

## Peer Review File

**Article information:** <https://dx.doi.org/10.21037/atm-21-3057>

### Reviewer A

The authors have written a good paper that compares the Barrett True-K formula and the Shammas-PL formula in eyes with previous myopic refractive surgery and multifocal / segmental IOLs.

**Comment 1:** There are some information that needs to be corrected:

1) Line 80, The Shammas-PL formula does not use measured ACD for prediction, but rather predicts a pACD.

**Reply 1-1:** The sentence in introduction section was modified as you mentioned (see Page 4, line 82-83).

#### **Changes in the text:**

(Page 4, line 82-83) The Shammas-PL formula calculates IOL power based upon estimated postoperative anterior chamber depth (pACD), axial length (AL) and post-refractive surgery keratometry (1).

2) Line 260, I think the authors meant the Barrett True-K accuracy improved with total keratometry rather than the Shammas-PL formula

**Reply 1-2:** The sentences in discussion section had been described to explain the benefit of total keratometry compared to keratometry of the anterior corneal surface. From recently clinical studies, this concept has been applied to not only the Barrett True-K but also Shammas-PL formula based on the calculation with preoperative total keratometry from IOLMaster 700 biometer (see Page 12, line 270-275).

#### **Changes in the text:**

(Page 12, line 270-275) In previous studies reporting the results of cataract surgery after corneal refractive laser surgery, IOL power calculation using total keratometry which considers both anterior and posterior corneal curvature showed better results than conventional calculation using only the anterior corneal curvature (19-24). Additionally, Shammas-PL based on total keratometry measured with an IOLMaster 700 biometer showed improved accuracy compared to that based on anterior keratometry in clinical studies by Lawless et al. and Yeo et. al. (25,26).

**Comment 2:** The authors mentioned that the Barrett True-K uses both anterior and posterior corneal curvatures. This is true if the posterior corneal values were inputted in the Barrett True-K formula. It is unclear which posterior corneal values were used here. Was it from the Pentacam? The Argos does not measure posterior cornea. The authors can state this more clearly.

**Reply 2:** The sentence in methods section was modified as you mentioned (see Page 6-7, line 140-145 and Page 7, line 158-160).

**Changes in the text:**

(Page 6-7, line 140-145) To calculate mIOL power during cataract surgery, preoperative biometry of the eye was measured, namely the keratometry of the anterior surface, central corneal thickness, anterior chamber depth, and axial length, using a swept-source optical coherence tomography (SS-OCT) biometer (ARGOS, Suntec, Inc., Aichi, Japan). Keratometry of the posterior surface was measured with a Scheimpflug camera (Pentacam, Oculus, Wetzlar, Germany).

(Page 7, line 158-160) To calculate IOL power with both formula, preoperative biometry was used measured values from SS-OCT biometer except keratometry of the posterior surface. Posterior corneal curvature from Scheimpflug camera was used in the Barrett true-K formula.

**Comment 3:** Finally, since the authors used the Argos machine, it needs to be stated as a limitation as the Argos measures axial length differently from standard biometers (eg. IOLMaster).

**Reply 3:** The sentence in discussion section was modified as you mentioned (see Page 14, line 323-326).

**Changes in the text:**

(Page 14, line 323-326) SS-OCT biometer used in the present study (ARGOS) could not be the same one with other biometer which other clinician uses (IOL Master 700; Carl Zeiss Meditec AG, Jena, Germany). As there is a difference in axial length measurement between two biometer, the results from this study cannot be applied to the cases with IOL Master 700.

## **Reviewer B**

**Comment 1:** In this study the authors analyzed and compared the prediction accuracy of two no-history IOL power calculation formulas (Shammas PL and Barrett True K) in eyes with a history of corneal refractive surgery. The authors conclude that the Barrett True K offers a higher accuracy than the Shammas, as it considers both the anterior and posterior corneal curvatures. While the study is well-conducted, the findings are not very "novel". Several studies in recent years have already sought to compare the IOL power accuracy of different formulas, including both Shammas and Barrett True K, some of which were discussed in the study and some were not. Furthermore, although the manuscript is surely well-written and presented, this reviewer believes the readers of this specific journal will most likely not benefit directly from the main findings of the current study. It would be more beneficial and useful to clinicians who specialize in performing cataract and refractive surgery.

**Reply 1:** Previous studies (related to IOL power accuracy of different formulas, including both Shammas and Barrett True K) which were not included in the prior version of our manuscript, were added to the discussion section (see Page 11, line 261-267). Although the present study is not the first study related to eyes with prior refractive surgery, we found two important points in the present study: 1) the predictive accuracy of the Barrett True-K formula was based on the total keratometry, 2) eyes with history of larger amount of laser ablation in corneal refractive surgery seems to show weaker predictive accuracy of IOL power calculation when using the Barrett True-K formula. These two points would be good indicators for ophthalmologists to perform cataract surgery with multifocal intraocular lens.

### **Changes in the text:**

(Page 11, line 261-267) Recently published meta-analysis concluded that the ASCRS average based on ASCRS calculator (available at: <http://www.ascrs.org>) (6,12), Barrett True-K (7), or OCT formula (13) was recommended to calculate IOL power in eyes with prior laser refractive surgery for correcting myopia (14). Furthermore, the Barrett True-K (7), OCT (13), and optiwave refractive analysis formula (15) showed more accurate in prediction error than other formula including Haigis-L and Shammas formulas in eyes with previous myopic laser refractive surgery from Bayesian network meta-analysis (16).

## Reviewer C

This is an interesting and highly relevant study which again demonstrates that the Barrett True-K formula is the most accurate in the setting of insertion of mIOL post previous corneal laser refractive surgery. Again reinforcing the importance of the posterior corneal curvature measurements.

Appropriate ethics approval has been obtained.

**Comment 1:** Authors have concluded that eyes with extreme biometry (mean K 39.13, mean AL 26.59) have a greater prediction error with the Barrett True-K. I am not sure that this relates to an issue with the formula rather it seems that in these eyes getting consistent values is less common due to higher levels of ablation and reduced predictability of values. The number of cases that included eyes with extreme biometry in the current study was limited (only two eyes had an axial length of  $> 30$ ), meaning that there may not be adequate power to make such conclusions. This should be mentioned in the limitations section of the paper.

**Reply 1:** The detailed value for keratometry and axial length was removed from the conclusion in our manuscript and the limitation related to small sample ( $n = 2$ ) which had an axial length of more than 30mm was described in the discussion section (see Page 11, line 246-249 and Page 14, line 325-333).

### **Changes in the text:**

(Page 11, line 246-249) However, eyes with history of larger amount of laser ablation in corneal refractive surgery seems to show weaker predictive accuracy of IOL power calculation when using the Barrett True-K formula.

(Page 14, line 325-333) As there is a difference in axial length measurement between two biometer, the results from this study cannot be applied to the cases with IOL Master 700. The adequate values for keratometry and axial length to estimate the lower predictive accuracy for postoperative refraction error could not be concluded as only two eyes had an axial length of  $> 30$  were included into the present study. Therefore, further prospective study based on a larger number with same type of mIOL is needed in order to improve the predictive accuracy of each IOL power calculation, especially in eyes that have undergone a large amount of corneal ablation.

**Comment 2:** Please change the syntax of the sentence "However targeting slightly myopia (line 291).

**Reply 2:** The sentence in discussion section was modified as you mentioned (see Page 13, line 304-306).

**Changes in the text:**

(Page 13, line 304-306) However, targeting slightly myopia may improve near vision without compromising distant vision, especially in high myopic patients, which is the case in the real world practice.

**Comment 3:** Perhaps an overarching statement should be included - reinforcing that auto refraction is NOT a replacement for manifest refraction. (Line 305)

**Reply 3:** The sentence in discussion section was modified as you mentioned (see Page 14, line 318-319).

**Changes in the text:**

(Page 14, line 318-319) Postoperative refraction in patients with refractive or EDOF mIOL should be measured by MR and AR cannot be a replacement for MR.