

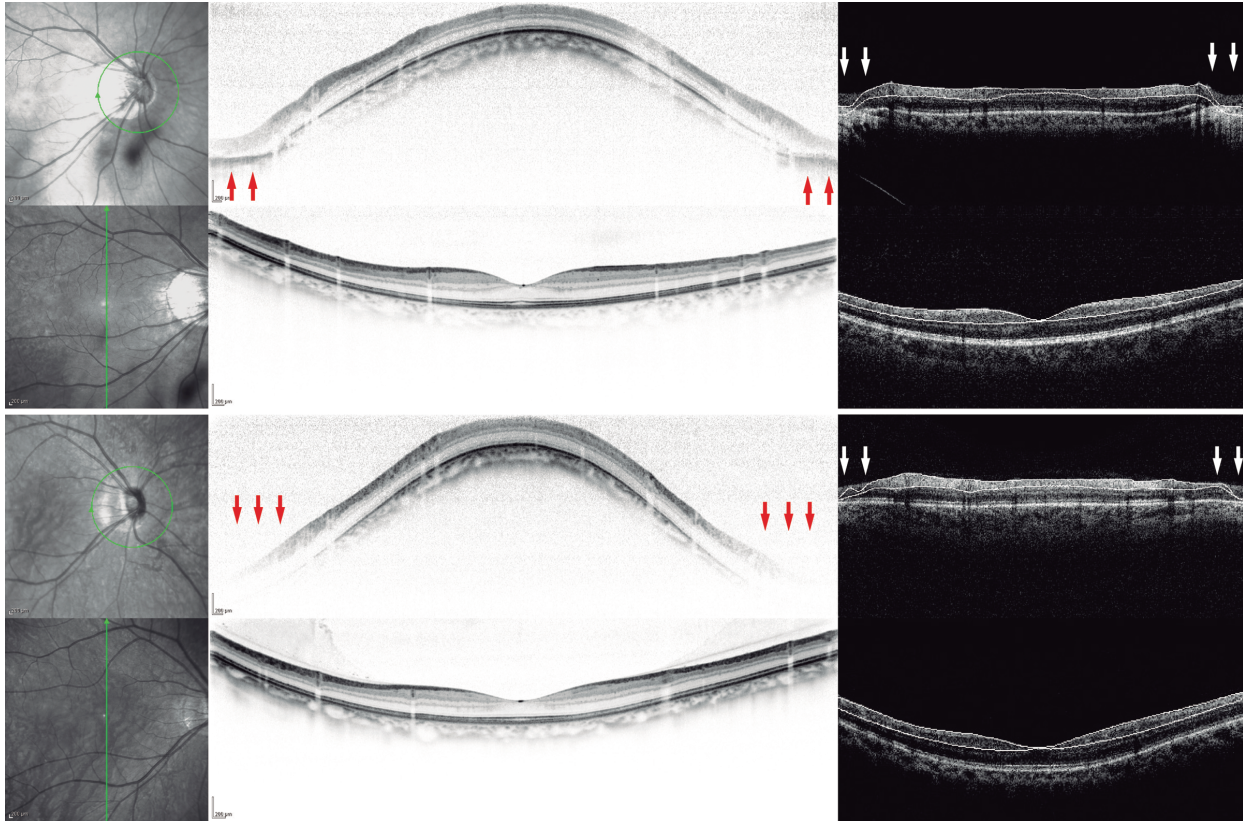


Figure 5. Anomalous circumpapillary retinal nerve fiber layer appearance in images obtained in 2 highly myopic eyes. Spectralis infrared images (Left), vertical 9-mm-long Spectralis scans from inferior to superior (Center), and RTVue-100 scans (Right) in 2 highly myopic eyes are shown. (Top and Second row) A large peripapillary area is apparent in the circumpapillary retinal nerve fiber layer (RNFL) scan (red arrows on Spectralis, in [Top center]). Segmentation lines in RTVue-100 circumpapillary RNFL images stray from the RNFL boundaries toward the high reflectivity of the sclera within the peripapillary atrophy (white arrows in [Top right]). (Third row and Bottom) On this image, there is excessive axial elongation of the circumpapillary RNFL image, which extends temporally into the inferior half of the image acquisition frame, where signal intensity becomes low (red arrows in [Third row center] and white arrows in [Third row right]). Note that the highly reflective retinal pigment epithelium lines on circumpapillary RNFL images of RTVue-100 (Top and Third row right) are aligned to generate more flat circumpapillary RNFL shape. The segmentation lines in the RTVue-100 circumpapillary RNFL images fluctuate around the low signal in the retina (white arrows in [Third row right]). In contrast, the Spectralis macular images for both eyes (Second row and Bottom center) are within the superior half of the image acquisition frame, where no reduction of signal intensity is seen. The segmentation lines appear to outline the macular ganglion cell complex correctly (Second row and Bottom right).

Table 1. Characteristics of 91 Eyes without (< -6.0 diopters) and 90 Eyes with High Myopia, Categorized by Visual Field Test Results

Visual field n	Non-high Myopia				P Value	High Myopia				P Value
	All	Normal	Early	Severe		All	Normal	Early	Severe	
	91	30	31	30		90	28	30	32	
Age	56.0±10.2	54.0±10.2	54.4±10.9	60.0±8.2	0.05 ^a	43.3±10.6	42.1±11.1	42.3±9.5	45.2±11.1	0.51 ^a
Gender Man/woman	42/49	17/13	11/20	14/16	0.26 ^b	35/55	9/19	10/20	16/16	0.27 ^b
Refraction	-2.2±2.1	-2.2±2.0	-2.0±2.3	-2.2±2.0	0.95 ^a	-9.5±2.5	-9.7±2.5	-9.4±2.4	-9.6±2.7	0.90 ^a
Axial length	24.5±1.1	23.8±4.4	23.7±4.1	24.6±1.3	0.97 ^a	27.5±1.0	27.7±1.1	27.4±1.1	27.4±0.8	0.34 ^a
MD	-4.9±5.7	-0.1±1.5 ^{c,d}	-2.8±1.8 ^{c,e}	-11.7±4.5 ^{d,e}	<0.0001 ^a	-5.6±5.1	-1.2±1.5 ^{f,d}	-3.7±1.4 ^{f,e}	-11.2±4.3 ^{d,e}	<0.0001 ^a
PSD	6.4±4.8	1.5±0.3 ^{d,e}	5.4±2.2 ^{d,g}	12.1±2.5 ^{e,g}	<0.0001 ^a	6.3±4.5	1.8±1.0 ^{d,e}	5.2±2.4 ^{d,g}	11.3±2.5 ^{e,g}	<0.0001 ^a

^aAnalysis of variance (ANOVA) followed by Scheffé' test as posthoc comparisons. ^bFisher's exact test

^c $P = 0.001$; ^{d,e,g} $P < 0.0001$; ^f $P = 0.007$

MD = mean deviation; n = number; PSD = pattern standard deviation

Table 2. Inter-observer Agreement and Accuracy in Evaluating Optic Disc Photographs and Spectralis Macular Images in 91 Non-highly and 90 Highly Myopic Eyes.

		Non-High Myopia			High Myopia		
Visual Field		Normal	Early	Severe	Normal	Early	Severe
Number of eyes		30	30	31	28	30	32
Inter-Observer Agreement							
Disc	Cohen's κ	0.926 ^a			0.363 ^a		
	Agreement rate	96.7%	93.3%	100%	57.1% ^b	56.7% ^c	78.1% ^d
OCT	Cohen's κ	0.951			0.946		
	agreement rate	100%	93.3%	100%	96.4% ^b	96.7% ^c	100% ^d
Accuracy							
Disc	Accuracy rate by M.N.	100% ^a			71.4% ^a		
		100%	100%	100%	85.7%	53.3% ^d	78.1% ^e
	Accuracy rate by S.M.	96.7% ^a			80.2% ^a		
		96.7%	93.3%	100%	57.1% ^f	90.0%	93.8%
OCT	Accuracy rate by M.N.	98.9%			94.5%		
		100%	96.7%	100%	85.7%	100% ^d	96.9% ^e
	Accuracy rate by S.M.	98.9%			94.5%		
		100%	96.7%	100%	89.3% ^f	96.7%	96.9%

^a $P < 0.0001$ between non-high myopia and high myopia groups; ^b $P = 0.022$; ^c $P = 0.0005$

^d Unable to be calculated because of the absence of false-negative cases; ^e $P = 0.016$

(McNemar's test) ^f $P = 0.012$

κ = kappa; OCT = optical coherence tomography; Photos = stereo disc and color fundus photographs

Table 3. Results of the Receiver Operating Characteristic Regression for Average Circumpapillary Retinal Nerve Fiber Layer and Ganglion Cell Complex Parameters

Average cpRNFL	Coefficients	95%CI		<i>P</i> -value
(Intercept)	12.200	-0.042	28.200	0.051
$\Phi^{-1}(t)$	1.080	0.775	1.640	< 0.001
Age	-0.021	-0.069	0.019	0.268
Sex	0.098	-0.885	0.892	0.994
MD	-0.123	-0.266	-0.047	0.005
AL	-0.274	-0.635	0.009	0.056
SSI	-0.043	-0.125	0.022	0.170
Average superior cpRNFL	Coefficients	95%CI		<i>P</i> -value
(Intercept)	9.270	-0.824	21.800	0.069
$\Phi^{-1}(t)$	0.821	0.556	1.200	< 0.001
Age	-0.028	-0.067	0.007	0.108
Sex	0.025	-0.690	0.765	0.920
MD	-0.068	-0.142	-0.023	0.007
AL	-0.306	-0.655	-0.031	0.031
SSI	0.006	-0.053	0.050	0.954
Average inferior cpRNFL	Coefficients	95%CI		<i>P</i> -value
(Intercept)	15.300	1.950	31.300	0.026
$\Phi^{-1}(t)$	0.828	0.536	1.340	< 0.001
Age	-0.031	-0.085	0.005	0.082
Sex	0.114	-0.735	1.070	0.716
MD	-0.108	-0.267	-0.034	0.011
AL	-0.355	-0.771	-0.017	0.041
SSI	-0.050	-0.112	0.013	0.121
Average GCC	Coefficients	95%CI		<i>P</i> -value
(Intercept)	0.030	-10.000	12.200	0.846
$\Phi^{-1}(t)$	1.110	0.661	1.650	< 0.001
Age	-0.025	-0.067	0.014	0.195
Sex	0.033	-0.794	0.815	0.980
MD	-0.091	-0.165	-0.036	0.002
AL	-0.049	-0.379	0.223	0.612
SSI	0.053	0.003	0.103	0.037
FLV	Coefficients	95%CI		<i>P</i> -value
(Intercept)	6.150	-17.800	40.100	0.450

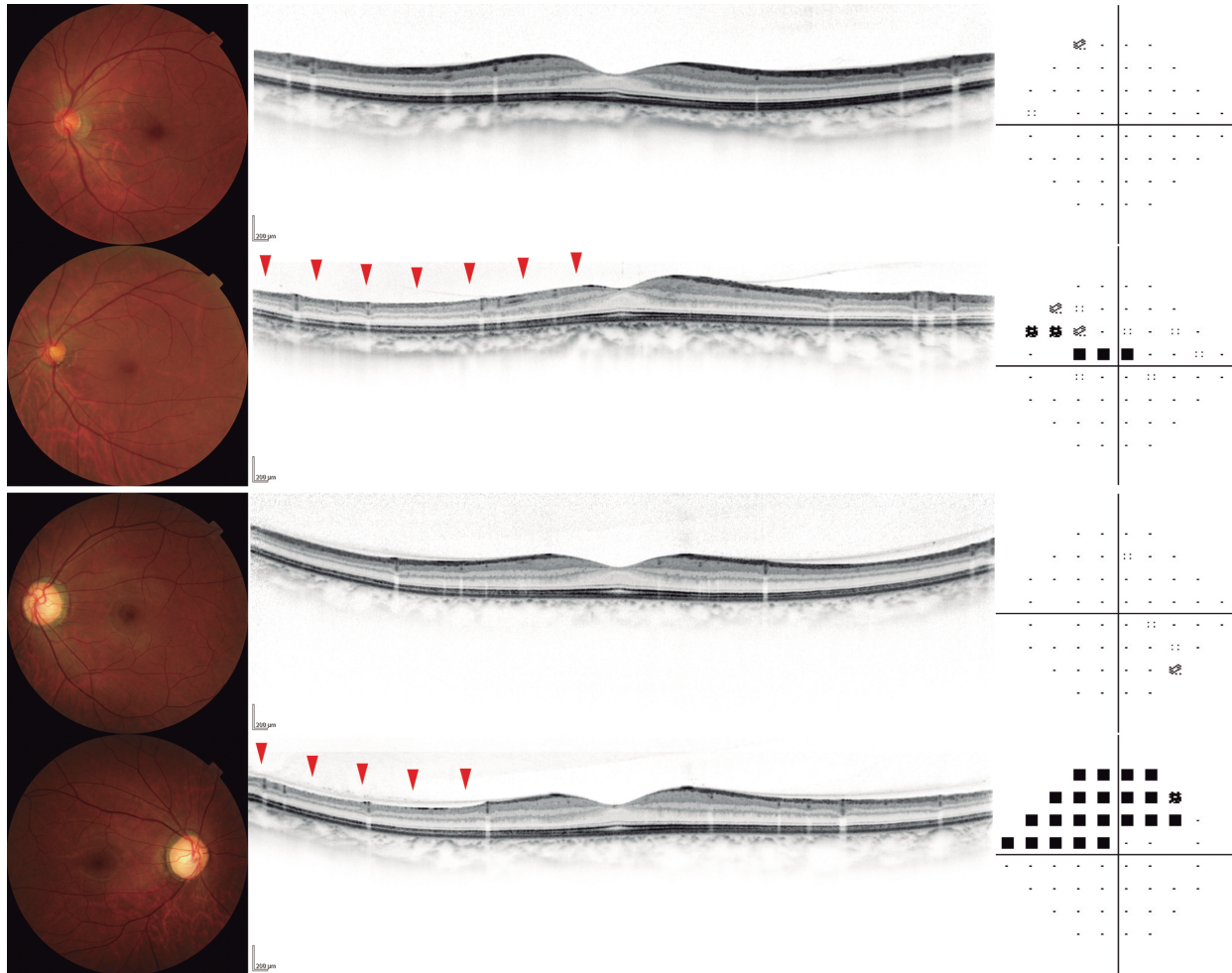
$\Phi^{-1}(t)$	2.410	1.460	5.620	0.001
Age	0.005	-0.117	0.153	0.794
Sex	-1.020	-4.240	1.350	0.311
MD	-0.081	-0.169	-0.028	0.006
AL	-0.350	-1.220	0.267	0.209
SSI	0.100	-0.030	0.307	0.107
GLV	Coefficients	95%CI		<i>P</i> -value
(Intercept)	15.000	-6.200	60.300	0.111
$\Phi^{-1}(t)$	3.180	1.810	6.740	0.001
Age	-0.151	-0.402	-0.043	0.015
Sex	-0.614	-4.440	2.510	0.586
MD	-0.064	-0.119	-0.012	0.016
AL	-0.670	-2.030	-0.089	0.032
SSI	0.191	0.058	0.414	0.009

cpRNFL = circumpapillary retinal nerve fiber layer; CI = confidence interval

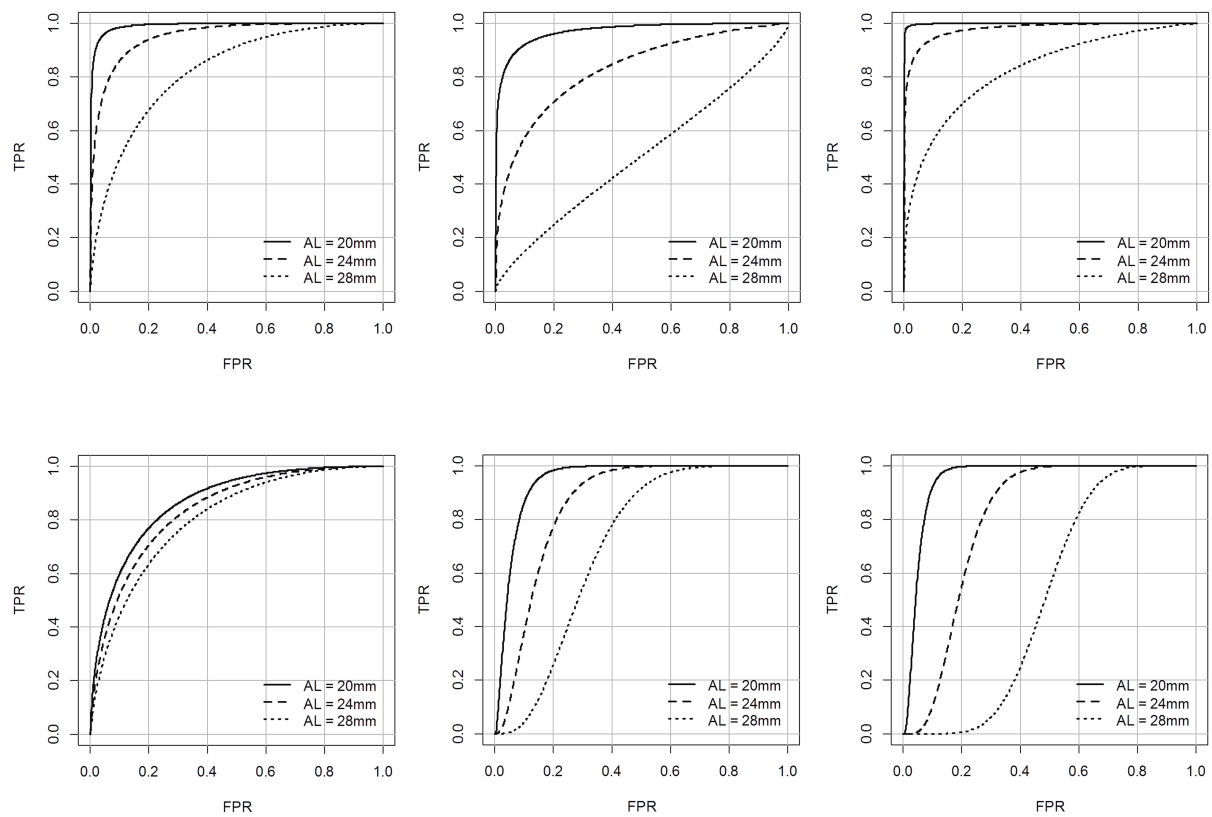
Φ = probit function; t = time; MD = mean deviation; AL = axial length

SSI = signal strength index; GCC = ganglion cell complex; FLV = focal loss volume

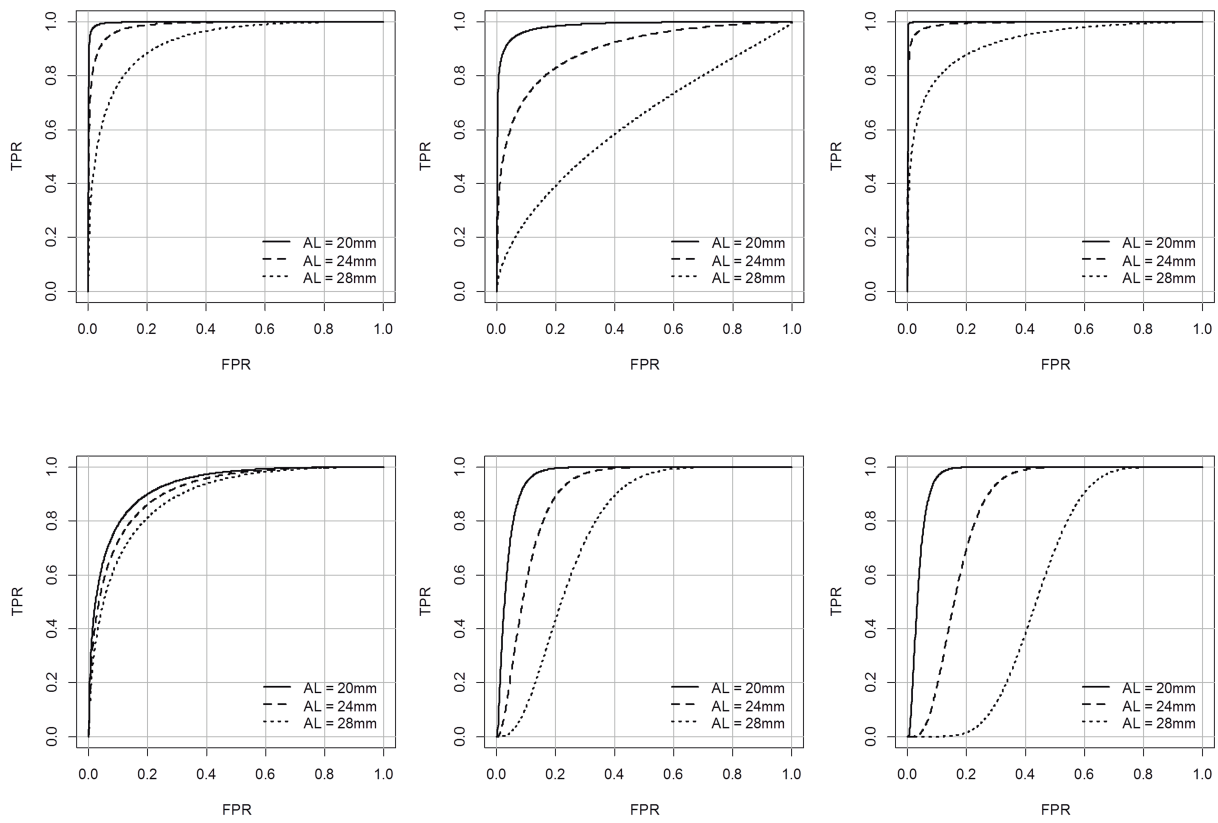
GLV = global loss volume



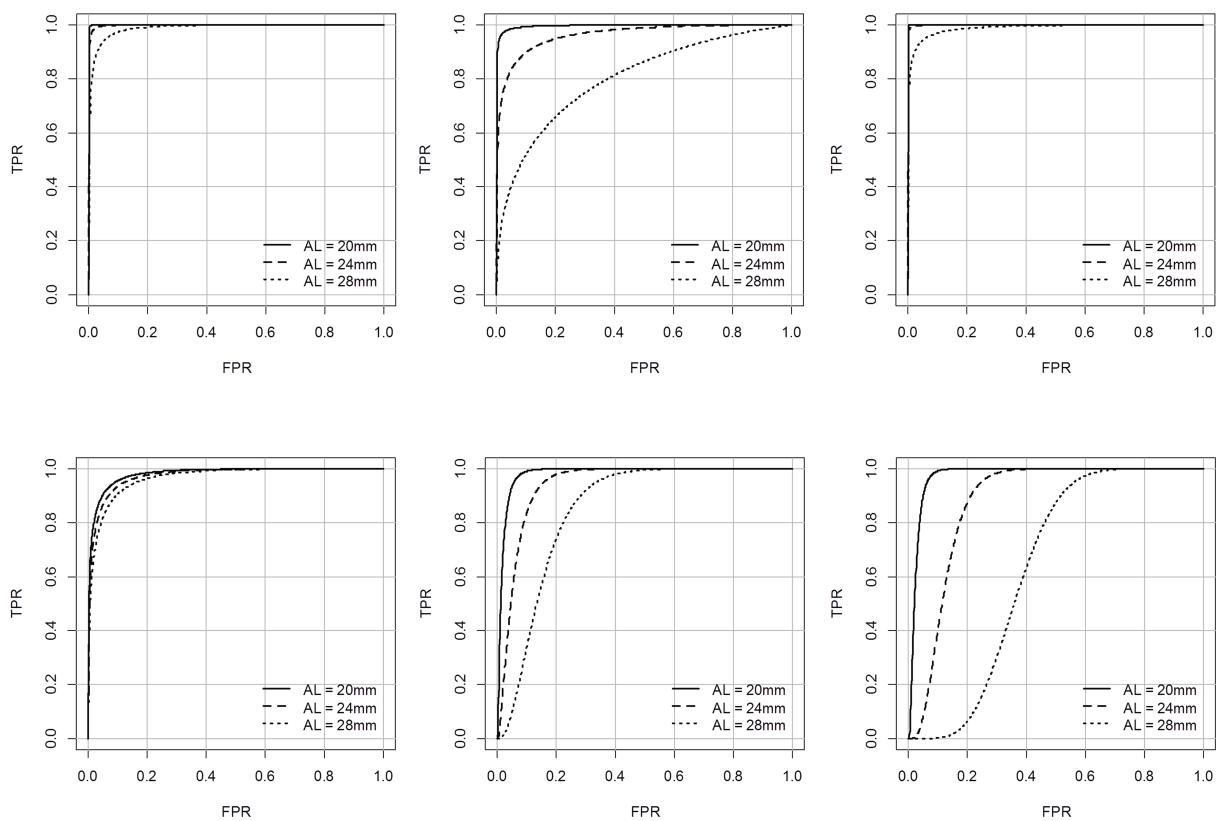
Supplementary Figure 1. Appearance of the macula on Spectralis optical coherence tomography (OCT) images obtained by in highly myopic eyes with small and large optic discs. Color disc photographs (Left), 9 mm long vertical Spectralis OCT scans from inferior to superior (Center), and visual field (VF) pattern deviation maps (Right) are shown. (Top and Second row) Eyes with small optic discs. (Third row and Bottom) Eyes with large optic discs. In eyes without VF defects, the macula appears uniformly symmetrical across the horizontal meridian, regardless of disc size (Top and Third row). In eyes with VF defects (Second row and Bottom), the ganglion cell layer and retinal nerve fiber layer appear thinned in the hemisphere (red arrowheads) corresponding to VF defects.



Supplementary Figure 2. (Top and Second row) Receiver operating characteristic curves on the representative mean deviation and axial length values in the regression model. Age, sex and signal strength index were fixed at 50 years, men, and 65. Receiver operating characteristic curves at an MD level of -4 dB (Top and Second row), -10 dB (Third and Fourth row), and -20 dB (Fifth and Sixth row) are shown. The solid, broken and dotted lines indicate 20 mm, 24 mm and 28 mm in axial length. (Top, Third, and Fifth row left) Average circumpapillary retinal nerve fiber layer. (Top, Third, and Fifth row center) Average superior circumpapillary retinal nerve fiber layer. (Top, Third, and Fifth row right) Average inferior circumpapillary retinal nerve fiber layer. (Second, Fourth, and Sixth row left) Ganglion cell complex thickness. (Second, Fourth, and Sixth row center) Focal loss volume. (Second, Fourth and Sixth row right) Global loss volume. AL = axial length; TPR = true positive ratio; FPR = false positive ratio



Supplementary Figure 2. (Third and Fourth row)



Supplementary Figure 2. (Fifth and Sixth row)

Supplementary Table 1. Number of Eyes with Small and Large Optic Disc in Eyes without (< -6.0 diopters) and Eyes with High Myopia, Categorized by Visual Field Test Results

Visual field number	Non-high Myopia				High Myopia			
	All	Normal	Early	Severe	All	Normal	Early	Severe
	91	30	31	30	90	28	30	32
Small disc	4	1	2	1	3	1	1	1
Large disc	2	1	1	0	2	0	1	1

Supplementary Table 2. Mean Measurements in Eyes with and without High Myopia

Visual field	Non-high myopia			<i>P</i> Value ^a	High myopia			<i>P</i> Value ^a
	Normal	Early	Severe		Normal	Early	Severe	
	n	30	31		30	23	27	
cpRNFL								
SSI	76.9 ± 8.6	75.4 ± 7.3	73.0 ± 8.5	0.19	71.4 ± 7.6	69.3 ± 5.5	67.7 ± 8.8	0.065
Average (μm)	96.5 ± 8.4 ^{b,c}	83.7 ± 9.1 ^{b,d}	75.9 ± 7.8 ^{c,d}	<0.0001	91.9 ± 9.1 ^{b,c}	81.7 ± 6.5 ^{b,e}	76.0 ± 7.6 ^{c,e}	<0.0001
Average Superior (μm)	97.6 ± 10.4 ^{f,b}	88.0 ± 12.2 ^{f,g}	79.1 ± 12.5 ^{b,g}	<0.0001	91.6 ± 13.1 ^h	87.4 ± 7.9	82.7 ± 12.7 ^h	0.027
Average Inferior (μm)	93.6 ± 9.4 ^{b,c}	79.0 ± 9.0 ^{b,i}	72.9 ± 7.1 ^{c,i}	<0.0001	87.8 ± 14.2 ^{j,b}	76.0 ± 9.6 ^{j,k}	68.2 ± 7.8 ^{b,k}	<0.0001
Macular GCC								
SSI	70.3 ± 9.9	72.0 ± 8.2	67.6 ± 8.0	0.23	66.4 ± 7.6	62.0 ± 8.4	64.6 ± 8.4	0.16
Average (μm)	90.1 ± 7.4 ^{b,c}	77.6 ± 7.1 ^{b,i}	70.5 ± 9.3 ^c	<0.0001	84.6 ± 7.7 ^{j,b}	75.3 ± 8.4 ^j	70.5 ± 8.8 ^b	<0.0001
FLV (%)	1.1 ± 1.1 ^{b,c}	7.9 ± 4.0 ^b	10.9 ± 3.8 ^c	<0.0001	2.8 ± 2.6 ^{b,c}	7.9 ± 3.8 ^b	9.9 ± 3.4 ^c	<0.0001
GLV (%)	10.0 ± 6.3 ^{b,c}	22.0 ± 6.8 ^b	28.9 ± 8.7 ^c	<0.0001	15.0 ± 7.3 ^{d,b}	24.3 ± 8.0 ^d	28.8 ± 8.4 ^b	<0.0001

^a Analysis of variance (ANOVA) followed by Scheffé test as post hoc comparisons. ^{b,c}*P* <0.0001; ^d*P* = 0.004; ^e*P* = 0.031; ^f*P* = 0.009; ^g*P* = 0.016; ^h*P* = 0.045; ⁱ*P* = 0.030; ^j*P* = 0.001; ^k*P* = 0.033; ^l*P* = 0.024;

cpRNFL = circumpapillary retinal nerve fiber layer; FLV = focal loss volume; GCC = ganglion cell complex; GLV = global loss volume; n = number; SSI = signal strength index