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Original Article

# Comparison of Swept-Source Optical Biometry and Contact A-Scan Ultrasonography for Axial Length Measurement in Eyes with Mature Cataract

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### Abstract

**Objectives:** The objectives are to compare axial length (AL) measurements obtained using swept-source optical biometers and contact A-scan ultrasonography (USG) in eyes with mature cataract, and to evaluate inter-device agreement and acquisition success rates.

**Methods:** This retrospective cross-sectional study included eyes with clinically defined mature cataract. AL measurements were obtained using two swept-source optical devices (Tomey - OA and Heidelberg Anterion) and contact A-scan USG (Tomey UD-800), all performed on the same day by a single examiner. Inter-device comparisons, Bland–Altman agreement analyses, and intraclass correlation coefficients (ICC) were calculated. Optical measurement failure rates were recorded.

**Results:** AL measurements were successfully obtained with both optical biometers in 50 eyes. AL values showed strong agreement between the Tomey - OA OA-2000 and Anterion, with no significant inter-device difference. In contrast, contact A-scan USG yielded significantly shorter AL measurements compared with both optical devices (mean difference approximately 0.26–0.30 mm). Optical biometry failed to obtain AL measurements in approximately one-third of eyes with mature cataract. Inter-method reliability for AL was high (ICC >0.90).

**Conclusion:** Swept-source optical biometers provide consistent and interchangeable AL measurements in eyes with mature cataract when measurements are obtainable. However, optical acquisition failure remains common in advanced cataracts, highlighting the continued clinical relevance of A-scan USG. The systematic tendency of contact ultrasound to produce shorter AL measurements should be considered during intraocular lens power calculation.

**Keywords:** A-scan ultrasonography, axial length, intraocular lens power calculation, mature cataract, swept-source optical biometry

## Introduction

A mature cataract represents an advanced stage of lens opacification in which all cortical fibers become opaque, resulting in severe visual impairment and increased complexity of surgical management (1). Accurate ocular biometry is therefore particularly critical in patients with mature cataracts to achieve optimal refractive outcomes following cataract surgery.

Intraocular lens (IOL) power calculation relies on several key biometric parameters, including keratometry, axial length (AL), anterior chamber depth (ACD), and lens thickness (LT) (2-4). Among these parameters, AL is the most influential de-

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terminant of post-operative refractive accuracy. As IOL calculation formulas continue to evolve and incorporate an increasing number of biometric inputs, the need for precise and reliable ocular biometry has become even more pronounced (5-7).

Optical biometry based on partial coherence interferometry (PCI) and, more recently, swept-source optical coherence tomography (SS-OCT) has become the standard method for AL measurement because of its high accuracy, reproducibility, and non-contact nature (8). SS-OCT-based devices, utilizing longer wavelengths and advanced signal-processing algorithms, have demonstrated superior AL acquisition success compared with PCI-based systems (9). Nevertheless, in eyes with mature or very dense cataracts, severe lens opacification can significantly limit optical signal penetration, and reliable AL measurements may still not be obtainable even with advanced swept-source technology (10).

Despite the widespread adoption of optical biometry in routine clinical practice, A-scan ultrasonography (USG) continues to play an essential role in the evaluation of dense and mature cataracts. When optical biometry fails, AL measurement must necessarily be performed using ultrasound. Moreover, ultrasound biometry remains widely used in many developing countries due to its cost-effectiveness and the higher prevalence of advanced cataracts in these settings (11,12). Although newer SS-OCT-based optical devices offer improved accuracy, their performance may still be constrained by patient-related factors such as severe lens opacity, underscoring the continued clinical relevance of ultrasound-based biometry (13).

The primary aim of this study was to compare AL measurements obtained using three different modalities in eyes with mature cataracts: the Tomey-OA swept-source optical biometer, the Heidelberg Anterion swept-source OCT device, and contact A-scan USG. Secondary objectives included evaluating inter-device agreement, measurement reliability, and AL acquisition success rates under real-world clinical conditions.

## Methods

This retrospective cross-sectional observational study evaluated AL measurements obtained using three different biometric devices in consecutive patients with mature cataract who underwent preoperative cataract assessment at the Ophthalmology Clinic of Cam and Sakura City Hospital a tertiary referral center.

Mature cataract was clinically defined as complete lens opacification precluding visualization of the posterior segment on dilated fundus examination.

All included patients underwent AL measurements using three different biometry techniques. Optical biometry was performed with the Tomey OA-2000 (Tomey Corporation, Japan), a SS-OCT-based device providing AL, keratometry, ACD, and LT measurements, and with the Anterion® (Heidelberg Engineering, Germany), a high-resolution anterior segment SS-OCT platform capable of acquiring AL and additional biometric parameters.

Ultrasonic AL measurements were obtained using the Tomey UD-800 contact A-scan USG device. Contact A-scan measurements were performed by an experienced examiner using the applanation technique with careful perpendicular alignment to the visual axis. Topical anesthesia was instilled prior to measurement, and minimal corneal contact was ensured to reduce the potential effect of corneal indentation.

All measurements were obtained on the same day by the same examiner to minimize inter-operator variability. For each device, three consecutive measurements were acquired, and the mean AL value was used for statistical analysis. Measurement failure due to dense media opacity was recorded for the optical biometers. Comparisons of AL values between devices were performed only in eyes in which measurements were successfully obtained with the respective modality. To avoid possible corneal compression affecting optical measurements, contact ultrasound biometry was deliberately performed after completion of measurements with the two non-contact optical devices.

Patients with coexisting corneal pathology, extreme ALs (<20 mm or >28 mm), retinal detachment, previous intraocular surgery, or any condition preventing adequate posterior segment assessment even with USG were excluded. Demographic and clinical data collected included age, sex, laterality, keratometry, ACD, LT, and AL measurements. The primary outcome measure was the comparison of AL values obtained with the three biometry techniques, while secondary outcomes included measurement success rates and inter-device agreement.

The study was conducted in accordance with the tenets of the Declaration of Helsinki and was approved by the local Institutional Ethics Committee (2023-252).

### Statistical Analysis

All statistical analyses were performed using Statistical Package for Social Sciences (version 22.0; IBM Corp., Armonk, NY, USA). Normality of distributions was assessed using the Shapiro-Wilk test. For AL, comparisons across USG, Tomey- OA, and Anterion were performed using the Friedman test. If significant, *post hoc* pairwise comparisons were conducted using the Wilcoxon signed-rank test with Bonferroni correction. For Tomey-OA versus Anterion comparisons of other parameters, paired $t$-tests or Wilcoxon signed-rank tests were used as appropriate. Agreement was assessed using Bland-Altman statistics (bias and 95% limits of agreement). Bland-Altman plots were provided for AL only; agreement for other parameters was reported numerically. Inter-device reliability was assessed using intraclass correlation coefficients (ICC). A two-sided $p<0.05$ was considered statistically significant.

## Results

AL measurements were attempted in 79 eyes with mature cataract using both devices. AL could not be measured in 24 eyes with the Tomey - OA device and in 26 eyes with the Anterion device ($p$=0.875). A total of 50 eyes in which AL measurements were successfully obtained with both devices were included in the final analysis. The mean age was 69.1±10.2 years, and 27 (54.0%) were male. Paired comparisons of Tomey - OA and Anterion measurements for biometric parameters are summarized in Table 1. Overall, Tomey - OA produced slightly higher anterior keratometry readings, lower LT and deeper ACD than Anterion, while the remaining parameters showed no statistically significant differences.

AL differed significantly across the three measurement methods (USG, Tomey - OA, and Anterion). *Post hoc* analyses indicated that USG tended to yield shorter AL measurements than both optical biometers, whereas no statistically significant difference was observed between Tomey - OA and Anterion (Table 2).

**Table 1.** Comparison of biometric measurements among devices

| Parameter | USG | Tomey - OA | Anterion | P |
|---|---|---|---|---|
| AL (mm) | 23.05±0.85 | 23.17±0.90 | 23.15±0.89 | <0.001 |
| K1 (D) | | 42.87±2.28 | 42.67±1.85 | 0.013 |
| K2 (D) | | 44.35±1.80 | 44.13±1.61 | 0.025 |
| Avg K (D) | | 43.61±1.92 | 43.40±1.58 | 0.011 |
| Corneal astigmatism (D) | | 1.48±1.46 | 1.46±1.43 | 0.489 |
| ACD (mm) | | 3.51±0.53 | 3.26±0.50 | 0.017 |
| WTW | | 11.99±0.48 | 11.59±0.44 | 0.099 |
| Pupil diameter (mm) | | 5.28±1.50 | 4.95±1.30 | 0.394 |
| LT (mm) | | 4.27±0.43 | 4.51±0.42 | <0.001 |

AL: Axial length, ACD: Anterior chamber depth, LT: Lens thickness, WTW: White-to-white, USG: Ultrasonography, K1: Flat keratometry, K2: Steep keratometry, Avg K: Mean keratometry, D: Diopter. Values are presented as mean±standard deviation. *P*-values are from paired comparisons between devices.

**Table 2.** Pairwise comparisons of axial length measurements among USG, Tomey - OA, and Anterion

| Item | Mean difference | P | 95% LoA (min/max) |
|---|---|---|---|
| USG versus Tomey - OA | –0.261±0.367 | <0.0001 | –0.980–0.458 |
| USG versus Anterion | –0.298±0.428 | 0.0001 | –1.137–0.541 |
| Tomey - OA versus Anterion | 0.005±0.075 | 0.8857 | — |

LoA: Limits of agreement, USG: Ultrasonography.

A summary of AL measurements across methods, including pairwise comparisons and Bland–Altman agreement statistics, is provided in Table 2. Bland-Altman plots are presented for AL to visualize pairwise agreement. Compared with Anterion, USG tended to produce shorter AL measurements, indicating a systematic negative bias (Fig. 1). A similar negative bias was observed when comparing USG with Tomey - OA (Fig. 2). In contrast, Anterion and Tomey - OA showed minimal mean bias with relatively narrow limits of agreement, supporting close agreement between the two optical biometers (Fig. 3).

Inter-method reliability for AL was high in complete cases measured by all three methods, with strong absolute agreement (ICC(2,1)=0.919) and similarly high consistency (ICC(3,1)=0.940). For non-AL parameters, agreement between Tomey - OA and Anterion is summarized using Bland-Altman bias and 95% limits of agreement in Table 3. Inter-device reliability for these parameters, assessed using ICC(2,1) absolute agreement, is presented in Table 4.

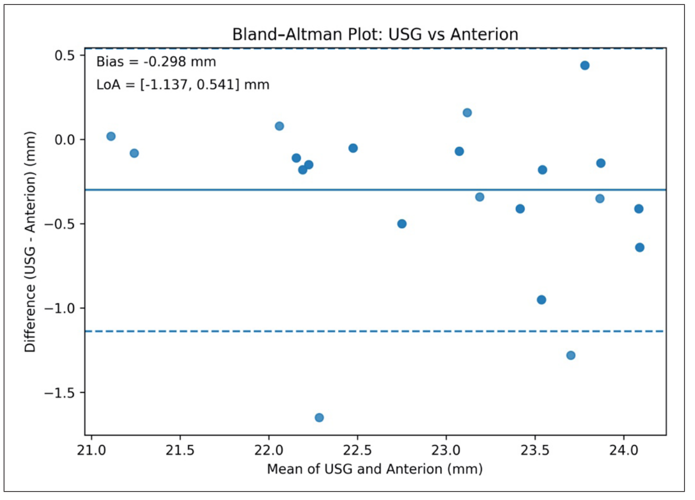


**Figure 1.** Bland-Altman plot for axial length: Ultrasonography versus Anterion.

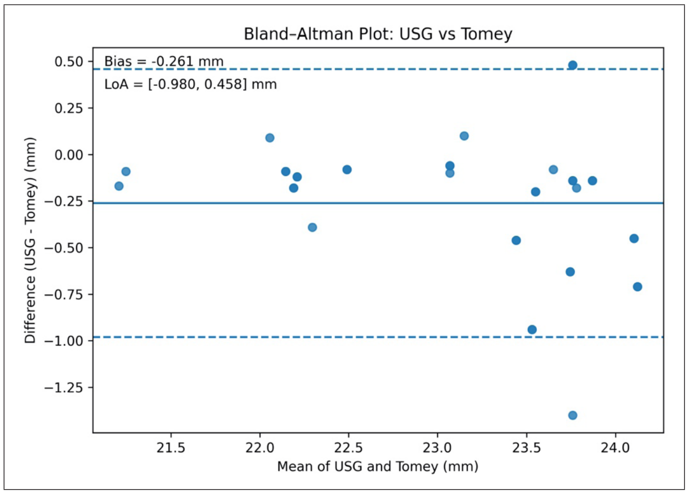


**Figure 2.** Bland-Altman plot for axial length: Ultrasonography versus Tomey – OA.

**Table 3.** Agreement between Tomey - OA and anterion for biometric parameters

| Parameter | Mean | LoA min | LoA max |
|---|---|---|---|
| ACD (mm) | 0.224 | –0.403 | 0.852 |
| LT (mm) | –0.196 | –0.756 | 0.363 |
| WTW (mm) | 0.243 | –0.525 | 1.012 |
| Pupil diameter | 0.347 | –2.498 | 3.191 |
| Corneal astigmatism (D) | –0.016 | –1.898 | 1.866 |
| K1 (D) | 0.188 | –1.955 | 2.331 |
| K2 (D) | 0.203 | –0.747 | 1.154 |
| Avg K (D) | 0.222 | –1.147 | 1.590 |

AL: Axial length, ACD: Anterior chamber depth, LT: Lens thickness, WTW: White-to-white, K1: Flat keratometry, K2: Steep keratometry, Avg K: Mean keratometry, D: Diopter. Agreement is summarized numerically using Bland-Altman bias and 95% limits of agreement (LoA).

**Table 4.** Inter-device reliability between Tomey - OA and anterion for biometric parameters (ICC)

| Parameter | ICC(2,1) absolute agreement |
|---|---|
| ACD | 0.731 |
| LT | 0.694 |
| WTW | 0.462 |
| Pupil diameter | 0.370 |
| Corneal astigmatism | 0.734 |
| K1 | 0.858 |
| K2 | 0.953 |
| Avg K | 0.916 |

AL: Axial length, ACD: Anterior chamber depth, LT: Lens thickness, WTW: White-to-white, K1: Flat keratometry, K2: Steep keratometry, Avg K: Mean keratometry, D: Diopter. ICC(2,1) was calculated using a two-way random effects model with absolute agreement

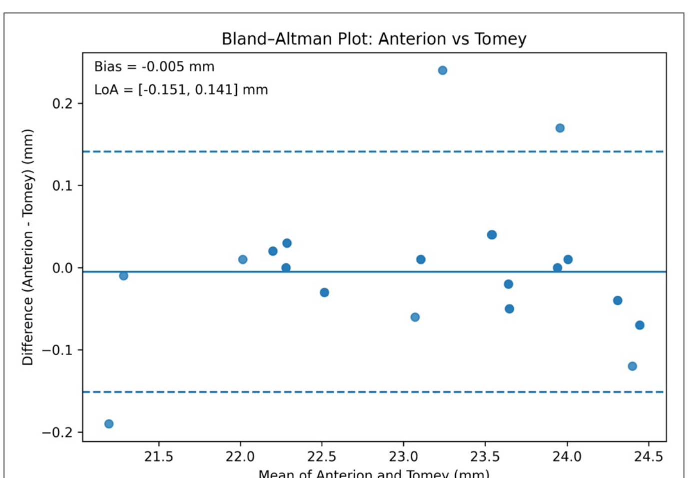


**Figure 3.** Bland-Altman plot for axial length: Anterion versus Tomey – OA.

## Discussion

Accurate AL measurement is fundamental to achieving optimal refractive outcomes after cataract surgery, particularly in eyes with mature cataract where dense media opacity poses significant challenges to biometric assessment. In this study, AL measurements obtained using two swept-source optical biometers, the Tomey - OA and Heidelberg Anterion, were compared with contact A-scan USG in eyes with mature cataract. The findings demonstrated a high level of agreement between the two swept-source optical devices when measurements were successfully acquired, while contact A-scan USG yielded significantly shorter AL values compared with both optical biometers. Moreover, AL acquisition with swept-source optical biometry was not achievable in a substantial proportion of eyes, highlighting the persistent clinical relevance of ultrasound biometry in the evaluation of mature cataracts.

Numerous studies have compared optical biometric devices in eyes with mature or dense cataracts (6,7,10,11,13-16).However, studies evaluating SS-OCT-based biometers in comparison with earlier biometric technologies in dense cataracts remain limited (8-10,13,14,16-18). Moreover, direct comparisons among SS-OCT devices themselves are scarce. To the best of our knowledge, this is among the first studies to directly compare the Heidelberg Anterion and Tomey - OA swept-source biometers specifically in eyes with mature cataract." Our findings indicate that even in mature cataracts, AL measurements obtained with the Tomey - OA and Heidelberg Anterion remain highly comparable, with no significant inter-device difference when measurements are successfully acquired.

Ocular biometry devices based on SS-OCT principles are known to have a superior ability to successfully measure AL compared with PCI-based systems (9,14,15). Nevertheless, even advanced swept-source OCT-based devices may fail to obtain reliable measurements in eyes with mature or very dense cataracts (10,13). In such cases, AL assessment necessarily relies on A-scan USG. Although optical and ultrasound biometry devices are both widely used in clinical practice, ultrasound biometry remains particularly important in developing countries owing to its cost-effectiveness and the higher prevalence of advanced cataracts. Previous studies have demonstrated a high correlation between swept-source OCT-based optical biometers and ultrasound AL measurements in dense cataract cohorts; however, systematic differences between these techniques have also been consistently reported (10,11). In the present study, AL measurements obtained using contact A-scan USG were consistently shorter than those obtained with swept-source optical biometers, with a mean difference of approximately 0.26–0.30 mm. This finding is in agreement with earlier studies comparing optical and ultrasound biometry, which have similarly reported shorter AL values with contact ultrasound measurements (3,10,11). These discrepancies have primarily been attributed to corneal indentation associated with the applanation technique, as well as differences in the anatomical reference points used by ultrasound- and optical-based devices, and have been observed in both PCI- and swept-source OCT-based comparative studies.

The close agreement observed between the Tomey - OA and the Heidelberg Anterion devices in the present study is another important finding. Bland-Altman analysis demonstrated minimal mean bias and relatively narrow limits of agreement between the two swept-source optical biometers, indicating that AL measurements obtained with these devices are largely interchangeable when successful acquisition is achieved. This finding is consistent with previous reports showing high agreement among swept-source optical biometers, including comparisons between devices such as the IOL Master 700, OA-2000, Heidelberg Anterion and other SS-OCT-based platforms (17-20). Although the Anterion device was originally designed as an anterior segment imaging platform, its AL measurement capability demonstrated good agreement with a dedicated optical biometer in the present study, supporting its potential utility in selected cases. Therefore, while good agreement was observed between swept-source optical biometers in measurable cases, these results should be interpreted in the context of the relatively high optical acquisition failure rate in eyes with mature cataract.

Despite these favorable agreement results, it is noteworthy that AL measurements could not be obtained with swept-source optical biometers in approximately one-third of the eyes included in this study. Severe lens opacification in mature cataract remains a major limitation for optical biometry, even with the longer wavelengths and improved signal penetration of swept-source technology. Similar acquisition failure rates in dense or mature cataracts have been reported in previous studies, emphasizing that optical biometry cannot yet fully replace ultrasound in all clinical scenarios (21,22).

From a clinical perspective, these findings underscore the importance of being aware of systematic differences between measurement modalities. When ultrasound biometry is used as a fallback method due to optical measurement failure, surgeons should recognize the tendency toward shorter AL values and consider this potential bias during IOL power calculation. While swept-source optical biometry should remain the preferred method when measurements are obtainable, contact A-scan USG continues to play an indispensable role in the pre-operative evaluation of eyes with mature cataract.

Recent advances in IOL power calculation formulas have shifted emphasis toward multivariable models that incorporate several biometric parameters beyond AL alone. Contemporary formulas, such as the Barrett Universal II, Olsen, Kane, and Holladay 2, integrate AL, ACD, LT, and keratometric values, with some also including white-to-white (WTW) distance, to improve effective lens position prediction (23,24). Consequently, the accuracy and inter-device agreement of these parameters have become increasingly important, particularly in eyes with mature cataract where biometric reliability may be compromised.

In the present study, AL and keratometric parameters showed strong agreement between the Tomey - OA and Anterion devices, whereas differences were observed in ACD and LT measurements, and WTW measurements demonstrated relatively lower inter-device agreement. Similar findings have been reported in previous studies, suggesting that ACD, LT, and WTW may be more sensitive to variations in measurement principles and segmentation algorithms among swept-source optical biometers (25,26). Although WTW plays a secondary role in most IOL power calculation formulas, variations in ACD and LT may be more clinically relevant, as both parameters directly influence effective lens position estimation in contemporary multivariable formulas (27). However, the present study did not evaluate the impact of these inter-device differences on postoperative refractive outcomes or IOL power prediction error, which represents an important limitation. Future studies correlating device-specific biometric differences with refractive outcomes in eyes with mature cataract are warranted.

This study has several limitations. First, its retrospective design may have introduced inherent selection bias. Second, immersion A-scan USG was not used, which might have affected AL measurements obtained with contact ultrasound. In addition, eyes with unsuccessful optical biometry measurements were excluded from the final analysis, which may have resulted in underrepresentation of the most advanced mature cataracts. Finally, the single-center design and measurements performed by a single examiner may limit the generalizability of the findings.

## Conclusion

Swept-source optical biometry provides consistent AL measurements in eyes with mature cataract when acquisition is successful, with strong agreement between the Tomey - OA and Heidelberg Anterion devices. However, optical measurement failure remains common in advanced cataracts, emphasizing the continued clinical relevance of A-scan USG. The tendency of contact ultrasound to yield shorter AL values should be considered during IOL power calculation when optical biometry is not feasible.

### Disclosures

**Ethics Committee Approval:** This study was approved by the Basaksehir Cam Sakura City Hospital Ethics Committee (Date: 07.06.2023, Number: 2023-252) and conducted in accordance with the tenets of the Declaration of Helsinki.

**Conflict of Interest:** None declared.

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## References

1. Tabandeh H, Thompson GM, Heyworth P. Lens hardness in mature cataracts. Eye 1994;8:453–5. [CrossRef]
2. Engren AL, Behndig A. Anterior chamber depth, intraocular lens position, and refractive outcomes after cataract surgery. J Cataract Refract Surg 2013;39:572–7. [CrossRef]
3. Findl O, Kriechbaum K, Sacu S, Kiss B, Polak K, Nepp J, et al. Influence of operator experience on the performance of ultrasound biometry compared to optical biometry before cataract surgery. J Cataract Refract Surg 2003;29:1950–5. [CrossRef]
4. See CW, Iftikhar M, Woreta FA. Preoperative evaluation for cataract surgery. Curr Opin Ophthalmol 2019;30:3–8. [CrossRef]
5. Lee AC, Qazi MA, Pepose JS. Biometry and intraocular lens power calculation. Curr Opin Ophthalmol 2008;19:13–7. [CrossRef]
6. Amro M, Chanbour W, Arej N, Jarade E. Third- and fourth-generation formulas for intraocular lens power calculation before and after phakic intraocular lens insertion in high myopia. J Cataract Refract Surg 2018;44:1321–5. [CrossRef]
7. Olsen T. Calculation of intraocular lens power: a review. Acta Ophthalmol Scand 2007;85:472–85. [CrossRef]
8. Cheng SM, Li X, Zhang JS, Mei JQ, Shi GL, Lin J, et al. Comparison of refractive prediction accuracy with three optical devices. J Refract Surg 2023;39:48–55. [CrossRef]
9. Yang CM, Lim DH, Kim HJ, Chung TY. Comparison of two swept-source optical coherence tomography biometers and a partial coherence interferometer. PLoS One 2019;14:e0223114. [CrossRef]
10. González-Godínez S, Saucedo-Urdapilleta R, Mayorquín-Ruiz M, Velasco-Barona C, Moragrega-Adame E, Domínguez-Varela IA, et al. Ocular biometry in dense cataracts: comparison of partial-coherence interferometry, swept-source optical coherence tomography and immersion ultrasound. Indian J Ophthalmol 2022;70:107–11. [CrossRef]
11. Tañá-Rivero P, Aguilar-Córcoles S, Tañá-Sanz P, Tañá-Sanz S, Montés-Micó R. Axial length acquisition success rates and agreement of four optical biometers and one ultrasound biometer in eyes with dense cataracts. Eye Vis 2023;10:35. [CrossRef]
12. Hirnschall N, Murphy S, Pimenides D, Maurino V, Findl O. Assessment of a new averaging algorithm to increase the sensitivity of axial eye length measurement with optical biometry in eyes with dense cataract. J Cataract Refract Surg 2011;37:45–9. [CrossRef]
13. Tañá-Rivero P, Tañá-Sanz S, Pastor-Pascual F, Ruiz-Mesa R, Montés-Micó R. Axial length measurement failure rates using optical biometry based on swept-source OCT in cataractous eyes. Expert Rev Med Devices 2022;19:633–40. [CrossRef]
14. Arriola-Villalobos P, Almendral-Gómez J, Garzón N, Ruiz-Medrano J, Fernández-Pérez C, Martínez-de-la-Casa JM, et al. Agreement and clinical comparison between a new swept-source optical coherence tomography-based optical biometer and an optical low-coherence reflectometry biometer. Eye 2017;31:437–42. [CrossRef]
15. Goebels S, Pattmöller M, Eppig T, Cayless A, Seitz B, Langenbucher A. Comparison of 3 biometry devices in cataract patients. J Cataract Refract Surg 2015;41:2387–93. [CrossRef]
16. Henriquez MA, Zúñiga R, Camino M, Camargo J, Ruiz-Montenegro K, Izquierdo L Jr. Effectiveness and agreement of 3 optical biometers in measuring axial length in the eyes of patients with mature cataracts. J Cataract Refract Surg 2020;46:1222–8. [CrossRef]
17. Moon JY, Cho SC, Kim HJ, Jun RM, Han KE. Agreement between two swept-source optical coherence tomography biometers and a partial coherence interferometer. Korean J Ophthalmol 2022;36:326–37. [CrossRef]
18. Oh R, Oh JY, Choi HJ, Kim MK, Yoon CH. Comparison of ocular biometric measurements in patients with cataract using three swept-source optical coherence tomography devices. BMC Ophthalmol 2021;21:62. [CrossRef]
19. Fişuş AD, Hirnschall ND, Findl O. Comparison of 2 swept-source optical coherence tomography-based biometry devices. J Cataract Refract Surg 2021;47:87–92. [CrossRef]
20. Reitblat O, Levy A, Kleinmann G, Assia EI. Accuracy of intraocular lens power calculation using three optical biometry measurement devices: the OA-2000, Lenstar-LS900 and IOLMaster-500. Eye 2018;32:1244–52. [CrossRef]
21. Hirnschall N, Varsits R, Doeller B, Findl O. Enhanced penetration for axial length measurement of eyes with dense cataracts using swept source optical coherence tomography: a consecutive observational study. Ophthalmol Ther 2018;7:119–24. [CrossRef]
22. Kanclerz P, Hecht I, Tuuminen R. Technical failure rates for biometry between swept-source and older-generation optical coherence methods: a review and meta-analysis. BMC Ophthalmol 2023;23:182. [CrossRef]

23. Yasar II, Yasar S, Al Barri L, Darabus DM, Tîrziu AT, Munteanu M, et al. Comparative analysis of intraocular lens power calculation formulas (Kane, Barrett universal II, Hill-radial basis function, and Ladas super formula): which one is more accurate? J Clin Med 2025;14:2443. [CrossRef]
24. Stopyra W, Langenbucher A, Grzybowski A. Intraocular lens power calculation formulas-a systematic review. Ophthalmol Ther 2023;12:2881–902. [CrossRef]
25. Kesim C, Yıldız-Taş A, Karslıoğlu MZ, Hasanreisoğlu M, Müftüoğlu O, Şahin A. The effect of anterior segment depth on the accuracy of 7 different intraocular lens calculation formulas. Turk J Ophthalmol 2022;52:228–36. [CrossRef]
26. Lu W, Li Y, Savini G, Song B, Hu Q, Wang Q, et al. Comparison of anterior segment measurements obtained using a swept-source optical coherence tomography biometer and a Scheimpflug-Placido tomographer. J Cataract Refract Surg 2019;45:298–304. [CrossRef]
27. Sanchez-Liñan N, Márquez-Díaz S, Castaño-Fernandez AB, Alaskar-Alani H, Castro-Luna G. Importance of different topographic, biometric, and retinal parameters for calculating IOL power. Sci Rep 2024;14:23498. [CrossRef]