

TESSUTI PER DSAEK: LE ASPETTATIVE DEL CHIRURGO

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PREPARAZIONE DEL LEMBO

- **SURGEON-DISSECTED PRECUT TISSUE** FOR DESCOMET' S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY
- **SURGEON-PREPARED TISSUE** FOR DESCOMET' S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY
 - STANDARD PROCEDURE WITH MICROKERATOME FOR DSAEK
 - "ULTRA-THIN" (UT) DSAEK
 - FEMTOSECOND LASER-ASSISTED TISSUE PREPARATION (WITH OR WITHOUT HYP-SCL

SURGEON-PREPARED TISSUE FOR DESCEMET'S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY

Descemet's stripping automated endothelial
keratoplasty (DSAEK) tissue
preparation with femtosecond laser and
contact lens

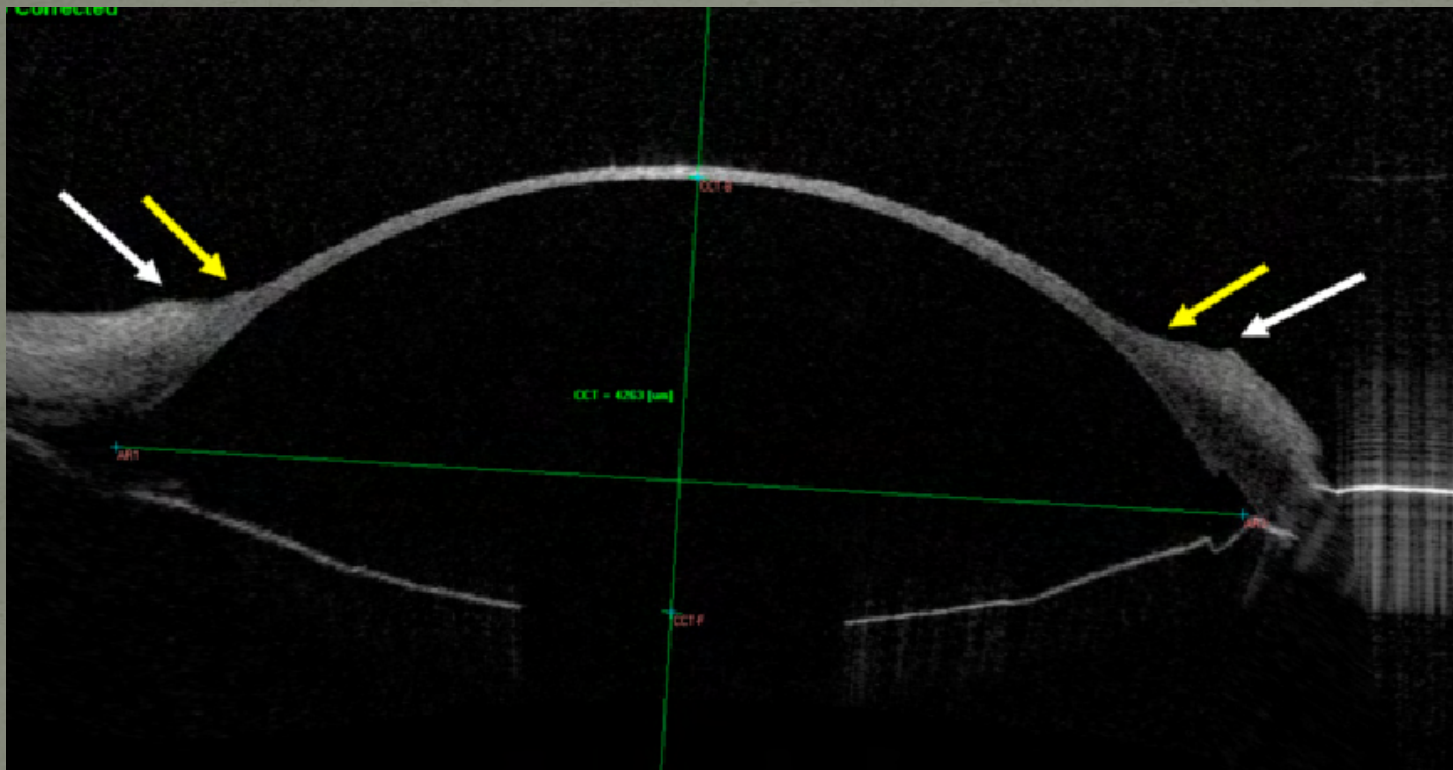
SURGEON-PREPARED TISSUE FOR
DESCEMET' S STRIPPING
AUTOMATED ENDOTHELIAL
KERATOPLASTY

- “Ultra-thin” (UT) DSAEK

“Ultra-thin” (UT) DSAEK

- The UT graft is created with two microkeratome passes, the first one to debulk the donor tissue and the second one to cut down the final thickness to about 100 micrometers. This is an easy-to-perform and widely applicable procedure to obtain reproducible results with the use of the microkeratome

“Ultra-thin” (UT) DSAEK



Anterior OCT image of a donor cornea after preparation for UT-DSAEK. The white arrows indicate the site of the first cut, the yellow arrows the site of the second pass

“Ultra-thin” (UT) DSAEK

- FIRST CUT : remove approximately 2/3 of the anterior stroma, using a disposable 300- or 350-micrometer cutting head, which should be passed for at least 4 seconds.
- SECOND CUT :The second cut (the refinement cut) is made with a 90- to 200-micrometer microkeratome head, depending on the tissue thickness, with the goal of ultimately creating a graft that is approximately 100 micrometers or less (see guidelines in table below).

Pachymetry ranges and Choice of microkeratome head for second cut

- <150 micrometers → No second cut
 - Between 150 and 180 micrometers → Use 50 micrometers
 - Between 180 and 210 micrometers → Use 90 micrometers
 - Between 210 and 230 micrometers → Use 110 micrometers
 - Between 230 and 250 micrometers → Use 130 micrometers
- With the ultra-thin procedure, the speed of visual recovery is faster than conventional DSAEK and equivalent to DMEK—and the proportion of patients who achieve final acuity of 20/20 is higher than conventional DSAEK and perhaps also DMEK. In short, this procedure offers the potential to achieve the visual results of DMEK with the ease of handling and tissue preparation of DSAEK.

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SURGEON-DISSECTED PRECUT
TISSUE FOR DESCOMET' S
STRIPPING AUTOMATED
ENDOTHELIAL KERATOPLASTY

- WHAT' S NEW ?

Surgeon-dissected precut tissue for Descemet's stripping automated endothelial keratoplasty

- Preparation of donor tissue is performed under a laminar flow hood in the **eye bank** at our institution by the surgeon approximately 1-2 hours prior to DSAEK surgery. The entire procedure utilizes sterile technique and complies with Association of Operating Room Nurses (AORN)/Eye Bank Association of America (EBAA) regulations. The eye bank staff then delivers the tissue to the hospital for use at the time of the procedure.

Surgeon-dissected precut tissue for Descemet's stripping automated endothelial keratoplasty

- Significant debate and study has gone into addressing the issue of precut tissue for Descemet's stripping automated endothelial keratoplasty (DSAEK) surgery and its **comparison** with surgeon-prepared tissue^{*-**}

Price MO, Price FW Jr, Stoege C, et al. Central thickness variation in precut DSAEK donor grafts. J Cataract Refract Surg. 2008;34(9):1423-4

Kitzmann AS, Goins KM, Reed C, et al. Eye bank survey of surgeons using precut donor tissue for descemet stripping automated endothelial keratoplasty. Cornea. 2008;27(6):632-3.

Surgeon-dissected precut tissue for Descemet's stripping automated endothelial keratoplasty

- . Although published literature has shown eye bank pre-cut tissue to be **comparable** to tissue dissected at the time of surgery, surgeons continue to have concerns about varying quality of tissue preparation between different institutions. .
- Possible tissue collapse on the artificial anterior chamber, **decentration** of the microkeratome cut, loss of tissue marking, lack of anterior cap adherence to posterior lamella, anterior edge undermining, and other **tissue preparation problems** continue to keep some surgeons from moving to exclusively precut tissue.

•Kitzmann AS, Goins KM, Reed C, et al. Eye bank survey of surgeons using precut donor tissue for descemet stripping automated endothelial keratoplasty. Cornea. 2008;27(6):632-3.

Surgeon-dissected precut tissue for Descemet's stripping automated endothelial keratoplasty

- In a prior surgeon survey of tissue from a single eye bank used in 197 DSAEK surgeries, donor tissue preparation difficulties occurred in 10% of cases and the tissue was found to be unacceptable in 2%.
- Due to these issues and the poor reimbursement for intra-operative tissue preparation, it is necessary to develop an efficient mechanism for surgeon-dissected precut tissue for our DSAEK patients.

•Kitzmann AS, Goins KM, Reed C, et al. Eye bank survey of surgeons using precut donor tissue for descemet stripping automated endothelial keratoplasty. *Cornea*. 2008;27(6):632-3.

Surgeon-dissected precut tissue for Descemet's stripping automated endothelial keratoplasty

- **Methods:**

- The procedure is performed under a laminar flow hood in the eye bank at our institution by the surgeon approximately 1-2 hours prior to DSAEK surgery. Preparation of donor tissue using a Moria CB microkeratome and artificial chamber system has been previously described³. Necessary instrumentation is assembled by an eye bank technician who also assists during tissue preparation. The entire procedure utilizes sterile technique and complies with Association of Operating Room Nurses (AORN)/Eye Bank Association of America (EBAA) regulations. Proper tissue preparation is confirmed by the surgeon. A 350 micron microkeratome head is used for all pachymetry measurements without epithelium of 550 microns or more. Alternatively, a 300 micron head is used. The periphery of the microkeratome cut is marked anteriorly using a single use sterile marking pen to allow proper centration during corneal trephination in the operating room. After the free anterior stromal cap is replaced, the surgeon-cut tissue is placed back in storage media, the container is resealed, and the eye bank staff then delivers the tissue to the hospital for use at the time of the procedure.

Surgeon-dissected precut tissue for Descemet's stripping automated endothelial keratoplasty

- The described **protocol** allows donor tissue preparation for DSAEK surgery in an efficient and optimally sterile environment.
- It eliminates surgeon concern regarding the quality of tissue preparation.
- Since institution of this protocol, a total of 32 lamellar cuts have been performed and no complications have been encountered during tissue preparation or peri-operatively. In institutions with an eye bank within a reasonable proximity to the operating room, this protocol could be easily instituted to ensure proper tissue preparation and maximize surgical reimbursement.

Lembi a facce parallele:laser ad eccimeri

- Esterna+ spessa meno nell'ultrathin
- Taglio 300
- Laser eccimeri spessore uniforme
- Vantaggio no variazione sferica

Lembi dmek

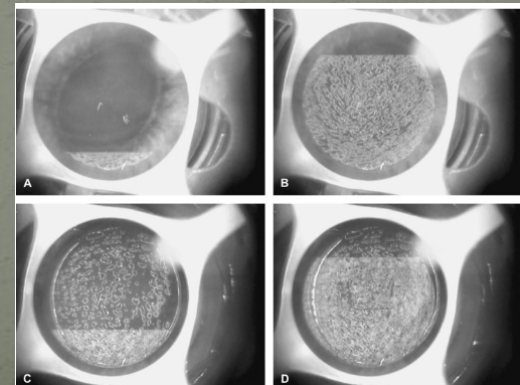
- Vantaggi recupero rapido
- Difficoltà maneggiare perdita endoteliale
- Difficoltà di preparazione

Lembi precaricati?

- Di diversa geometria su richiesta del chirurgo
- Non ancora disponibile
- Device in via di sviluppo
- Conservazione?
- Risultati
- Vantaggi: no punch e carico

A novel method of preparing planar Descemet stripping automated endothelial keratoplasty (DSAEK) tissue using a femtosecond laser with a hyperopic soft contact lens (Hyp-SCL).

- DSAEK tissue was prepared from 11 cadaveric porcine eyes. A femtosecond laser was used to create 400-microm flaps, with or without a Hyp-SCL, after which the eyes were imaged with anterior segment optical coherence tomography. The ratio of the mean central thickness (C) to the mean peripheral thickness (P) was calculated using the flap tool.



Aspettative del chirurgo

- Lembi sempre meno spessi
- Geometria sempre più regolare
- Facilità di utilizzo

GRAZIE PER L'ATTENZIONE



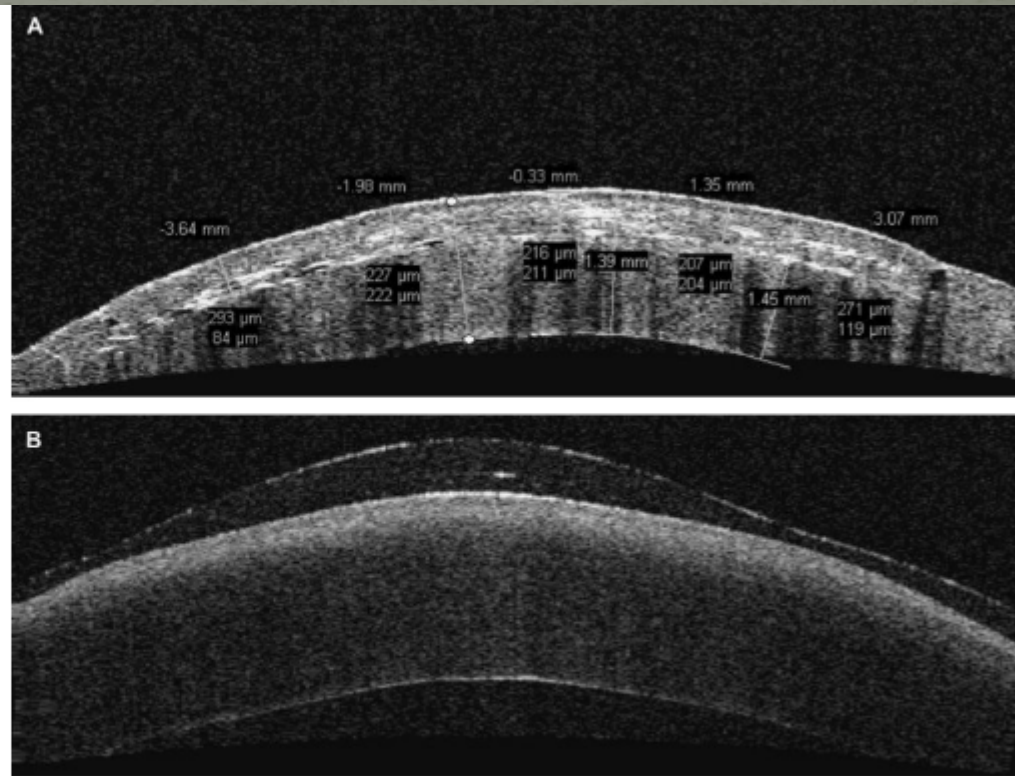
Descemet's stripping automated endothelial keratoplasty (DSAEK) tissue preparation with femtosecond laser and contact lens

- The dsaek procedures have the unwanted effect of a higher hyperopic shift (approximately + 1 diopter).
- Although there is no definitive evidence implicating a specific factor, a recent study using anterior segment optical cooherence tomography (AS-OCT) revealed that there was a significant correlation between the corneal donor lenticle C:P ratio (the ratio of the average Central graft thickness to the average of the peripheral graft thickness at 3 mm) and the postoperative hyperopic shift.

Descemet's stripping automated endothelial keratoplasty (DSAEK) tissue preparation with femtosecond laser and contact lens

- Current DSAEK tissue preparation methods result in a concave-shaped lenticle with a C:P ratio of less than 1.
- Based on this correlation, DSAEK donor tissue in a planar configuration with a C:P ratio of 1 would be desirable to prevent a refractive surprise.
- Placing a hyperopic soft contact lens on a eye, increase donor central thickness before a femtosecond laser was applied to cut a flap
- Theoretically, this would result in a concave-shaped anterior corneal flap and a DSAEK donor lenticle that was more planar with a C:P ratio closer to 1.

FIGURE 2. (A) AS-OCT image of the cornea after 2 treatments with a femtosecond laser. Two distinct interfaces are present in the corneal stroma, which correspond to the treatment planes of the femtosecond laser with and without a Hyp-SCL in place. The depth of first cut without a Hyp-SCL remained consistent, whereas the cut depth changed according to the Hyp-SCL shape when it was in place. The shape of the Hyp-SCL as seen on the porcine cornea can be appreciated with AS-OCT (B).



Descemet's stripping automated endothelial keratoplasty (DSAEK) tissue preparation with femtosecond laser and contact lens

- Eleven eyes were cut (5 without, 5 with, and 1 without and with a Hyp-SCL). In all corneas, the cut interfaces were visualized by anterior segment optical coherence tomography.
- The C:P ratios calculated for DSAEK tissue made without (mean 0.998, range 0.965-1.02, SD = 0.0195) and with (mean 1.02, range 0.986-1.05, SD = 0.0250) a Hyp-SCL did not show significance ($P = 0.07$).

Conclusion

- Combining a femtosecond laser and a Hyp-SCL may aid in the creation of planar donor tissue for DSAEK. Clinically, this could reduce the amount of postoperative hyperopic shift, although further human corneal studies are warranted