

Keratoconus Treatment with the Keraflex Procedure

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Eurokeratoconus Congress 2011 Bordeaux · Sylvia Paulig MD

Paulig Eye Surgery Centre | Office · Cottbus

**Commercial Interest:
NONE**

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What is Keraflex? I

It is a 50 milliseconds procedure for keratoconus treatment. It uses microwave energy, delivered in a small annulus to the corneal mid-periphery.

TWO STEP PROCEDURE:

STEP 1: Keraflex Procedure

STEP 2: KXL accelerated crosslinking

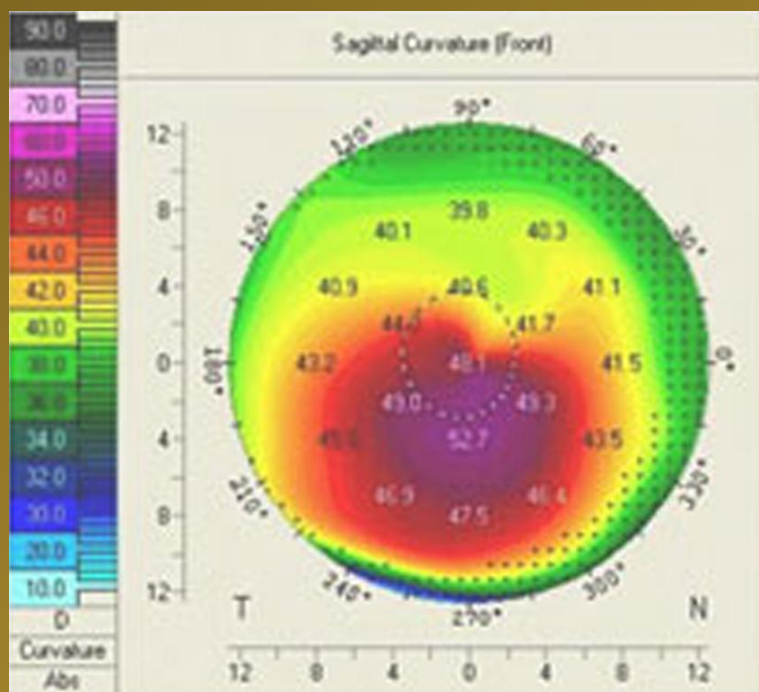
What is Keraflex? II

This procedure can flatten the cone and help to regularize the cornea. At the same time it offers the possibility of correcting the refractive error that the steepening has produced.

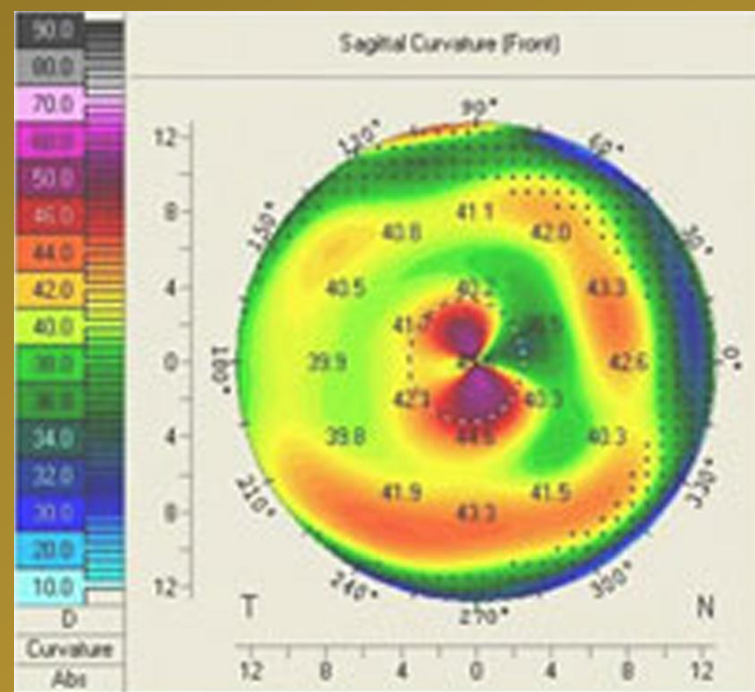
What is Keraflex? III

With the Keraflex procedure we have the possibility to improve patients uncorrected visual acuity. In addition Keraflex can increase the tolerance to wear contact lenses and also improve the possibility of vision correction with glasses.

What is Keraflex? IV



**Keratoconus
Pre-Kerflex
(KXL)**



**Keratoconus
One Week Post-
Kerflex (KXL)**

Courtesy of Avedro.com

Vedera system with accessoires



KXL crosslinking system

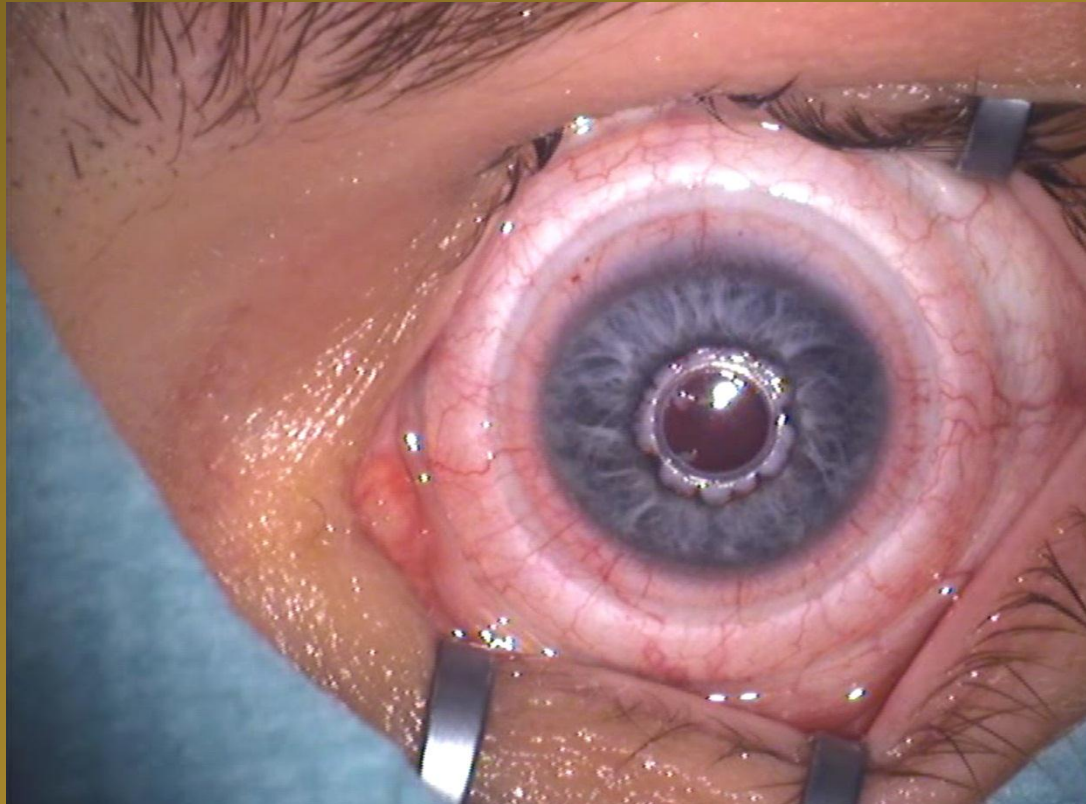


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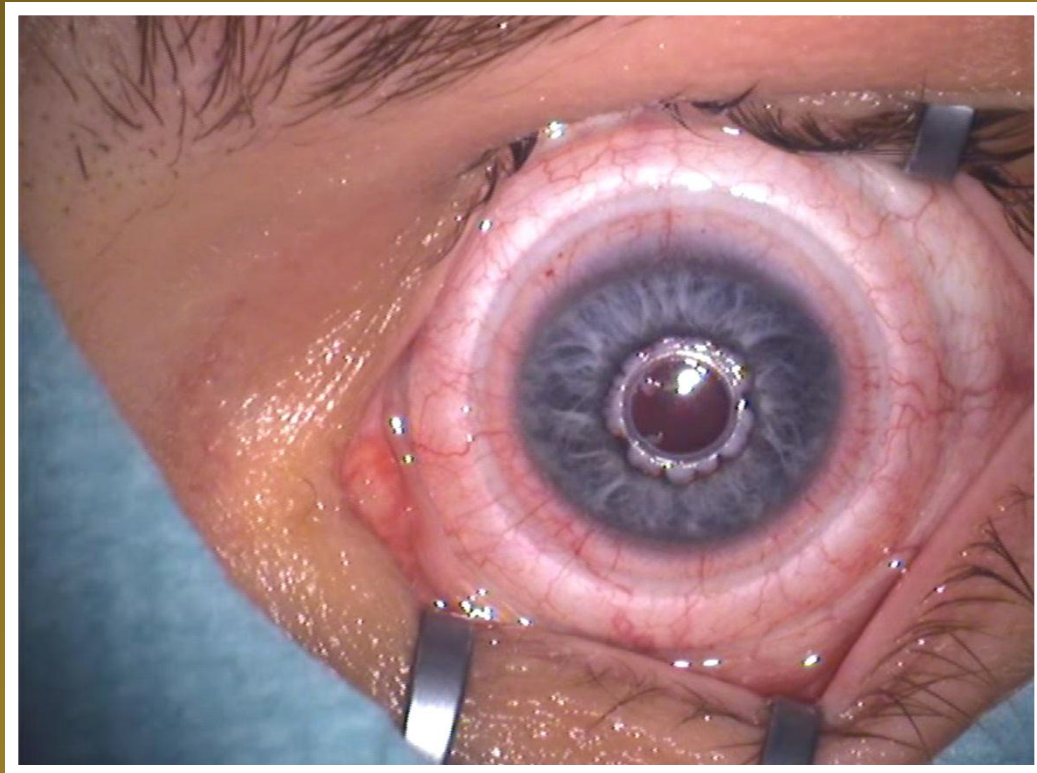
Procedure Animation



Procedure Live-Video



Male, age: 24



Post-Keraflex (1 minute)



Post-Keraflex (12 months)

Keraflex procedure in Cottbus

We started one year ago.

We use 2 STEP procedure.

STEP 1: Keraflex

STEP 2: KXL accelerated crosslinking

- Riboflavin 0,1%
- 3 Minuten / 30 mW - 6 Minuten / 15 mW

Time between STEP 1 & STEP 2 between 1 day and 1 month

Some selected Patients

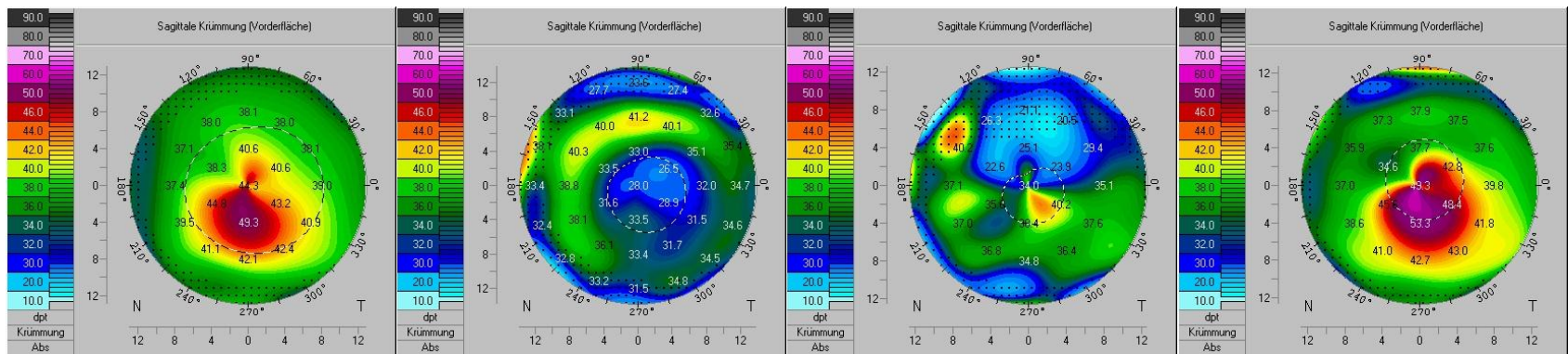
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We test VA with and without a pinhole aperture.

With the pinhole aperture we are simulating vision after the scar has faded. It is also a good model for exclusion of the ring-shaped scar in bright light and narrow pupil.

PATIENT 7	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-0,5 -8,5 / 162°	0,6p		40,9	45,6	
Post-KXL/Pre-CXL	+9,0 -4,0 / 14°	0,2p		28,0	31,5	12,9 / 14,1
Pre-CXL	+5,25 -4,25 / 176°		1,0p			
Post-CXL				29,8	34,0	11,1 / 11,6
3 Days Post-CXL			0,8p			
4 Months Post-CXL	0,0 -0,75 / 156°	0,8p / ND I	0,8 / ND I	41,8	47,7	-0,8 / -2,1



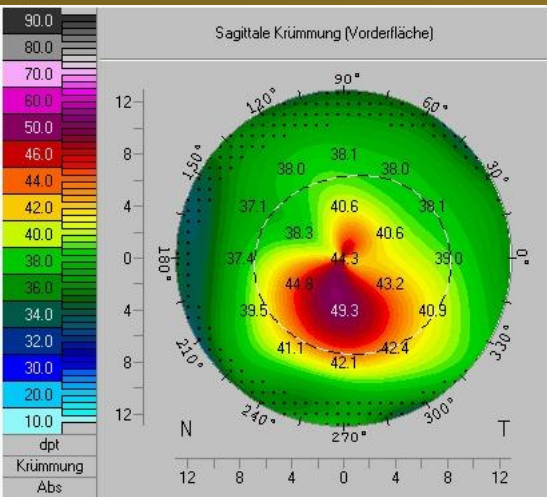
Pre-OP

Post-KXL

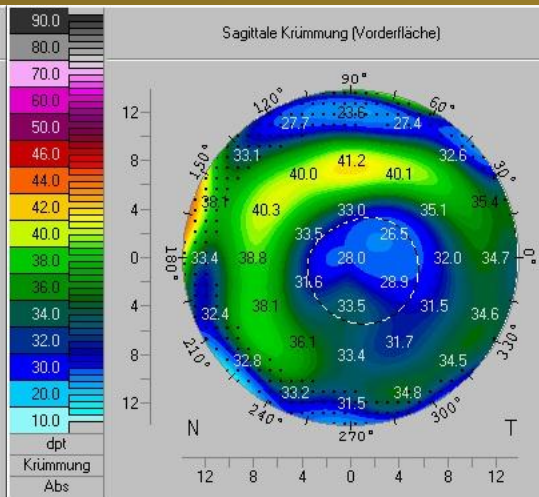
Post-KXL/CXL

4 Months Post-KXL/CXL

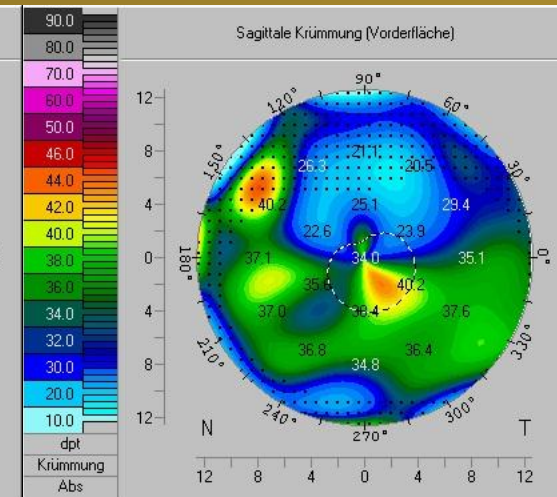
Pre-OP



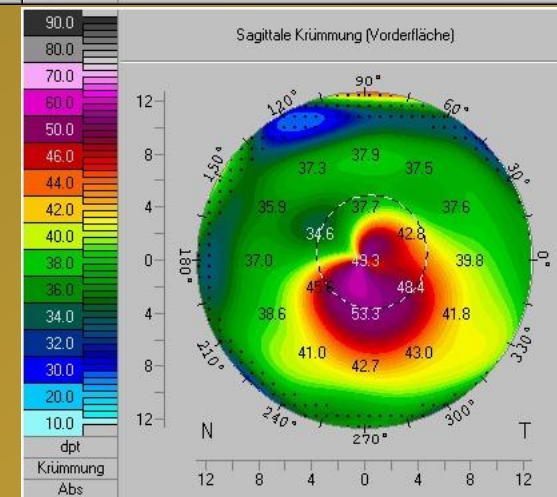
Post-KXL



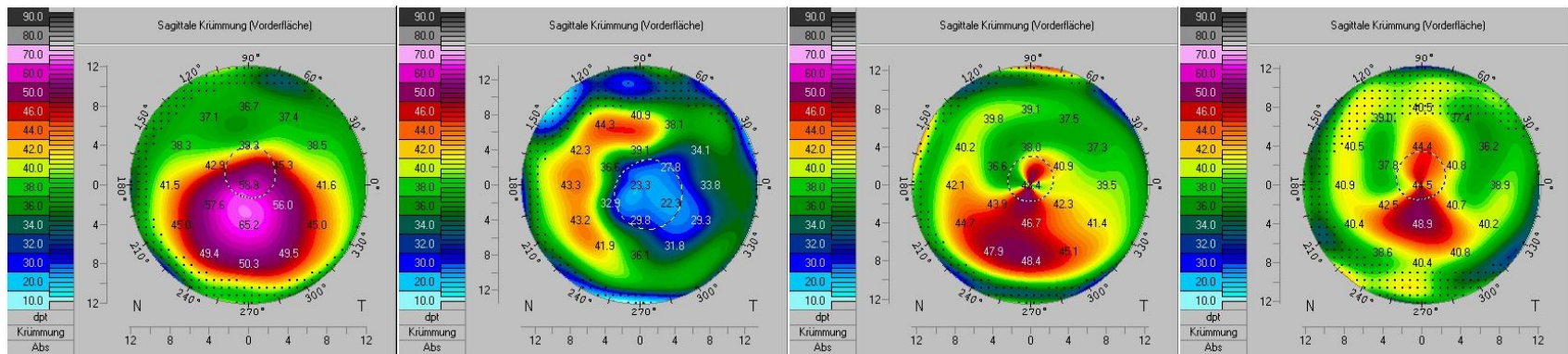
Post-KXL/CXL



4 Months Post-KXL/CXL



PATIENT 1	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-9,5 -8,75 / 146°	0,6		51,8	54,4	
Post-KXL/Pre-CXL	+9,0 -4,25 / 153°	0,1		26,2	27,2	25,6 / 27,2
Pre-CXL	+7,75 +3,0 / 169°		0,6			
Post-CXL			0,6	39,4	47,0	12,4 / 7,4
3 Days Post-CXL	+7,0 -4,75 / 169°	0,5	0,8			
1 Month Post-CXL	+5,25 -5,0 / 175°	0,5	0,8			
4 Months Post-CXL	+3,25 -6,25 / 172°	0,6	0,8	38,4	45,6	13,4 / 8,8



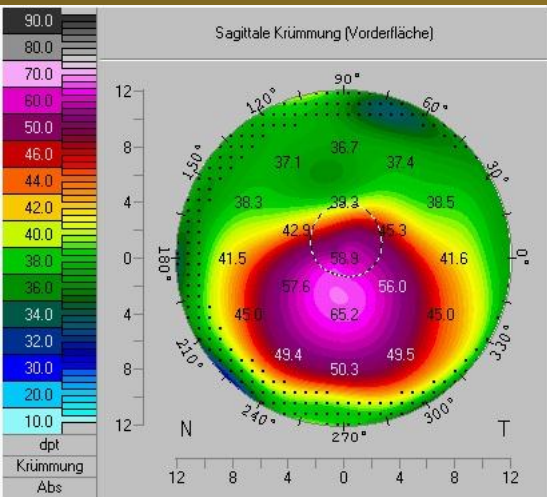
Pre-OP

Post-KXL

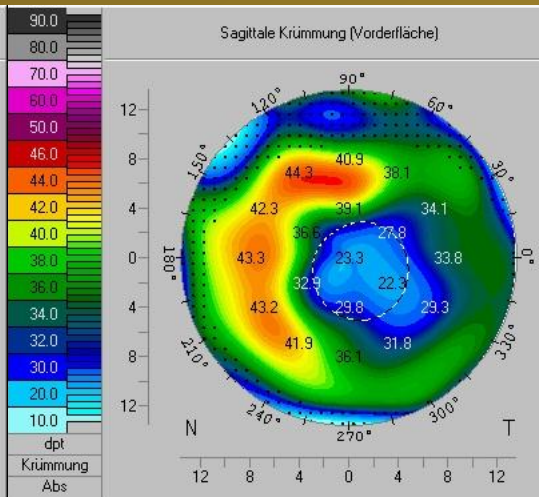
Post-KXL/CXL

1 Month Post-KXL/CLX

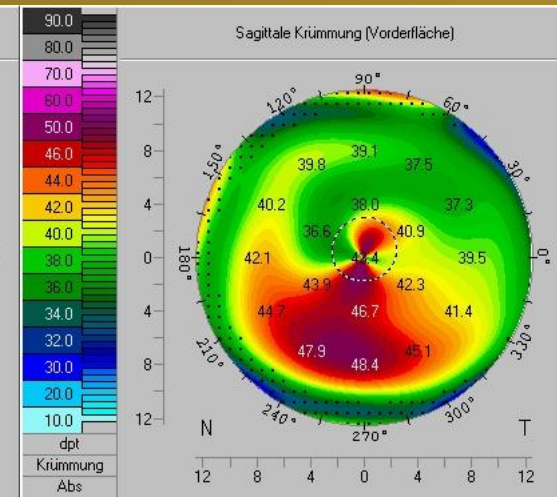
Pre-OP



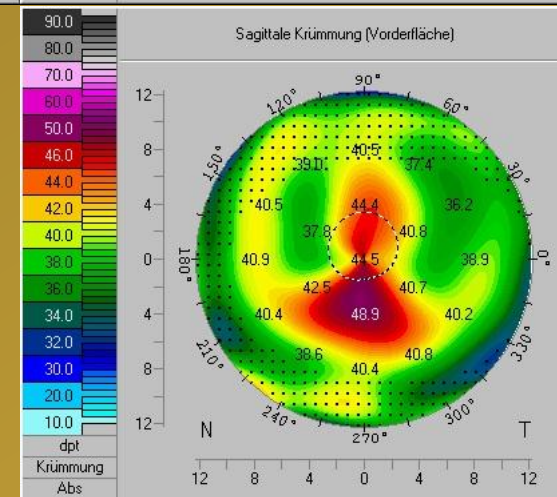
Post-KXL



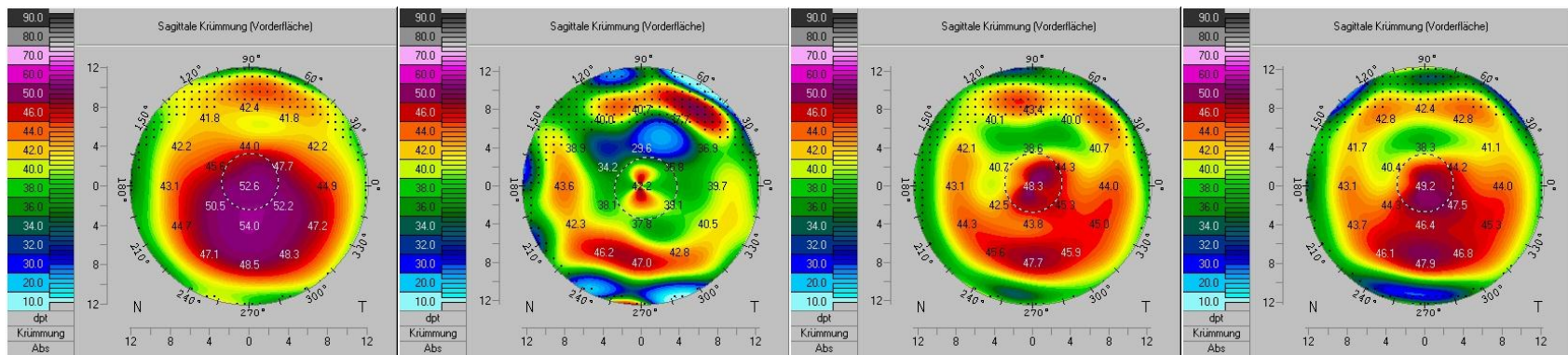
Post-KXL/CXL



1 Month
Post-KXL/CXL



PATIENT 2	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-5,5 -0,5 / 108°	0,12		49,9	50,9	
Post-KXL/Pre-CXL	+7,0 -4,5 / 115°	0,05		37,1	37,6	12,8 / 13,3
Pre-CXL	+2,0 -1,5 / 123°	0,4		43,9	45,7	6,0 / 5,2
Post-CXL	+2,5 -3,25 / 169°	0,12				
1 Month Post-CXL	-0,25 -2,25 / 114°	0,4				
3 Months Post-CXL	+0,25 -1,25 / 94°	0,3				
6 Months Post-CXL	+0,25 -1,0 / 156°	0,4	1,0p	44,6	45,2	5,3 / 5,7
12 Months Post-CXL	-0,75 +0,75 / 137°	0,6	1,0p	44,7	44,9	5,2 / 6,3



Pre-OP

Post-KXL

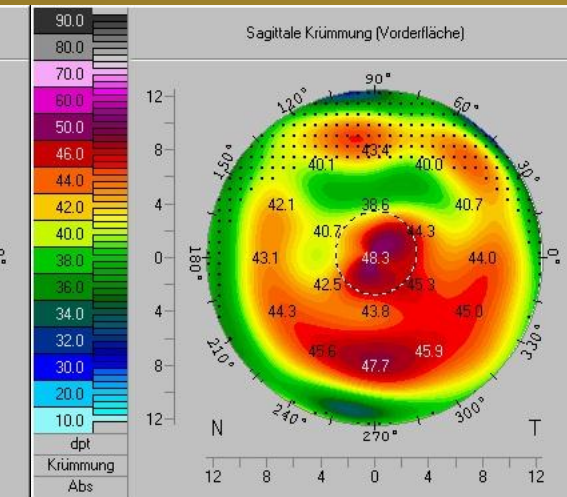
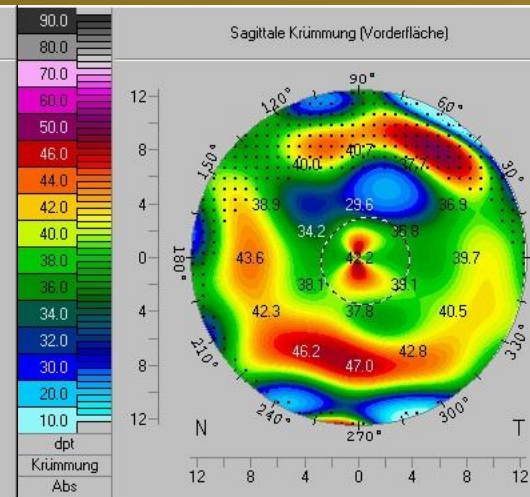
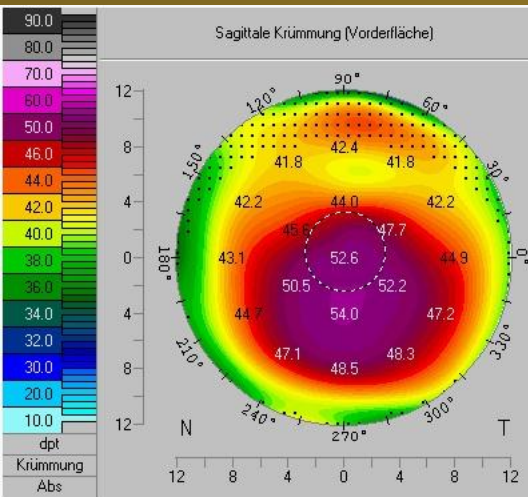
Post-KXL/CXL

6 Months Post-KXL/CXL

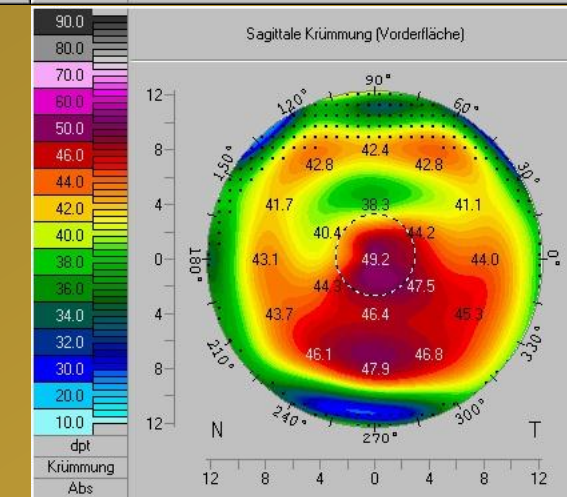
Pre-OP

Post-KXL

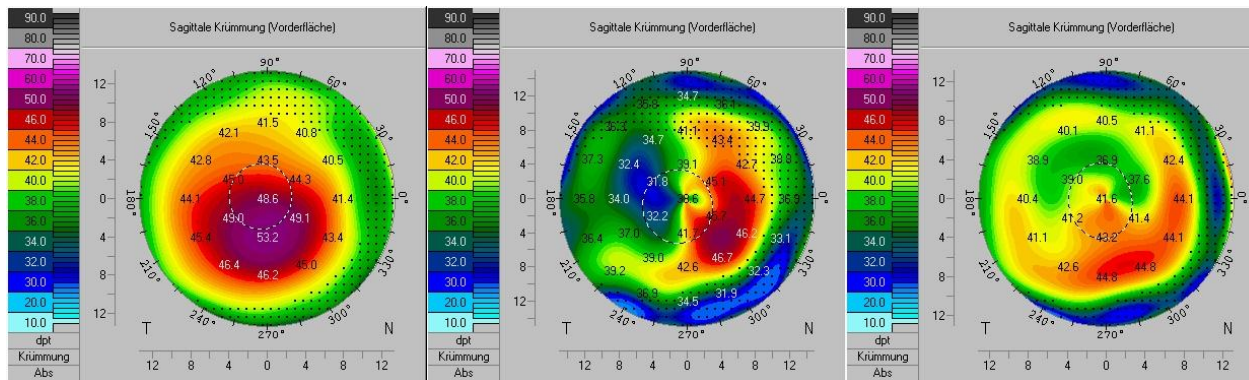
Post-KXL/CXL



6 Months
Post-KXL/CXL



PATIENT 3	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-1,25 -1,5 / 77°	0,5		47,3	48,2	
Post-KXL/Pre-CXL	+7,0 -2 / 17°	0,3	0,7	36,1	41,3	11,2 / 6,9
Pre-CXL	+7,0 -1,25 / 38°	0,3	1,0p			
Post-CXL	+6,5 -3,0 / 16°	0,3	0,4p	39,0	41,0	8,3 / 7,2
3 Days Post-CXL	+5,25 -2,75 / 160°	0,5	0,6			
1 Month Post-CXL	+3 -3 / 1°	0,6	1,0			
3 Months Post-CXL	0,0 -0,25 / 99°	0,5	0,8	41,0	43,8	6,3 / 4,4

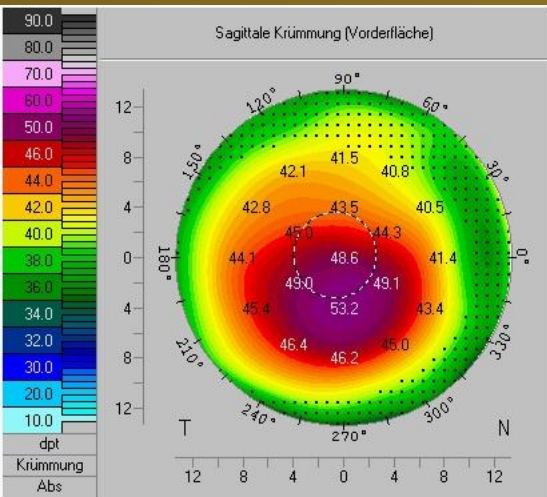


Pre-OP

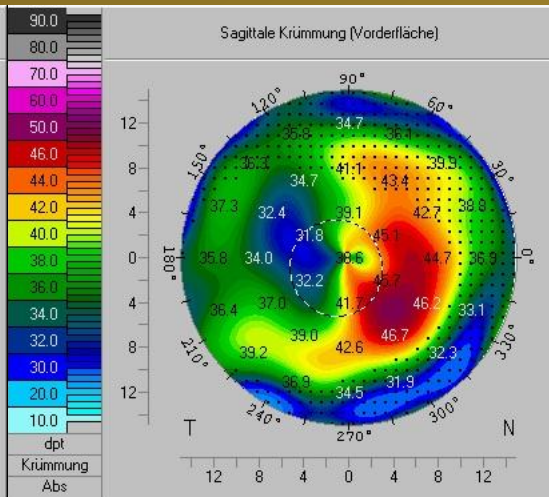
Post-KXL

Post-KXL/CXL

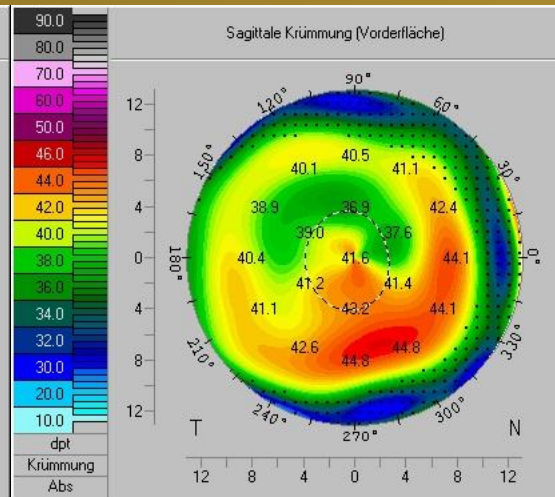
Pre-OP



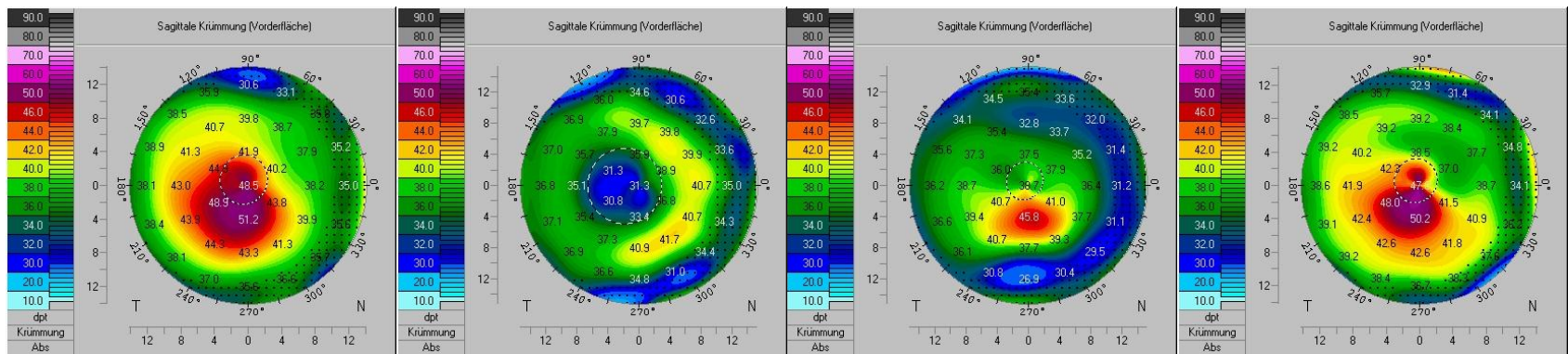
Post-KXL



Post-KXL/CXL



PATIENT 4	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-4,75 -4,0 / 160°	0,2p		44,4	48,0	
Post-KXL/Pre-CXL	+2,5 -1,0 / 160°		0,5p	32,1	33,9	12,3 / 14,1
Pre-CXL		0,05				
Post-CXL				37,8	40,9	6,6 / 7,1
3 Days Post-CXL	-0,25 -6,75 / 157°		0,8p			
1 Month Post-CXL	-2,75 -3,75 / 172°	0,8p	1,0p	41,2	46,8	3,2 / 1,2



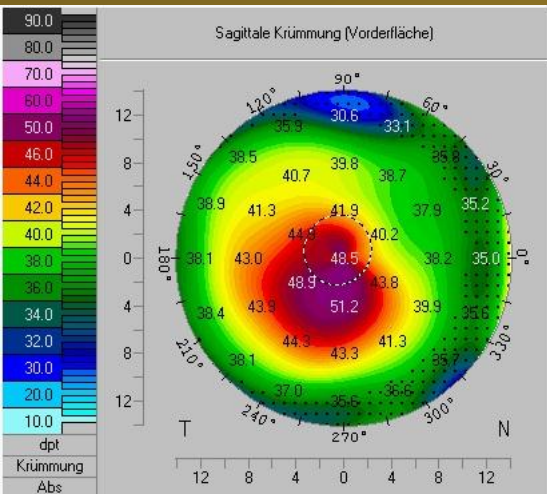
Pre-OP

Post-KXL

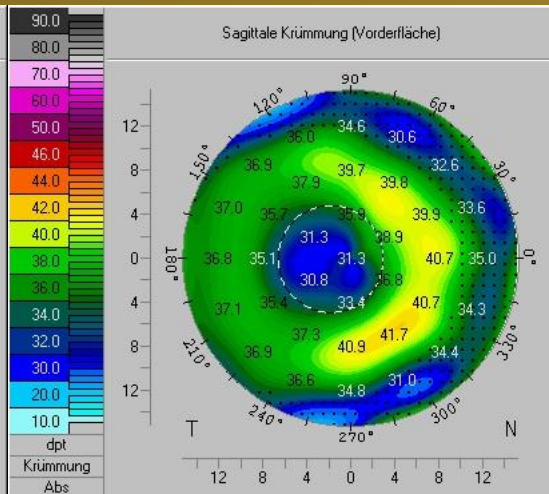
Post-KXL/CXL

1 Month Post-KXL/CXL

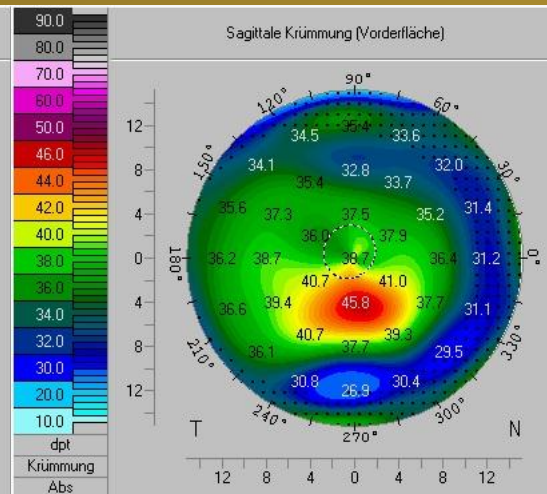
Pre-OP



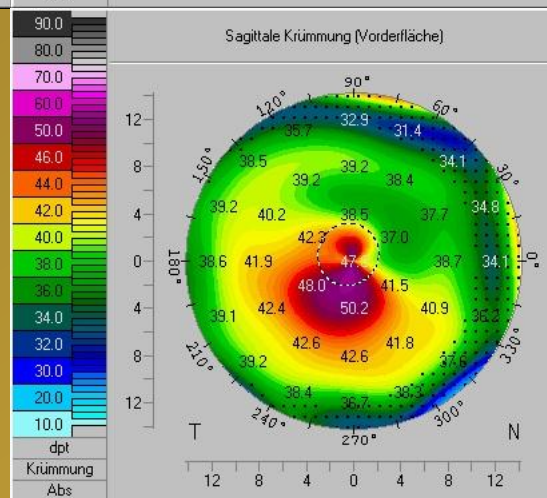
Post-KXL



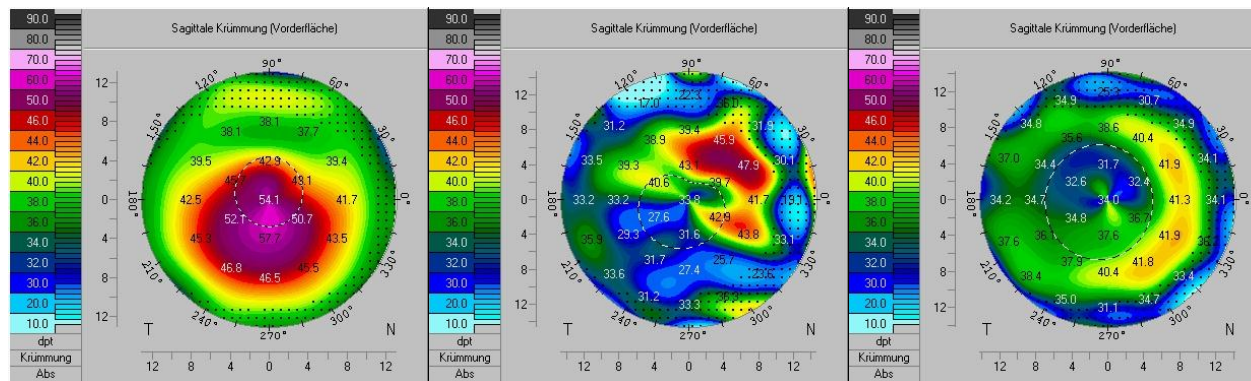
Post-KXL/CXL



1 Month
Post-KXL/CXL



PATIENT 5	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-11,0 -9,25 / 5°	0,05		48,3	52,7	
Post-KXL/Pre-CXL			0,5	32,0	40,2	16,3 / 12,5
Pre-CXL						
Post-CXL			0,3	31,4	36,5	16,9 / 16,2
3 Days Post-CXL		0,5	0,8			

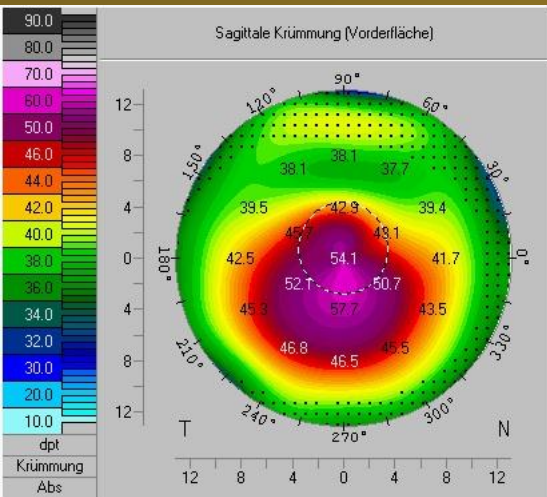


Pre-OP

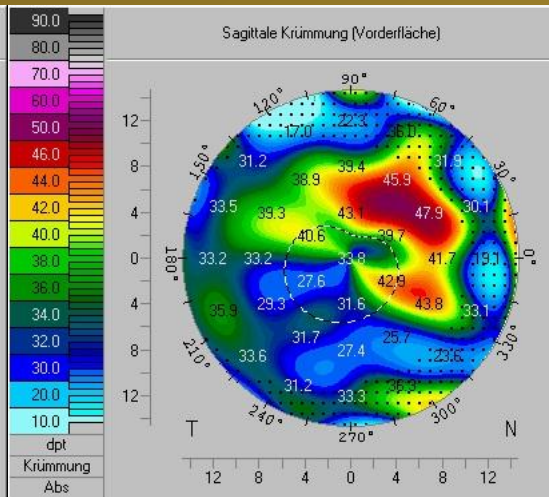
Post-KXL

Post-KXL/CXL

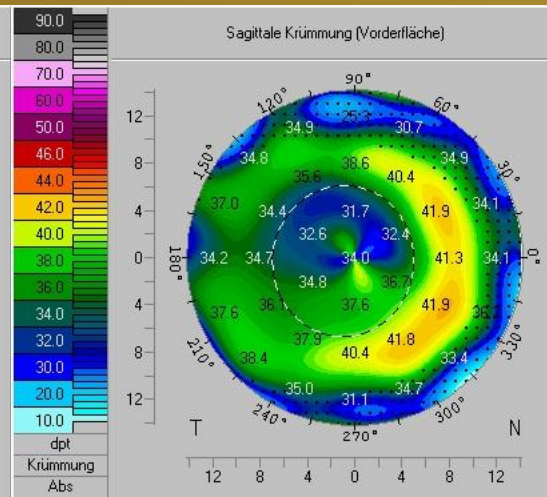
Pre-OP



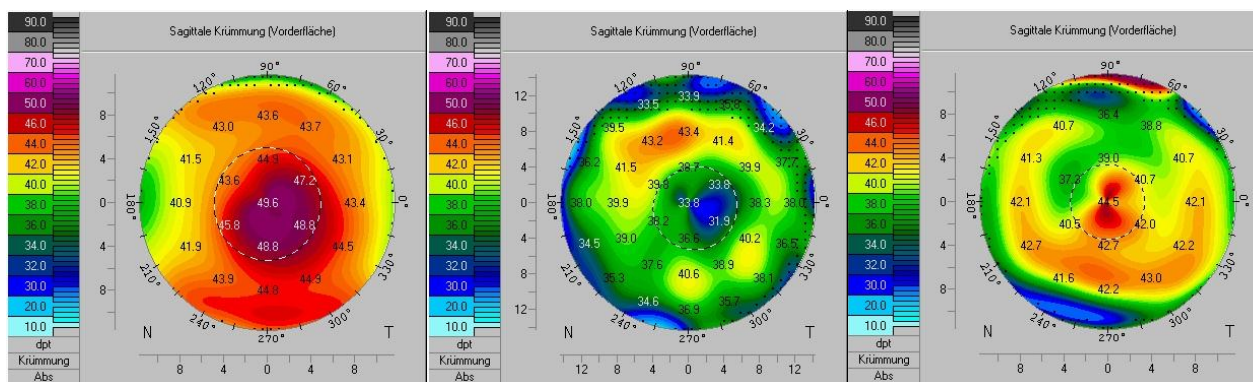
Post-KXL



Post-KXL/CXL



PATIENT 6	objective refraction	Visus UCVA no pinhole	Visus UCVA with pinhole	K1	K2	K1/K2 diff
Pre-OP	-3,0 -1,5 / 138°	0,4		47,0	48,4	
Post-KXL/Pre-CXL		0,2	0,8	33,4	37,0	13,6 / 11,4
Pre-CXL	+5,25 -2,0 / 165°	0,6	1,0p			
3 Days Post-CXL	+2,75 -4,5 / 177°	0,5	0,8	40,0	43,1	7,0 / 5,3
7 Days Post-CXL	+5,25 -4,0 / 157°	0,5	1,0			

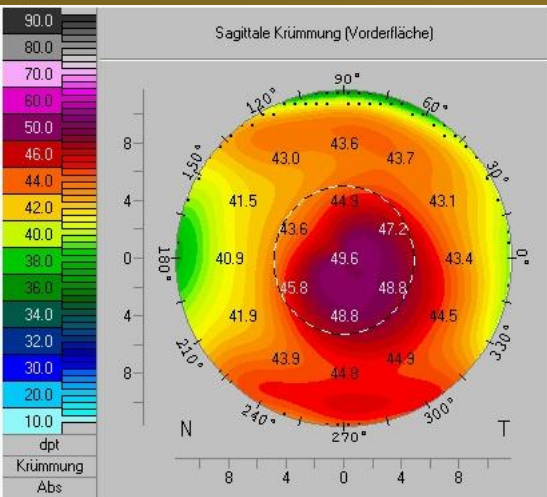


Pre-OP

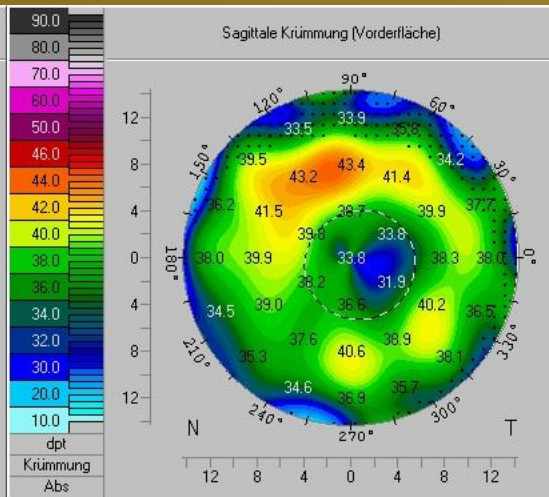
Post-KXL

Post-KXL/CXL

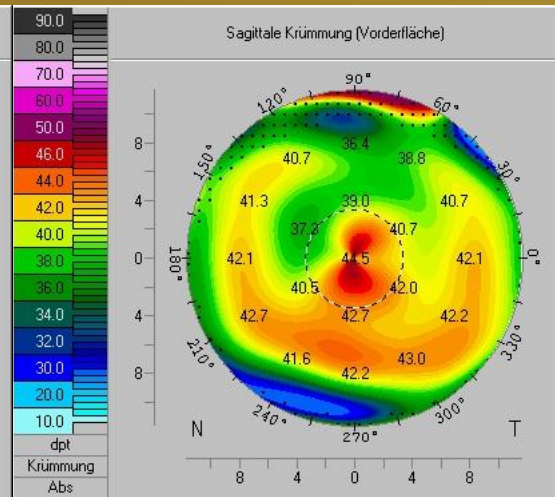
Pre-OP

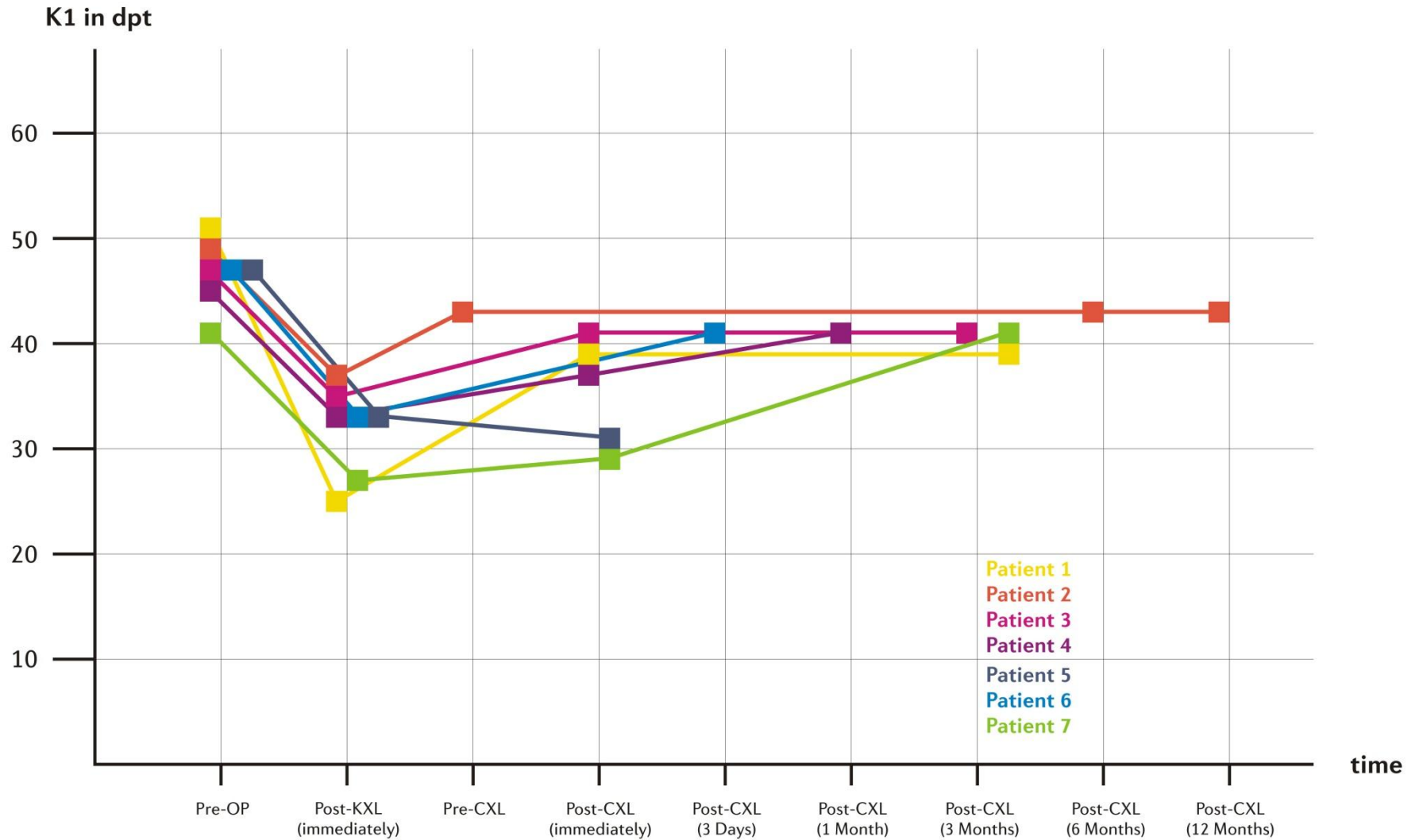


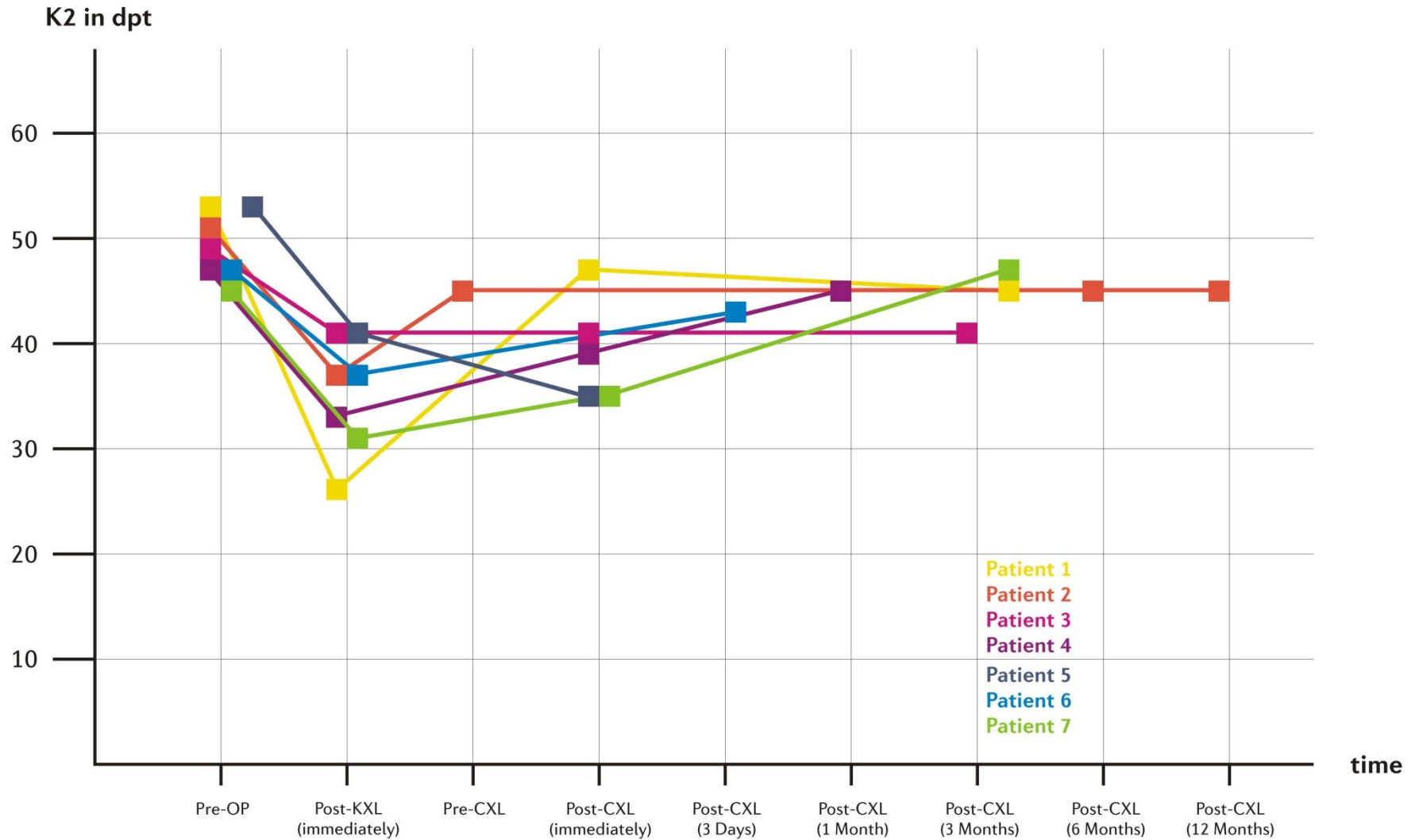
Post-KXL



Post-KXL/CXL







Conclusion

Keraflex in connection with KXL Accelerated Crosslinking seems to be a promising modality for correction of Keratoconus.

Thank You!

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