

# Structural abnormalities associated with glaucoma using swept-source optical coherence tomography in patients with systemic sclerosis

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## Research Article

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# Abstract

## Purpose

Vasospasm represents an early event in systemic sclerosis (SSc). Ocular vasospasm may induce optic nerve head (ONH) damage and has been involved in the pathogenesis of glaucoma, especially normal-tension glaucoma (NTG). We aimed to investigate the presence of structural abnormalities associated with NTG using swept-source optical coherence tomography (SS-OCT) and to correlate the OCT parameters with clinical, capillaroscopy and digital blood flow measures in patients with SSc.

## Methods

In this cross-sectional study, 40 patients with SSc and 23 age-matched controls were included. The following parameters were measured using SS-OCT: mean and sectoral retinal nerve fiber layer (RNFL) thickness, macular ganglion cell layer complex (GCC) thickness and ONH morphology. Nailfold capillaroscopy (NFC) and digital blood flow measurements using laser Doppler imaging (LDI) were performed in all subjects.

## Results

Patients with SSc showed a thinner temporal RNFL than the controls ( $69.23 \pm 11.74$  versus  $83.35 \pm 20.19$   $\mu\text{m}$ ,  $p=0.001$ ). The other parameters were similar between the two groups. In SSc patients, there was an inverse correlation between the disease duration and the average, superior and inferior RNFL thickness and the GCC thickness and between Raynaud's phenomenon duration and the average RNFL and GCC thickness ( $p<0.05$ ). NFC and LDI measurements did not show correlations with OCT parameters.

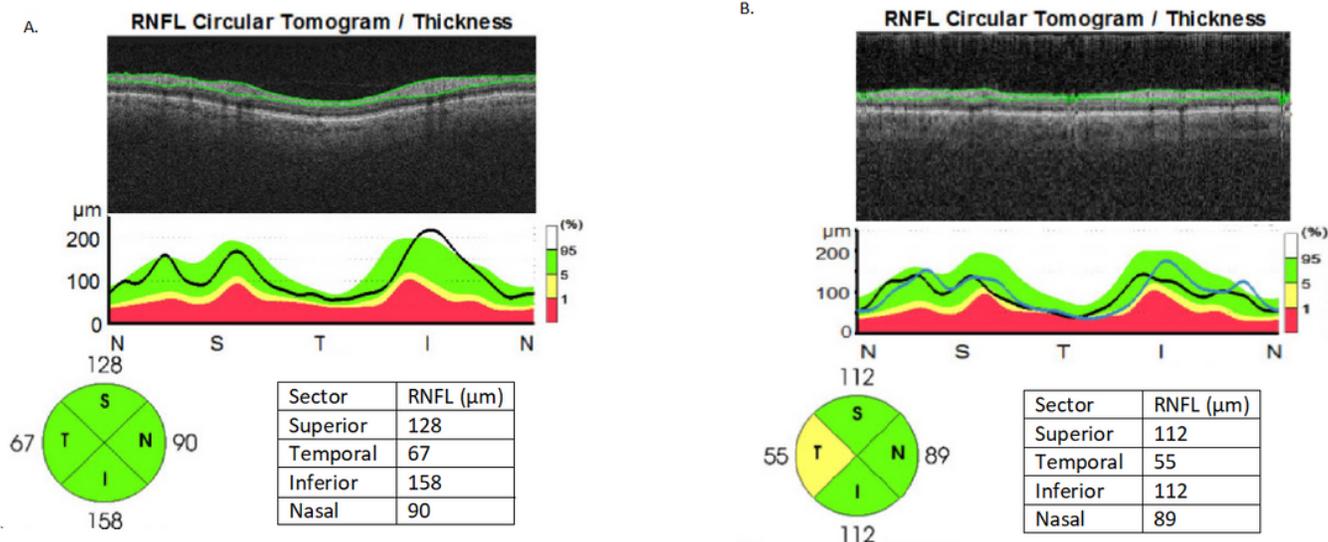
## Conclusion

A thinner temporal RNFL and the correlation between Raynaud's phenomenon and disease duration and structural abnormalities on OCT suggest the presence of early ganglion cell damage in patients with SSc. Although mild, these findings indicate the need to monitor ocular abnormalities in SSc.

# Full Text

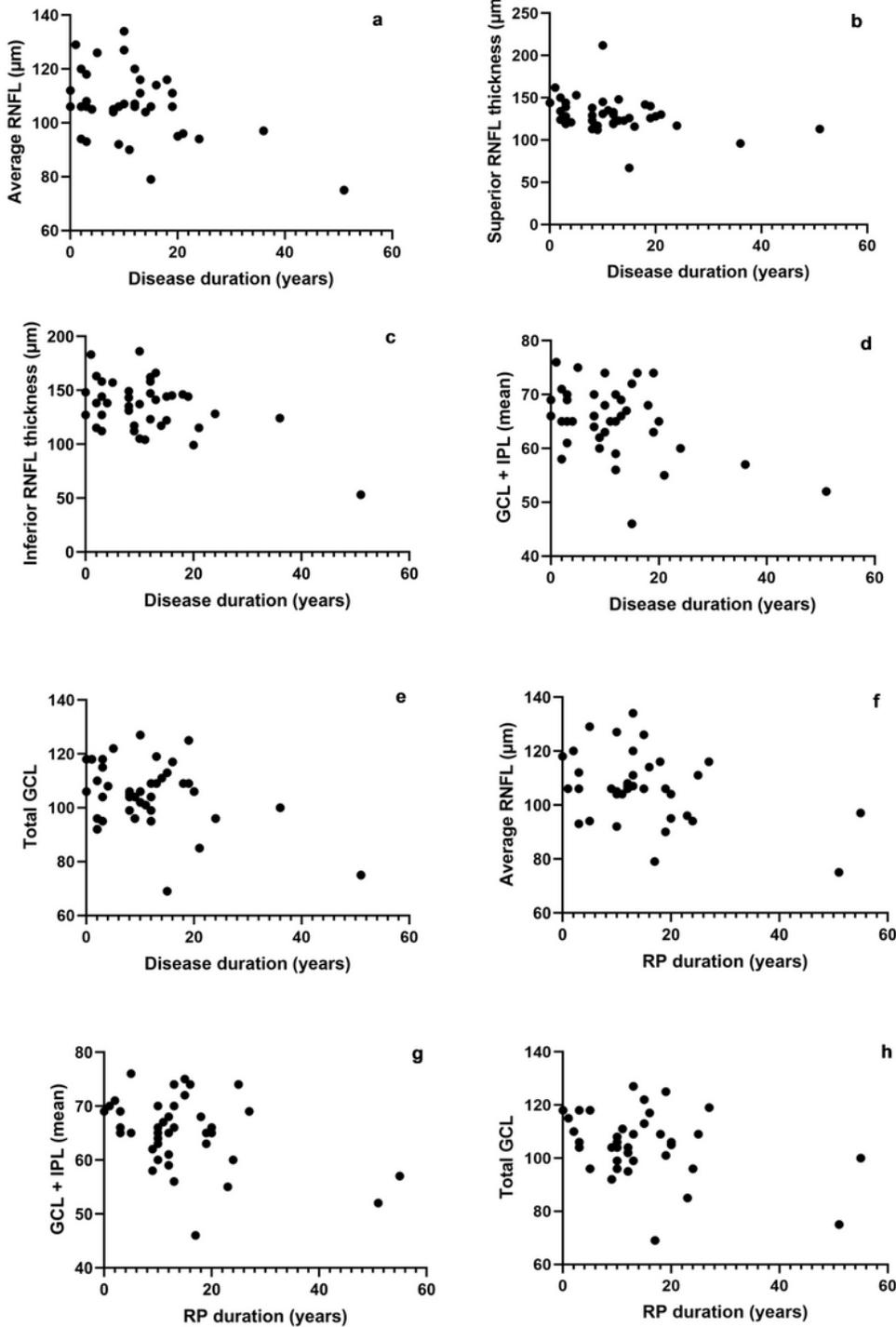
Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

# Figures



**Figure 1**

Measurement of the retinal fiber layer (RNFL) thickness using SS-OCT. Circular tomogram of RNFL and RNFL in the 4 sectors (disk) in a healthy control (A) and in a systemic sclerosis (SSc) patient (B), showing decreased RNFL thickness, particularly in the temporal sector, in SSc.



**Figure 2**

Correlation between disease duration and the average RNFL thickness ( $R = -0.460$ ;  $p = 0.003$ ) (a), the superior RNFL thickness ( $R = -0.353$ ;  $p = 0.025$ ) (b), the inferior RNFL thickness ( $R = -0.495$ ;  $P = 0.001$ ) (c), the mean GCL+ IPL thickness ( $R = -0.431$ ,  $p = 0.005$ ) (d), the total GCL thickness ( $R = -0.379$ ,  $p = 0.015$ ) (e) and between RP duration and mean RNFL thickness ( $R = -0.393$ ;  $p = 0.012$ ) (f), the mean GCL+ IPL thickness ( $R = -0.389$ ,  $p = 0.013$ ) (g) and total GCL thickness ( $R = -0.332$ ,  $p = 0.035$ ) (h).