· Clinical Research ·

# Agreement between swept-source OCT-based and Scheimpflug-based optical biometers in myopic children

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## Abstract

● **AIM:** To evaluate the agreement of axial length (AL), anterior chamber parameters, and total cornea power obtained by swept-source optical coherence tomography (SS-OCT)-based and Scheimpflug-based optical biometers in myopic children.

● **METHODS:** AL, steep keratometry (K), flat K, posterior corneal keratometry (PK), total keratometry (TK), anterior chamber depth (ACD), horizontal corneal diameter (CD), and central corneal thickness (CCT) were obtained using IOL Master 700 and Pentacam AXL. The agreement between the devices was evaluated using intraclass correlation coefficients (ICC), Bland-Altman plots, and astigmatism vector analysis.

● **RESULTS:** Totally 175 myopic children (48.5% male) with a mean age of 10.29±2.14y were enrolled. The ICC and Bland-Altman plots indicated a satisfactory agreement for AL, ACD, and CCT. The mean difference in CD of -0.31±0.30 mm was considered clinically significant (>0.2 mm). Additionally, measurements of K and TK obtained from the IOL Master 700 showed good agreement. Nevertheless, there were clinically significant differences observed in PK, simulated keratometry (simK), total cornea power, and astigmatism (at least 10% of the cases with a difference of >10 degrees in meridian) between the two devices.

● **CONCLUSION:** The study findings demonstrate a significant difference in K, PK, astigmatism, and CD, indicating that the two optical biometers cannot be considered interchangeable. Therefore, it is recommended to utilize one kind device for follow-up examinations in myopic children.

● **KEYWORDS:** myopia; axial length; total cornea power; optical biometers; swept-source optical coherence tomography

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## INTRODUCTION

Myopia affected approximately 22% of the global population, with high myopia affecting 9.8%[1]. Complications such as retinal detachment, macular disease, cataract, and glaucoma are associated with high myopia[2]. As the annual burden of blindness caused by myopia has increased, it is critical to monitor one's axial length (AL) and corneal biological parameters to predict myopia's progression and adopt preventive treatments.

Myopia is characterized by excessive AL elongation of the eye[3]. The cornea and lens are essential two optical components that compensated for axial elongation to maintain emmetropia[4]. Hence, tracking changes in AL and anterior parameters in the myopic eyes are crucial for understanding and predicting the progression of myopia[5]. Several myopia prediction models were developed using AL, corneal curvature, lens power, anterior chamber depth (ACD), astigmatism, AL to corneal radius ratio as predictors and achieved area under the receiver operating characteristic curve ranged from 0.815 to 0.974[6-9].

The precision of AL and cornea power measurement has substantially increased with the continued development of corneal topographies and optical biometers. Total corneal power, which takes into account corneal thickness, posterior corneal curvature, and anterior corneal curvature, can more accurately represent the true cornea power than simulated keratometry (simK)[10]. The measurement of the posterior corneal curvature and the total keratometry (TK) has now become a new function of the IOL Master 700 (Carl Zeiss Meditec AG, Germany), which is based on swept-source optical coherence tomography (SS-OCT) technology. The Pentacam AXL (Oculus, Germany), is considered a standard device that measures corneal power using a rotating Scheimpflug camera[11]. Given that corneal curvature affects refractive power and high corneal astigmatism can lead to various visual disturbances, accurate assessment of both parameters is essential. In clinical practice, it is important for surgeons to know whether different devices provide comparable measurements and can be used interchangeably. Although previous researches have reported the agreement between SS-OCT-based and Scheimpflug-based optical biometer[12-14]. Little research has compared the agreement between SS-OCT and Scheimpflug imaging-based measurements of total cornea power and astigmatism vectors[12-13]. The purpose of this study is to evaluate the agreement of AL, anterior chamber parameters, and total cornea power obtained by IOL Master 700 and Pentacam AXL in myopic children.

## PARTICIPANTS AND METHODS

**Ethical Approval** This study followed a protocol approved by the Institutional Ethics Committee of Zhongshan Ophthalmic Center (No.2020KYPJ107) and was carried out per the tenets of the Declaration of Helsinki. Informed consent was obtained for use of the clinical data.

**Participants** This was a prospective cohort with inter-device agreement analysis. Totally 175 myopic children were enrolled in outpatient service at Zhongshan Ophthalmic Center between January 2021 and August 2021. Children who underwent IOL Master 700 (Carl Zeiss Meditec AG, Jena, Germany) and Pentacam AXL (Oculus Incorporation, Wetzlar, Germany) at the same visit were included. All children had spherical equivalent values lower than 0 diopter (D). Only the right eye of the participant was included in the study to avoid double organ bias. Eyes with a history of contact lens use in the last 4wk and ocular pathology other than myopia were excluded.

**Measurement** The clinical characteristics including age, sex, subjective refraction, and visual acuity of the participants were collected from the medical records. To ensure the quality of the measurements, the optical biometry was performed by an experienced examiner under standardized guidelines. All the patients were instructed to fully blink before each scan as part of the routine procedure to prevent eyelid interference and tear film disruption. The examiner made sure that no alerts were displayed on the instrument software. AL, steep keratometry (K), flat K, posterior corneal keratometry, ACD, horizontal corneal diameter (CD), and central corneal thickness (CCT) were obtained using IOL Master 700 and Pentacam AXL. TK was obtained using IOL Master 700. True net power (TNP) and total corneal refractive power (TCRP) were obtained using Pentacam AXL. The K, TNP, and TCRP acquired by Pentacam AXL within the central 3.0 mm ring are used for analysis.

**Statistical Analysis** Statistical analysis was performed using SPSS statistics (version 26.0, IBM Corp, Armonk, NY, USA) and MedCalc (version 20, MedCalc Software Ltd, Ostend, Belgium). Astigmatism vector analysis was performed as previously described[15]:

$$J_0\ (\text{Jackson cross} - \text{cylinder at 0 and 90 degrees}) = -\frac{cylinder}{2} \times \cos(2 \times steep\ axis)$$

$$J_{45}\ (\text{Jackson cross} - \text{cylinder at 45 and 135 degrees}) = -\frac{cylinder}{2} \times \sin(2 \times steep\ axis)$$

Intraclass correlation coefficients (ICC), and Bland-Altman plots were used to compare the difference between tests. ICCs were calculated based on single measures, a two-way random model, and absolute agreement. The data of each group were expressed as the mean±standard deviation (SD). Statistical significance was determined by paired-sample *t*-test between two groups. A *P* value lower than 0.05 was considered statical significant.

## RESULTS

Totally 175 eyes of 175 children (48.5% male) with a mean age of 10.29±2.14y (3-16y) were included in the study. The mean spherical equivalent was -1.75±1.41 D.

**Agreement of AL and Anterior Chamber Parameters** The mean AL, ACD, CCT, and CD were listed in Table 1.

All parameters were statistically significant ($P<0.001$). The ICC of AL, ACD, and CCT were 0.999, 0.883, and 0.969 respectively indicating good agreement between IOL Master 700 and Pentacam. The agreement of CD was moderate with an ICC of 0.490. Consistently, the Bland-Altman plot (Figure 1A-1C) suggested a narrow 95% limit of agreement (LoA) of AL (-0.01 to 0.07 mm), ACD (-0.2 to 0.02 mm), and CCT (-16.1 to 4.0 μm). And the CD had a 95%LOA of -0.25 to 0.92 mm suggesting moderate agreement between the two measurements (Figure 1D).

**Agreement of Cornea Power and Astigmatism** In comparison to the Pentacam, the posterior K of the IOL Master 700 was significantly flatter ($P<0.001$ for flat K and steep K). But there was no statistically significant between $J_0$ and $J_{45}$ measured by the two devices (Table 2).

The mean K, $J_0$, $J_{45}$, and astigmatism of the two devices were displayed in Table 3.

The difference in corneal power and astigmatism were compared in Table 4. flat K, steep K, astigmatism, and axis orientation were statistically significant ($P<0.05$). As for

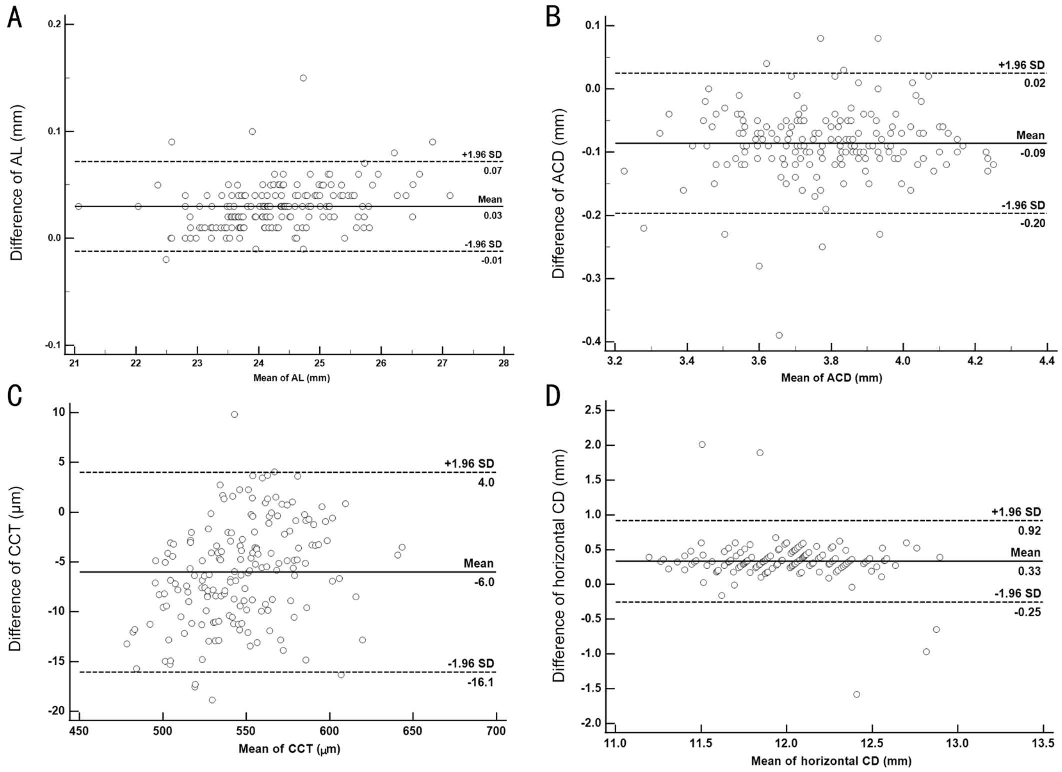


**Figure 1 Agreement of AL and anterior chamber parameters** The bland-Altman plots of comparison between AL (A), ACD (B), CCT (C), and CD (D) measured by IOL Master 700 and Pentacam. AL: Axial length; ACD: Anterior chamber depth; CCT: Central corneal thickness; CD: Corneal diameter; SD: Standard deviation.

**Table 1 Comparison of parameters between Pentacam and IOL Master 700** mean±SD

| Parameters | Pentacam | IOL Master 700 | Mean difference | Mean, *P* | ICC, *P* |
|---|---|---|---|---|---|
| AL (mm) | 24.28±0.97 | 24.31±0.98 | 0.03±0.02 | <0.001 | 0.999, *P*<0.001 |
| ACD (mm) | 3.82±0.20 | 3.73±0.21 | -0.09±0.06 | <0.001 | 0.883, *P*<0.001 |
| CCT (μm) | 549.89±30.57 | 543.86±32.24 | -6.02±5.13 | <0.001 | 0.969, *P*<0.001 |
| Horizontal CD (mm) | 11.83±0.40 | 12.16±0.35 | -0.31±0.30 | <0.001 | 0.490, *P*<0.001 |

AL: Axial length; ACD: Anterior chamber depth; CCT: Central corneal thickness; SD: Standard deviation; ICC: Intraclass coefficient of correlation; CD: Corneal diameter.

**Table 2 Comparison of posterior corneal parameters** mean±SD

| Parameters | Pentacam | IOL Master 700 | Mean difference | Mean, *P* | ICC, *P* |
|---|---|---|---|---|---|
| K flat (D) | -6.10±0.20 | -5.68±0.19 | 0.89±0.41 | <0.001 | 0.283, <0.001 |
| K steep (D) | -6.40±0.23 | -5.93±0.22 | 0.33±0.44 | <0.001 | 0.294, <0.001 |
| $J_0$ (D) | -0.0034±0.12 | -0.011±0.09 | -0.01±0.15 | | |
| $J_{45}$ (D) | 0.0032±0.11 | -0.0006±0.10 | 0.00±0.14 | | |

K flat: Flat keratometry; K steep: Steep keratometry; $J_0$: Jackson cross-cylinder at 0 and 90 degrees; $J_{45}$: Jackson cross-cylinder at 45 and 135 degrees; D: Diopter; SD: Standard deviation; ICC: Intraclass coefficient of correlation.

**Table 3 Comparison of true corneal power and astigmatism** mean±SD

| Parameters | Pentacam | | | IOL Master 700 | |
|---|---|---|---|---|---|
| | simK | TNP | TCRP | simK | TK |
| K flat (D) | 42.52±1.26 | 41.26 ±1.22 | 42.01±1.26 | 42.77±1.27 | 42.83±1.27 |
| K steep (D) | 43.64±1.42 | 42.23±1.37 | 43.04±1.42 | 43.85±1.42 | 43.83±1.42 |
| $J_0$ (D) | -0.04 ±0.43 | 0.04±0.40 | 0.03±0.43 | -0.05±0.39 | -0.01±0.41 |
| $J_{45}$ (D) | 0.05±0.44 | -0.03±0.36 | -0.03±0.37 | -0.03±0.45 | 0.05±0.38 |
| Astigmatism (D) | 1.12±0.50 | 0.97±0.49 | 1.02±0.51 | 1.09±0.51 | 1.00±0.50 |
| Axis orientation | 87.50±10.34 | 89.00±12.84 | 88.82±12.74 | 84.76±14.05 | 83.80±15.47 |

simK: Simulated keratometry; TK: Total keratometry; TNP: True net power; TCRP: Total corneal refractive power; K flat: Flat keratometry; K steep: Steep keratometry; $J_0$: Jackson cross-cylinder at 0 and 90 degrees; $J_{45}$: Jackson cross-cylinder at 45 and 135 degrees; D: Diopter.

**Table 4 Mean difference of corneal power and astigmatism**

| simK | Mean difference | 95%LoA | Range of LoA | Mean, *P* | ICC, *P* |
|---|---|---|---|---|---|
| K flat (D) | | | | | |
| TK | -0.06±0.08 | -0.22 to 0.10 | 0.32 | <0.001 | 0.997, <0.001 |
| Pentacam-K | 0.25±0.11 | 0.02 to 0.47 | 0.45 | <0.001 | 0.977, <0.001 |
| TNP | 1.51±0.16 | 1.20 to 1.82 | 0.62 | <0.001 | 0.572, <0.001 |
| TCRP | 0.76±0.16 | 0.44 to 1.07 | 0.63 | <0.001 | 0.842, <0.001 |
| K steep (D) | | | | | |
| TK | 0.02±0.09 | -0.16 to 0.20 | 0.36 | 0.002 | 0.998, <0.001 |
| Pentacam-K | 0.21±0.19 | -0.15 to 0.58 | 0.73 | <0.001 | 0.980, <0.001 |
| TNP | 1.62±0.22 | 1.18 to 2.06 | 0.88 | <0.001 | 0.590, <0.001 |
| TCRP | 0.82±0.23 | 0.38 to 1.27 | 0.90 | <0.001 | 0.874, <0.001 |
| $J_0$ (D) | | | | | |
| TK | -0.04±0.59 | -1.12 to 1.20 | 2.32 | 0.363 | |
| Pentacam-K | 0.00±0.57 | -1.11 to 1.12 | 2.23 | 0.923 | |
| TNP | -0.08±0.56 | -1.01 to 1.18 | 2.19 | 0.048 | |
| TCRP | -0.07±0.58 | -1.07 to 1.22 | 2.29 | 0.099 | |
| $J_{45}$ (D) | | | | | |
| TK | -0.08±0.56 | -1.03 to 1.18 | 2.21 | 0.076 | |
| Pentacam-K | -0.08±0.65 | -1.20 to 1.36 | 2.56 | 0.118 | |
| TNP | 0.00±0.61 | -1.19 to 1.19 | 2.38 | 0.997 | |
| TCRP | 0.01±0.63 | -1.23 to 1.22 | 2.45 | 0.894 | |
| Astigmatism (D) | | | | | |
| TK | 0.08±0.08 | -0.23 to 0.06 | 0.29 | <0.001 | 0.975, <0.001 |
| Pentacam-K | -0.04±0.20 | -0.37 to 0.44 | 0.81 | 0.021 | 0.915, <0.001 |
| TNP | 0.11±0.23 | -0.55 to 0.33 | 0.88 | <0.001 | 0.875, <0.001 |
| TCRP | 0.06±0.23 | -0.51 to 0.39 | 0.90 | <0.001 | 0.892, <0.001 |
| Axis orientation | | | | | |
| TK | 0.96±3.24 | -7.31 to 5.38 | 12.69 | <0.001 | 0.974, <0.001 |
| Pentacam-K | -2.74±11.34 | -19.50 to 24.97 | 44.47 | 0.002 | 0.565, <0.001 |
| TNP | -4.24±12.68 | -20.62 to 29.09 | 49.71 | <0.001 | 0.531, <0.001 |
| TCRP | -4.05±12.76 | -20.95 to 29.06 | 50.01 | <0.001 | 0.525, <0.001 |

LoA: Limit of agreement; simK: Simulated keratometry; TK: Total keratometry; Pentacam-K: Simulated keratometry measured by Pentacam; TNP: True net power; TCRP: Total corneal refractive power; K flat: Flat keratometry; K steep: Steep keratometry; $J_0$: Jackson cross-cylinder at 0 and 90 degrees; $J_{45}$: Jackson cross-cylinder at 45 and 135 degrees; D: Diopter; SD: Standard deviation; ICC: Intraclass coefficient of correlation.

astigmatism vector analysis, there was a statistically significant between simK-$J_0$ and TNP-$J_0$. Other astigmatism vectors of the two devices did not show any statistically significant differences.

To further evaluate how many cases the difference of astigmatism between the 2 variables exceeded a clinically significant limit, we enumerated the cases that exceeded 0.5 D or 10 degrees (Table 5).

## DISCUSSION

Early identification and monitoring of myopia progression are essential for timely intervention, particularly through the evaluation of AL, astigmatism, and anterior segment parameters. Most cases of myopia onset occur between the ages of 6 and 9y[16], highlighting the importance of accurate biometric assessment during this critical period. In the present study, we found a good agreement in measurements of AL, ACD, and CCT between IOL Master 700 and Pentacam AXL in myopic children with a mean age of 10.29±2.14y (range: 3-16y). However, significant discrepancies were observed between the two devices in K, posterior corneal keratometry, astigmatism, and CD measurements.

Accurate measurement of AL is essential for monitoring myopia progression. A measurement error of 0.1 mm in AL corresponds to approximately 0.27 D of refractive error; therefore, a precision within 0.1 mm is required[17]. Differences greater than 0.1 mm are generally considered clinically significant. Previous research in adults has reported excellent agreement of AL between the IOL Master 700 and Pentacam AXL[14]. In pediatric populations, Sabur and Takes[18] found no statistically significant between the two devices, with a

**Table 5 Cases with clinically significant difference in astigmatism and meridian**

| Parameters | simK *vs* TK | simK *vs* Pentacam-K | simK *vs* TNP | simK *vs* TCRP |
|---|---|---|---|---|
| Astigmatism | | | | |
| ≤0.5 D | 175 | 172 | 171 | 173 |
| >0.5-1.0 D | 0 | 2 | 3 | 1 |
| >1.0 D | 0 | 1 | 1 | 1 |
| Meridian | | | | |
| ≤10° | 171 | 157 | 146 | 145 |
| >10°-20° | 4 | 14 | 23 | 25 |
| >20°-40° | 0 | 2 | 3 | 2 |
| >40° | 0 | 2 | 3 | 3 |

simK: Simulated keratometry; TK: Total keratometry; Pentacam-K: Simulated keratometry measured by Pentacam; TNP: True net power; TCRP: Total corneal refractive power; D: Diopter.

mean difference of -0.01 mm in AL measurement ($P$=0.06). In contrast, Tañá-Rivero *et al*[19] observed a statistically significant difference in adults, reporting a mean difference of 0.013 mm ($P$<0.001). Our study found that the AL measured by IOL Master 700 was statistically significantly longer than Pentacam AXL with a mean difference of 0.03 mm ($P$<0.001, 95%LoA from -0.01 to 0.07 mm). Although statistically significant, the magnitude of the mean difference across studies remains below the threshold of clinical relevance. Therefore, AL measurements obtained from the Pentacam AXL are clinically valid and may be considered interchangeable with those from the IOL Master 700.

All anterior chamber parameters were statistically significant ($P$<0.001). For ACD, a 1.0 mm error of ACD caused a 1.5 D refractive error. Studies reported that Pentacam AXL exhibited higher ACD values compared to the IOL Master 700, with the mean differences ranging from 0.03 to 0.07[19-21]. In our pediatric cohort, we observed a slightly larger mean difference of 0.09 mm. Notably, although this value was statistically significant, the mean difference remained below 0.1 mm and was considered too small to have any clinical impact.

In terms of CCT, it is known that intraocular pressure measurements are typically adjusted by 1 mm Hg for every 25 μm deviation from the standard CCT of 550 μm[22]. Previous studies have reported mean CCT differences between the two devices ranging from -6.80 to 12 μm[19,23-24]. In our study, the mean difference was -6.02 μm ($P$<0.001), with a narrow 95%LoA from -16.1 to 4.0 μm, indicating good consistency and suggesting that the two devices may be used interchangeably for CCT measurement.

Regarding CD, a difference greater than 0.2 mm is considered clinically significant, as CD is an important parameter in determining the appropriate size of rigid gas permeable (RGP) contact lenses. Consistent with previous studies[18-19] that we found a mean difference of -0.31 mm ($P$<0.001), a wide 95%LOA (from -0.25 to 0.92 mm), and moderate ICC (0.490). Therefore, it is not recommended to use CD measurements from the two devices interchangeably.

The IOL Master 700 just became capable of measuring posterior corneal curvature and astigmatism. As of this writing, our study first evaluated the agreement of posterior corneal curvature and astigmatism in myopic children. Consistent with the findings in adult population, the posterior K of the IOL Master 700 was significantly flatter than Pentacam[11]. Astigmatism components $J_0$ and $J_{45}$ were calculated using vector analysis to represent the with-the-rule, against-the-rule and oblique components, respectively. Kose[11] reported significant differences in both $J_0$ and $J_{45}$ values between the IOL Master 700 and the Pentacam HR in adults, while Jin *et al*[25] found a significant difference only in the $J_{45}$ component. In contrast, our study found no statistically significant differences in either $J_0$ or $J_{45}$ between the two devices, suggesting a better agreement in posterior astigmatism measurements in the pediatric population.

Previous studies in adults have demonstrated a good agreement of anterior keratometry among devices[12-13,24]. In our study, the simK and TK measured by the IOL Master 700 showed statistically significant differences compared to the simK measured by the Pentacam; however, these differences were not clinically significant, with mean differences of less than 0.5 D. In contrast, the differences in simK, TNP, and TCRP between devices were statistically significant and exceeded 0.5 D, indicating poor agreement and suggesting that these parameters are not interchangeable. Notably, a 0.5 D discrepancy at the corneal plane corresponds to an approximate 0.73 D difference at the intraocular lens plane, which may be clinically relevant in refractive planning[26].

Astigmatism is necessary for the follow-up of myopia. Our result showed a statistically significant between simK-$J_0$ and TNP-$J_0$ indicating the poorest agreement between simK and TNP. The difference in astigmatism exceeding 0.5 D and the difference in meridian exceeding 10 degrees were considered clinically significant. As shown in Table 5 that the agreement of astigmatism between devices was good. But the agreement of meridian was poor with more than 10% of the cases exceeding 10 degrees. Similarly, previous studies also considered that the agreement in astigmatism was good in K and TK measured by IOL Master 700[12-13]. But astigmatism measured by IOL Master 700 and Pentacam was considered not interchangeable[13,27]. The observed differences may be partly due to variations in measurement zones: the IOL Master 700 assesses a 2.5 mm ring, while the Pentacam uses a 3.0 mm ring. As corneal curvature varies by location, this can lead to discrepancies in corneal power and astigmatism measurements.

Our research has some limitations. First, as repeatability has previously been evaluated in earlier[12-13], we did not analyze it. Second, no follow-up examinations were planned. Prospective studies need to be conducted to determine the device's efficacy in monitoring myopia development.

In conclusion, our study identified good agreement in AL, ACD, and CCT between IOL Master 700 and Pentacam AXL. However, there were significant differences in K, PK, astigmatism, and CD between the two devices, and considered not interchangeable. If AL is the only factor used to track myopic progression, the AL values obtained from the two devices can be used interchangeably. It is recommended to use one device for the follow-up examinations in myopic children if AL, astigmatism, and anterior chamber parameters must be recorded.

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## REFERENCES

1 Holden BA, Fricke TR, Wilson DA, *et al*. Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. *Ophthalmology* 2016;123(5):1036-1042.

2 Shah R, Vlasak N, Evans BJW. High myopia: reviews of myopia control strategies and myopia complications. *Ophthalmic Physiologic Optic* 2024;44(6):1248-1260.

3 Ehongo A. Understanding posterior staphyloma in pathologic myopia: current overview, new input, and perspectives. *Clin Ophthalmol* 2023;17:3825-3853.

4 Li LL, Liao CM, Zhang XJ, *et al*. Association between body stature with ocular biometrics and refraction among Chinese preschoolers. *BMC Ophthalmol* 2024;24(1):107.

5 Wang Y, Liu Y, Zhu X, *et al*. Corneal and lenticular biometry in Chinese children with myopia. *Clin Exp Optom* 2023;106(8):836-844.

6 Zhang MZ, Gazzard G, Fu ZF, *et al*. Validating the accuracy of a model to predict the onset of myopia in children. *Invest Ophthalmol Vis Sci* 2011;52(8):5836-5841.

7 Ma YY, Zou HD, Lin SL, *et al*. Cohort study with 4-year follow-up of myopia and refractive parameters in primary schoolchildren in Baoshan District, Shanghai. *Clin Exp Ophthalmol* 2018;46(8):861-872.

8 Zadnik K, Sinnott LT, Cotter SA, *et al*. Prediction of juvenile-onset myopia. *JAMA Ophthalmol* 2015;133(6):683-689.

9 Zadnik K, Mutti DO, Friedman NE, *et al*. Ocular predictors of the onset of juvenile myopia. *Invest Ophthalmol Vis Sci* 1999;40(9):1936-1943.

10 Nanavaty MA. Understanding the relationship between astigmatism, posterior cornea and corneal thickness: a move to total corneal power. *Eye (Lond)* 2025;39(8):1437-1439.

11 Kose B. Agreement between swept-source optical biometry and Scheimpflug-based topography measurements of posterior corneal curvature. *J Cataract Refract Surg* 2022;48(2):185-189.

12 Savini G, Taroni L, Schiano-Lomoriello D, *et al*. Repeatability of total Keratometry and standard Keratometry by the IOLMaster 700 and comparison to total corneal astigmatism by Scheimpflug imaging. *Eye (Lond)* 2021;35(1):307-315.

13 Shajari M, Sonntag R, Ramsauer M, *et al*. Evaluation of total corneal power measurements with a new optical biometer. *J Cataract Refract Surg* 2020;46(5):675-681.

14 Yu JJ, Wen DZ, Zhao J, *et al*. Comprehensive comparisons of ocular biometry: a network-based big data analysis. *Eye Vis* (*Lond*) 2022;10(1):1.

15 Thibos LN, Wheeler W, Horner D. Power vectors: an application of Fourier analysis to the description and statistical analysis of refractive error. *Optom Vis Sci* 1997;74(6):367-375.

16 Biswas S, El Kareh A, Qureshi M, *et al*. The influence of the environment and lifestyle on myopia. *J Physiol Anthropol* 2024;43(1):7.

17 Olsen T. Calculation of intraocular lens power: a review. *Acta Ophthalmol Scand* 2007;85(5):472-485.

18 Sabur H, Takes O. Agreement of axial length and anterior segment parameters measured with the MYAH device compared to Pentacam AXL and IOLMaster 700 in myopic children. *Int Ophthalmol* 2023;43(2):475-482.

19 Tañá-Rivero P, Aguilar-Córcoles S, Tello-Elordi C, *et al*. Agreement between 2 swept-source OCT biometers and a Scheimpflug partial coherence interferometer. *J Cataract Refract Surg* 2021;47(4):488-495.

20 Bamdad S, Fathian A, Khalili MR, *et al*. Biometry and keratometry measurements after intracorneal ring segment implantation in keratoconus patients: a pilot comparison between Pentacam AXL and IOL Master 700. *BMC Ophthalmol* 2025;25(1):80.

21 Karmiris E, Gartaganis PS, Ntravalias T, *et al*. Agreement between swept-source optical biometry and Scheimpflug-based tomography in eyes with previous myopic refractive surgery. *Saudi J Ophthalmol* 2022;36(2):229-236.

22 Kohlhaas M, Boehm AG, Spoerl E, *et al*. Effect of central corneal thickness, corneal curvature, and axial length on applanation tonometry. *Arch Ophthalmol* 2006;124(4):471-476.

23 Henriquez MA, Zúñiga R, Camino M, *et al*. Effectiveness and agreement of 3 optical biometers in measuring axial length in the eyes of patients with mature cataracts. *J Cataract Refract Surg* 2020;46(9):1222-1228.

24 Özyol P, Özyol E. Agreement between swept-source optical biometry and scheimpflug-based topography measurements of anterior segment parameters. *Am J Ophthalmol* 2016;169:73-78.

25 Jin AX, Han XT, Zhang JQ, *et al*. Agreement of total keratometry and posterior keratometry among IOLMaster 700, CASIA2, and pentacam. *Transl Vis Sci Technol* 2023;12(3):13.

26 Ma S, Gao R, Sun J, *et al*. Comparison of two swept-source optical coherence tomography devices, a Scheimpflug camera system and a ray-tracing aberrometer in the measurement of corneal power in patients with cataract. *Graefes Arch Clin Exp Ophthalmol* 2024;262(5):1567-1578.

27 Kommineni UB, Mohamed A, Vaddavalli PK, *et al*. Comparison of total keratometry with corneal power measured by optical low-coherence reflectometry and placido-dual Scheimpflug system. *Eur J Ophthalmol* 2022;32(3):1496-1503.