



# The Barrett IOL Calculation Suite and the Aladdin Biometer

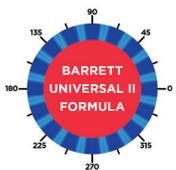


**T**he Barrett Universal II is a formula based on Gaussian principles, or ray tracing. It differs, therefore, from conventional formulae in that it takes into account the change in principal planes that

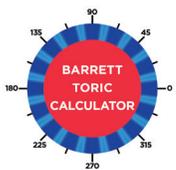
occur with different intraocular lens powers. It also changes the calculation depending on whether the optic configuration alters from a biconvex to a meniscus lens, and finally, it recognizes the changing versions that occur when a lens changes from a positive lens to a minus lens, and as such, it doesn't require additional correction factors such as axial length transformation or unusual constants for patients with high myopia and very long axial lenses.

In addition, it has a unique theoretical model to predict the ELP and this differs quite significantly from what has been used previously.

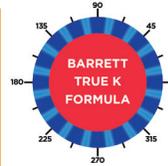
## The Barrett Formula Suite



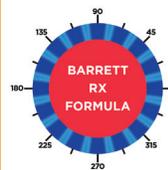
The Barrett Universal II is the core formula, which is at the heart of all the other formulae.



The Barrett Universal II forms the foundation for the Barrett Toric calculator, which is used to predict the required toric lens power in cylinder for patients requiring a toric lens for astigmatism.



The True K formula is a post refractive formula, which can be used for patients who've had previous refractive surgery. This includes patients who had previous laser core PRK including hyperopic or myopic procedures, as well as patients who have had radial keratotomy. In addition, there is a True K Toric calculator and this is for patients with astigmatism who have had previous laser surgery, because the calculations required for a toric calculation, in this circumstance, are somewhat different.



The Barrett Rx formula is a solution for patients who have had unexpected outcomes following cataract surgery and for these patients they require information with a rotating atoric lens is a solution or exchanging the lens is preferred, or a piggy back lens may be appropriate in some circumstances. And all these solutions and outcomes are provided by this formula.

## The Importance of Lens Thickness

An additional difference between the Barrett Universal II and earlier formulae is that it takes into account 5 variables. In addition to axial length, keratometry, and optical ACD, the formula takes into account the lens thickness as well as white to white. And in particular, the lens thickness adds additional accuracy to the prediction across all axial length ranges.

---

## Predicting Posterior Corneal Curvature

The Barrett Toric calculator predicts a posterior cornea, which is different for each individual patient. It does so based on a theoretical model, which I proposed to explain the phenomena of posterior corneal astigmatism and why it tends to be an against-the-rule effect vertically orientated in the majority of patients.

As a theoretical model, it's quite distinct from other methods of predicting the posterior cornea, which are based on regression and has proved to be more accurate. This posterior cornea will depend on several factors including keratometry, axial length, and even ACD. All these will influence the prediction which is provided. As such, it's quite distinctive from other methods of predicting the posterior cornea which are regression based and has proved to be more accurate than this other family of formulae. Indeed, the method of prediction, to date, seems to be more accurate than even measuring the posterior cornea directly.

---

*“A device [like the Aladdin] that contains keratometry, but in addition has topography, is an obvious advantage for the clinician.”*

—Graham Barrett, MD

---

## The Advantages of Built-in Corneal Topography

When contemplating a toric intra ocular lens, besides keratometry, additional information is always required and this is usually topography. So, having a device with potential for both these methods of measurements is obviously a very useful addition. Another factor, which can be helpful in prediction accuracy, is insuring that the distance from the patient is carefully controlled. This is implemented in the Topcon Aladdin Biometer with precise interferometry. Precise

control of the distance from the device to the patient's cornea adds another layer of accuracy. A device that contains keratometry, but in addition has topography, is an obvious advantage for the clinician.

## Validating the Barrett Formula in the Aladdin

Validation of a new formula or a set of formulae when you add them to an existing biometer is of fundamental importance. One of the significant principles is to validate that the results are indeed reflecting the output of the original formula. This has been done by comparing the results of the online calculators with the biometers and insuring in many hundreds of patients that this is achieved. So, a user can be quite certain that the Aladdin Biometer will provide the same result as using the Barrett formulae from other sources.



## The Aladdin Biometer with Corneal Topography: A step ahead of traditional biometry



Dr. Graham Barrett is a Clinical Professor at the University of Western Australia and is a Consultant Ophthalmic Surgeon at the Lions Eye Institute as well as Sir Charles Gairdner Hospital in Australia. He can be reached via email at [ChristineShimmon@lei.org.au](mailto:ChristineShimmon@lei.org.au)

*This article was sponsored and funded by Topcon Medical Systems. The content was prepared by the speaker in his/her personal capacity. The opinions, ideas, views, and assumptions expressed in this article are the author's own and do not necessarily reflect or represent the views of Topcon, nor do they constitute medical advice from Topcon.*