Il trattamento e la prevenzione delle recidive delle opacità corneali

San Marino Hospital
UOC Ophthalmology

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XXVII Congresso Nazionale AICCER

Associazione Italiana di Chirurgia della Cataratta e Refrattiva

AICCER

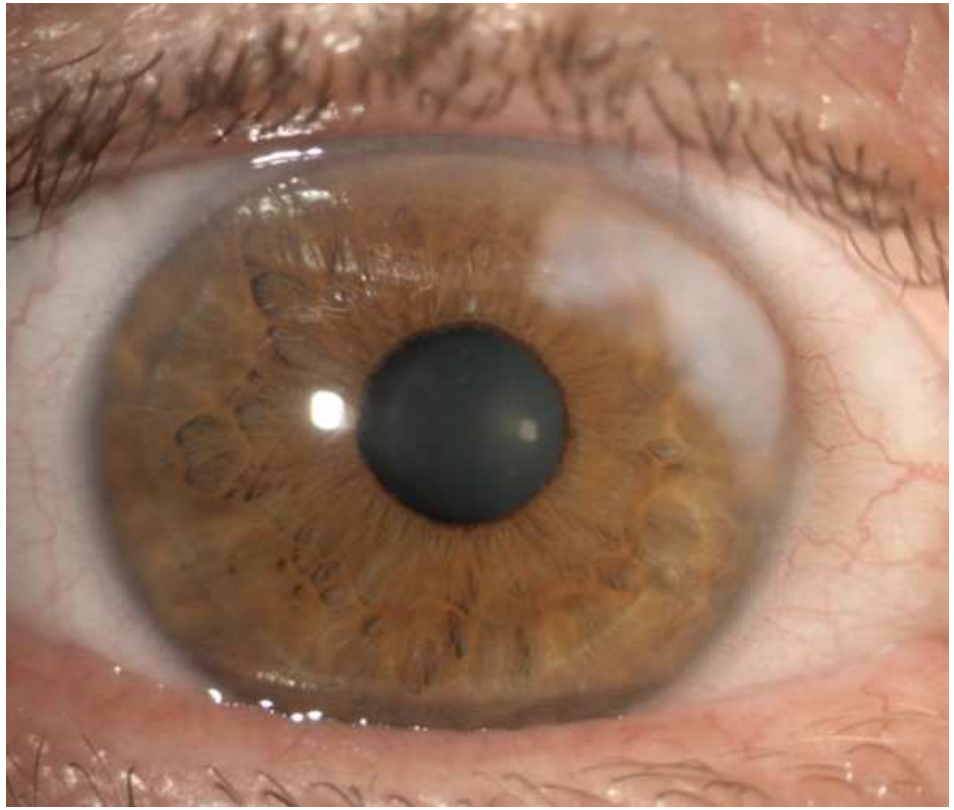
Palacongressi di Rimini

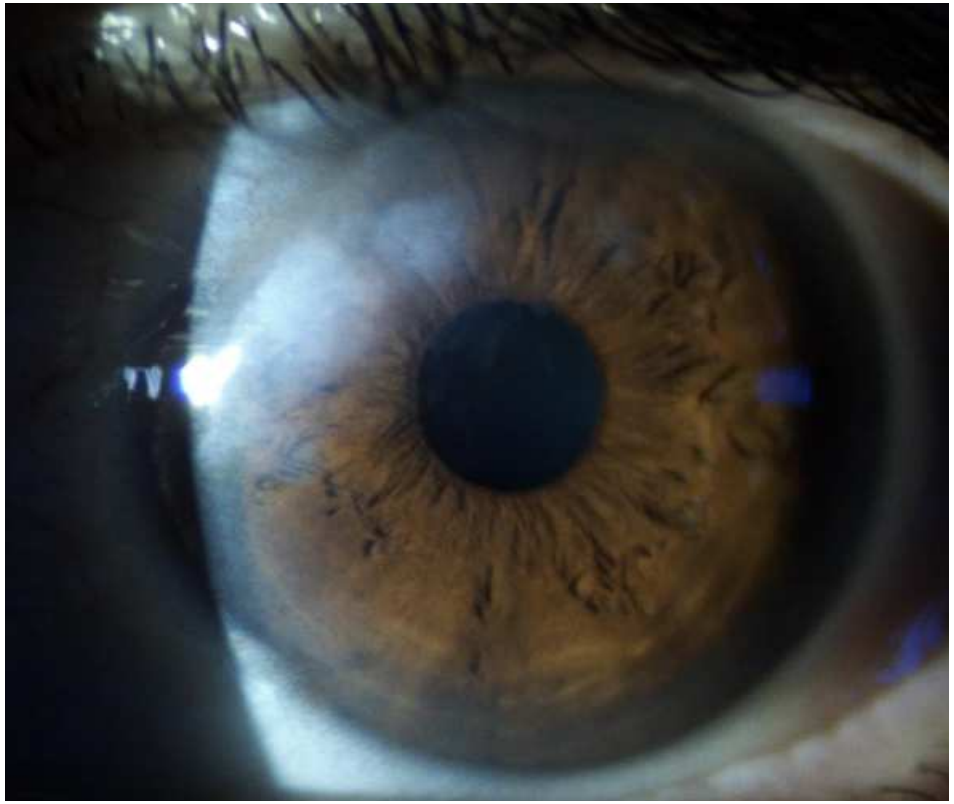
CON LE CHIRURGIE IN DIRETTA DA SAN MARINO

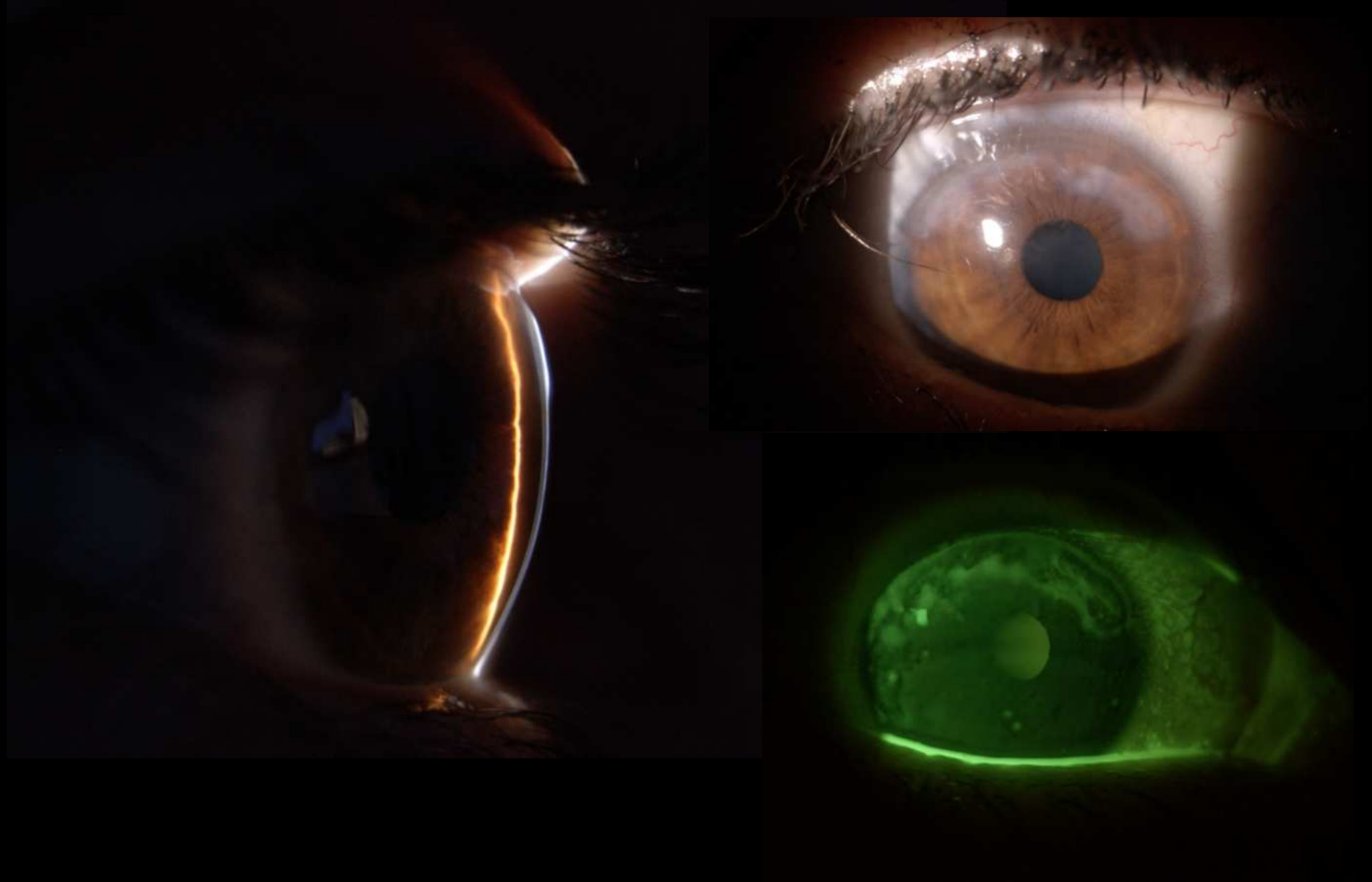
12-14 MARZO 2026

PERIPHERAL CORNEAL LESIONS

Topical lubrication
FANS drops
Low dose local steroids







Causes of ophthalmic examination

1.Ingravescent symptoms of surface disconfort :

tearing
hitching
burning
foreign body sensation

2.UCVA BCVA worsening

3.Ingravescent signs :

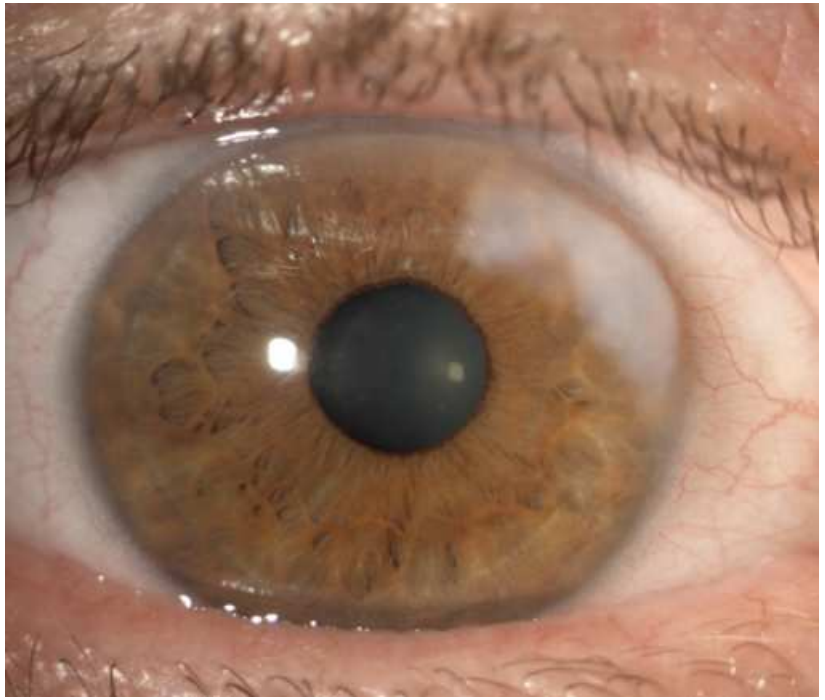
redness
conjunctival hyperemia
progression of white peripheral corneal lesions

Diagnostic criteria

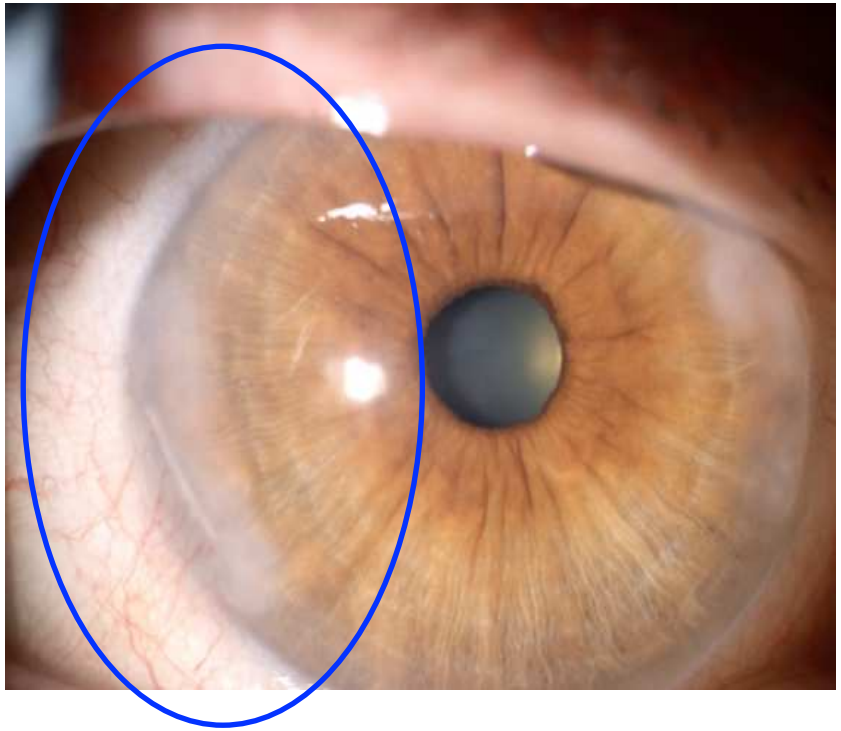
PHSCD

(PERIPHERAL HYPERTROPHIC SUBEPITHELIAL CORNEAL DEGENERATION)

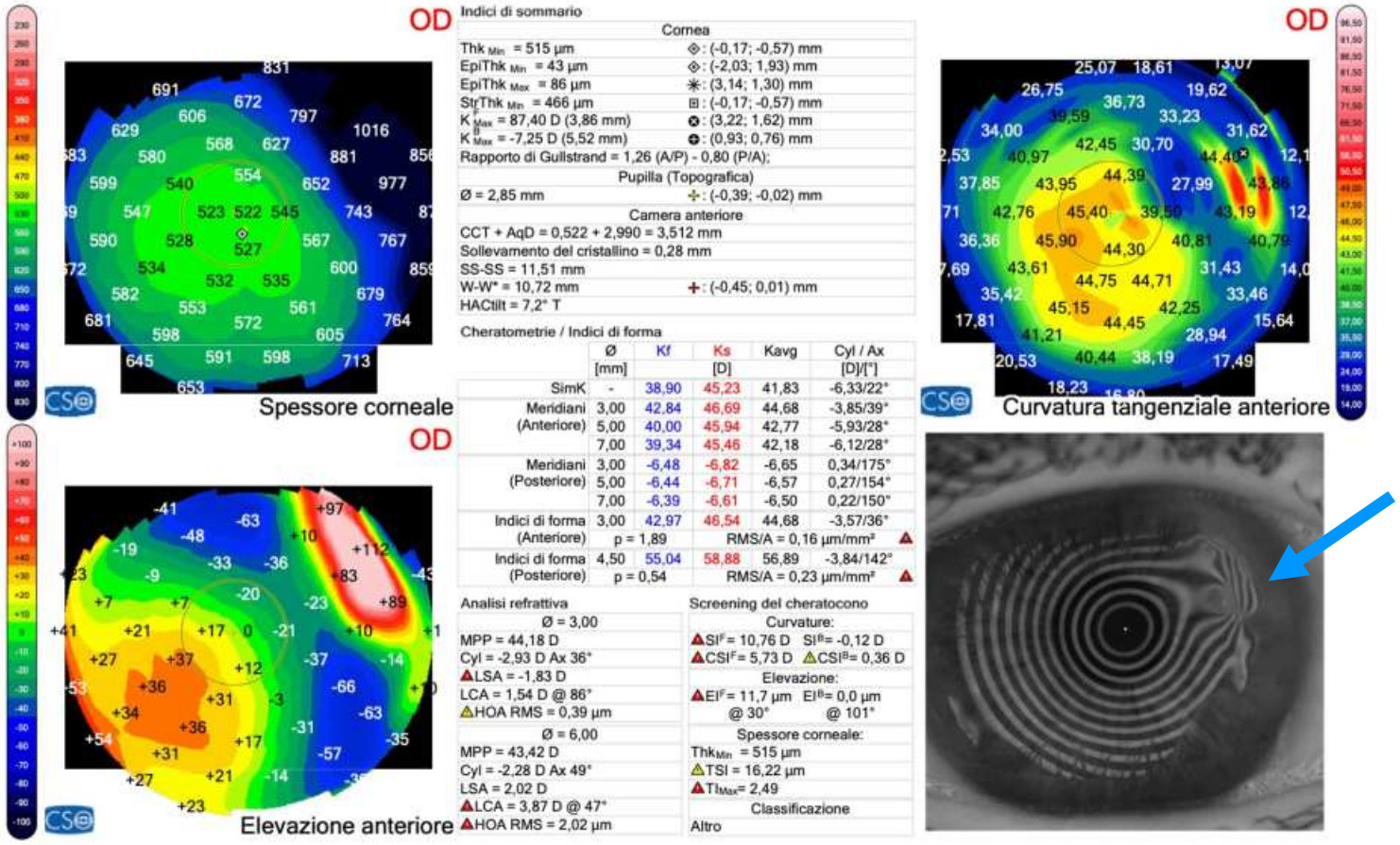
- Peripheral circumferential-elevated whitish subepithelial opacity



- Focal superficial vessels along the limbus



Diagnostic criteria



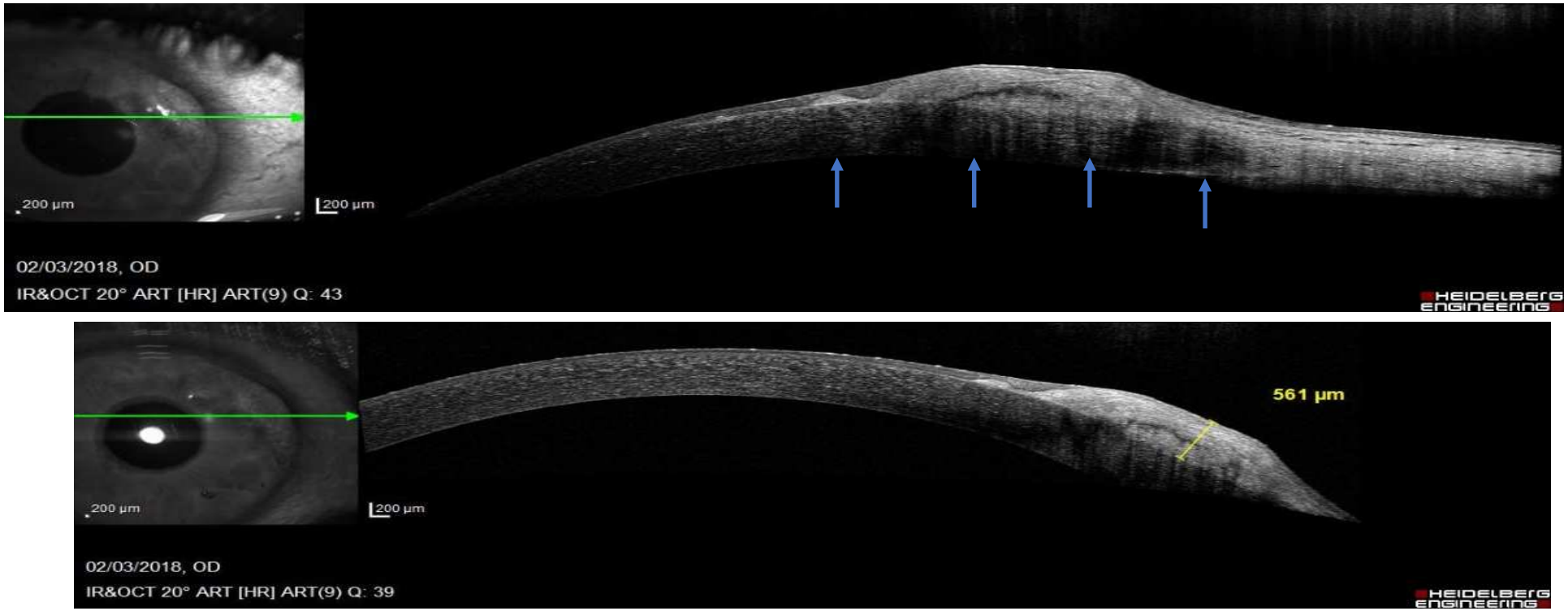
Corneal Tomography :

- Peripheral AS elevation
- **Irregular Astigmatism** (hyperopic)
- Peripheral thicker area
- Keratoscopic rings distorsion

Järventausta PJ et al. Peripheral hypertrophic subepithelial corneal degeneration - clinical and histopathological features.Acta Ophthalmol. 2014

Schargus M et al. Peripheral hypertrophic subepithelial corneal degeneration presenting with bilateral nasal and temporal corneal changes. Eye (Lond). 2015

Diagnostic criteria

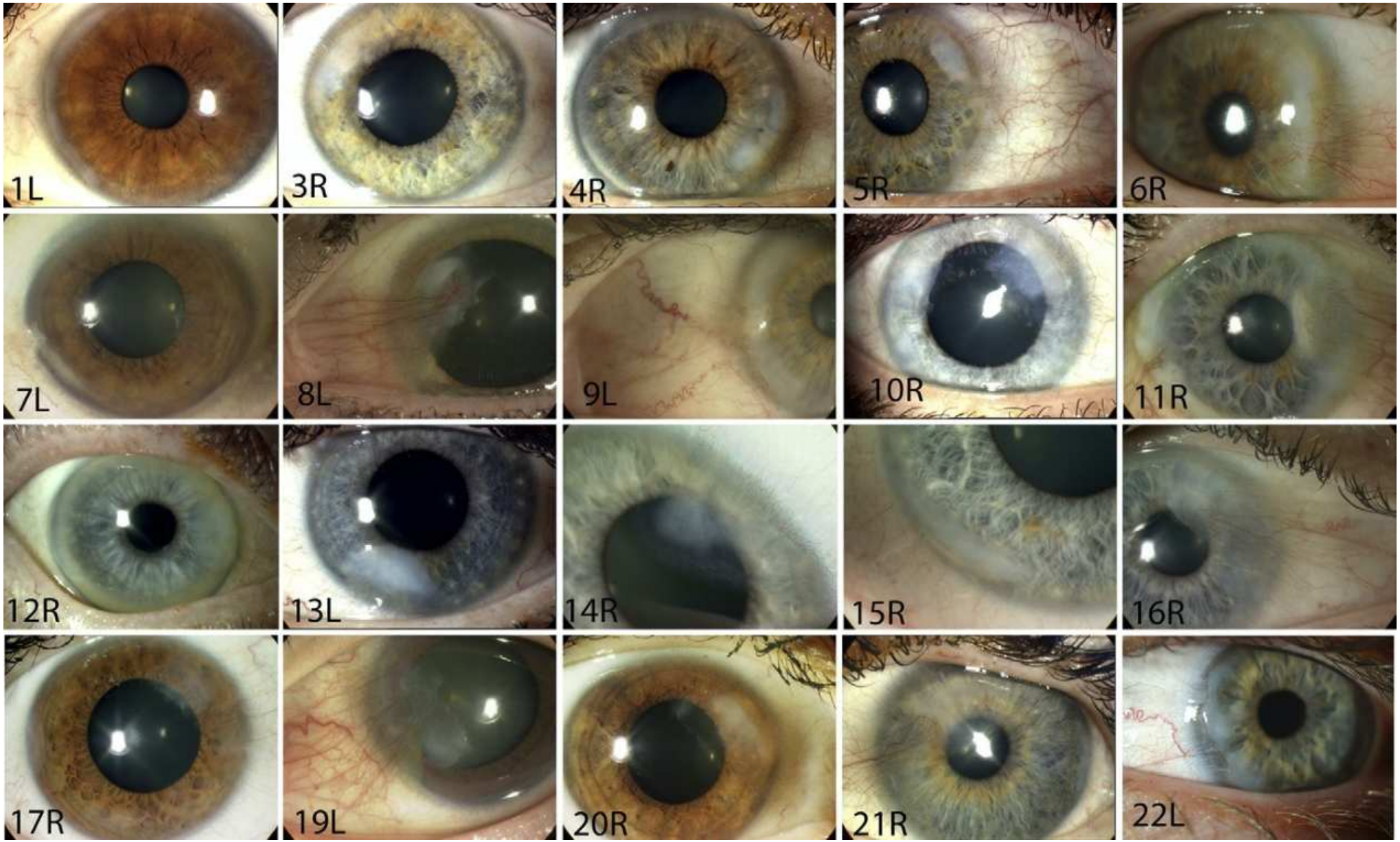


Anterior segment-OCT :

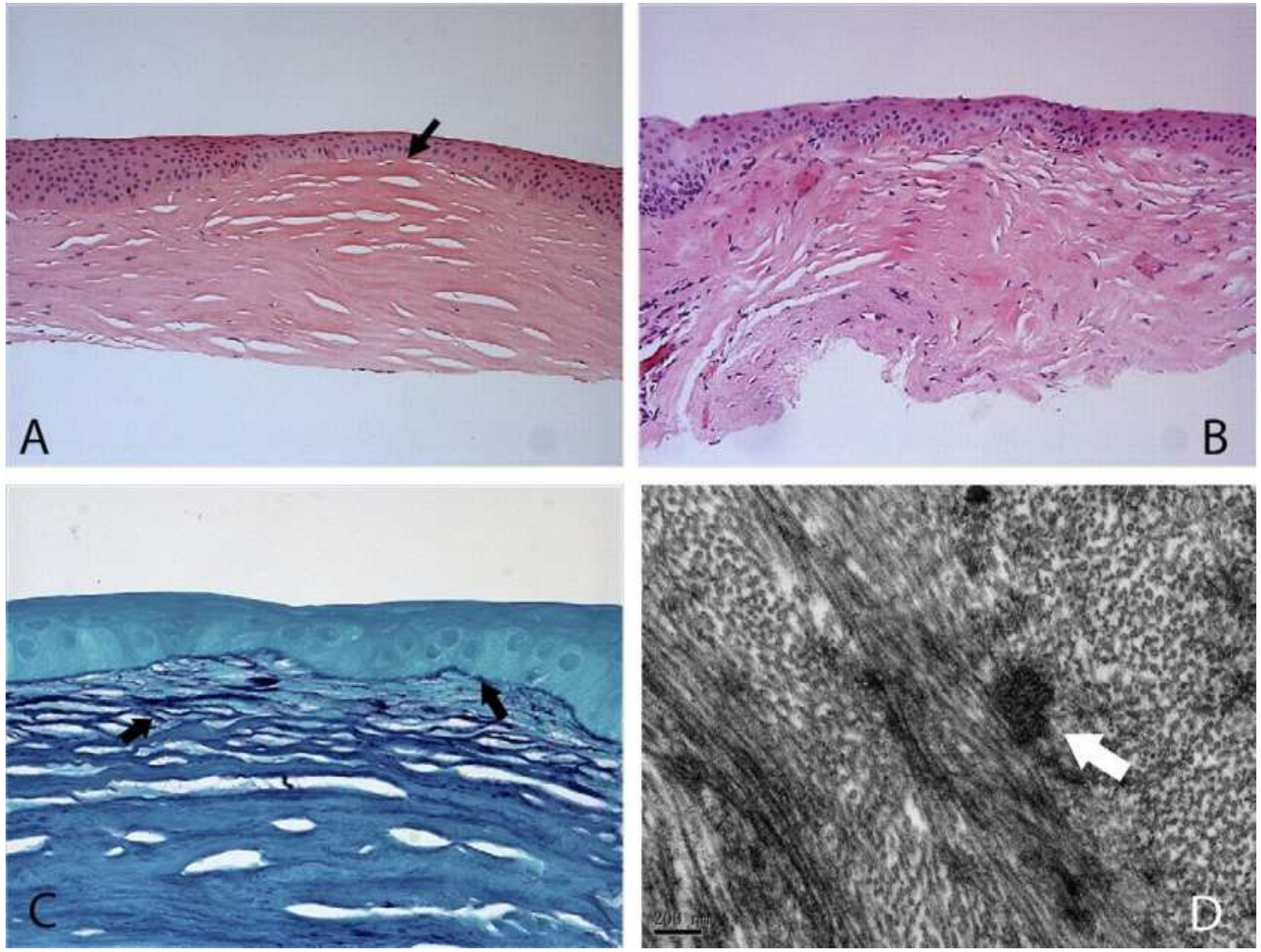
- lesion in detail
- thickness measurement (561µm)
- identification of a cleavage plane

the Bowman layer : intact or interrupted

Gore DM, Iovieno A, Connell BJ, Alexander R, Meligonis G, Dart JK.
Peripheral hypertrophic subepithelial corneal degeneration: nomenclature, phenotypes, and long-term outcomes.
Ophthalmology 2013;120(5):892–8.



MICROSCOPIC EXAMINATION



The corneal epithelium was typically variable in caliber and focally attenuated overlying extensive areas of subepithelial fibrosis. In some areas, the subepithelial fibrosis formed nodules comprised dense col- lagenous connective tissue that resembled corneal stroma but was notably paucicellular, hyalinized in appearance, and arranged in irregular lamellae. Focal fibroblastic activity and mild chronic inflammation bordered the nodular deposits in a few cases.
Bowman membrane was either absent (Fig. 4), indistinct, or focally disrupted (Fig. 5). When present, Bowman membrane was typically located deep to the subepithelial!brosis.

Therapeutic strategies

Medical treatments

Topical lubrication
FANS drops
Low dose local steroids

Surgical treatments

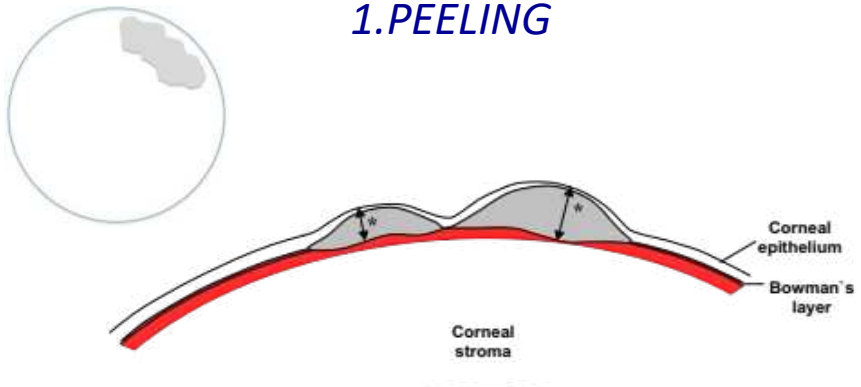
3 steps treatment:

- *Mechanical disepithelization*
- **Peeling of fibrotic tissue**
- **Sectorial PTK with mask fluid**
- **Final 8.50- 9 mm PTK**

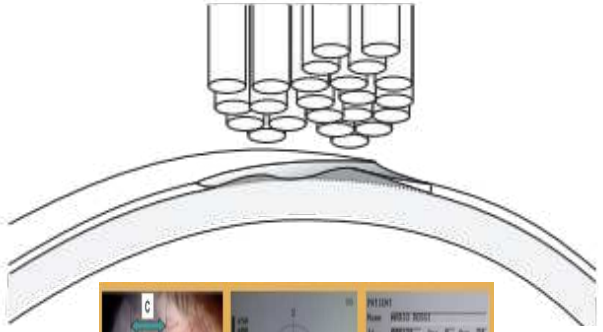
Lavoie P. Neutralization of transforming growth factor- beta attenuates hypertension and prevents renal injury in uremic rats. *J Hypertens* 2005
Cohn RD. Angiotensin II type 1 receptor blockade attenuates TGF-beta-induced failure of muscle regeneration in multiple myopathic states. *Nat Med* 2007
Park JK. Losartan improves adipose tissue-derived stem cell niche by inhibiting transforming growth factor-b and fibrosis in skeletal muscle injury. *Cell Transplant* 2012
Lim DS. Angiotensin II blockade reverses myocardial fibrosis in a transgenic mouse model of human hypertrophic cardiomyopathy. *Circulation* 2021

Therapeutic strategies

1.PEELING



2.SECTORIAL PTK



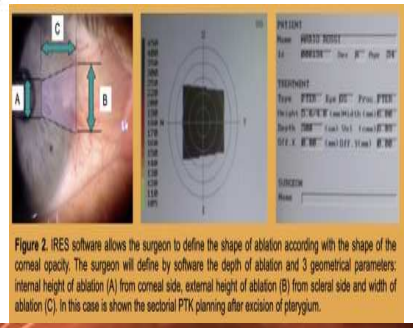
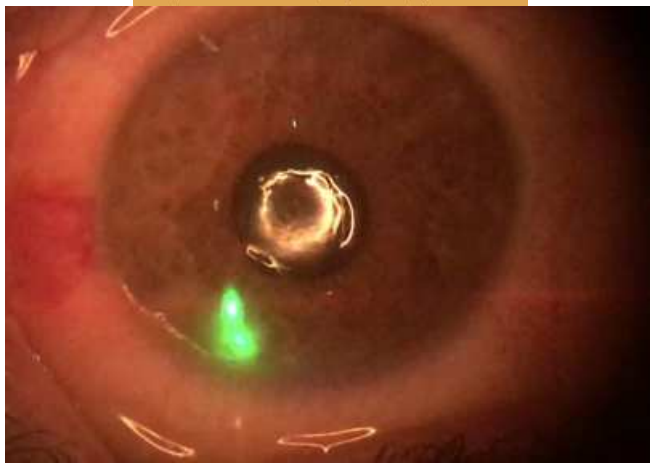
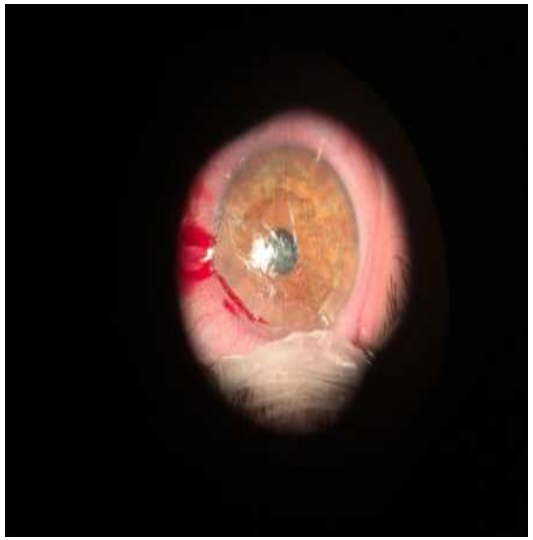
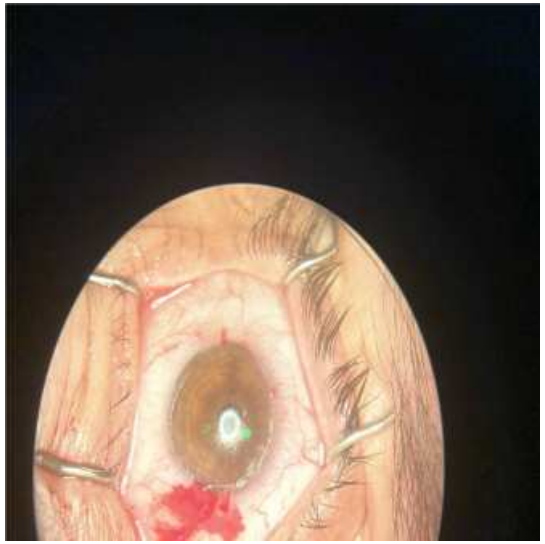


Figure 2. IRES software allows the surgeon to define the shape of ablation according with the shape of the corneal opacity. The surgeon will define by software the depth of ablation and 3 geometrical parameters: internal height of ablation (A) from corneal side, external height of ablation (B) from scleral side and width of ablation (C). In this case is shown the sectorial PTK planning after excision of pterygium.



3. PTK 9 MM





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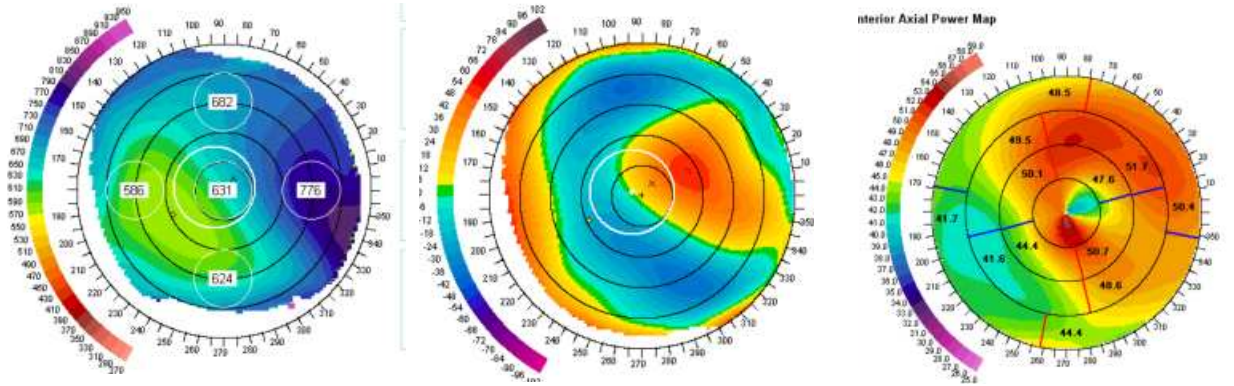
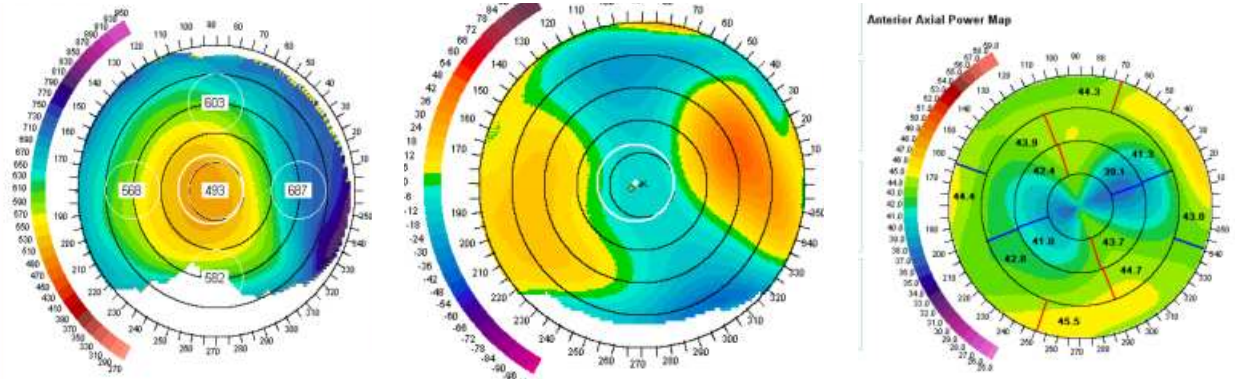
PHSCD (PERIPHERAL HYPERTROPHIC SUBEPITHELIAL CORNEAL DEGENERATION)



PREOP

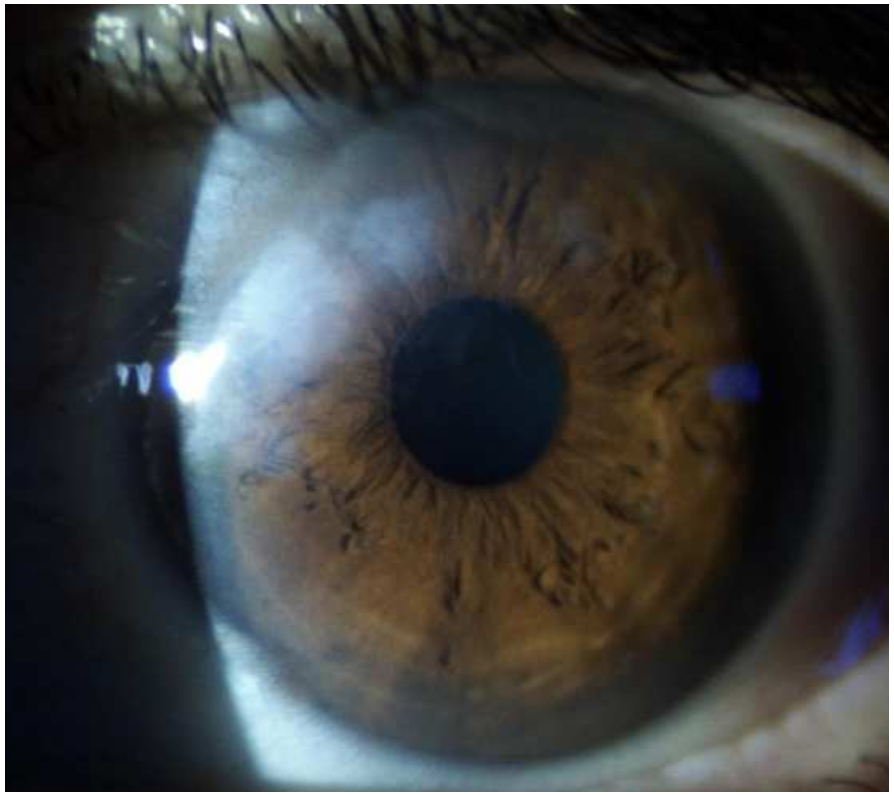


POSTOP

SL: clear cornea
RE BCVA: 9-10/10 +2 +1.50 ax 120
LE BCVA: 8/10 +0.50 +1.25 ax 40

CLINICAL CASE

PRE



POST 4 MONTHS

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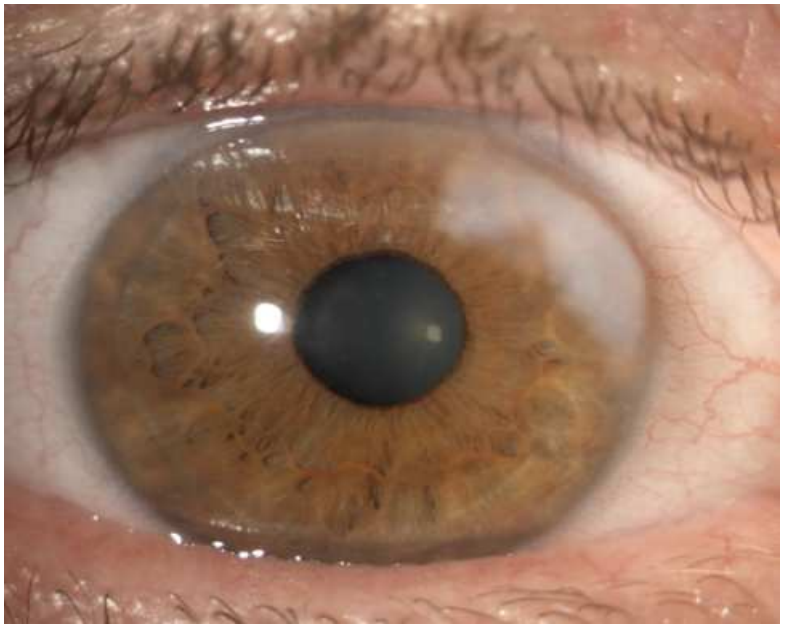
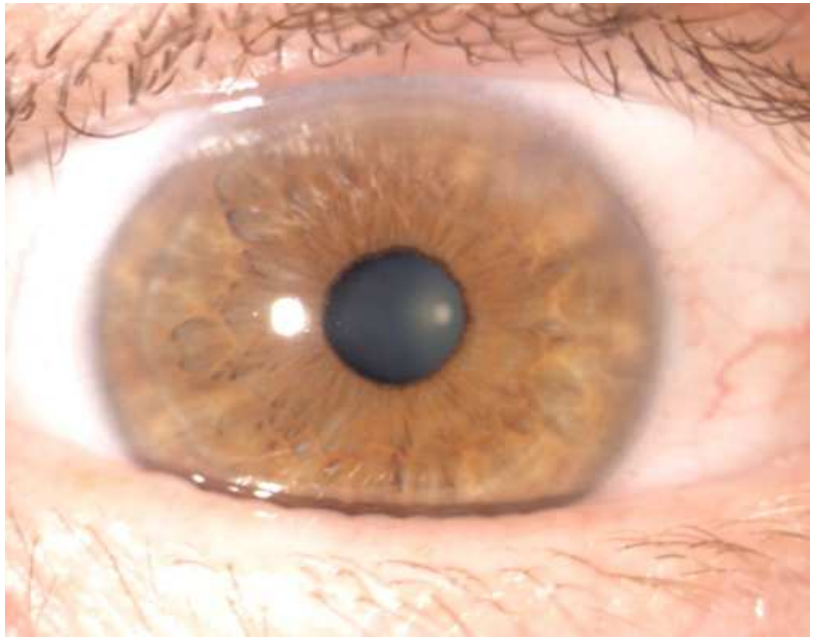
Peripheral corneal opacity : peeling and PTK

CLINICAL CASE

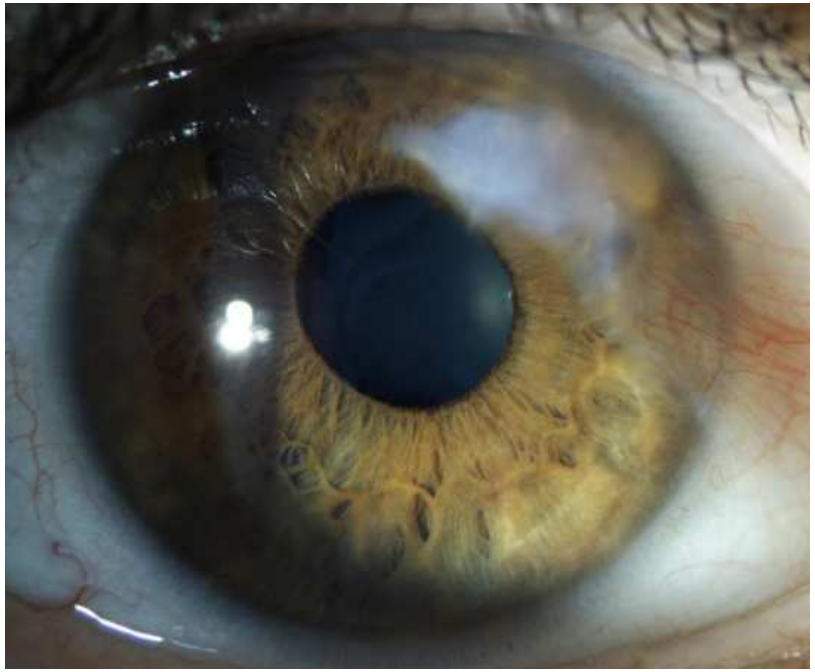
PRE



POST 30 months



POST 7 years



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Peripheral corneal opacity : peeling and PTK

Main postop challenges

3 R

Reepithelization delay: general and local therapy

Refractive results: unpredictable - further refractive treatment

Recurrence : innovative postop. treatment

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Lavoie P. Neutralization of transforming growth factor- beta attenuates hypertension and prevents renal injury in uremic rats. *J Hypertens* 2005
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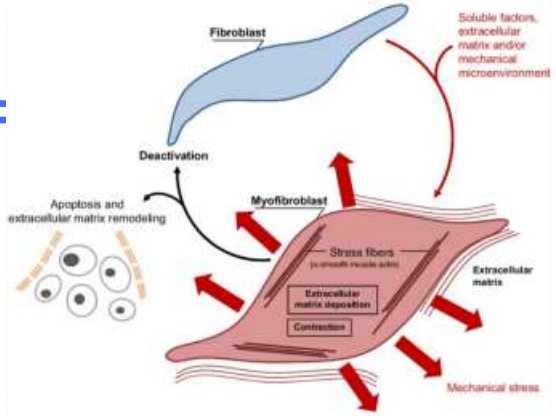
Literature recurrency : different criteria adopted

Study	Sample Size	Recurrence Rate	Mean Follow up	Surgical Intervention
Maust & Raber	3	0%	11 months	SK + MMC
Schargus et al.	3	33%	48 months	SK
Gore et al.	12	25%	23 months	SK
Auteri et al.	5	100%	55 months	SK
	6	100%	72 months	SK + PTK
	1	100%	84 months	SK + AMT
	1	0%	48 months	SK + PTK + MMC
	6	67%	68 months	SK + AMT + MMC
Our experience	25	4% (1 case)	8-36 months	SK + PTK +MMC **Losartan**

LOSARTAN

- It is an **ANGIOTENSIN II RECEPTOR BLOCKER**

- It is a known **INHIBITOR OF TRANSFORMING GROWTH FACTOR (TGF SIGNALING**
  that has been shown to have efficacy
  in the **prevention and treatment of myofibroblast-related fibrosis**



- Evidence has accumulated, supporting the hypothesis that
  TGF-βs (TGF-β1 and TGF-β2 and possibly TGF-β3)
  are the **most significant regulators of fibrosis in the cornea** and other tissues
  through their effects on **myofibroblast development and apoptosis**

- **After a fibrotic corneal injury**, in the absence of normal EBM and/or Descemet's basement membrane function, **TGF-β enters the stroma** in sufficient amounts
  from the **tears, epithelium, endothelium and/or aqueous humor**

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Lim SO. Angiotensin II type 1 receptor blockade attenuates TGF-beta-induced failure of muscle regeneration in multiple myopathic states. *Nat Med* 2007
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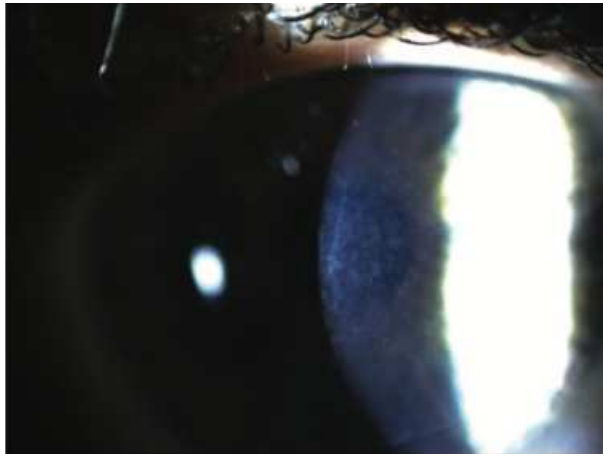
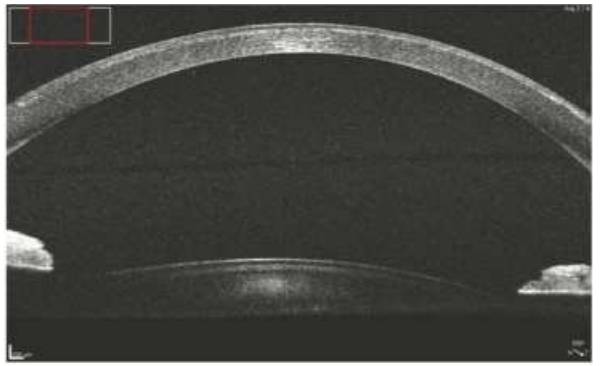
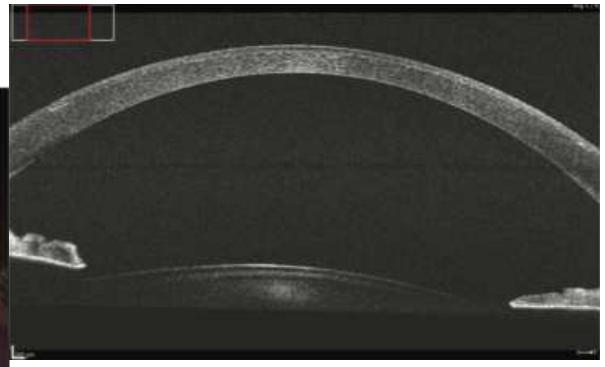
RATIONALE







upporting this hypothesis a 6-month course of topical Losartan as highly effective in decreasing scarring fibrosis that developed ollowing a **complicated LASIK procedure**

FIRST HUMAN CASE OF TREATMENT OF CORNEAL SCARRING FIBROSIS WITH TOPICAL LOSARTAN

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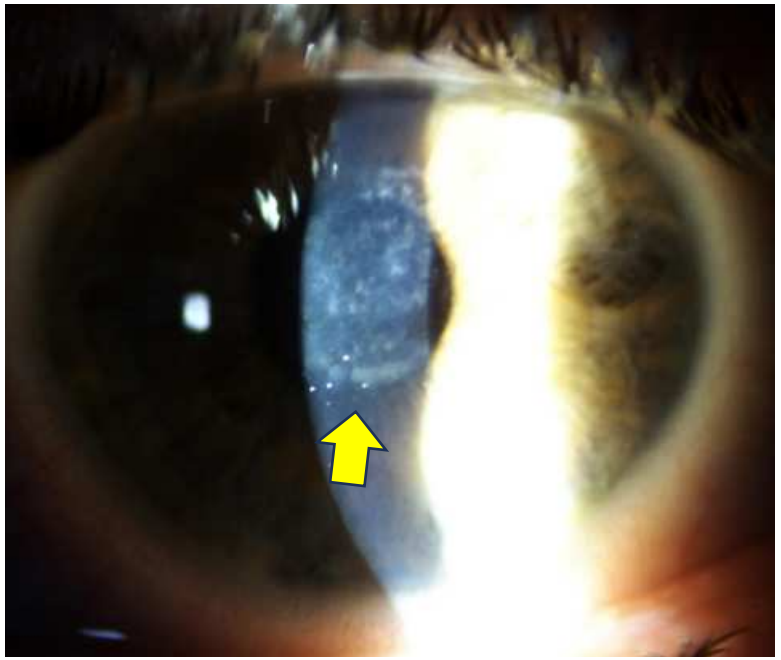
Pereira-Souza AL et al. Topical Losartan for treating corneal fibrosis (haze): first clinical experience. J Refract Surg 2022

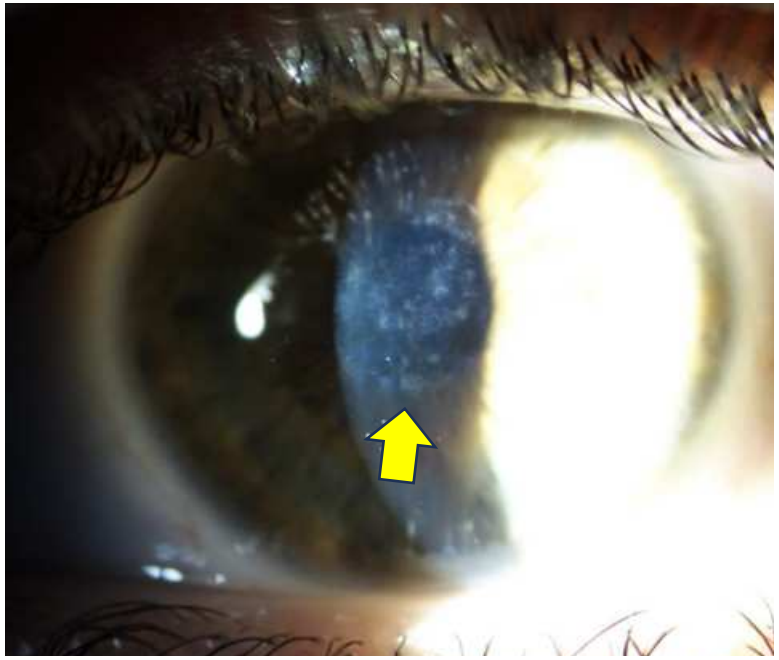
SLIT-LAMP PHOTOGRAPHY

PRE



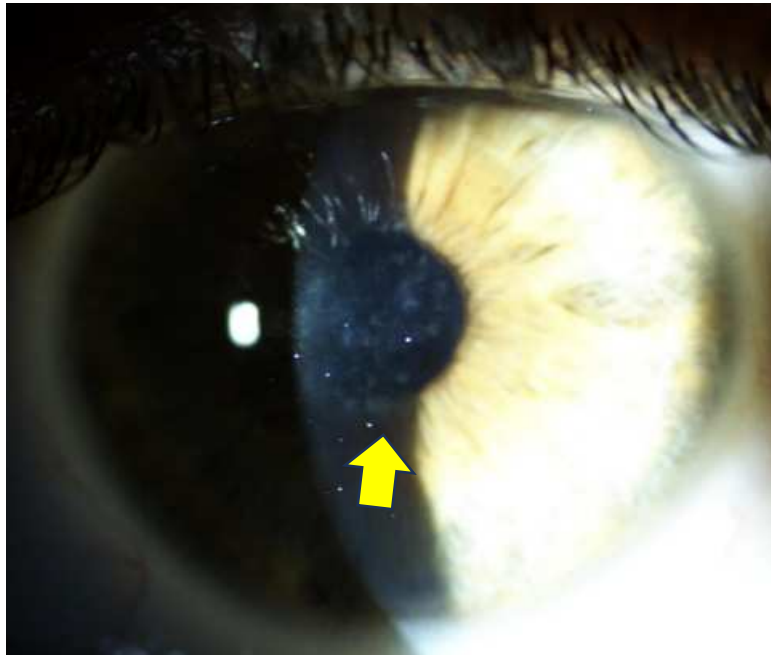
LE UCDVA 20/40
LE CDVA 20/25 -1.25 -0.50x60

POST 1 MONTH



LE UCDVA 20/40
LE CDVA 20/20 -0.50 -1.00x90

POST 3 MONTHS



LE UCDVA 20/32
LE CDVA 20/20 -0.50 -1.00x80

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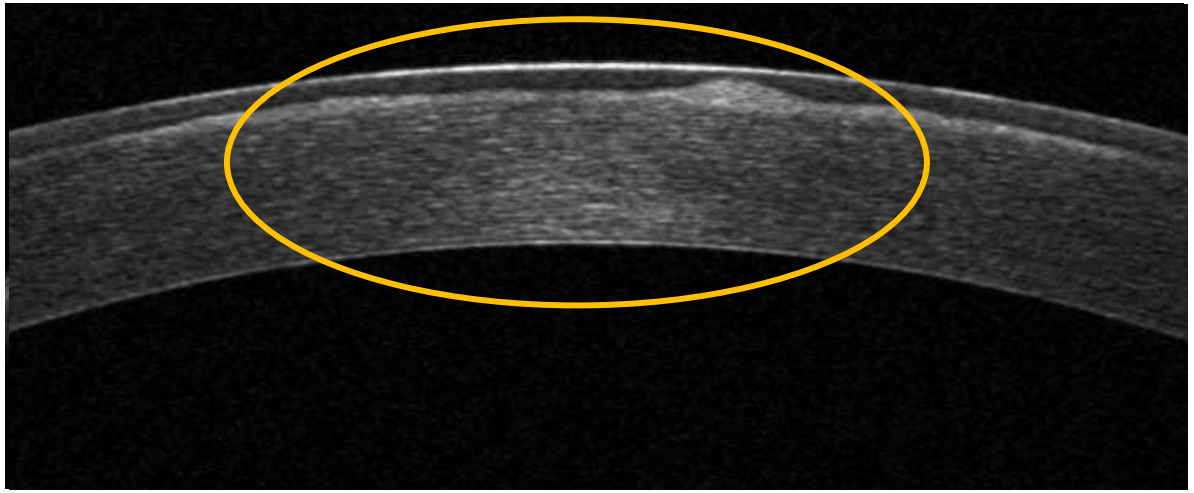
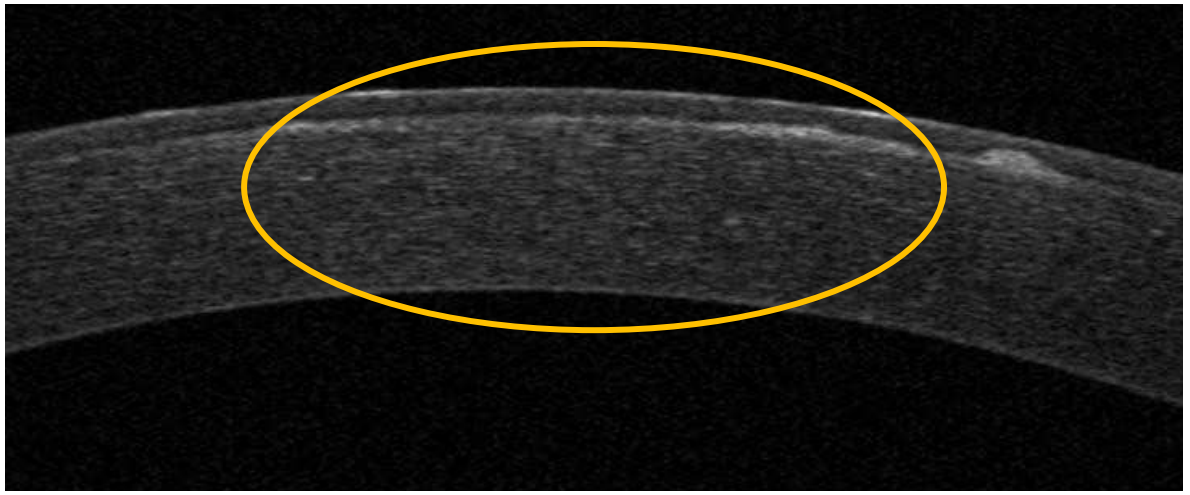
A progressive gaining in transparency after topical Losartan treatment

AS - OCT

PRE



POST 3 MONTHS



Subepithelial hyperreflectivity is reduced after topical Losartan treatment

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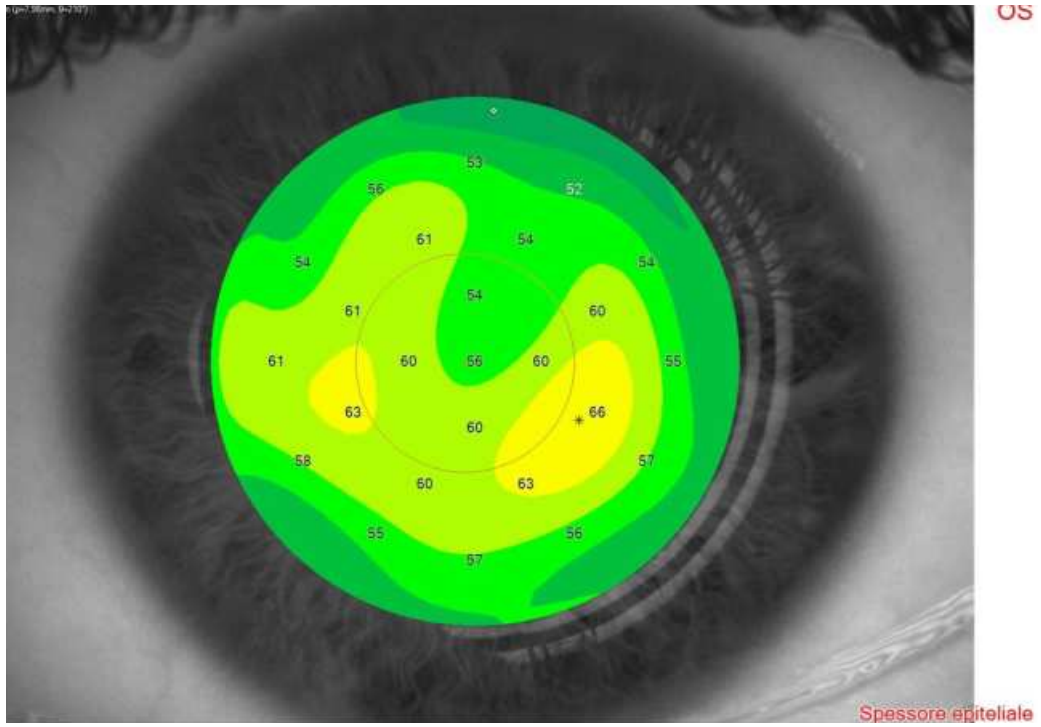
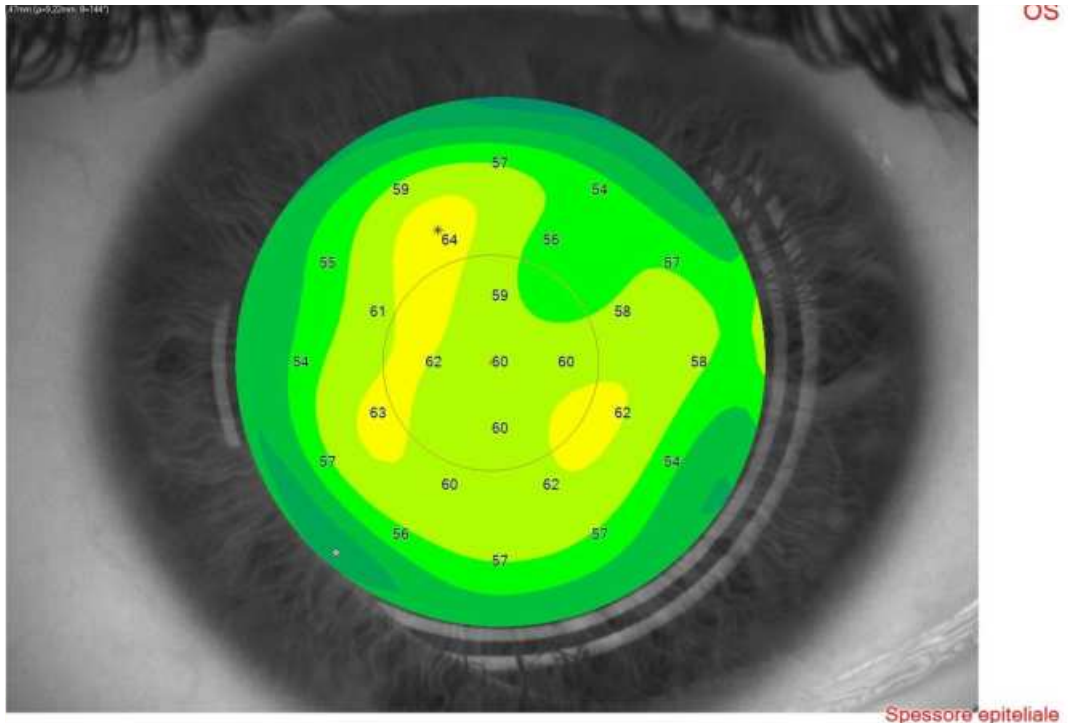
EPITHELIAL MAP

PRE



POST 3 MONTHS



More regular distribution of the corneal epithelium

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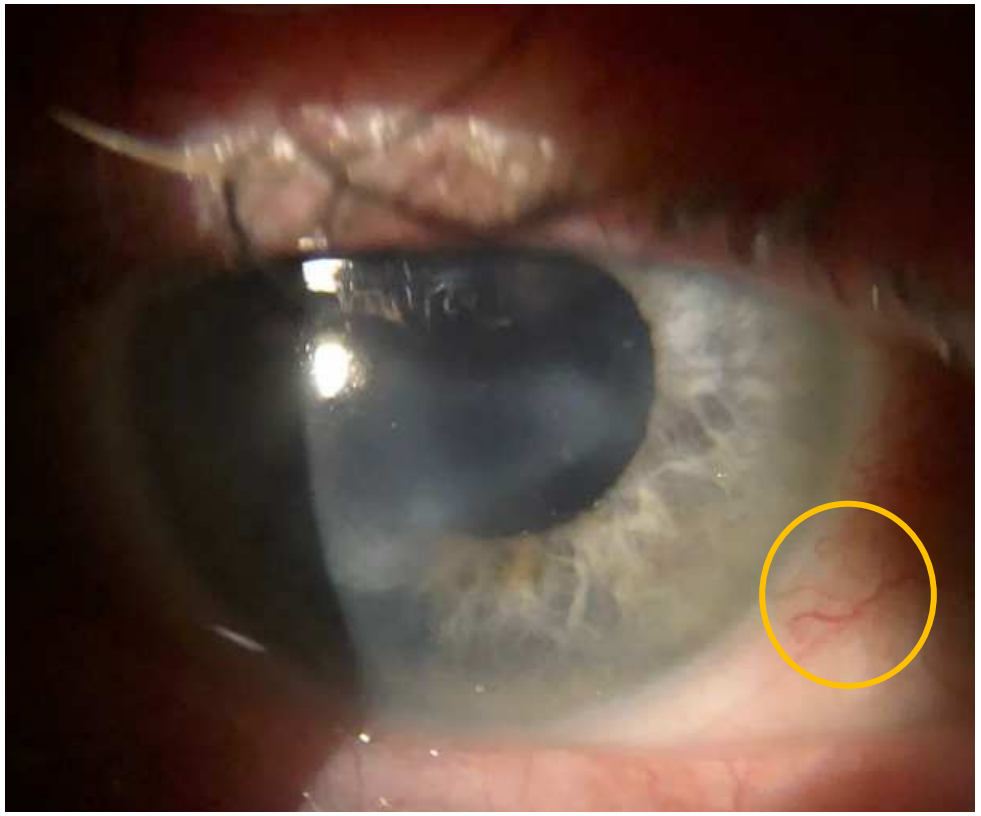
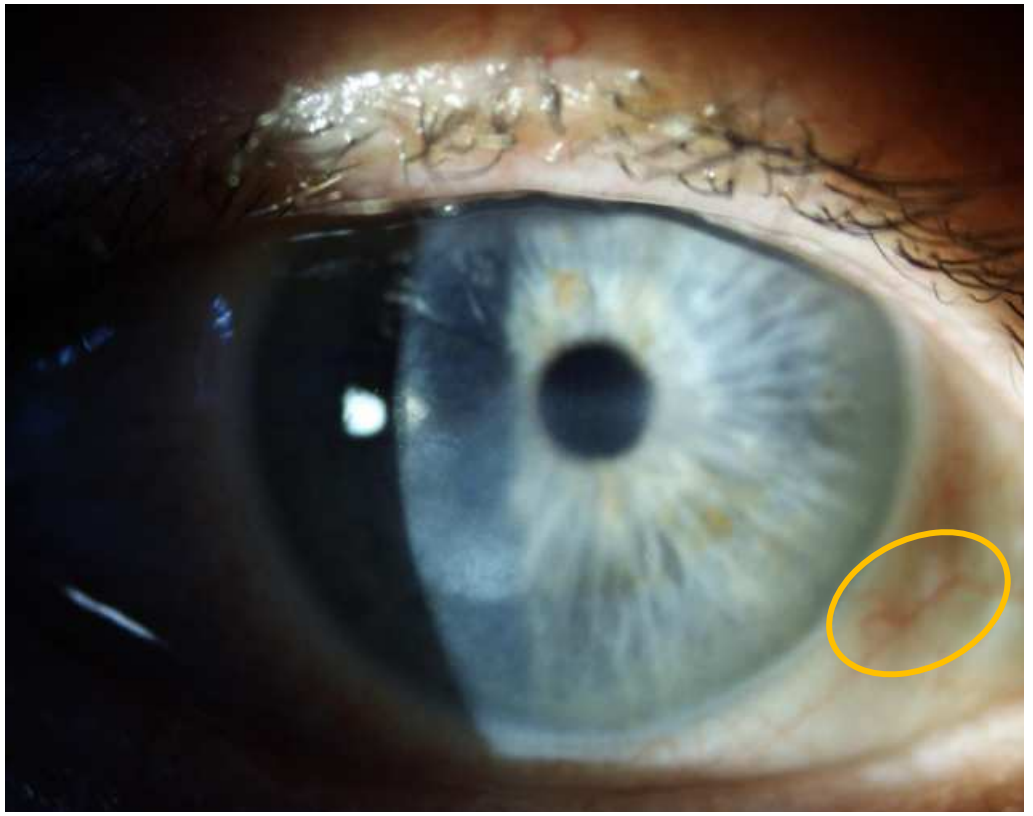
CLINICAL CASE 2

PRE



POST 3 MONTHS



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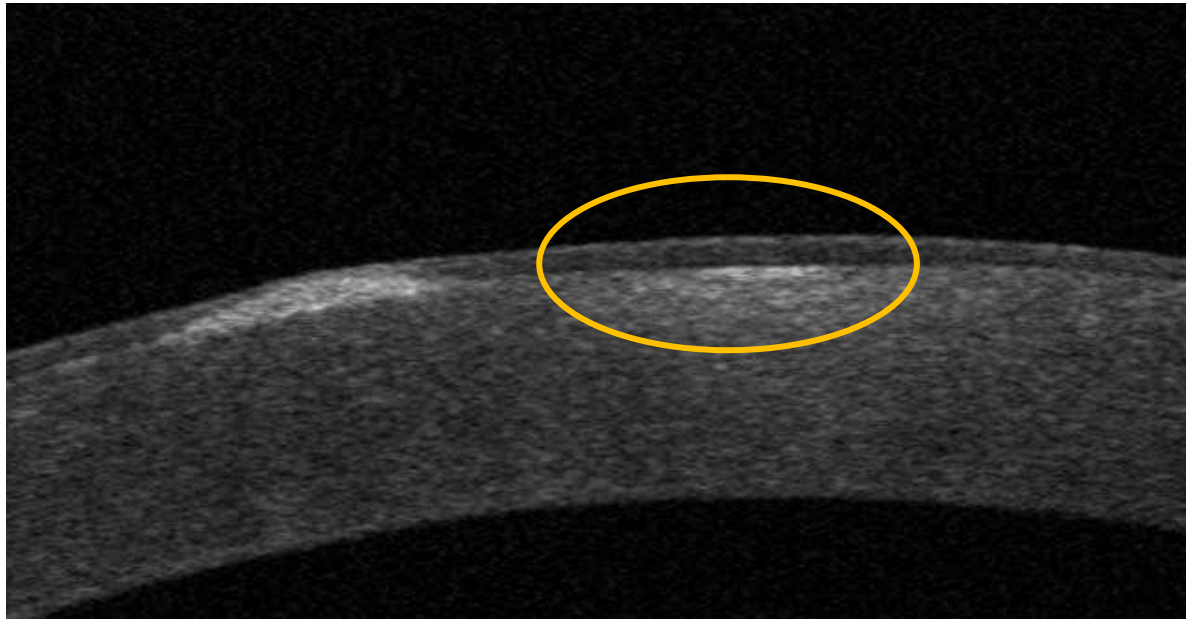
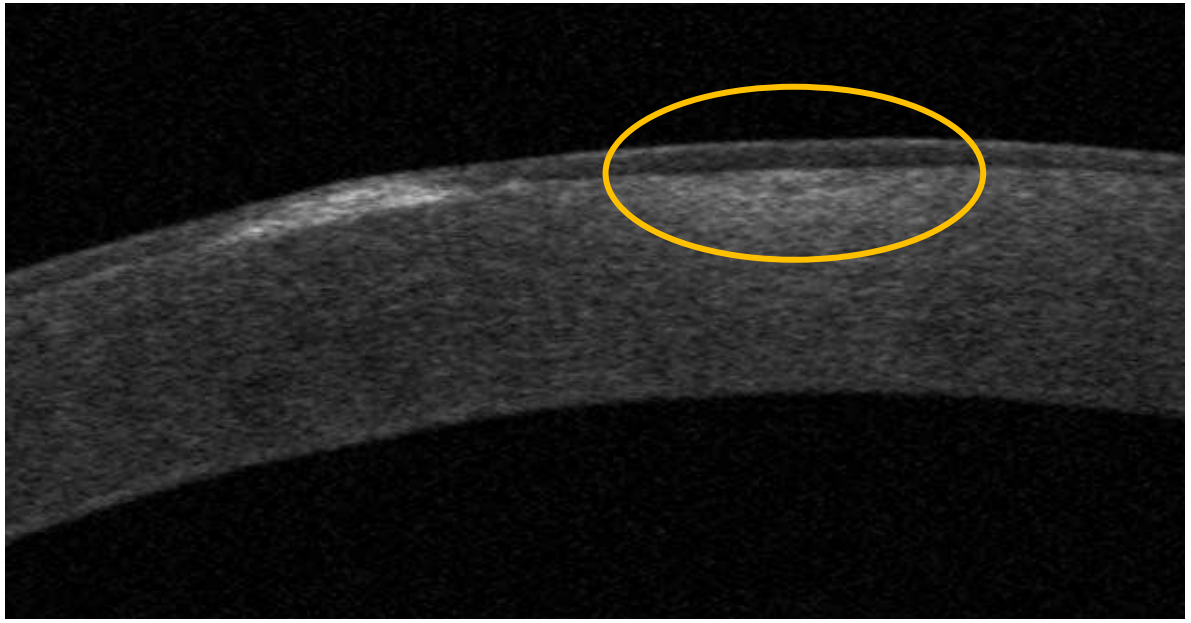
Leucoma as a consequence of recurrent keratitis

AS - OCT





Subepithelial hyperreflectivity is reduced after topical Losartan treatment

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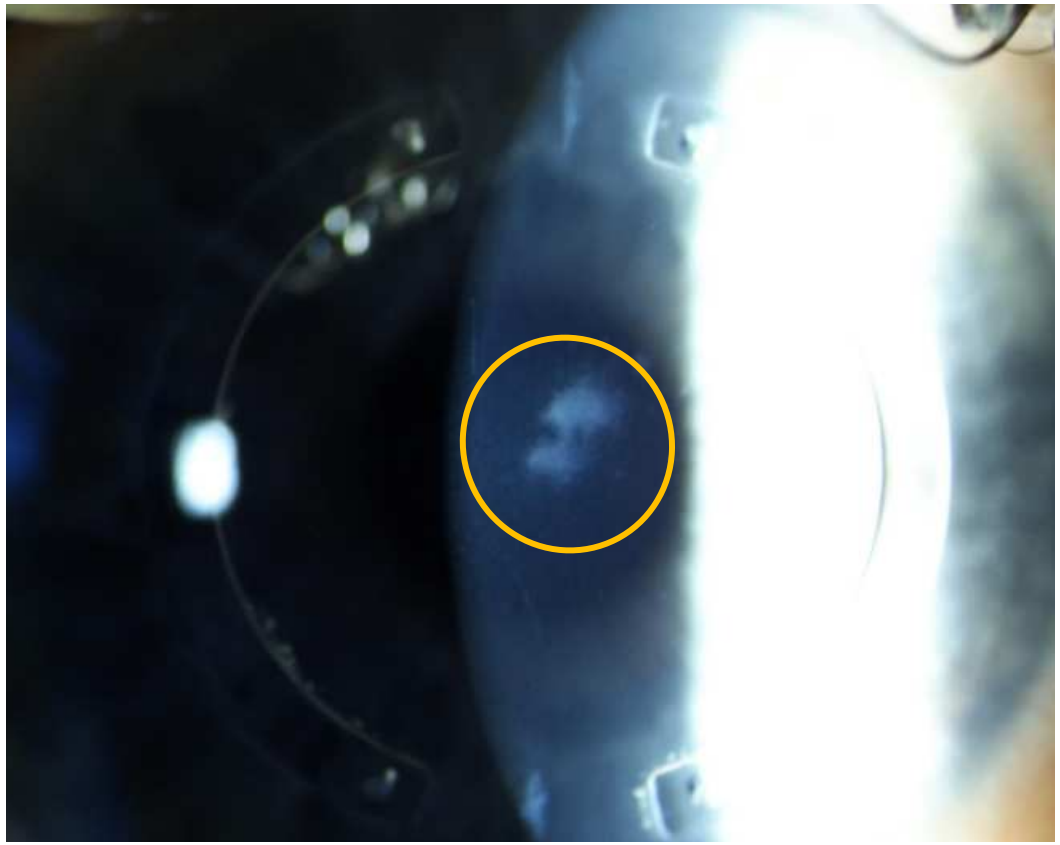
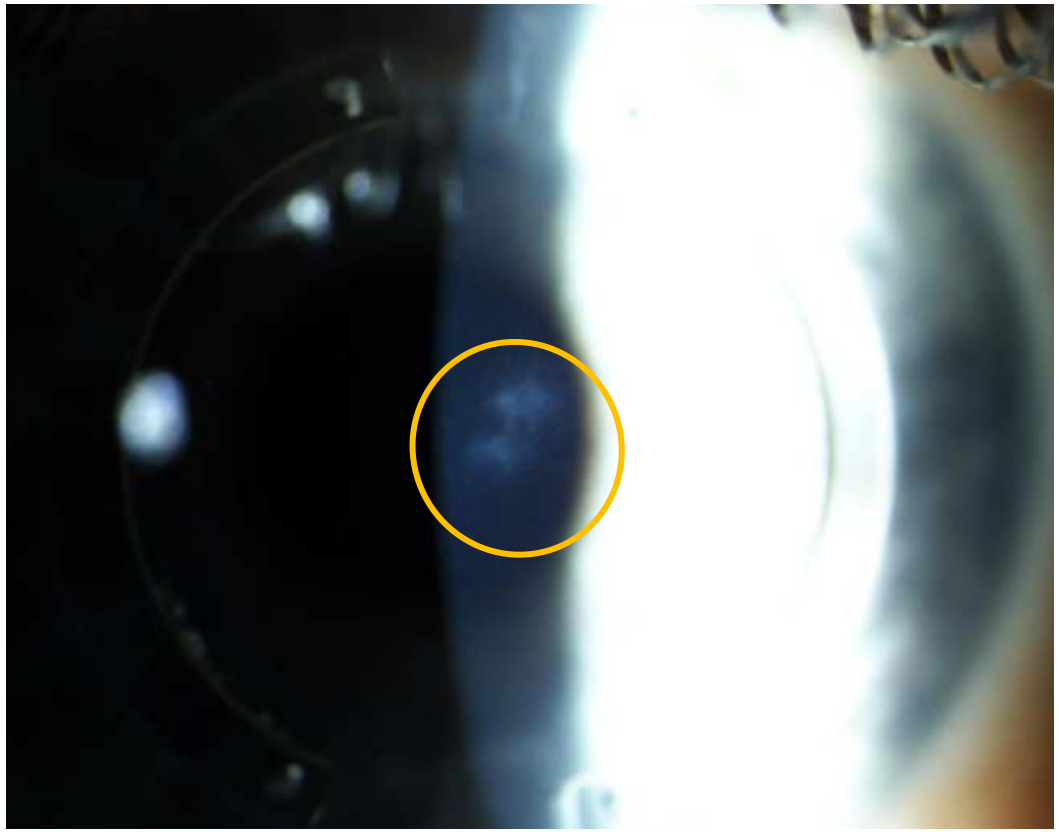
CLINICAL CASE 3

PRE



POST 3 MONTHS



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Central leukoma after PRK

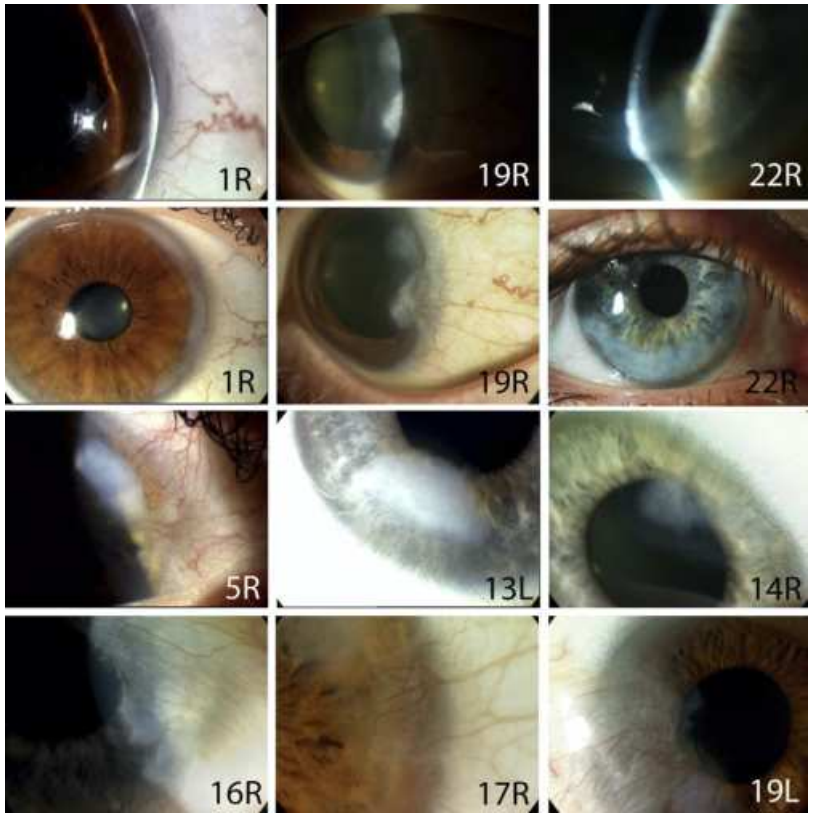
CONCLUSIONS

1. CORNEAL PERIPHERAL DEGENERATION : RECOGNIZE AND DISTINGUISH

2. IRREGULAR ASTIGMATISM IS THE MAIN CAUSE OF VISUAL WORSTENING

3. TREAT CORNEAL PATHOLOGY BEFORE PERFORMING CATARACT SURGERY

THANKS FOR ATTENTION



Financial disclosure

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