

*Corneal Collagen Crosslinking
in Pediatric Keratoconus:
Epithelium-Off Versus
Transepithelial Crosslinking*

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Disclosure Statement of Financial Interests

I have no conflict of interest to disclose



- **Purpose:**

To compare efficiency and safety of epithelium-off corneal cross-linking (CXL) and transepithelial cross-linking (TE-CXL) in pediatric patients with progressive keratoconus

• **Methods:**

Thirty two eyes underwent riboflavin- ultraviolet A- induced CXL. Best spectacle-corrected visual acuity (BSCVA), corneal topography, pachymetry and aberrometry (Pentacam; Oculus Pentacam) were evaluated at baseline and 1,3,6 and 12 months.

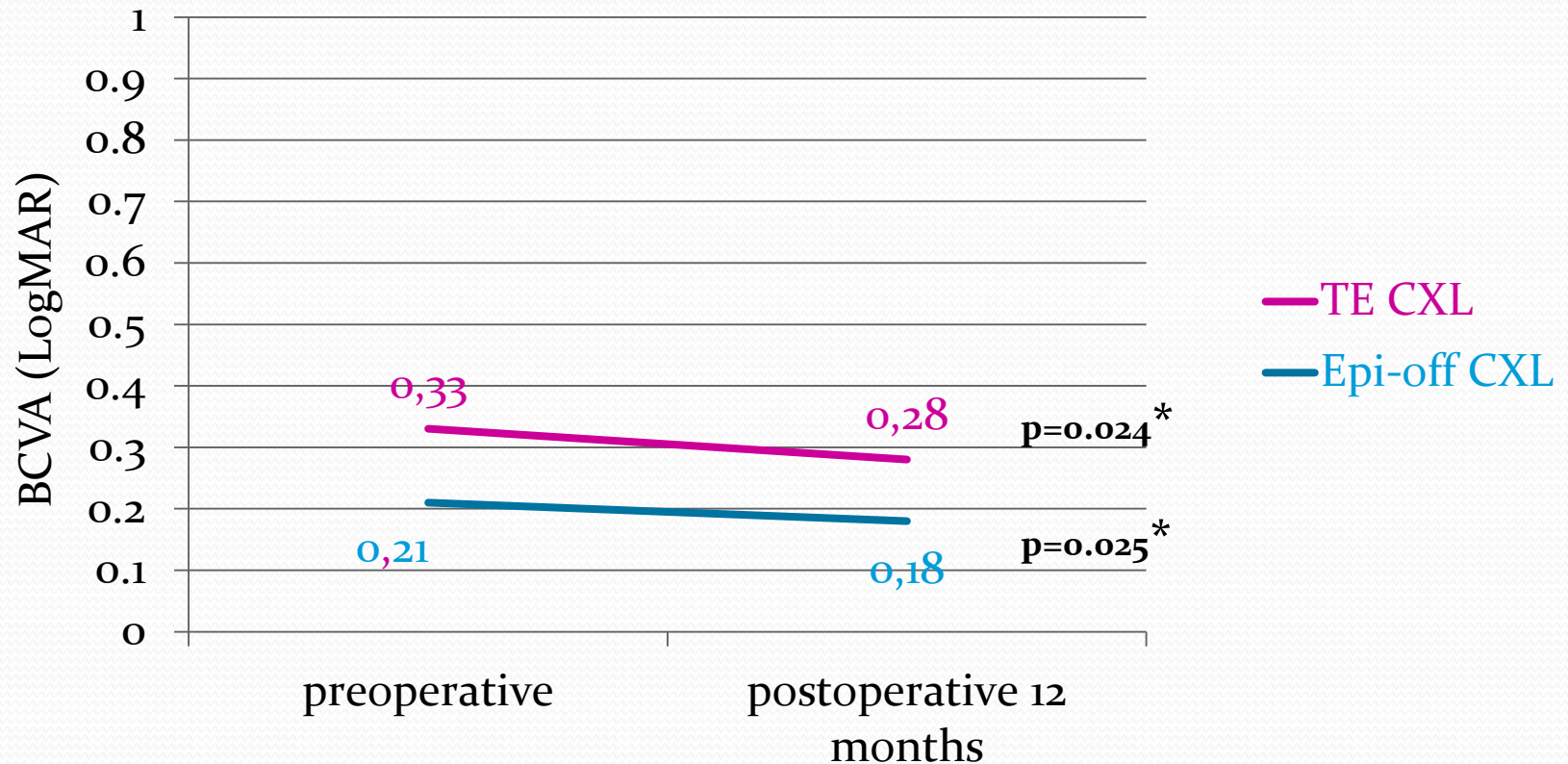
• **16 eyes Epi-off CXL**; after mechanical epithelial debridment 30 minutes corneal soaking with isotonic riboflavin solution (% 0.1 riboflavin + %20 dextran, Mediocross D), 30 minutes 3 mW/cm² UVA irradiation was applied.

• **16 eyes TE-CXL**; without mechanical epithelial debridment 30 minutes corneal soaking with TE riboflavin solution (% 0.1 riboflavin + %15 dextran, T500 EDTA %0.01 and trometamol, Mediocross TE CE), 30 minutes 3 mW/cm² UVA irradiation was applied.

Results:

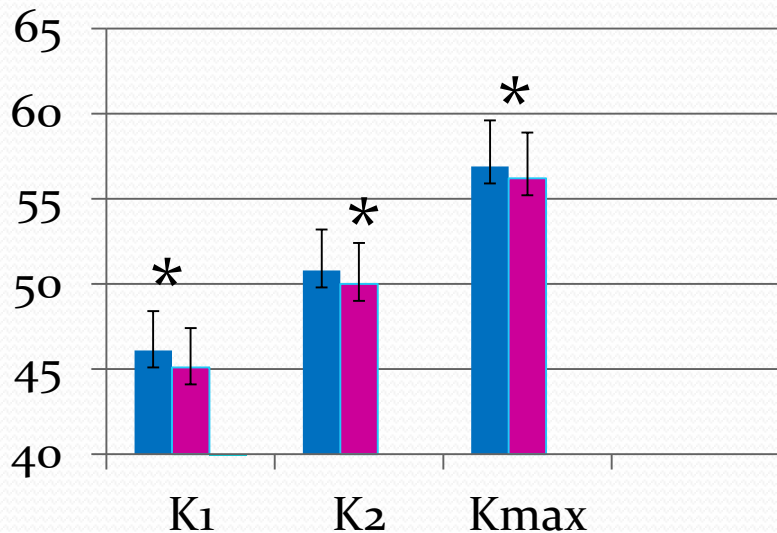
- Mean age was 16.4 years(13-18 years).
- 68.7% patients had vernal keratoconjunctivitis associated with keratoconus.
- No complications were observed in either study group.

BCVA significantly improved after treatment



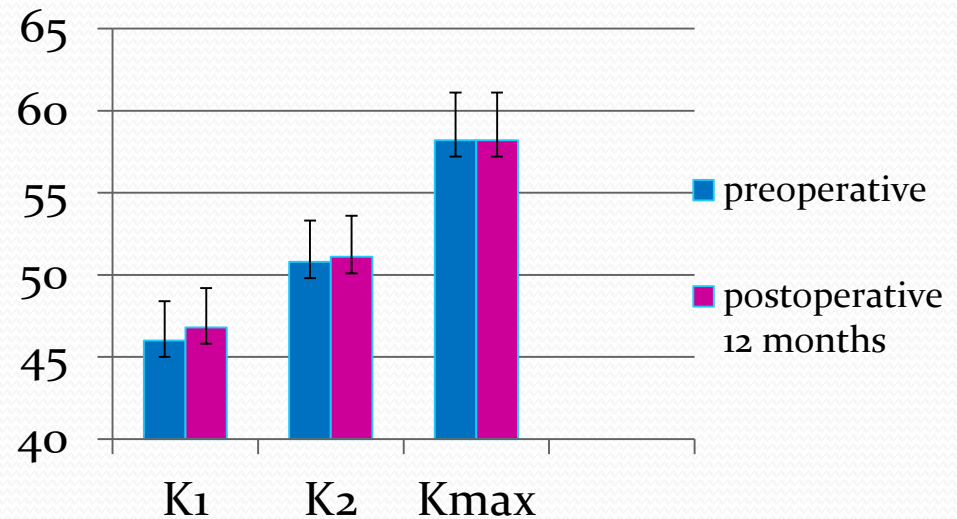
At 12 months, K1, K2 and Kmax significantly improved in the epi-off CXL group, whereas they remained stable in the TE CXL group

Epi-off CXL



	Pre operative	Post operative	p value
K1	46,1±3	45,1±3	0.004*
K2	50,8±3,5	50,0±3,1	0.032*
Kmax	56,9±5,7	56,2±5,7	0.021*

TE CXL



	Pre operative	Post operative	p value
K1	46±3,2	46,8±3,4	0.099
K2	50.8±3,4	51.1±3,6	0.306
Kmax	58,2±5,3	58,2±5,5	0.756

At 12 months, 3 of 7 keratoconic indexes significantly improved in the epi-off CXL group, whereas they remained unchanged in the TE CXL group

	preoperative	postoperative	p value		preoperative	postoperative	p value
ISV	91,6±37	87,5±34	0.023*	ISV	96,6±29,3	91,2±26,1	0.06
IVA	0,9±0,4	0,8±0,3	0.049*	IVA	1±0,44	0,86±0,3	0.09
KI	1,19±0,1	1,17±0,1	0,034*	KI	1,2±0,12	1,2±0,1	0.116
CKI	1,06±0,3	1,05±0,04	0.073	CKI	1,07±0,05	1,07±0,06	0.526
IHA	29,3±19	33,5±16,3	0.301	IHA	31,2±26,8	40,8±32	0.163
IHD	0,09±0,06	0,1±0,06	0.08	IHD	0,09±0,05	0,12±0,06	0.09
RMin	5,9±0,5	5,9±0,5	0.660	RMin	5,8±0,5	5,8±0,5	0.918

Postoperative Regression and Progression Rates at 12 months

	REGRESSION (decrease for $K_{max} > 1$ D)	STABILIZATION (increase- decrease for $K_{max} < 1$ D)	PROGRESSION (increase for $K_{max} > 1$ D)
EPI-OFF CXL	10 eyes (% 62.5)	5 eyes (% 31)	1 eyes (% 6.5)
TE- CXL	6 eyes (% 37.5)	6 eyes (% 37.5)	4 eyes (% 25)

	TOTAL NUMBER OF CASES	MEAN AGE	TREATMENT PROTOCOLE	FOLLOW UP TIME	RESULTS
A.Magli 2013	Epi-off : 19 patients, 23 eyes Epi-on : 10 patients, 14 eyes	Epi-off : 14.75 Epi-on : 15	Epi-off: %0.1 riboflavin+ %20 dextran Ricrolin 3 mW/cm ² 30 min UVA Epi-on: %0.1 riboflavin+ %15 dextran Ricrolin TE 3 mW/cm ² 30 min UVA	12 months	Significant improvement in corneal topographic indexes in two groups, no difference in changes between groups with 12 months follow up, more postoperative complications in epi-off group
Vinciguerra P. 2012	40 patients, 40 eyes	14.2	Epi-off: %0.1 riboflavin+ %20 dextran Ricrolin 3 mW/cm ² 30 min UVA	24 months	Significant improvement in UCVA and BSCVA. Significant decrease in SE refraction and corneal topographic indexes and total aberrations
Buzzonetti L. 2012	13 patients, 13 eyes	14.4	Epi-on: %0.1 riboflavin+ trometamol+ sodium EDTA 3 mW/cm ² 30 min UVA	18 months	Significant improvement in BSCVA increase in corneal topographic indexes and aberrations
Ozcan D. 2014, this study	Epi-off : 14 patients, 16 eyes Epi-on :10 patients, 16 eyes	16,2	Epi-off: %0.1 riboflavin+ %20 dextran 3 mW/cm ² 30 min UVA Epi-on: %0.1 riboflavin+ %15 dextran trometamol+ sodium EDTA Mediocross TE 3 mW/cm ² 30 min UVA	12 months	Significant improvement in BSCVA in two groups, ,significant decrease in corneal topographic indexes in epi-off group, stabilization in epi-on group

Conclusions:

- This study demonstrated significant functional improvement in pediatric patients with progressive keratoconus, undergoing riboflavin-UVA-induced CXL.
- In pediatric patients epithelium-off and TE CXL stabilize progressive keratoconus and additionally epithelium-off CXL causes a significant reduction in topographic parameters at 12 month follow-up.

References:

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