*Research Article*

# Role of Optical Coherence Tomography in Primary Open Angle Glaucoma.

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## Abstract
Optical coherence tomography has emerged over the years with the ability to detect changes in the optic nerve head, retinal nerve fiber layer, and currently the ganglion cell layer much earlier than the defects manifest functionally. Thus, optical coherence tomography acts as an important diagnostic aid to diagnose and monitor the progression of this sight threatening disease called glaucoma.
**Keywords:** Optical Coherence Tomography, Angle Glaucoma

## Introduction
Glaucoma is a group of many conditions sharing a final common pathway characterized by accelerated death of retinal ganglion cells and their retinal nerve **fibre** layer (RNFL) axons resulting in characteristic visual field defects and corresponding optic nerve head anatomical changes.[1] Although diagnosis of moderate to severe cases of glaucoma is relatively straightforward, with diagnoses confirmed based on the presence of typical visual field (VF) defects on standard automated perimetry (SAP) and corresponding signs of glaucomatous ONH damage, the disease typically remains asymptomatic in the early stages. Standard automated perimetry has been widely used for diagnosis, staging, and monitoring of glaucoma, but is only likely to detect functional deficits after at least 20%–40% of RGCs have been lost[2] Clinical assessment using multiple parameters, including peripapillary RNFL, ONH, and macular parameters, has proven useful, not only for management and diagnosing glaucoma at various levels of severity, but for evaluating risk in glaucoma suspects[3].

## Optical Coherence Tomography:
Optical coherence tomography was first demonstrated in 1991[4] as an application of low-coherence interferometry[5] Enabling noninvasive, high-resolution cross-sectional imaging of the retina in vivo, OCT's clinical utility for glaucoma was quickly realized[6] Optical coherence tomography has since changed the paradigm of assessment of the retina and revolutionized the management and diagnosis of glaucoma, allowing for objective and quantitative evaluation of neural structures affected by the disease, such as the macula and its individual layers, RNFL, and ONH[7].

## RNFL
OCT can directly measure and quantify RNFL thickness by calculating the area between the internal limiting membrane (ILM) and RNFL border, In general, average circumpapillary RNFL thickness and inferior sector RNFL thicknesses are the OCT parameters with the best diagnostic accuracy, with superior quadrant thickness values following in terms of sensitivity.[8].

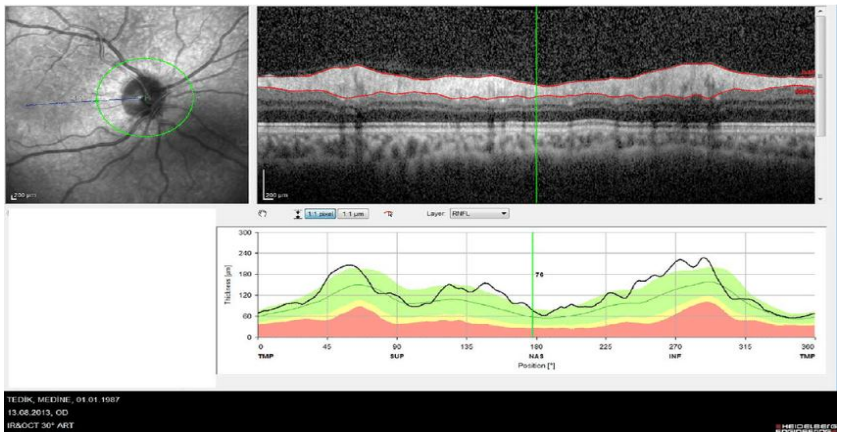

figure: Sample of retinal nerve fiber layer (RNFL) report provided by Spectral-Domain Optical Coherence Tomography (SD-OCT).. [9]

## Bruch's Membrane Opening Minimum Rim Width

the Bruch's membrane opening minimum rim width (BMO-MRW). The BMO-MRW measures the minimum distance from the inner opening of the BMO to the internal limiting membrane (ILM). It uses stable borders and offers a more accurate geometric assessment of neuroretinal rim tissue [10] The BMO seems to remain stable over time and can therefore be used as a reference point [11] the BMO-MRW was demonstrated to have a stronger association with visual field sensitivity than other parameters and comparable accuracy for the discrimination of pre- and perimetric glaucomatous eyes using the RNFLT (retinal nerve fibre layer thickness) [12] .

## Ganglion cell layer

The RGCs occupy the inner layers of the retina with their dendrites forming the inner plexiform layer, the cell bodies forming the ganglion cell layer (GCL), and the axons forming the nerve fiber layer. Together, they form the ganglion cell complex (GCC). [13]

Similarly, GCA(ganglion cell analysis) parameters have been found to be comparable to ONH and RNFL parameters. [14].

## Optical coherence tomography angiography

The application of OCT has also recently been extended to angiography and blood flow measurement, Reduced retinal perfusion in the ONH and peripapillary retina has been observed in glaucomatous eyes [15].

## Limitations

Because OCT utilizes light waves (unlike ultrasound which uses sound waves), media opacities such as vitreous hemorrhage, dense cataract, or corneal opacities can interfere with optimal imaging.

## Conclusion

Optical coherence tomography has changed the face of glaucoma assessment and research. Optical coherence tomography has impacted the ways that patients are diagnosed and followed clinically and remains a dynamic and evolving imaging modality

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