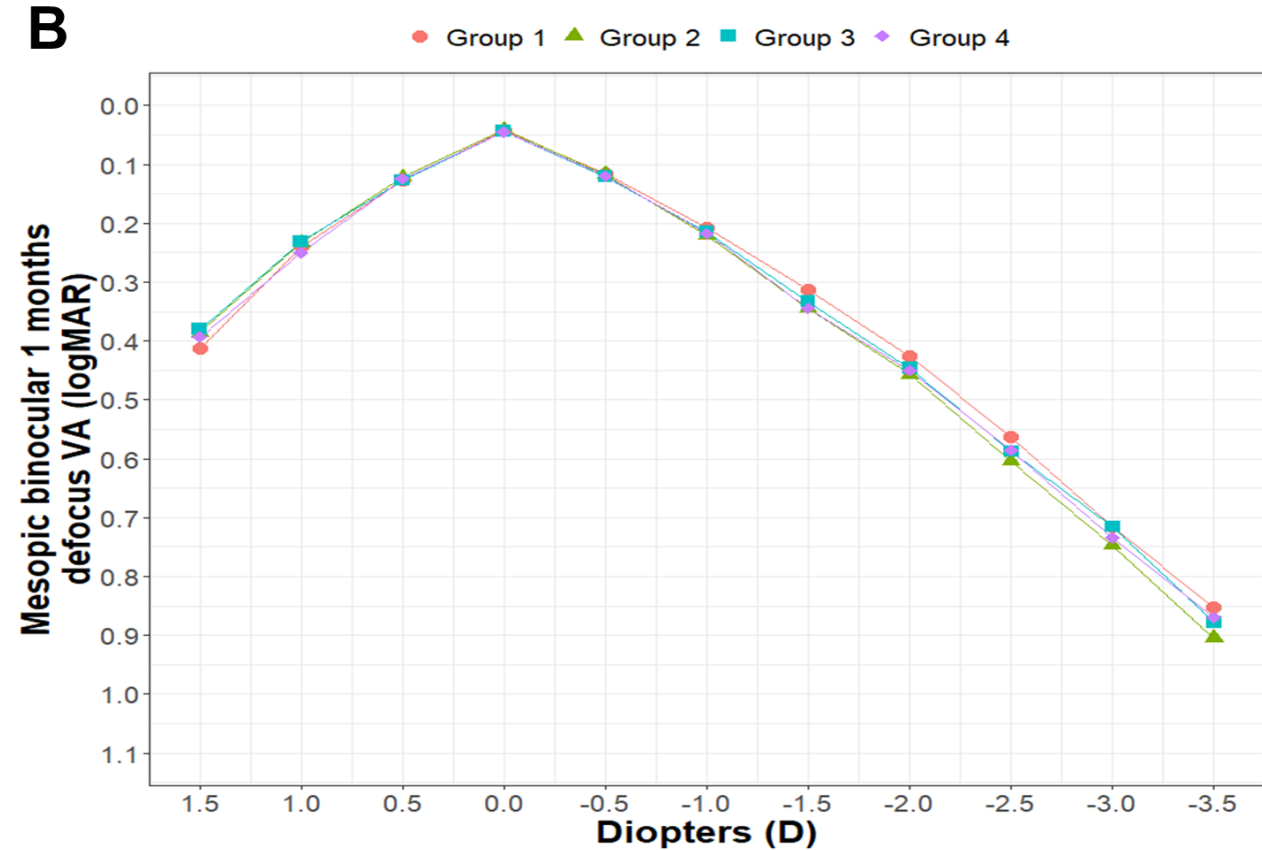
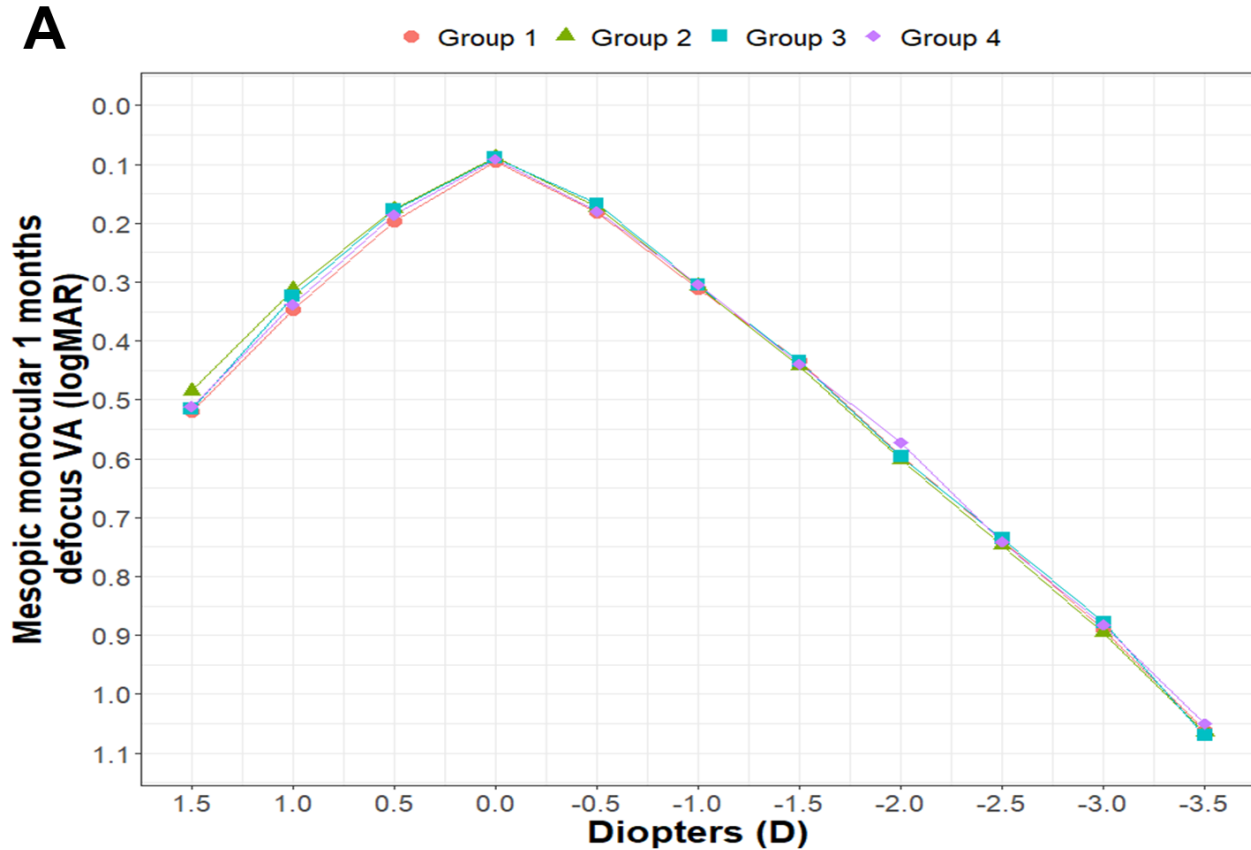
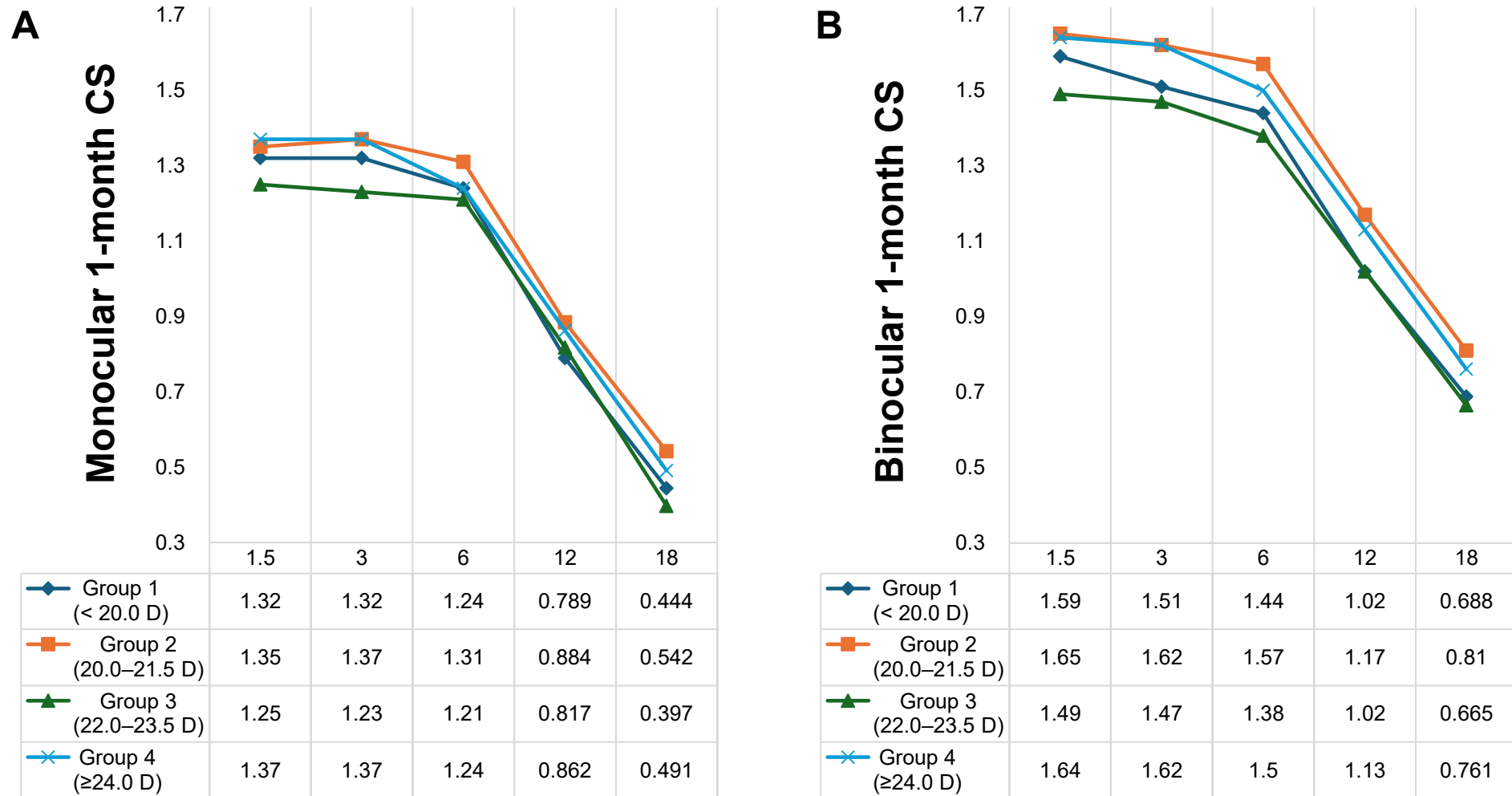


## Supplementary Figure 1



**Supplementary Figure 1. Mesopic defocus curves at 1 month post-surgery.** Mean monocular (left) and binocular (right) mesopic defocus curves at 1 month. Group 1 (<20.0 D), Group 2 (20.0–21.5 D), Group 3 (22.0–23.5 D), and Group 4 ( $\geq 24.0$  D). No significant inter-group differences were observed at most defocus levels ( $p > 0.05$  by generalized estimating equations [GEE]). D, diopters.

## Supplementary Figure 2



**Supplementary Figure 2. Photopic contrast sensitivity at 1 month post-surgery.** Mean monocular (left) and binocular (right) photopic contrast sensitivity (logCS) at spatial frequencies of 1.5, 3, 6, 12, and 18 cycles per degree (cpd). No significant inter-group differences were observed at any spatial frequency (all  $p > 0.05$  by generalized estimating equations [GEE]).

## Supplementary Table 1

**Supplementary Table 1.** Partial correlation coefficients ( $r$ ) between pupil size and key visual outcomes, controlling for age and gender

3 months		Group 1 ( $< 20.0$ D)	Group 2 ( $20.0$ – $21.5$ D)	Group 3 ( $22.0$ – $23.5$ D)	Group 4 ( $\geq 24.0$ D)	Total
SA (RMS)		-0.4340	0.0550	-0.1170	0.0300	-0.0220
Coma H (RMS)		0.1530	-0.1850	-0.0020	-0.0220	-0.0600
Coma V (RMS)		-0.2810	-0.1460	-0.2880	0.2870	-0.0940
UDVA (logMAR)		0.2160	0.1320	0.2160	0.1850	0.1840
1 month		Group 1 ( $< 20.0$ D)	Group 2 ( $20.0$ – $21.5$ D)	Group 3 ( $22.0$ – $23.5$ D)	Group 4 ( $\geq 24.0$ D)	Total
CS (monocular)	(cpd)					
	1.5	0.0800	-0.2370	-0.1670	0.1180	-0.1060
	3	0.0480	-0.1180	-0.2760	0.2930	-0.0460
	6	0.0650	-0.0910	-0.2310	0.1980	-0.0450
	12	0.0160	-0.0950	0.0030	0.2500	-0.0090
18	0.1340	0.0450	-0.2050	0.0140	-0.0010	
CS (binocular)	(cpd)					
	1.5	0.0990	-0.2820	-0.0510	0.3880	-0.0590
	3	0.1410	-0.0940	-0.1050	0.3960	0.0040
	6	0.2980	0.0120	-0.2320	0.0490	-0.0030
	12	0.2810	0.1020	0.0180	0.3370	0.1280
18	-0.0030	-0.0040	-0.1300	0.1710	-0.0070	

Note: Partial correlation coefficients ( $r$ ) between pupil size and spherical aberration (SA), coma (vertical/horizontal), uncorrected distance visual acuity (UDVA), and contrast sensitivity (CS). HOA and UDVA data are from 3-month measurements; CS data are from 1-month measurements. All analyses controlled for age and gender. No significant correlations were observed (all  $|r| < 0.3$ ,  $p > 0.05$ ). RMS, root mean square; logMAR, logarithm of the minimum angle of resolution; cpd, cycles per degree; D, diopters.