

PREPARAZIONE DI TESSUTI PER PROTESI INTRAOCULARI

Alessandro Ruzza

L'AQUILA, 18 MAGGIO 2024

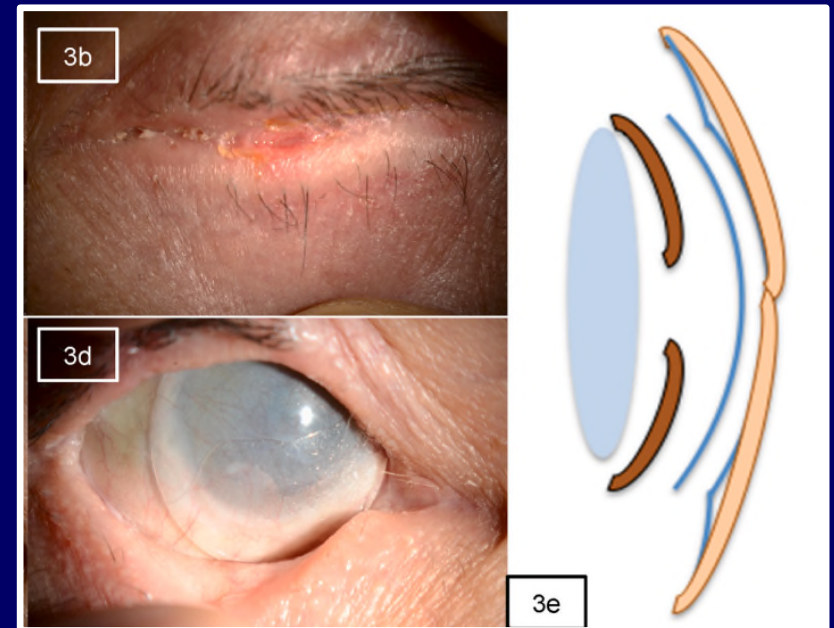
XVI CORSO NAZIONALE SIBO

BACKGROUND

- Stevens-Johnson syndrome
- Burns and caustics
- Multiple rejections

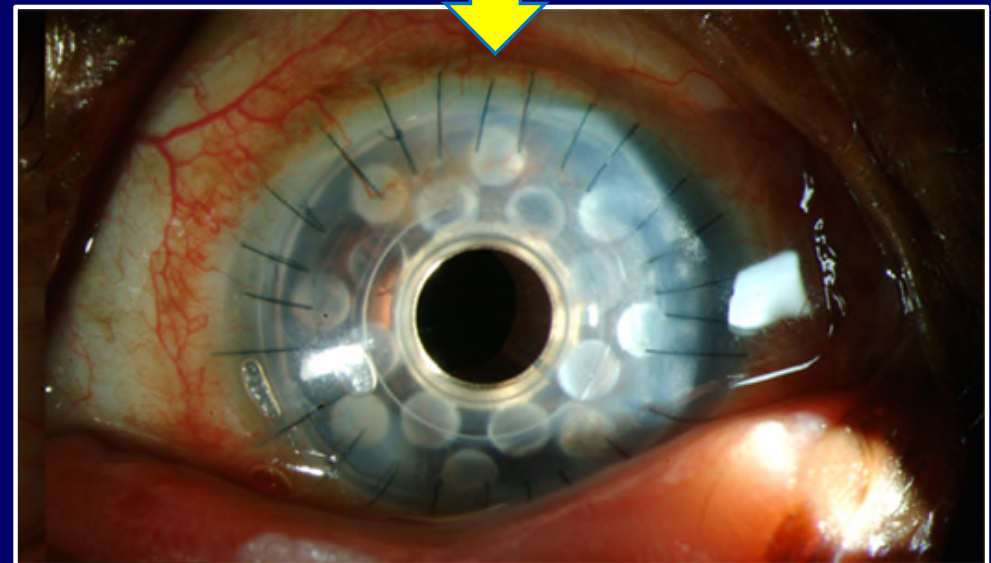
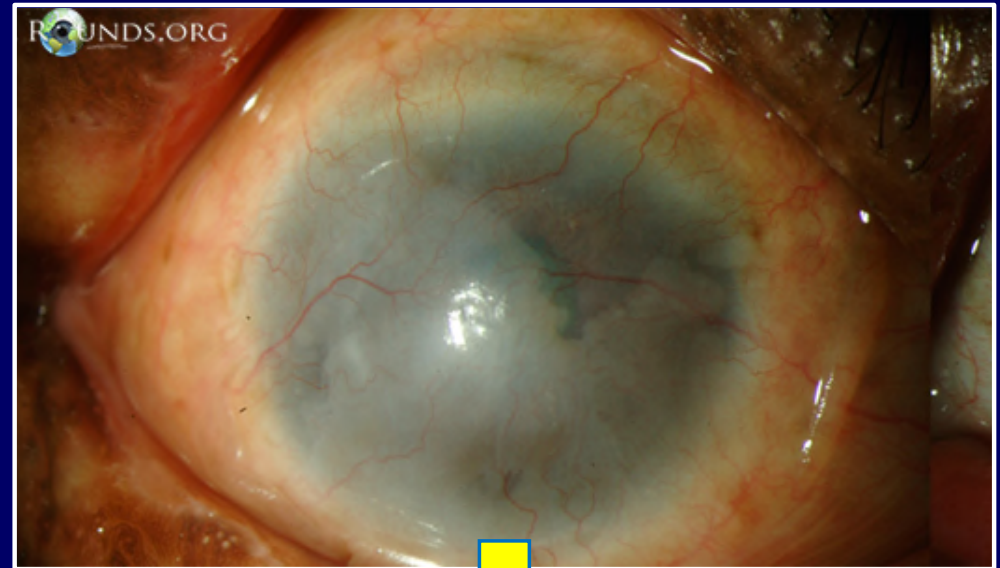
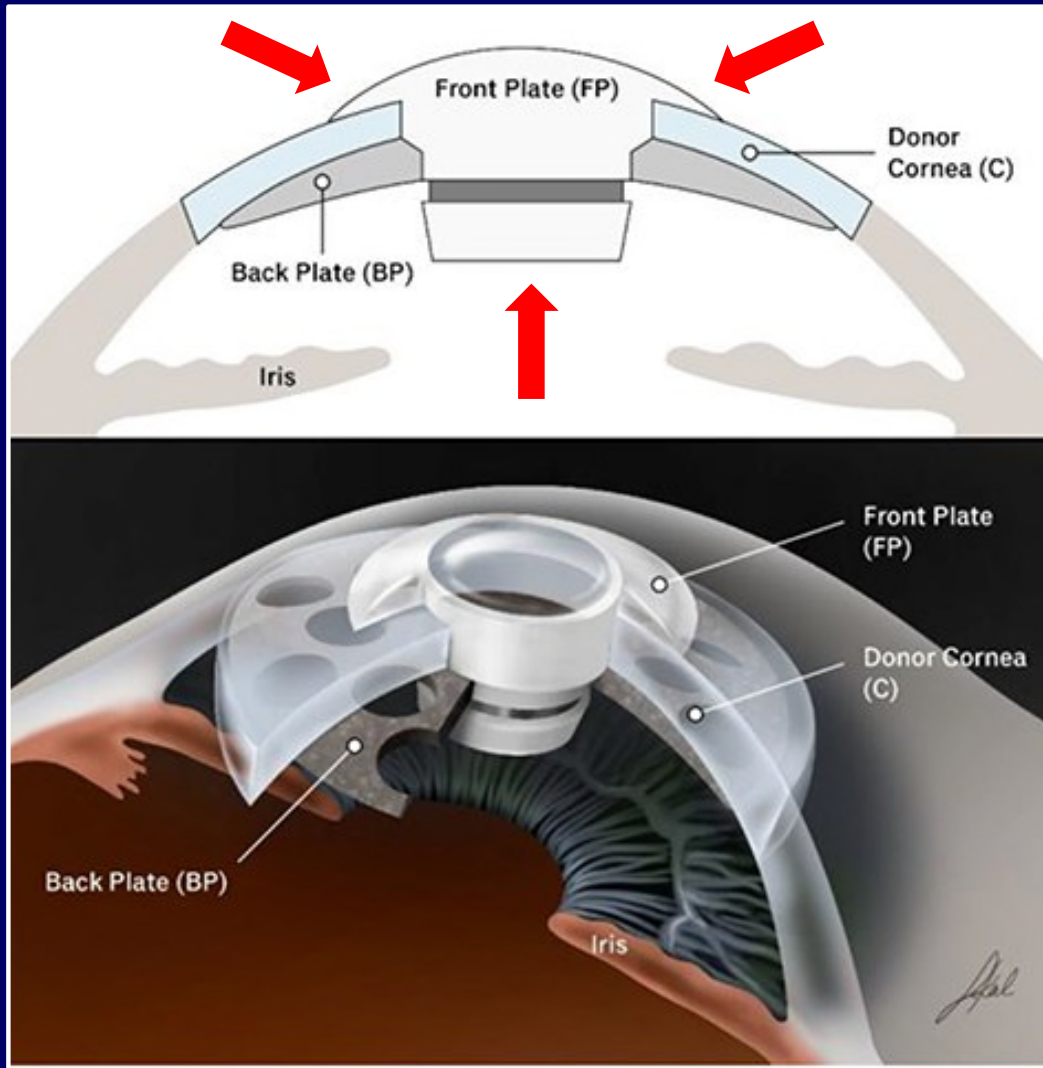


Basu et al. Chronic Ocular Sequelae of Stevens-Johnson Syndrome in Children: Long-term Impact of Appropriate Therapy on Natural History of Disease. Am J Ophthalmol. 2018 May;189:17-28. doi: 10.1016/j.ajo.2018.01.028. Epub 2018 Feb 6. PMID: 29421293.



Aziza et al. Challenges in the management of bilateral eyelid closure in Stevens-Johnson Syndrome. Am J Ophthalmol Case Rep. 2022 Mar 5;26:101473. doi: 10.1016/j.ajoc.2022.101473. PMID: 35308589; PMCID: PMC8924635.

Boston KERTOPROTESIS (Type-I)



0,3 % (n=156) K-PRO - 2023 Eye Banking Statistical Report

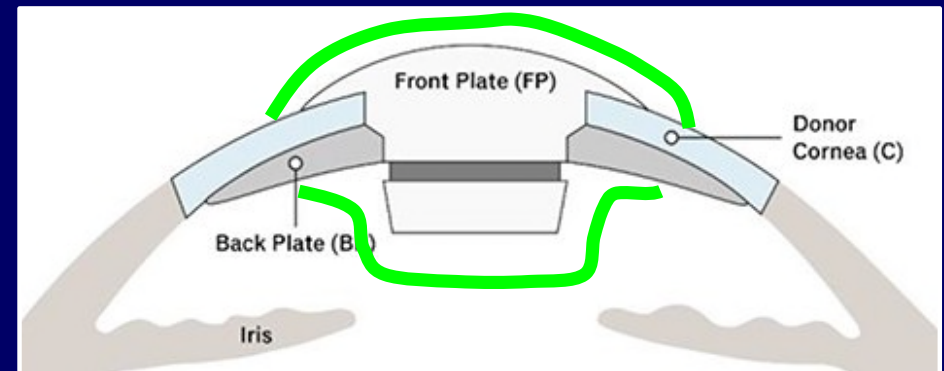
PROOF OF CONCEPT

- Scaffold corneo-sclerale
 - Utilizzo di **pre-descemet** nel campo ottico

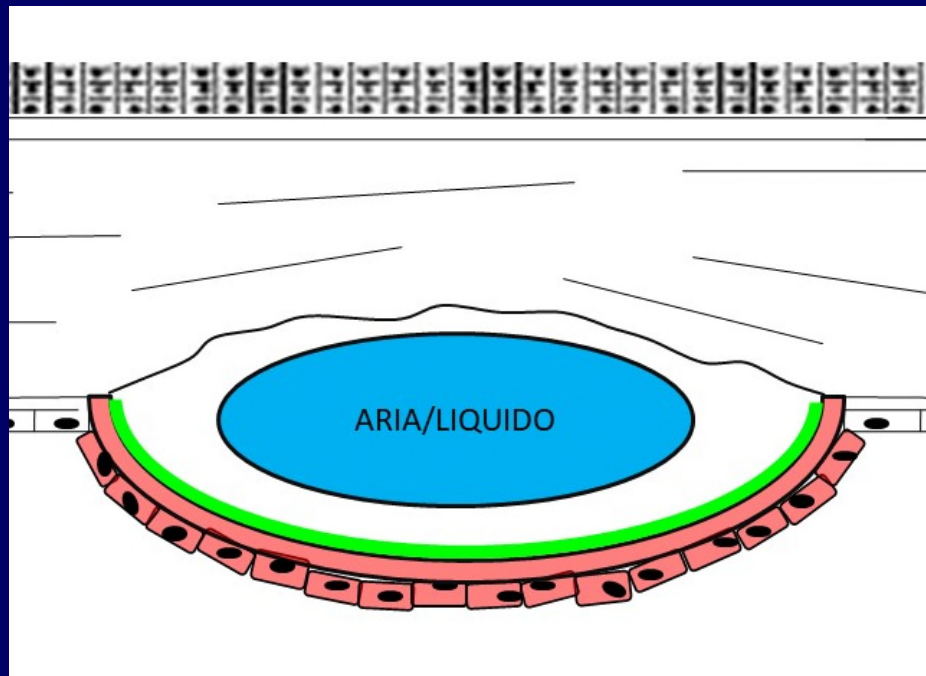
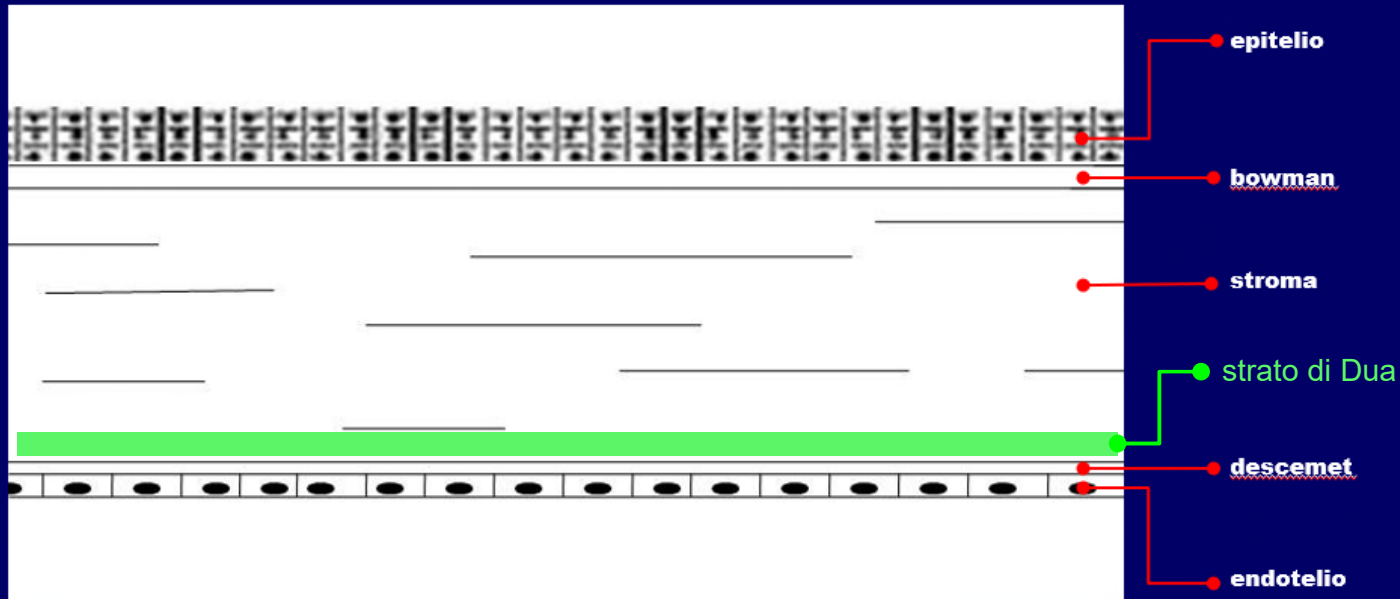
- Preparazione

- Caratterizzazione

- Integrazione con il prototipo

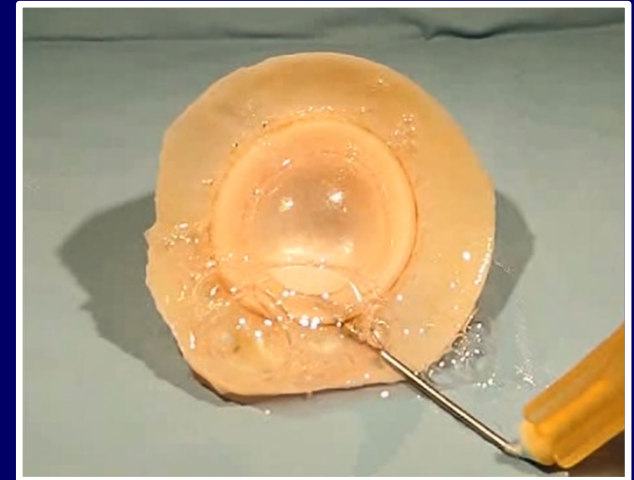


PRE-DESCEMET (STRATO DI DUA)

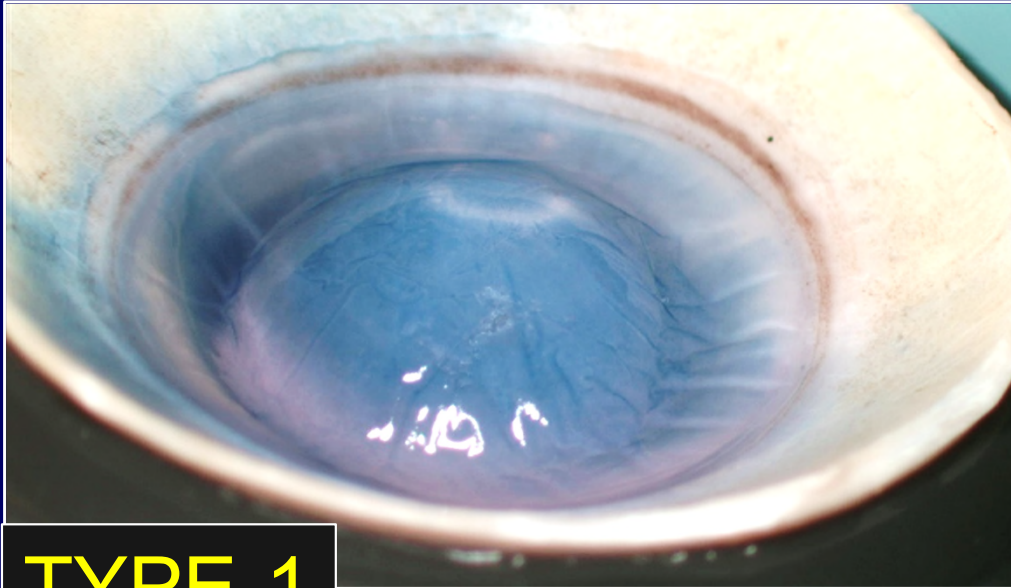


Anwar M, Teichmann KD. Big-bubble technique to bare Descemet's membrane in anterior lamellar keratoplasty. J Cataract Refract Surg. 2002;28(3):398-403. doi:10.1016/s0886-3350(01)01181-6

Dua et al. Human corneal anatomy redefined: a novel pre-Descemet's layer (Dua's layer). Ophthalmology. 2013 Sep;120(9):1778-85. doi: 10.1016/j.optha.2013.01.018. Epub 2013 May 25. PMID: 23714320.



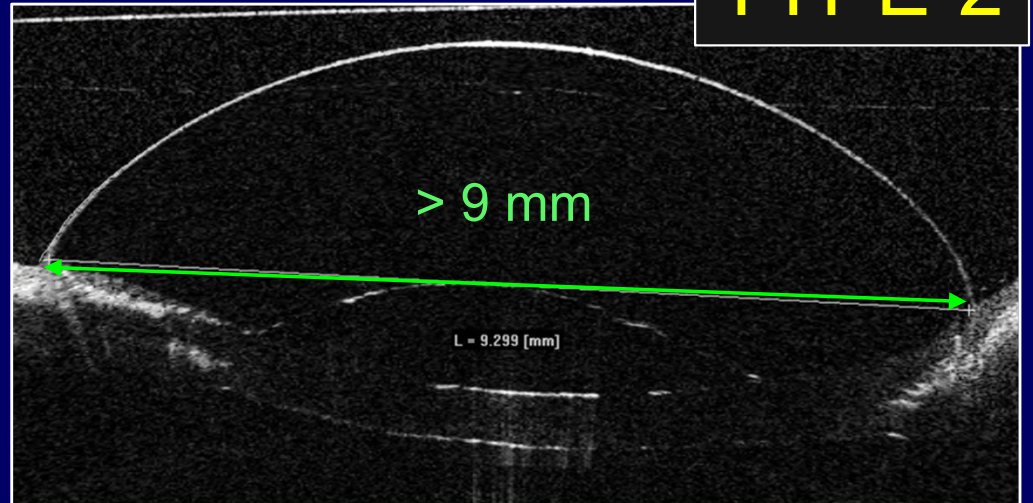
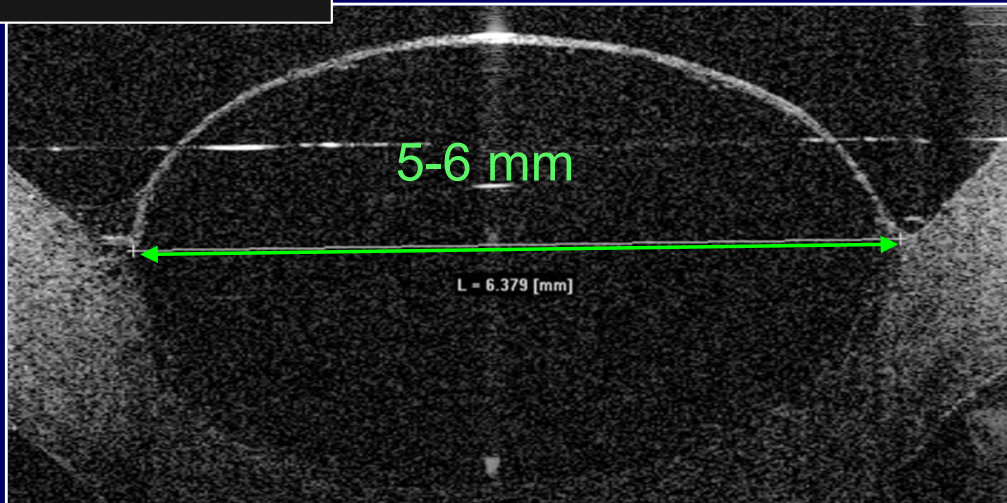
TYPE OF BUBBLES



TYPE-1



TYPE-2



DALK = lamellare anteriore (paziente)

PDEK = endoheratoplastica (donatore)

DMEK = endoheratoplastica (donatore)

PRE-DESCEMET: caratteristiche

- 10 μm di collagene I e VI

- Resistenza

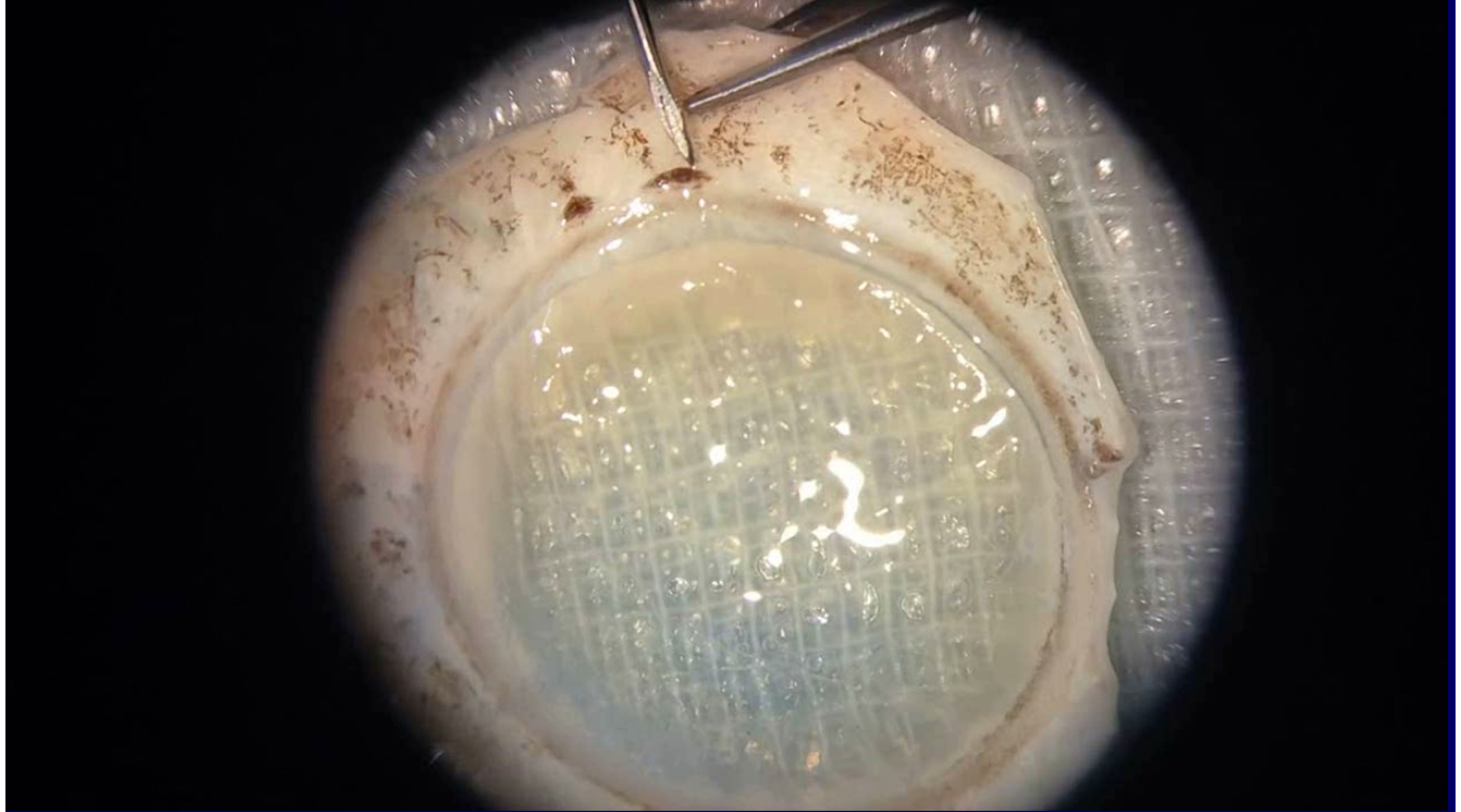
 - *Bursting pressure: 700 mmHg*

- Rigidità

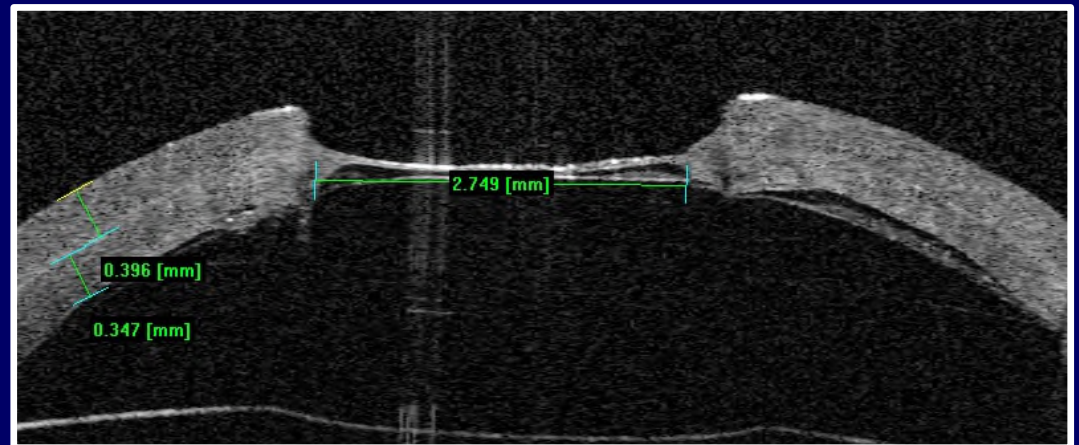
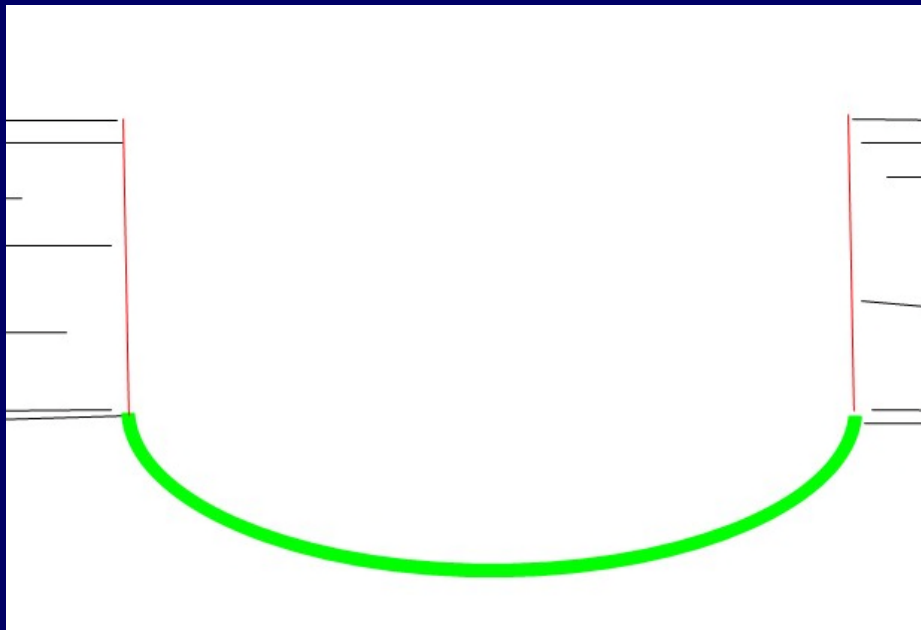
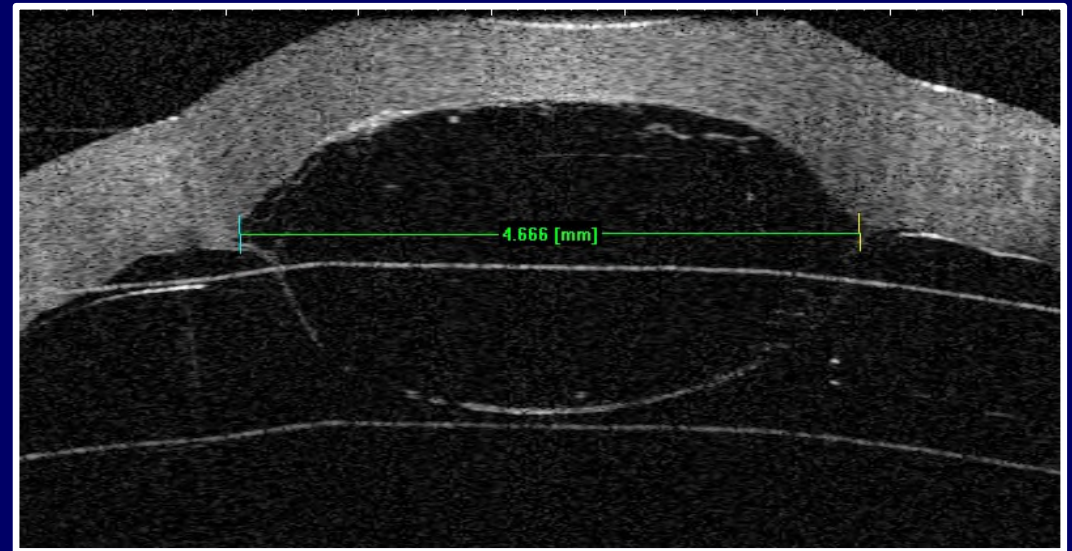
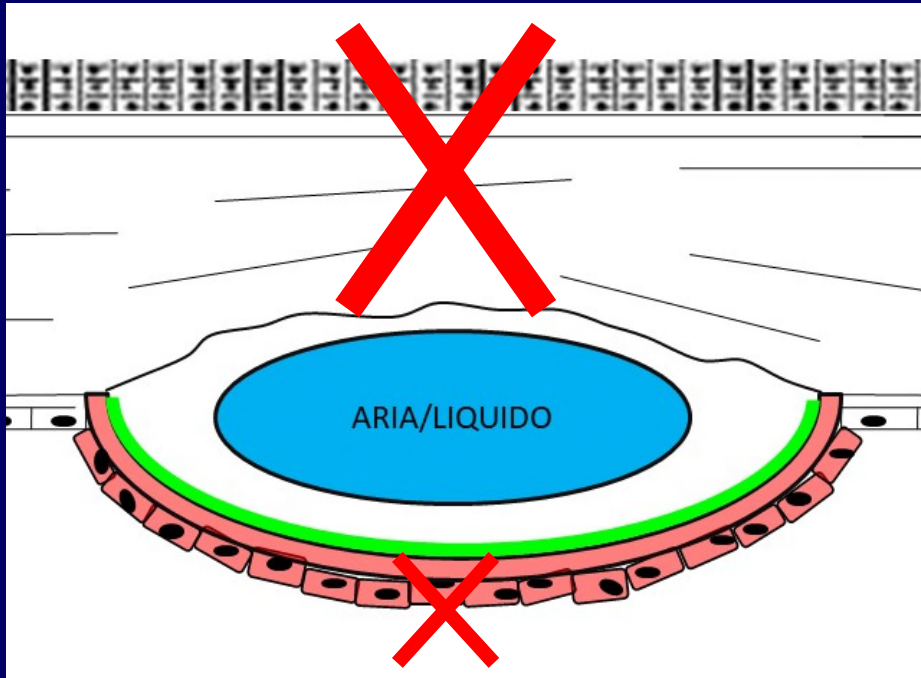
Dua, Harminder S et al. "The pre-Descemet's layer (Dua's layer, also known as the Dua-Fine layer and the pre-posterior limiting lamina layer): Discovery, characterisation, clinical and surgical applications, and the controversy." Progress in retinal and eye research vol. 97 (2023): 101161. doi:10.1016/j.preteyeres.2022.101161

- Trasparenza (con Endotelio funzionante)

TYPE-1 BUBBLE: AIR VS LIQUID



ISOLAMENTO della PRE-DESCEMET



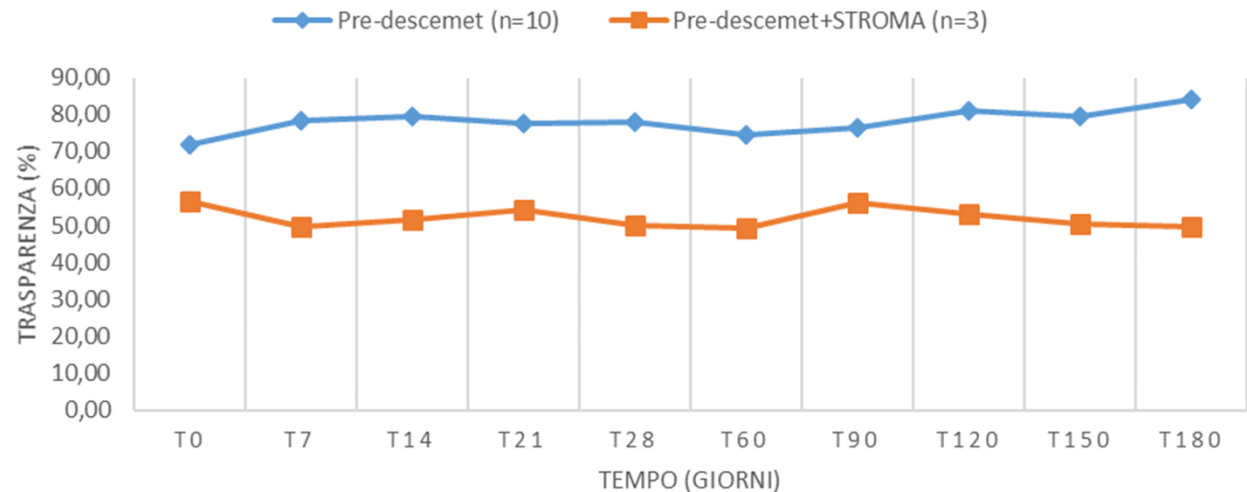
PREPARAZIONE DEL TESSUTO

CARATTERIZZAZIONE

■ Trasparenza

- Parekh et al. A portable device for measuring donor corneal transparency in eye banks. Cell Tissue Bank. 2014 Mar;15(1):7-13. doi: 10.1007/s10561-013-9372-2. Epub 2013 Apr 27. PMID: 23625054.

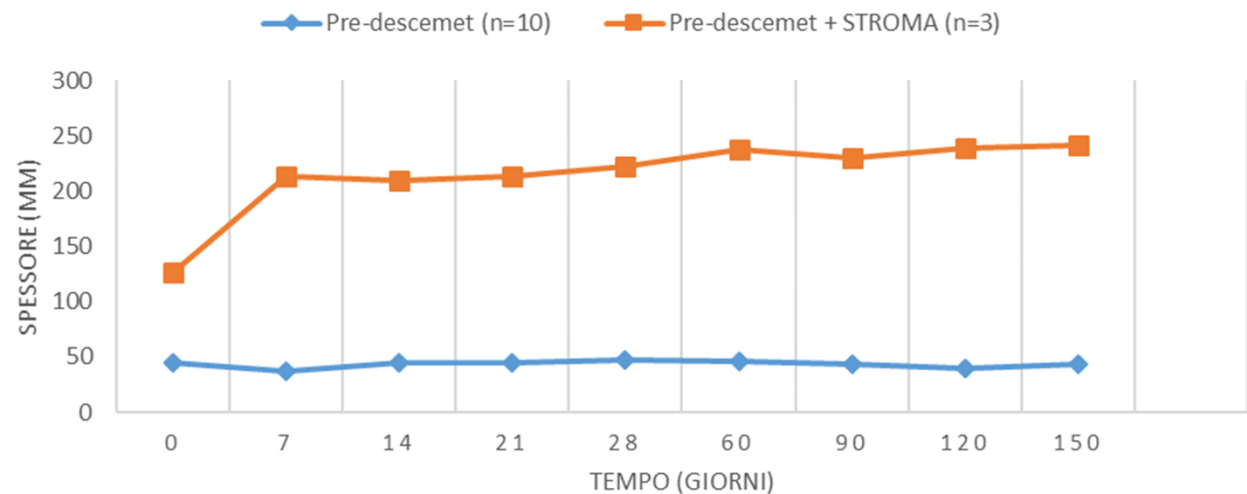
TRASPARENZA VS TEMPO DI CONSERVAZIONE



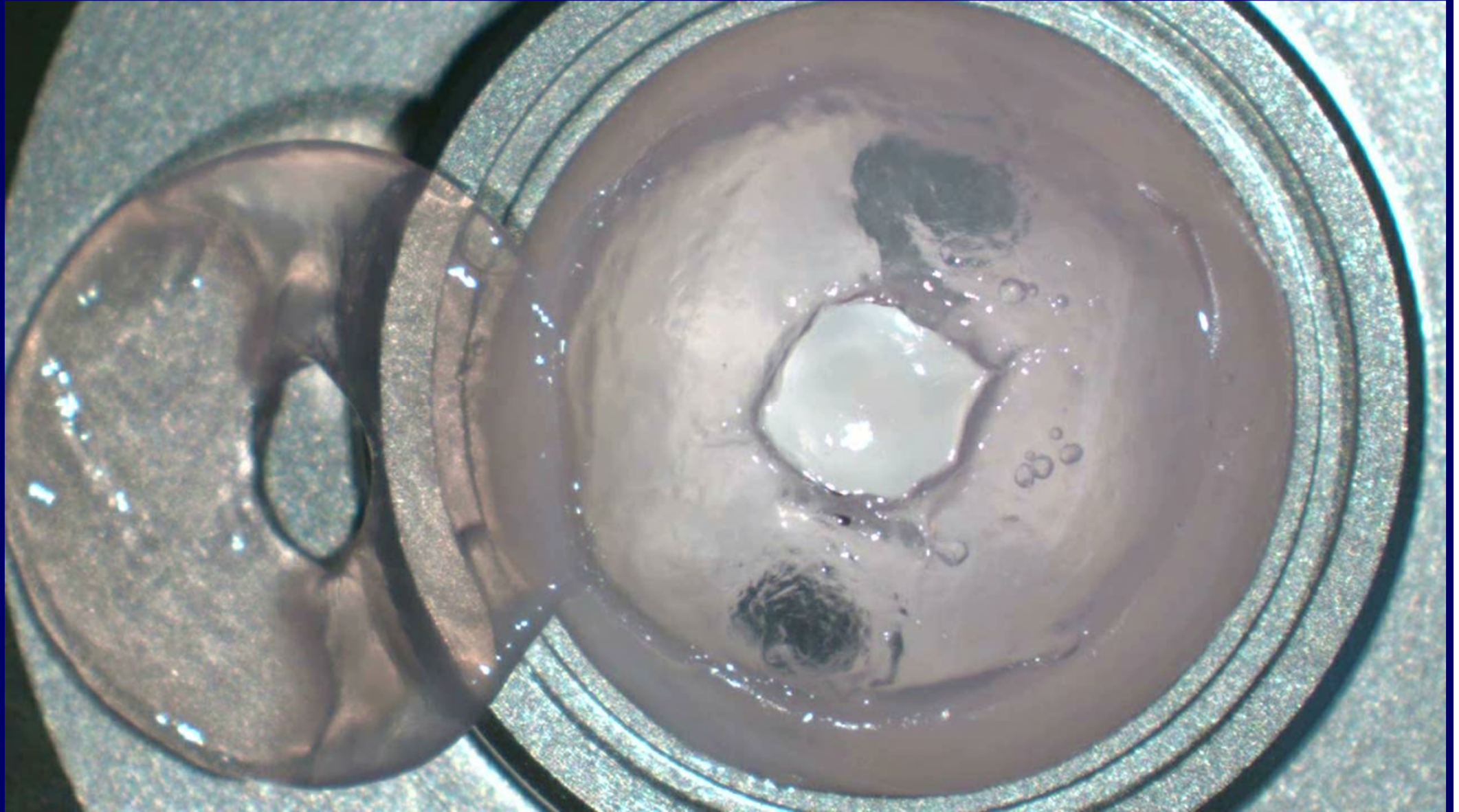
■ Spessore

- AS-OCT

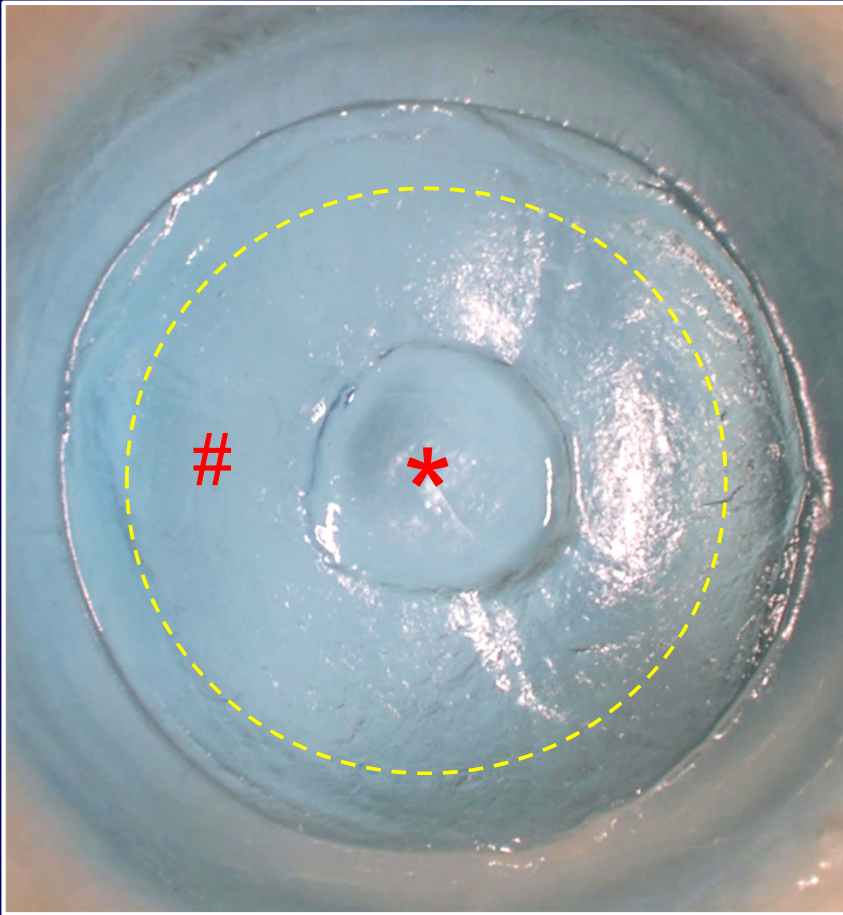
SPESSORE VS TEMPO DI CONSERVAZIONE



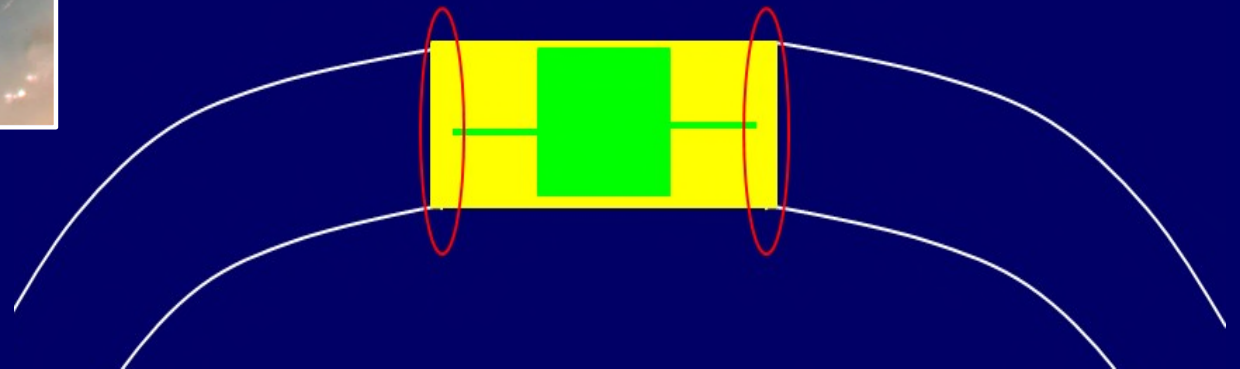
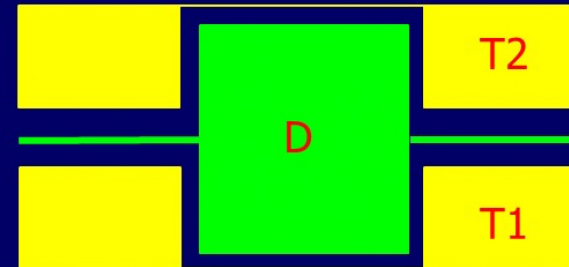
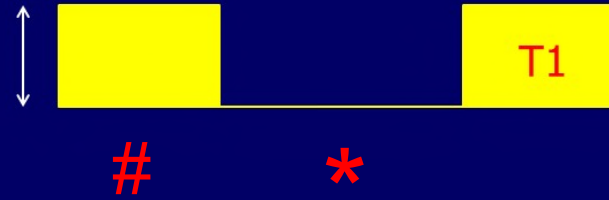
INTEGRAZIONE CON IL DEVICE



INTEGRAZIONE CON IL DEVICE



250 μm



CONCLUSIONI

■ Proof of concept

- Isolamento della pre-descemet (type-1 bubble)
- Conservazione e mantenimento della trasparenza fino ad 1 anno

■ Success rate: 61,5%

Dua et al. Dynamics of big bubble formation in deep anterior lamellar keratoplasty by the big bubble technique: in vitro studies. *Acta Ophthalmol.* 2018;96(1):69-76. doi:10.1111/aos.13460

■ Validazione chirurgica

