Keratoplasty

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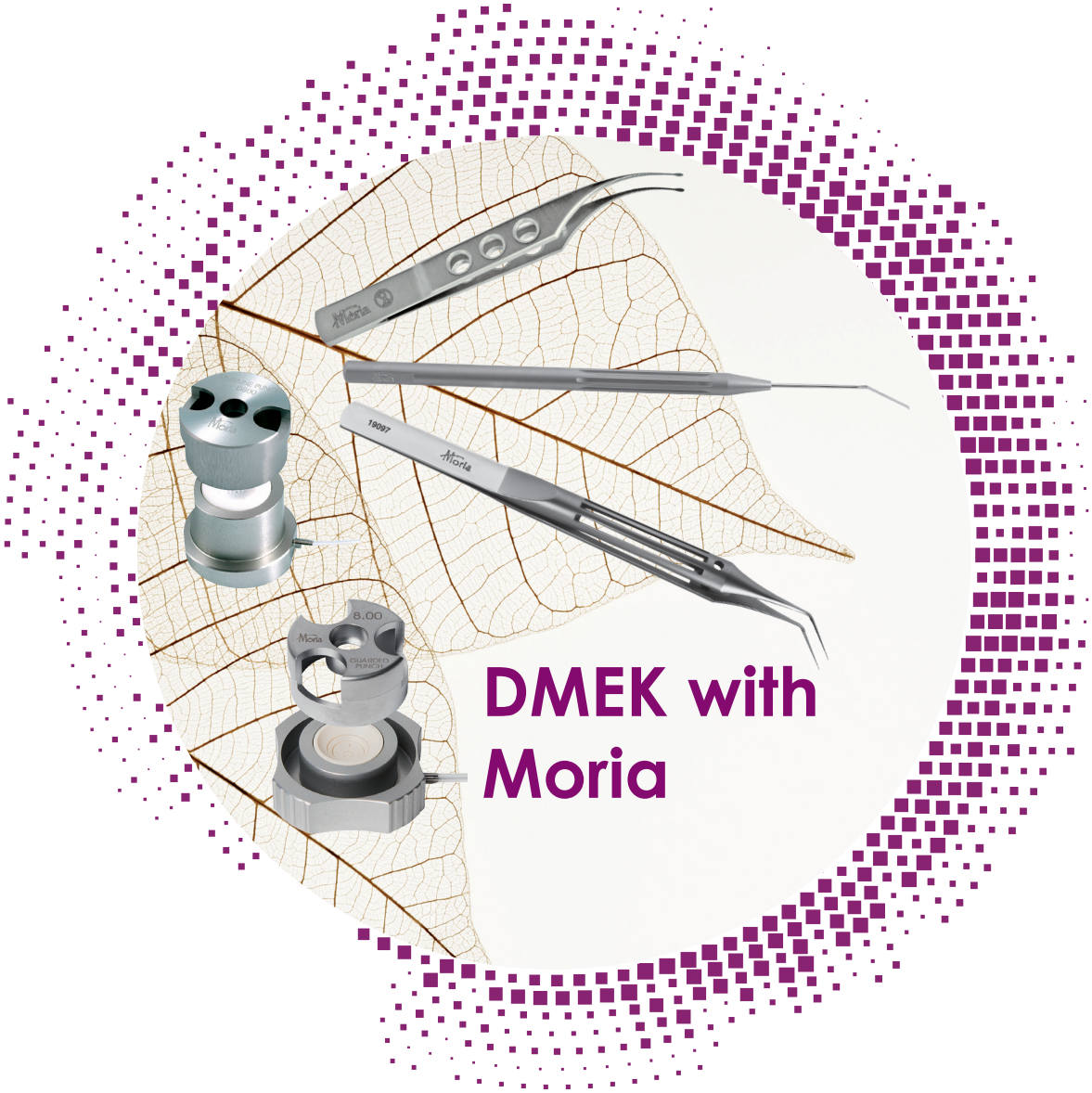
The right instruments whatever your DMEK preferred technique



Preparing the donor graft
Preparing the recipient eye

Moria
Ophthalmic Instruments

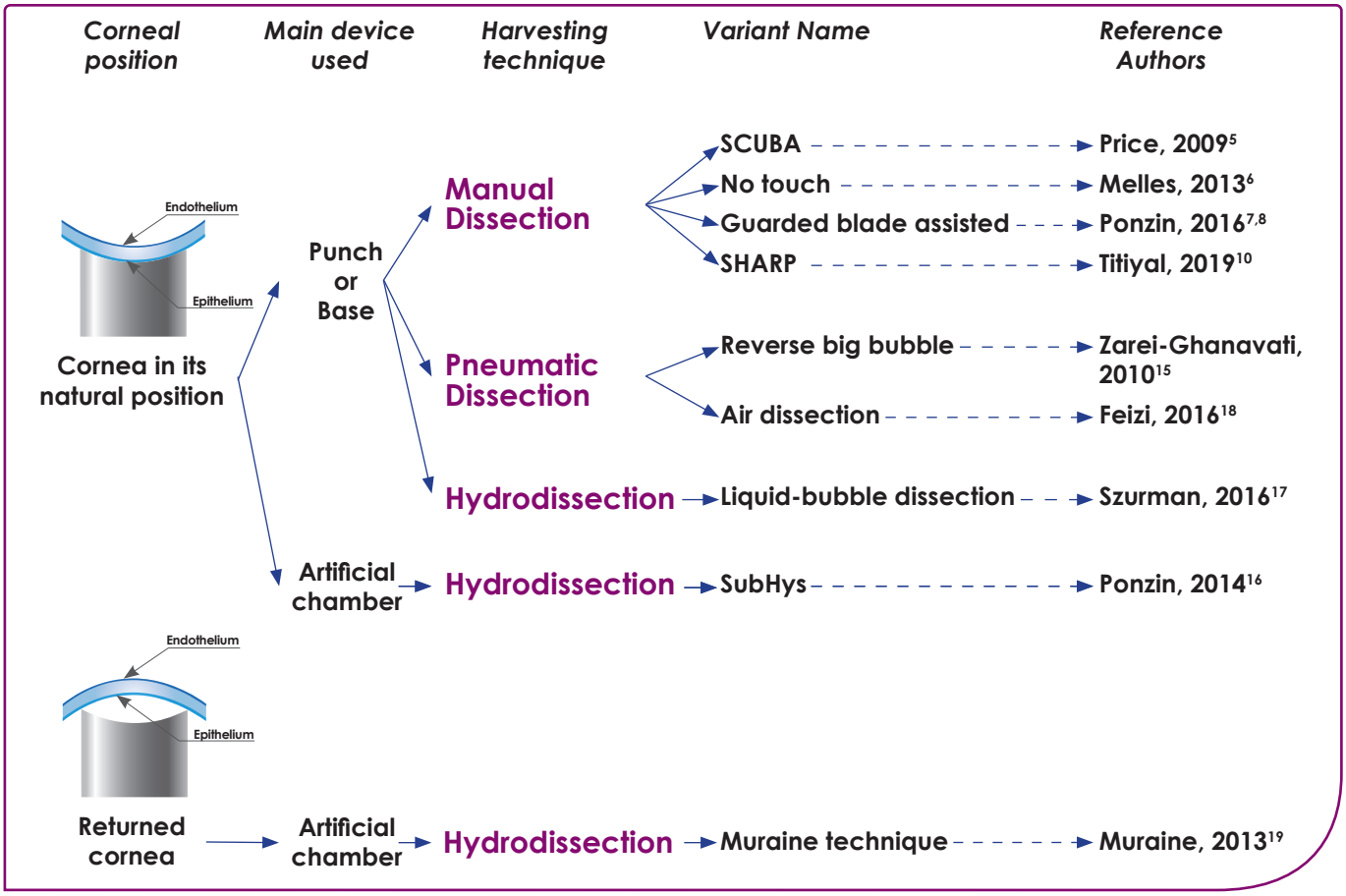
DMEK in 2021: a myriad of techniques

DMEK (Descemet Membrane Endothelial Keratoplasty) is a posterior lamellar keratoplasty technique that involves replacing the patient's damaged endothelium. As a minimally invasive technique, DMEK offers clinical benefits including rapid visual recovery[1-3] and low occurrence of rejection[4]. It has **therefore become a reference technique in endothelial keratoplasty**.

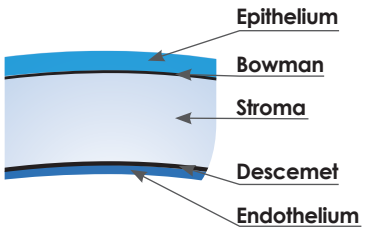
However, success relies on very delicate handling of the graft **to preserve as much as possible the endothelium and guarantee its viability**. Objective is to isolate the Descemet membrane with the endothelium to obtain a (purely) endothelial graft (without any posterior stroma). The difficulty of this technique led operators, eye banks and surgeons to innovate and standardize this procedure. That's why DMEK graft preparation technique has undergone **several evolutions**.

Reproducible DMEK grafts can now be obtained by choosing the most suitable harvesting technique for each specific user and setting among these 3:

- **manual dissection technique**
- **pneumatic dissection technique**
- **hydrodissection technique**



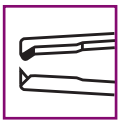
At Moria, we understand that every user has his preferred technique, so **we have developed a wide range of reusable and single-use instruments and devices to enable DMEK grafts to be performed using any technique** or, indeed, variation of a technique. In addition to being comprehensive, Moria range is also notable for its extremely high quality. Our reusable instruments in particular are **renowned worldwide for their durability and resistance**.



Preparing the donor graft

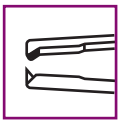
Common instruments whatever the harvesting technique

Holding forceps are used to handle a DMEK graft. Moria developed a range of fine toothed forceps dedicated to such a delicate step.



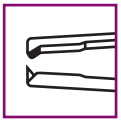
7835

Bonn forceps
0.1mm Micro-teeth
4mm Platforms
Reusable



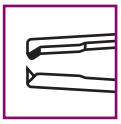
7850A

Bonn-Moria forceps
0.1mm Micro-teeth
5mm Platforms
Reusable



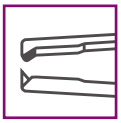
13161

Bonn-Moria forceps
0.1mm Micro-teeth
3mm Platforms
Reusable



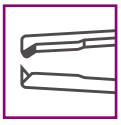
13160

Bonn forceps
0.1mm Micro-teeth
4mm Platforms
Reusable



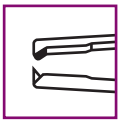
17504X5
17504X10

Bonn forceps
0.12mm Micro-teeth
5mm Platforms
Single-use



17221X10

Bonn forceps
0.12mm Micro-teeth
5mm Platforms
Single-use



M1809

Bonn forceps
0.12mm Micro-teeth
Reusable

Preparing the donor graft

1) Manual dissection

The manual dissection technique for preparing DMEK grafts was introduced by Dr. Melles and his team in 2006[1] and has since evolved considerably. This technique consists in making a peripheral dissection at the trabecular meshwork, separating the Descemet membrane from the stroma, then peeling the membrane in balanced saline solution. Developments include the "Submerged Cornea Using Backgrounds Away" (**SCUBA**) technique[5], the "**no-touch**" technique[6], with use of a **guarded punch**[7,8], and the **SHARP** technique.[9,10]

Moria offers a range of instruments and devices that will enable you to perform these various manual dissection techniques.

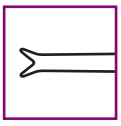
1	Placing the graft	Suction base (punch) Silicone Base
2	Peripheral dissection and cleavage plane identification	Sinskey hook. ("SHARP") Y hook Dissector Guarded Punch
3	Endothelial peeling	Forceps Two forceps
4	Graft sizing	Full-thickness Guarded Punch

Instruments for peripheral dissection and cleavage plane identification

Peripheral dissection can be carried out using an angled hook, as is the case with the SHARP technique[9, 10], with a Y hook and micro-dissector as Dr. Price does[11], or using other types of dissectors.

20022

Micro-dissector
Active part 3mm
Reusable



20021

Hook
Descemetic stroma hook
Reusable

6062A

Strampelli knife
Active part 3mm
Reusable

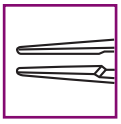
Preparing the donor graft

Endothelial peeling forceps

Peeling the endothelium requires one or two forceps[2] with flat, non-serrated jaws[12].

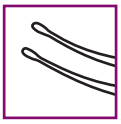
20038

Curved DMEK forceps
7° curvature, 10 mm platforms,
12 cm long.
Reusable



20039

Straight DMEK forceps
10 mm platforms,
12 cm long.
Reusable



17521x5
17521x10

Graft preparation forceps
1.2 mm oval-shaped tip
Curved, 15 mm long
Sold in box of 5 or 10 units
Single-use

Endothelial marker

Dr. Terry and his team have developed a technique in which a "S" is stamped on the stromal side of the Descemet membrane[13, 14]. This establishes a reference point to ensure the graft is correctly oriented when it is inserted into the patient's eye.

20034

Angled "S" marker
Reusable

Preparing the donor graft

Punches and trephines

Punch-assisted peripheral dissection for a clear-cut cleavage plan

As Dr. Ponzin and his team have described[7,8], guarded blade technology can be used to facilitate peripheral dissection and identification of the cleavage plane. Moria has developed two types of punches with a guarded blade to simplify this step: the guarded punch and the DeepWell guarded punch.

Punch-assisted final trephination for diameter

The final trephination may or may not be penetrating. In the "no-touch" technique described by Dr. Melles and his team[6], the endothelium is drawn onto a support and then undergoes penetrating trephination. The Busin Punch, trephine blade or Hanna trephine by Moria can all be used under those conditions. Other authors have shown interest in using a guarded punch to facilitate the final peeling of the graft[12]. Two guarded punches by Moria can be used for these purposes.

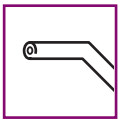
	Reference	17212DXXX	17213DXXX	17207DXXX	17200DXXX	17150DXXX	17169	17171DXXX
	Name	DeepWell Punch	DeepWell blade-holder	Guarded Punch	Busin Punch	Trephine Blade	Hanna Punch	Hanna Blade
Blade design	Double-bevel blade for a clean cut	✓	✓	✓	✓		✓	✓
	360° Blade for uniform cutting	✓	✓	✓	✓	✓	✓	✓
	Guarded blade with length adapted to the depth of the well allowing cutting under the Descemet to be performed	✓	✓	✓				
	Penetrating blade				✓	✓	✓	✓
	Blade holder sold separately		✓					
	Available sizes (mm)	7.5, 7.75, 8, 8.25, 8.5, 9.5, 10	9.5, 10	7.5, 7.75, 8, 8.5, 9.5, 10	6, 6.5, 6.75, 7, 7.25, 7.5, 7.75, 8, 8.25, 8.5, 8.75, 9, 9.5, 10	6.5, 7, 7.25, 7.5, 7.75, 8, 8.25, 8.5, 8.75, 9		7, 7.25, 7.50, 7.75, 8, 8.25, 8.50, 8.75, 9, 9.5, 10, 10.5
Well design	Deep and enveloping well, covering cornea	✓						
	Lowered base for optimized working comfort	✓						
	Wide and stable base with imprint	✓						
	Suction system	Double suction		21 suction holes	21 suction holes			
	4 non-aspirating holes to facilitate the « S » marking	✓		✓	✓			
	Graft centering system	8.5mm centering groove		4 cardinal holes	4 cardinal holes			

Preparing the donor graft

2) Hydrodissection and pneumatic dissection

Pneumatic dissection, also called "reverse big bubble technique" by Dr. Zarei Ghanavati et al.[15], and hydrodissection are among the core techniques developed to prepare DMEK grafts. Principle of these techniques involves using a cannula to lift off the Descemet membrane by air (pneumatic dissection) or liquid (hydrodissection). The cannula can be inserted at different locations depending on whether the operator is performing hydrodissection[16, 17] or pneumatic dissection[15, 18].

As with manual dissection, there are variations on those two techniques. For example, Dr. Ponzin et al.[16] has developed a hydrodissection technique called "SubHys", which requires use of an artificial chamber and a trephine.



7504

Rycroft cannula
35G orifice, external diameter of 30G
For injection of air or liquid
Reusable

18153

Hydrodissection cannula
31G orifice, external diameter of 25G, Flat, blunt tip
Reusable

19161

Artificial chamber - Base
To maintain the donor's cornea
Reusable

19162

Artificial chamber - Cover
Compatible with base of articifial chamber (19161)
Reusable

19182

Artificial chamber
To maintain the donor's cornea
Single-use

17204

Artificial chamber for single-use trephines
To maintain the donor's cornea
Compatible with 17201DXX and 17202DXX trephines
Single-use

17201DXXX

Simple trephine
Available from 7mm to 9mm (increment 0.25mm) and 9.5mm
Compatible with artificial chamber (17204)
Single-use

17202DXXX

Adjustable trephine
Pre-setting of the desired depth
Available in 6mm, 6.5mm to 9mm (increment 0.25mm), 9.5mm, 10mm
Compatible with artificial chamber (17204)
Single-use

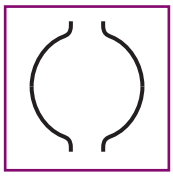
17150DXXX

Trephine blade
For penetrating trepanation
Available in 6.5mm, 7mm - 9mm (increment 0.25mm)
Reusable

Preparing the donor graft

3) Muraine technique

Prof. Muraine's technique consists in trephining the endothelium incompletely with two opposite hinges using a dedicated device: the Muraine punch by Moria. Donor tissue is then mounted on an artificial chamber, the endothelium upward. A Rycroft cannula is then used to hydrodissect the Descemet membrane[18]. This technique is described step by step in our brochure #65057 available on our website (www.moria-surgical.com).



Shape of the incision

17209D800
Muraine Punch
Allows a partial trephination with two opposite hinges
Single-use

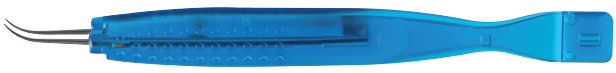
19161
Artificial chamber - Base
To maintain the donor's cornea
Reusable

19162
Artificial chamber - Cover
Compatible with base of artificial chamber (19161)
Reusable

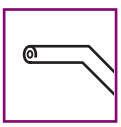
19182
Artificial chamber
To maintain the donor's cornea
Single-use

7835
Bonn forceps
0.1mm Micro-teeth
4mm Platforms
Reusable

9605
Troutman curved forceps
Active part with 7.5 mm platform.
Reusable



17225X10
Troutman forceps
Curved, 3.5mm platforms
Single-use



7504
Rycroft cannula
35G orifice, external diameter of 30G
For injection of air or liquid
Reusable

Preparing the recipient eye

1) Keeping the patient's eye open

19078
Colibri Speculum
Lid-blades, 16mm
Reusable

20035
Adjustable speculum
Rounded lid-blades, 14mm
Reusable

18195
Schapira Speculum
15mm open lid blades
Reusable

17508x5
17508x10
Adjustable speculum
15mm lid blades
Sold in box of 5 or 10
Single-use

2) Measuring and marking diameter

12994
Sourdille caliper
16mm opening
Graduation every 1mm
Reusable

Corneal markers
Reusable

> Available in:

19095/800 Diameter: 8 mm
19095/850 Diameter: 8.5 mm
19095 Diameter: 9 mm

Corneal markers
Available in boxes of 10 units
Single-use

> Available in:

17518x10 Diameter: 8 mm

17519x10 Diameter: 8.5 mm

17520x10 Diameter: 9 mm

Preparing the patient's eye

3) Maintaining the patient's anterior chamber

19092

Chamber Maintainer 20G
Length, 170mm
External diameter, 1.65mm
5mm active part with internal diameter 0.90mm
Reusable

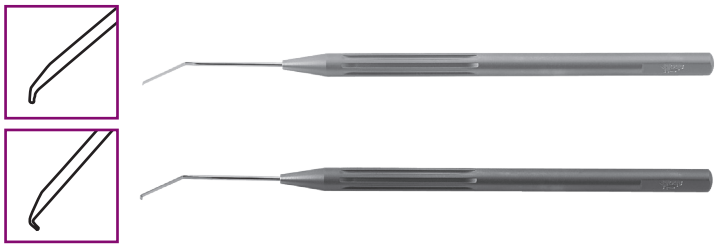
4) Descemetorhexis and removal of endothelium

19097

Gorovoy forceps
Descemetorhexis forceps
Length 11.7cm
Blunt tip
Reusable

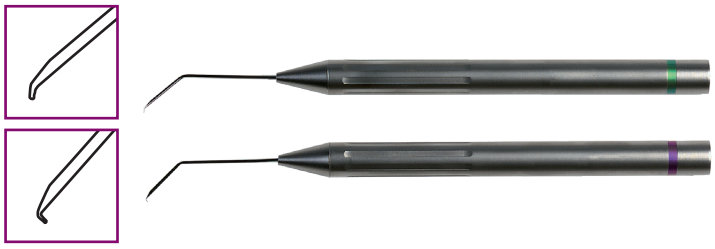
19091

Price hook
Descemetorhexis hook
Inverted Sinskey shape
Reusable



19077/A
19077/B

Spatulas
For peeling the Descemet membrane
A: 45° angled tip
B: 90° angled tip
Reusable



19083/A
19083/B

Irrigating spatulas
For peeling the Descemet membrane
A: 45° angled tip
B: 90° angled tip
Single-use

17302x5

Price hook
Descemetorhexis hook
Inverted Sinskey shape
Sold in box of 5 units
Single-use

17303x5
17303x10

90° Spatula
For peeling the Descemet membrane
90°angled tip
Sold in box of 5 or 10 units
Single-use

Bibliography

1. **Melles**, G. R., San Ong, T., Ververs, B., & van der Wees, J. (2006). Descemet membrane endothelial keratoplasty (DMEK). *Cornea*, 25(8), 987-990.
2. **Kruse**, F. E., Laaser, K., Cursiefen, C., Heindl, L. M., Schlötzer-Schrehardt, U., Riss, S., & Bachmann, B. O. (2011). A stepwise approach to donor preparation and insertion increases safety and outcome of Descemet membrane endothelial keratoplasty. *Cornea*, 30(5), 580-587.
3. **Price** Jr, F. W., & Price, M. O. (2013). Evolution of endothelial keratoplasty. *Cornea*, 32, S28-S32.
4. Anshu, A., Price, M. O., & **Price** Jr, F. W. (2012). Risk of corneal transplant rejection significantly reduced with Descemet's membrane endothelial keratoplasty. *Ophthalmology*, 119(3), 536-540.
5. Giebel AW, **Price** FW . Descemet membrane endothelial keratoplasty: the bare minimum. In: Price FW, Price MO editors. *DSEK: What You Need to Know About Endothelial Keratoplasty*. Slack Incorporated: Thorofare, NJ, 2009 pp 119–146.
6. Groeneveld-van Beek, E. A., Lie, J. T., van der Wees, J., Bruinsma, M., & **Melles**, G. R. (2013). Standardized 'no-touch'donor tissue preparation for DALK and DMEK: harvesting undamaged anterior and posterior transplants from the same donor cornea. *Acta Ophtalmologica*, 91(2), 145-150.
7. Ruzza, A., Parekh, M., Salvalaio, G., Ferrari, S., & **Ponzin**, D. (2016). Development of a new superficial punch for Descemet's Membrane Endothelial Keratoplasty donor tissue preparation. *British Journal of Ophthalmology*, 100(4), 443-445.
8. Parekh, M., Baruzzo, M., Favaro, E., Borroni, D., Ferrari, S., **Ponzin**, D., & Ruzza, A. (2017). Standardizing Descemet membrane endothelial keratoplasty graft preparation method in the eye bank—experience of 527 Descemet membrane endothelial keratoplasty tissues. *Cornea*, 36(12), 1458-1466.
9. Maharana, P. K., Sahay, P., Singhal, D., Sharma, N., & **Titiyal**, J. S. Donor preparation in descemet membrane endothelial keratoplasty. New Front Ophthalmol, 2019. Vol 5: 1-6.
10. Maharana, P. K., Sahay, P., **Titiyal**, J. S., & Sharma, N. (2019). Sinsky hook assisted roll preparation (SHARP): a modified technique for Descemet membrane endothelial keratoplasty donor preparation. *Saudi Journal of Ophthalmology*, 33(1), 28-33.
11. Price, M. O., & **Price**, F. W. (2013). Descemet's membrane endothelial keratoplasty surgery: update on the evidence and hurdles to acceptance. *Current Opinion in Ophthalmology*, 24(4), 329-335.
12. Panthier, C., Courtin, R., Gatinel, D., & Saad, A. Description de notre technique de préparation des greffons endothéliaux dans la DMEK. *Images en Ophtalmologie*, 2015. Vol. IX -n°6, 210-213
13. Veldman, P. B., Dye, P. K., Holiman, J. D., Mayko, Z. M., Sáles, C. S., Straiko, M. D. & **Terry**, M. A. (2015). Stamping an S on DMEK donor tissue to prevent upside-down grafts: laboratory validation and detailed preparation technique description. *Cornea*, 34(9), 1175-1178.
14. Veldman, P. B., Dye, P. K., Holiman, J. D., Mayko, Z. M., Sáles, C. S., Straiko, M. D. & **Terry**, M. A. (2016). The S-stamp in Descemet membrane endothelial keratoplasty safely eliminates upside-down graft implantation. *Ophthalmology*, 123(1), 161-164.
15. Zarei-Ghanavati, S., Khakshoor, H., & **Zarei-Ghanavati**, M. (2010). Reverse big bubble: a new technique for preparing donor tissue of Descemet membrane endothelial keratoplasty. *British Journal of Ophthalmology*, 94(8), 1110-1111.
16. Salvalaio, G., Parekh, M., Ruzza, A., Ferrari, S., Camposampiero, D., & **Ponzin**, D. (2014). DMEK lenticule preparation from donor corneas using a novel 'SubHyS'technique followed by anterior corneal dissection. *British Journal of Ophthalmology*, 98(8), 1120-1125.
17. **Szurman**, P., Januschowski, K., Rickmann, A., Damm, L. J., Boden, K. T., & Opitz, N. (2016). Novel liquid bubble dissection technique for DMEK lenticule preparation. *Graefe's Archive for Clinical and Experimental Ophthalmology*, 254(9), 1819-1823.
18. **Feizi**, S., & Javadi, M. A. (2015). DMEK lenticule preparation using an air dissection technique: central versus peripheral injection. *European Journal of Ophthalmology*, 26(1), 6-11.
19. **Muraine**, M., Gueudry, J., He, Z., Piselli, S., Lefevre, S., & Toubeau, D. (2013). Novel technique for the preparation of corneal grafts for descemet membrane endothelial keratoplasty. *American Journal of Ophthalmology*, 156(5), 851-859.

References	Manufacturer	Classes	Notified body
7835, 7850A, 13161, 13160, M1809, 20022, 20021, 6062A, 20038, 20039, 20034, 17150DXXX, 17169, 7504, 18153, 19161, 19162, 9605, 19078, 20035, 18195, 19095, 19095/800, 19095/850, 19092, 19097, 19091, 19077/A, 19077/B, 19083/A, 19083/B	Moria S.A.	I	CE : self-declaration
17504x5, 17504x10, 17221, 17521x5, 17521x10, 17212DXXX, 17213DXXX, 17207DXXX, 17200DXXX, 19182, 17204, 17209D800, 17225x10, 17508x5, 17508x10, 17518x10, 17518x5, 17519x10, 17519x5, 17520x10, 17520x5	Moria S.A.	Is	CE 0459
17171DXXX, 17201DXXX, 17202DXXX, 17302x5, 17303x5, 17303x10	Moria S.A.	IIa	CE 0459
12994	Moria S.A.	Im	CE 0459

SINCE 1820
200 YEARS
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MADE IN FRANCE

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To obtain more information

Manufacturer
MORIA SA
15, rue Georges Besse
92160 Antony
FRANCE
Phone: +33 (0) 1 46 74 46 74
Fax: +33 (0) 1 46 74 46 00
www.moria-surgical.com

MORIA Inc
1050 Cross Keys Drive
Doylestown, PA 18902
USA
Phone: (800) 441 1314
Fax: + 1 (215) 230 7670
www.moria-surgical.com

Moria Japan K.K.
Arcadia Building 6F
1-12-3 Kanda
SudachoChiyoda-Ku
Tokyo 101-0041
JAPAN
Phone: 81-3-6260-8309
Fax: 81-3-6260-8310
www.moriajapan.com

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凯利大厦6楼08室
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