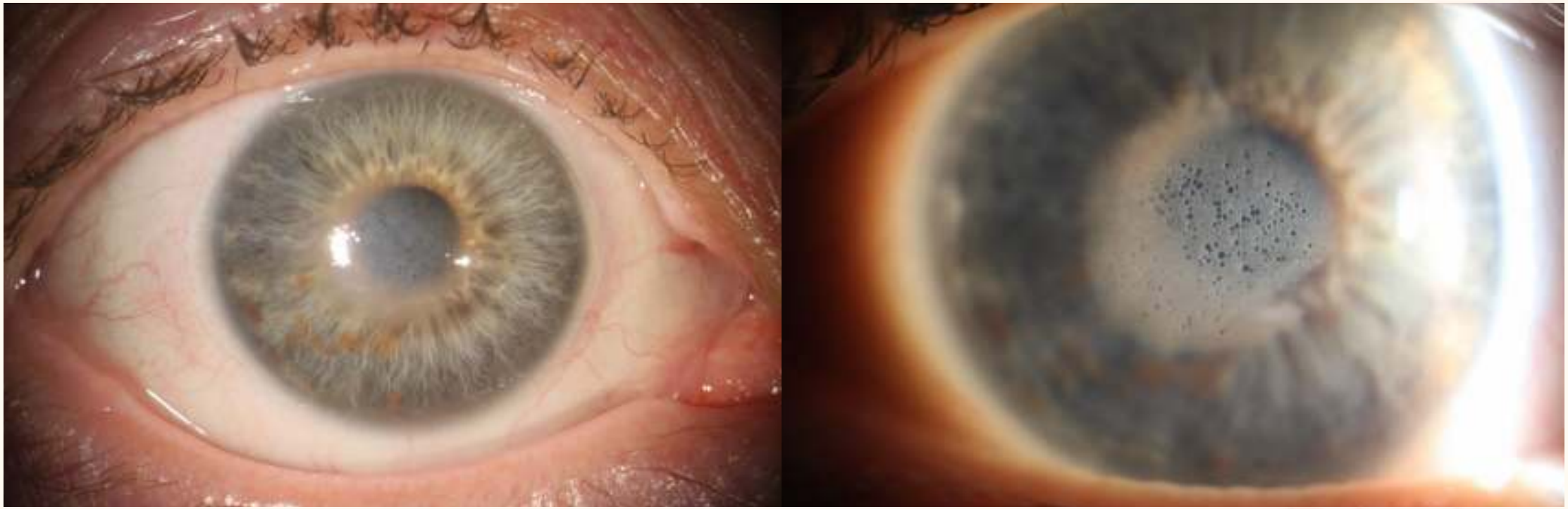


#4 65 y/o BCVA 0,45

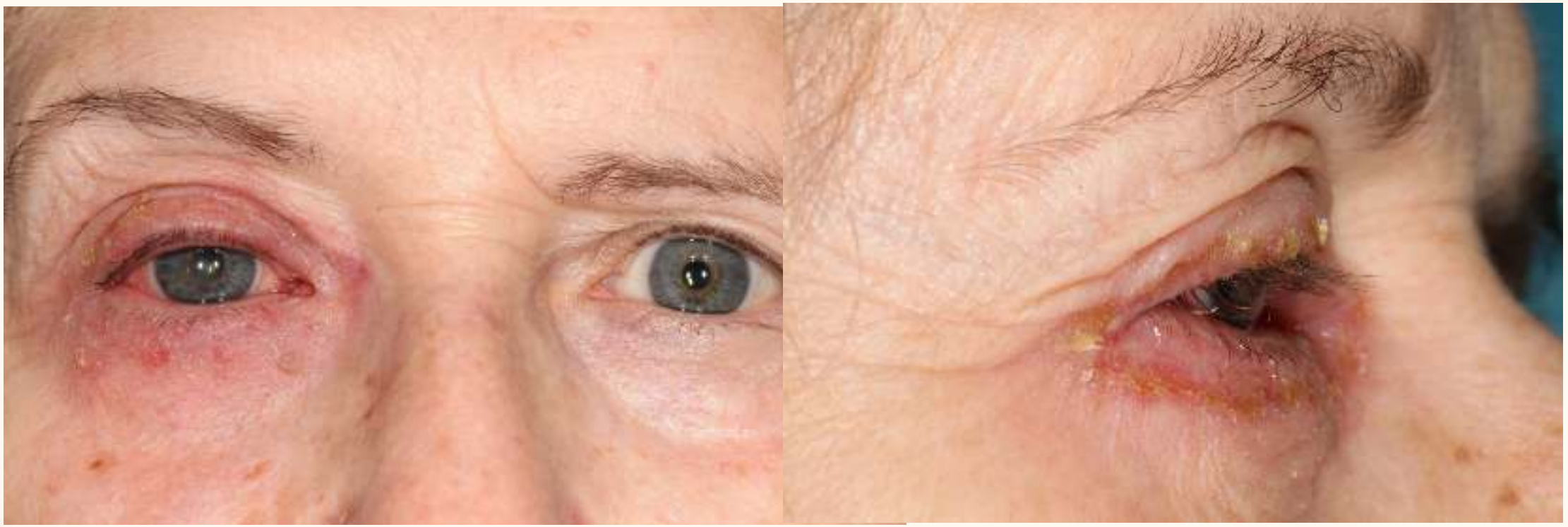

OD
Auto
Auto F Center
1600 CD 1/mm²
39 CV
55 HEX %
- PACHY µm
11 NUM (cells)
625 AVE µm²
1229 MAX µm²
393 MIN µm²
244 SD
OD
Auto
Auto F Center
5/21/2024 10:15
0 CD 1/mm²
0 CV
0 HEX %
559 PACHY µm
0 NUM (cells)
0 AVE µm²
0 MAX µm²
0 MIN µm²
0 SD
OD
Auto
F Center
1553 CD 1/mm²
36 CV
45 HEX %
- PACHY µm
11 NUM (cells)
644 AVE µm²
1086 MAX µm²
379 MIN µm²
234 SD



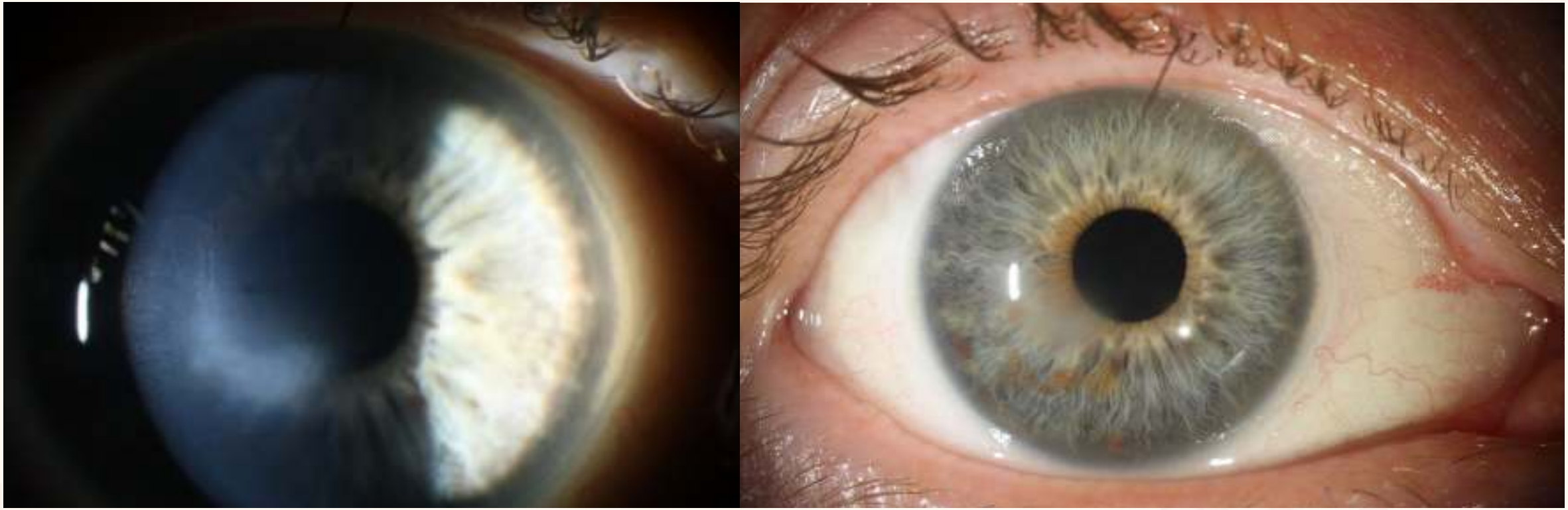




1 month

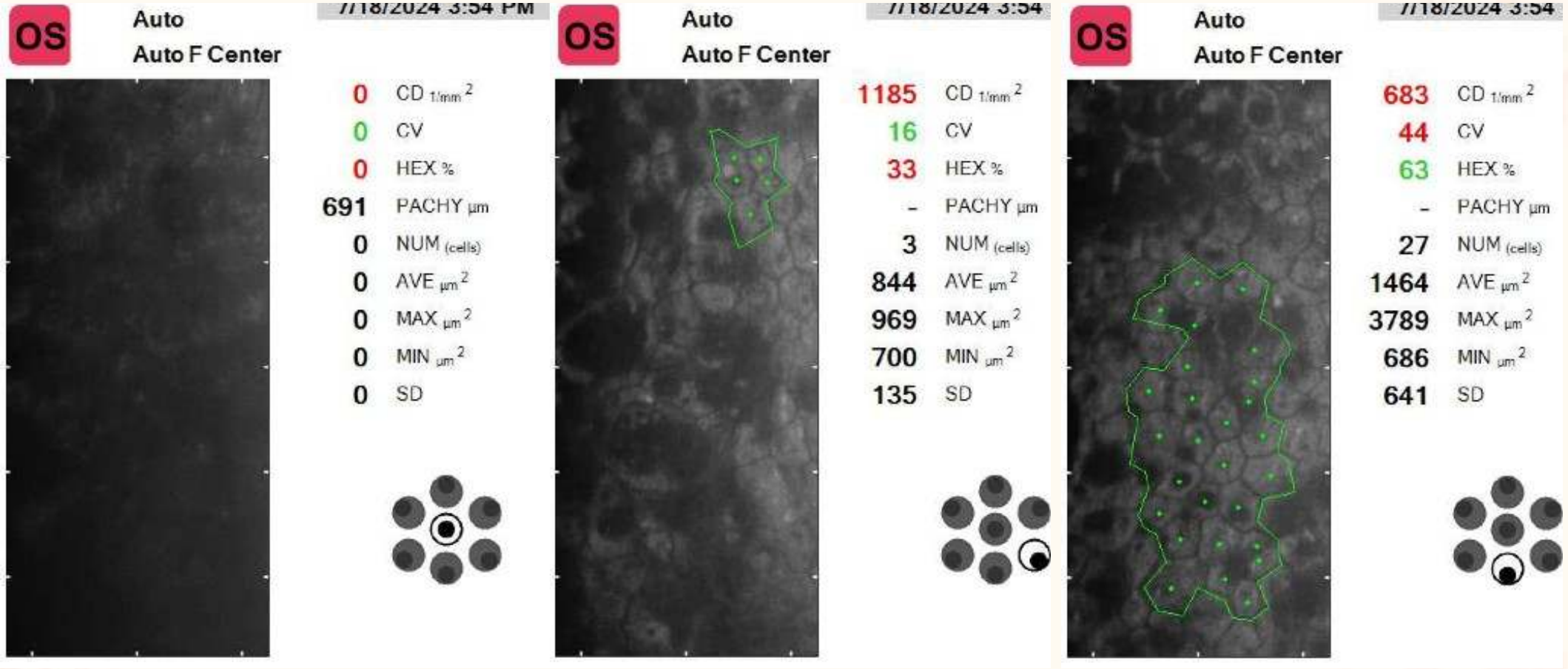


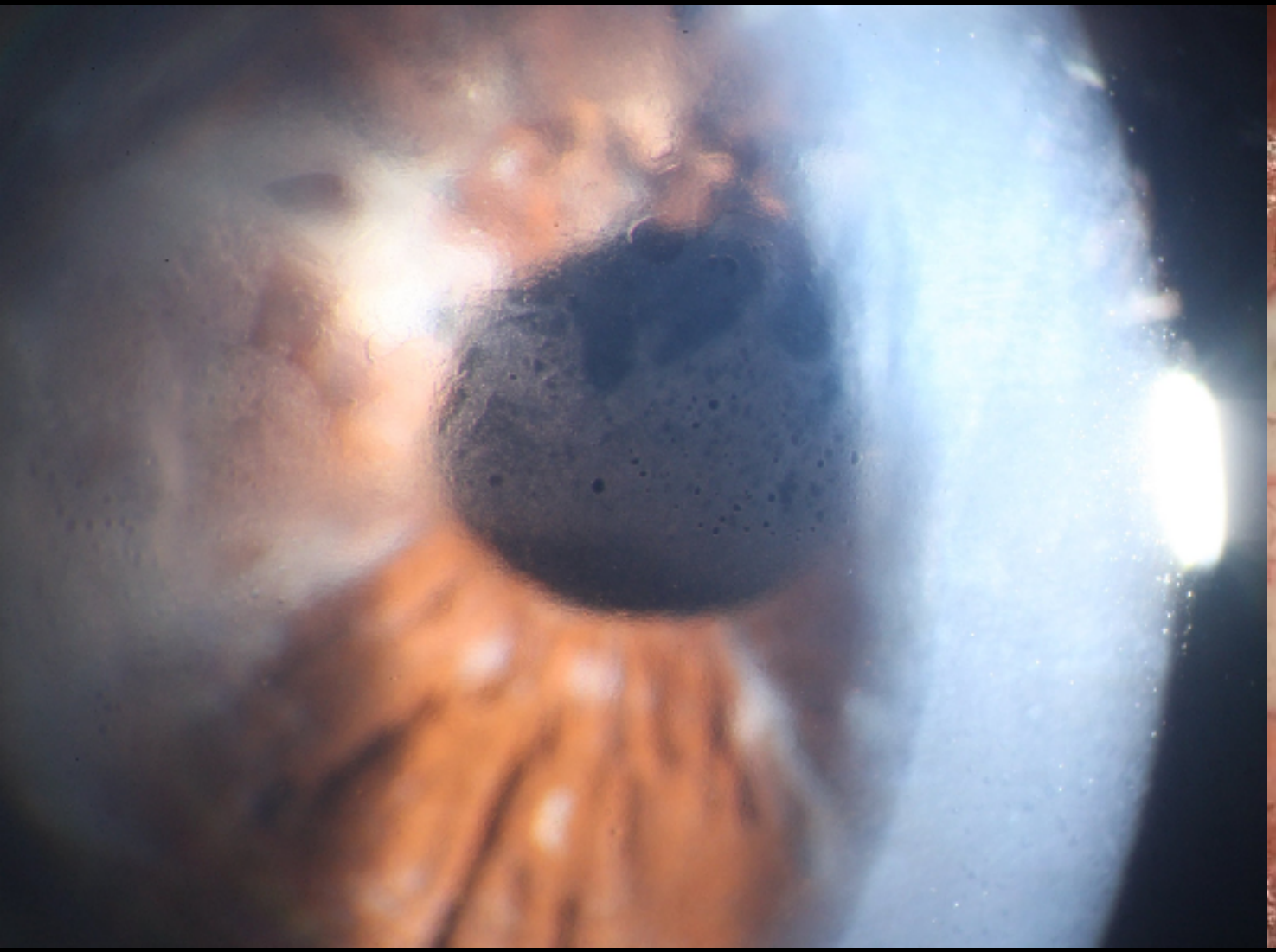
3 month

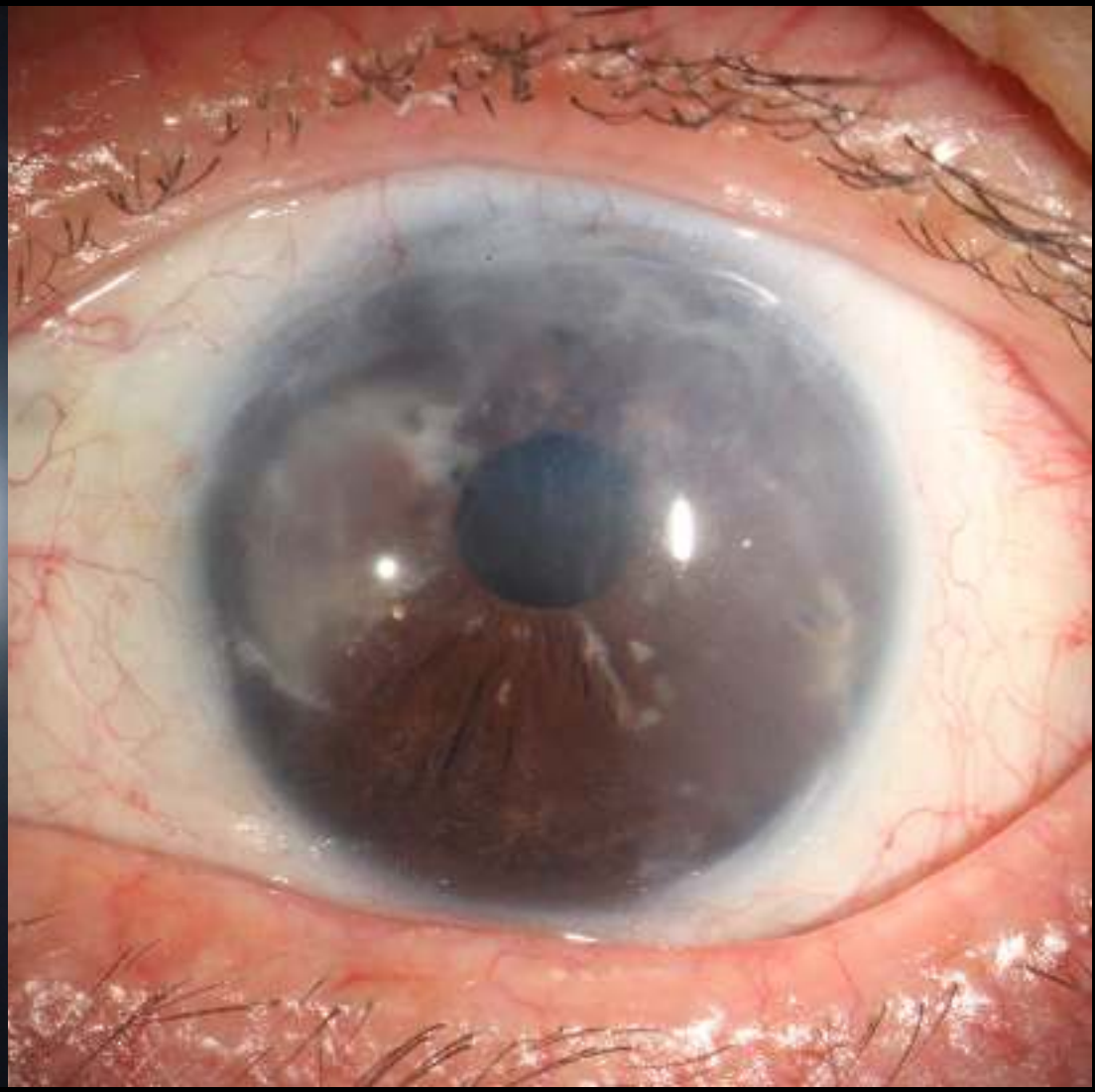


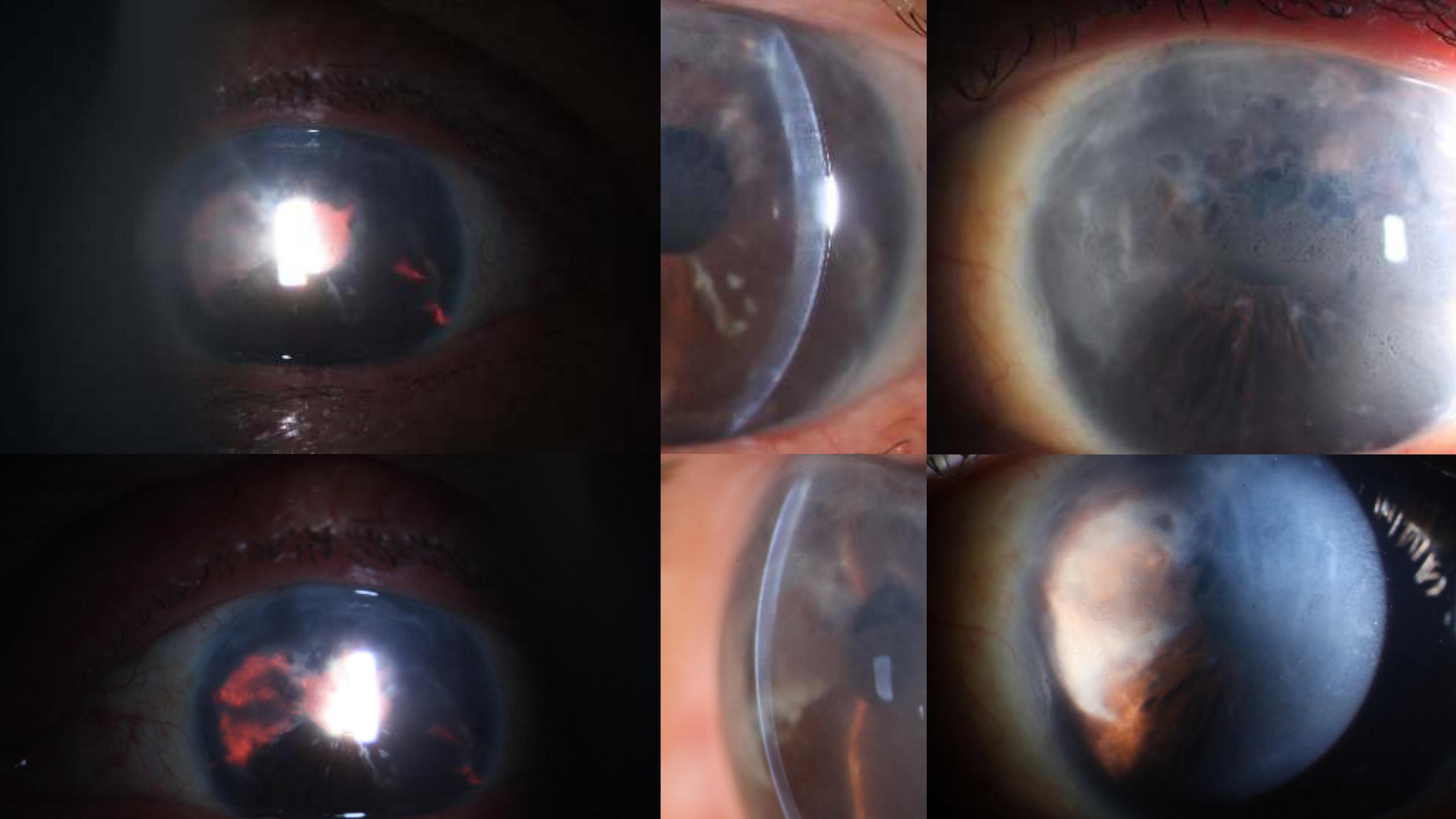
#4 Ripasudil stopped BCVA 0,75

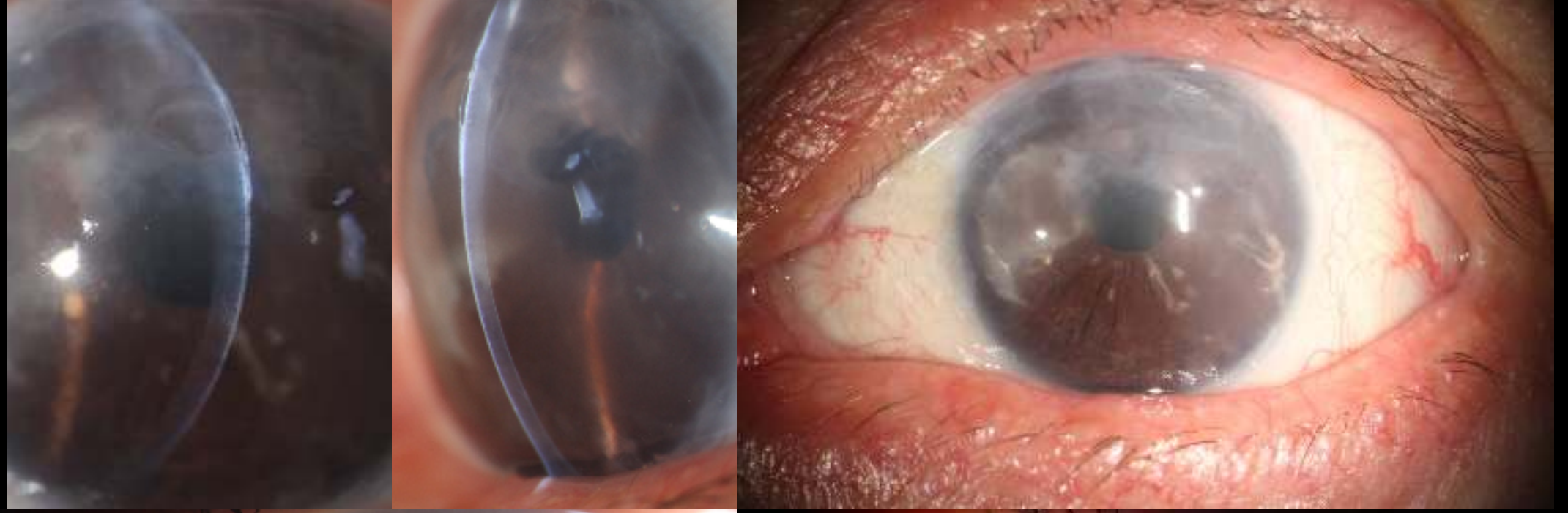

#5 Trauma on a 56 y/o BCVA 0,2

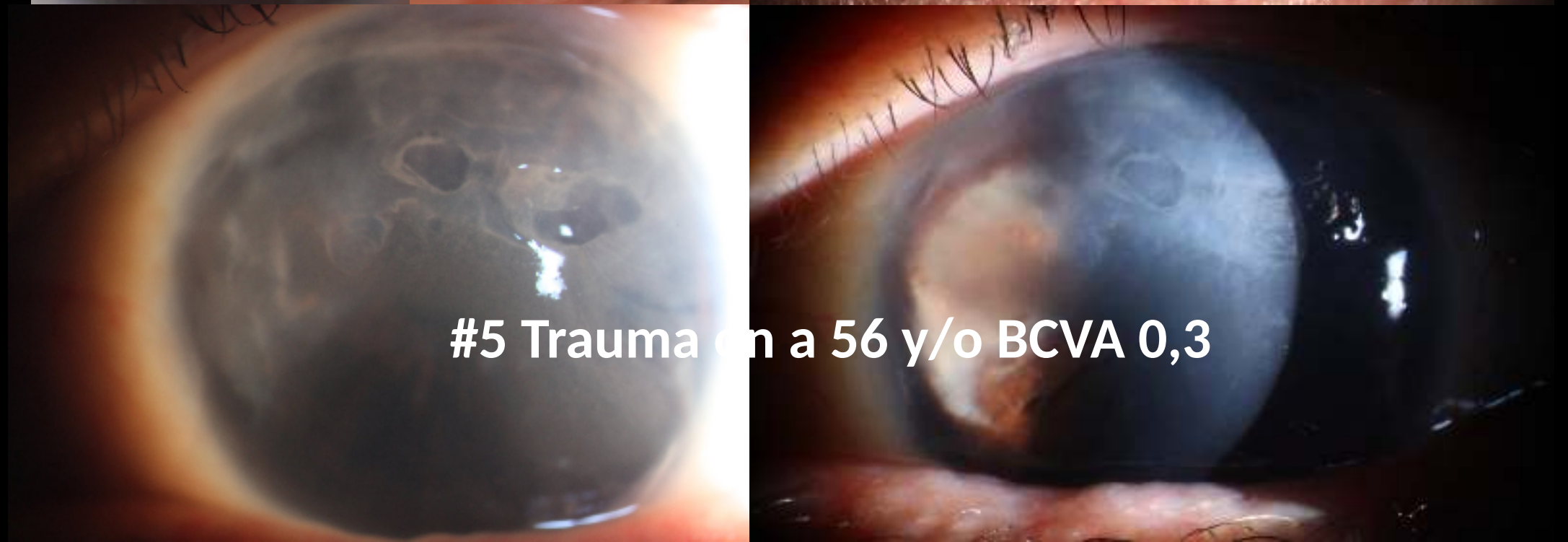

OS
Auto
Auto F Center
7/18/2024 3:54 PM
0 CD 1/mm 2
0 CV
0 HEX %
691 PACHY µm
0 NUM (cells)
0 AVE µm 2
0 MAX µm 2
0 MIN µm 2
0 SD
OS
Auto
Auto F Center
7/18/2024 3:54
1185 CD 1/mm 2
16 CV
33 HEX %
- PACHY µm
3 NUM (cells)
844 AVE µm 2
969 MAX µm 2
700 MIN µm 2
135 SD
OS
Auto
Auto F Center
7/18/2024 3:54
683 CD 1/mm 2
44 CV
63 HEX %
- PACHY µm
27 NUM (cells)
1464 AVE µm 2
3789 MAX µm 2
686 MIN µm 2
641 SD











#5 Trauma c n a 56 y/o BCVA 0,3

Conclusions DSO

Ideal indications:

1. Fuchs endothelial dystrophy with **central guttae**, clear peripheral cornea, and peripheral ECD ≥ **1000–1200 cells/mm²**.
2. Good visual potential and absence of stromal edema.

Descemetorhexis diameter:

3. A size of **5–6 mm** is optimal. Larger diameters (>6 mm) increase the risk of delayed or incomplete healing.

Surgical centration:

4. Should align with the visual axis and fully encompass the area of confluent guttae

Absolute contraindications:

5. Advanced stromal edema, ECD <1000 cells/mm², glaucoma, prior keratoplasty, or diffuse guttae.

Durability:

6. Clinical studies up to 24 months show **stable outcomes** with no progressive decompensation in well-selected patients.

Be very gentle..

Conclusions DSO+Ripasudil

Proven benefit:
•Reduces mean corneal clearance time from **12–16 weeks to 6–8 weeks**.
Adverse effects:
•Mostly mild hyperemia and transient discomfort. No significant intraocular toxicity reported.
When to suspend treatment:
•If no clinical improvement in corneal clarity or visual acuity after **3 months**.
•Persistent corneal thickness >650 µm or BCVA <20/40 at 12 weeks suggests failure.
.

INTERNATIONAL CONGRESS OF THE
EGYPTIAN
OPHTHALMOLOGICAL SOCIETY

EOS 1902

In collaboration with: MEACO

Thank you

Descemetorhexis and ROCK inhibitors

Dr. José Lamarca
jlamarca@uic.es
jlamarca@barraquer.com

BARRAQUER