

# Evaluation of a combined OCT index in healthy and glaucomatous eyes



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## PURPOSE

- Optical coherence tomography (OCT) provides clinicians with a large number of quantitative parameters that aid in glaucoma diagnosis.
- The OCT Early Glaucoma Diagnostic Structural Index (EGDSI), was previously proposed and validated in healthy and glaucomatous eyes with no associated disease providing a combined structural index for the detection of early glaucoma [1, 2].
- In this preliminary, ongoing study, we evaluated the sensitivity and specificity of EGDSI in healthy and in a range of glaucomatous eyes that may include comorbidities.

## METHODS

- Retrospective CIRRUS™ 6000 AngioPlex (ZEISS, Dublin, CA) OCT data were sampled from a glaucoma clinic including 76 eyes of 38 subjects that were clinically diagnosed as healthy, glaucomatous, or having other morbidities (see Table 1).
- Optic Disc 200x200 and Macular 512x128 cube scans from the first clinical visit were used for analyses.
- Sixteen OCT summary parameters and subject ages were extracted to calculate EGDSI as previously described (see Figure 1).
- Mean Deviation (MD) from SITA Standard or SITA Fast 24-2 visual field data were collected from non-healthy eyes to gauge severity.
- Sensitivity and specificity for EGDSI were calculated using 5% and 1% normative cut-off values determined from the CIRRUS reference database.

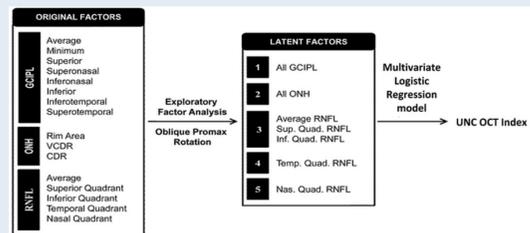


Figure 1. Overview of EGDSI calculation

Morbidity	Occurrence
Diabetes (No diabetic retinopathy) and age-related macular degeneration	2
Age-related macular degeneration	1*
Epiletinal membrane	1
Fuchs uveitis	1
Devic myelopathy	1
Optic neuritis with Devic myelopathy	1*
Retinal detachment (surgically treated) and epiretinal membrane	1*
Macular hole	1
<b>Total</b>	<b>9</b>

\*Comorbid with Glaucoma

Table 1. Occurrence of non-glaucoma morbidities by eye

## The Early Glaucoma Diagnostic Structural Index (EGDSI) may be effective in glaucomatous eyes with comorbidities

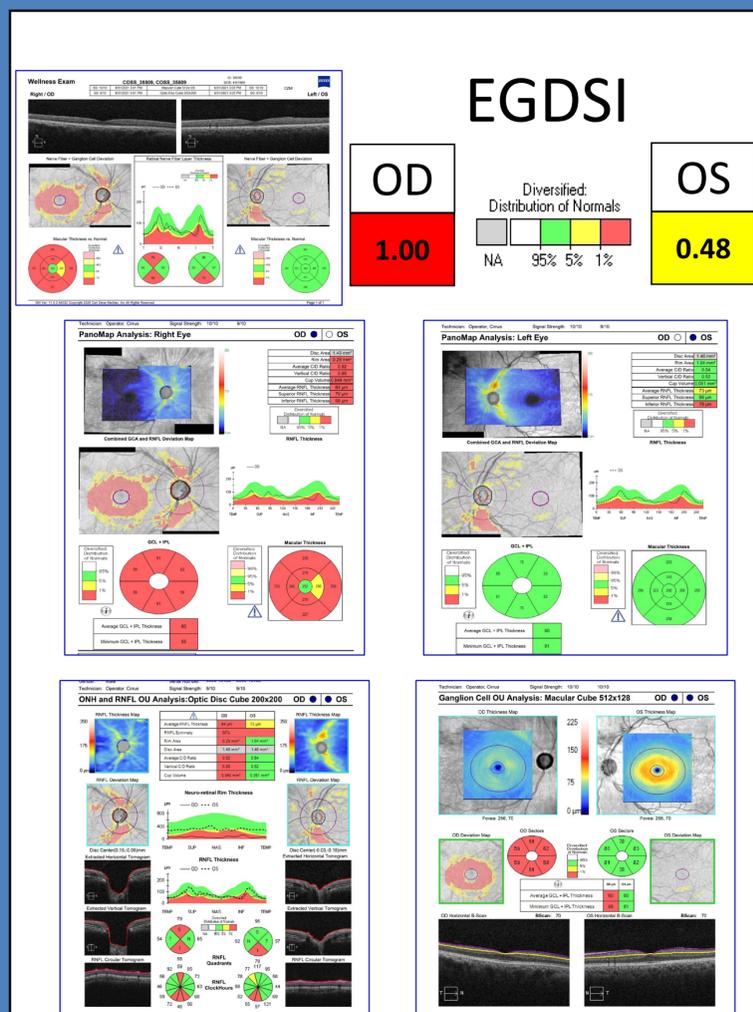


Figure 2. Examples of EGDSI for glaucoma eyes with no comorbidities with MD of -28.2 dB (OD) and MD of -3.7 dB (OS)

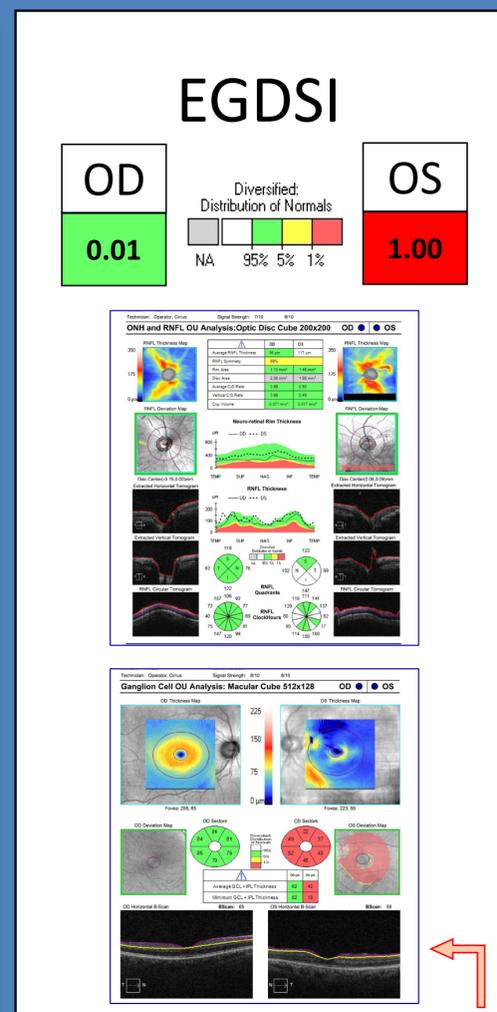


Figure 3. Example of healthy eye (OD) and Fuchs uveitis (OS; false positive)

## RESULTS

- For 37 healthy eyes, mean age was 56.3 years (standard deviation, SD: 18.4; range: 27.1 to 85.7).
- For 39 eyes with glaucoma or other morbidities, mean age was 65.5 years (SD: 13.3; range 30.8 to 85.7) and mean MD was -5.15 dB (SD: 8.10; range: -28.79 to 0.35).
- In the full cohort, sensitivities were 78.8% and 60.6% and specificities were 83.7% and 95.3% at the 5% and 1% cutoffs, respectively (see Figure 2, Table 2).
- There was an additional false positive (1 of 6; see Figure 3) and false negative (1 of 3) due to the additional 9 morbidities.

Group	Eyes	5% Normative Cutoff		1% Normative Cutoff	
		Sensitivity	Specificity	Sensitivity	Specificity
All	76	78.8% [61.1%, 91.0%]	83.7% [69.3%, 93.2%]	60.6% [42.1%, 77.1%]	95.3% [84.2%, 99.4%]
Healthy	37	---	83.8% [68.0%, 93.8%]	---	97.3% [85.8%, 99.9%]
Healthy plus Non-Glaucoma Morbidity	43	---	83.7% [69.3%, 93.2%]	---	95.3% [84.2%, 99.4%]
Glaucoma Only	30	80.0% [61.4%, 92.3%]	---	60.0% [40.6%, 77.3%]	---
Glaucoma plus Glaucoma with Comorbidity	33	78.8% [61.1%, 91.0%]	---	60.6% [42.1%, 77.1%]	---
Non-Glaucoma Morbidity Only	6	---	83.3% [35.9%, 99.6%]	---	83.3% [35.9%, 99.6%]
Glaucoma with Comorbidity	3	66.7% [9.4%, 99.2%]	---	66.7% [9.4%, 99.2%]	---

[95% Confidence Interval]

Table 2. Sensitivity and specificity at 5% and 1% normative cutoffs

## CONCLUSIONS

- In this preliminary, ongoing study, EGDSI shows comparable sensitivity to detect glaucoma as previously reported in a range of glaucomatous eyes [3] despite the presence of a limited number of comorbidities.
- However, additional Type I and II errors were observed in two cases with non-glaucomatous morbidities.
- Additional clinical data sampling a wider variety of retinal comorbidities may help determine their effects on the EGDSI and its clinical utility to aid in detection of glaucoma.

## References

- Mwanza et al. *IOVS* 2013; 54(13).
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- Wilson et al. *IOVS* 2021; 62(6): 99.

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