# MAESTRO CLINICAL COMPENDIUM

Summary of peer-reviewed clinical research



# **HTOPCON** Healthcare

### PREFACE

Topcon Healthcare's Maestro is a user-friendly optical coherence tomography (OCT) and fundus camera combination device. With a single click, Maestro's robotic technology automatically performs alignment, focus, and multimodal capture of high-resolution OCT images and a true-color retinal image. This clinical compendium provides an overview of peer-reviewed publications for the Maestro, highlighting its advancements in efficiency and diagnostic power in clinical practice.

# **Table of Contents**

# 06 MAESTRO REFERENCE DATABASE AND ASSOCIATED STUDIES

- The development of a reference database with the Topcon 3D OCT-1 Maestro Chaglasian M, Fingeret M, Davey PG, Huang WC, Leung D, Ng E, Reisman CA. Clin Ophthalmol. 2018 May 7;12:849-857. doi: 10.2147/OPTH.S155229.
- Optic disc morphometry using spectral domain optical coherence tomography in a Nigerian population
  Awe OO, Onakpoya OH, Adeoye AO. Eur J Ophthalmol. 2021 Apr 16:11206721211008781. doi: 10.1177/11206721211008781. Epub ahead of print.
- Comparison of the Thickness of the Fiber Layer of the Retinal Nerves in
  Spectral Domain Optical Coherence Tomography in Normal Eyes Older than
  40 Years

Gündogan M, Kiliç S. Klin Monbl Augenheilkd. 2021 Sep 15. English. doi: 10.1055/a-1554-5663. Epub ahead of print.

<sup>10</sup> Optical Coherence Tomography Retinal Nerve Fibre Layer and Ganglion Cell Complex Measurements in Normal Southern Nigerian Eyes

Obasuyi OC, Osuji UE, Ifijen CO, Imafidon MA, Ovienria WA, Eguaojie IE, Eigbedion TE, Alikah AA. Cureus. 2022 Dec 29;14(12):e33101. doi: 10.7759/cureus.33101.

# 11 GLAUCOMA

# 12 Agreement and Precision of Wide and Cube Scan Measurements between Swept-source and Spectral-domain OCT in Normal and Glaucoma Eyes

Hou H, El-Nimri NW, Durbin MK, Arias JD, Moghimi S, Weinreb RN Sci Rep. 2023 Sep 23;13(1):15876.

## 13 Increased Glaucoma Case-finding Through Routine Optical Coherence Tomography in Optometry Practice

Paul JP, McGuinness MB, Ashby BD, Tan J, Barber NM, Weisinger HS, Martin KR, van Wijngaarden P, Larsen PD. J Glaucoma. 2023 Nov 28. doi: 10.1097/IJG.000000000002339. Epub ahead of print.

# 14 NEURODEGENERATIVE DISORDERS

# 15 Usefulness of peripapillary nerve fiber layer thickness assessed by optical coherence tomography as a biomarker for Alzheimer's disease

Sánchez D, Castilla-Marti M, Rodríguez-Gómez O, Valero S, Piferrer A, Martínez G, Martínez J, Serra J, Moreno-Grau S, Hernández-Olasagarre B, De Rojas I, Hernández I, Abdelnour C, Rosende-Roca M, Vargas L, Mauleón A, Santos-Santos MA, Alegret M, Ortega G, Espinosa A, Pérez-Cordón A, Sanabria Á, Ciudin A, Simó R, Hernández C, Villoslada P, Ruiz A, Tàrraga L, Boada MSci Rep. 2018 Nov 5;8(1):16345. doi: 10.1038/s41598-018-34577-3. Erratum in: Sci Rep. 2019 Nov 8;9(1):16713.

### <sup>15</sup> Evaluation of macular thickness and volume tested by optical coherence tomography as biomarkers for Alzheimer's disease in a memory clinic

Sánchez D, Castilla-Marti M, Marquié M, Valero S, Moreno-Grau S, Rodríguez-Gómez O, Piferrer A, Martínez G, Martínez J, Rojas I, Hernández I, Abdelnour C, Rosende-Roca M, Vargas L, Mauleón A, Gil S, Alegret M, Ortega G, Espinosa A, Pérez-Cordón A, Sanabria Á, Roberto N, Ciudin A, Simó R, Hernández C, Tárraga L, Boada M, Ruiz A Sci Rep. 2020 Jan 31;10(1):1580. doi: 10.1038/s41598-020-58399-4.

## 16 VITREORETINAL DISORDERS

## 17 Agreement, repeatability, and reproducibility of quantitative retinal layer assessment using swept-source and spectral-domain optical coherence tomography in eyes with retinal diseases

Hou H, Durbin MK, El-Nimri NW, Fischer JL, Sadda SR\*Front Med. 2023 Dec 18; 10:1281751. doi: 10.3389/fmed.2023.1281751.

#### 18 Retinal microvascular signs in COVID-19

Sim R, Cheung G, Ting D, Wong E, Wong TY, Yeo I, Wong CW Br J Ophthalmol. 2022 Sep;106(9):1308-1312. doi: 10.1136/bjophthalmol-2020-318236.

# 18 The Outcome of Manual Small Incision Cataract Surgery and Anterior Vitrectomy for Persistent Fetal Vasculature in an 18-Year-Old Woman: A One-Year Follow-Up

Egbu E. Cureus. 2020 Sep 23;12(9):e10605. doi: 10.7759/cureus.10605

# **19 TELEMEDICINE**

### 20 Evaluation of the Inclusion Of Spectral Domain Optical Coherence Tomography in a Telemedicine Diabetic Retinopathy Screening Program: A Real Clinical Practice

Arruabarrena C, Rodríguez-Miguel A, Allendes G, Vera C, Son B, Teus MARetina. 2023 Aug 1;43(8):1308-1316. doi: 10.1097/IAE.000000000003832.

# <sup>21</sup> Alabama Screening and Intervention for Glaucoma and Eye Health through Telemedicine (AL-SIGHT): Baseline Results

Owsley C, Swain TA, McGwin G Jr, Nghiem VTH, Register S, Asif IM, Fazio M, Antwi-Adjei EK, Girkin CA, Rhodes LAAm J Ophthalmol. 2024 Jan;257:66-75. doi: 10.1016/j. ajo.2023.09.001. Epub 2023 Sep 7.

# MAESTRO REFERENCE DATABASE & ASSOCIATED STUDIES

# The development of a reference database with the Topcon 3D OCT-1 Maestro

AUTHORS: Chaglasian M, Fingeret M, Davey PG, Huang WC, Leung D, Ng E, Reisman CA\*PUBLICATION: Clin Ophthalmol. 2018 May 7;12:849-857. doi: 10.2147/OPTH.S155229.

\*MC, MF, and PGD received financial support from Topcon Medical Systems. WCH, DL, and CAR are employees of Topcon Medical Systems. EN is a consultant of Topcon for this work.

#### STUDY PURPOSE

To report the range of thickness values for the new Topcon Maestro 3D OCT device with 2 scan size settings: the 12x9 mm wide field and 6x6 mm scans

#### OVERVIEW



#### STUDY DESIGN

Prospective, multicenter cohort study



STUDY DEVICE

Topcon 3D OCT-1 Maestro



# OF EYES/PATIENTS

399 healthy eyes of 399 subjects



**OUTCOME MEASURES** 

Average and 1st, 5th, 95th, and 99th percentile ranges for OCT parameters: Early Treatment Diabetic Retinopathy Study macula full retinal thickness (FRT), ganglion cell + inner plexiform layer thickness (GCL + IPL), ganglion cell complex (GCC) thickness, circumpapillary retinal nerve fiber layer (cpRNFL) thickness

#### RESULTS

A	12×9 mm	6×6 mm
	1	
- 141-		
	C. Alter Town	
Ser .		
10	and the second second	
NA K		
Diac a	10 00 00 M	Disc are 2 company
	a long i has a	and i may a

FIGURE 1. The relationships of cpRNFL thickness with age and disc area displayed in the 3D scatter plots. Adapted from Clin Ophthalmol. 2018 May 7;12:849-857.doi: 10.2147/OPTH.S155229.

- The mean age was  $46.3 \pm 16.3$  years (ranged 18-88 years) and 57% of the subjects were female
- Eighteen percent of the subjects were Hispanic or Latino. Fifty-nine percent of the subject were Caucasians, followed by Black/African American (20%), Asian (13%), Native American/ Pacific Islander (2%), and American Indian/Alaskan Native (1%)
- The mean foveal FRT was  $237.079 \pm 20.899 \,\mu$ m for the 12x9 mm scan and  $234.000 \pm 20.657 \,\mu$ m for the 6x6 mm scan; FRT reduced with age in the outer ETDRS guadrants
- The mean GCL + IPL thickness was 71.363  $\pm$  5.924 µm for the 12x9 mm scan and 71.726  $\pm$  5.880 µm for the 6x6 mm scan; a reduction in GCL + IPL thickness was seen with age
- The mean GCC thickness was 105.949  $\pm$  8.533 µm for the 12x9 mm scan and 106.698  $\pm$  9.094 µm for the 6x6 mm scan; overall, GCC thickness decreased with age
- The mean cpRNFL thickness was 104.720  $\pm$  11.829 µm for the 12x9 mm scan and 104.036  $\pm$  11.341 µm for the 6x6 mm scan; age had little or no effect, whereas disc area showed large degree of influence on the cpRNFL thickness (Figure 1)

#### CONCLUSIONS

Across all parameters, the measurements obtained by the 12x9 wide, the 6x6 macula, and 6x6 disc scan modes on the Topcon 3D OCT-1 Maestro were generally similar and their trends were consistent with those in the literature. The reference limits at the 1st, 5th, 95th, and 99th percentile points establish thresholds to provide for the quantitative comparison of the RNFL, optic nerve head, and the macula in the human retina to a database of known healthy eyes.

# Optic disc morphometry using spectral domain optical coherence tomography in a Nigerian population

AUTHORS: Awe OO, Onakpoya OH, Adeoye AO.

**PUBLICATION:** Eur J Ophthalmol. 2021 Apr 16:11206721211008781. doi: 10.1177/11206721211008781. Epub ahead of print.

#### STUDY PURPOSE

To assess morphological optic disc dimensions using spectral-domain optical coherence tomography (OCT) in a Nigerian population

#### **OVERVIEW**



#### STUDY DESIGN

Retrospective



STUDY DEVICE

Topcon 3D OCT-1 Maestro # OF EYES/PATIENTS

147 eyes of 88 subjects



#### OUTCOME MEASURES

Disc area (DA), vertical disc diameter (VDD), and horizontal disc diameter (HDD)

#### RESULTS

- The mean age of the study subjects was 52.6 ± 20.9 years with a range of 8-90 years; male to female ratio was 1:1.3
- The mean DA, VDD, and HDD were  $2.54 \pm 0.48$  mm<sup>2</sup>, 1926.5 ± 189.6 µm and 1673.9 ± 173.9 µm, respectively
- Males had significantly larger DA than females (2.56  $\pm$  0.53 mm<sup>2</sup> vs 2.51  $\pm$  0.44 mm<sup>2</sup>, p = 0.043)
- The mean DA and VDD of eyes of subjects aged 21-40 years were significantly higher compared to subjects aged 60 years and more (p = 0.008 and 0.001, respectively)

#### CONCLUSIONS

The mean optic disc area and diameters are larger than those reported in similar studies involving blacks and other races. The mean disc area was found to be larger in subjects aged 21-40 years in comparison to subjects aged 60 and older.

# Comparison of the Thickness of the Fiber Layer of the Retinal Nerves in Spectral Domain Optical Coherence Tomography in Normal Eyes Older Than 40 Years

AUTHORS: Gündogan M, Kiliç S.

PUBLICATION: Klin Monbl Augenheilkd. 2021 Sep 15. English. doi: 10.1055/a-1554-5663. Epub ahead of print.

#### STUDY PURPOSE

To compare measurements of the thickness of the retinal nerve fibre layer (RNFL) and assess the agreement between three different devices for spectral domain optical coherence tomography

#### **OVERVIEW**



#### STUDY DESIGN

Prospective, cross-sectional



STUDY DEVICE(S)

- Topcon MaestroCanon HS100
- NIDEK RS-3000



46 eyes of 23 subjects



#### OUTCOME MEASURES

Average RNFL thickness, four quadrants (superior, inferior, nasal, and temporal) of RNFL thickness

#### RESULTS

- The average RNFL thickness measured by the three OCT devices was correlated (p < 0.001), but differed significantly between the three devices
- Topcon Maestro showed the highest average RNFL thickness value; the mean average RNFL thickness was 98.5  $\pm$  6.6 µm as measured by Canon HS100, 108.5  $\pm$  8.8 µm as measured by Topcon Maestro, and 104.9  $\pm$  9.0 µm as measured by NIDEK RS-3000
- Bland-Altman plots revealed considerable agreement among the three devices, except for the inferior quadrants between Topcon Maestro and NIDEK RS-3000 measurements

#### CONCLUSIONS

Although the peripapillary RNFL thickness measurements taken with Topcon Maestro, Canon HS100, and NIDEK RS-3000 were in good agreement, they were not interchangeable in clinical practice, as the values differed significantly.

# Optical Coherence Tomography Retinal Nerve Fibre Layer and Ganglion Cell Complex Measurements in Normal Southern Nigerian Eyes

AUTHORS: Obasuyi OC, Osuji UE, Ifijen CO, Imafidon MA, Ovienria WA, Eguaojie IE, Eigbedion TE, Alikah AA.PUBLICATION: Cureus. 2022 Dec 29;14(12):e33101. doi: 10.7759/cureus.33101

#### **STUDY PURPOSE**

To provide the measurements of RNFL, GCL, and GCL+IPL in normal eyes of southern Nigerian patients and specifically to evaluate the relationship of these measurements to gender, age, intra-eye variability, and the Topcon SD-OCT normative database

#### OVERVIEW



#### STUDY DESIGN

Cross-sectional retrospective



STUDY DEVICE

Topcon 3D OCT-1 Maestro



# OF EYES/PATIENTS

304 eyes of 152 patients



OUTCOME MEASURES

Retinal nerve fiber layer (RNFL), ganglion cell layer (GCL), and ganglion cell layer + inner plexiform layer (GCL + IPL)

#### RESULTS

- The male-to-female ratio was 1:1, and ages ranged between 18 and 71 for both genders
- The average RNFL values were 111.49  $\pm$  10.44 for the right eye (RE) and 111.96  $\pm$  9.66 for the left eye (LE)
- For the GCL, average values were 66.23 ± 4.4 (RE) and 66.34 ± 4.19 (LE). GCL+IPL values were 104.02 ± 6.71 (RE) and 103.89 ± 6.66 (LE)
- There was no difference between genders (X<sup>2</sup> = 56.467; df = 46; p = 0.160), and RNFL, GCL, and GCL+IPL values showed a significant reduction as the age of the respondents increased
- There was a significant difference between RNFL, GCL, and GCL+IPL values and the Topcon reference database, p < 0.001</li>

#### CONCLUSIONS

Significant differences exist between the Southern Nigerian eyes' RNFL, GCL, and GCL+ IPL values and the Topcon 3D OCT-1 Maestro reference database, which should be considered while diagnosing and managing glaucoma with the OCT.

# GLAUCOMA -

©2024 Topcon Healthcare | Maestro Clinical Compendium

# Agreement and Precision of Wide and Cube Scan Measurements between Swept-source and Spectral-domain OCT in Normal and Glaucoma Eyes

AUTHORS: Hou H, El-Nimri NW, Durbin MK, Arias JD, Moghimi S, Weinreb RN\*

**PUBLICATION:** Sci Rep. 2023 Sep 23;13(1):15876.

\*HH, NE-N, MD, JA are Topcon employees. RNW is a consultant for Topcon.

## STUDY PURPOSE

To evaluate agreement of Wide scan measurements from swept-source optical coherence tomography (SS-OCT) Triton and spectral-domain OCT (SD-OCT) Maestro in normal/glaucoma eyes, and to assess the precision of measurements from Wide and Cube scans of both devices

### OVERVIEW



#### STUDY DESIGN

Prospective



STUDY DEVICE(S)

- 3D OCT-1 Maestro
- DRI OCT Triton



#### **# OF EYES/PATIENTS**

25 normal eyes & 25 glaucoma eyes



#### OUTCOME MEASURES

Circumpapillary retinal nerve fiber layer (cpRNFL), macular ganglion cell layer + inner plexiform layer (GCL + IPL/ abbreviated to GCL+), and ganglion cell complex (abbreviated to GCL++)

#### RESULTS

- GCL++ thickness measurements from both the wide scan and the macular cube scan on the Maestro showed CV within 1 % for repeatability and reproducibility for both normal and glaucoma groups, with the exception of CV% of reproducibility for the Superior Nasal region in the Glaucoma group, which was 1.1%
- GCL+ thickness measurements from both the wide scan and the macular cube scan on the Maestro showed CV within 1.1 % for repeatability and reproducibility for the normal group RNFL thickness measurements from both the wide scan and the optic disc cube scan on the Maestro showed CV within 3.2% for repeatability and reproducibility for the normal group
- RNFL thickness measurements from both the wide scan and the optic disc cube scan on the Maestro showed CV within 3.2 % for repeatability and reproducibility for the normal group
- Wide scan measurements from both devices have shown excellent agreement with each other (intercepts did not significantly differ from 0 and the slopes did not differ significantly from 1)
- The differences between Triton and Maestro (mean difference of all measurements <3 μm) were less than the axial resolution in tissue (Triton axial resolution 8 μm, Maestro axial resolution 6 μm), and smaller than the corresponding reproducibility limits

- Wide scan measurements from both devices have shown excellent agreement with each other in both normal and glaucoma eyes.
- Precision of cpRNFL, macular GCL+, and macular GCL++ thickness measurements from the Wide and the Macular/Optic Disc Cube scans were high and similar for both devices in normal and glaucoma eyes.
- Measurement differences between Triton and Maestro are assumed to not be of clinical significance (mean difference below resolution in tissue).
- Wide scans including the ONH and the macula may provide benefits for glaucoma diagnosis and management as they demonstrate interchangeable measurement and high precision.

# Increased Glaucoma Case-finding Through Routine Optical Coherence Tomography in Optometry Practice

AUTHORS: Paul JP, McGuinness MB, Ashby BD, Tan J, Barber NM, Weisinger HS, Martin KR, van Wijngaarden P, Larsen PD
 PUBLICATION: Glaucoma. 2023 Nov 28. doi: 10.1097/IJG.0000000002339. Epub ahead of print.

#### **STUDY PURPOSE**

To assess whether the routine use of optical coherence tomography (OCT) by optometrists for detection of glaucomatous changes in the optic nerve and retina increased glaucoma referrals to ophthalmologists

#### **OVERVIEW**





#### STUDY DESIGN

Retrospective



Maestro 3D OCT-1CenterVue DRS fundus camera



#### # OF EYES/PATIENTS

Electronic medical records of 994,461 patients from 195 optometry practices in Australia were included for analysis; 175 practices performed OCT routinely on all patients and 20 practices were without OCT



#### OUTCOME MEASURES

Primary: referral to an ophthalmologist for glaucoma assessment. Secondary: rate of false positive referrals

#### RESULTS

- A total of 10,475 (1.1%) were referred to an ophthalmologist for first assessment or review of previously suspected glaucoma
- Practices employing routine OCT were more likely to refer patients for glaucoma assessment (n=9719/900651, 1.1%) than were practices without OCT devices (n=756/93810, 0.8%)
- Patients of all ages were more likely to be referred from practices with OCTs, and magnitude of relative difference on log scale decreased with age (joint interaction p < 0.001)</li>
- Referred patients younger than 40 years old from OCT practices were much more likely to have IOP within the normal range (≤21 mmHg) (66%) compared to younger referred patients from non-OCT practices (47%)
- Ophthalmologist feedback was received for 318 of the referred patients in the primary analysis, among which 129 (41%) were diagnosed with glaucoma, 121 (38%) were deemed glaucoma suspects, and no sign of glaucoma was detected in 68 (21%)
- The proportion of patients with no glaucoma did not differ by practice OCT status, IOP range, or gender

- Australian optometric practices that employed OCT technology exhibited a 34% higher odds of referring patients for ophthalmologists' evaluation of glaucoma compared to practices without OCT devices, which suggests the routine inclusion of OCT imaging increases the detection of glaucoma by optometrists.
- Adoption of OCT as a routine clinical tool in optometry may reduce the burden of undiagnosed glaucoma and lead to improved visual outcomes.
- Further research is needed to ascertain the false positive detection rate.

# NEURODEGENERATIVE -DISORDERS

## **PEER-REVIEWED PUBLICATIONS**

# Usefulness of peripapillary nerve fiber layer thickness assessed by optical coherence tomography as a biomarker for Alzheimer's disease

Sánchez D, Castilla-Marti M, Rodríguez-Gómez O, Valero S, Piferrer A, Martínez G, Martínez J, Serra J, Moreno-Grau S, Hernández-Olasagarre B, De Rojas I, Hernández I, Abdelnour C, Rosende-Roca M, Vargas L, Mauleón A, Santos-Santos MA, Alegret M, Ortega G, Espinosa A, Pérez-Cordón A, Sanabria Á, Ciudin A, Simó R, Hernández C, Villoslada P, Ruiz A, Tàrraga L, Boada M

Sci Rep. 2018 Nov 5;8(1):16345. doi: 10.1038/s41598-018-34577-3. Erratum in: Sci Rep. 2019 Nov 8;9(1):16713.

# Evaluation of macular thickness and volume tested by optical coherence tomography as biomarkers for Alzheimer's disease in a memory clinic

Sánchez D, Castilla-Marti M, Marquié M, Valero S, Moreno-Grau S, Rodríguez-Gómez O, Piferrer A, Martínez G, Martínez J, Rojas I, Hernández I, Abdelnour C, Rosende-Roca M, Vargas L, Mauleón A, Gil S, Alegret M, Ortega G, Espinosa A, Pérez-Cordón A, Sanabria Á, Roberto N, Ciudin A, Simó R, Hernández C, Tárraga L, Boada M, Ruiz A Sci Rep. 2020 Jan 31;10(1):1580. doi: 10.1038/s41598-020-58399-4.

# VITREORETINAL DISORDERS

# Agreement, repeatability, and reproducibility of quantitative retinal layer assessment using swept-source and spectral-domain optical coherence tomography in eyes with retinal diseases

AUTHORS: Hou H, Durbin MK, El-Nimri NW, Fischer JL, Sadda SR\*

PUBLICATION: Front Med. 2023 Dec 18; 10:1281751. doi: 10.3389/fmed.2023.1281751.

\*HH, MD and NE-N are employed by Topcon Healthcare. SS received research support from Topcon.

### STUDY PURPOSE

To evaluate the agreement and precision of retinal thickness measurements obtained using swept-source optical coherence tomography (SS-OCT) and spectral-domain OCT (SD-OCT) in healthy eyes and eyes with retinopathy

## OVERVIEW



STUDY DESIGN

Prospective



STUDY DEVICE

3D OCT-1 Maestro DRI OCT Triton



#### **# OF EYES/PATIENTS**

25 normal eyes and 26 eyes with retinal disease, including age-related macular degeneration, macular hole, and diabetic retinopathy



#### OUTCOME MEASURES

Thickness of the full retina, ganglion cell layer (GCL) + inner plexiform layer (IPL) (GCIPL/abbreviated to GCL+), and ganglion cell complex (GCC/abbreviated to GCL++)

#### RESULTS

	Central Ferma	Joner Superior	Inner Natal
		1-22	
10	20 30 all 30 Annage	20 20 50 40 Arcings	61 20 30 30 40 40 semap
	hance informe	Inner Fampural	Outor Separter
	Annap	durings	areage.
	Outer Navid	Outer Infector	Outer Temporal
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			

FIGURE 1. Bland-Altman plots show all the average full retinal thickness measurement differences between Maestro and Triton macular cube scans are less than 6 µm in eyes with retinal disease.

- Overall, measurement differences between Triton and Maestro were <6 µm; mean differences of full retina, GCL++, and GCL+ thickness were ≤5.5 µm, 1.3 µm, and 2.8 µm, respectively and not statistically significant across the parameters (Figure 1)
- Maestro and Triton showed excellent agreement with one another; most of the 95% confidence intervals (CI) for intercept contained 0 and CI for slope contained 1
- Full retinal thickness measurements from the Maestro wide and macular cube scans showed a maximum coefficient of variance (CV) of 1.8% for repeatability and reproducibility in normal and retina groups
- GCL+ thickness measurements from both the wide scan and the macular cube scan on the Maestro showed CV within 1.1 % for repeatability and reproducibility for the normal group and showed CV range of 0.7% to 3.5% for the retina group
- In the normal group, all the repeatability and reproducibility CVs of Maestro were within 1% for GCL++
- In the retina group, the maximum repeatability and reproducibility CVs were 3.0% and 3.0% for the wide scan, and 1.8% and 2.1% for the macular cube scan on the Maestro for GCL++

- The repeatability and reproducibility estimates indicate high precision in both normal and retina groups for full retinal thickness, GCL+, and GCL++ measurements using the Maestro SD-OCT and Triton SS-OCT.
- As expected and consistent with other studies, the repeatability and reproducibility in eyes with retinal disease were worse compared with healthy eyes.
- This study demonstrated excellent agreement of retinal thickness measurements between the Maestro SD-OCT and Triton SS-OCT.

## **PEER-REVIEWED PUBLICATIONS**

#### **Retinal microvascular signs in COVID-19**

Sim R, Cheung G, Ting D, Wong E, Wong TY, Yeo I, Wong CW Br J Ophthalmol. 2022 Sep;106(9):1308-1312. doi: 10.1136/bjophthalmol-2020-318236.

# CASE STUDY -

# The Outcome of Manual Small Incision Cataract Surgery and Anterior Vitrectomy for Persistent Fetal Vasculature in an 18-Year-Old Woman: A One-Year Follow-Up

Egbu E. Cureus. 2020 Sep 23;12(9):e10605. doi: 10.7759/cureus.10605.

# TELEMEDICINE -

# Evaluation of the Inclusion Of Spectral Domain Optical Coherence Tomography in a Telemedicine Diabetic Retinopathy Screening Program: A Real Clinical Practice

AUTHORS: Arruabarrena C, Rodríguez-Miguel A, Allendes G, Vera C, Son B, Teus MAPUBLICATION: Retina. 2023 Aug 1;43(8):1308-1316. doi: 10.1097/IAE.0000000003832.

#### STUDY PURPOSE

To evaluate whether combining spectral domain optical coherence tomography (SD-OCT) with monoscopic fundus photography using a nonmydriatic camera (MFP-NMC) improves the accuracy of diabetic macular edema (DME) referrals in a teleophthalmology diabetic retinopathy screening program

#### OVERVIEW



STUDY DESIGN

Cross-sectional study



STUDY DEVICE(S)

Topcon 3D OCT-1 Maestro: 3-field MFP-NMC centered on macula, disc, and superior-temporal, and a 6x6 macula raster OCT scan



#### # OF EYES/PATIENTS

3,819 eyes of 1,925 patients with diabetes (Type I or II)



#### OUTCOME MEASURES

Prevalence of DME using different diagnostic criteria defined for MFP-NMC and SD-OCT, diagnostic accuracy of DME when SD-OCT was added to a retinographybased teleophthalmology DR screening program

#### RESULTS

- The prevalence of DME in MFP-NMC was found to be 1.52%, 1.83%, and 1.22% according to English National Screening Program (ENSP), Scotland National Screening Program (SNSP), and central hard exudates criteria, respectively
- Using SD-OCT, the prevalence of DME was 1.75% for center involved diabetic macular edema, 8.77% had a macular volume of >8 mm<sup>3</sup>, 8.45% showed foveal or parafoveal thickening, and 1.54% had foveal or parafoveal thickening with anatomical signs of DME
- Sensitivity barely reached 50% in MFP-NMC and less for the quantitative criteria of spectral domain optical coherence tomography
- When macular thickening and anatomical signs of DME were considered for the OCT criterion, sensitivity increased to 88.3% with a 99.8% specificity, and the false DMEs and non-gradable images were reduced

- Incorporation of SD-OCT into MFP-NMC using an all-in-one device within a well-established diabetic screening program improved the diagnostic accuracy of DME.
- Macular thickening and anatomical signs showed the highest suitability for screening, with a sensitivity of 88.3% and a specificity of 99.8%. Notably, MFP-NMC alone missed half of the true DMEs that lacked indirect signs.

# Alabama Screening and Intervention for Glaucoma and Eye Health through Telemedicine (AL-SIGHT): Baseline Results

AUTHORS: Owsley C, Swain TA, McGwin G Jr, Nghiem VTH, Register S, Asif IM, Fazio M, Antwi-Adjei EK, Girkin CA, Rhodes LA
 PUBLICATION: Am J Ophthalmol. 2024 Jan;257:66-75. doi: 10.1016/j.ajo.2023.09.001. Epub 2023 Sep 7.

#### **STUDY PURPOSE**

To describe baseline results of the Alabama Screening and Intervention for Glaucoma and Eye Health through Telemedicine (AL-SIGHT) for patients at federally qualified health centers (FQHCs). Candidates were persons at risk for glaucoma-associated diseases (GAD) based on age, race/ethnicity, current diagnosis of GAD, family history, and diabetes

#### OVERVIEW



#### STUDY DESIGN

Baseline screening visit followed by remote diagnosis and referral for follow-up examinations at 3 FQHCs



STUDY DEVICE(S)

Maestro2 SD-OCT, QuickSee or Retinomax autorefractor, iCare portable rebound tonometer, Humphrey Field Analyzer 3 or Melbourne Rapid Fields



#### **# OF EYES/PATIENTS**

First 500 participants enrolled in the AL-SIGHT program between November 2020 and June 2022; mean age was 58 years; 45.6% were African American and 51.6% White



#### OUTCOME MEASURES

Detection rates of eye disease, rate of referral by the ophthalmologist for followup eye care, rate of patients adhering to attending follow-up care, and patient satisfaction

#### RESULTS

- Remote diagnostic evaluation of ocular screening by ophthalmologist revealed 29.7% GAD, 6.8% diabetic retinopathy, 37.6% cataract, 67.3% refractive error, 9.2% other eye conditions
- Fundus photographs were unreadable for 32 right eyes and 28 left eyes; OCT images were unreadable for 52 right eyes and 61 left eyes. Visual field data were unreliable in the HFA for 168 right eyes and 176 left eyes, and in the Melbourne Rapid Field test for 234 right eyes and 210 left eyes
- In all, 47.2% of the participants were referred for follow-up examination and for acuity 20/40 or worse or IOP ≥23 mm Hg in one or both eyes
- Follow-up examination attendance was 76.7% for those referred; participants referred for glaucoma had a follow-up rate of 92%
- A total of 428 participants (85.8%) reported that they were very satisfied with the vision screening, 83.2% were very satisfied with the time for the complete screening, and 92.2% stated that it was very convenient having their ocular screening in the same clinic as their primary care provider

- The high percentage of patients diagnosed with treatable eye conditions through the AL-SIGHT telemedicine screening and their strong adherence to follow-up eye care suggests that these screenings in FQHCs could be effective and scalable nationwide.
- Participants welcomed screenings in their communities.
- A strength of the AL-SIGHT program is its use of both structural and functional optic nerve testing. Although the reliability of the visual fields in this study was poor in ~34% of participants, this is in the range noted in other studies and reflects a cohort not considered to be experienced visual field test takers.

## **PEER-REVIEWED PUBLICATIONS**

# Evaluating the impact of optical coherence tomography in diabetic retinopathy screening for an Aboriginal population

O'Halloran RA, Turner AW Clin Exp Ophthalmol. 2018 Mar;46(2):116-121. doi: 10.1111/ceo.13018.

#### Automated Identification of Referable Retinal Pathology in Teleophthalmology Setting

Gao Q, Amason J, Cousins S, Pajic M, Hadziahmetovic M Transl Vis Sci Technol. 2021 May 3;10(6):30. doi: 10.1167/tvst.10.6.30.

### Use of Teleophthalmology for Evaluation of Ophthalmic Emergencies by Ophthalmology Residents in the Emergency Department

Shah YS, Fliotsos MJ, Alaqeel A, Boland MV, Zafar S, Srikumaran D, Woreta FA Telemed J E Health. 2022 Jun;28(6):858-864. doi: 10.1089/tmj.2021.0334.



MCA # 5280 | ©2024 Topcon Healthcare | All trademarks are the property of respective owners.