



Universiteit  
Leiden  
The Netherlands

## Clinical outcomes of modern lamellar keratoplasty techniques

Dijk, K. van

### Citation

Dijk, K. van. (2018, January 16). *Clinical outcomes of modern lamellar keratoplasty techniques*. Retrieved from <https://hdl.handle.net/1887/59337>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/59337>

**Note:** To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/59337> holds various files of this Leiden University dissertation

**Author:** Dijk, Korine van

**Title:** Clinical outcomes of modern lamellar keratoplasty techniques

Date: 2018-01-16

**Clinical outcomes  
of modern lamellar  
keratoplasty techniques**

Korine van Dijk

## **Clinical outcomes of modern lamellar keratoplasty techniques**

© 2017 Korine van Dijk

ISBN: 978-94-6361-026-1

Photography: Netherlands Institute for Innovative Ocular Surgery, Rotterdam, the Netherlands

Layout and printed by: Optima Grafische Communicatie, Rotterdam, the Netherlands ([www.ogc.nl](http://www.ogc.nl))

Cover: Representation of a patient's view of part of the painting (by J. de Graaf with permission) in my consultation room, before and after Descemet membrane endothelial keratoplasty

The research presented in this thesis was performed at the Netherlands Institute for innovative Ocular Surgery, Rotterdam.

Publication of this thesis was supported by:  
Optiek Swemmer, Maasluis and Eye-Med, Zwolle

# **Clinical outcomes of modern lamellar keratoplasty techniques**

## **Proefschrift**

Ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden,  
op gezag van Rector Magnificus prof.mr. C.J.J.M. Stolker,  
volgens besluit van het College voor Promoties  
te verdedigen op dinsdag 16 januari 2018  
klokke 16.15 uur

Door

Korine van Dijk  
Geboren te Maassluis  
in 1970

**Promotor**

Prof. Dr. M.J. Jager

**Copromotor**

Dr. G.R.J. Melles, Netherlands Institute for Innovative Ocular Surgery, Rotterdam

**Leden Promotiecommissie**

Prof. Dr. C. Koppen, Universiteit van Antwerpen

Prof. Dr. S.M. Imhof, Universiteit van Utrecht

Dr. Y.Y. Cheng

## CONTENTS

Preface		7
Chapter 1	General introduction and outline	9
<b>Part I - Selective, minimal invasive treatment of endothelial disorders</b>		
Chapter 2	Near complete visual recovery and refractive stability in modern corneal transplantation: Descemet membrane endothelial keratoplasty (DMEK). <i>Cont Lens Anterior Eye 2013;36:13-21</i>	47
Chapter 3	Incidence of irregular astigmatism eligible for contact lens fitting after Descemet membrane endothelial keratoplasty. <i>J Cataract Refr Surg 2013;39:1036-1046</i>	67
Chapter 4	Optical quality of the cornea after Descemet membrane endothelial keratoplasty. <i>Am J Ophthalmol 2014;158:71-79</i>	85
Chapter 5	Two-Year Refractive Outcomes After Descemet Membrane Endothelial Keratoplasty. <i>Cornea 2016;35:1548-1555</i>	101
<b>Part II - New treatment option for advanced keratoconus</b>		
Chapter 6	Midstromal isolated Bowman layer graft for reduction of advanced keratoconus: a technique to postpone penetrating or deep anterior lamellar keratoplasty. <i>JAMA Ophthalmol. 2014;132:495-501</i>	121
Chapter 7	Bowman layer transplantation to reduce and stabilize advanced progressive keratoconus. <i>Ophthalmology 2015;122:909-917</i>	135
Chapter 8	Bowman layer transplantation: 5-year results. <i>Submitted for publication</i>	157
Chapter 9	Summary	173
Chapter 10	Nederlandse samenvatting (Dutch summary)	189
Appendices	List of publications	205
	Dankwoord (Acknowledgement)	211
	Curriculum Vitae	213





## **PREFACE**

Corneal transplantation (or keratoplasty) is one of the most successful and widely performed methods of tissue transplantation. Its major goal is to restore or improve vision, but globe preservation, pain reduction and improving the cosmetic appearance of the eye are also important motives. Leading indications for corneal transplantation are Fuchs endothelial dystrophy, bullous keratopathy, failed corneal grafts, keratoconus and corneal scars.

Since the first successful corneal transplantation in 1905, numerous ophthalmologists have contributed to further refinement, assisted by the development of surgical microscopes, the introduction of general anesthesia and corticosteroids, improved suture materials, and the founding of eye banks. Recently, the selective replacement of only the diseased corneal layers, rather than replacing all corneal layers (such as in penetrating corneal transplantation), has dramatically transformed corneal transplantation surgery. At present, endothelial keratoplasty (EK) has become the treatment of choice for corneal endothelial disease, and anterior lamellar keratoplasty is increasingly advocated for corneal stromal disease.

The latest innovation in the field of EK is Descemet membrane endothelial keratoplasty (DMEK). With this technique, only the Descemet membrane and endothelium are replaced, resulting in a restoration that approaches the original corneal anatomy. Alongside the trend towards more selective and minimally invasive transplantation techniques in endothelial keratoplasty, recently, also new treatment options have emerged for patients with (advanced) keratoconus, including the mid-stromal implantation of an isolated donor Bowman layer, referred to as Bowman layer transplantation.

This thesis will focus on the feasibility and clinical outcomes of DMEK for managing endothelial disorders, and the use of Bowman layer grafts, i.e. Bowman layer transplantation, in the management of advanced keratoconus.

