BEST KEPT SECRETS

WIOL-CF

The Expert

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The WIOL-CF (Medicem) is unique among modern IOLs in that it has no haptics. Discussing this lens requires a few definitions up front. The manufacturer calls it a *bioanalogic lens*: that is, a lens that mimics the properties of the human crystalline lens. It has a large 9-mm optic that is believed to be *polyfocal*: that is, to adjust its optical power through the negative spherical aberrations of its posterior hyperbolic shape, through changes in pupil size and through changes in the actual shape of the lens itself. With its polyfocal properties, the company says, the IOL offers *continuous focus* from near to far—hence the *CF* in the name—and a large depth of field.

The lens has its roots in history. The *W* in WIOL is in memory of Otto Wichterle, the Czech inventor of industrial manufacturing of soft contact lenses. Professor Wichterle had the idea of creating the large contact lens optic, mimicking the natural lens. Then Bausch + Lomb bought the patent and built their business of soft contact lenses based on his idea. The haptic-less design of the lens also recalls the early IOLs of Sir Harold Ridley. So, in a way, IOL design has come full circle with this latest iteration.

We have been using the WIOL-CF for quite some time in clinical studies. Recently, we have been participating in a trial assessing the results of this lens when implanted after laser-assisted capsulotomy. The results were promising, although I am not at liberty to discuss them in detail pending completion of the trial. I can say, however, that the lens consistently achieves good refractive outcomes. The postoperative refraction is on target, and most patients experience the benefits of the extended depth of focus.

UNIQUE DESIGN

One key to my preference for the WIOL-CF is that the lens is closest in size to the natural crystalline lens (NCL) of all currently available IOLs (Table 1). The diameter of the crystalline lens is 10.5 mm, with an area of 87 mm^2. The diameter of the WIOL-CF is 8.9 mm, with an area of 62 mm^2. By contrast, an IOL with a 6-mm optic yields an area of only 28 mm^2.

Also key, the refractive index of the proprietary hydrogel lens material (42% water content) of the WIOL-CF is 1.43, closer to that of the NCL than any other IOL on the market. The IOL does not need haptics because it adheres to the posterior capsule, and, therefore, it can feature the large optic with its polyfocal qualities.

The last key advantage of the lens is that its design greatly decreases the possibility for

TABLE 1. SELECTED FEATURES OF NCL VERSUS WIOL-CF AND MULTIFOCAL/TRIFOCAL LENSES

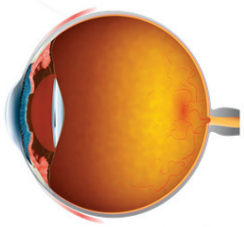
	NCL	WIOL-CF	FineVision (PhysIOL)	M Plus (Oculentis)	Tecnis Multifocal (Abbott)	AT LISA (Carl Zeiss Meditec)	AcrySof Restor (Alcon)
Diameter of optic (mm)	10	9	6	6	6	6	6
Water content (%)	66	42	25	25	–	25	–
Refractive index	1.42	1.43	1.46	1.46	1.47	1.46	1.55

Abbreviations: NCL = natural crystalline lens

The Lens

WIOL-CF

MEDICEM



Images courtesy of Medicem

- Bioanalogic lens mimics the qualities of the human crystalline lens
- Large 9-mm, glare-free optic provides continuous focus at all distances
- Depth of focus up to 3.50 D due to negative spherical aberration
- IOL has no haptics; it is stabilized by adhering to the posterior capsule
- Excellent contrast sensitivity, even in mesopic conditions
- IOL-specific power calculator available online

For more information:
http://www.wiols.com/

dysphotopsias that can be caused by the edge of the optic with some other IOLs. This is because the edge of the WIOL-CF optic is far from the visual axis. Further, the profile of the lens serves to enhance the depth of focus, with most patients seeing well at far and intermediate distances, and some able to read well. In early studies, about 70% of eyes were able to read J5 unaided, what we call *social reading*—for example, reading a restaurant menu.[1]

One potential risk of the design is that, with the lack of haptics, there is a possibility of decentration. However, although technically the lens may decenter, the large diameter of the optic should decrease the risk of poor optical results.

POINTERS AND PEARLS

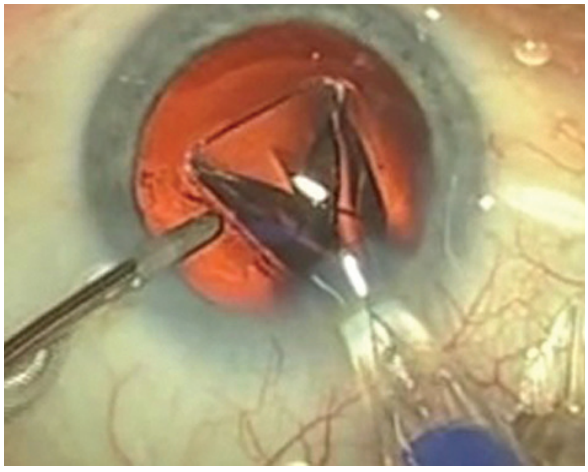
Despite the size of the WIOL-CF, it is not difficult to handle or to load into the injector cartridge. It does, however, require a slightly larger incision than some modern microincision lenses; I use an incision of 2.6 mm.

The IOL is delivered from the injector right into the capsular bag because it is larger than the usual capsulorrhexis or laser capsulotomy opening. The lens should be opened inside the bag (Figure 1), and then OVD aspirated from underneath the lens so that no remnants remain. The lens is slightly dehydrated when it is inserted, so as it sits on the posterior capsule it rehydrates. This increases the adhesion of the lens to the capsule and stabilizes it in position.

One special consideration with this lens is that, after implantation, the patient should lie on the surgical bed for 3 minutes or more in order to ensure that the lens sits reliably in a centered position.

FUTURE PLANS

At our clinics right now, under the conditions of the ongoing clinical study, we are allowed to offer the WIOL-CF to patients who desire a standard monofocal lens. We tell



Courtesy of Medicem

Figure 1. The WIOL-CF unfolds inside the capsular bag.

AT A GLANCE

- The WIOL-CF is a unique lens that is closer to the shape of the crystalline lens than any other IOL on the market, that has the largest optical diameter of all available lenses, and that does not need haptics because it adheres to the posterior capsule.
- Slightly dehydrated when inserted, the WIOL-CF rehydrates as it sits on the posterior capsule; this increases the adhesion of the lens to the capsule and stabilizes it in position.

CASE EXAMPLE

The WIOL-CF has been helpful for many patients, but I recall one in particular. This woman was a 2.00 D hyperope and felt burdened by her need for glasses for many daily tasks. As is my standard procedure with this lens, I targeted one eye for emmetropia and the other to -0.50 or -0.75 D. She is now able to do all of her daily tasks without glasses, and she is extremely grateful for that. With the extended depth of focus, the WIOL-CF delivered spectacle independence for her.

these patients that they may benefit from the extended depth of focus this lens can provide, and, if they agree, we enroll them in the study. Once the study is complete, I believe this lens will be offered to patients as an option similar to other extended depth of focus IOLs already on the market.

The company is also developing a new concept of using a femtosecond laser postoperatively to selectively change the refractive index within the IOL material. This would allow clinicians to refine the refractive result after lens surgery. In the event of a refractive surprise or in order to introduce an additional correction (eg, cylindrical or depth of focus), the laser could be used to increase or decrease the refraction without opening the eye again. This concept is similar to that of the Light Adjustable Lens (Calhoun Vision). The difference is, however, that Calhoun's approach requires the use of UV light to lock in the refraction, and patients must wear dark sunglasses for UV protection for weeks after surgery, which is quite impractical. This femtosecond laser approach, if it works, would require only a short laser procedure. Once the laser procedure is done, the patient walks out with immediately improved refraction.

To the best of my knowledge, the company's proprietary material is potentially suitable for this approach, but that is as far as exploration has gone. No clinical work has been done. If these efforts prove to be successful eventually, this could be an important development in bringing improved accuracy to cataract surgery. ■

1. Sanders DR, Sanders ML. Near visual acuity for everyday activities with accommodative and monofocal intraocular lenses. *J Refract Surg*. 2007;23(8):747-751.