Toric IOL Implantation in Cataract Patient with Keratoconus and Post-Penetrating Keratoplasty Astigmatism- A Case Report

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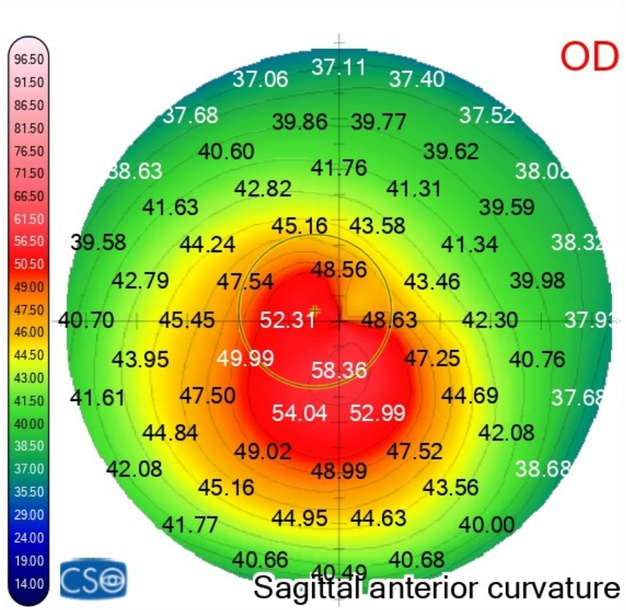
Case Presentation

- A 55 year old female patient presented to our department with bilateral cortical cataract and medical history of keratoconus. She had undergone PK surgery on her left eye 20 years ago. The right eye had non progressive keratoconus.

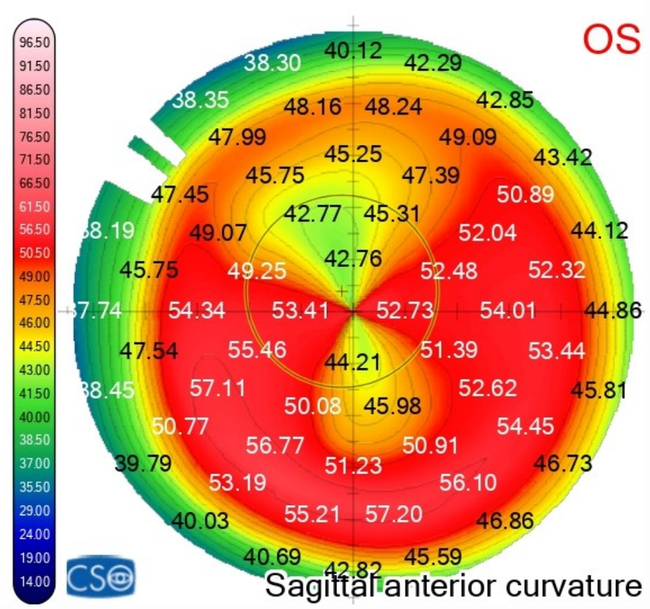
- Preoperative assessment with Scheimpflug tomography on her right and left eye, demonstrated 4,60D and 10,60D irregular astigmatism, respectively.



K readings / Shape indices

	Ø	Kf	Ks	Kavg	Cyl / Ax
	[mm]		[D]		[D]/[°]
SimK	-	47.26	50.73	48.93	-3.47/19°
Meridians (Anterior)	3.00	49.06	53.65	51.25	-4.58/30°
	5.00	48.01	51.46	49.68	-3.45/26°
	7.00	46.71	49.35	47.99	-2.63/19°
Meridians (Posterior)	3.00	-8.30	-8.85	-8.57	0.55/154°
	5.00	-7.58	-8.01	-7.79	0.43/164°
	5.00	-7.04	-7.43	-7.23	0.39/165°
Shape indices (Anterior)	4.50	51.95	56.47	54.12	-4.52/18°
	p = -1.68		RMS/A = 0.26 µm/mm²		
Shape indices (Posterior)	4.50	76.76	82.99	79.75	-6.22/160°
	p = -2.77		RMS/A = 0.77 µm/mm²		

Fig.1: Anterior curvature maps demonstrating moderate keratoconus (OD).



K readings / Shape indices

	Ø	Kf	Ks	Kavg	Cyl / Ax
	[mm]		[D]		[D]/[°]
SimK	-	43.81	53.34	48.11	-9.53/101°
Meridians (Anterior)	3.00	42.92	54.05	47.85	-11.13/105°
	5.00	43.45	54.07	48.18	-10.62/105°
	7.00	44.71	54.26	49.03	-9.55/105°
Meridians (Posterior)	3.00	-6.03	-7.35	-6.62	1.32/99°
	5.00	-6.00	-7.35	-6.61	1.35/106°
	5.00	-6.27	-7.33	-6.76	1.06/113°
Shape indices (Anterior)	4.50	43.16	53.29	47.70	-10.13/103°
	p = 1.55		RMS/A = 0.13 µm/mm²		
Shape indices (Posterior)	4.50	52.14	62.21	56.73	-10.06/107°
	p = 0.68		RMS/A = 0.30 µm/mm²		

Fig.2: Anterior curvature maps demonstrating post-PK irregular astigmatism (OS).

Surgical Technique

- Patient underwent phacoemulcification cataract extraction and Toric IOL implantation.
- Toric IOL was calculated using IOL Master 700 measurements, SRK/T formula and Scheimpflug's keratometry evaluation.
- A well-based toric IOL calculator program was used to determine the optimal cylinder power and alignment axis(Barrett Toric Calculator).
- The toric lens with the highest available cylindrical power(5,75D) was implanted on both eyes in situ, aligned on the steep axis according to patient's tomography.
- Limbal marks were made at 180 degree before the surgery with the patient in a sitting position focusing at distance.

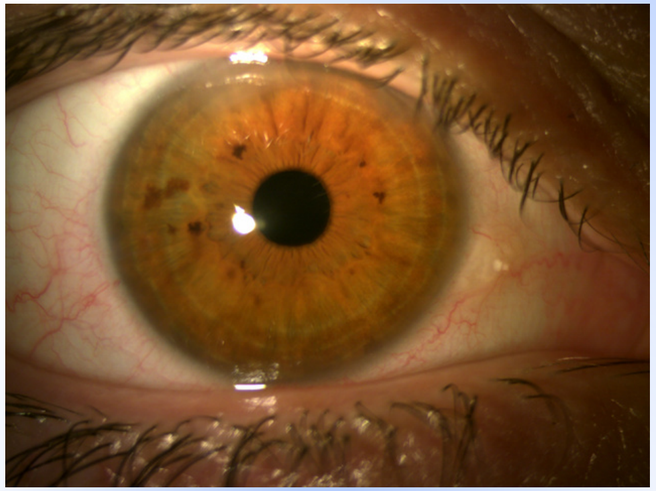


Fig.3: 15 days post-op slit lamp photo (OD).

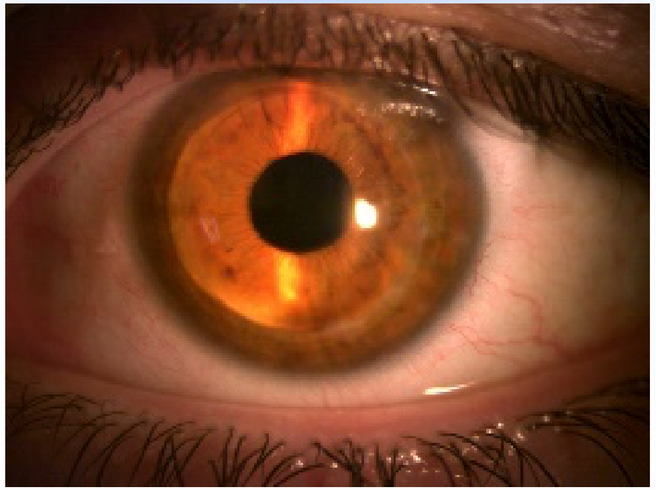


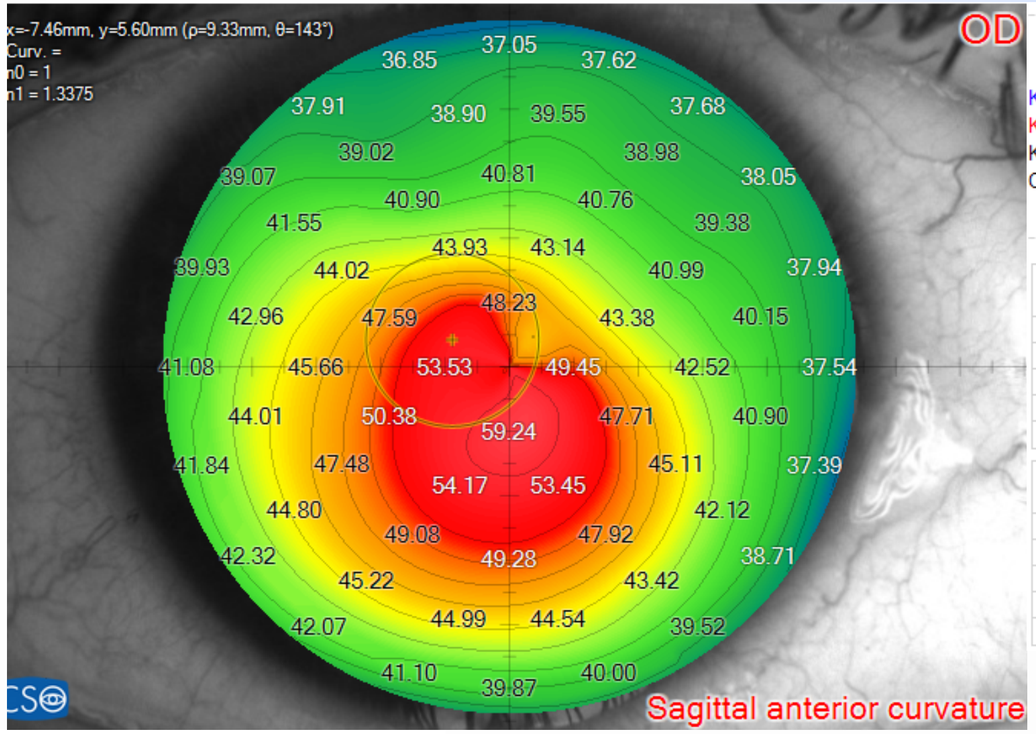
Fig.4: 15 days post-op slit lamp photo(OS).

Results

- Postoperatively, on the right eye, BCVA was 4/10, with -0.50sph -0.50cyl x 120° correction and Spherical Equivalent (SE) was –0,75D which did not significantly differ from the initial target refraction (-0.75D).

- On the left eye, post-op BCVA was 7/10, with +2.0sph -5,50cyl x 105° correction and Spherical Equivalent (SE) was –0,75D which did not significantly differ from the initial target refraction (-0,3D). The final refractive astigmatism was reduced from -10.60D to -5.50D.

- No IOL misalignment was observed during the 6-month follow-up, as determined by slit-lamp biomicroscopy.



K readings (Anterior)

SimK

Kf = 47.46 D @ 28°
Ks = 50.45 D @ 118°
Kavg = 48.91 D
Cyl = -2.99 D Ax 28°

Peripheral degrees

	Curvatures [mm]				
	20°	25°	30°	35°	40°
N	8.06	8.37	8.52	8.78	9.18
T	6.76	7.05	7.40	7.67	8.14
I	6.38	6.91	7.47	7.97	
S	8.02	8.56	8.89	9.13	
Avg	7.30	7.72	8.07	8.39	8.66

	Asphericity (p)				
	20°	25°	30°	35°	40°
N	-2.53	-1.24	-0.57	-0.07	0.15
T	-0.40	-0.61	-0.42	-0.23	-0.06
I	-1.20	-1.28	-1.03	-0.89	
S	-3.85	-2.13	-1.43	-0.88	
Avg	-1.99	-1.31	-0.86	-0.52	0.04

Fig 5: 30 days post-op Scheimpflug tomography (OD).

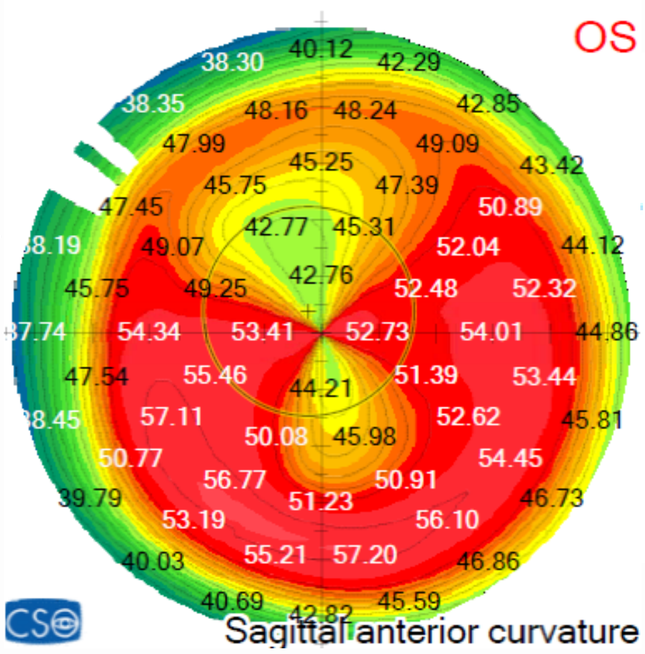


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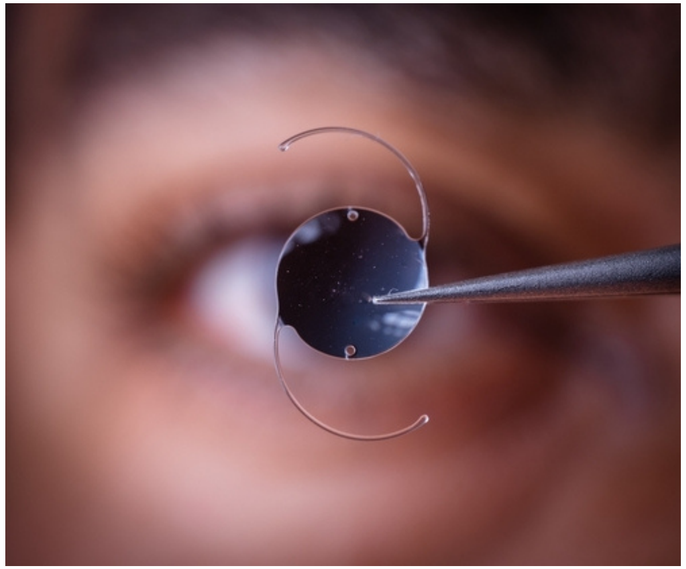
Fig 6: 30 days post-op Scheimpflug tomography(OS).

Conclusion

- Cataract extraction and toric IOL implantation on patient with non progressive keratoconus and cataract can provide an effective and safe option to correct high irregular astigmatism and significantly improve visual acuity.
- Toric IOLs placed during cataract surgery after PKP serve as an effective modality in reducing the refraction cylinder and in treating patients with high post-PK astigmatism.
- Toric IOL implantation in this case showed great results reducing postoperative refractive astigmatism despite the high corneal irregular astigmatism and leading to increased spectacle tolerance and a better quality of vision.



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