COMPARISON OF CLINICAL OUTCOMES OF THREE TRIFOCAL INTRAOCULAR LENSES

SHORT TITLE: COMPARISON OF 3 TRIFOCAL IOLs

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ABSTRACT

Purpose: To compare the clinical outcomes obtained after implantation of 1 of 3 models of trifocal diffractive intraocular lenses (IOLs).

Setting: Hospital da Luz, Lisbon, Portugal.

Design: Prospective randomized comparative study.

Methods: Ninety eyes of 45 patients undergoing cataract surgery with bilateral implantation of 1 of 3 models of trifocal diffractive IOLs were enrolled. The IOL models implanted were the FineVision POD F, RayOne Trifocal, or the Acrysof IQ PanOptix (30 eyes of 15 patients in each group). Visual acuity (VA), refraction, defocus curve, and contrast sensitivity outcomes were evaluated during a 3-month follow-up. Furthermore, the quality-of-vision (QoV) questionnaire (McAlinden et al.) was used to evaluate the frequency, severity, and discomfort of different visual symptoms.

Results: No statistically significant differences were found between groups in distance, intermediate, and near VA (p≥0.112) and postoperative refraction (p≥0.059). Postoperative binocular uncorrected intermediate VA of 0.10 logMAR or better was found in 14 (93.33%) patients in the 3 groups. Postoperative binocular uncorrected near VA of 0.10 logMAR or better was found in 13 (86.67%), 14 (93.33%) and 13 (86.67%) patients in the PODF, RayOne, and PanOptix groups, respectively. No statistically significant differences were found between groups in scotopic contrast sensitivity with and without glare as well as in the QoV scores (p≥0.057), except for the difference between the PODF and RayOne groups in depth perception severity, which was less in the RayOne group (p=0.019).

Conclusions: The 3 trifocal IOLs evaluated provided a complete visual restoration with good visual quality outcomes.
INTRODUCTION

A great variety of studies has demonstrated that trifocal diffractive intraocular lenses (IOLs) can provide effective distance, intermediate, and near visual restoration after cataract surgery.\textsuperscript{1-10} For this reason, these IOLs are currently considered a safe and effective option for presbyopia correction in cases of crystalline lens extraction.\textsuperscript{11,12} Indeed, high levels of spectacle independence and a significant positive impact on quality of life have been reported after cataract surgery with implantation of different models of trifocal IOLs in presbyopic and cataract eyes.\textsuperscript{2,13-15}

With the advances in optics research, new designs of trifocal IOLs have continuously been developed by combining the effect of different diffractive orders and even some refractive components.\textsuperscript{16-18} Comparative clinical studies with these new designs are necessary to evaluate their real benefit in terms of visual acuity, refractive predictability, contrast sensitivity, visual quality, photic phenomena perception, and patient satisfaction. These studies are crucial to learn about clinical outcome differences between the trifocal IOLs and to define clear indications for each. The purpose of the current study was to compare the clinical outcomes in terms of visual acuity, refraction, contrast sensitivity, and visual quality of patients undergoing cataract surgery with implantation of 1 of 3 different models of trifocal diffractive IOLs: FineVision POD F (PhysIOL), RayOne Trifocal (Rayner), or AcrySof IQ PanOptix (Alcon).
METHODS

Patients

This prospective randomized comparative study enrolled a total of 90 eyes of 45 patients undergoing cataract surgery with bilateral implantation of 1 of 3 models of trifocal diffractive IOL, the FineVision POD F (PhysIOL), RayOne Trifocal (Rayner IOL Ltd.) or Acrysof IQ PanOptix (Alcon). All patients were informed about the surgery and provided informed consent to undergo the clinical examinations in accordance with the tenets of the Declaration of Helsinki. The study received the approval of the hospital ethics committee.

Each patient involved in the study was randomized to 1 of the 3 groups defined according to the IOL implanted (https://www.randomizer.org): PODF group (30 eyes, 15 patients), RayOne group (30 eyes, 15 patients) and PanOptix group (30 eyes, 15 patients). In all patients, bilateral cataract surgery was performed.

Inclusion criteria for the study were the indication of bilateral refractive lens exchange or cataract surgery, an age of 21 years or older, and signed informed consent before surgery. Exclusion criteria included preoperative regular corneal astigmatism of more than 1.00 diopter (D) of magnitude; irregular corneal astigmatism; relevant concomitant ophthalmic diseases, such as pseudoexfoliation; glaucoma; traumatic cataract; and other co-morbidities that could affect capsular bag stability (eg, Marfan syndrome), systemic disease with potential impact on visual outcome, previous ocular surgery, and patient inability to understand and/or fill in patient questionnaires.
Intraocular lenses

The FineVision POD F IOL is a hydrophilic acrylic lens with an aspheric optic (spherical aberration [SA] -0.11) with 26 diffractive steps, a +3.50 D near add and +1.75 D intermediate add, and a light split of 42% for distance, 15% for intermediate, and 29% for near. The Rayone Trifocal IOL is a hydrophilic acrylic lens with an aspheric optic (neutral SA) with 16 diffractive steps, a +3.50 D near add and +1.75 D intermediate add, and a light split of 52% for distance, 22% for intermediate, and 26% for near. The PanOptix IOL is a hydrophobic acrylic lens with an aspheric optic (SA -0.20) with 15 diffractive steps, a +3.25 D near add and +2.17 D intermediate add, and a light split of 42% for distance, 24% for intermediate, and 22% for near.

Preoperative examination

All patients underwent a complete eye examination preoperatively, including subjective refraction, corrected distance visual acuity (CDVA) using logMAR acuity charts under photopic conditions (lighting levels of 85 candelas(cd)/m²), optical biometry using the Lenstar LS900 system (Haag Streit AG), corneal topographic evaluation with the Cassini system (i-Optics), anterior segment analysis by slitlamp biomicroscopy, and fundus evaluation under pupil dilation. IOL power was selected using the Hill-RBF formula, considering emmetropia or the closest myopic value to emmetropia as the postoperative target.

Surgical procedure

All surgical procedures were performed by 2 experienced surgeons (F.J.R, T.B.F) using topical anesthesia and microcoaxial phaco-emulsification with a sutureless incision of 2.2 mm. The sequence followed in the surgical procedure was as follows: creation of a clear cornea self-sealing incision in the steepest meridian to reduce
postoperative astigmatism, injection of ophthalmic viscosurgical device (OVD), creation of the capsulorhexis, phacoemulsification, irrigation/aspiration of cortical material, and IOL implantation in the capsular bag by docking the cartridge onto the incision. The Accuject 2.0 (Medicel AG) injector was used to preload and implant the FineVision POD F IOL, the Monarch injector (Alcon) to implant the Acrysof IQ PanOptix IOL, and the preloaded RayOne Trifocal IOL was inserted using its ready-to-use injection system.

Postoperative examinations
Postoperative ocular examinations were performed at 1 week and 1 month and 3 months after surgery. At the last postoperative visit, the following clinical tests were performed: subjective refraction, measurement of monocular and binocular uncorrected distance visual acuity (UDVA), CDVA, uncorrected (UIVA) and distance-corrected intermediate visual acuity (DCIVA) (measured at 66 cm), and uncorrected (UNVA) and distance-corrected near visual acuity (DCNVA) (measured at 40 cm), slitlamp examination, measurement of the binocular defocus curve under photopic conditions (85 cd/m²) using defocusing lenses from +1.00 to -4.00 D in 0.50 D steps of blur, and measurement of contrast sensitivity with and without glare at luminance levels of 85 cd/m² and 3.0 cd/m² using the Optec 6500 device (Stereo Optical, Inc.). Distance, near, and intermediate visual acuities were assessed by logMAR acuity charts under photopic conditions (85 cd/m²).

Furthermore, quality of vision (QoV) was evaluated at the last postoperative visit using the questionnaire developed by McAlindien et al.19 The following visual symptoms are captured: glare, halos, starbursts, hazy/blurred/double vision, distortion, focusing difficulties, fluctuation, and depth perception. This 30 item QoV questionnaire is separated into 3 scales according to the frequency of visual
symptoms (never = 0; occasionally = 1; quite often = 2; very often = 3), severity of the symptoms (not at all = 0; mild =1; moderate = 2; severe = 3), and how bothered the patient is by the symptoms (not at all = 0; a little =1; quite = 2; very = 3).\textsuperscript{19}

\textit{Statistical analysis}

The sample size was calculated for an alpha of 0.05 and a power of 0.80. A standard deviation in visual acuity of 0.10 logMAR units was presumed as well as a minimum detectable difference of one line of visual acuity (0.1 logMAR), based on previous data analyses for a similar study.\textsuperscript{1} This calculation recommended the inclusion of 13 eyes per group.

All statistical analyses were performed using SPSS for Mac (version 22.0; SPSS, Inc.). Normality of data samples was evaluated by means of the Kolmogorov-Smirnov test. As most of samples were not normally distributed, non-parametric statistical tests were used. Differences between IOL groups were evaluated using the Kruskal-Wallis test, with the use of the Mann-Whitney test with the Bonferroni adjustment for the post-hoc comparative analysis by pairs. The results were expressed as the mean ± standard deviation (SD), and p<0.05 was considered as statistically significant.

\textbf{RESULTS}

A total of 30 eyes of 15 patients ranging in age from 55 to 79 years were included in each group (PODF, RayOne and PanOptix). Table 1 displays the mean preoperative clinical data obtained in each group, as well as the statistical significance of differences between groups for each parameter evaluated. As shown, only
statistically significant differences between groups were detected in preoperative manifest sphere (p = 0.005) and spherical equivalent (p = 0.006).

Table 2 shows the 3-month postoperative data obtained in the 3 groups, as well as the statistical significance of differences between groups for each parameter evaluated. As shown, no statistically significant differences were found between groups in any of the visual acuity parameters evaluated (p ≥ 0.112). A total of 14 (93.33%) of patients in all 3 groups achieved a postoperative binocular UIVA of 0.10 logMAR or better (Figure 1). Furthermore, a total of 13 (86.67%), 14 (93.33%) and 13 (86.67%) of patients achieved a postoperative binocular UNVA of 0.10 logMAR or better in the PODF, RayOne and PanOptix groups, respectively (Figure 1). Concerning postoperative refractive data, no statistically significant differences were found between groups (p ≥ 0.059). A total of 22 (73.33%), 29 (96.67%), and 23 (76.67%) of eyes had a postoperative spherical equivalent within ±0.50 D in the PODF, RayOne, and PanOptix groups, respectively (Figure 2).

Figure 3 displays the mean 3-month postoperative binocular defocus curve obtained in the 3 groups. No statistically significant differences were found between groups in the visual acuity measurements obtained with the different levels of defocus (p ≥ 0.555). Contrast sensitivity results in the 3 groups are displayed in Figure 4. No statistically significant differences were found between groups in low mesopic contrast sensitivity with and without glare for any of the spatial frequencies evaluated (p > 0.05). Contrast sensitivity tended to be slightly worse in the PanOptix group for the highest spatial frequency compared to the other 2 groups, but differences did not reach statistical significance (p > 0.05) (Figure 4). Finally, the visual quality was also evaluated using the McAlinden questionnaire. No statistically significant differences between groups were found in the QoV scores in terms of frequency (p ≥ 0.145) and discomfort (p ≥ 0.057) of the visual symptoms evaluated (Figure 5). In terms of
severity, only statistically significant differences between groups were found in limited depth perception (p=0.019), with more severity of this visual symptom in the PODF group compared to the RayOne group (p=0.048) (Figure 5).

**DISCUSSION**

In the current study, a comparison of the clinical outcomes obtained with 3 models of commercially available trifocal diffractive IOLs has been performed. In terms of distance, intermediate, and near visual outcomes, no statistically significant differences have been found between these three IOL models, despite the theoretical differences in preferred working distances given by the different additions for near and intermediate vision in the 3 IOLs. Mean 3-month postoperative binocular logMAR UDVA was -0.01 ± 0.06, -0.02 ± 0.08 and -0.02 ± 0.09 in the PODF, RayOne and PanOptix groups, respectively. These results are consistent with those reported previously for a great variety of trifocal diffractive IOLs.\(^1\)\(^-\)\(^10\) Likewise, as in previous series,\(^1\)\(^-\)\(^6\)\(^,\)\(^9\)\(^,\)\(^10\) good levels of intermediate vision were found in the current study, with 3-month postoperative binocular UIVA values of 0.04 ± 0.07, 0.00 ± 0.10 and 0.06 ± 0.06 in the PODF, RayOne and PanOptix groups, respectively. Sezgin Asena\(^2\) recently reported the results of a comparative study of two different types of trifocal diffractive IOLs, showing good results but with more limited intermediate visual outcome for a hydrophilic trifocal IOL (AT LISA tri 839MP, Carl Zeiss Meditec AG). Similar outcomes have been reported in other studies evaluating this modality of hydrophilic trifocal IOL.\(^7\)\(^,\)\(^8\) In our series, no clear trend to a more limited intermediate visual outcome was observed with any of the three IOLs evaluated. This result was contradictory to that obtained in previous studies showing evidence of a slight but statistically significant difference between PODF and PanOptix IOLs in intermediate
vision. Indeed, Carson et al.\textsuperscript{18} confirmed in an experimental study that better intermediate vision at 60 degrees cm was expected to be obtained with the PanOptix compared to the FineVision trifocal IOL, whereas the trend should be the opposite at 80 degrees cm. Several factors may have accounted for this apparently contradictory finding, which might be contributed to the experimental setting of the study by Carson et al and our clinical setting.

Concerning near vision, mean binocular logMAR UNVA values of 0.02 ± 0.11, 0.01 ± 0.12 and 0.03 ± 0.09 were obtained in the PODF, RayOne and PanOptix groups, respectively. These near visual outcomes were consistent with those reported in previous clinical studies evaluating the PODF, RayOne and PanOptix IOLs.\textsuperscript{1,2,4,6,8-10} Bilbao-Calabuig et al\textsuperscript{20} evaluated in a sample of 5,802 eyes the visual results obtained with a previous version of the PODF IOL with binocular UDVA and UNVA values of 0.01 ± 0.05 and 0.05 ± 0.08 logMAR, respectively. The near visual outcomes obtained in the current comparative study with the 3 models of trifocal IOLs were better than those reported in previous studies with low-addition designs of trifocal diffractive IOLs.\textsuperscript{3,5} All these outcomes are consistent with the profile of the binocular defocus curve obtained with the 3 IOLs in our study with no significant differences between IOLs. For the 3 trifocal IOLs evaluated, there was no loss of visual acuity for defocus levels simulating intermediate vision, with the best level of visual acuity achieved at 4 m (0.00 D of defocus) and for near vision at 33 cm (-3.00 D of defocus). These findings are consistent with other series reporting defocus curves for these specific models of trifocal IOL.\textsuperscript{1,2,6,8,10,20,21} A trend to lower visual acuity values for defocus levels of -0.5 to -1.5 D was observed in the PODF group compared to the other 2 groups, but these differences did not reach statistical significance.
The predictability of the refractive correction was good for all 3 types of IOLs evaluated, although a statistically not significant trend to a more predictable outcome in terms of spherical equivalent was observed in the RayOne group. One of the main factors potentially contributing to this might be a better optimization of the IOL constants required for IOL power calculations with this specific trifocal design. Indeed, a similar outcome was obtained in a previous comparative study conducted by our research group in a different population implanted with the RayOne trifocal and PODF IOLs.¹ However, other studies showed higher levels of predictability in terms of spherical equivalent with the PanOptix and PODF IOLs, with similar percentages of eyes with postoperative values within ±0.50 D than that obtained in the current series in the RayOne group.⁸ These differences among studies may be attributed to differences in the surgical procedure (manual phacoemulsification vs femtosecond-assisted), the optical biometer used and even the method to obtain subjective refraction. In any case, despite these differences in the percentage of eyes with a spherical equivalent within ±0.50 D, no significant differences between groups were observed for monocular and binocular distance, intermediate and near visual outcomes.

Besides visual acuity and refraction, visual quality outcomes were also evaluated in our series in terms of distance low mesopic contrast sensitivity outcomes, as well as subjective complaint scores on photic phenomena and other visual disturbances, which were assessed with a validated questionnaire. Although a trend to a slightly worse contrast sensitivity for the highest spatial frequency was observed in the PanOptix group, differences between groups did not reach statistical significance for any of the spatial frequencies evaluated. Furthermore, the contrast sensitivity data are consistent with those obtained in previous series evaluating the PODF, RayOne and PanOptix IOLs.¹⁶,¹⁰ Concerning the perception of visual
disturbances evaluated with the McAlinden questionnaire, no statistically significant
differences were found between groups in the QoV score associated to the frequency
and discomfort of the visual symptoms. Regarding severity, the only significant
difference between groups was found for limited depth perception, with slightly more
severity of this visual symptom in the PODF group compared to the RayOne group.
Our research group reported a similar finding when comparing in another sample of
patients the severity scores of visual symptoms observed with RayOne Trifocal and
PODF IOLs, with less severity of limited depth perception with the RayOne IOL.\textsuperscript{1} This
may be due to the difference in the diffractive design of the 2 IOLs, with less
diffractive rings in the RayOne Trifocal IOL, being something that should be
investigated further in future studies. In general, the scores associated to disturbing
visual symptoms were low, as in previous series,\textsuperscript{1,2,6,21,22} and comparable between
IOLs. Monaco et al\textsuperscript{22} demonstrated that similar QoV scores were obtained with an
extended depth of focus IOL compared to the PanOptix trifocal IOL.

In conclusion, the POD F, RayOne and PanOptix trifocal IOLs allowed a
complete visual restoration, with good visual quality outcomes and a low incidence of
photonic phenomena. This confirmed the suitability of these IOLs as an effective option
for visual restoration in presbyopia.

WHAT WAS KNOWN

*Commercially available trifocal diffractive IOLs can provide functional levels of
distance, intermediate, and near visual acuity as well as a predictable correction.

*These IOLs provide high levels of spectacle independence and induce a
significant positive impact on quality of life
WHAT THIS PAPER ADDS

*The POD F, RayOne and PanOptix trifocal IOLs provided similar levels of distance, intermediate, and near visual restoration, as well as quality of vision.

*The frequency, severity, and discomfort of photic phenomena were comparable between these 3 IOL models, with only a trend to a more severely limited depth perception with the POD F IOL compared with the RayOne IOL.

REFERENCES


Disclosures: None of the authors has a financial or proprietary interest in any material or method mentioned.

Figure legends

Figure 1. Three-month postoperative binocular uncorrected distance (UDVA), intermediate (UIVA) and near visual acuity (UNVA).

Figure 2. Three-month postoperative refractive data.

Figure 3. Mean 3-month postoperative binocular defocus curve.

Figure 4. Contrast sensitivity functions measured under photopic conditions without glare (left) and mesopic conditions with glare (right).

Figure 5. Quality-of-vision scores obtained with the McAlinden questionnaire in terms of frequency (up), severity (middle) and discomfort (down) of different visual symptoms.
### Table 1: Mean preoperative clinical data and statistical significance of differences for each parameter evaluated between groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PODF Group</th>
<th>RayOne Group</th>
<th>PanOptix Group</th>
<th>P Value</th>
</tr>
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<tr>
<td>Eyes (n)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>---</td>
</tr>
<tr>
<td>Patients (n)</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>Age (y)</td>
<td>68 ± 8 (55, 79)</td>
<td>66 ± 6 (58, 77)</td>
<td>64 ± 6 (55, 72)</td>
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<td>Manifest sphere (D)</td>
<td>0.86 ± 1.84 (-3.00, 4.00)</td>
<td>-0.39 ± 1.67 (-3.00, 3.00)</td>
<td>1.04 ± 2.83 (-7.75, 5.00)</td>
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<td>POD FT RayOne</td>
<td></td>
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<td>0.534</td>
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<tr>
<td>RayOne PanOptix</td>
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<td></td>
<td>0.006</td>
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<td>Manifest cylinder (D)</td>
<td>-0.48 ± 0.40 (-1.25, 0.00)</td>
<td>-0.53 ± 0.39 (-1.50, 0.00)</td>
<td>-0.64 ± 0.45 (-1.25, 0.00)</td>
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<td>Manifest SE (D)</td>
<td>0.62 ± 1.94 (-3.50, 3.75)</td>
<td>-0.66 ± 1.78 (-3.62, 2.88)</td>
<td>0.72 ± 2.86 (-8.25, 4.62)</td>
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<td>RayOne PanOptix</td>
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<tr>
<td>Axial length (mm)</td>
<td>23.79 ± 0.97 (21.22, 25.55)</td>
<td>23.21 ± 0.41 (22.66, 24.30)</td>
<td>23.86 ± 1.71 (21.25, 28.01)</td>
<td>0.124</td>
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<td>POD FT PanOptix</td>
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<td>RayOne PanOptix</td>
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<td>0.081</td>
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<tr>
<td>IOL power (D)</td>
<td>21.82 ± 2.63 (16.00, 30.00)</td>
<td>22.30 ± 1.15 (20.00, 24.50)</td>
<td>21.35 ± 4.54 (8.00, 29.50)</td>
<td>0.522</td>
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</tbody>
</table>

IOL = intraocular lens; SE = spherical equivalent
Table 2.- Mean 3-month postoperative visual acuity and refractive data and statistical significance of differences for each parameter evaluated between groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PODF Group</th>
<th>RayOne Group</th>
<th>PanOptix Group</th>
<th>P Value</th>
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<tr>
<td></td>
<td>Mean ± SD (Range)</td>
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<tr>
<td>UDVA (logMAR)</td>
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<tr>
<td>Monocular</td>
<td>0.04 ± 0.08 (-0.12, 0.30)</td>
<td>0.03 ± 0.11 (-0.18, 0.30)</td>
<td>0.05 ± 0.09 (-0.10, 0.20)</td>
<td>0.419</td>
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<td>Binocular</td>
<td>-0.01 ± 0.06 (-0.12, 0.10)</td>
<td>-0.02 ± 0.08 (-0.20, 0.10)</td>
<td>-0.02 ± 0.09 (-0.10, 0.20)</td>
<td>0.854</td>
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<td>CDVA (logMAR)</td>
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<td>-0.01 ± 0.08 (-0.16, 0.10)</td>
<td>-0.01 ± 0.08 (-0.18, 0.20)</td>
<td>-0.01 ± 0.07 (-0.10, 0.12)</td>
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<td>-0.02 ± 0.06 (-0.14, 0.05)</td>
<td>-0.04 ± 0.10 (-0.20, 0.10)</td>
<td>-0.01 ± 0.07 (-0.10, 0.10)</td>
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<td>UIVA (logMAR)</td>
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<tr>
<td>Monocular</td>
<td>0.09 ± 0.11 (-0.10, 0.36)</td>
<td>0.06 ± 0.10 (-0.18, 0.28)</td>
<td>0.11 ± 0.13 (-0.10, 0.36)</td>
<td>0.311</td>
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<tr>
<td>Binocular</td>
<td>0.04 ± 0.07 (-0.08, 0.20)</td>
<td>0.00 ± 0.10 (-0.20, 0.20)</td>
<td>0.06 ± 0.06 (-0.05, 0.20)</td>
<td>0.112</td>
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<td>DCIVA (logMAR)</td>
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<tr>
<td>Monocular</td>
<td>0.04 ± 0.10 (-0.10, 0.30)</td>
<td>0.04 ± 0.13 (-0.20, 0.30)</td>
<td>0.05 ± 0.09 (-0.10, 0.40)</td>
<td>0.960</td>
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<tr>
<td>Binocular</td>
<td>0.02 ± 0.08 (-0.10, 0.20)</td>
<td>0.02 ± 0.13 (-0.20, 0.30)</td>
<td>0.01 ± 0.07 (-0.10, 0.20)</td>
<td>0.269</td>
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<td>UNVA (logMAR)</td>
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<tr>
<td>Monocular</td>
<td>0.05 ± 0.12 (-0.20, 0.30)</td>
<td>0.04 ± 0.13 (-0.18, 0.20)</td>
<td>0.05 ± 0.11 (-0.10, 0.24)</td>
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<tr>
<td>Binocular</td>
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<td>0.01 ± 0.12 (-0.20, 0.20)</td>
<td>0.03 ± 0.09 (-0.10, 0.20)</td>
<td>0.781</td>
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<td>DCNVA (logMAR)</td>
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<tr>
<td>Monocular</td>
<td>0.03 ± 0.11 (-0.20, 0.20)</td>
<td>0.02 ± 0.12 (-0.18, 0.30)</td>
<td>0.02 ± 0.10 (-0.18, 0.18)</td>
<td>0.666</td>
</tr>
<tr>
<td>Binocular</td>
<td>0.00 ± 0.07 (-0.10, 0.10)</td>
<td>0.00 ± 0.09 (-0.18, 0.10)</td>
<td>0.00 ± 0.10 (-0.18, 0.18)</td>
<td>0.997</td>
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<tr>
<td>Manifest sphere (D)</td>
<td>-0.07 ± 0.44 (-1.00, 1.00)</td>
<td>0.02 ± 0.28 (-0.50, 0.75)</td>
<td>-0.04 ± 0.43 (-0.75, 0.75)</td>
<td>0.716</td>
</tr>
<tr>
<td>Manifest cylinder (D)</td>
<td>-0.39 ± 0.27 (-1.00, 0.00)</td>
<td>-0.37 ± 0.31 (-1.00, 0.00)</td>
<td>-0.24 ± 0.32 (-1.00, 0.00)</td>
<td>0.059</td>
</tr>
<tr>
<td>Manifest SE (D)</td>
<td>-0.26 ± 0.39 (-1.00, 0.50)</td>
<td>-0.17 ± 0.28 (-0.62, 0.50)</td>
<td>-0.16 ± 0.48 (-1.25, 0.75)</td>
<td>0.509</td>
</tr>
</tbody>
</table>

CDVA = corrected distance visual acuity; DCIVA = distance-corrected intermediate visual acuity; DCNVA = distance-corrected near visual acuity; SE = spherical equivalent; UDVA = uncorrected distance visual acuity; UIVA = uncorrected intermediate visual acuity; UNVA = uncorrected near visual acuity.