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## Recent innovations in minimally invasive anterior and posterior lamellar keratoplasty

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# Chapter 7

## Endothelial cell density after Descemet membrane endothelial keratoplasty: 1-4 year follow-up

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**KEYWORDS:** Endothelium, Descemet membrane endothelial keratoplasty, posterior lamellar keratoplasty, corneal transplantation, Descemet membrane, surgical technique

'Descemet membrane endothelial keratoplasty' (DMEK) is one of several surgical options for patients with corneal endothelial disorders.<sup>1</sup> 'Deep lamellar keratoplasty' (DLEK) and 'Descemet stripping (automated) endothelial keratoplasty' (DSEK/DSAEK) are alternative therapies, and early follow-up data have shown that endothelial cell densities (ECDs) in grafted tissue may be similar in these patients to those treated with DMEK.<sup>1-3</sup> Previously, we reported the ECDs in 58 patients 1-3 years after DMEK.<sup>2</sup> In the current study, we continued and expanded our analysis on mid-term ECDs after DMEK as a measure of long-term Descemet graft survival.

From a larger group of 225 consecutive patients who underwent DMEK for Fuchs endothelial dystrophy or pseudophakic bullous keratopathy, ECD measurements were available in 186 eyes with 6 months follow-up; 80 also had 12 months follow-up; 49 had 24 months follow-up, 13 had 36 months follow-up, and 6 had 48 months follow-up (**Supplemental Figure ; Supplemental Table; Supplemental Material at AJO.com** ).

Our findings support a 34% sharp decrease in ECD in the first 6 months after DMEK, followed by a slower decrease of about 9% per year sustained over 4 years. This result closely resembles previous reports of 34% decrease in ECD within 6 months after DSEK, followed by a 8% decrease between 6 to 24 months.<sup>2,4,5</sup> Our updated data showed that the similarity between ECDs in patients after DMEK and earlier types of endothelial keratoplasty is robust over a larger period of time and with a greater number of patients than has been previously reported.<sup>2,4,6</sup> This, combined with evidence that more than three-fourths of patients achieve visual acuities >20/25 six months after surgery, may indicate that DMEK could become a preferred treatment method in corneal endothelial disease.<sup>1</sup>

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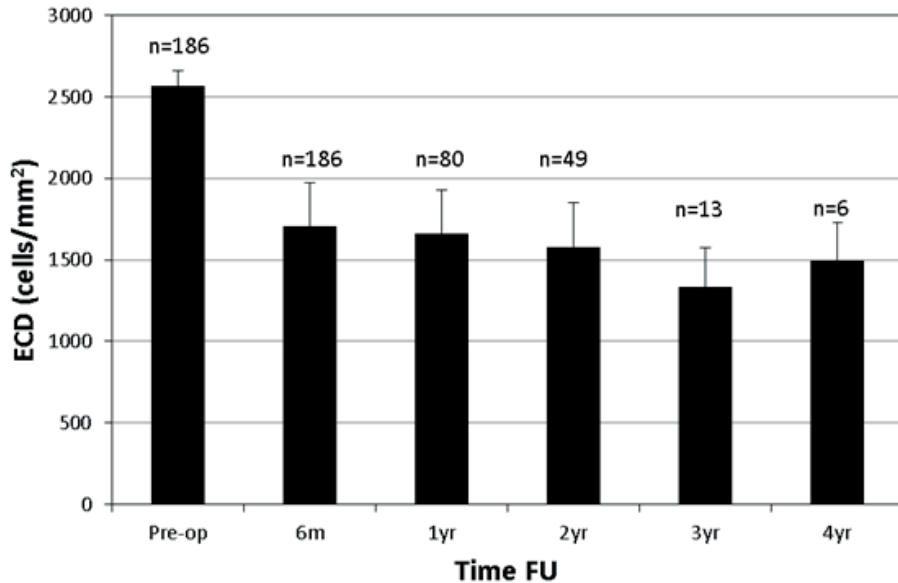
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4. IRB/IC - Study conducted in compliance with the Institutional Review Board and Informed Consent requirements, in adherence to the tenets of the Declaration of Helsinki, at the Netherlands Institute for Innovative Ocular Surgery (Study registration no N.08.11).
5. Other Acknowledgments – None.

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## SUPPLEMENTAL FIGURES

## ECD vs. Time



**Supplemental Figure.** Graph displaying the cross-sectional decrease in central corneal endothelial cell density (ECD) of the Descemet graft in absolute values up to 4 years after Descemet membrane endothelial keratoplasty (DMEK).

**Supplemental Table.** Cross-sectional central corneal endothelial cell density in absolute values up to 4 years after Descemet membrane endothelial keratoplasty (DMEK)

Groups of DMEK eyes		Endothelial cell density (cells/mm <sup>2</sup> ) at follow-up intervals					
		Preoperative	6 months	1 year	2 years	3 years	4 years
Eyes with 4 years FU	n=6	2730	2260	2100	1830	1610	1500
Eyes with 3 years FU	n=13	2650	1880	1740	1540	1330	
Eyes with 2 years FU	n=49	2660	1940	1800	1570		
Eyes with 1 year FU	n=80	2620	1780	1660			
Eyes with 6 months FU	n=186	2570	1710				

