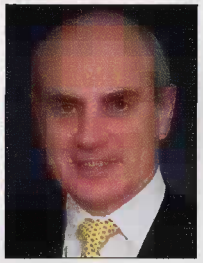
Online calculator determines target power for toric IOLs



Noel A. Alpins

George Stamatelatos

An online calculator lets surgeons determine the power of any commercially available toric IOL with a high degree of predictability and accuracy, according to its developers.

The toric IOL calculator is a component of the Alpins Statistical System for Ophthalmic Refractive Surgery Techniques (ASSORT). It uses corneal parameters, anterior chamber depth, effective lens position, axial length, and sphere and cylinder to determine toric IOL power.

Noel A. Alpins, MD, OSN Refractive Surgery Board Member, and **George Stamatelatos, BscOptom,** explained advantages of the ASSORT toric IOL calculator in an interview with OCULAR SURGERY NEWS.

Many toric calculators have shortcomings, especially in terms of user interface, Alpins said.

"It's really like a whole bunch of numbers and boxes, and it doesn't explain to the doctor how it works. It's all intuitive," Alpins said.

Currently, there are nine approved toric lenses available worldwide. The ASSORT toric IOL calculator helps surgeons determine the correct power for each and avoid refractive surprises, Alpins said.

"With the ASSORT toric calculator, you can choose any one of the companies and their implants and avoid having to go to several different websites to confirm the most effective-powered implant," he said. "They don't have to be locked into one particular implant."

According to the ASSORT website, the calculator accounts for spherical equivalent refraction using the SRK/T, Holladay, Hoffer Q and Haigis formulas, and effective lens position using the A-constant, surgeon factor, personalized anterior chamber depth, or the a0, a1 and a2 Haigis constants.

Surgeons can also evaluate vector magnitude and axis separately. Data are displayed numerically and graphically.

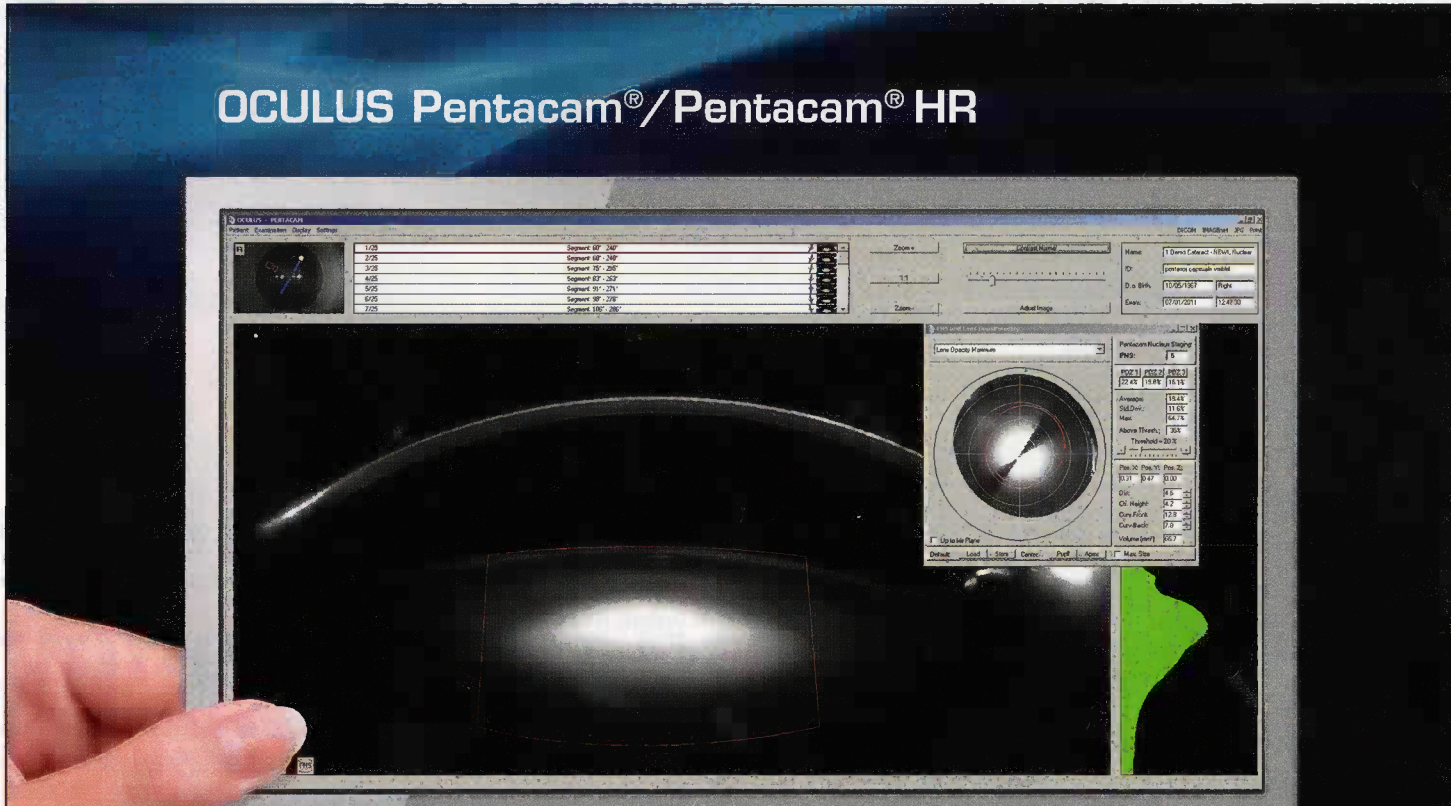
Effective lens position

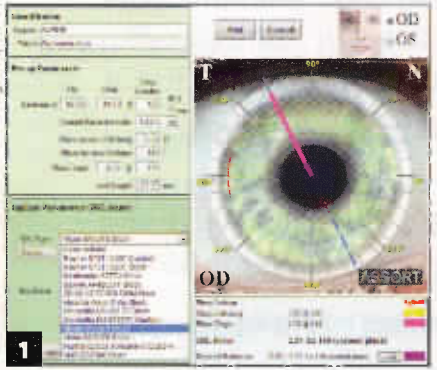
Many toric calculators do not include anterior chamber depth or effective lens position, according to Alpins

"If you don't calculate the length of the distance between the implant and the cornea, you're going to get the wrong number," he said. "We address that question. … The effective lens position has a very important influence on the accuracy of the implant that you use."

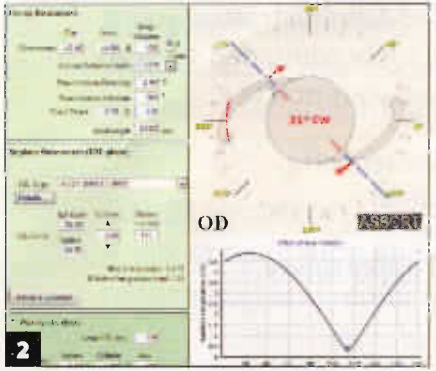
The calculator accounts for the amount of astigmatism at the corneal plane, Alpins said.

Online calculator *continues on page 18*





The ASSORT toric IOL calculator displaying the option of selecting any of the nine toric IOL manufacturers, the IOL power at the corneal plane and the expected refraction.



The ASSORT website software calculates the degree of IOL rotation required to minimize the refractive cylinder with the existing toric IOL. In this example, the postoperative manifest refraction was +0.50/−1.75 × 175; a rotation of the toric IOL of 21° clockwise would reduce the refraction to -0.19/-0.35 × 26.

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Online calculator

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"The ASSORT toric IOL calculator can also estimate what power implant should be placed in an eye based on biometry. Furthermore, we calculate specifically with the astigmatic power that you want to correct," he said. "That's a very important component."

Incision placement

The program also helps the surgeon place the clear corneal incision to address corneal astigmatism, Stamatelatos said. The surgeon is directed where to make the incision to maximize the flattening effect.

"All of the numbers are based pretty much on corneal astigmatism," Alpins said. "So, [the program] asks two questions: How much corneal astigmatism are you trying to reduce by taking out the cataractous lens, and at what meridian are you trying to flatten it?"

Alpins said he makes all of his incisions on the steep meridian.

"That way, I don't even need to have a vector analysis, just an arithmetic analysis: 3.25 D of corneal astigmatism, take away 0.50 D flattening induced by my phaco incision at the steep meridian, and that makes 2.75 D. So, I'll pick an implant that corrects 2.75 D," Alpins said.

Handling refractive surprises

The ASSORT toric IOL calculator helps the surgeon solve any refractive surprises, according to Stamatelatos.

"Five percent to 10% of patients don't quite get the results they want and they're disappointed. The doctor says, 'I've got this refractive cylinder left in my patient's glasses. What do I do next?'" Alpins said. "Many of the companies don't have the answer. So, this is a great service, to be able to actually let the doctors do the calculations in a simple form to help their clinical management."

Rotating the existing toric lens to an axis that minimizes the refractive cylinder can improve the visual outcome. The other options available to the surgeon are to remove the implant, replace it or perform a LASIK enhancement, Stamatelatos said. The calculator provides data that help the surgeon devise an appropriate strategy.

"Why did this patient get a refractive surprise? Was the lens badly aligned? Was the lens over- or under-powered? Or was it a combination of the two?" Alpins asked.

To reduce refractive cylinder in the case of an IOL that is off-axis anatomically or functionally, Alpins said the physician can "tweak the lens and rotate it to a position calculated to provide the minimum refractive cylinder with the implanted IOL" as a secondary procedure rather than change the lens or perform laser enhancement at a later time.– *by Matt Hasson* OSN

Reference:
Alpins Statistical System for Ophthalmic Refractive Surgery Techniques (ASSORT). http://www.assort.com. Accessed June 28, 2013.

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Disclosure: Alpins and Stamatelatos have a financial interest in the ASSORT toric IOL calculator.

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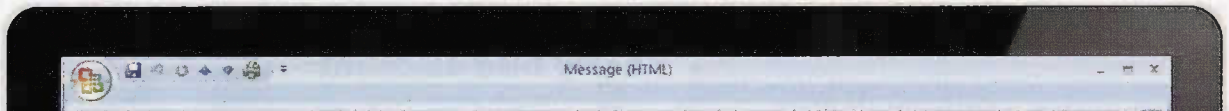

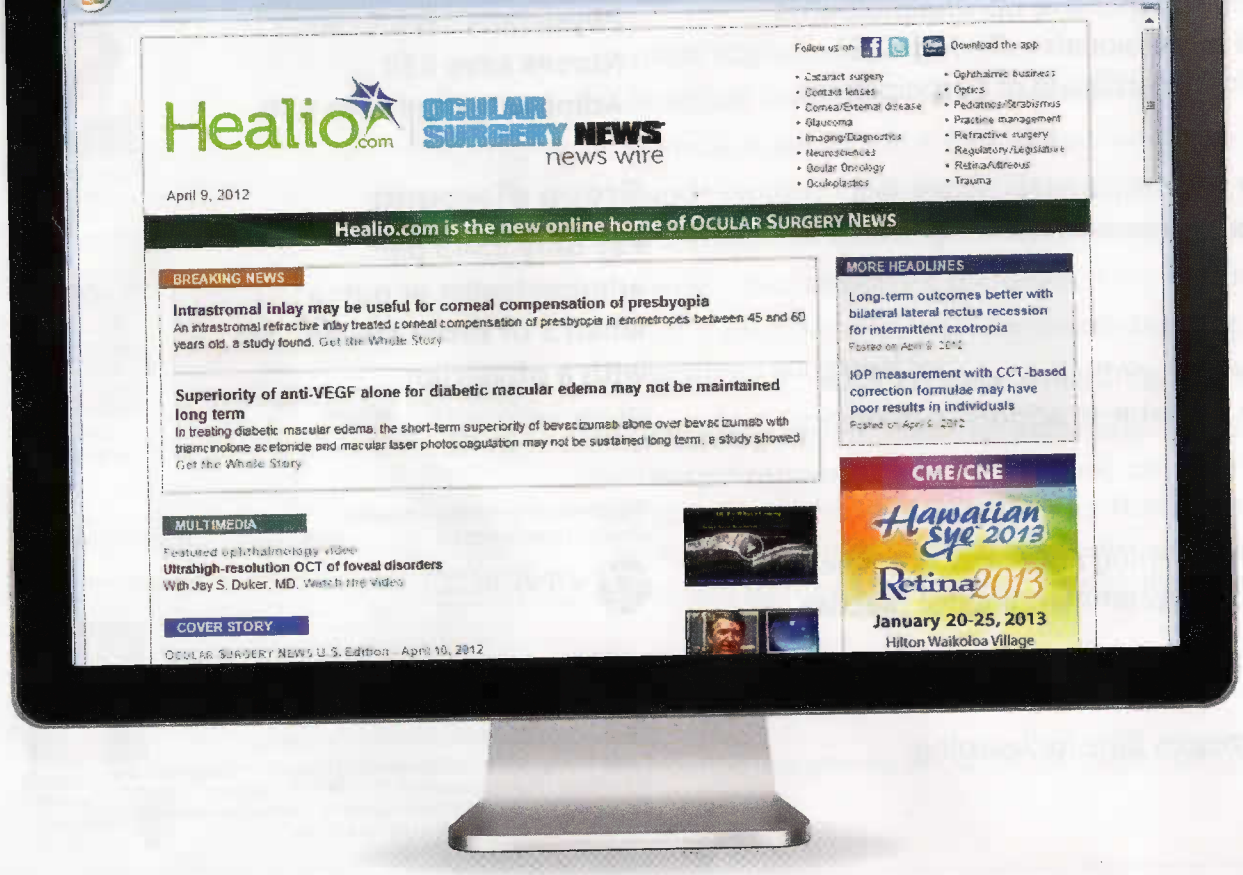

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PERSPECTIVE

The Alpins ASSORT Toric IOL calculator is a comprehensive approach to the management of sphere and astigmatism in cataract surgery with the use of any commercially available toric IOL. The toric IOL calculator determines the spherical equivalent of the IOL using SRK/T, Holladay or Hoffer Q formula. In addition, the effective lens position is determined by using the A-constant and surgeon factor based on previous outcomes, and the spherical power of the IOL is factored into the calculation of toric power of the IOL at the corneal plane. The most common source of suboptimal outcomes with toric IOLs is the lack of consideration of the effect of the cataract incision on altering the final cylindrical axis. The Alpins calculator employs vector analysis of the cataract incision into the final axis of IOL placement. Postoperative mathematical analysis of the sphere and axis of the IOL is available for the management of refractive surprises. Alpins has made a significant contribution to cataract surgery with this website.

Eric D. Donnenfeld

– Eric D. Donnenfeld, MD

OSN Cornea/External Disease Board Member

Disclosure: Donnenfeld has no relevant financial disclosures.