TEMPO™
CLINICAL COMPENDIUM

Summary of peer-reviewed clinical research

TOPCON Healthcare

PREFACE

The Topcon Healthcare TEMPO™ is a novel binocular perimeter that improves the visual field experience for patients, technicians, and eye care professionals. Backed by clinical evidence, the TEMPO perimeter is a table–top device that completes standard automated perimetry testing 39% faster than the gold standard.[1] The binocular design enables effective testing in ambient environments. Multiple peer-reviewed publications have demonstrated the accuracy and speed of TEMPO for visual field screening through advanced glaucoma management.

SPECIAL NOTE: Topcon joined forces with CREWT, a spin-off from a major optical manufacturer in Japan, to bring TEMPO to the market. TEMPO is marketed as IMOvifa™ in Japan.

1 "Comparison between New Perimetry Device (IMOvifa®) and Humphrey Field Analyzer" M Eslani, T Nishida, S Moghimi, JM Arias, C Vasile, V Mohammadzadeh, RN Weinreb; Invest. Ophthalmol. Vis. Sci. 2022;63(7):1272 – A0412.

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13 **Comparison between New Perimetry Device (IMOvifa®) and Humphrey Field Analyzer**

Eslani M; Nishida T; Moghimi S; Arias JM; Vasile C; Mohammadzadeh V; Weinreb RN.

Presented at the Association for Research in Vision and Ophthalmology meeting, 2023

14 **Repeatability of visual fields taken with the Imovifa perimeter**

Tafreshi M; Menou J; Kasanoff D; Durbin M; El-Nimri NW; Cieslinski K.

Presented at the Association for Research in Vision and Ophthalmology meeting, 2023

15 IMO PUBLICATIONS

PEER-REVIEWED PUBLICATIONS

Perimetric Comparison Between the IMOvifa™ and Humphrey® Field Analyzer (HFA™)

AUTHORS: Nishida T, Eslani M, Weinreb RN, Arias J, Vasile C, Mohammadzadeh V, Moghimi S.

PUBLICATION: J Glaucoma. 2023 Feb 1;32(2):85-92. Epub 2022 Oct 7.

Robert N Weinreb: Commercial Relationship(s): Code C (Consultant/Contractor), Code F (Financial Support): Topcon Corporation. Remaining authors declare no conflict of interest.32(2): 85-92. Epub 2022 Oct 7.

STUDY PURPOSE

To evaluate the performance of IMOvifa, a perimeter that performs binocular visual field (VF) testing, and to compare its results with standard automated perimetry

OVERVIEW

STUDY DESIGN

Observational, cross-sectional study

*IMOvifa is known as TEMPO in the USA

STUDY DEVICE

- IMO Smart Visual Function Analyzer (referred to as IMOvifa SVFA)*
- Humphrey® Field Analyzer (HFA™)
- Melbourne Rapid Fields (MRF)

OF EYES/PATIENTS

138 eyes of 69 patients, including healthy, glaucoma suspects, and primary open angle glaucoma

OUTCOME MEASURES

Primary: Mean deviation (MD), pattern standard deviation (PSD), foveal threshold, visual field index (VFI). **Secondary:** measurement time for visual field

RESULTS

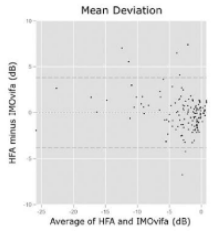


FIGURE 1. Bland-Altman diagram with median difference and agreement limits (including 95% of all difference values). Adapted from J Glaucoma. 2023 Feb 1; 32(2): 85-92. Epub 2022 Oct 7.

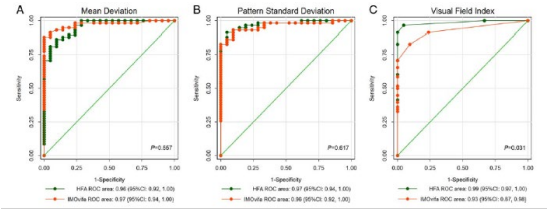


FIGURE 2. Area under the receiver operator characteristic curves for mean deviation (A), pattern SD (B), and visual field index (C). Adapted from J Glaucoma. 2023 Feb 1;32(2):85-92. Epub 2022 Oct 7.

- IMOvifa reduced measurement time by 39%
- No significant difference in MD (-3.1 dB for HFA vs. -3.1 dB for IMOvifa, P>0.05) or VFI (93.1% for HFA vs. 92.6% for IMOvifa; P>0.05) between HFA 24-2 SITA-Fast and IMOvifa 24-2 AIZE-Rapid
- Significant differences were seen in mean PSD (3.2 dB for HFA vs. 4.1 dB for IMOvifa, P<0.001) and foveal threshold (33.9 dB for HFA vs. 30.6 dB for IMOvifa, P<0.001)
- Correlation was strong for MD (r=0.90, P<0.001), PSD (r=0.78, P<0.001), and VFI (r=0.94, P<0.001)
- The mean difference (95% limits of agreement) was -0.1 (-3.8, 3.5) dB for MD, -0.4 (-3.4, 2.5) dB for PSD, and 0.1 (-8.9, 9.1) dB for VFI, respectively (**Figure 1**)
- Diagnostic accuracies differentiating glaucomatous and healthy eyes were similar for MD and PSD (P>0.05 for both), but not for VFI (P=0.031), from pairwise comparisons of AUROC (**Figure 2**)

CONCLUSIONS

IMOvifa AIZE-Rapid showed good agreement and strong correlation to HFA SITA-Fast for mean deviation, pattern standard deviation, and visual field index. Additionally, IMOvifa shortened visual field test time for healthy and glaucoma patients and reduced fatigue for both patients and examiners.

Comparison of Perimetric Outcomes from a Tablet Perimeter, Smart Visual Function Analyzer, and Humphrey® Field Analyzer (HFA™)

AUTHORS: Kang J, De Arrigunaga S, Freeman SE, Zhao Y, Lin M, Liebman DL, Roldan AM, Kim JA, Chang DS, Friedman DS, Elze T.

PUBLICATION: Ophthalmol Glaucoma. 2023 Mar 12:S2589-4196(23)00059-5. Ophthalmol Glaucoma. 2023 Sep-Oct;6(5):509-520. doi: 10.1016/j.ogla.2023.03.001. Epub 2023 Mar 12.

STUDY PURPOSE

To compare tablet and Smart Visual Function Analyzer results with outputs from the Humphrey Field Analyzer 24-2 Swedish Interactive Threshold Algorithm Standard program

OVERVIEW

STUDY DESIGN

Observational, cross-sectional study

STUDY DEVICE

- IMO Smart Visual Function Analyzer (referred to as IMOvifa SVFA)*
- Humphrey® Field Analyzer (HFA™)
- Melbourne Rapid Fields (MRF)

OF EYES/PATIENTS

133 eyes of 79 patients, including glaucoma suspects, ocular hypertension, and glaucoma patients

OUTCOME MEASURES

Primary: Mean deviation (MD), pattern standard deviation (PSD), reliability parameters, and point sensitivity

*IMOvifa is known as TEMPO in the USA

RESULTS

- The mean difference in MD between HFA 24-2 SITA-Standard and IMOvifa 24-2 AIZE was 0.24 dB, 95% confidence interval (-0.16 dB, 0.63 dB), P=0.237. The mean difference in MD between HFA and MRF was 0.03 dB, 95% CI (-0.36 dB, 0.42 dB), P=0.89 (**Figure 1**)

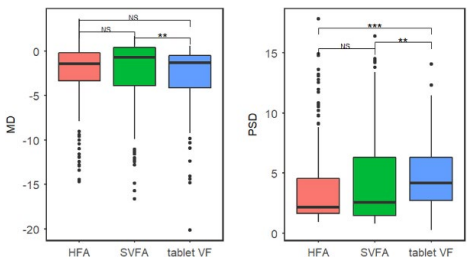


FIGURE 1. Boxplot comparing the mean deviation (MD) and PSD for the HFA, SVFA, and tablet, with pairwise significance shown. Adapted from Ophthalmol Glaucoma. 2023 Mar 12:S2589-4196(23)00059-5. Epub ahead of print.

- There was no significant difference in PSD between HFA and IMOvifa, however, MRF reported a mean PSD value that was 0.64 dB greater than that of HFA (95% CI = 0.27 dB to 1.02 dB, P<0.001) (**Figure 1**)
- Point-by-point sensitivities on IMOvifa and MRF tablet differed from those of HFA at 39 and 36 locations, respectively. On average, the sensitivity values of the HFA were 1.2 dB higher than the sensitivity values of the IMOvifa throughout the field. Compared to HFA, MRF reported greater sensitivity values in the nasal field and lower sensitivity values in the temporal field with differences up to 6.5 dB in some locations

CONCLUSIONS

IMO Smart Visual Function Analyzer provided comparable mean deviation and pattern standard deviation values to those of Humphrey Field Analyzer for glaucoma patients. Relative to HFA, IMOvifa underestimated light sensitivity but its results were more similar to HFA results than MRF.

A new static visual field test algorithm: the Ambient Interactive ZEST (AIZE)

AUTHORS: Nomoto H, Matsumoto C, Okuyama S, Kimura S, Inoue S, Yamanaka K, Kusaka S.

PUBLICATION: Sci Rep. 2023 Sep 11;13(1):14945. doi: 10.1038/s41598-023-42266-z.

STUDY PURPOSE

To evaluate the performance of a new perimetric algorithm (AIZE) by computer simulation

OVERVIEW

STUDY DESIGN

Simulation study

STUDY DEVICE

- Computer simulations using: AIZE (ambient interactive zippy estimation by sequential testing)*
- Non-weighted test strategy (WL = 0)
- Weighted test strategy (WL = 0.33)

OF EYES/PATIENTS

10 glaucomatous and 10 normal empirical visual field (VF) test results simulated with 5 error conditions: 3% false positives (FP), 3% false negatives (FN), 9% FP and 9% FN, 15% FP and 15% FN, 3% FP and 15% FN, 15% FP and 3% FN

OUTCOME MEASURES

Total number of test presentations and root mean square error (RMSE) of estimated visual sensitivities

*AIZE is a perimetric algorithm on TEMPO and a modified ZEST procedure that utilizes spatial information (weighted likelihood: WL) of neighboring test locations to estimate visual thresholds

RESULTS

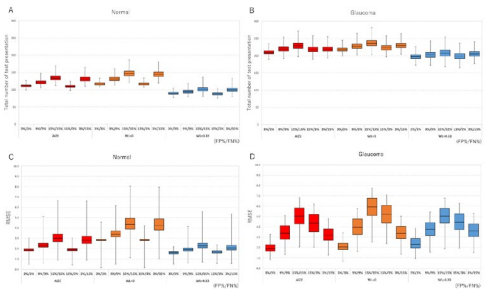


FIGURE 1. The total number of test presentation with AIZE, the non-weighted and the fixed-weighted tests under 5 error conditions in normal (A) and glaucoma (B). The RMSE with AIZE, the non-weighted and the fixed-weighted tests under 5 error conditions in normal (C) and glaucoma (D). Adapted from Sci Rep. 2023 Sep 11;13(1):14945. doi:10.1038/s41598-023-42266-z.

- In both glaucomatous (G) and normal (N) VFs, the fixed-weighted test had the lowest number of test presentations (median G 256, N 139), followed by the AIZE (G 285, N 174) and the non-weighted test (G 303, N 195) (**Figure 1**)
- The RMSE of the fixed-weighted test was lower (median 1.7 dB) than that of the AIZE (1.9 dB) and the non-weighted test (1.9 dB) for normal VFs, whereas the AIZE had a lower RMSE (3.2 dB) than the fixed-weighted test (4.5 dB) and the non-weighted test (4.0 dB) for glaucomatous VFs (**Figure 1**)
- Test-retest variability of AIZE, non-weighted test, and the fixed-weighted test at the same test location yielded median RMSE values of 2.7 dB, 3.0 dB, and 2.7 dB for glaucomatous VFs. For normal VFs, the median RMSE values were 2.0 dB, 3.0 dB, and 1.6 dB
- All 3 algorithms underestimated simulated sensitivities for true sensitivities of 34 dB and higher. The non-weighted test under-estimated 28 dB and higher sensitivities whereas the weighted test showed a larger variability of simulation sensitivities in the 8-20 dB range compared to AIZE and the non-weighted test

CONCLUSIONS

Simulation results showed that AIZE had fewer test presentations and a smaller RMSE than the non-weighted test strategy. Thus, AIZE is a test algorithm that saves time without affecting the accuracy for glaucomatous visual fields.

Participant Experience Using Novel Perimetry Tests to Monitor Glaucoma Progression

AUTHORS: Freeman SE, De Arrigunaga S, Kang J, Zhao Y, Roldán AM, Lin MM, Elze T, Liebman D, Chang DS, Friedman DS.

PUBLICATION: J Glaucoma. 2023 Nov 1;32(11):948-953. doi: 10.1097/IJG.0000000000002296. Epub 2023 Aug 17.

STUDY PURPOSE

To compare patient experience using the IMOvifa SVFA and the tablet-based Melbourne Rapid Fields visual field (VF) tests to the Humphrey Field 24-2 Swedish Interactive Threshold Algorithm Standard

OVERVIEW

STUDY DESIGN

Prospective observational cohort study. Participants completed VFs on the three devices on two study visits 10-24 weeks apart and were surveyed at both visits; participants were instructed to perform weekly MRF VF test at home in between the baseline and final study visit.

*IMOvifa is known as TEMPO in the USA

STUDY DEVICE

- IMO Smart Visual Function Analyzer (referred to as IMOvifa SVFA)*
- Humphrey® Visual Field (HVF)
- Melbourne Rapid Fields (MRF)

OF EYES/PATIENTS

81 adults with diagnosis of ocular hypertension, glaucoma suspect, or glaucoma

OUTCOME MEASURES

Patient response to multiple-choice questions surveying: overall experience, device preference, and frequency with which patient would be willing to complete at-home tests on each device; Mean test duration

RESULTS

- At baseline, participants preferred the SVFA (71.7%) and tablet tests (69.2%) over the Humphrey VF and most were willing to perform weekly monitoring at home on the SVFA (69.1%) and tablet (75.4%)
- SVFA and MRF VF tests are significantly faster than HVF for glaucoma patients, and mean test duration was shortest on SVFA VF and longest on HFA for the glaucoma suspect group (all $P<0.01$)
- At the final study visit, there was a significant increase in the number of participants who strongly preferred SVFA over HVF (51.9% to 69.1%, $P=0.01$). In contrast, proportion of participants who strongly preferred HVF over MRF increased from 1.2% to 9.9%
- 77.8% of participants reported a positive overall experience (“very good”) with the IMOvifa SVFA
- Patients who preferred SVFA cited that the device was more comfortable, easier to use, and that they could keep both eyes open during test. Conversely, participants who preferred HVF over SVFA cited comfort and perceived accuracy

CONCLUSIONS

Glaucoma patients preferred the IMOvifa SVFA and MRF visual field devices over the HVF.

Overall participant experience using these devices was positive, supporting the feasibility of home monitoring of VFs from an experience perspective. At-home VF monitoring would allow for more frequent testing which could detect progression sooner and possibly decrease the burden of office visits on patients, clinical staff, and physicians.

Comparison of the TEMPO Binocular Perimeter and Humphrey Field Analyzer

AUTHORS: Nishida T, Weinreb R, Arias J, Vasile C, Moghimi S.

PUBLICATION: Sci Rep. 2023 Dec 1;13(1):21189.

Takashi Nishida: Commercial Relationship(s): Code C (Consultant/Contractor): Topcon Corporation | Robert N Weinreb: Commercial Relationship(s): Code C (Consultant/Contractor): Topcon Corporation | Sasan Moghimi: Code F (Financial Support): Topcon Corporation. Remaining authors declare no conflict of interest.

STUDY PURPOSE

To compare the TEMPO 24–2 Ambient Interactive Zippy Estimated by Sequential Testing (AIZE)-Rapid with the Humphrey field analyzer (HFA) 24–2 Swedish Interactive Threshold Algorithm (SITA)-Fast

OVERVIEW

STUDY DESIGN

Prospective

STUDY DEVICE

- TEMPO binocular perimeter
- Humphrey® field analyzer (HFA)
- Cirrus® optical coherence tomography (OCT)

OF EYES/PATIENTS

740 eyes of 370 participants, including 68 healthy, 262 glaucoma suspects, and 410 glaucoma

OUTCOME MEASURES

Visual field (VF) parameters, reliability indices, and coefficient of determinations for VF parameters and retinal nerve fiber layer (RNFL) thickness; measurement time and participant survey

RESULTS

- No significant differences were seen in mean deviation and visual field index between the two perimeters (P > 0.05), while significant differences were seen in pattern standard deviation and foveal threshold between TEMPO and HFA (both P < 0.001)
- TEMPO AIZE-Rapid demonstrated lower values than HFA SITA-Fast for all reliability indices: fixation loss (11.2 [10.0, 12.5] % for HFA and 8.9 [7.3, 10.5] % for TEMPO), false positive (4.1 [3.7, 4.6] % for HFA and 1.3 [1.1, 1.5] % for TEMPO), and false negative (4.3 [3.8, 4.8] % for HFA and 0.4 [0.3, 0.4] % for TEMPO)

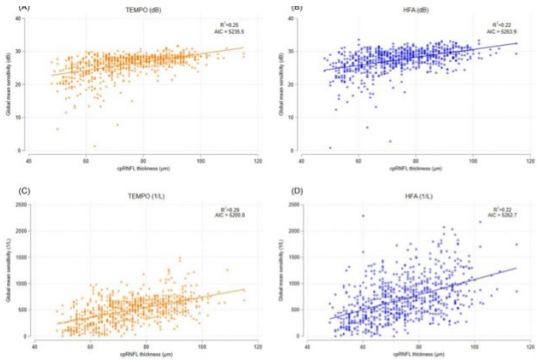


FIGURE 1. Scatterplots showing associations between global VF mean sensitivity from TEMPO and HFA in dB scale (A, B) and unlogged 1/L scale (C, D), and circumpapillary retinal nerve fiber layer thickness. *Adapted from Sci Rep. 2023 Dec 1;13(1):21189.*

- A stronger association between VF mean sensitivity (dB or 1/L) and circumpapillary RNFL was found for TEMPO (adjusted R2 = 0.25; Akaike information criteria [AIC] = 5235.5 for dB, and adjusted R2 = 0.29; AIC = 5200.8 for 1/L, respectively) compared to HFA (adjusted R2 = 0.22; AIC = 5263.9 for dB, and adjusted R2 = 0.22; AIC = 5262.7 for 1/L, respectively) (**Figure 1**)
- Stronger associations were found in the inferotemporal disc, followed by modest associations in the superotemporal disc area. Weak associations were observed in the temporal disc area
- Measurement time was faster for TEMPO compared to HFA (261 s vs. 429 s, P < 0.001)
- 73% of participants preferred TEMPO while 17% preferred HFA. 83% of participants reported no difficulties with TEMPO; TEMPO received positive feedback in terms of screen readability, ease of concentration, and shorter test duration, as compared to HFA

CONCLUSIONS

TEMPO demonstrated a stronger structure–function association with Cirrus OCT compared to HFA, both globally and sectorally.

CONGRESS PRESENTATIONS AND POSTERS

Comparison of Portable Perimetry Tests with the Humphrey® Field Analyzer (HFA™)

AUTHORS: Lin M; Zhao Y; Freeman S; Kang J; De Arrigunaga S; Friedman DS; Liebman DL; Roldan AM; Chang D; Elze T

PUBLICATION: Presented at the Association for Research in Vision and Ophthalmology meeting, 2022

STUDY PURPOSE

To compare Melbourne Rapid Fields and IMOvifa outputs to the HFA 24-2 Swedish Interactive Threshold Algorithm Standard program

OVERVIEW

STUDY DESIGN

Pilot observational study

*IMOvifa is known as TEMPO in the USA

STUDY DEVICE

- IMO Smart Visual Function Analyzer (IMOvifa)*
- Humphrey® Field Analyzer (HFA™)
- Melbourne Rapid Fields (MRF)

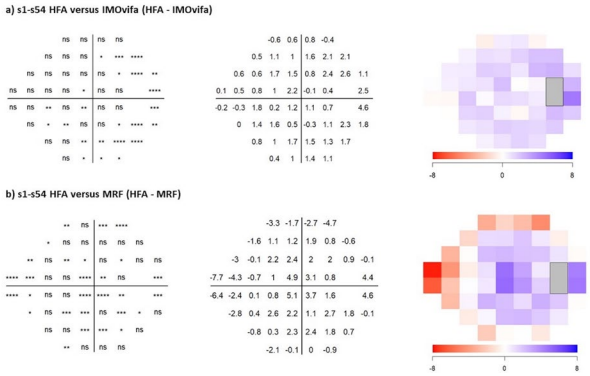
OF EYES/PATIENTS

50 patients

OUTCOME MEASURES

Mean deviation (MD), pattern standard deviation (PSD), and point sensitivity

RESULTS



- MD for all three devices was not significantly different; HFA vs. IMOvifa CI= [-0.30 to 1.38], p=0.205; HFA vs. MRF CI=[-0.75 to 0.93], p=0.837
- PSD was comparable among the three devices; HFA vs. IMOvifa CI=[-0.05 to 1.18, p=0.070]; HFA vs. MRF CI=[-0.65 to 0.57], p=0.905
- MRF and IMOvifa point sensitivities differed from those of HFA. IMOvifa generally reported lower sensitivity versus HFA (**Figure 1**)

FIGURE 1. Point by point analysis of sensitivities at each testing location comparing (a) HFA and IMOvifa and (b) HFA and MRF. Locations and degrees of significantly different values are shown (all eyes plotted as right eye). Adapted from Invest. Ophthalmol. Vis. Sci. 2022;63(7):1278 – A0418.

CONCLUSIONS

Global indices of mean deviation and pattern standard deviation are comparable between IMO Smart Visual Function Analyzer and Humphrey Field analyzer, while point-by-point comparisons may show a small bias on IMOvifa.

Comparison between New Perimetry Device (IMOvifa) and Humphrey® Field Analyzer (HFA™)

AUTHORS: Eslani M; Nishida T; Moghimi S; Arias JM; Vasile C; Mohammadzadeh V; Weinreb RN

PUBLICATION: Presented at the Association for Research in Vision and Ophthalmology meeting, 2022

Robert N Weinreb: Commercial Relationship(s): Code C (Consultant/Contractor), Code F (Financial Support): Topcon Corporation. Remaining authors declare no conflict of interest.

STUDY PURPOSE

To evaluate the performance of IMOvifa, a new perimeter which performs visual field (VF) testing outside an examination darkroom, and compare with HFA

OVERVIEW

STUDY DESIGN

Cross-sectional study

STUDY DEVICE

- IMO Smart Visual Function Analyzer (IMOvifa)*
- Humphrey® Field Analyzer (HFA™)

OF EYES/PATIENTS

138 eyes of 69 patients, including healthy, glaucoma suspects, and primary open angle glaucoma

OUTCOME MEASURES

Mean deviation (MD), pattern standard deviation (PSD), foveal threshold, visual field index (VFI), and visual field test time

*IMOvifa is known as TEMPO in the USA

RESULTS

- Test time was significantly faster for IMOvifa compared to HFA (256 seconds vs 419 seconds, P<0.001)
- There was no difference in MD (-3.1 dB vs -3.1 dB, p>0.05) or VFI (92.6% vs 93.1%, p>0.05) between IMOvifa and HFA, while Bland Altman showed reasonable agreement
- Differences were seen in mean PSD (4.1 dB vs 3.2 dB, p<0.001) and foveal threshold (30.6 dB vs 33.9 dB, p<0.001) between the two perimeters

CONCLUSIONS

IMO Visual Function Analyzer demonstrated acceptable agreement to Humphrey Field Analyzer while significantly reducing test time.

Repeatability of Visual Fields Taken with the IMOvifa™ Perimeter

AUTHORS: Tafreshi M; Menou J; Kasanoff D; Durbin M; El-Nimri NW; Cieslinski K

PUBLICATION: Presented at the Association for Research in Vision and Ophthalmology meeting, 2023

Mayra Tafreshi: Commercial Relationship(s): Code E (Employment): Topcon Corporation | Jessica Menou: Commercial Relationship(s): Code C (Consultant/Contractor): Topcon Corporation | David Kasanoff: Commercial Relationship(s): Code C (Consultant/Contractor): Topcon Corporation | Mary Durbin: Commercial Relationship(s): Code E (Employment): Topcon Corporation | Nevin El-Nimri: Commercial Relationship(s): Code E (Employment): Topcon Corporation | Kelly Cieslinski: Commercial Relationship(s): Code E (Employment):

STUDY PURPOSE

To evaluate the repeatability of two test strategies offered for the IMOvifa perimeter in healthy eyes and glaucomatous eyes

OVERVIEW

STUDY DESIGN

Repeatability study

STUDY DEVICE

- IMO Smart Visual Function Analyzer (IMOvifa)*

OF EYES/PATIENTS

20 patients
(11 healthy and 9 glaucoma)

OUTCOME MEASURES

Primary: Mean deviation (MD), pattern standard deviation (PSD), and their repeatability standard deviations. **Secondary**: test times

*IMOvifa is known as TEMPO in the USA

RESULTS

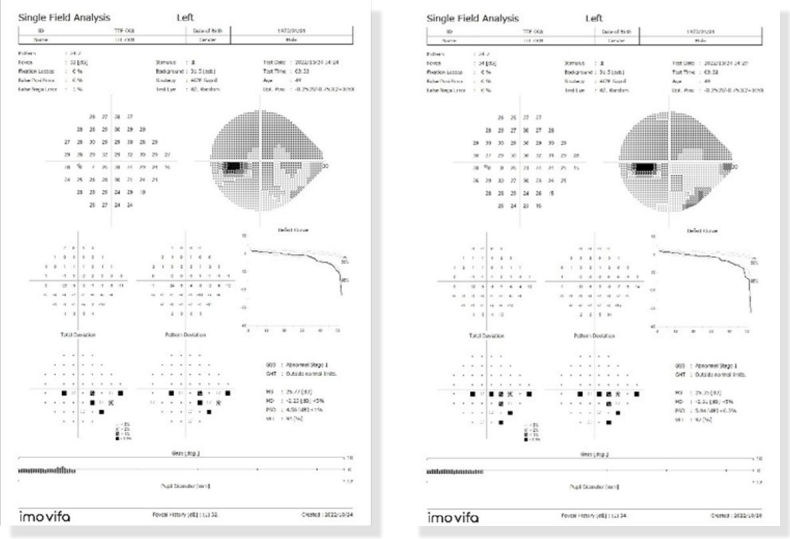


FIGURE 1. Shows two AIZE-Rapid tests from an eye with early glaucoma. Adapted from Invest. Ophthalmol. Vis. Sci. 2023;64(8):5505.

- Repeatability standard deviation was 1.2 dB for the MD for glaucoma eyes, and 0.2 dB for normal eyes
- Repeatability standard deviation was 0.31 dB for the PSD for glaucoma eyes, and 0.05 dB for normal eyes
- The test time ranged from 1.8 to 3.4 minutes for normal eyes while it varied from 2.0 to 6.9 minutes for glaucomatous eyes

CONCLUSIONS

IMOvifa's binocular test allowed for rapid testing while providing acceptable repeatability for clinical use. As expected with visual field testing, repeatability was worse in eyes with glaucoma.

IMO PUBLICATIONS

IMO is TEMPO's head-mounted predecessor sharing the same core binocular testing strategies and display technology.

PEER-REVIEWED PUBLICATIONS

Visual Field Testing with Head-Mounted Perimeter 'imo'

Matsumoto C, Yamao S, Nomoto H, Takada S, Okuyama S, Kimura S, Yamanaka K, Aihara M, Shimomura Y.
PLoS One. 11(8): e0161974.

Effects of head tilt on visual field testing with a head-mounted perimeter imo

Yamao S, Matsumoto C, Nomoto H, Numata T, Eura M, Yamashita M, Hashimoto S, Okuyama S, Kimura S, Yamanaka K, Chiba Y, Aihara M, Shimomura Y.
PLoS One. 2017 Sep 25;12(9):e0185240.

Evaluation of Pupil Fields Using a Newly Developed Head-mounted Perimeter in Healthy Subjects

Asakawa K, Nanno M, Ishikawa H, Shoji N J.
Glaucoma. 2018 Sep;27(9):807-815.

Comparison of monocular sensitivities measured with and without occlusion using the head-mounted perimeter imo

Wakayama A, Matsumoto C, Ayato Y, Shimomura Y.
PLoS ONE 14(1): e0210691.

Comparison of head-mounted perimeter (imo) and Humphrey Field Analyzer

Kimura T, Matsumoto C, Nomoto H.
Clin Ophthalmol. 2019 Mar 14;13:501-513.

Evaluation of Pupil Fields Using a Newly Developed Perimeter in Glaucoma Patients

Totsuka K, Asakawa K, Ishikawa H, Shoji N.
Curr Eye Res. 2019 May;44(5):527-532.

Challenges to detect glaucomatous visual field loss with pupil perimetry

Asakawa K, Shoji N.
Clin Ophthalmol. 2019 Aug 26;13:1621-1625.

Comparison of Humphrey Field Analyzer and IMO visual field test results in patients with glaucoma and pseudo-fixation loss

Goukon H, Hirasawa K, Kasahara M, Matsumura K, Shoji N.
PLoS One. 2019 Nov 7;14(11):e0224711.

Comparison of central visual sensitivity between monocular and binocular testing in advanced glaucoma patients using IMO perimetry

Kumagai T, Shoji T, Yoshikawa Y, Mine I, Kanno J, Ishii H, Saito A, Ishikawa S, Kimura I, Shinoda K.
Br J Ophthalmol. 2020 Nov; 104(11):1258-1534.

PEER-REVIEWED PUBLICATIONS (CONTINUED)

Age-dependent changes in visual sensitivity induced by moving fixation points in adduction and abduction using imo perimetry

Shoji T, Mine I, Kumagai T, Kosaka A, Yoshikawa Y, Shinoda K.

Sci Rep. 2020 Dec 3; 10(1):21175.

Effect of Sensitivity Disparity Between the Two Eyes on Pointwise Monocular Sensitivity Under Binocular Viewing in Patients With Glaucoma

Wakayama A, Nomoto H, Chiba Y, Matsumoto C, Kusaka S.

J Glaucoma. 2021 Jan 1; 30(1):37-43.

Central Visual Field Sensitivity With and Without Background Light Given to the Nontested Fellow Eye in Glaucoma Patients

Mine I, Shoji T, Kumagai T, Yoshikawa Y, Kosaka A, Shinoda K.

J Glaucoma. 2021 Jun 1; 30(6):537-544.

Comparison of imo and Humphrey field analyzer perimeters in glaucomatous eyes

Nakai Y, Bessho K, Shono Y, Taoka K, Nakai Y.

Int J Ophthalmol. 2021 Dec 18; 14(12):1882-1887.

The Open Perimetry Initiative: A framework for cross-platform development for the new generation of portable perimeters

Marín-Franch I, Turpin A, Artes PH, Chong LX, McKendrick AM, Alawa KA, Wall M.

J Vis. 2022 Apr 6; 22(5):1.

Measurement of Fixational Eye Movements With the Head-Mounted Perimeter Imo

Ishibashi T, Matsumoto C, Nomoto H, Tanabe F, Narita I, Ishibashi M, Okuyama S, Kayazawa T, Kimura S, Yamanaka K, Kusaka S.

Transl Vis Sci Technol. 2022 Aug 1;11(8):26.

Agreement in the detection of chiasmal and postchiasmal visual field defects between imo binocular random single-eye test and Humphrey monocular test

Sakamoto M, Sawamura H, Aihara M, Goseki T, Ikeda T, Ishikawa H, Nakamura M.

Jpn J Ophthalmol. 2022 Sep; 66(5):413-424.

A Novel Visual Field Screening Program for Glaucoma With a Head-Mounted Perimeter

Arai K, Nishijima E, Ogawa S, Hosaka D, Itoh Y, Noro T, Okude S, Okada S, Yoshikawa K, Nakano T.

J Glaucoma. 2023 Jun 1; 32(6):520-525.

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CASE STUDIES

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