



# WHAT HAPPENED TO THE CORNEAS TREATED 20 YEARS AGO BY PRK AND LASIK?

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## FINANCIAL DISCLOSURES

Francesco Carones, MD consults for the following companies:

- **Alcon Laboratories (relevant to this presentation)**
- **CSO (relevant to this presentation)**
- Johnson & Johnson Vision (not relevant to this presentation)
- Slack (not relevant to this presentation)
- Vivior (not relevant to this presentation)
- WaveLight (not relevant to this presentation)



## BACKGROUND

- 20 years ago, diagnostic instruments available today did not exist
  - Corneal topography was already developed
  - Corneal Tomography was starting spreading (Orbscan, Pentacam)
  - Corneal OCT did not exist
  - No precise pachymetry, no hysteresis, no gene testing, ecc.
- → Not the same experience and knowledge of today



## BACKGROUND

- 20 years ago, surgical instruments available today did not exist
  - Mechanical and not FS laser microkeratomes
  - Broad beam and not flying spot excimer laser
  - Deeper ablations
  - No corneal cross-linking



*Related to surgery  
what is called "EXPERIENCE"  
is just the sum  
of all mistakes we have done*

Rosario Brancato, MD



## CORNEAS TREATED BY PRK AND LASIK 20 YEARS AGO

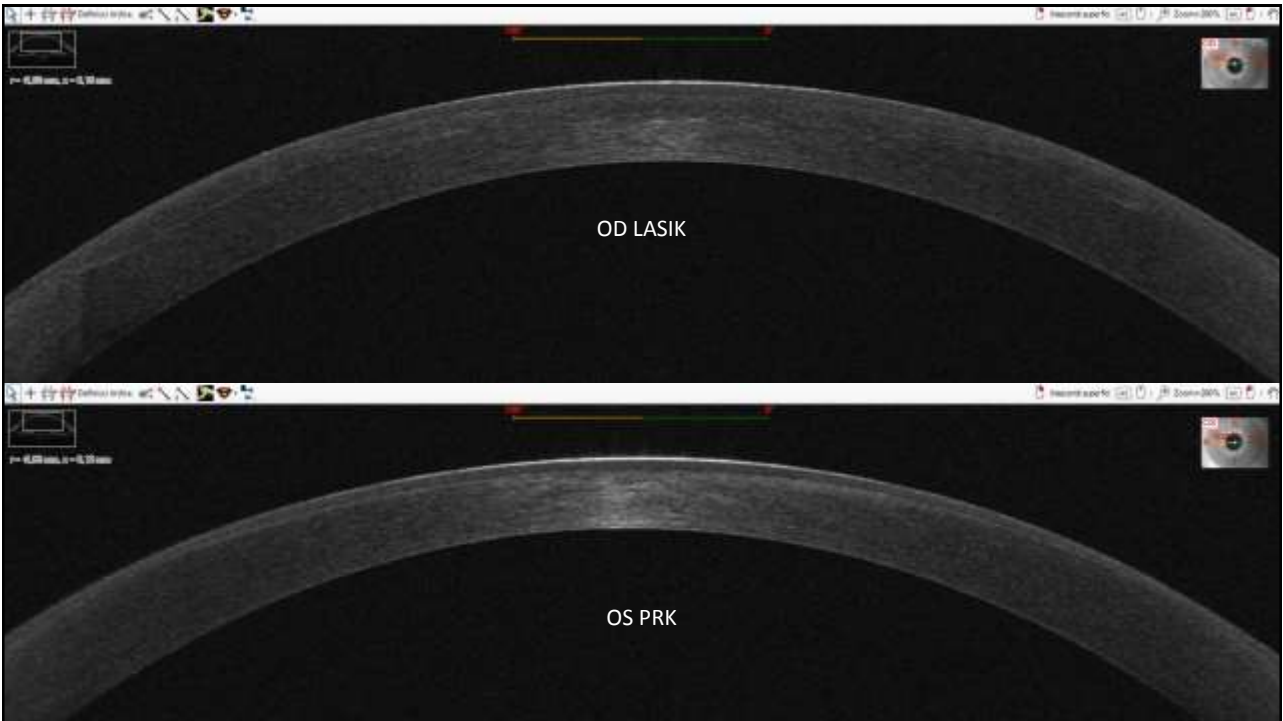
- All patients coming from personal experiences
- Analyzed using a technology that was not existing 20 years ago
  - High resolution spectral domain OCT and placido disk-based corneal topography (CSO MS-39)
    - Corneal structure
    - Corneal epithelium
    - Corneal curvatures, heights



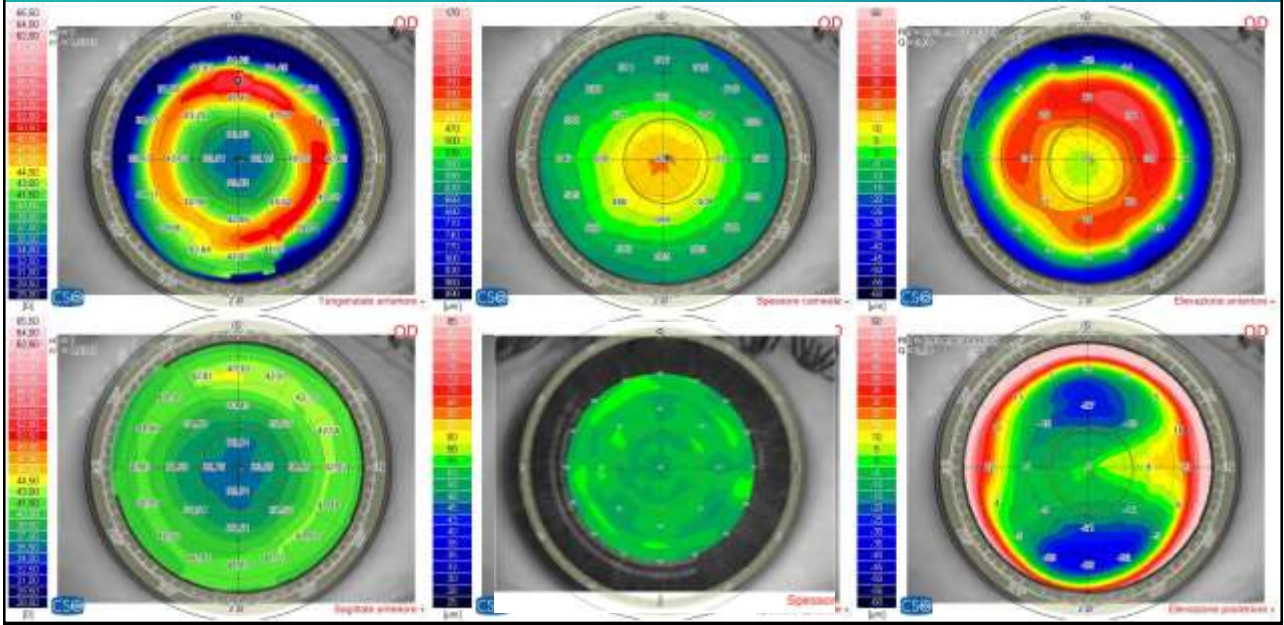
# FP, 31 YO (NOW 51), -7.50 D IN BOTH EYES

OD LASIK April 1998  
Today -1.25 D

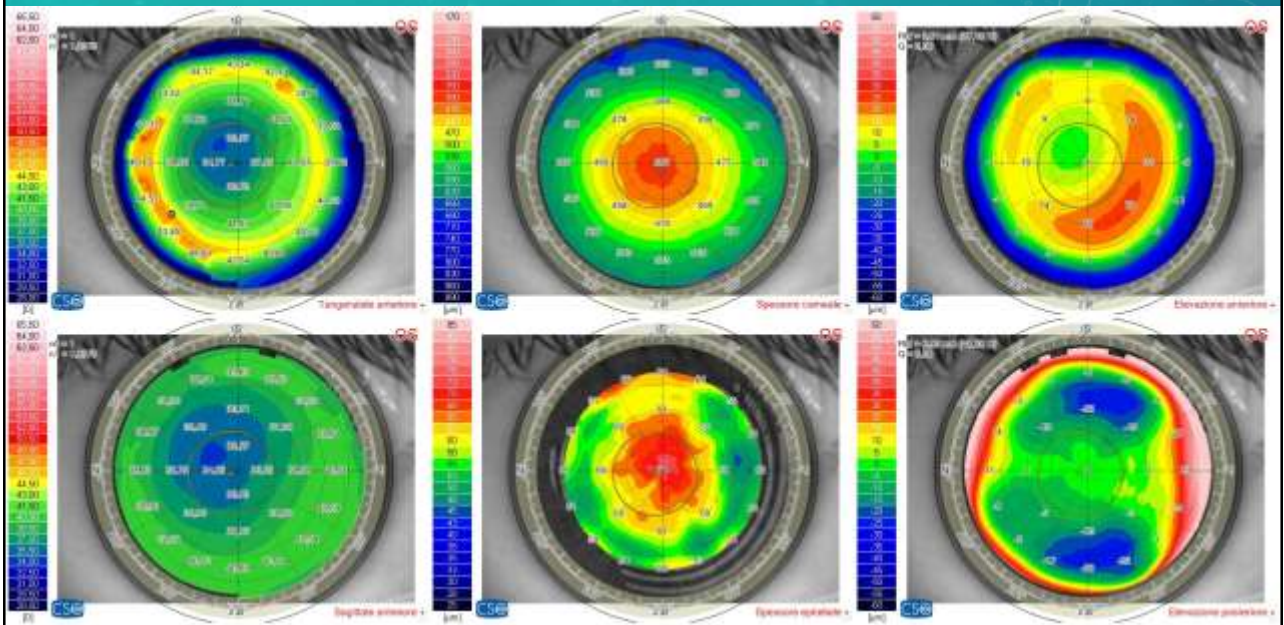
OS PRK March 1998  
Today -1.00 D



# OD: LASIK



# OS: PRK





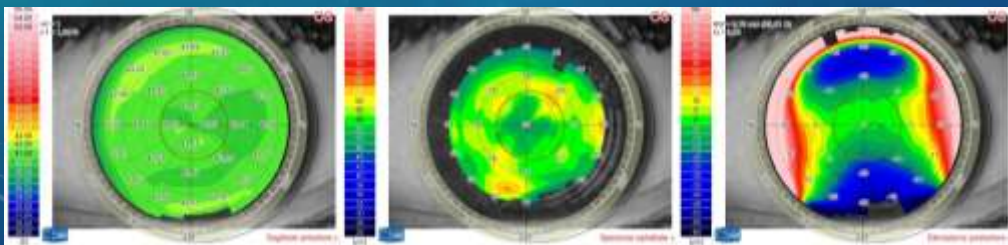
## MOST INTERESTING FEATURES OF EYES TREATED 20 YEARS AGO

- Epithelial hyperplasia, thickening in the center
  - Impact on refraction?
  - May explain overcorrection when treating by PRK
- Structural integrity
  - Changes in the posterior and anterior curvature (ectasia)



## EPITHELIAL HYPERPLASIA

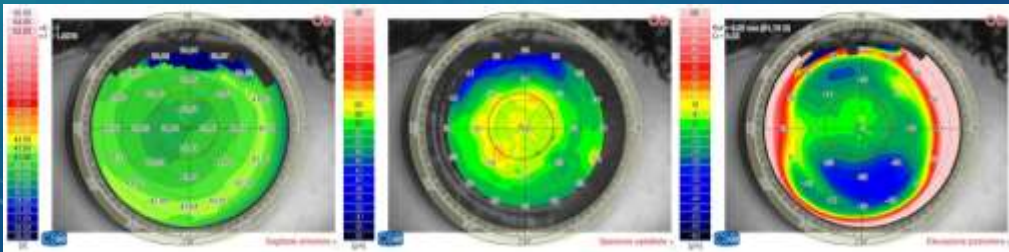
- Myopic correction
- Slight thinning in the central part (3-5 microns)





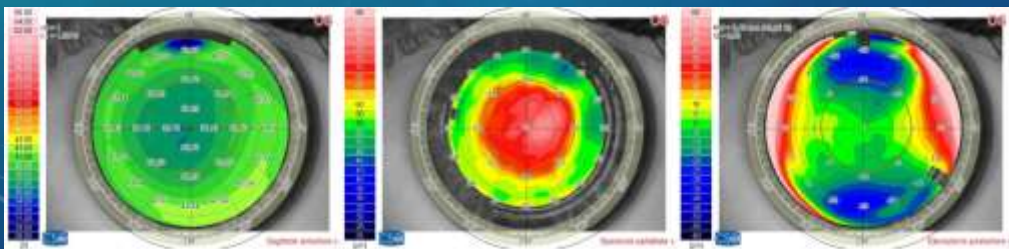
## EPITHELIAL HYPERPLASIA

- Myopic correction
- Slight thickening in the central part (3-5 microns)



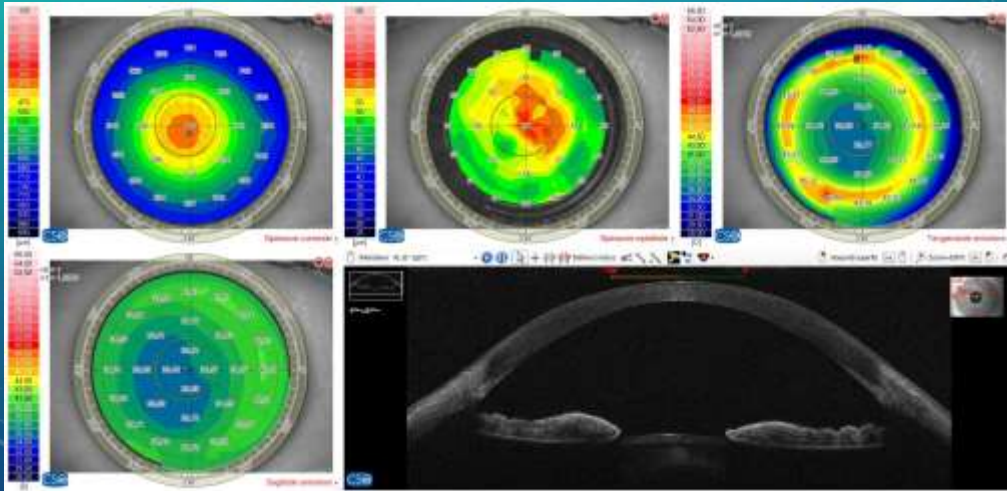
## EPITHELIAL HYPERPLASIA

- Myopic correction
- Significant thickening in the central part (10-20 microns)





## ASYMMETRIC EPITHELIAL HYPERPLASIA

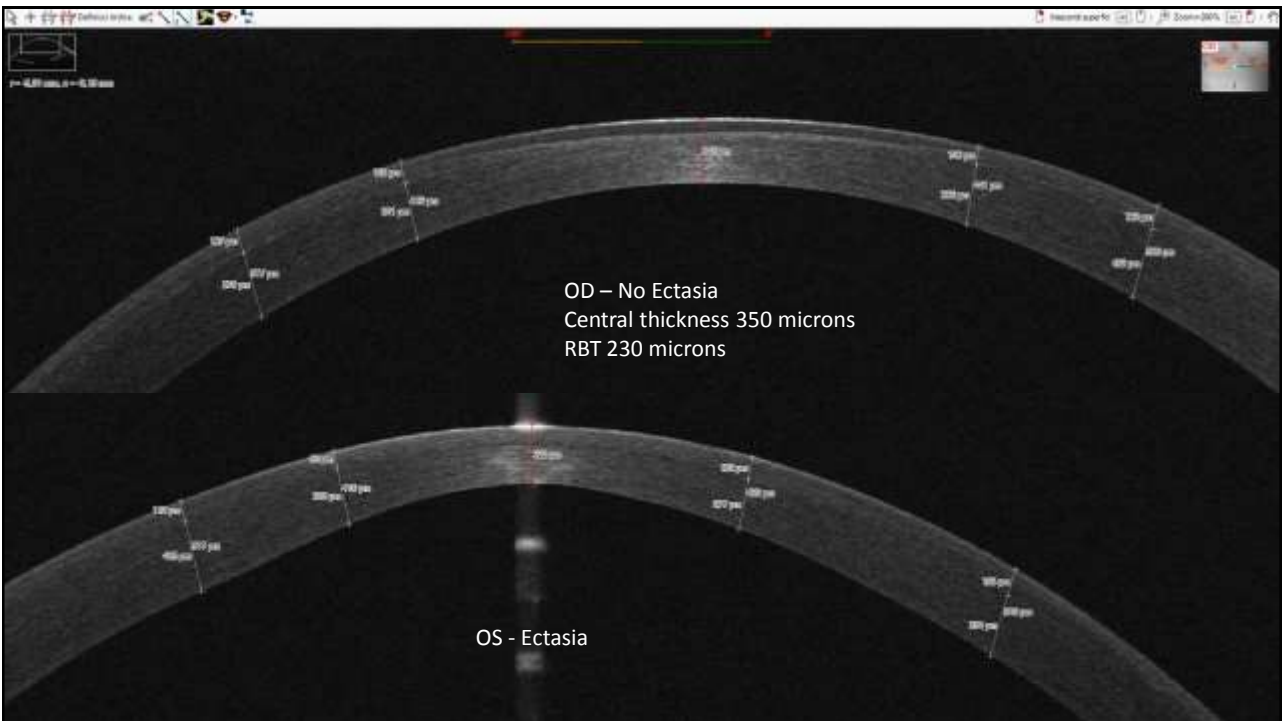
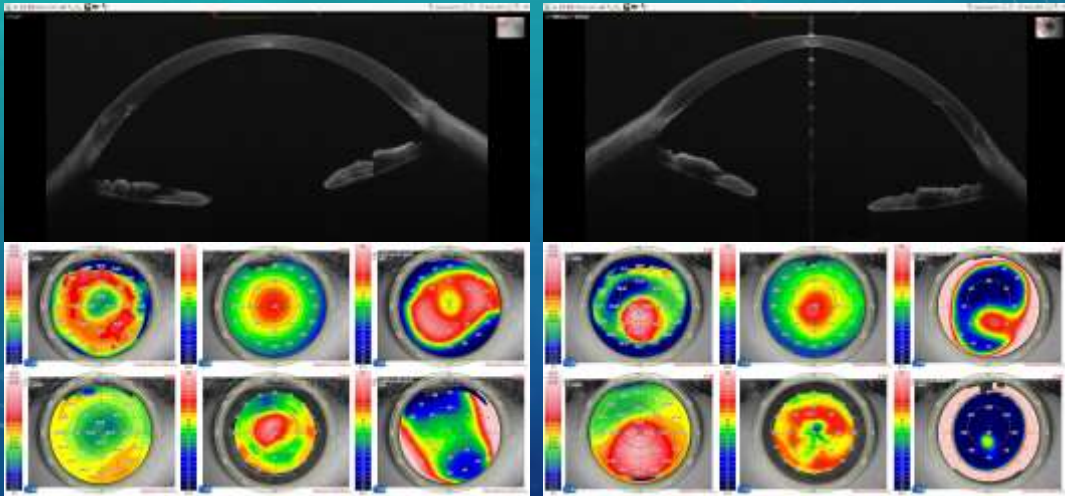


## EPITHELIAL CHANGES - CONSIDERATIONS

- Thickening of the epithelium:
  - Related to the amount of correction performed (the higher, the higher)
  - Related to the optical zone size diameter (the larger, the lower)
  - Produces to changes in refraction (contact lens- like effect)
  - Sensitive to tear film changes – vision fluctuation



# STRUCTURAL INTEGRITY

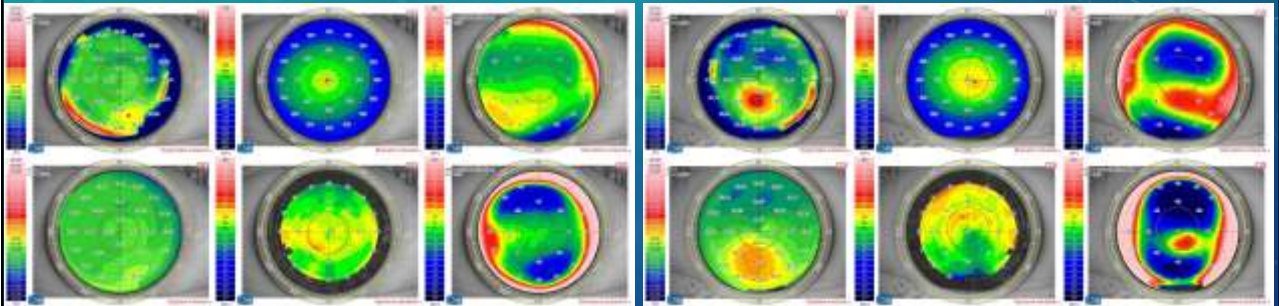




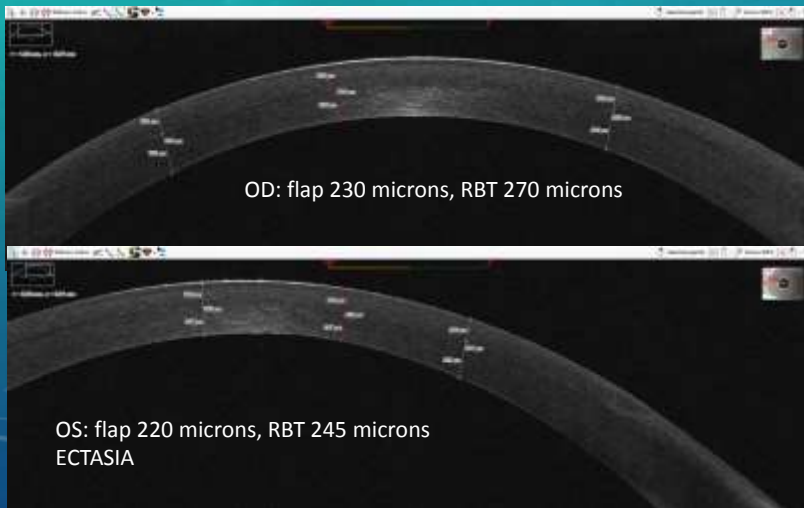
# STRUCTURAL INTEGRITY

-2.50 D sphere -1.50 D Cyl x 10°

-3.50 D sphere -2.50 D Cyl x 170°



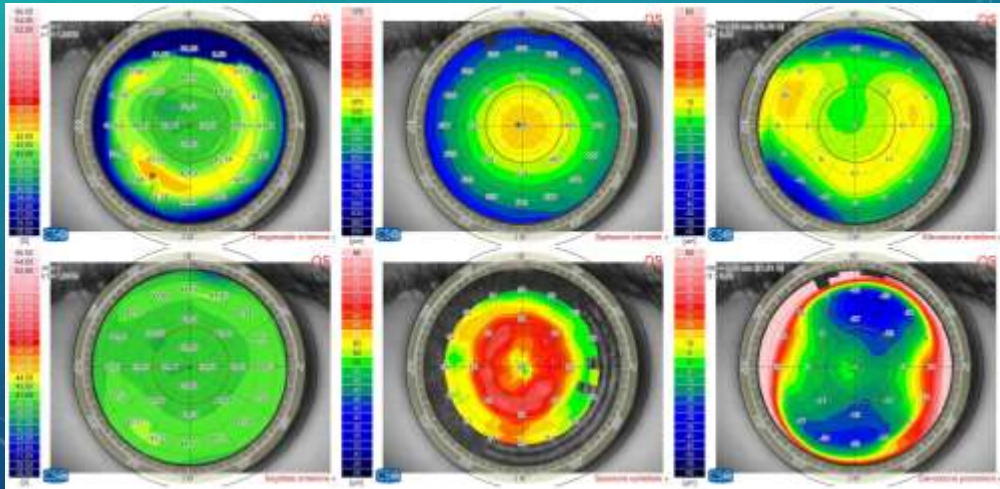
# STRUCTURAL INTEGRITY



Intended flap thickness  
160 microns  
For both eyes



## STRUCTURAL INTEGRITY (PRK OS)

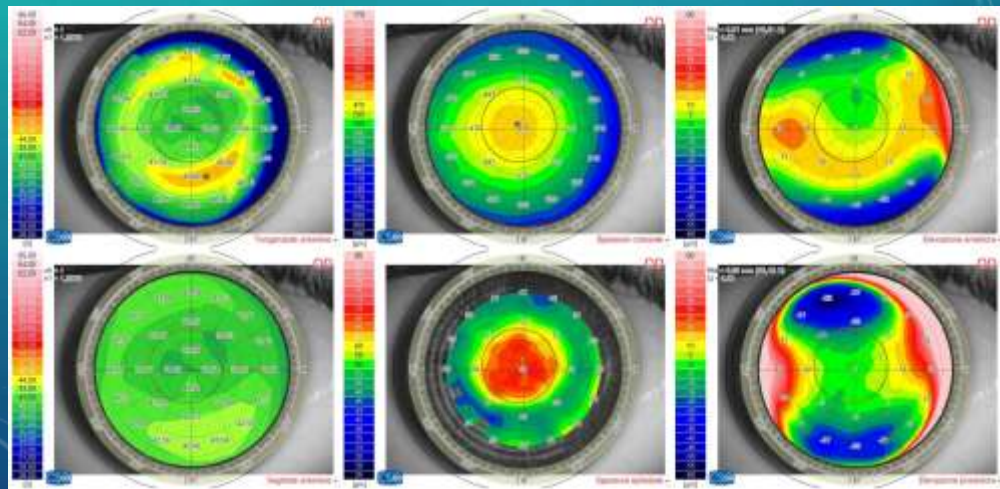


RBT:  
420  $\mu$

Micro  
Ectasia



## STRUCTURAL INTEGRITY (PRK OD)



RBT:  
400  $\mu$

Normal



## STRUCTURAL INTEGRITY - CONSIDERATIONS

- Risk of compromising is associated with:
  - Attempted correction
  - Flap thickness
  - Unaffected residual stromal bed thickness (PRK as well), in relation to the original corneal thickness



*”EXPERIENCE”  
is just the sum  
of all mistakes we have done*

**...20 years later  
experience and technology  
help not to commit  
The same mistakes**