

Investigation of the Peripapillary Microvasculature in Normal Tension Glaucoma, Primary Open Angle Glaucoma, and Normal Eyes



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Purpose

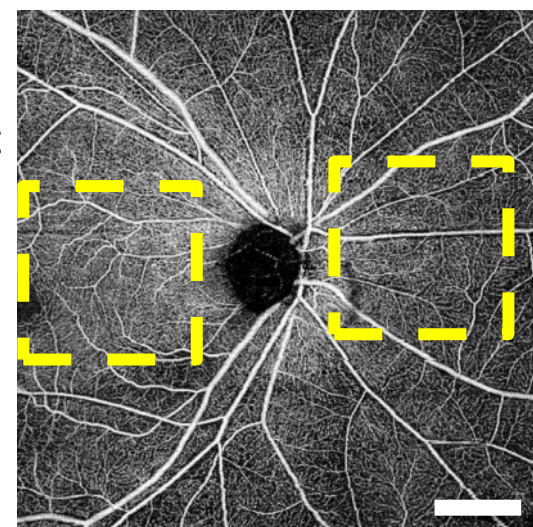
Glaucoma is a progressive optic neuropathy that involves a loss of retinal ganglion cells, and their accompanying axons.¹ Changes to the vasculature have been shown to have a role in pathogenesis of glaucoma.² Optical coherence tomography angiography allows the microvascular circulation to be analyzed non-invasively.³ The purpose of the study is to analyze peripapillary microvasculature in control, normal tension glaucoma (NTG) and primary open angle glaucoma (POAG) subjects.

Subjects

Group	Age ± std.	AL ± std. (mm)	VF ± std. (%)	MD ± std. (dB)
Control (n=30)	62.53 ± 6.74	24.14 ± 1.35	-	-
NTG (n=30)	63.17 ± 8.61	24.91 ± 1.42	85.17 ± 20.75	-4.56 ± 6.65
POAG (n=30)	60.90 ± 11.79	24.44 ± 1.32	88.33 ± 18.76	-3.90 ± 6.28

Methods

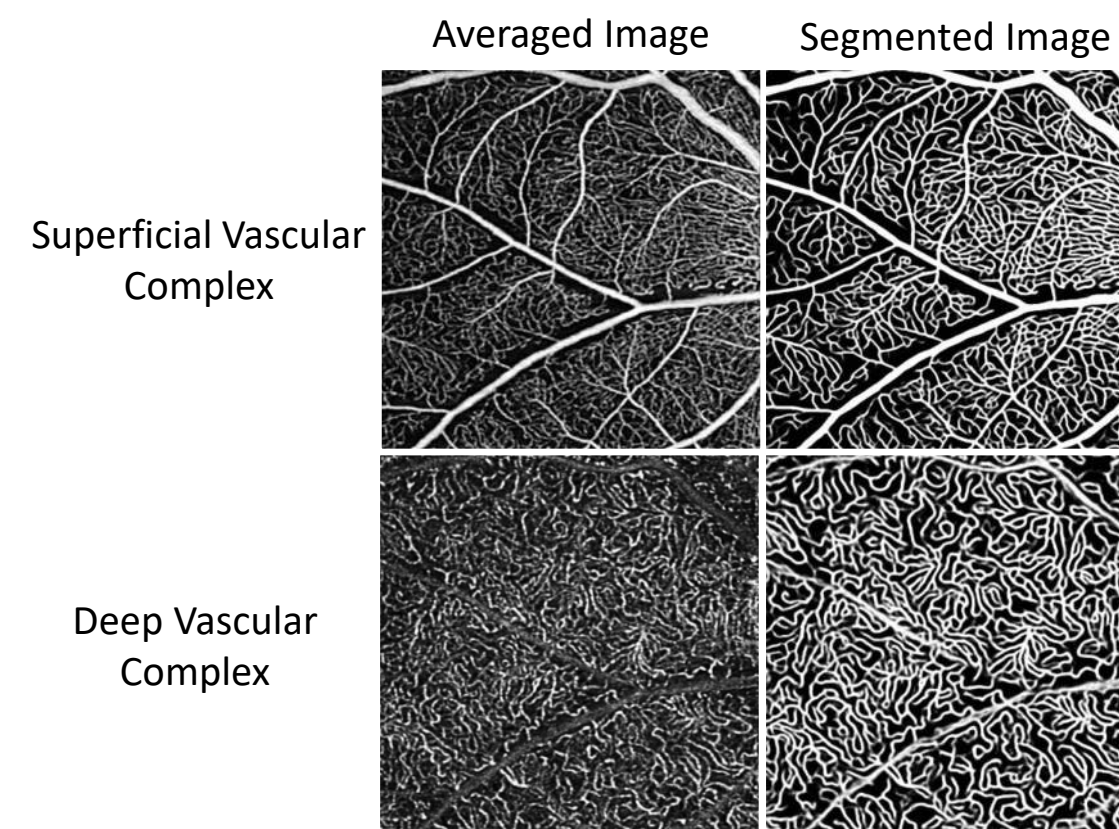
- Acquired using the PLEX Elite 9000 Swept Source OCT system
- 5 averaged 3 x 3 mm images temporal & nasal to optic disc
- Extracted the superficial vascular complex (SVP), deep vascular complex (DVC) and choriocapillaris
- Axial length adjusted



Parameters

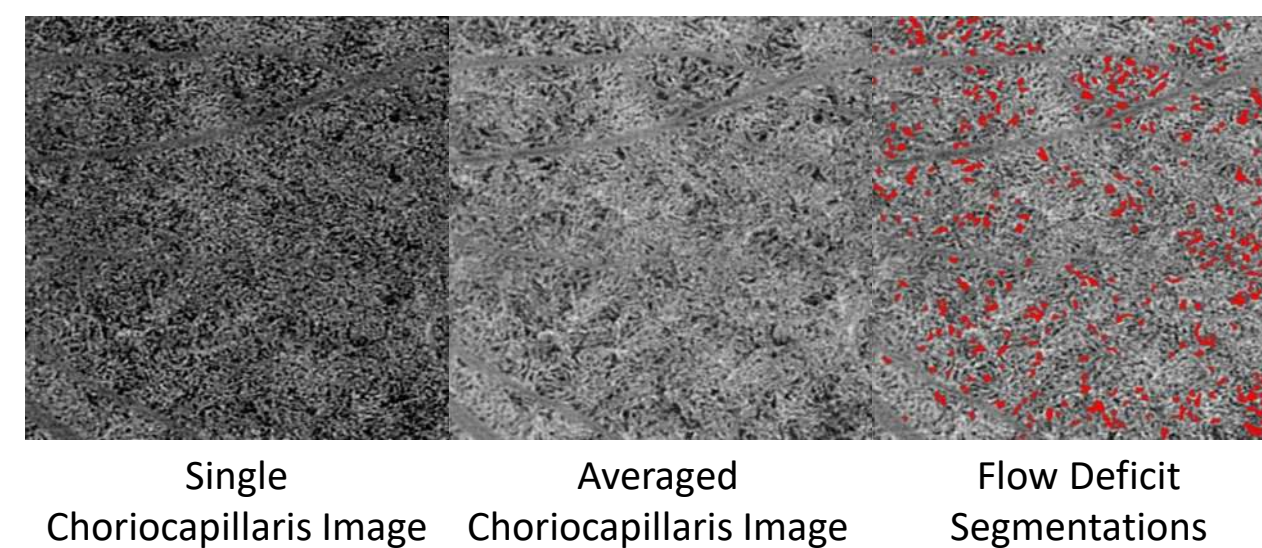
Retinal Vascular Parameters:

1. Superficial vascular complex vessel density (SVC VD)
2. Deep vascular complex vessel density (DVC VD)



Choriocapillaris Parameters:

1. Flow deficit number (FDN): total number of FD
2. Flow deficit area (FDA): total area occupied by FD
3. Mean flow deficit size (MFDS): average area of FD
4. Flow deficit density (FDD): percentage of image area with no flow to the total image area



Results

	Control-NTG	Control-POAG	NTG-POAG
Temporal SVC VD %	-	-	-
Temporal DVC VD %	-	-	-
Nasal SVC VD %	< 0.01	< 0.01	-
Nasal DVC VD %	-	-	-
Temporal FDD (%)	-	-	-
Temporal FDN	-	-	-
Temporal FDA (μm ²)	-	-	-
Temporal MFDS (μm)	-	-	-
Nasal FDD (%)	0.03	-	-
Nasal FDN	0.04	-	-
Nasal FDA (μm ²)	0.03	-	-
Nasal MFDS (μm)	-	-	-

Conclusion

- NTG and POAG had significantly lower vessel density nasal to the optic disc when compared to control eyes.
- NTG eyes had significantly higher FDD, FDN and FDA nasal to the optic disc than control eyes.

References

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3. Zhang A, Zhang Q, Chen C-L, Wang RK. Methods and algorithms for optical coherence tomography-based angiography: a review and comparison. *J Biomed Opt.* 2015. doi:10.1117/1.jbo.20.10.100901