

# **TOMOGRAFIA IN EYE BANKING**

**Alessandro Ruzza**

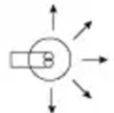

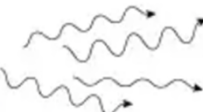
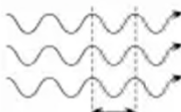
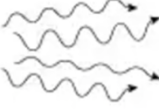
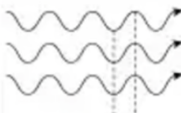
**L'AQUILA, 18 MAGGIO 2024**

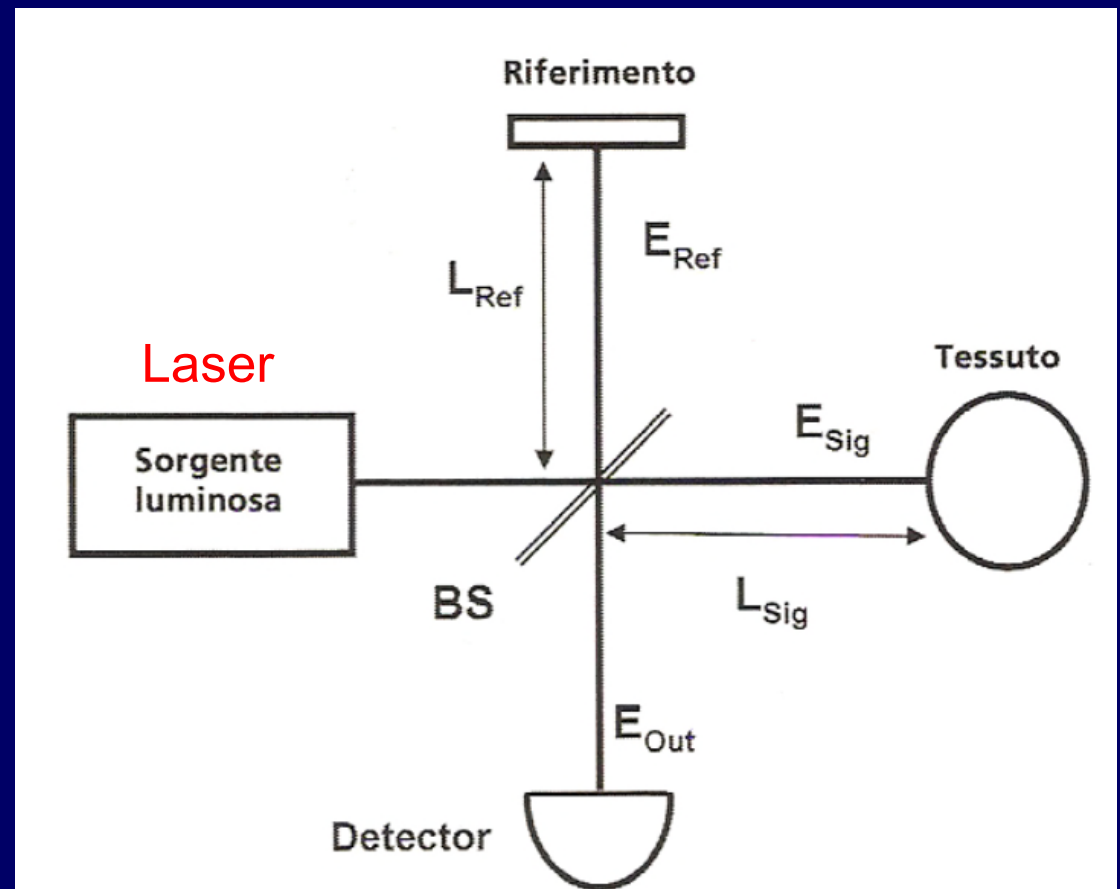
**XVI CORSO NAZIONALE SIBO**

# INTERFEROMETRO

- Fascio di luce laser (coerente) a **precisa lunghezza d'onda**
- Generazione di due fasci di luce in due percorsi equidistanti:

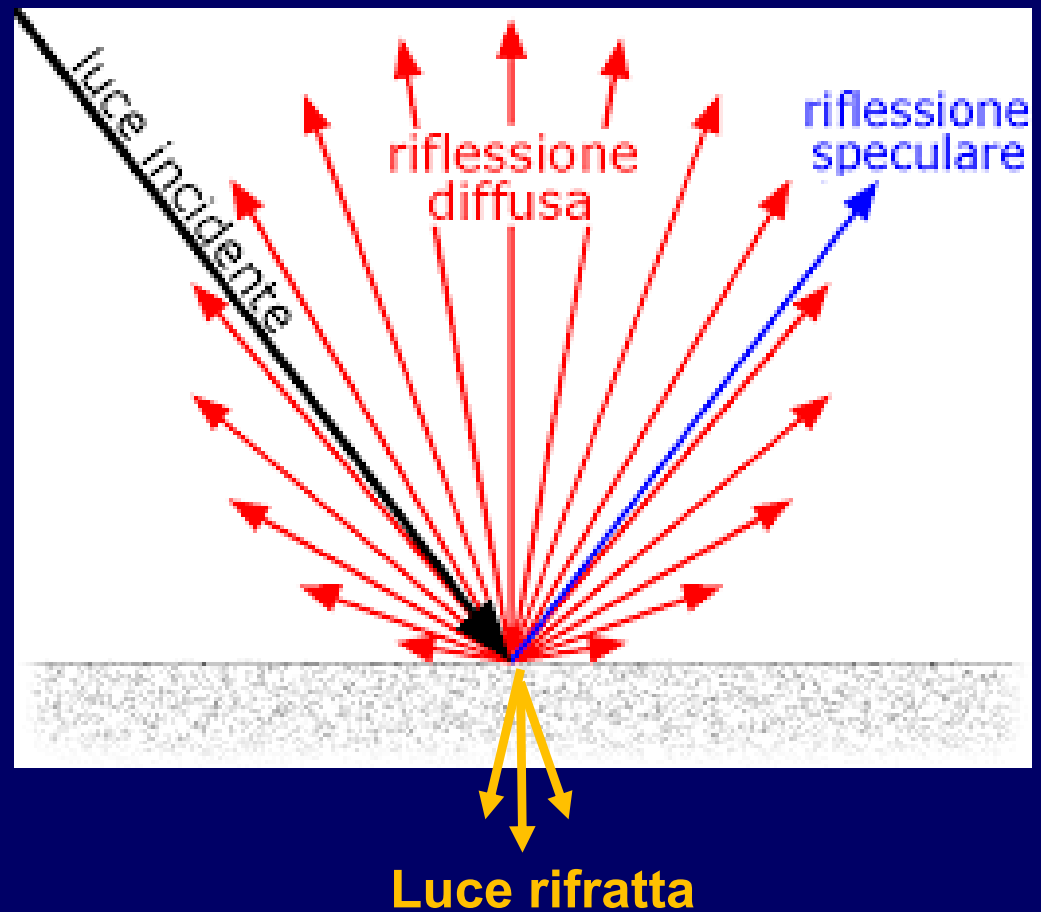
## RIFERIMENTO e CAMPIONE

Luce ordinaria	Luce laser
 <p>Lampadina</p>	 <p>Laser</p>
 <p>Lunghezze d'onda non uniformi</p>	 <p>Lunghezze d'onda uniformi</p>
 <p>Fase non uniforme</p>	 <p>Picchi e avvallamenti sono allineati.</p>



# PROPAGAZIONE DELLA LUCE

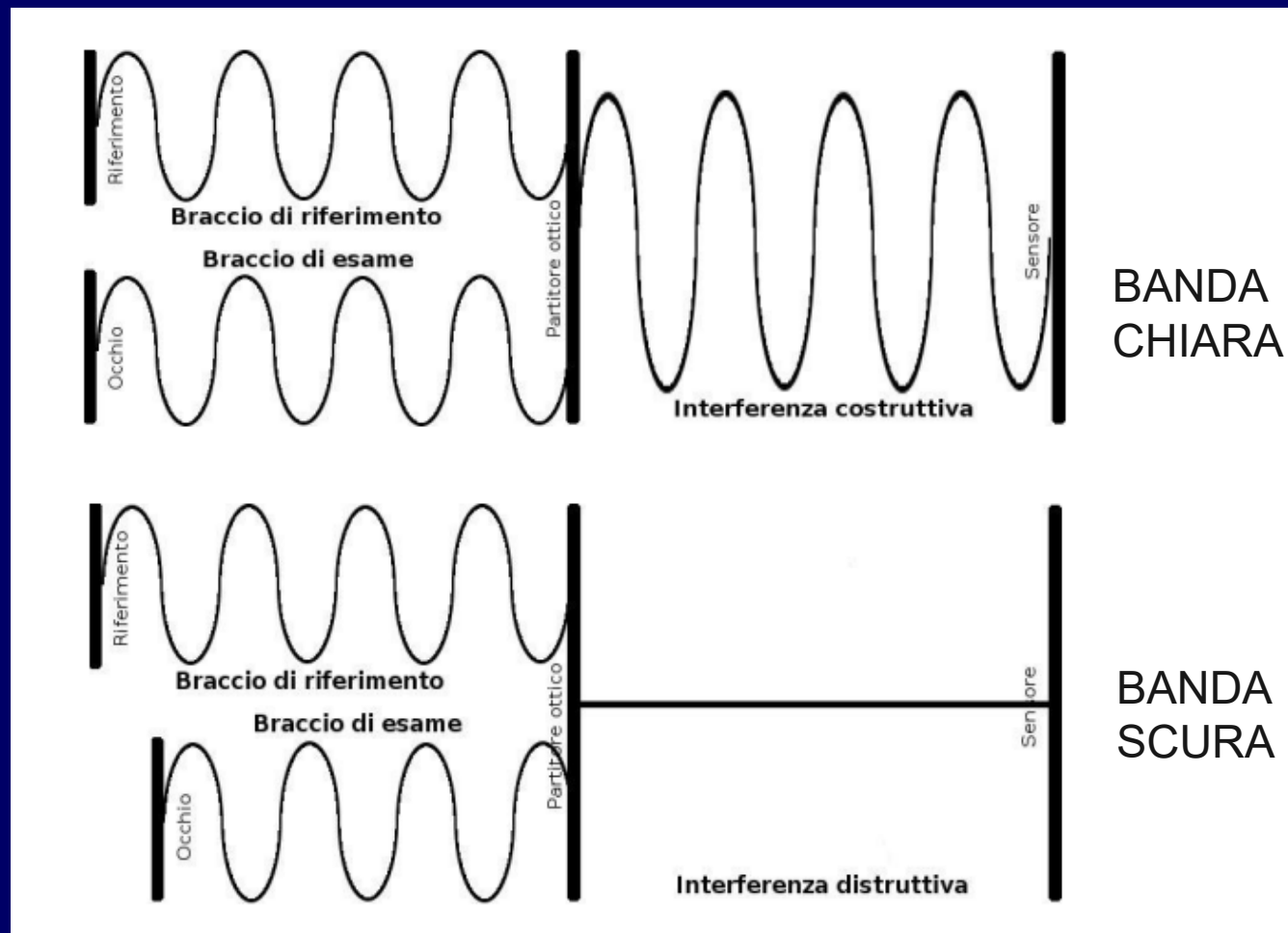
- ASSORBITA
- RIFRATTA
- RIFLESSA
  - SPECULARE
  - DIFFUSA



# INTERFERENZA

**COSTRUTTIVA (COERENTE):** l'onda risultante ha ampiezza pari alla somma delle due onde

**DISTRUTTIVA:** l'onda risultante ha un'ampiezza pari a zero

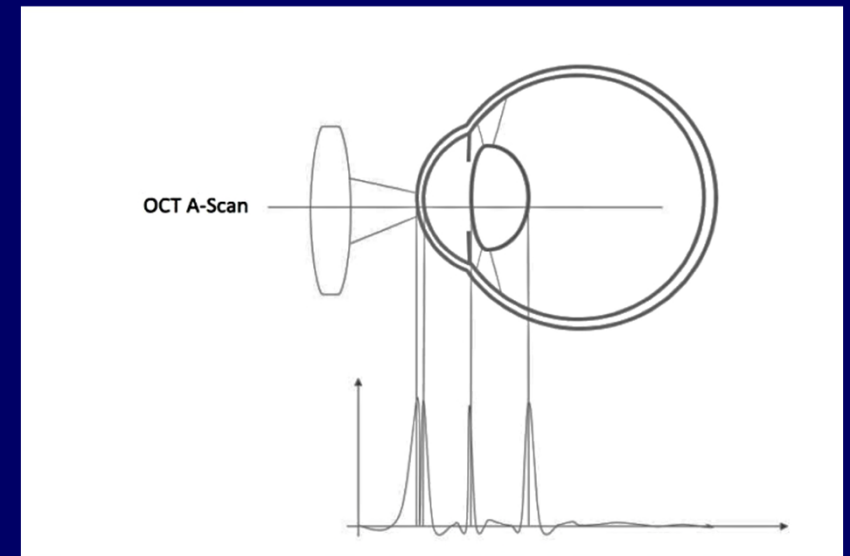
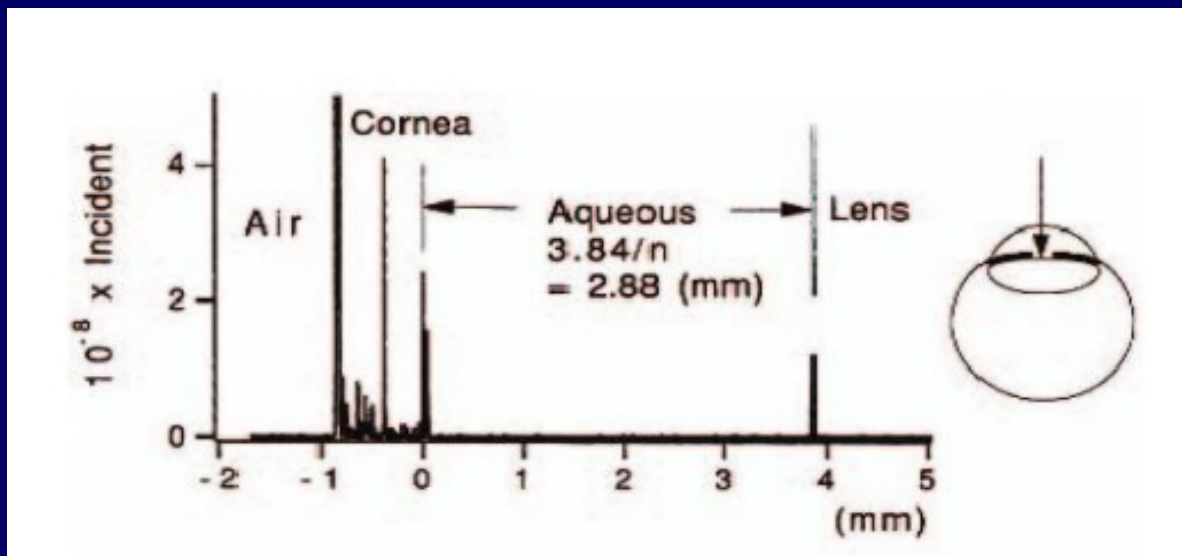


LUCE SPECULARE

LUCE DIFFUSA

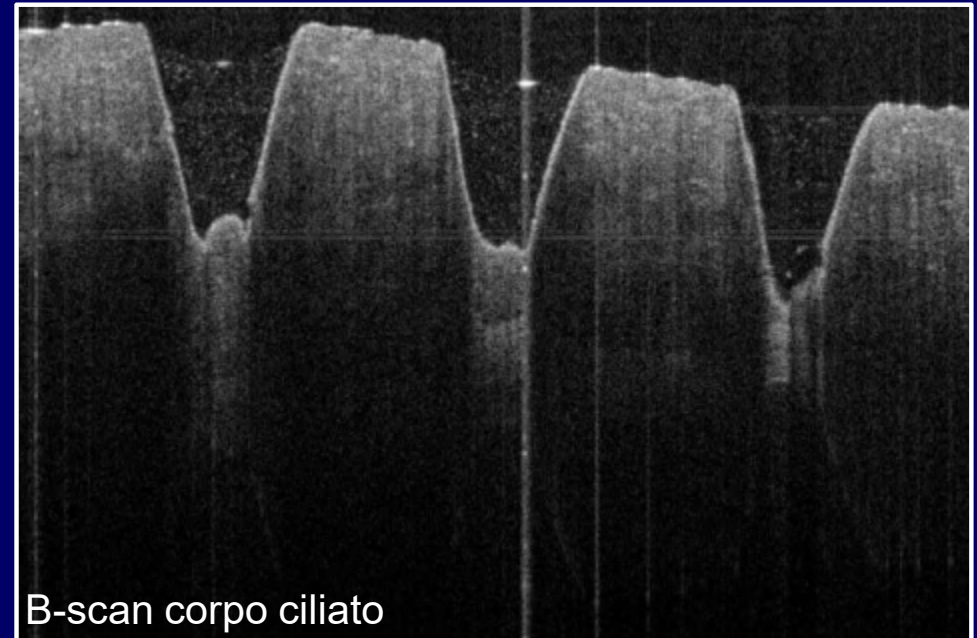
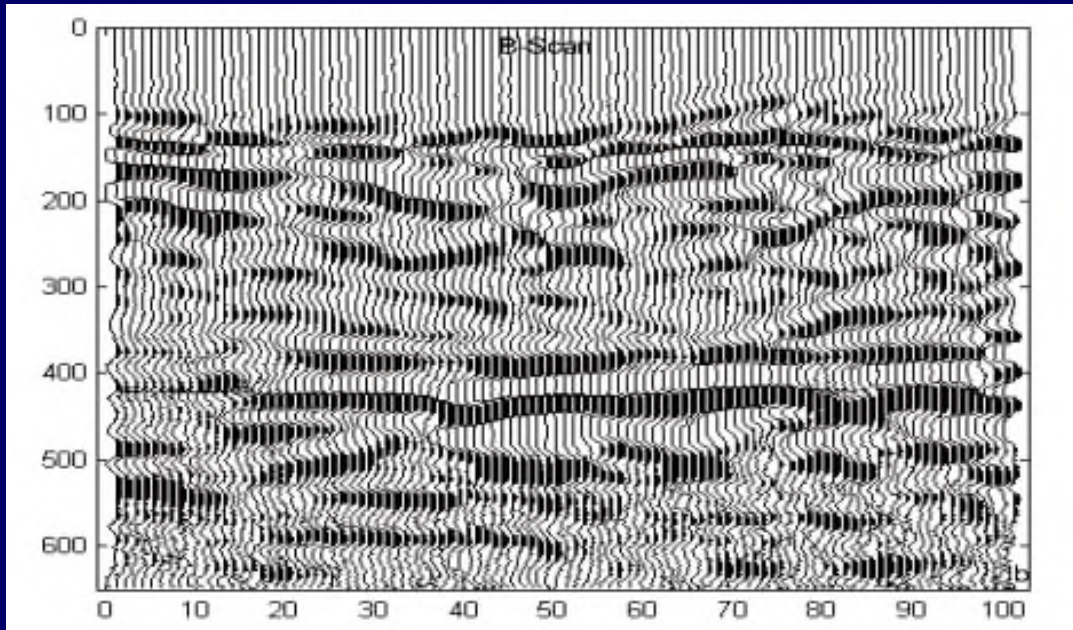
# PRODUZIONE DELL'IMMAGINE

- **A-SCAN:** tracciato monodimensionale, analizza la riflettività delle strutture per calcolare la distanza (ampiezza segnale-tempo/spazio)



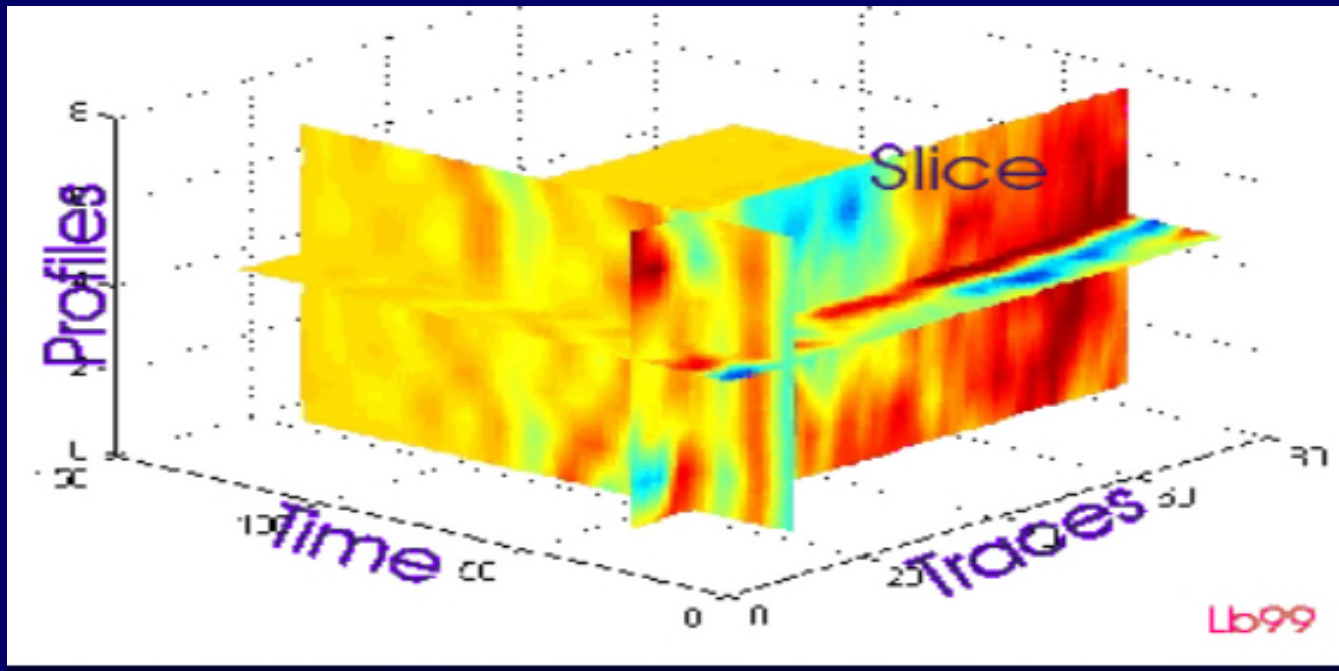
# PRODUZIONE DELL'IMMAGINE

- **B-SCAN**: immagine formata da insieme di A-scan, trasformata in **scala di grigi** sulla base della diversa riflettenza degli **strati** che compongono il tessuto



# PRODUZIONE DELL'IMMAGINE

- **C-SCAN**: immagine formata da insieme di B-scan disposti in uno **spazio tridimensionale**, raffigurando l'immagine in **voxel colorati** sulla base della **diversa riflettenza** degli strati che compongono il tessuto

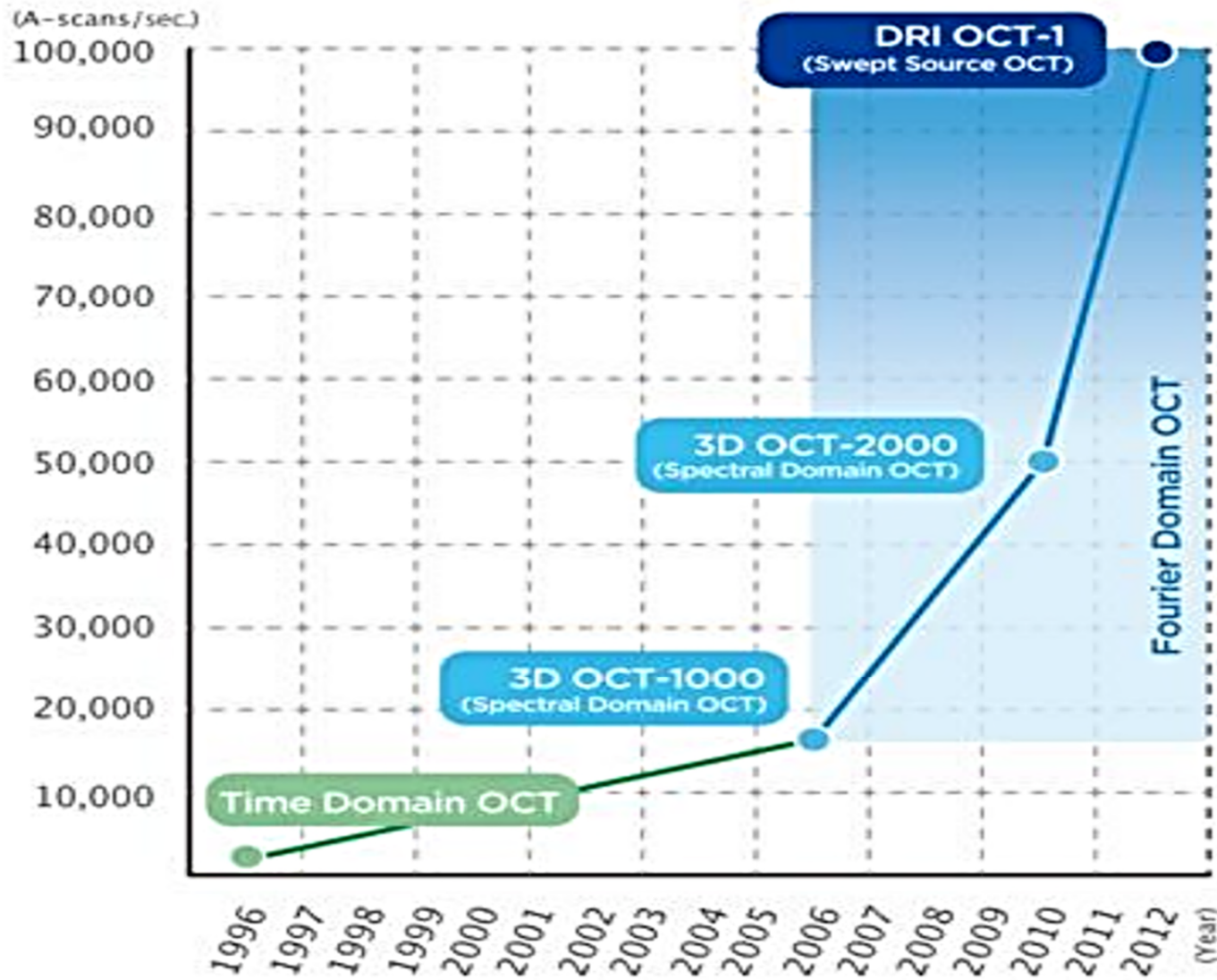


# FOURIER (SPECTRAL) DOMAIN

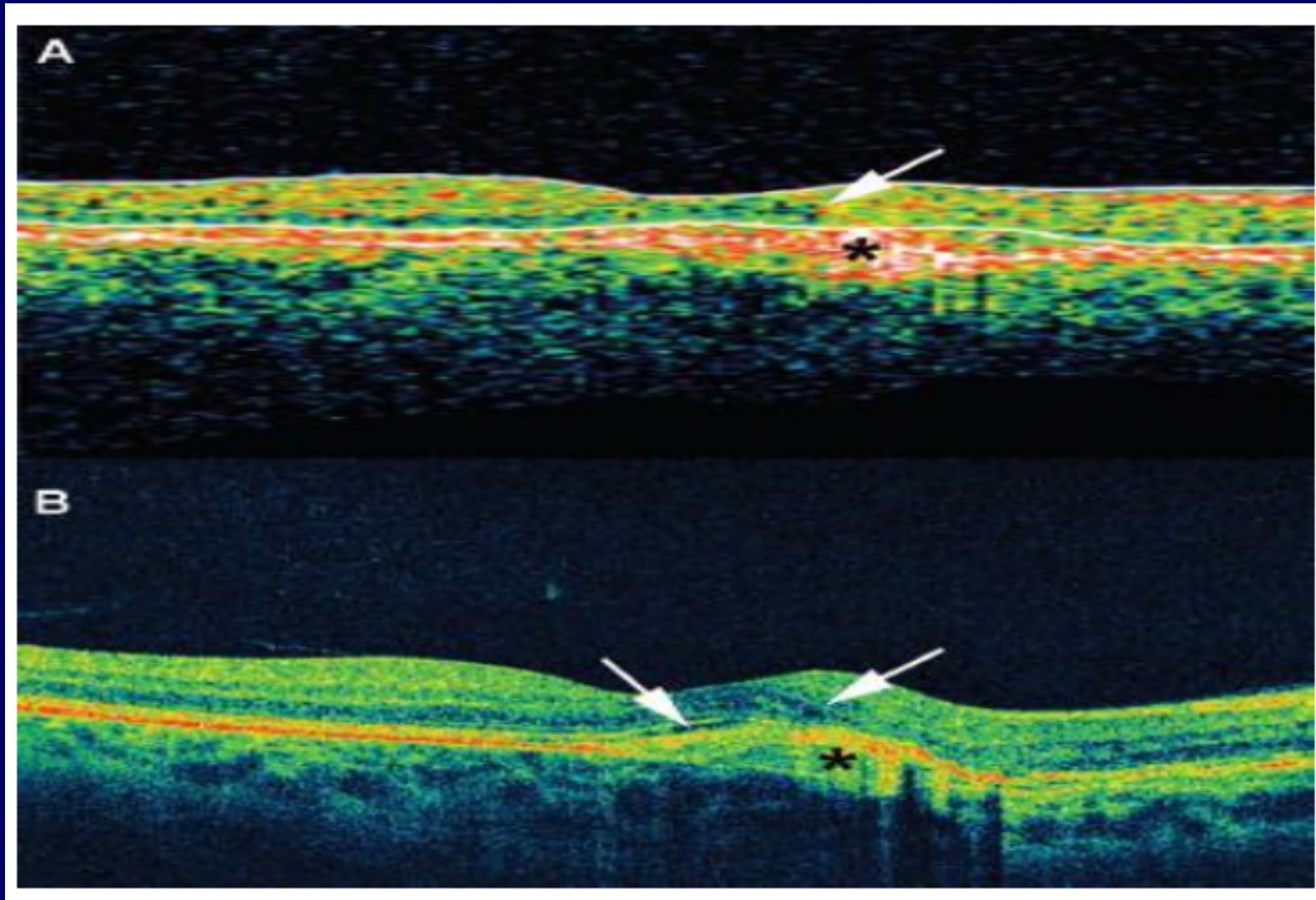
- Rilevatore: **spettrofotometro**
- Rileva le variazioni spettrali del segnale a diverse profondità (sensibilità)
- Analisi di Fourier => A-B-C scan
- **VANTAGGI:**
  - Aumento frequenza delle scansioni (A-scan/s)
  - Riduzione tempi di esecuzione
  - Aumento sensibilità



# FOURIER (SPECTRAL) DOMAIN



# FOURIER (SPECTRAL) DOMAIN

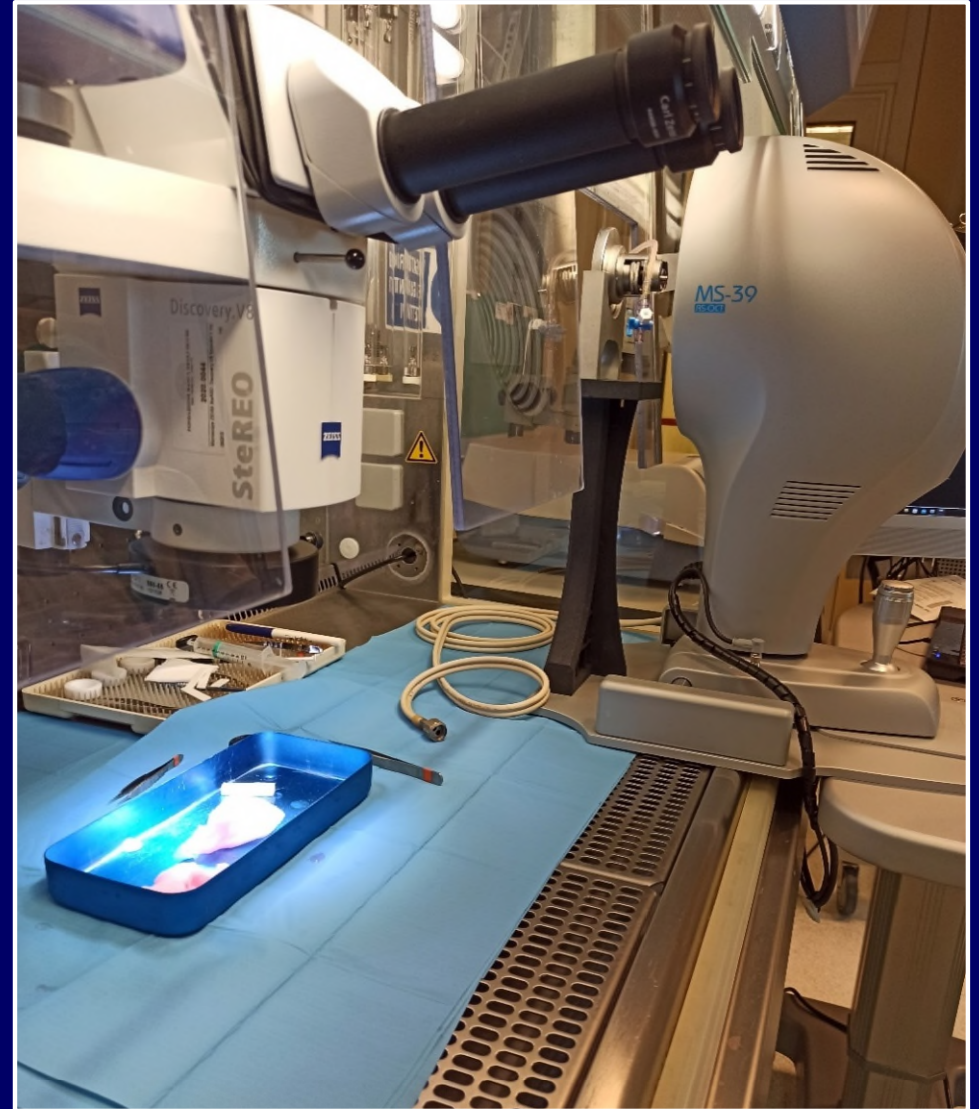
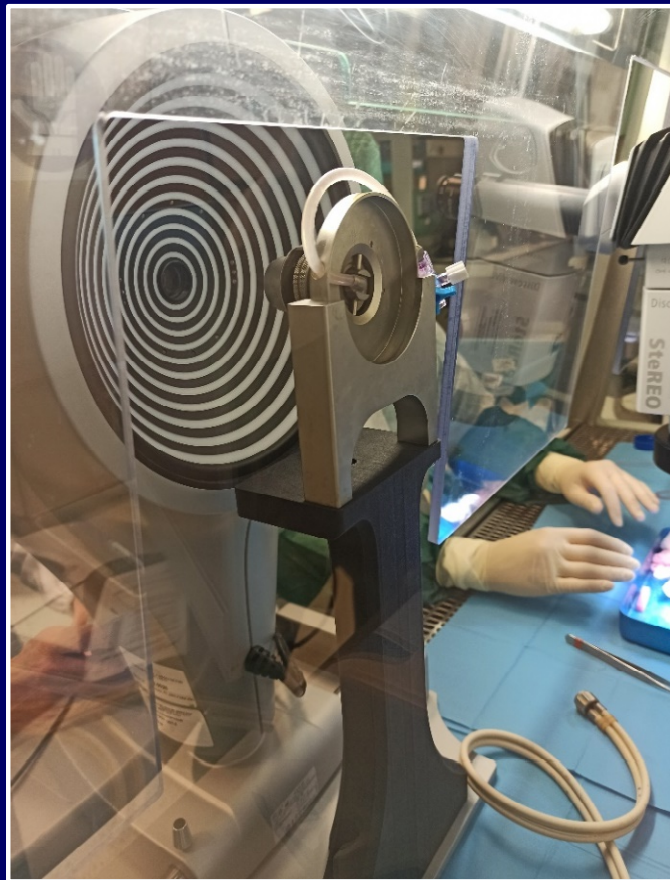


TD OCT

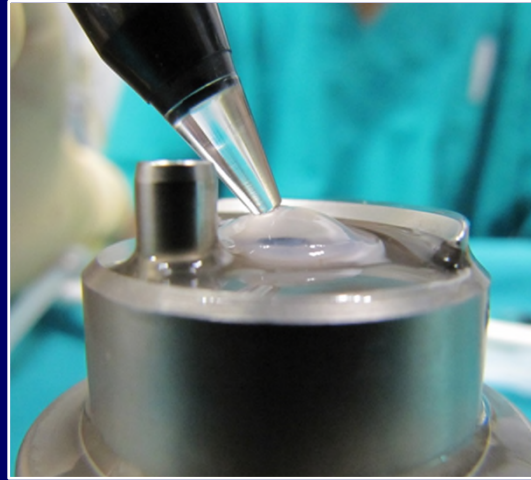
F(S)D OCT

# EYE BANK

- LENTICULES PREPARATION
- QUALITY CONTROL
- TISSUES SELECTION

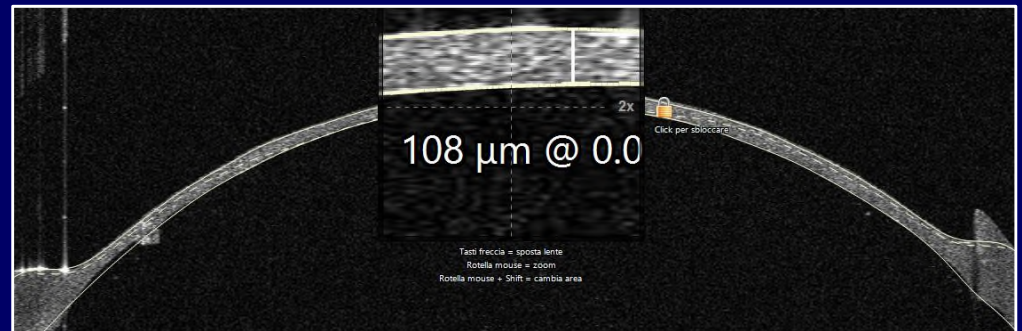
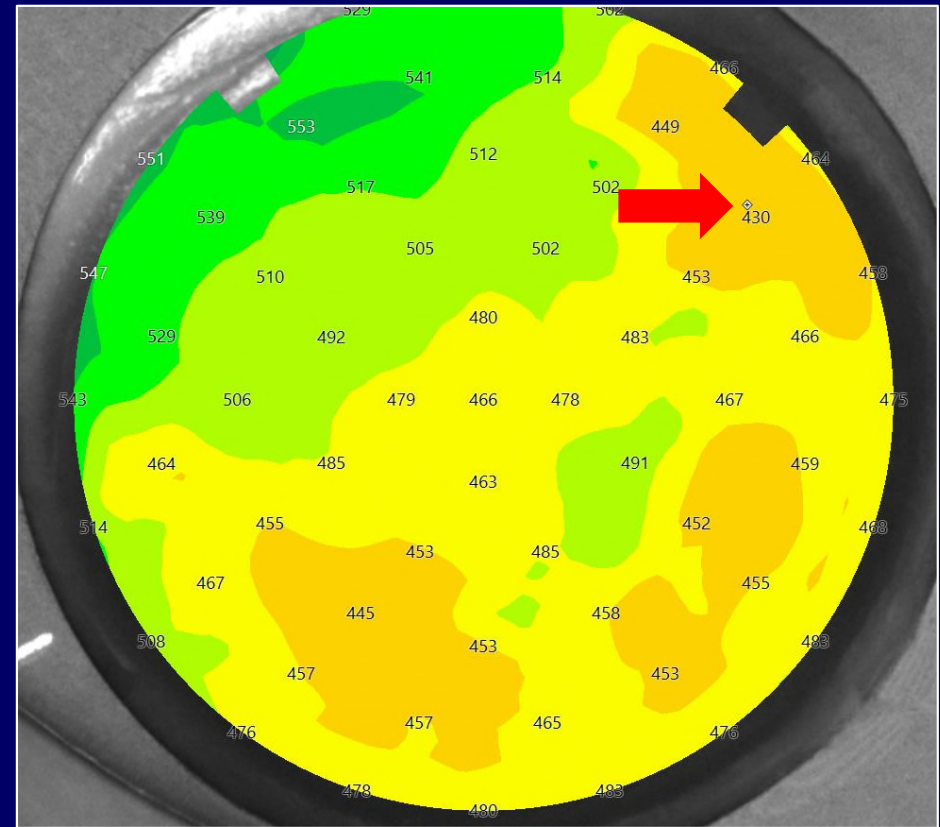


# PACHIMETRIA ULTRASUONI vs OCT



**2010**

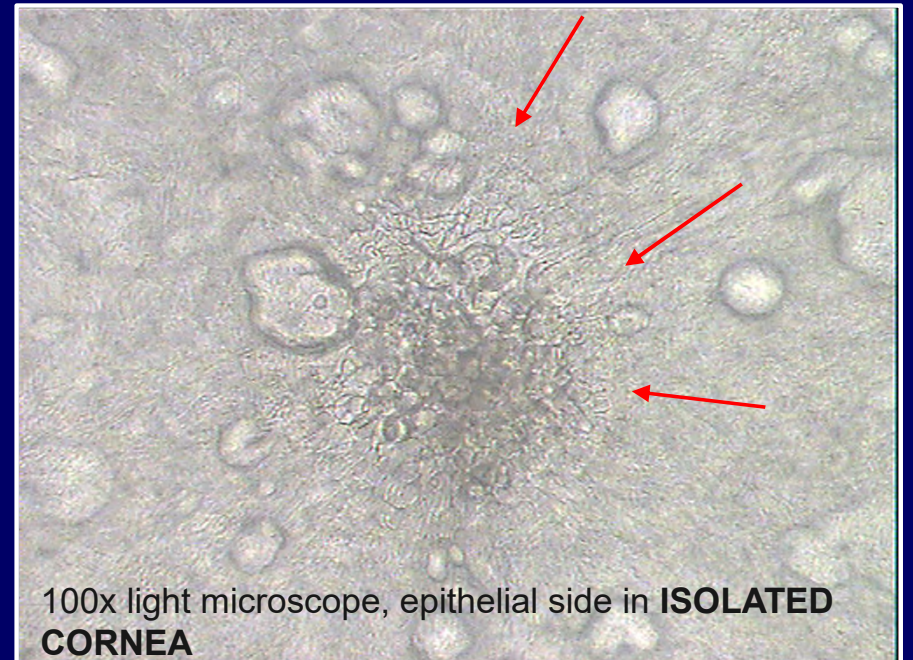
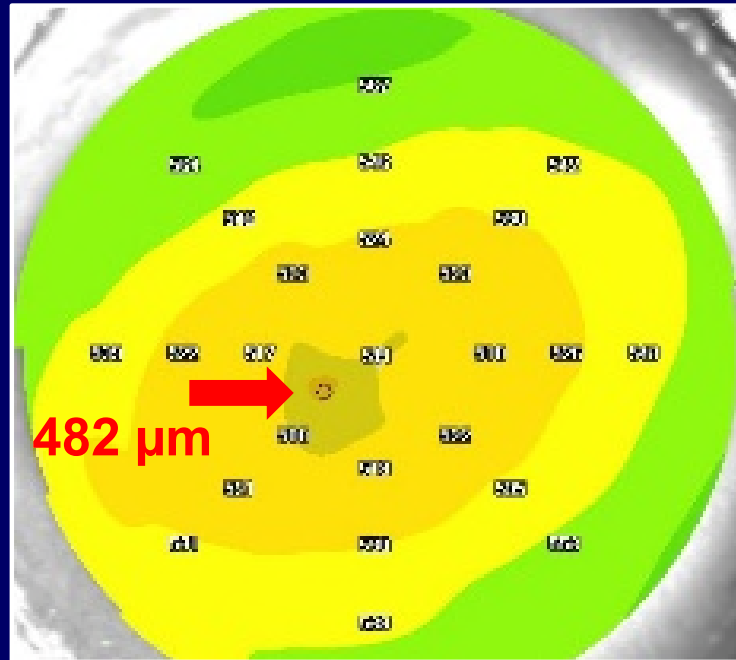
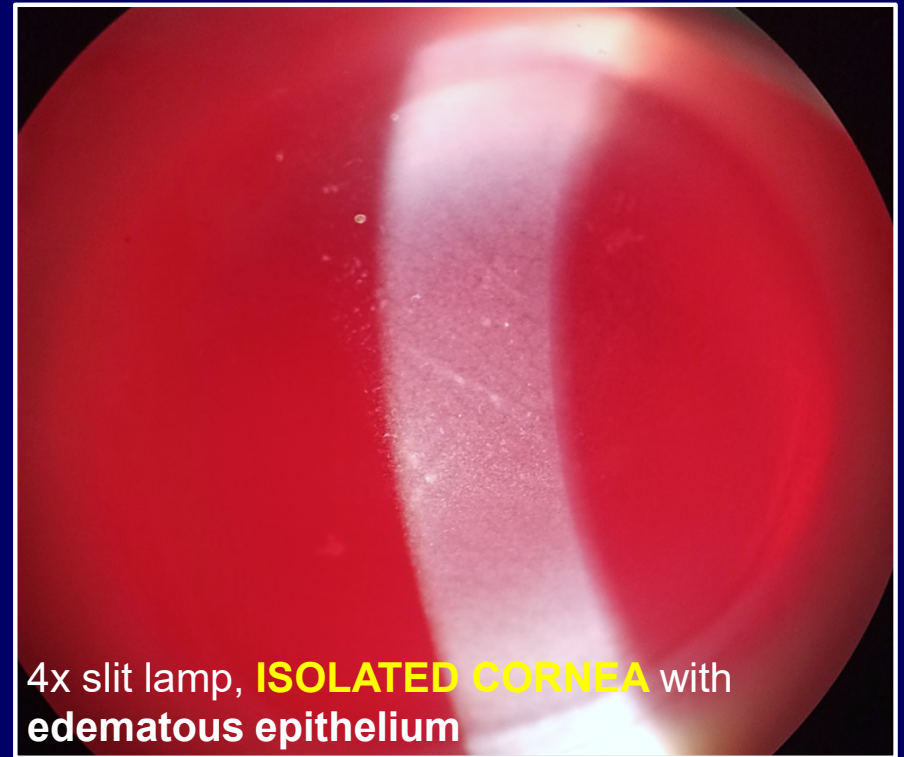
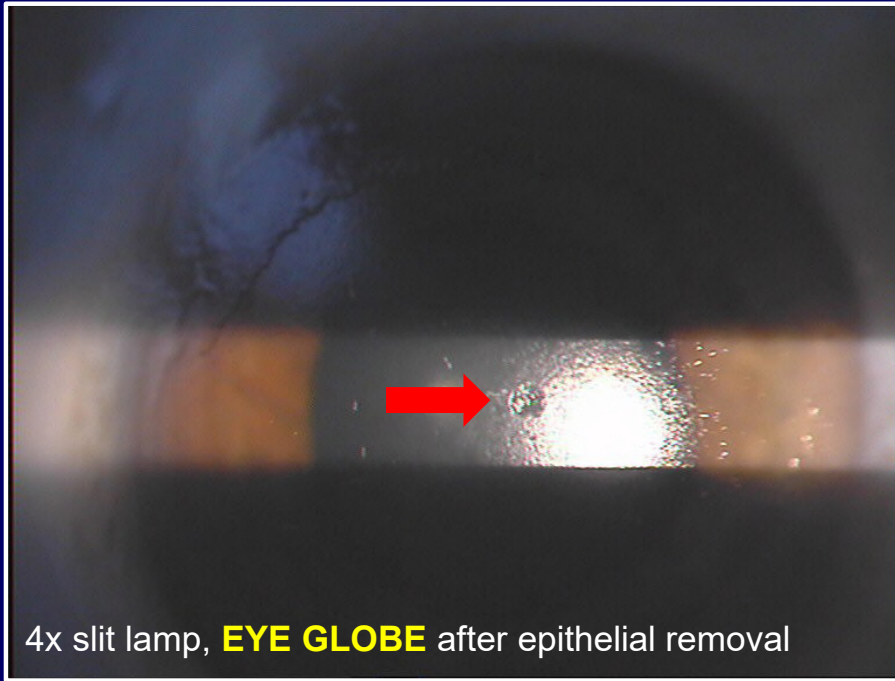
**153,94 ± 26,27 μm (n=111)**



**2013**

**111 ± 25 μm (n=573)**

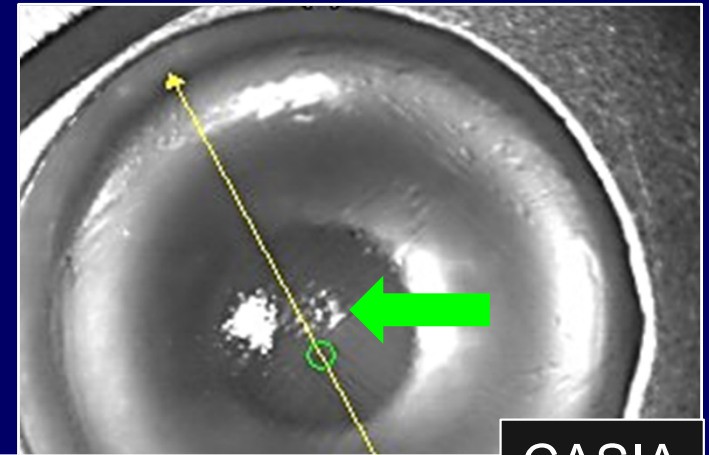
# CORNEAL SCARS



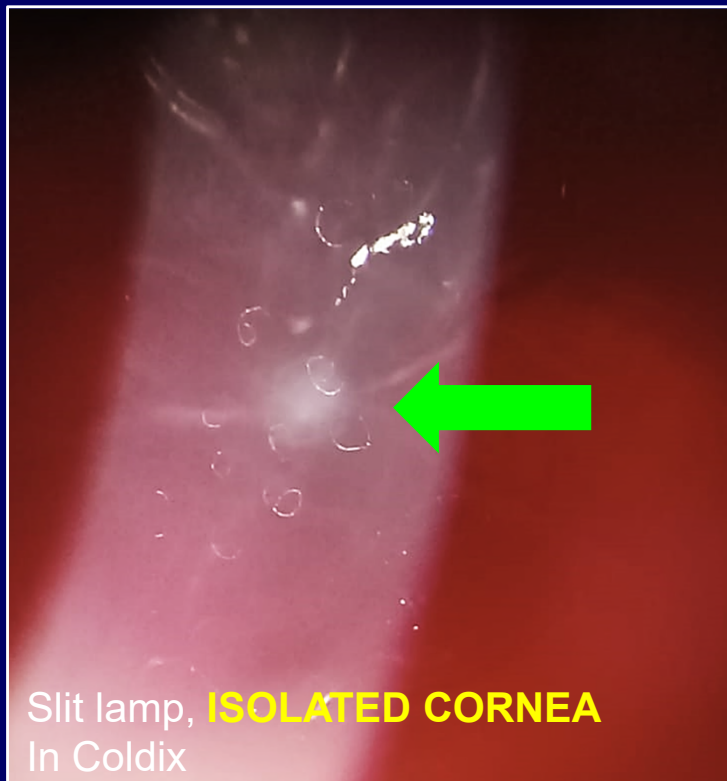
# CORNEAL SCARS

DSAEK: depends on the depth

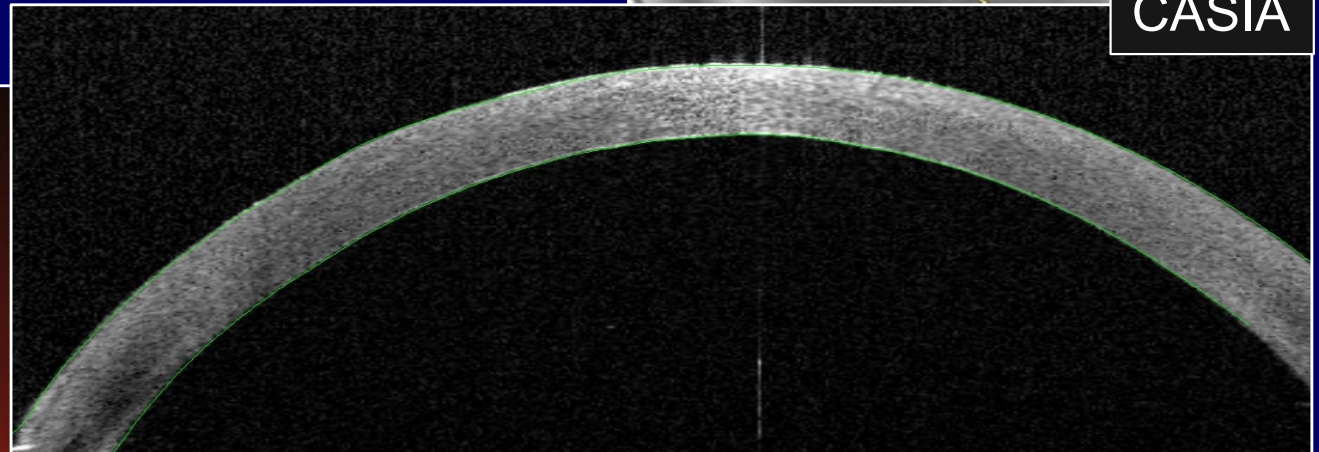
DMEK: Ok



CASIA



Slit lamp, **ISOLATED CORNEA**  
In Coldix



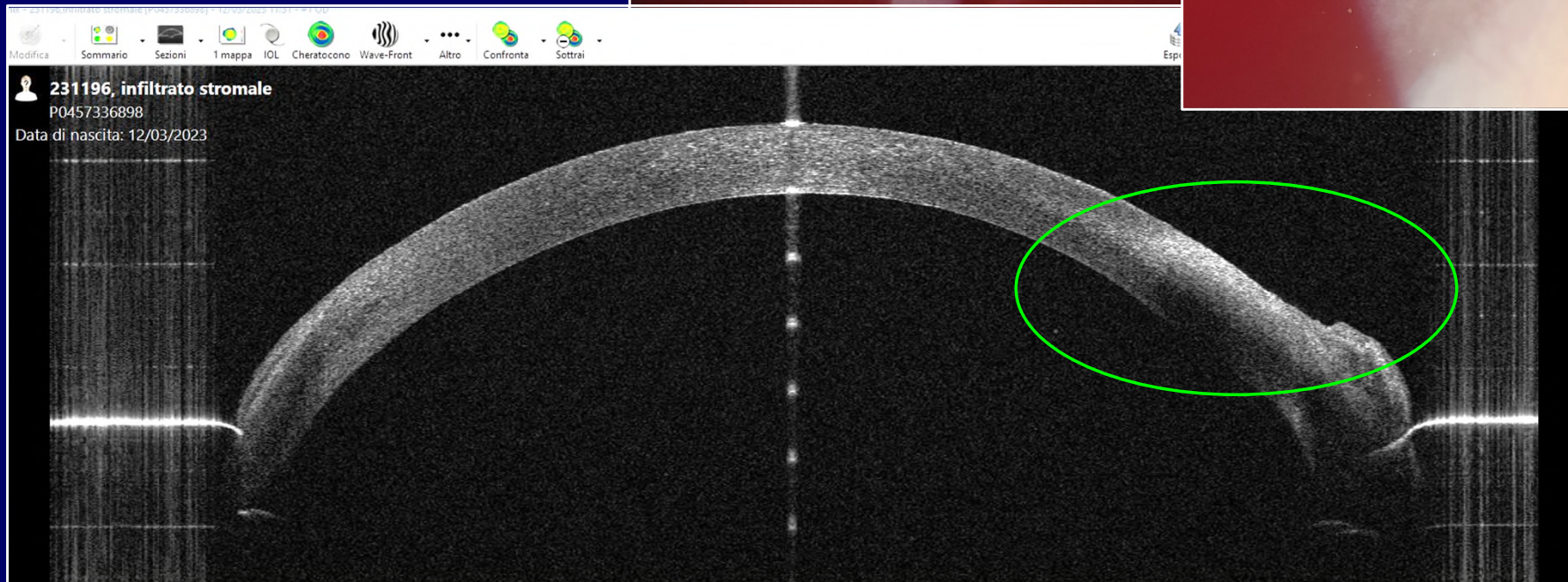
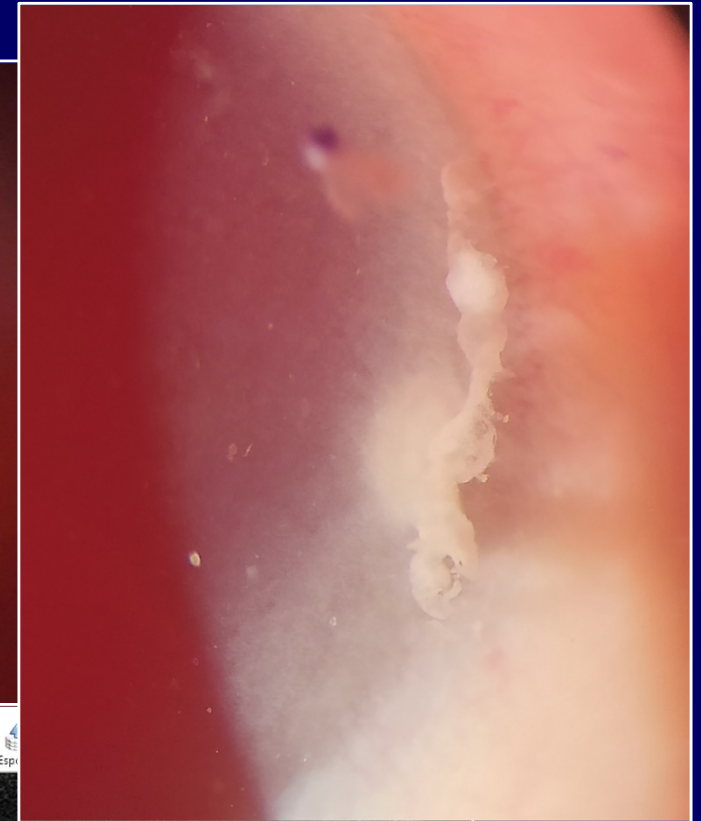
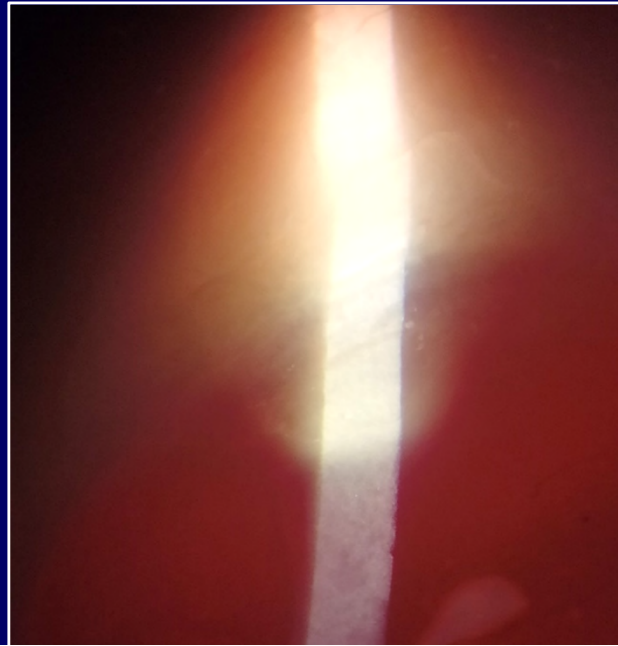
MS-39



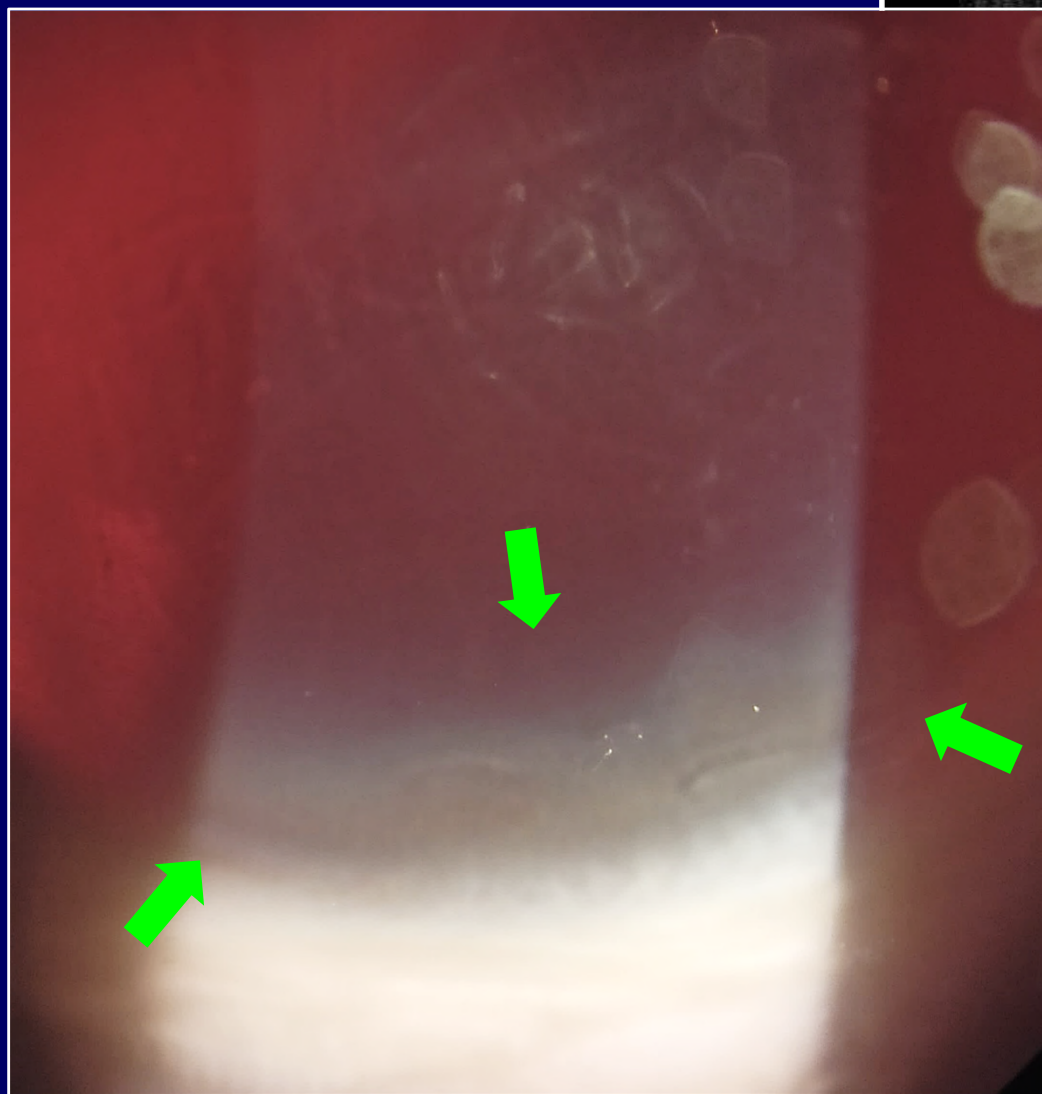
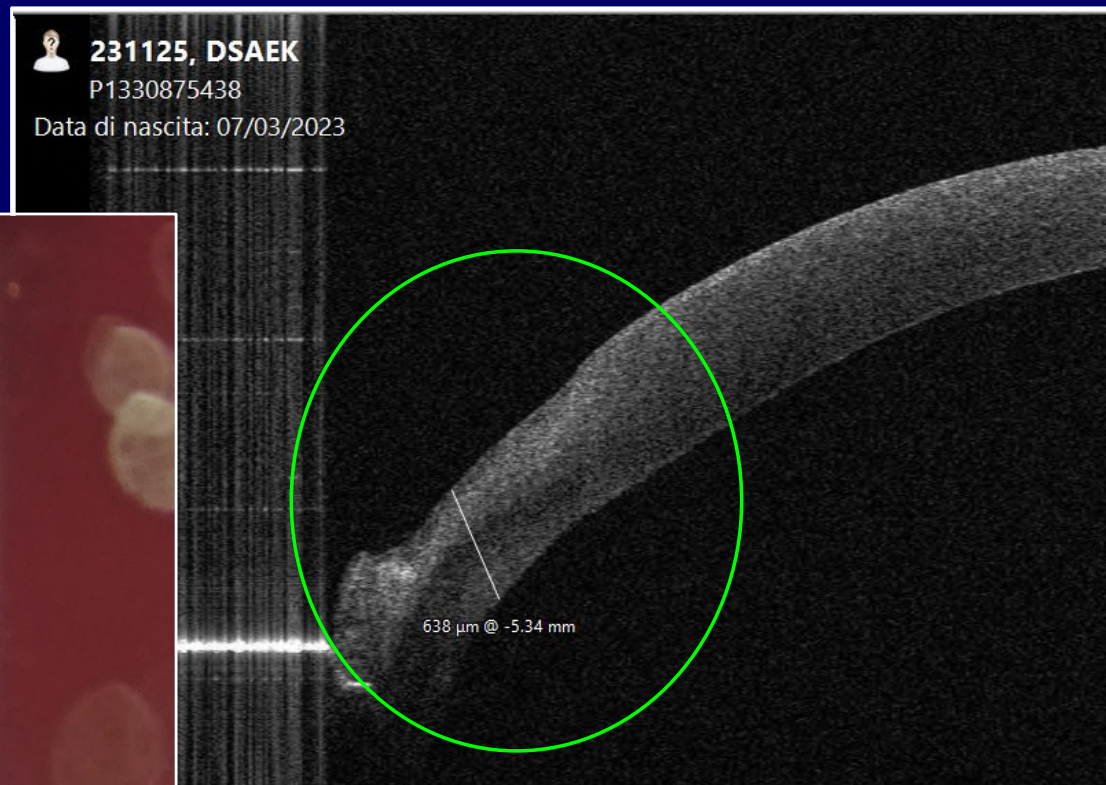
231122, dsek  
P1726704503  
Data di nascita: 07/03/2023

# STROMAL DEFECTS

- INFILTRATES
- SCARS
- For DSEAK



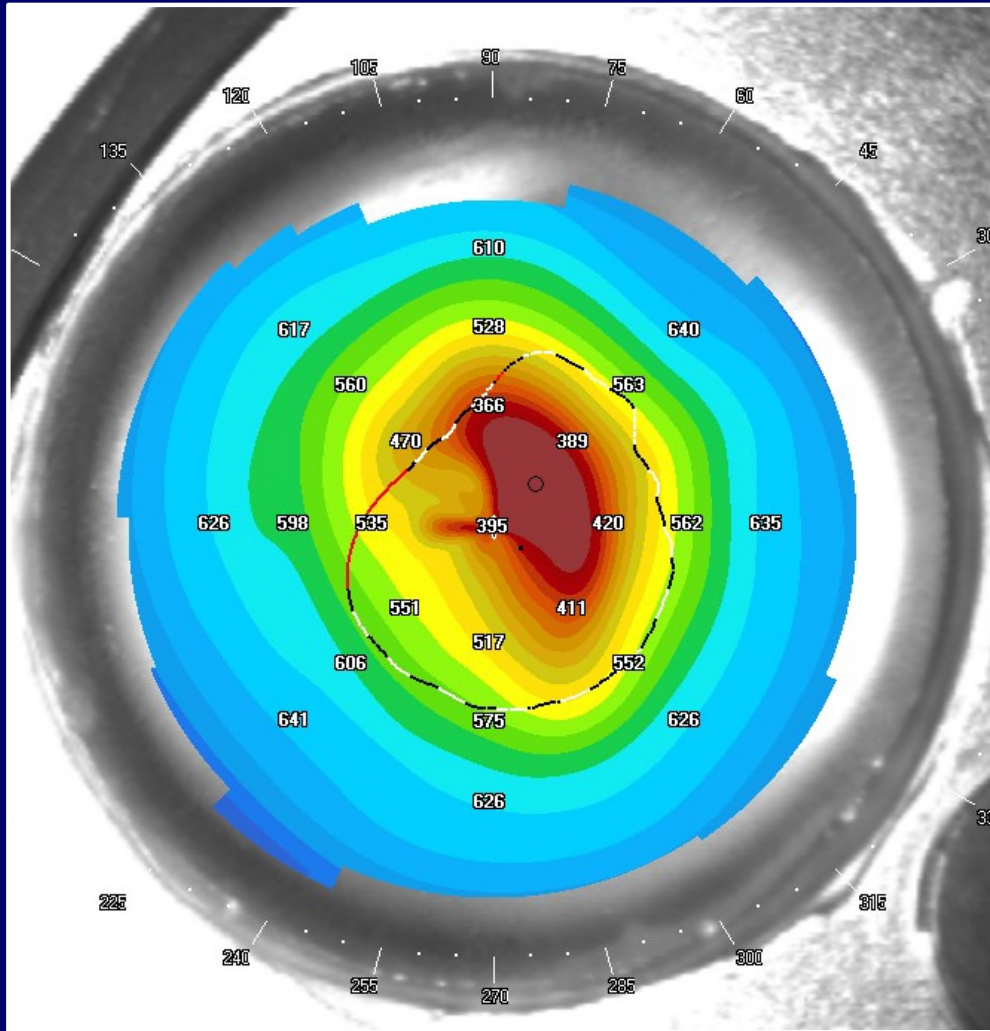
# STROMAL DEFECTS



- INFILTRATES
- ULCERS
- For DMEK

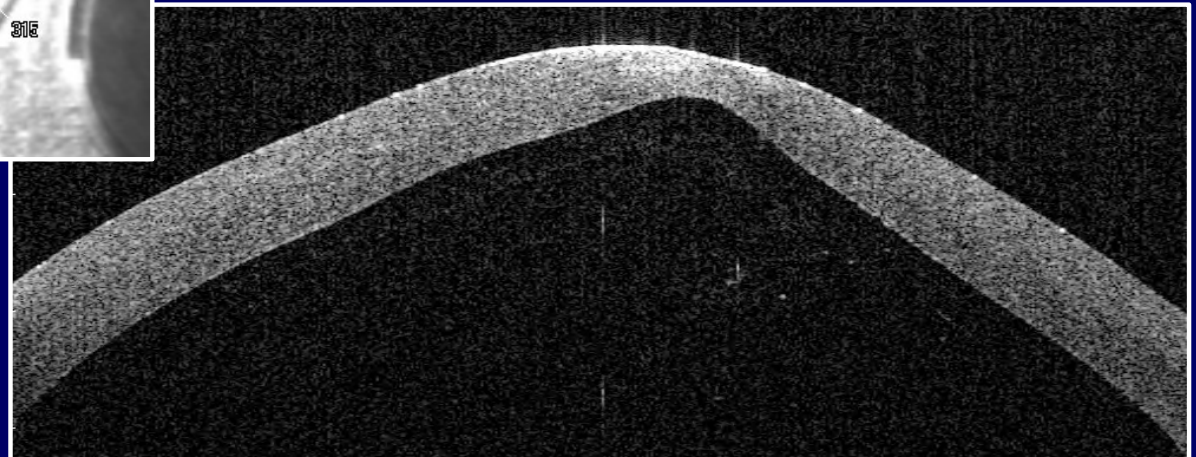


# KERATOCONUS

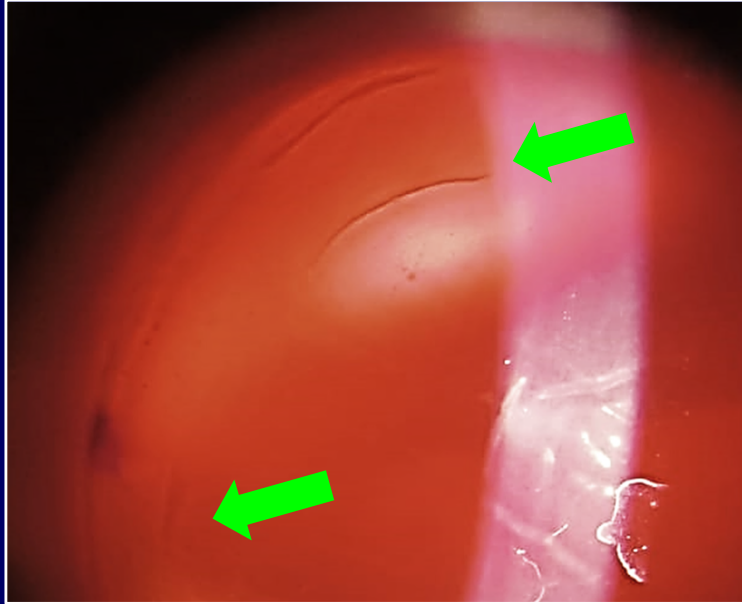


DSAEK: NO, tissue perforation!

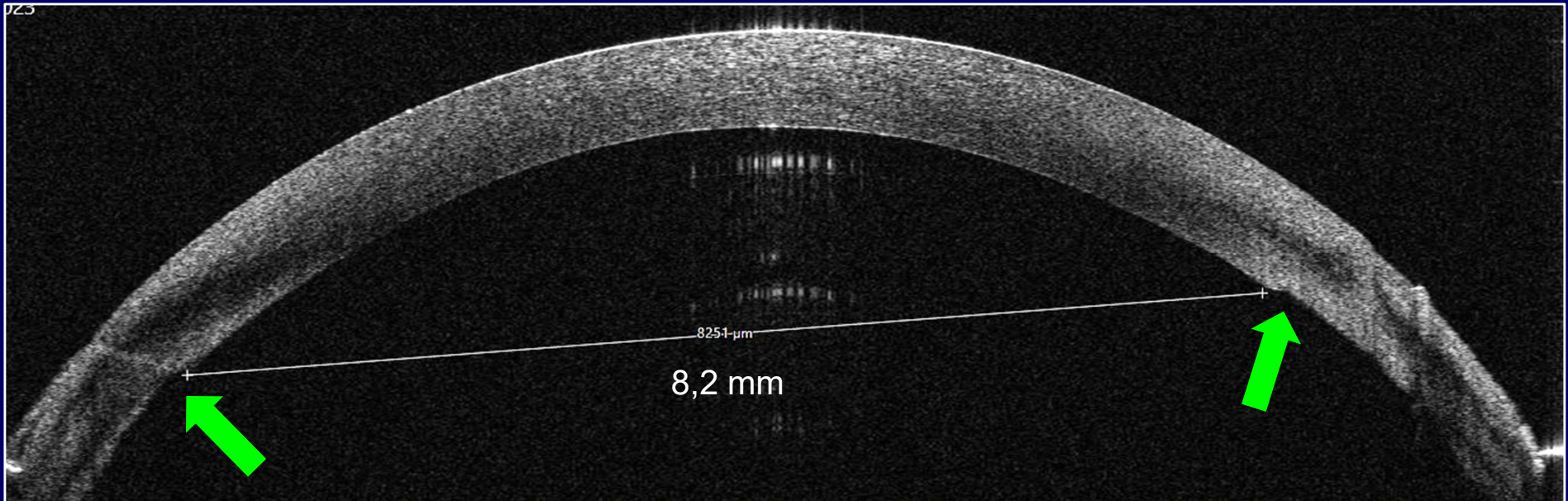
DMEK: > 55 old



# CATARACT SURGERY

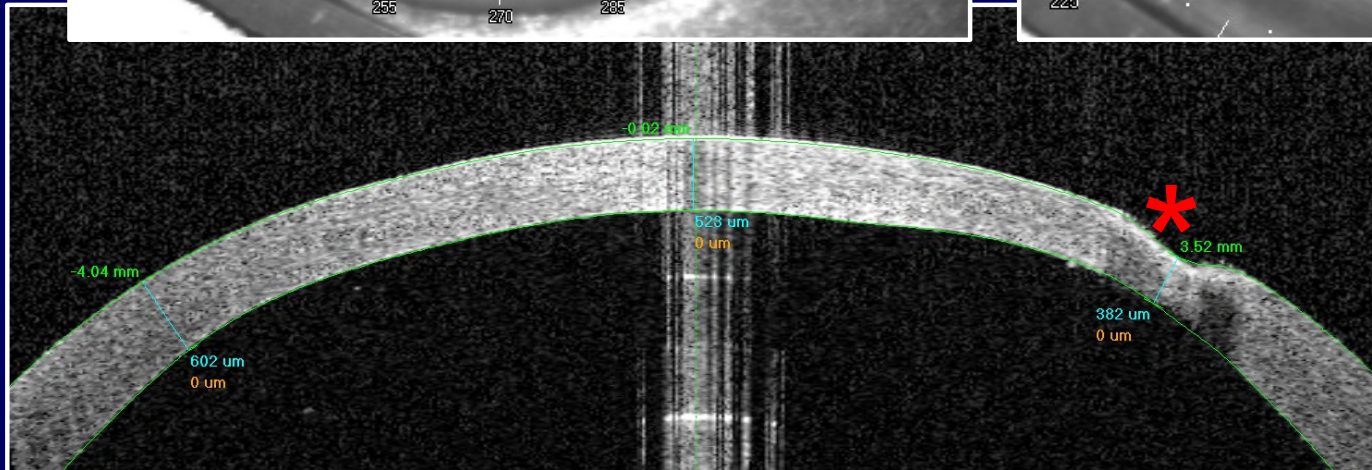
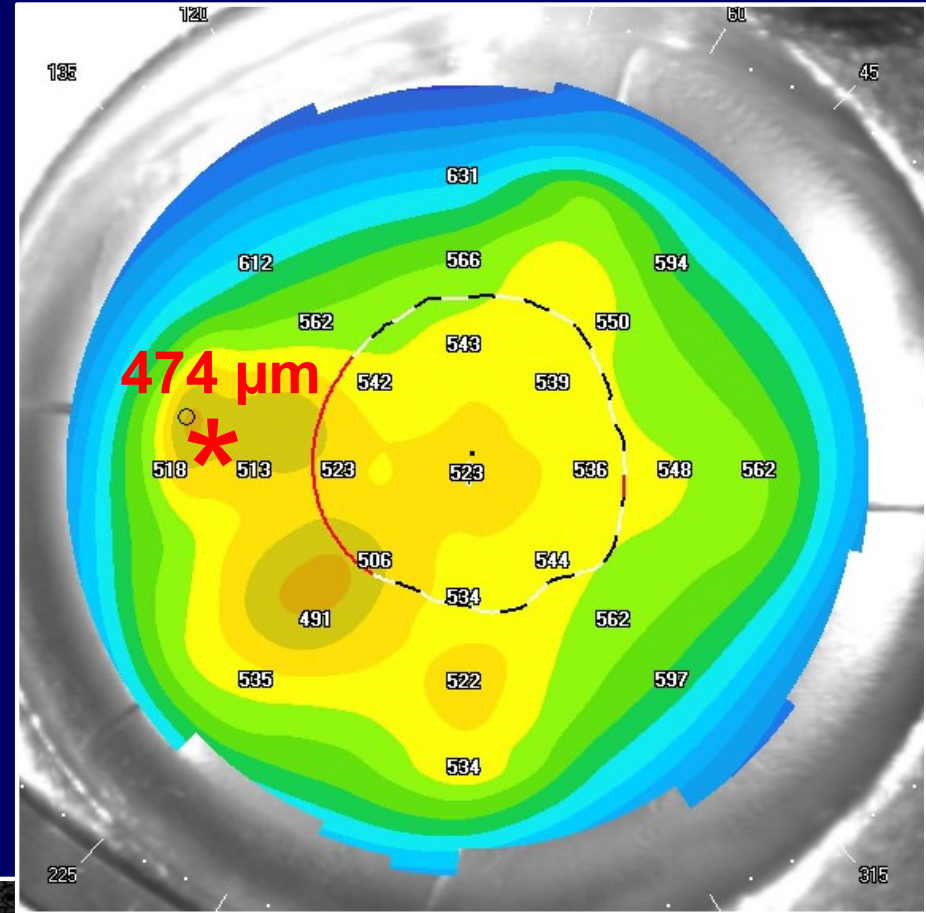
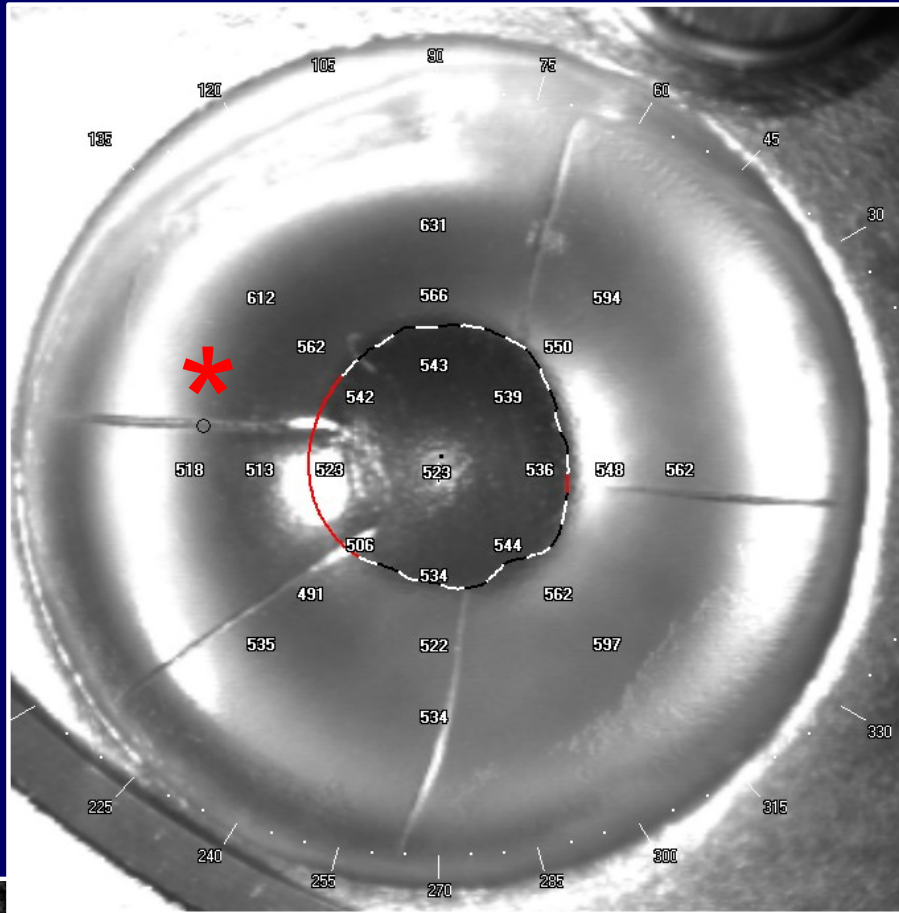


- NO DSAEK
- DMEK?





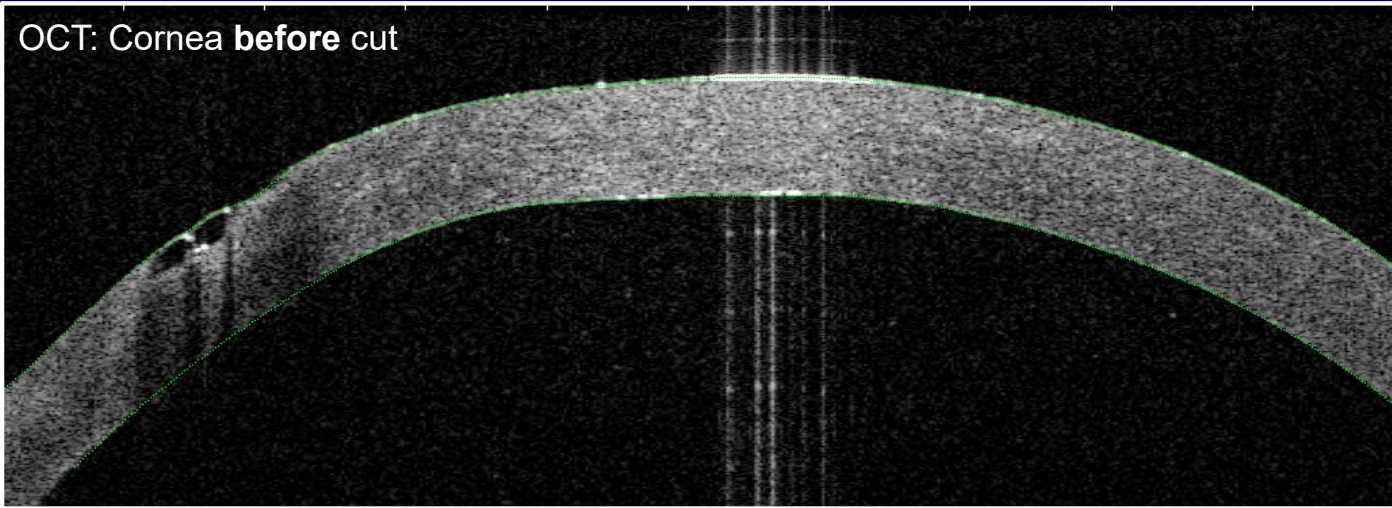
# RADIAL KERATOTOMY



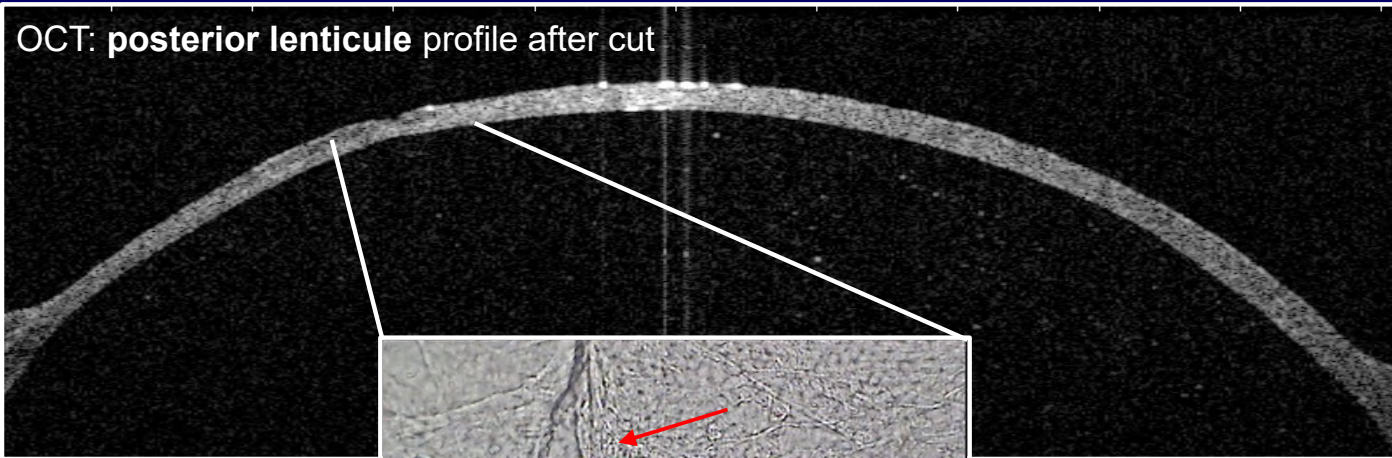
\* Thinnest point detected

# RADIAL KERATOTOMY

OCT: Cornea before cut



OCT: posterior lenticule profile after cut



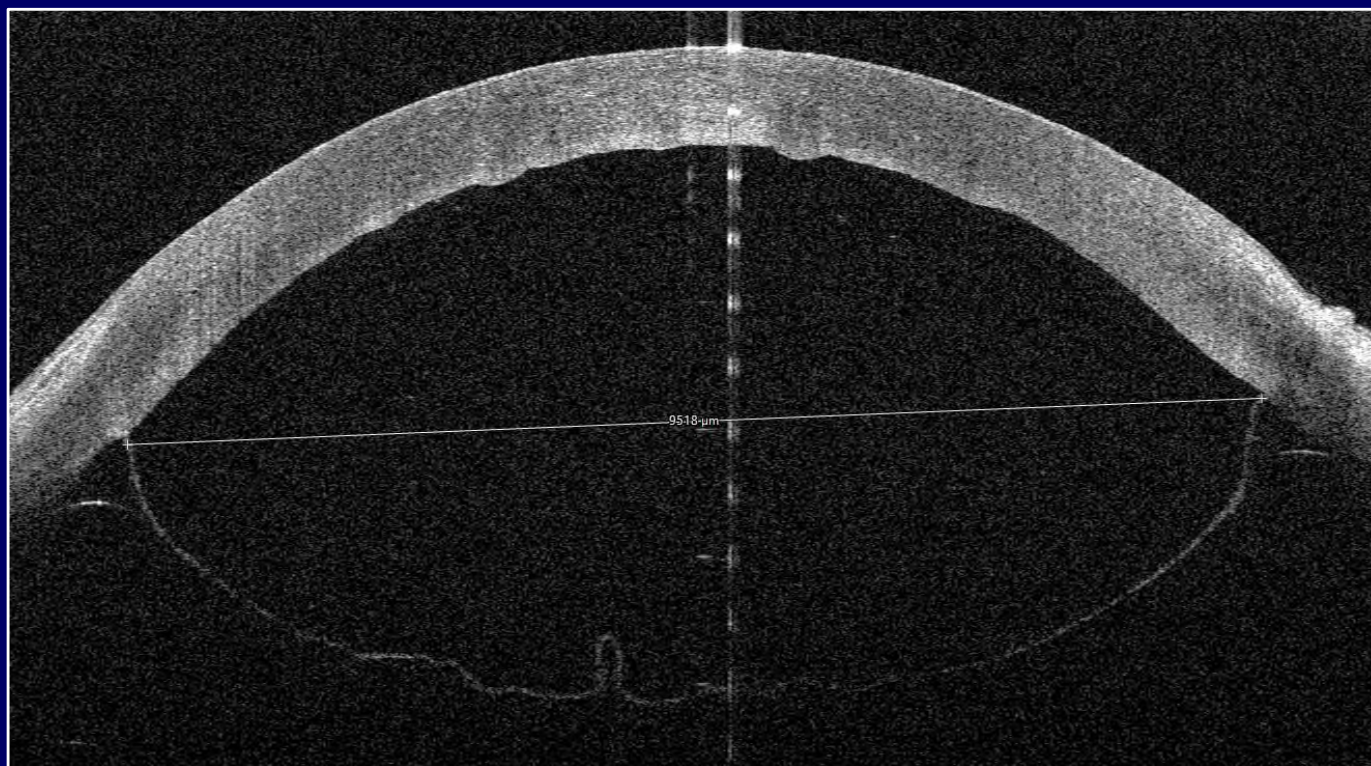
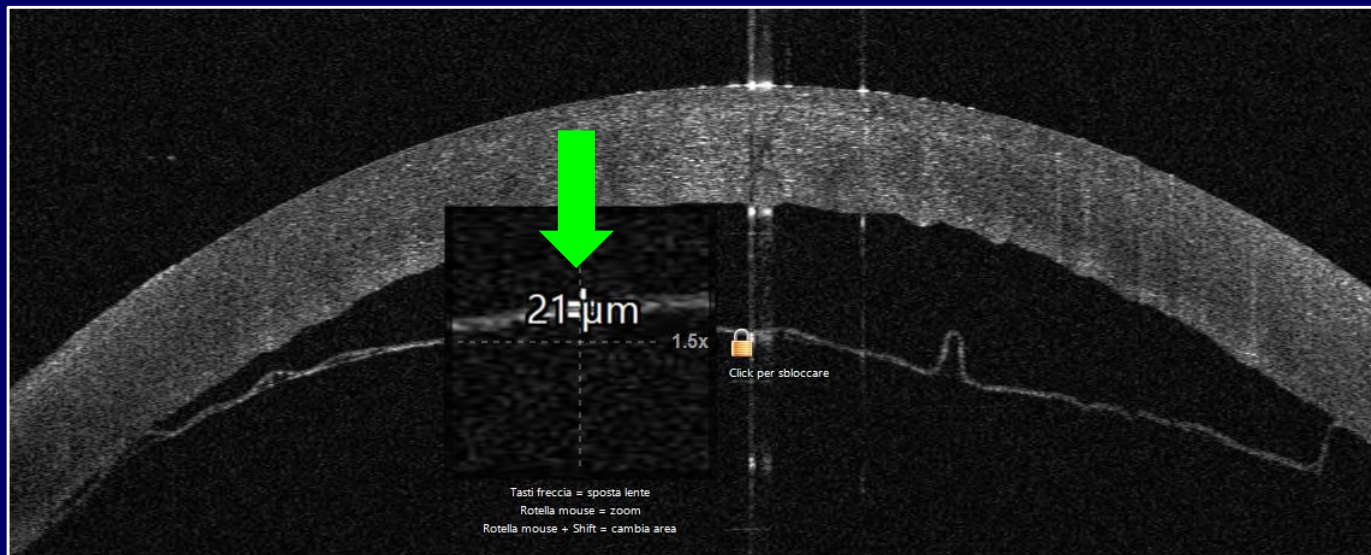
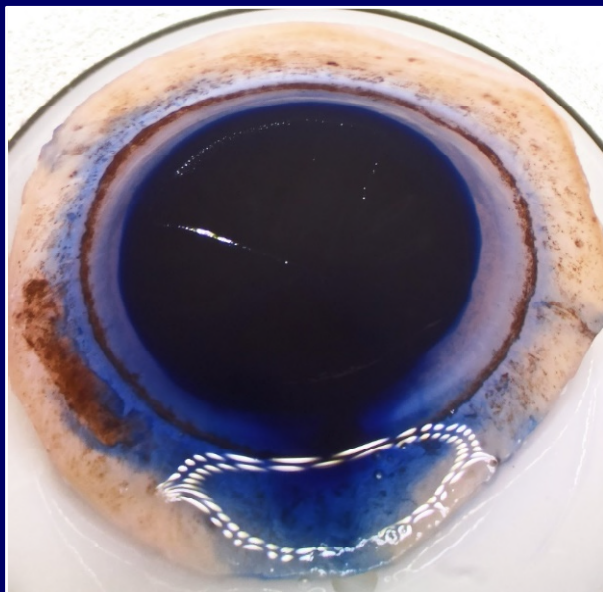
100x  
light microscope.  
stromal bed  
incision.

Nahum, Yoav et al. "Two cases of ultrathin Descemet stripping automated endothelial keratoplasty utilizing a graft that had undergone radial keratotomy." Indian journal of ophthalmology vol. 64,2 (2016): 162-4. doi:10.4103/0301-4738.179713

DSAEK: YES, depends on the  
depth of the incisions

# DMEK

Type-2 bubble preparation



# GRAZIE PER L'ATTENZIONE



**RESEARCH**



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**EYE BANKING**

**TRAINING**

