2012 FEMTO & PRESBY OPHTHALMIC SOLUTIONS IN CATARACT AND REFRACTIVE SURGERY

Highlights in Review
June 2012 – Cannes, France

Save The Date for 2013
June 28 – 30, 2013
Cannes, France

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PROGRAM PLANNING COMMITTEE
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Chris P. Lohmann, MD
Erik L. Mertens, MD, FEBOphth
Tobias Neuhann, MD
William Trattler, MD
John Vukich, MD

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The 2012 Femto and Presby Ophthalmic Solutions in Cataract and Refractive Surgery Symposium, held in Cannes, France, for the second year in a row, showcased some of the latest developments in presbyopia-correction techniques and technologies. In addition to the four keynote lectures and eight supplementary presentations highlighted below, visit www.femtopresby.com to watch live video footage and review PDFs of other selected presentations. The print and online digital enduring materials derived from this ACOS symposium represent some of the latest clinical data and evaluations from ophthalmology's biggest experts in presbyopia correction.

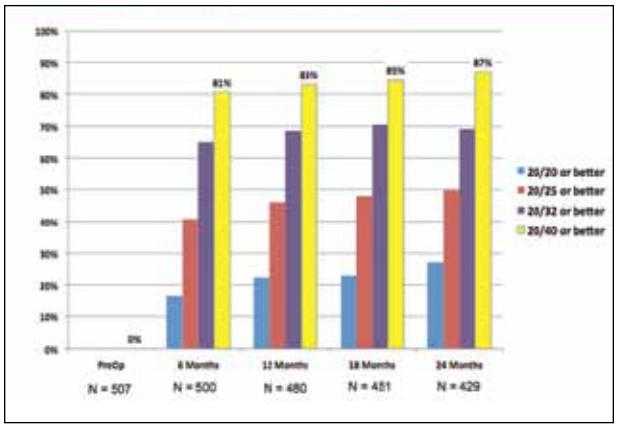
KEYNOTE LECTURE

IS THERE A ROLE FOR CORNEAL PRESBYOPIA CORRECTION?

John Vukich, MD

According to statistics from the World Health Organization, more than 1 billion people worldwide have presbyopia. Therefore, Dr. Vukich said during his keynote lecture, "presbyopia [correction] is the last great frontier in terms of what we can offer our patients." His presentation included a brief background on presbyopia and an overview of presbyopia correction at the corneal level, where he touched on laser ablation to reshape the presbyopic cornea but mostly concentrated on corneal inlays.

The idea behind implantation of a corneal inlay, Dr. Vukich explained, is to increase the depth of focus in the human eye. Some inlays like the Kamra corneal inlay (AcuFocus, Inc.) use the pinhole effect to achieve increased depth of focus. Data from the ongoing US Food and Drug Administration (FDA) multicenter clinical trial of the Kamra corneal inlay indicate that 87% of eyes (n=507) are 20/40 or better and 28% of eyes are 20/20 or better 24 months after surgery (Figure 1). Results tend to be pretty stable from 6 months onward, Dr. Vukich said. "The reality is that 20/32 is about where [patient] satisfaction becomes quite high; it doesn't have to be 20/20. At 20/32, patients are functional and pleased with their vision."



Courtesy of John Vukich, MD

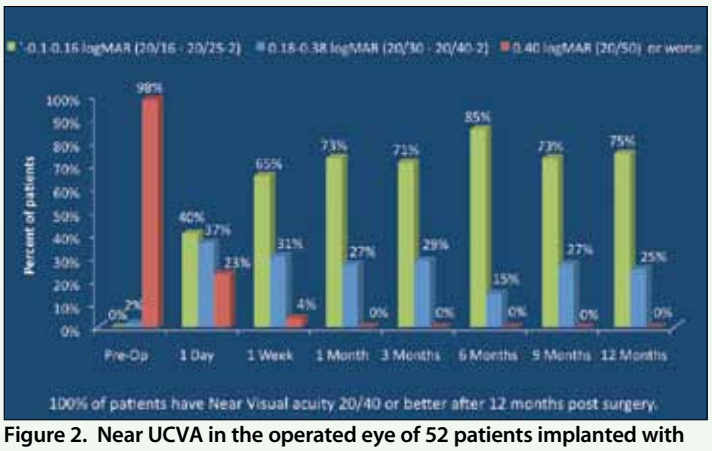
Figure 1. Monocular near UCVA at 24 months after implantation of the Kamra corneal inlay.

Dr. Vukich states that he is a consultant to AcuFocus, Inc.

CORNEAL AND OPTICS OF PRESBYOPIA

Annalisa Canovetti, MD
Mark Wevill, MD
Michael O'Keeffe, FRCS

Several other presentations were made on corneal inlays. According to Annalisa Canovetti, MD, patients implanted with the Flexivue Microlens (Presbia) showed a dramatic improvement in near visual acuity within 1 week of surgery. Of the 52 patients who had at least 12 months' follow-up, 100% had a near visual acuity of 20/40 or better (Figure 2). The average improvement in visual acuity was 20/100 before surgery to 20/25 after surgery, Dr. Canovetti said.



Courtesy of Annalisa Canovetti, MD

Figure 2. Near UCVA in the operated eye of 52 patients implanted with the Flexivue Microlens.

Courtesy of Mark Wevill, MD

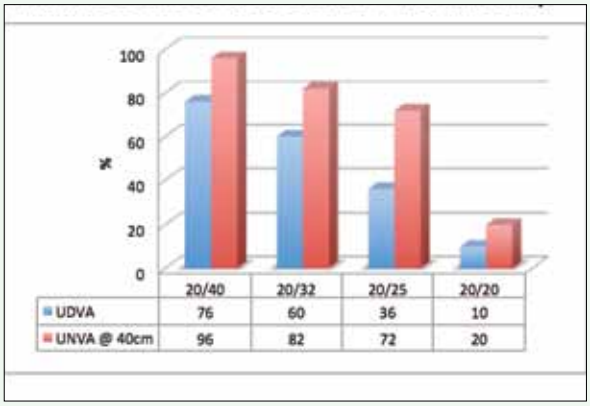
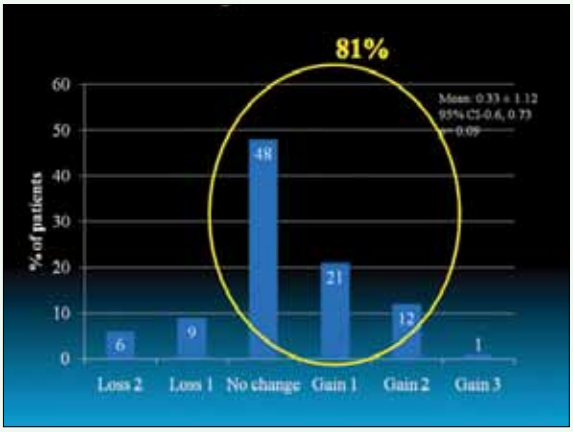


Figure 3. Near and distance UCVA at the last follow-up in patients implanted with the Vue+ corneal inlay.



Courtesy of Michael O'Keeffe, FRCS

Figure 4. Binocular change in lines of distance UCVA at 16 weeks after implantation of the Icolens.

Presenting data on the Vue+ corneal inlay, Mark Wevill, MD, showed that 96% of patients achieved a near UCVA of 20/40 or better in the treated eye at 6 months (Figure 3). Lastly, a new corneal inlay to hit the market, the Icolens (Neoptics), has also shown positive results, according to Michael O'Keeffe, FRCS. In his study, 81% of eyes (n=33) gained 1 or 2 lines of binocular distance UCVA at a mean follow-up of 16 weeks (Figure 4).

Dr. Canovetti states that she has received travel reimbursement from Presbia.

Dr. Wevill states that he is a consultant to ReVision Optics.

Dr. O'Keeffe states that he has no financial interest in the products mentioned.

KEYNOTE LECTURE

WHY IS THE PRESBYOPIC MARKET IN EUROPE NOT GROWING?

Joseph Colin, MD

With the key goals of cataract surgery being to restore vision and to improve quality of life with minimal adverse effects, the best option is a premium IOL, Professor Colin said during his keynote lecture. Although the market is growing quite steadily in the United States, representing 14.7% of the total volume of implanted premium IOLs, the use of premium IOLs is lagging behind in Europe. "We have a wide range of premium IOLs [in Europe], including multifocal, toric, add-on, phakic, and accommodating IOLs," Professor Colin said (Figure 5). However, European surgeons are only implanting 250,000 premium IOLs each year, which represents 7.8% of the total IOL market. Although this is very low, Professor Colin said, he predicted that European surgeons will experience a steep increase in the number of toric IOLs implanted in the coming year.

Courtesy of Joseph Colin, MD

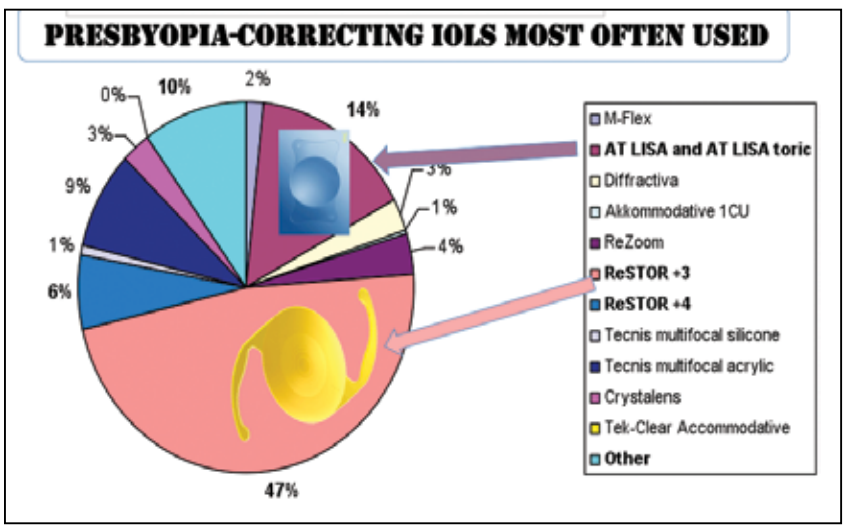


Figure 5. Depiction of the presbyopia-correcting IOLs most often used in Europe.

Professor Colin also offered a few pointers for increasing premium IOL conversion rates, including perfect patient selection, avoiding and treating complications, and educating patients. He also emphasized the importance of pre- and postoperative treatment of dry eye, retinal optical coherence tomography, corneal topography, adjustments to pupil decentration, and perfect IOL power calculation.

Professor Colin states that he is a consultant to Alcon Laboratories, Inc., and Abbott Medical Optics Inc.

PRESBYOPIA-CORRECTING IOLs AND PRACTICE

William J. Lahners, MD, FACS
Richard Awdeh, MD

According to a presentation made by William J. Lahners, MD, FACS, one way to maximize presbyopia-correcting IOL conversion rates is to introduce patient care counselors to your practice. The role of these counselors is to define and explain presbyopia to patients and to assess patient motivation for spectacle independence. After a patient speaks with the patient care counselor, it is then the surgeon's job to offer patient-specific recommendations based on his or her ocular health, interests and hobbies, and visual needs. The surgeon should inform the patient of his or her options; however, it is not the surgeon's job to *sell* a particular lens, Dr. Lahners cautioned.

In another featured presentation on presbyopia-correcting IOLs, Richard Awdeh, MD, shared his thoughts on the limitations of current premium lens models, including the unpredictability of outcomes due to IOL centration, IOL size, and IOL calculations. Dr. Awdeh believes that the future of presbyopia-correcting IOLs is lenses that can be fine-tuned with a femtosecond laser or those that change in response to the environment.

Dr. Lahners states that he is a consultant to Alcon Laboratories, Inc., Bausch + Lomb, and Abbott Medical Optics Inc.

Dr. Awdeh did not provide financial disclosure information.

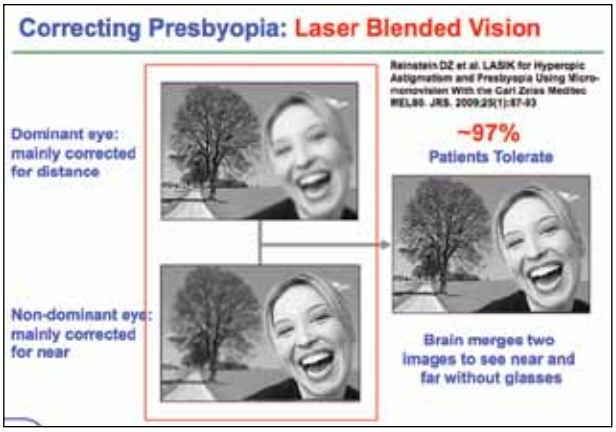
KEYNOTE LECTURE

LASIK FOR PRESBYOPIA BY SPHERICAL MODULATION

Dan Z. Reinstein, MD, MA(Cantab), FRCSC, DABO, FRCOphth, FEBO

In his keynote lecture, Professor Reinstein explained the concept of Laser Blended Vision, a LASIK-based presbyopia-correction strategy. Professor Reinstein began his lecture by explaining the importance of spherical aberration and its relationship to depth of field. "In an eye with no spherical aberration, light is focused to a point, so any forward or backward movement of the object will make it instantly go out of focus," Professor Reinstein said. "However, if we introduce some spherical aberration into the system, then there is dissemination of the focal point, meaning that there is a wider range of distances where the focus is equivalent, although slightly reduced. This of course applies to the retinal image; however, due to the natural ability of the visual cortex to process spherical aberration, the image is still perceived as sharply as if there were no aberrations. This range is the depth of field."

Professor Reinstein explained that the concept of Laser Blended Vision is an extension of the eye's natural state, as everyone has some naturally occurring spherical aberration and the brain is preprogrammed to do this filtering. If there is too much spherical aberration, however, the visual cortex is no longer able to fully process the spherical aberration and will result in loss of contrast sensitivity and other aberration-related quality of vision symptoms, as often seen after multifocal ablations. The ideal depth of field in each eye is 3.00 D; however, the maximum depth of field that can be introduced into the eye without inducing loss of contrast sensitivity is 1.50 D, Professor Reinstein continued. Therefore, this spherical aberration method cannot be used to correct presbyopia by itself. In order to give the patient good near, intermediate, and distance vision, Laser Blended Vision borrows from monovision, but the increased depth of field in each eye allows a lower degree of anisometropia to be used than in traditional monovision—which is called *micro-monovision*. With Laser Blended Vision, it is possible to "displace the foci between the eyes and create continuous vision, from near to intermediate to far," he said. In essence, this strategy creates a blend zone of vision between the two eyes at intermediate distances, meaning that much less suppression is required and there is no dissociation between the eyes. In fact, patients retain a



Courtesy of Dan Z. Reinstein, MD, MA(Cantab), FRCSC, DABO, FRCOphth, FEBO

Figure 6. Laser Blended Vision allows the brain to merge two images to see near and far without glasses.

functional level of uncorrected stereoacuity, proving that they have binocular function.

Although the tolerance for monovision is somewhere between 50% and 60%, by making the near vision of the distance eye and the distance vision of the near eye closer, "about 97% of patients tolerate this small difference between the eyes," Professor Reinstein said. The concept behind Laser Blended Vision was to find a solution that did not compromise safety or quality of vision, which has been achieved by basing it on the natural mechanisms of spherical aberration processing and binocular fusion (Figure 6), unlike multifocal approaches that require patients to adjust to differentiating between two images in the same eye.

Dr. Reinstein states that he is a consultant to Carl Zeiss Meditec.

OTHER PRESBYOPIA-CORRECTING PROCEDURES

Erik L. Mertens, MD, FEBOphth
Michael Endl, MD

Erik L. Mertens, MD, FEBOphth, also presented on the value of corneal laser approaches to treating presbyopia. In his lecture, Dr. Mertens said that Intracor, a customizable intrastromal ablation that changes the biomechanical properties of the cornea, leads to an increase in central refractive power of approximately 1.50 to 2.00 D (Figure 7). However, there are limitations to the procedure, including that it is not reversible, and therefore his preference is for Supracor, a reversible, bilateral varifocal excimer-based treatment for presbyopia. This procedure, Dr. Mertens said, provides a smooth transition from distance to near vision and eliminates segment lines, thus providing good intermediate vision as well. Dr. Mertens said that Supracor produces precise outcomes and induces minimal higher-order aberrations. Additionally, enhancements are easy to perform and can be used to remove or enhance the near addition and adjust distance vision. Both Intracor and Supracor can be used to treat postcataract patients with monofocal IOLs and post-LASIK patients who have become presbyopic.

Courtesy of Erik L. Mertens, MD, FEBOphth

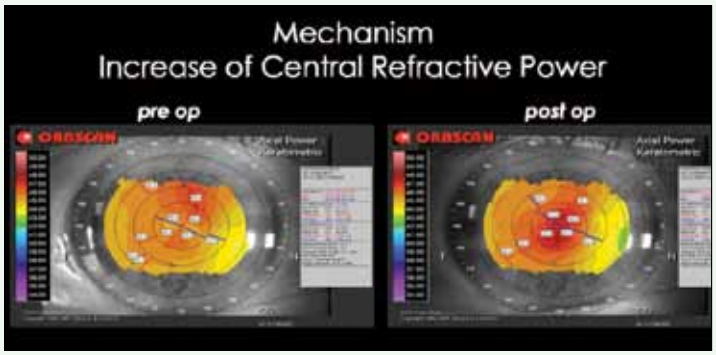


Figure 7. Intracor can lead to an increase in central refractive power of approximately 1.50 to 2.00 D.

Another presbyopia-correcting procedure, scleral spacing, was also highlighted at the meeting. According to Michael Endl, MD, the PresView Scleral Implant (ReFocus Group) is a safe and effective procedure for the treatment of presbyopia. In an ongoing study of 32 patients (61 eyes), of whom 19 were available for 24-month follow-up, the average gain in lines of visual acuity from baseline was 3.05. Additionally, 95% of patients achieved a distance BCVA of 20/40 or better at 24 months. Results for distance-corrected near visual acuity are seen in Figure 8.

Courtesy of Michael Endl, MD

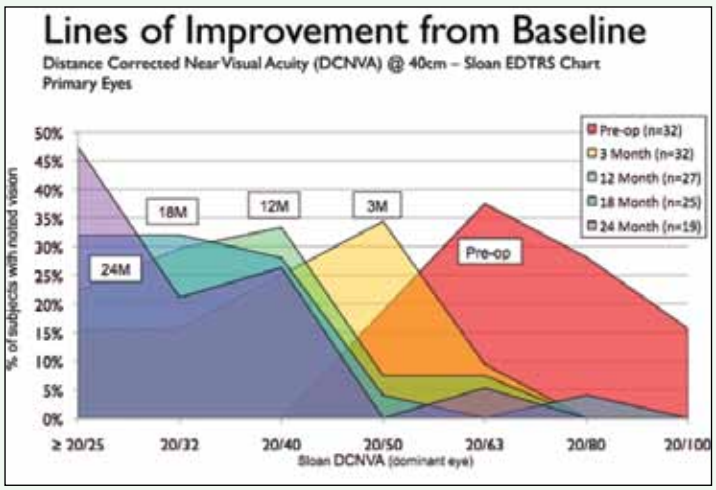


Figure 8. Distance-corrected near visual acuity after the scleral spacing procedure.

Dr. Mertens states that he is a consultant to Technolas Perfect Vision GmbH.

Dr. Endl states that he has received travel reimbursement from ReFocus Group.

KEYNOTE LECTURE

LASER CATARACT SURGERY: WHERE ARE WE NOW, AND WHERE WILL WE BE BY THIS TIME NEXT YEAR?

Lucio Buratto, MD

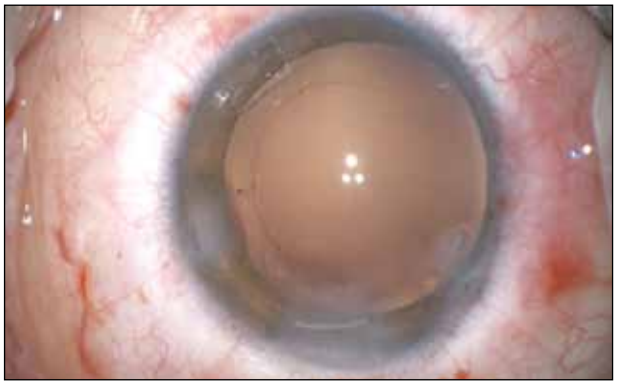
To open his keynote lecture, Lucio Buratto, MD, posed the question: Is the femtosecond laser the future of cataract surgery? Using his experience with the LenSx Laser System (Alcon Laboratories, Inc.) as a guide, in Dr. Buratto's opinion, the answer is a resounding yes.

"There is already [general] acceptance by the doctors," Dr. Buratto said, adding that this occurred rather quickly compared with other ophthalmic technologies to come to market.

In his early experience, docking was the trickiest part of the procedure for Dr. Buratto, and in some cases, he would have to try docking multiple times before proceeding with the treatment. However, recent upgrades to the laser platform have increased the efficiency of the procedure, and it no longer takes as long to achieve a good dock. It is also less painful for the patient.

"There is an improvement from the beginning to now," Dr. Buratto said, emphasizing that other parts of the procedure have always been promising, including laser capsulotomy. "The [laser] capsulotomy is very precise, it is very circular, and we do not need viscoelastic for the procedure. It is probably the most important step of surgery."

The preciseness of the laser capsulotomy (Figure 9) allows better IOL centration, and the capsule overlaps the lens, he said, adding that this is increasingly important with the use of premium IOLs. Other benefits of laser cataract surgery include the ability to reduce ultrasound energy, perform lens fragmentation, and create incisions, he continued.



Courtesy of Lucio Buratto, MD

Figure 9. Laser capsulotomy with the LenSx Laser System.

"Today the machine is just a laser in the operating room," Dr. Buratto said, stressing that, in the future, it will become more integrated into the entire surgical procedure. "I am very happy to have started this new and positive experience. I do believe that the future of [cataract] surgery is with the laser."

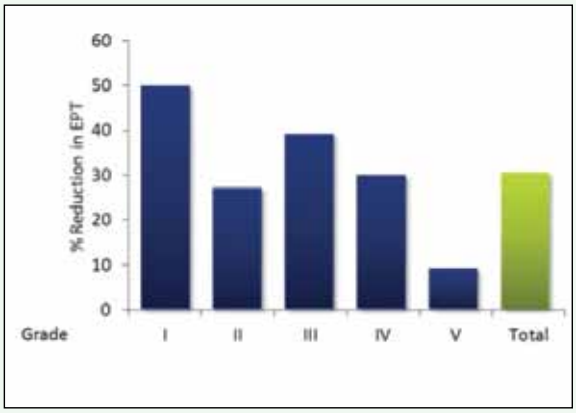
Dr. Buratto states that he has no financial interest in the products or companies he mentions.

FEMTOSECOND LASERS FOR CATARACT SURGERY

Chris P. Lohmann, MD

Chris P. Lohmann, MD, shared his experience with laser cataract surgery in a clinical setting. Using the Victus (Technolas Perfect Vision GmbH and Bausch + Lomb), Dr. Lohmann said that laser capsulotomy led to better accuracy and predictability of the capsulotomy diameter, circularity, and centration. Additionally, laser fragmentation led to easier phacoemulsification of the lens and a reduction in phaco power (Figure 10). The pattern he used to fragment the lens with the laser depended on the cataract grade.

Dr. Lohmann states that he is a consultant to Technolas Perfect Vision GmbH.



Courtesy of Chris P. Lohmann, MD

Figure 10. Percent reduction in effective phaco time depending on the grade of the cataract.