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Ciliary sclerotomy with the insertion of silicone expansion plug

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

The mini-fellowship gives surgeons both a bird's-eye view and a hands-on experience.

Surgeons from around the world recently had an opportunity to learn anterior ciliary sclerotomy (ACS) techniques and gain a unique understanding of the procedure during a mini-fellowship at the Fukasaku Eye Center in Yokohama, Japan.

Hideharu Fukasaku, MD, said the program fosters unique learning opportunities within a small-group environment that is conducive to learning. The course is part of a broader mini-fellowship program sponsored by the American Society of Cataract and Refractive Surgery in which participants are also able to observe other aspects of practice that may be unique to the host's practice.

"We are planning to host the ASCRS Mini-Fellowship program again this year. This will probably occur at the Fukasaku Eye Center in Yokohama in the fall," he said.

"Expansion of the sclera overlying the ciliary body allows the ciliary body ring to expand, resulting in an increase in the distance from the lens equator to the ciliary body. This uncrowding of the posterior chamber leads to a resetting of the accommodative tone of the equatorial zonules and increased accommodative amplitude."



— Hideharu Fukasaku, MD

[Anterior ciliary sclerotomy background](#)

One theory of accommodation is that the lens is under pressure during accommodation, due to the increased tension of the equatorial zonules. As the lens increases in size with age, the effective pressure is reduced in a more crowded eye, limiting accommodation. Spencer P. Thornton, MD, of the Thornton Eye Center, Nashville, Tenn., was one of the earliest advocates of the ACS procedure for the correction of presbyopia. The technique involves placing four or more symmetrical partial-thickness radial incisions in the sclera over the ciliary body. The incisions are placed beginning in the surgical limbus, extending 2 to 3 mm posteriorly, stopping anterior to the pars plana.

Fukasaku said that ACS with scleral expansion plug (SEP) implantation is a unique technique that restores accommodative amplitude by expanding the globe circumference overlying the ciliary body.

In the Fukasaku technique, four full-thickness radial scleral incisions are created using the Fukasaku Universal Diamond (FUD) knife. "Expansion of the sclera overlying the ciliary body allows the ciliary body ring to expand, resulting in an increase in the distance from the lens equator to the ciliary body. This uncrowding of the posterior chamber leads to a resetting of the accommodative tone of the equatorial zonules and increased accommodative amplitude," he said.

For the technique, the implantation of inert silicone plugs into the radial incisions maintains the separation of the incision walls and the increase in scleral circumference. "This ensures that there will be little or no regression in the increased accommodative amplitude," Fukasaku explained.

He said that a side effect following the ACS-SEP procedure is that there is a clinically significant drop in intraocular pressure that is maintained by implantation of the silicone expansion plugs. "We believe that we are creating mini-ciliochoroidal dialyses that increase uveoscleral outflow and lower IOP," Fukasaku said.

In addition, Fukasaku and his colleagues are investigating the IOP-lowering effect of ACS-SEP as a combined procedure with their trabeculotomy technique, which is called trabeculo-uveosclerotomy. "Thus far, we have found the ACS with trabeculo-uveosclerotomy procedure has a synergistic effect with an IOP-lowering effect greater than either ACS-SEP or trabeculotomy alone," he said.

“Dr. Fukasaku is far ahead of everybody outside the United States in perfecting the ACS procedure and adapting the silicone plug to treat glaucoma.”

— Spencer P. Thornton, MD



Feedback on the course

Thornton has assisted Fukasaku in a number of ACS training courses.

“Watching Dr. Fukasaku perform ciliary sclerotomy with the insertion of his silicone expansion plug was like watching a concert violinist at work,” he said. “He has some of the best surgical hands in the business, and the cases went [as] smooth as silk. The best part was the next day when each of the patients was reading the smallest print at 10 to 12 inches. He had no complications and the patients were quite pleased.

“Dr. Fukasaku is far ahead of everybody outside the United States in perfecting the ACS procedure and adapting the silicone plug to treat glaucoma,” Thornton said.

Thornton said that Fukasaku has advanced the ACS procedure in several ways, particularly in contributing a significant way of maintaining the effect by keeping the incision from contracting with vascular ingrowth and scarring by the use of a silicone tissue barrier in the incision. “He also showed that by expanding the incision with the silicone expansion plug, the intraocular aqueous outflow could be increased, lowering the IOP,” Thornton explained.

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