

# RELIABILITY OF SPECTRAL-DOMAIN TOMOGRAPHY IN EVALUATING OPTIC DISC AND MACULAR GANGLION CELL LAYER IN TYPE 2 DIABETIC PATIENTS

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## INTRODUCTION

Diabetes mellitus (DM) has become one of the most significant public health problems in the last decades. The condition affects major vital organs and systems of the body and is frequently accompanied by neuropathy, nephropathy, cardiovascular disorders, and retinopathy. A widely accepted pathogenesis of diabetic retinopathy consists of retinal abnormalities and micro vasculopathies; the early clinical signs of diabetic retinopathy include micro aneurysms and retinal micro hemorrhage. Optical coherence tomography is a non-invasive diagnostic tool that works on the principle of low coherence interferometry. Near-infrared light creates an in vivo cross-sectional view of the retina that is accurate to within at least 3 to 6 microns. There are 10 separate layers identifiable on the OCT of the retina. The layer of importance in this issue is the ganglion cell-inner plexiform layer. The high resolution of SD-OCT allows measurement of the thickness of all individual retinal layers, including RNFL and GC-IPL. In addition, the SD-OCT provides data related to the optic disc.

## AIM OF THE WORK

The purpose of this research was to evaluate the reliability of Spectral domain-optical coherence tomography in evaluating ganglion cell-inner plexiform layer, peripapillary retinal nerve fiber layer, and Optic disc parameters of subjects with nonproliferative diabetic retinopathy, with and without macular edema.

## SUBJECTS AND METHODS

The study was a prospective single-center cross-sectional and comparative study including a total number of 232 eyes from 150 participants of more than 40 years old; 100 patients with type 2 diabetes mellitus for more than 10 years who had non-proliferative diabetic retinopathy changes (50 patients with macular edema and 50 patients without macular edema) and 50 healthy for control, were included. This study has been performed using spectral-domain optical coherence tomography, from November 2020.

**Inclusion criteria:** All non-proliferative diabetic retinopathy patients with type 2 diabetes over 10 years ago, with clear media on SD-OCT and with Intraocular pressure <22mmHg.

**Exclusion criteria:** Any ocular pathology other than low-grade age-related cataracts, Subjects with any history of ocular surgery, intravitreal injection, laser photocoagulation, and optic neuropathy.

**Ethical considerations:** The study was approved by the Ethical Committee of Alexandria University. Written informed consent was obtained from all participants.

## RESULTS

Table 1: GC-IPL segmental parameters for different groups of the study.

GC-IPL (Mean±SD)	Eyes with ME	Eyes without ME	Healthy eyes for control	P-value
<b>Average</b>	69.94±21.0	74.06±10.69	80.35±10.30	0.001
<b>Minimum</b>	44.36±25.76	63.45±16.61	72.31±16.95	0.001
<b>Inferior</b>	65.33±24.01	72.66±12.49	80.24±13.44	0.001
<b>Inferonasal</b>	67.49±20.88	71.52±12.50	80.01±13.32	0.001
<b>Inferotemporal</b>	77.06±25.24	77.56±9.47	81.91±10.11	0.003
<b>Superior</b>	75.44±26.13	75.68±11.68	80.78±11.07	0.004
<b>Superonasal</b>	69.22±21.24	77.21±12.52	80.60±12.94	0.001
<b>Superotemporal</b>	78.46±25.22	76.66±10.73	79.83±11.62	0.019

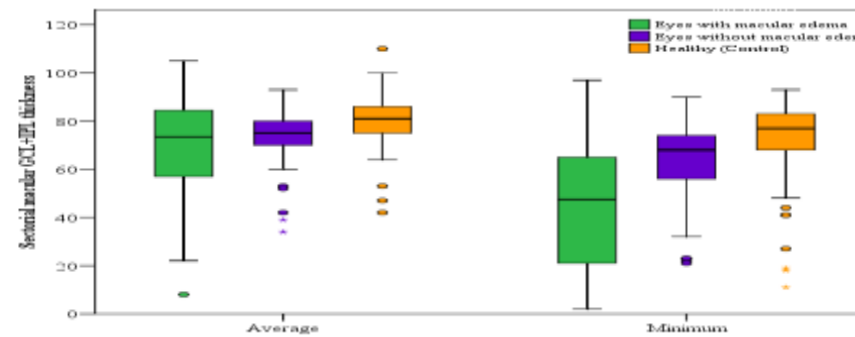


Figure 1: Comparison of the researched groups according to sectorial macular GCL+IPL thickness.

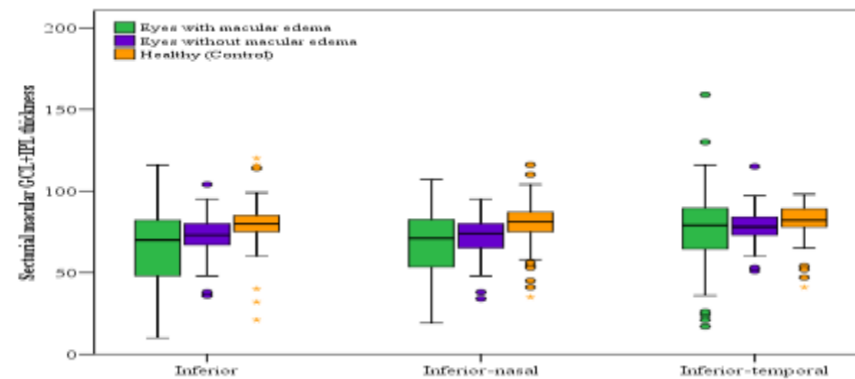


Figure 2: Comparison of the analyzed groups on the basis of sectorial macular GCL+IPL thickness.

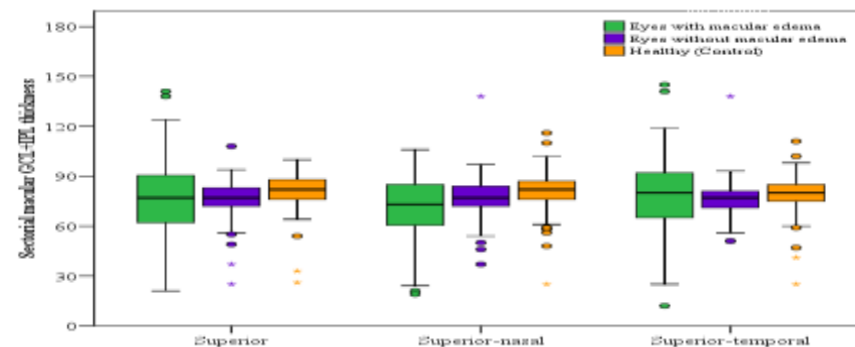


Figure 3: Comparison of the researched groups based on sectorial macular GCL+IPL thickness.

Table 2: Peripapillary RNFL parameters for different groups of study.

pRNFL	Eyes with ME	Eyes without ME	Healthy eyes for control	P-value
<b>Average</b>	82.27±21.47	76.48±15.32	84.88±13.01	0.001
<b>Inferior</b>	101.66±30.69	98.63±16.33	112.86±15.0	0.001
<b>Superior</b>	101.66±29.02	99.26±19.79	107.67±18.23	0.039
<b>Nasal</b>	64.55±20.14	61.26±12.71	63.94±9.86	0.656
<b>Temporal</b>	65.73±19.81	54.94±9.50	63.51±11.56	0.001

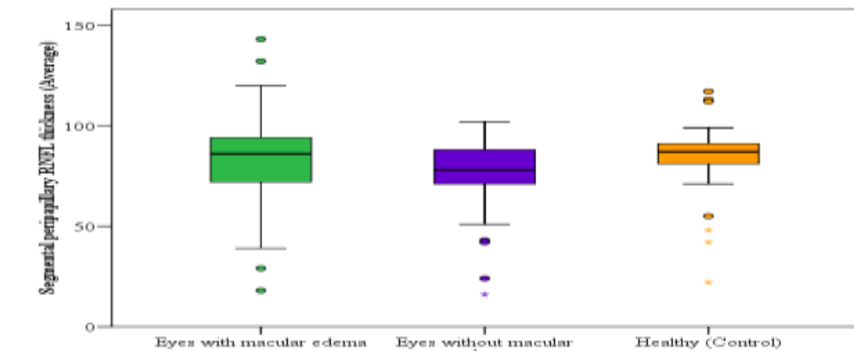


Figure 4: Analysis of the studied groups on basis of segmental pRNFL thickness.

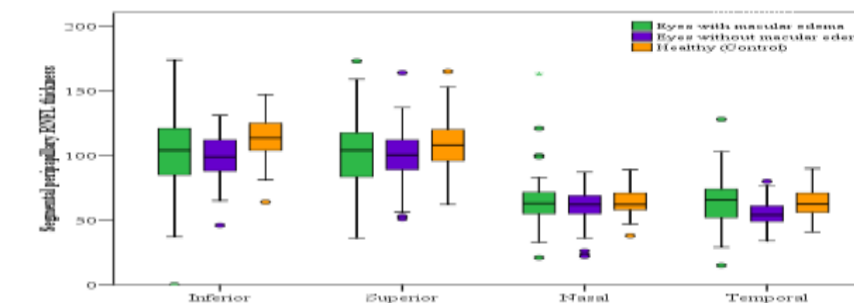


Figure 5: Analysis of the studied groups according to segmental pRNFL thickness.

## CONCLUSION

-We employed spectral-domain optical coherence tomography to track changes in, ganglion cell and inner plexiform layer, peripapillary retinal nerve fiber layer thickness, and optic nerves parameters in type 2 nonproliferative individuals with and without macular edema, in this research.

-According to our findings compared to other studies, we confirmed that SD-OCT is reliable in assessing, Ganglion cell layer, pRNFL, and optic disc parameters in non-proliferative diabetic retinopathy patients with and without macular edema.



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