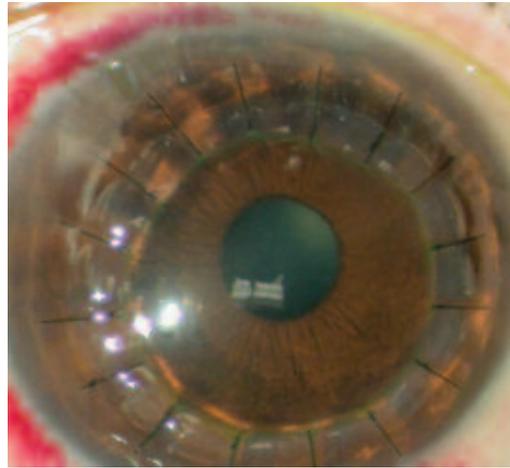


New Selective Corneal Transplant Technique Has Advantages over Penetrating Keratoplasty



One week after DALK surgery, donor stroma is clear, and uncorrected vision is 20/50.

A corneal specialist at UCLA's Jules Stein Eye Institute has begun to perform a new type of selective transplant for patients with keratoconus or corneal stromal scar and a normal endothelium. Sophie Deng, M.D., Ph.D., Assistant Professor of Ophthalmology, says the deep anterior lamellar keratoplasty (DALK), with baring of the Descemet membrane using the "big bubble technique," offers several potential advantages over the traditional treatment for these patients: penetrating keratoplasty.

Rather than the traditional method of replacing the entire cornea, Dr. Deng replaces the portions of the cornea that are abnormal in patients who have a corneal scar or keratoconus. For DALK patients, the endothelium and Descemet membrane remain intact, and only the diseased corneal stroma is replaced.

The technique, first developed by Dr. Mohammed Anwar at Magrabi Eye & Ear Hospital in Jeddah, Saudi Arabia, has been modified by Dr. Deng. The original

approach described by Dr. Anwar performs the trephination without entering the anterior chamber. Subsequently, air is injected into the deep stroma with a 30-gauge needle to create a big bubble that allows the Descemet membrane to be dissected from the stroma.

Dr. Deng's main modification is to perform the partial lamella dissection first, then inject air to create the big bubble. Following that portion of the procedure, she removes the remaining stroma from the receiving bed. "With this modification it is easier to manipulate the remaining stromal bed, and there is better visualization of the depth of the needle tip to prevent puncturing the Descemet membrane," Dr. Deng explains. After preparing the donor cornea, she peels the Descemet membrane from the donor stroma and sutures the stroma onto the receiving bed, careful not to puncture the paper-thin host Descemet membrane.

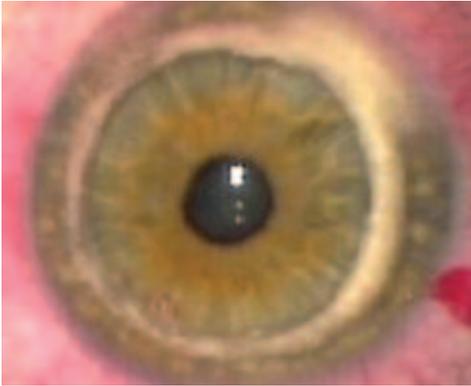
DALK provides a complement to another selective transplant procedure, Descemet stripping endothelial keratoplasty (DSEK), which has been evolving over the last several years. That procedure, also performed by Dr. Deng and described in the May 2007 issue of *Clinical Update*, is for patients with Descemet membrane and endothelial dysfunction. DSEK involves selective replacement of the Descemet membrane and endothelium without removing the normal corneal stroma.

Complications, Rejection Risk Reduced

DALK potentially improves on penetrating keratoplasty in several ways. "Because you don't need to enter into

"OVERALL, IT IS A VERY BIG IMPROVEMENT – WOUND HEALING IS FASTER FOR THESE PATIENTS, AND THE VISUAL OUTCOME IS COMPARABLE."

NEW SELECTIVE CORNEAL TRANSPLANT TECHNIQUE *(continued from page 1)*



Baring of the Descemet membrane during the surgery.

the anterior chamber of the eye, there is no risk of damaging the intraocular tissues such as the lens and the iris, and there is less chance of intraocular infection,” Dr. Deng notes. “In addition, because we don’t replace the healthy endothelium, there will not be rejection and failure of the cornea endothelial cells that are critical to keeping the cornea clear. Possibly, there is less need for steroids as well.” This is a great advantage in light of a recent publication from the Corneal Donor Study Investigation Group, which reported a daunting 69-75 percent loss of endothelial cells five years after successful penetrating keratoplasty. “Overall, it is a very big improvement – wound healing is faster for these patients, and the visual outcome is comparable,” Dr. Deng says.

Another major advantage, Dr. Deng notes, is that the requirements of the donor tissue are much less stringent than with penetrating keratoplasty. “The traditional surgery has a very high standard for the cornea donor,” she explains. “For this procedure, as long as the donor cornea’s stroma is normal, we can accept it, which puts our limited resources to better use. However, during the learning curve period, it is wise to have a good quality cornea in case the surgery

needs to be converted to penetrating keratoplasty.”

The downside to the new selective corneal transplant is that the technique is highly challenging; as a result, at this point only a few ophthalmologists have performed it. The operating time is longer, though as ophthalmologists gain more experience with it, Dr. Deng expects the length of surgery to be greatly reduced. Moreover, when it comes to the most technically challenging aspect of the DALK – avoiding damage to the Descemet membrane – if there is any microperforation, it can be salvaged without the need to convert to the traditional penetrating keratoplasty. “There are many ways that can help to salvage the procedure so that the patient will maintain his or her Descemet membrane and endothelium,” says Dr. Deng.

Majority of Patients Have Better than 20/30 Corrected Visual Acuity After Surgery

Dr. Deng started the procedure very recently and has performed it on a small number of patients. The follow-up period is still very short, but the results have been very good. The first patient, who had keratoconus, had uncorrected vision of counting fingers before the surgery. One week post-op, she was 20/50 uncorrected with a clear cornea and no interface haze between the host Descemet membrane and the donor tissue. By one month, her vision had improved to 20/30 uncorrected. Another keratoconic patient had a microperforation of the Descemet membrane and had a small localized Descemet membrane detachment at post-op day one. The detachment resolved four days later and his corrected vision was 20/80 just three weeks after the surgery.

Dr. Anwar’s pioneering group in Saudi Arabia, which has the most experience with DALK, has published data collected on 652 eyes. A total of 84 percent of the patients have had better than 20/40 corrective visual acuity after the surgery, and 59 percent resulted in better than 20/30.

Certain patients are not appropriate candidates for this selective corneal transplant, including those who have scars affecting the Descemet membrane and those whose endothelial cells are not healthy (in such cases, a DSEK could be performed). Keratoconic patients who have developed hydrops are also not candidates. For the patients who are candidates for the DALK, though, Dr. Deng believes that it will increasingly be seen as the preferred option.

“When we measure outcomes, we want to know first whether the patient is seeing well and can reach his or her visual potential. In that regard, I am very confident that this is equal to penetrating keratoplasty – baring of the Descemet membrane seems to eliminate the interface haze that is seen in the earlier form of DALK, in which the dissection did not reach the depth of the Descemet membrane,” Dr. Deng says. “Secondly, we want to know how the complications and rejection rates compare. In the long run, both are likely to be lower with this procedure. We are likely to see no rejection for the corneal endothelium and less risk of intraocular complications. As this procedure evolves and more people learn how to do it, I expect that we will see it becoming increasingly common, and ultimately the procedure of choice for corneal stromal diseases.”



JSEI Establishes New Clinical Division: Retinal Disorders and Ophthalmic Genetics

In January 2008, Bartly J. Mondino, M.D., director of the Jules Stein Eye Institute (JSEI), announced the creation of a new clinical division, Retinal Disorders and Ophthalmic Genetics, to address the rapidly developing educational, clinical and research initiatives needed in this area. "The ongoing explosion of genetic information is bringing genetics into the realm of clinical medicine, and we are quickly moving down a busy road to make treatments and cures for retinal degenerative diseases a reality. Our new division will allow us to focus more attention and resources on this burgeoning field," he says.

Michael B. Gorin, M.D., Ph.D., Harold and Pauline Price Professor of Ophthalmology, and chief of the new Retinal Disorders and Ophthalmic Genetics Division, explains, "The Institute has very talented vitreoretinal surgeons who also provide a lot of medical retinal services and are involved in related research. The creation of this division highlights the fact that there have been such dramatic changes in our knowledge of medical retinal disorders and such major advances in research on vascular diseases and genetic disorders, that the Institute needs a group to focus on these issues."

The new division headed by Dr. Gorin, and including Steven Nusinowitz, Ph.D., associate professor of ophthalmology, and director of the Visual Physiology Laboratory, and David Sarraf, M.D., associate clinical professor of ophthalmology, provides a wide range of highly specialized services related to medical retinal disorders. These

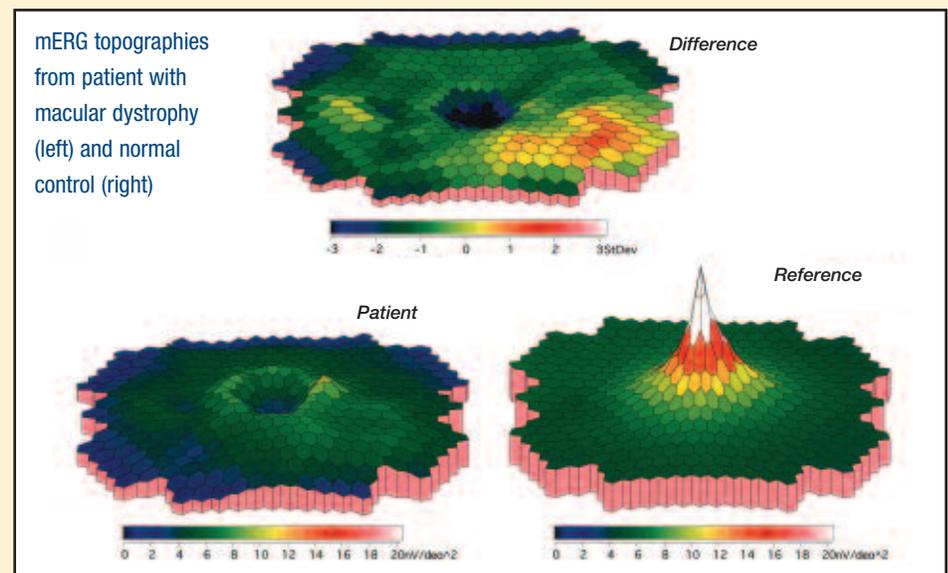
include comprehensive care for patients who have retinal conditions, such as diabetic retinopathy,

age-related macular degeneration and retinitis pigmentosa; diagnostic evaluations with state-of-the-art

(continues on page 4)

Visual Physiology Clinical Laboratory

The Visual Physiology Clinical Laboratory, under the direction of Drs. Michael Gorin and Steven Nusinowitz, quantitatively evaluates the function of the retina and visual pathways. Patients are referred for functional testing to confirm a specific diagnosis or, in cases where the etiology is unknown, to rule out alternative possibilities.



Complete Listing of Tests

- **Electroretinogram - full field**
Standard rod and cone
Research protocol
Under anesthesia (with EUA)
- **Electroretinogram - multifocal (Veris)**
Standard
Research protocol
- **Color Testing**
Screening (D15 desaturated, other)
FM 100 Hue
Blue-cone monochromatism
Pseudo-isochromatic color plates
- **Contrast Sensitivity Testing**
- **Dark Adaptometry**
Screening
Complete dark adaptation curve
- **Visually-evoked Cortical Potentials (VECP)**
Standard flash
Pattern VECP for acuity estimates
Visual pathway misrouting (albinism)
- **Visual Field Testing (automated)**
Humphrey 10-2 (macular program)
Humphrey 24-2, 30-2 and 60-2

Appointments: (310) 794-5400, fax (310) 206-7821, VPLab@jsei.ucla.edu
Laboratory Request Forms are provided on request or may be downloaded from JSEI website: <http://jsei.org/clinical/VPLab.asp>

RETINAL DISORDERS AND OPHTHALMIC GENETICS *(continued from page 3)*

imaging and electrophysiological systems; genetics management incorporating mutational analysis and family counseling; and therapeutic strategies including intraocular injections and medical and laser therapies. Clinical and basic science research into retinal disorders, especially hereditary retinal dystrophies and degenerations, represents another major role of this division, as does educating the next generation of ophthalmologists.

“One of the clinical services in our division that really stands out is genetics counseling,” says Dr. Gorin. “We’re very fortunate to have a full-time, board-certified genetics counselor who is available to coordinate genetics counseling and molecular diagnostic testing. Having someone who has this kind of genetics background and is officially trained to perform these functions, ensures that we’re bringing the very best knowledge and expertise to our

clinical service, as well as our research studies,” he continues. Division members are collaborating with JSEI vision scientists on studies of Stargardt macular-degeneration and approaches to experimental gene therapy. Critical studies are also taking place out of the laboratory with members of the Institute’s clinical divisions—studies of non-invasive technologies for early diagnosis of diabetic retinal disease, identification of patients who may be at greater risk for complications of anti-VEGF injection therapy, and clinical characterization of affected individuals and at-risk family members, in conjunction with molecular genetic testing, to identify the gene(s) responsible for inherited disorders that are either specific to the eye or that affect the eye as part of the medical condition.

Dr. Gorin, whose research group was the first to identify genetic regions that contribute to macular

degeneration, which then led to the identification of several macular degeneration genes by multiple investigators, recognizes that the contributions of JSEI scientists are part of a large landscape of research that has moved us to a point now where molecular genetic testing for a variety of retinal disorders and treatment for retinal conditions previously considered to be untreatable are feasible undertakings. He concludes, “I think that it’s fundamental to the mission of this division to partner with other clinicians and scientists at the Institute, as well as in the greater scientific and ophthalmic communities, in this enterprise of advancing and harnessing the discoveries of modern medicine and genetics to improve the care of our patients.”

Referrals to the Retinal Disorders and Ophthalmic Genetics Division at the Jules Stein Eye Institute are welcome at (310) 794-5400.

**This corrected
edition replaces the
previous mailing.**

JSEI CONTINUING EDUCATION PROGRAMS & GRAND ROUNDS SCHEDULE

For information or to add your name to our distribution list, contact the Office of Academic Programs at (310) 825-4617 or visit our website at <http://www.jsei.org>.



2008

Jules Stein Eye Institute UCLA
100 Stein Plaza
Box 957000
Los Angeles, CA 90095-7000
U.S.A.

First Class Mail
U.S. Postage
PAID
UCLA