

Clinical Update

TOOLS AND TECHNIQUES

REFRACTIVE

Experts Weigh in on Light Touch CK

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Serendipity. That is how H. L. “Rick” Milne III, MD, a surgeon in Columbia, S.C., describes his discovery of “light touch” conductive keratoplasty—a new technique that some say has radically improved this refractive procedure.

“In April 2004, I was performing CK on a patient whose anterior chamber was quite flat, with not much space between the cornea and iris,” Dr. Milne recalled. “Instead of using normal pressure as I applied the Keratoplast tip (which delivers the low-energy, high-frequency current), I decided not to use any pressure.” He then did his standard treatment, making 16 treatment spots in the mid-peripheral cornea. The result shocked him.

“My patient had a huge response to the effect, and I immediately knew it was because of the lack of pressure I used during the procedure,” Dr. Milne explained. “I decided to postpone my CK cases, and started doing only one patient per week using fewer spots and less pressure. Every single patient had this dramatically improved response to the procedure.”

The rest, as they say, is history. Dr. Milne, who has no financial interest in Refractive Inc., which owns the CK technology, contacted the company with these preliminary results.

The company sent 10 leading refractive surgeons a video outlining the new technique and requested three-month and six-month results. The surgeons were able to duplicate Dr. Milne’s results.

A Variety of Opinions

Refractive surgeons who have been CK advocates since its introduction—such as Marguerite B. McDonald, MD, director of the Southern Vision Institute and clinical professor of ophthalmology at Tulane University in New Orleans, and Forrest P. Murphy, MD, of the Murphy Eye Center of La Jolla, Calif.—see light touch as making an already effective technology even better. Still other refractive surgeons, including Jonathan M. Davidorf, MD, of the Davidorf Eye Group in West Hills, Calif., say light touch has breathed new life into a technology that was not living up to its initial results.

And some, including Steven E. Wilson, MD, director of corneal research at the Cleveland Clinic Foundation, continue to have reservations about the viability of the procedure.

Advantages Described

CK is a thermal technique that uses an electrical current to shrink peripheral corneal collagen, thereby steepening the central cornea. CK originally received FDA approval in April 2002 for patients aged 40 or older with between +0.75 D and +3.25 D of refractive error, with no more than 0.75 D of astigmatism. CK correction of presbyopia, approved in 2004, involves only one eye and is for patients who would benefit from a spherical treatment of between 1 D and 2.25 D to achieve a myopic endpoint of between -1 D and -2 D in their non-dominant eye.

Dr. McDonald notes that light touch



Conventional CK, shown above, requires more spots than does light touch CK.

offers several advantages over conventional CK: It requires fewer spots (8 spots vs. 16 or 24) and offers greater predictability, more space for enhancement and increased comfort for the patient. Perhaps most important, induction of cylinder is minimal, thus lowering the incidence of induced astigmatism, a side effect that caused many refractive surgeons to shy away from the procedure.

“When I performed conventional CK, I would often apply a ‘bonus spot’ for induced cylinder,” said Dr. McDonald. “I would add these bonus spots in about 20 percent of my cases. Since I switched to light touch CK, however,

I haven't had to place a bonus spot."

Dr. Murphy has been involved in CK since he heard about the concept at a breakfast meeting more than four years ago. Since that time, he has done more than 1,000 CK procedures. While he has been pleased with his results, he said the light touch technique introduced by Dr. Milne represents a "major advance" and is "twice as powerful" as conventional CK. "I have been doing light touch since October 2004 and have found that we achieved twice the effect with eight spots as we did with 16 spots." As with Dr. McDonald, he does not need to use bonus spots, and fewer than 5 percent of his patients experience induced cylinder.

Another positive Dr. Milne sees with light touch is the fact that his patients have been very stable six months to a year out from the initial procedure.

With light touch, mild treatment is considered eight spots placed at the 8-millimeter optic zone, moderate treatment is eight spots at 7 mm, and the most powerful is a combination of spot placements.

Almost Shelved

Dr. Davidorf was initially attracted to CK because of its safety profile and its potential for hyperopic patients. He was among the first investigators to study CK and the results were "quite good," with results comparable to hyperopic LASIK. However, after Dr. Davidorf purchased his own CK device, his results were "underwhelming." He said, "I wasn't getting the results that I remembered, so we stopped using the device, except in select cases."

When he heard about Dr. Milne's light touch experience last year, Dr. Davidorf decided to try the technology again. He, too, found that he achieved a more robust response with fewer spots. With this advance, his initial enthusiasm for the procedure returned. "During the clinical trials, we failed to recognize the importance of probe pressure. Fortunately, the natural tendency for most surgeons when given a sharp probe for the eye is to employ a light touch; hence the efficacy in trials. Following FDA approval, the standardized technique

Right Patients for Light Touch

Dr. Davidorf noted that one of the keys to success with CK is proper patient selection. The best presbyopia candidates for light touch CK are those plano-presbyopes who are sick of constantly taking their reading glasses on and off and would like help with everyday tasks such as reading e-mails, writing checks, seeing small print for a short period of time or normal-sized print for a longer period.

Light touch CK is preferable to LASIK and PRK for low hyperopes who may have very flat corneas or dry cornea issues. In addition, low hyperopes with early cataracts are candidates. If they are much too early to consider cataract surgery and the refractive error is too small to consider clear lens extraction, "CK may be a reasonable bridge," Dr. Davidorf said.

Dr. Murphy also performs light touch instead of LASIK for patients who are becoming presbyopic, and he uses the minimum amount of CK correction. While he will perform light touch CK in patients in their 60s and 70s, the advent of refractive lens exchange and newer lens designs may provide better options in this age group.

Easy screening test. Dr. Murphy has actually developed a screening test using a phoropter to determine if a patient is an appropriate candidate for presbyopic CK. The phoropter can help determine if patients have the ability to suppress their nondominant eye. If patients cannot do this, then they most likely cannot adapt to the CK change.

Centration is key. Dr. Davidorf said, "With light touch, we mark the eye in the same way we did before. When you are placing the markers, be sure the probe is well-seated and perpendicular to the cornea." He gauges his indentation pressure by ensuring that there is a 1/2-mm to 1-mm diameter light reflection from the cornea around the CK probe.

called for firm probe pressure," he said. "Light touch is the closest thing to doing nothing from a safety standpoint, as no tissue is removed and we don't touch anything near the central optical zone."

Not Convinced

One expert who is not convinced of CK's effectiveness is Dr. Wilson.

"Basically, the majority of these patients regress, and because they regress, doctors try to overcorrect them so they can retain a part of their correction," he said. "So the vision remains variable, even with light touch."

He added that he has seen a number of CK patients in whom the effects have regressed, and so they tried PRK or LASIK over it and really "got into trouble" because the areas that have the burn heal differently than areas of the surrounding cornea.

Dr. Wilson, a corneal biologist who specializes in wound healing, said it all boils down to biology.

"The fundamental issue here is that

when you alter the corneal tissue, in this case by essentially denaturing collagen and other components in the stroma, the keratocytes detect these alterations and do their job to repair them," he said. "As a result, patients will lose a significant amount of the effect of the surgery over time, regardless of how light the touch is."

There is nothing that CK does that cannot be done with LASIK or PRK, said Dr. Wilson, and the results are much more stable with the latter. "My main message can be applied to almost all technology: We always have to keep in mind the biology. If we understand the biology of what cells in the cornea do and how they respond to injuries, then we can predict whether new technologies are likely to be useful long term."

Drs. Milne and Wilson have no related financial interests. Dr. McDonald is a paid consultant for Refractec. Drs. Davidorf and Murphy are guest speakers for Refractec.