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Table of Contents	Index to Advertisers	Calendar of Events	Classified & Marketplace	Multimedia Theatre	Guest Register	Ophthalmology Links	SEARCH	Editorial Board	How to Contribute	Publishing Statement
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## *Accommodative IOLs coming a long way*

by [Lisa B. Samalonis](#) Contributing Editor

*The latest data on accommodative IOLs are promising.*

Accommodative intraocular lenses will ultimately be a major win for ophthalmology and all those involved, said I. Howard Fine, MD, clinical associate professor, Oregon Health Sciences University, Portland.

“My research with accommodative IOLs has pushed me further into the belief that in the future, pseudophakic presbyopia will be fully and satisfactorily addressable,” Fine said.

### *Accommodation*



**The C&C Vision AT-45 Crystalens**

accommodative effort of the patient. It creates increased vitreous pressure that moves the IOL forward, making it a

More than a decade ago, A. Stuart Cummings, MD, now in private practice in Aliso Viejo, Calif., found that a group of patients who had plate-haptic IOLs tended to have better near performance than those who had looped lenses. “Cummings found that the patients who did best tended to be those whose lenses sat in position of rest most posteriorly,” Fine said.

Theories to account for this “accommodation” included the idea that the ciliary body directly causes a vaulting forward of the IOL. Under this theory, the ciliary body presses on the lens or it causes anterior displacement of the vitreous, moving the lens forward.

The method of the accommodative IOL is thought to be constriction of the ciliary body that is a result of the

higher plus lens, he said.

Cummings developed an initial accommodative plate haptic, which is now in its seventh generation.

### *C&C Vision*

Fine is a lead investigator in the U.S. clinical trial for the C&C Vision AT-45 Crystalens. The first implantation was in March 2000 and in total, 425 eyes were treated at centers across the country. Follow-up on patients is from 3 to 15 months postop at this time.

“The AT-45 is a silicone lens that is 1.5 mm thick, compared with 4- to 5-mm crystal lens in elderly patients. There is a large space in front of the silicone lens in the eye with the plate haptic. The model has a hinge at the junction of the haptic with the optic to facilitate forward movement of the optic,” Fine said.

Previous models of the IOL had problems, mostly decentration or dislocation, he said.

### *Highlights results*

Results for the Crystalens accommodative IOL have been promising so far. All the patients achieved a best-corrected distance vision postop of 20/40 or better. For best-corrected near acuity, all patients were 20/40 or better. For distance-corrected near vision, 86.7% of patients were 20/40 or better and 100% were 20/60 or better.

At 1 year, for 42 patients with follow-up of 11 to 15 months postop, distance-corrected near vision was 20/40 for 92.9% and 20/60 or better for 100% of patients.

In 50 bilaterally implanted patients with 3 to 6 months of follow-up, uncorrected distance vision binocular acuity was 20/20 or better in 86% of patients, 20/25 in 96% of patients, and 20/40 or better in all patients.

For uncorrected binocular near vision, 60% of patients in the study achieved 20/20 or better, 72% achieved 20/25 or better, 98% achieved 20/40 or better, and 100% had 20/60 or better.

In a recent study, D. Michael Colvard, MD, assistant professor, University of Southern California, evaluated glare and contrast between patients who were implanted with the C&C Vision AT-45 and the AcrySof lens, using the Stereo Optical 1600 Vision tester.

“No difference in glare and contrast was found between patients implanted with

the 4.5-mm AT-45 third-generation silicone optic and patients implanted with the 6-mm acrylic optic," reported Colvard, in private practice in Encino, Calif.

"We feel that the Crystalens does restore accommodation. Patients can see very well with their distance correction both near and intermediate and their contrast sensitivity and glare are comparable to standard monofocals. Patients see better if they are binocularly implanted," Fine said.

Fine's practice performed 100 of the procedures in the study and the data are being analyzed. Updated information will be released at various meetings this year. "Almost all our patients from this study are functioning without glasses. We are very impressed with the performance of this lens," he said.

### *Human Optics*

Human Optics AG, in Erlangen, Germany, is developing an accommodating IOL, called the Accommodative 1CU.

The posterior chamber lens, which was designed by K.D. Hanna using finite element models, is a one-piece lens made of hydrophilic acrylic with ultraviolet inhibitor. The biconvex implant has an optical diameter of 5.5 mm, with an overall diameter of 9.8 mm. The refractive index is 1.46; the estimated A-constant is 118.1. The Accommodative 1CU is available in +16 D to +26 D; further powers are available with special ordering.

At the 2001 Asclepion Wavefront Symposium at the American Academy of Ophthalmology meeting in New Orleans, H. Burkhard Dick, MD, of the University of Mainz, Germany, presented the first dynamic wavefront of pseudophakic elderly patients with the Accommodative 1CU.

The WASCA Analyzer, manufactured by Asclepion-Meditec, enabled Dick to define the range of pseudo-accommodation accomplished by these elderly patients following cataract surgery. For example, during accommodation in a 72-year-old subject following implantation of the 1CU, the dynamic wavefront sphere and cylinder parameter plot clearly showed the change in sphere of the eye from -2 D to approximately -3 D. Data were acquired for 30 seconds. The cylinder also appeared to change marginally during accommodation in this eye.

The 1CU was implanted for the first time in June 2000 at the University Eye Hospital of Erlangen-Nuremberg University. Since then, more than 200 patients have received the lens in Italy, Japan, Greece, Finland, the United Kingdom, and Germany. To date all the patients have reported satisfactory results, according to Human Optics.

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