

## Commentary: Intraocular lens formulas for near perfect visual acuity – Search continues

The goal of any cataract surgery is to achieve near perfect vision in the postoperative period considering the only issue to be addressed in preoperative period is the cataractous lens. Over a period of time, many formulas were used to measure the appropriate power of the intraocular lens to be used. There are theoretical formulas, which are based on the mathematical principles revolving around the “schematic eye,” and there are regression formulas, which are based on retrospective outcomes. There are many variables to be considered for calculating the intraocular lens, such as anterior chamber depth (ACD), axial length (AL), keratometry readings, etc.,<sup>[1]</sup> Both theoretical formulas and regression formulas use these variables in their calculations.

In eyes having AL within the range of 22.50–24.00 mm and central corneal powers ranging from 42.00 D to 45.00 D with a normal ACD, most advanced IOL power calculating formulas will give good results. However, for eyes not falling in this range, most of the studies have clearly proven that Haigis (with properly optimized a0, a1, and a2 constants) and the newer generation formulas, like Hill RBF, Kane’s, Holladay 2, Olsen, Barrett Universal – II give edge over other old generation IOL calculating formulas.<sup>[2-4]</sup>

The IOL calculating formulas like Holladay 1, SRK/T, Haigis, and Holladay 2 require an adjustment for the eyes having AL of more than 25.00 mm, and this can be easily modified at the following link<sup>[3]</sup>: [http://www.doctor-hill.com/iol-main/extreme\\_axial\\_myopia.htm](http://www.doctor-hill.com/iol-main/extreme_axial_myopia.htm).

The universally acceptable mode of IOL calculating formula has been shown in the below image [Fig. 1].

This study by the accepted article Mieno *et al.*<sup>[5]</sup> has found that the BU II formula had significantly lower absolute error in patients with long AL. A study conducted by Mohan *et al.* found that the Barrett universal II formula predict IOL power accurately in eyes with extremely long AL and even in eyes where negative power IOLs are used.<sup>[5]</sup> No adjustments were necessary even if the implantation of meniscus lens is planted.<sup>[6]</sup> Yichi Zhang *et al.* in their study supported the use of newer Barrett Universal II formula to enhance predictability in high myopic eyes.<sup>[6]</sup> Kei Iijima *et al.* stated that the absolute error (0.38 ± 0.38 D) using SRK/T formula was significantly larger than that of (0.33 ± 0.27 D) using Barrett Universal II formula (P = 0.0006).<sup>[7]</sup>

However ironically, we surgeons are most of the time being judged by our fellow colleagues and patients by our refractive

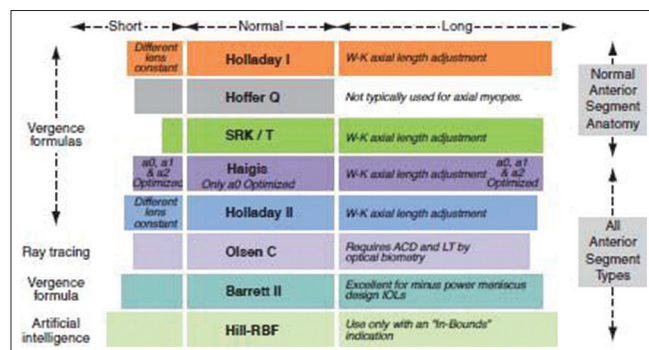


Figure 1: Accuracy range of commonly used formulas by axial length

outcomes only. So, it is always an extraexpensive investment for every ophthalmologist to buy the latest biometry module equipped with the most advanced IOL calculating formulas. Although to achieve emmetropia in every eye is still an enigma, so as a researcher we must keep looking for a near perfect solution.<sup>[4]</sup>

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### Conflicts of interest

There are no conflicts of interest.

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