

Fellow Eye Analysis

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Unadjusted Analysis

With some of the continuous variables, there is a skew in the distribution so we will use the median [IQR] instead of the mean (sd) in the tables and use a wilcoxon rank test to test the p-value. Below shows the skew in the distribution of some of the variables.

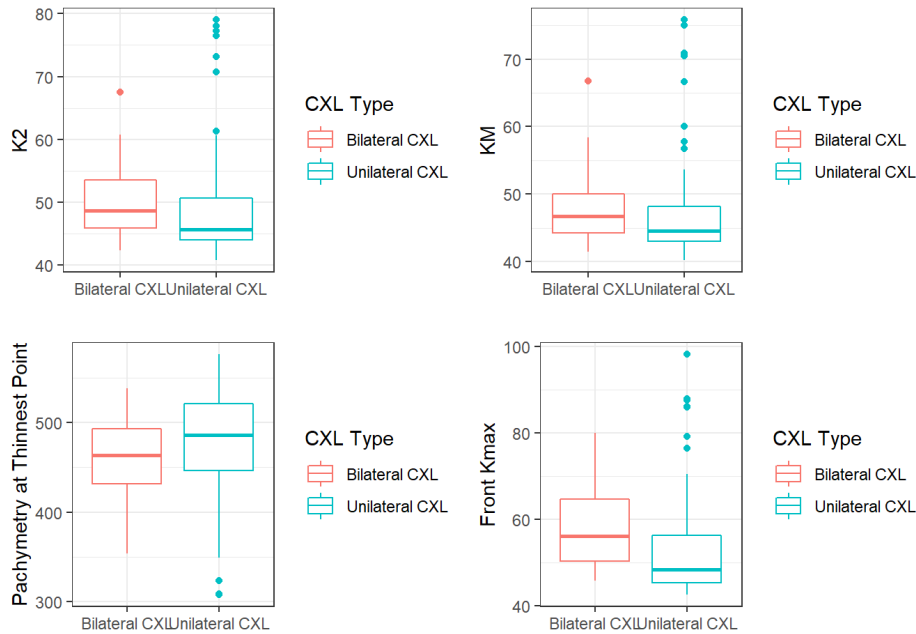


Table 1 Patient characteristics among those with bilateral CXL and unilateral CXL, respectively.

Variable	Bilateral CXL, N = 28 ¹	Unilateral CXL, N = 63 ¹	p-value ²
Age	20 (17, 24)	24 (20, 31)	0.019
Gender			0.022
Male	24 (86%)	37 (59%)	
Female	4 (14%)	26 (41%)	
Family History			0.8
KCN	3 (18%)	6 (12%)	
Myopia/ astigmatism	0 (0%)	2 (4.2%)	
None	14 (82%)	40 (83%)	
Unknown	11	15	
Ethnicity			0.6
Caucasian	1 (4.0%)	0 (0%)	
African American	18 (72%)	33 (62%)	

¹ median (IQR) for continuous variables; n (%) categorical variables

² Statistical tests performed: Wilcoxon rank-sum test; chi-square test of independence; Fisher's exact test

Variable	Bilateral CXL, N = 28 ¹	Unilateral CXL, N = 63 ¹	p-value ²
South Asian	4 (16%)	13 (25%)	
East Asian	1 (4.0%)	4 (7.5%)	
Hispanic	1 (4.0%)	3 (5.7%)	
Unknown	3	10	

¹ median (IQR) for continuous variables; n (%) categorical variables

² Statistical tests performed: Wilcoxon rank-sum test; chi-square test of independence; Fisher's exact test

Table 2 Baseline eye characteristics among those with bilateral CXL and unilateral CXL, respectively.

Variable	Bilateral CXL, N = 28 ¹	Unilateral CXL, N = 63 ¹	p-value ²
Eye			0.8
Right	16 (57%)	33 (52%)	
Left	12 (43%)	30 (48%)	
Disease Duration	0.4 (0.1, 2.2)	1.0 (0.0, 3.0)	0.6
Unknown	0	3	
Atopic Disease	14 (52%)	22 (37%)	0.3
Unknown	1	3	
Eye Rubbing	11 (61%)	29 (63%)	>0.9
Unknown	10	17	
Contact Lenses Use and Type			0.5
None	17 (61%)	37 (59%)	
Scleral	1 (3.6%)	7 (11%)	
RGP	4 (14%)	11 (17%)	
Soft	6 (21%)	8 (13%)	
Apical Scar			0.029
No Scarring	26 (100%)	52 (83%)	
Apical Scarring	0 (0%)	11 (17%)	
Unknown	2	0	
Vogt Striae	3 (12%)	8 (13%)	>0.9
Unknown	2	1	
Cone Observed Clinically	14 (54%)	27 (44%)	0.5
Unknown	2	1	

¹ median (IQR) for continuous variables; n (%) categorical variables

² Statistical tests performed: chi-square test of independence; Wilcoxon rank-sum test; Fisher's exact test

Table 3 Severity of disease at preoperative visit among those with bilateral CXL and unilateral CXL, respectively.

Variable	Bilateral CXL, N = 28 ¹	Unilateral CXL, N = 63 ¹	p-value ²
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Variable	Bilateral CXL, N = 28 ¹	Unilateral CXL, N = 63 ¹	p-value ²
K2	49 (46, 54)	46 (44, 51)	0.018
Unknown	0	1	
Km	47 (44, 50)	45 (43, 48)	0.029
Unknown	0	1	
Front Kmax	56 (50, 65)	48 (45, 56)	0.004
Unknown	0	1	
Pachymetry at thinnest point	464 (432, 493)	486 (446, 521)	0.075
Unknown	0	1	

¹ median (IQR) for continuous variables; n (%) categorical variables

² Statistical tests performed: Wilcoxon rank-sum test

Table 4 Comparison of visual acuity and pentacam parameters

Variable	Mean Value (SE)	Pre op to post op mean change	Pre op to post op p-value
K1	K1	K1	K1
Preoperative	43.90 (7.22)	NA	NA
1 month	44.05 (5.62)	-0.84	0.8
3-31 months	44.50 (7.94)	0.8	0.49
K2	K2	K2	K2
Preoperative	46.40 (8.72)	NA	NA
1 month	45.95 (8.18)	-0.57	0.64
3-31 months	46.80 (9.69)	0.85	0.7
Km	Km	Km	Km
Preoperative	45.30 (7.84)	NA	NA
1 month	45.20 (6.62)	-0.63	0.87
3-31 months	45.70 (8.68)	0.82	0.63
Kmax	K_Max_Front	K_Max_Front	K_Max_Front
Preoperative	51.20 (12.00)	NA	NA
1 month	49.85 (12.70)	-0.17	0.84
3-31 months	50.90 (12.74)	0.82	0.82
Astigmatism	Astig	Astig	Astig
Preoperative	2.20 (2.67)	NA	NA
1 month	2.15 (3.84)	0.26	0.8
3-31 months	2.20 (3.37)	0.3	0.92
Pachymetry at the apex	Pachy_apex	Pachy_apex	Pachy_apex
Preoperative	491.00 (56.79)	NA	NA
1 month	489.00 (78.72)	9.76	0.86

Variable	Mean Value (SE)	Pre op to post op mean change	Pre op to post op p-value
3-31 months	483.00 (62.61)	-7.7	0.45
Pachymetry at thinnest point	Pachy_thinnest	Pachy_thinnest	Pachy_thinnest
Preoperative	480.00 (59.73)	NA	NA
1 month	483.00 (67.87)	9.93	0.74
3-31 months	470.00 (64.55)	-7.59	0.47
Chamber Volume	Chamber_volume	Chamber_volume	Chamber_volume
Preoperative	200.00 (36.06)	NA	NA
1 month	198.50 (37.71)	-0.11	0.9
3-31 months	189.00 (35.55)	-7.58	0.19

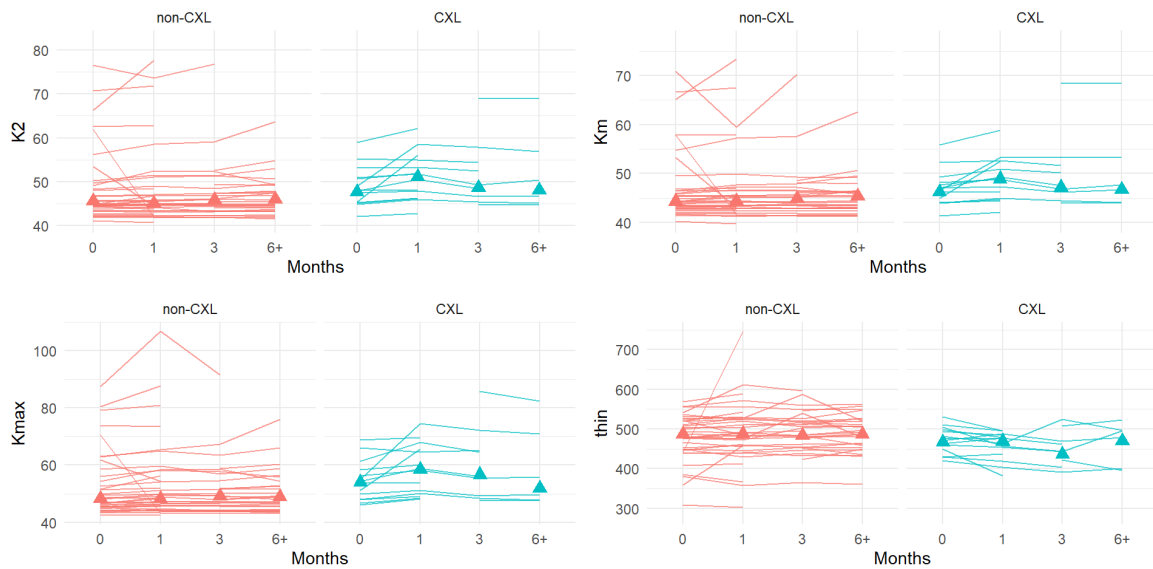
Table 5 Comparison of visual acuity and pentacam parameters among those with CXL and no CXL in the fellow eye

Variable	Mean Value (SE) among CXL	Mean Value (SE) among no CXL	Group difference at pre op visit or changes at post op visit: p-value
K1	K1	K1	K1
Preoperative	45.05 (5.23)	43.70 (8.03)	0.061
1 month	46.70 (3.77)	43.60 (6.21)	0.04
3-31 months	46.50 (6.77)	44.00 (8.39)	0.41
K2	K2	K2	K2
Preoperative	48.65 (5.99)	45.75 (9.77)	0.018
1 month	51.15 (5.45)	45.00 (9.02)	0.09
3-31 months	48.50 (7.28)	46.00 (10.45)	0.08
Km	Km	Km	Km
Preoperative	46.75 (5.48)	44.60 (8.77)	0.029
1 month	48.90 (4.46)	44.45 (7.32)	0
3-31 months	47.50 (6.93)	45.50 (9.28)	0.05
Kmax	K_Max_Front	K_Max_Front	K_Max_Front
Preoperative	56.20 (8.80)	48.40 (13.16)	0.004
1 month	58.50 (8.80)	48.30 (13.84)	0.08
3-31 months	56.10 (9.96)	49.20 (13.53)	0.02
Astigmatism	Astig	Astig	Astig
Preoperative	3.35 (2.40)	1.90 (2.76)	0.008
1 month	3.90 (2.40)	1.70 (4.28)	0.71
3-31 months	3.60 (2.25)	2.10 (3.69)	0.63
Pachymetry at the apex	Pachy_apex	Pachy_apex	Pachy_apex
Preoperative	474.50 (43.92)	496.00 (61.71)	0.061

Variable	Mean Value (SE) among CXL	Mean Value (SE) among no CXL	Group difference at pre op visit or changes at post op visit: p-value
1 month	473.00 (36.72)	500.50 (88.62)	0.05
3-31 months	451.00 (50.89)	495.00 (65.10)	0.13
Pachymetry at thinnest point	Pachy_thinnest	Pachy_thinnest	Pachy_thinnest
Preoperative	463.50 (44.51)	486.00 (65.74)	0.075
1 month	469.00 (35.31)	487.50 (76.11)	0.1
3-31 months	428.00 (50.91)	485.00 (67.93)	0.09
Chamber Volume	Chamber_volume	Chamber_volume	Chamber_volume
Preoperative	212.50 (42.43)	194.50 (32.46)	0.103
1 month	232.00 (44.33)	187.00 (31.21)	0.05
3-31 months	191.00 (43.77)	186.00 (32.93)	0.84

Adjusted Analysis

K2



	non-CXL			CXL			Difference		
	Estimates	95% CI	p-values	Estimates	95% CI	p-values	Estimates	95% CI	p-values
CXL1	-0.95	(-5.14,3.24)	0.653						
Surgeon2	1.92	(-4.14,7.98)	0.531						
Surgeon3	1.70	(-2.38,5.77)	0.410						
time-1mon	0.00	(-0.93,0.94)	0.992	2.31	(0.83,3.79)	0.003	2.31	(0.54,4.07)	0.011
time-3mon	0.25	(-0.65,1.15)	0.586	1.07	(-0.41,2.55)	0.160	0.82	(-0.93,2.57)	0.356
time-6mon+	0.50	(-0.4,1.41)	0.275	1.70	(-0.08,3.48)	0.063	1.20	(-0.81,3.22)	0.240

Km

	non-CXL			CXL			Difference		
	Estimates	95% CI	p-values	Estimates	95% CI	p-values	Estimates	95% CI	p-values
CXL1	-0.95	(-6.12,4.22)	0.714						
Surgeon2	0.32	(-9.58,10.22)	0.948						
Surgeon3	0.73	(-4.25,5.71)	0.769						
time-1mon	0.14	(-0.95,1.23)	0.802	1.93	(0.11,3.75)	0.041	1.79	(-0.36,3.93)	0.101
time-3mon	-0.02	(-1.14,1.1)	0.965	0.94	(-0.88,2.76)	0.313	0.96	(-1.19,3.12)	0.376
time-6mon+	0.16	(-0.93,1.25)	0.767	1.17	(-0.89,3.23)	0.268	1.01	(-1.35,3.37)	0.397

Kmax

	non-CXL			CXL			Difference		
	Estimates	95% CI	p-values	Estimates	95% CI	p-values	Estimates	95% CI	p-values
CXL1	1.49	(-4.36,7.35)	0.612						
Surgeon2	6.25	(-2.38,14.88)	0.153						
Surgeon3	2.44	(-3.28,8.17)	0.398						
EthnicityAsian	-7.17	(-19.83,5.48)	0.262						
EthnicitySouth Asian	-12.54	(-24.14,-0.94)	0.035						
EthnicityWhite	-11.17	(-17.8,-4.53)	0.001						
time-1mon	1.14	(-0.47,2.75)	0.163	4.13	(1.71,6.55)	0.001	-7.17	(-19.83,5.48)	0.262
time-3mon	0.56	(-1.01,2.13)	0.481	2.85	(0.34,5.36)	0.028	-12.54	(-24.14,-0.94)	0.035
time-6mon+	1.02	(-0.51,2.56)	0.190	2.92	(-0.05,5.89)	0.056	-11.17	(-17.8,-4.53)	0.001

Pachymetry at thinnest point

	non-CXL			CXL			Difference		
	Estimates	95% CI	p-values	Estimates	95% CI	p-values	Estimates	95% CI	p-values
CXL1	-6.56	(-34.47,21.35)	0.641						
Surgeon2	-18.18	(-59.17,22.82)	0.379						
Surgeon3	-15.26	(-42.46,11.93)	0.267						
EthnicityAsian	-0.69	(-60.75,59.38)	0.982						
EthnicitySouth Asian	68.50	(13.38,123.63)	0.016						
EthnicityWhite	39.64	(8.14,71.14)	0.014						
time-1mon	-1.62	(-10.07,6.83)	0.705	-15.64	(-28.2,-3.08)	0.016	-0.69	(-60.75,59.38)	0.982
time-3mon	0.87	(-7.24,8.99)	0.832	-16.12	(-29.09,-3.15)	0.016	68.50	(13.38,123.63)	0.016
time-6mon+	0.94	(-7.02,8.89)	0.816	-7.86	(-23.25,7.53)	0.319	39.64	(8.14,71.14)	0.014