

Clemson Eye News

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Quarterly Report for Health Care Professionals Delivering Eye Care

Welcome Cornea Specialist Dr. Justin Roman!

Justin Roman, MD returns to the Upstate joining Clemson Eye after completing a cornea fellowship under the tutelage of Drs. Kerry Solomon and Charlene Grice of Carolina Eyecare Physicians in Charleston, SC. After becoming a Mechanical Engineer, Dr. Roman completed a Masters in Bioengineering at Clemson University, then decided to pursue a career in medicine. He attended medical school at the University of New Mexico and residency in ophthalmology at the Medical University of South Carolina (MUSC). He is American Board of Ophthalmology Certified and will offer our network of referring physicians his expertise in cornea, external disease, advanced dry eye, cataract and refractive surgery. Specialized procedures like corneal transplants, DMEK, DSEK, Lasik and cross-linking will also be his central focus. Dr. Roman is now accepting referrals and sees patients in all of the Clemson Eye locations: Anderson, Clemson, Easley and Greenville. Justin Roman enjoys competitive marathon running (3x Boston Marathon), and lives with his wife, Allison, a Greenville native, and their baby daughter, Riley.



Improving Outcome in Corneal Transplantation



By Justin Roman, MD

History of corneal transplantation

Eduard Konrad Zirm performed the first successful full thickness penetrating keratoplasty in 1905, and in doing so, became the first person to perform a solid organ transplant. Ironically, the indication was for bilateral alkali burns, one of the most challenging indications in ophthalmology.

Over the following century, keratoplasty techniques continued to evolve considerably. In 1914, to spare healthy tissue, Anton Elschnig performed the first anterior lamellar keratoplasty. It wasn't until 1956 that Charles Tillet performed the first successful endothelial keratoplasty (EK). Tillet's technique was successful, but was not pursued until the late 1990s when Gerrit Melles developed the posterior lamellar keratoplasty (PLK). The posterior cornea was dissected out and replaced with donor posterior stroma and endothelium. In 1999, Mark Terry simplified Melles' technique resulting in the deep lamellar endothelial keratoplasty (DLEK). However, both of these techniques were not widely adopted due to difficulty and limited postoperative visual acuity.

In 2004, Melles developed the descemetorhexis to strip and remove the patient's Descemet membrane and endothelium, the Descemet stripping endothelial keratoplasty (DSEK). With the invention of the microkeratome for automated preparation of donor cornea, the thickness of the donor tissue was significantly decreased and it was renamed Descemet stripping automated endothelial keratoplasty (DSAEK). DSAEK allowed patients to achieve postoperative visual acuity results in the 20/25-20/30 range. Eye banks began preparing this tissue around 2006, which resulted in quick spread of the technique.

Soon thereafter, Melles described the Descemet membrane endothelial keratoplasty (DMEK) in 2006. DMEK allows the surgeon to avoid implantation of donor stroma. Pure descemet membrane and endothelium could be transplanted in the exact anatomical location of the diseased tissue.

The reported number of corneal transplants performed in the United States was 48,792 in 2015. While full thickness transplants continue to decrease (19,160, -0.7%), the number of EK procedures increased (27,208, +4.8%). The growth in EK was due to increased DMEK procedures (4,694, +63.8%), whereas DSEK/DSAEK remains the predominant EK of choice (22,514, -2.5%).¹

Surgical options

Once endothelial dysfunction results in decreased quality of vision from corneal edema, decompensation or guttae-induced glare, there are three surgical options to consider. While full thickness transplants were the norm in the past, it is becoming less common, and most surgeons are turning to lamellar techniques such as DSAEK or DMEK. Due to its technical ease, DSAEK remains the predominant surgical preference. However, while DMEK is a more challenging surgery, there are many advantages that must be considered.

Advantages of DMEK

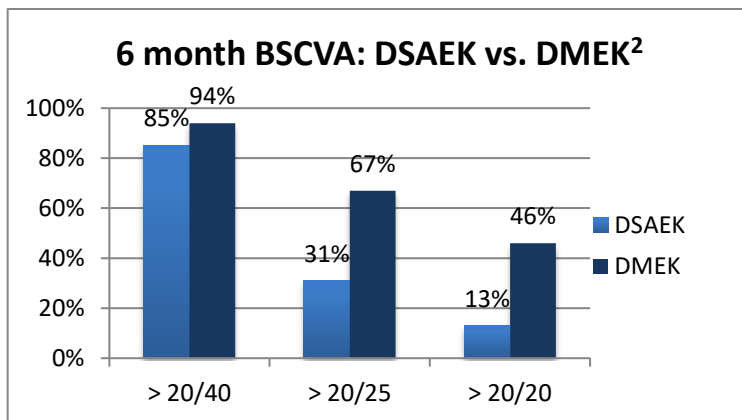
Compared to DSAEK, DMEK allows even faster visual recovery and better postoperative visual acuity results (Figure 1)². In 2011, Price et al performed DMEK in one eye and DSAEK in the fellow eye.

85% of patients perceived better visual quality in the DMEK eye and had objectively superior visual acuity³.

Elimination of the stroma-to-stroma graft-host interface appears to play a significant role. As well as decreased surgical incision size from 5mm in DSAEK to 2.5mm in DMEK. Also, rejection rates are around 1% in DMEK compared to 9% in DSAEK⁴. At one month post-op, in order to decrease the risk of glaucoma, it is typically safe to switch higher potency steroids to FML or Lotemax without increasing the risk of rejection⁵. Nonetheless, it is important to note that there is a surgical learning curve which has been a barrier to widespread application.

Surgical indications

Common indications for EK include Fuchs' endothelial dystrophy, post-cataract surgery corneal edema, posterior polymorphous membrane dystrophy, congenital hereditary endothelial dystrophy, iridocorneal endothelial (ICE) syndrome and failed endothelial keratoplasty.



While DMEK has the above-mentioned advantages, DSAEK continues to play an important role. In particular for more complex and challenging cases such as prior glaucoma filtering surgery, presence of an anterior chamber IOL, large iris defects and stromal scarring.

Although the number of full thickness transplants continues to decline, indications remain and include prior failed corneal transplants, dense corneal scars and select keratoconus, to name a few.

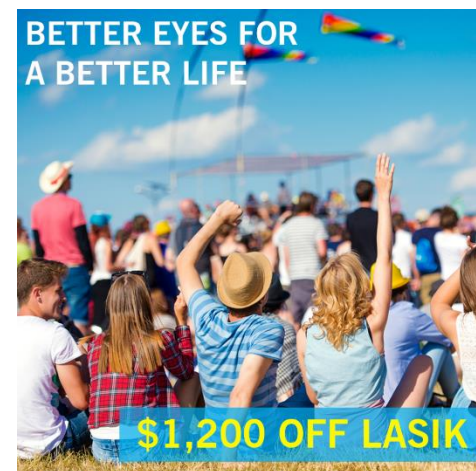
Surgery

Patients have surgery on an outpatient basis and go home within several hours. The actual surgery takes between 30 and 60 minutes, and is usually done under local anesthetic and IV sedation. Not infrequently, cataract surgery is performed simultaneously with either DSAEK or DMEK, which has the advantage of a single trip to the operating room and more pronounced improvements in visual acuity. After

surgery, specific instructions include lying flat for 24-48 hours in order for the gas bubble to tamponade the transplant and stimulate proper union. On occasion, an additional air bubble may be placed at the slit lamp in the days following the surgery in order to extend this support. In most cases, patients can expect to see significant improvements in vision within a few weeks of surgery.

Here at Clemson Eye, we pride ourselves in ensuring that our patients are getting the most up to date treatments that they deserve. Our purpose is to offer the best opportunity for a great visual outcome, and in the process, improving their overall quality of life. DMEK now offers us that opportunity.

1. Eye Bank Association of America. 2015 Eye Banking Statistical Report. 2016
2. Hamzaoglu EC, Straiko MD, Mayko ZM, et al. The First 100 Eyes of Standardized Descemet Stripping Automated Endothelial Keratoplasty versus Standardized Descemet Membrane Endothelial Keratoplasty. *Ophthalmology*. 2015;122:2193-2199.
3. Guerra FP, Anshu A, Price MO, Price FW. Endothelial keratoplasty: fellow eyes comparison of Descemet stripping automated endothelial keratoplasty and Descemet membrane endothelial keratoplasty. *Cornea*. 2011;30(12):1382-6.
4. Anshu A, Price MO, Price FW, Jr. Risk of corneal transplant rejection significantly reduced with Descemet's membrane endothelial keratoplasty. *Ophthalmology*. 2012;119(3):536-40.
5. Price MO, Price FW Jr, Kruse FE, Bachmann BO, Tourta T. Randomized comparison of topical prednisolone acetate 1% versus fluorometholone 0.1% in the first year after descemet membrane endothelial keratoplasty. *Cornea*. 2014 Sep;33(9):880-6.



Please be reminded that our current Lasik offer is \$1,200 off!