

Trans-epithelium accelerated Corneal Collagen Cross-linking in Treating Primary Keratoconus with Different UVA Fluencies

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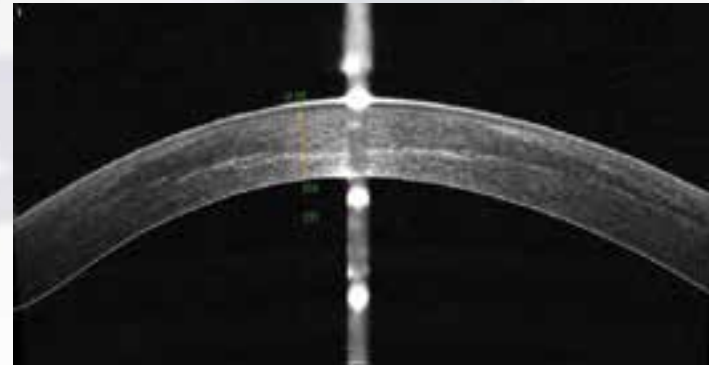
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All authors have no financial interests.

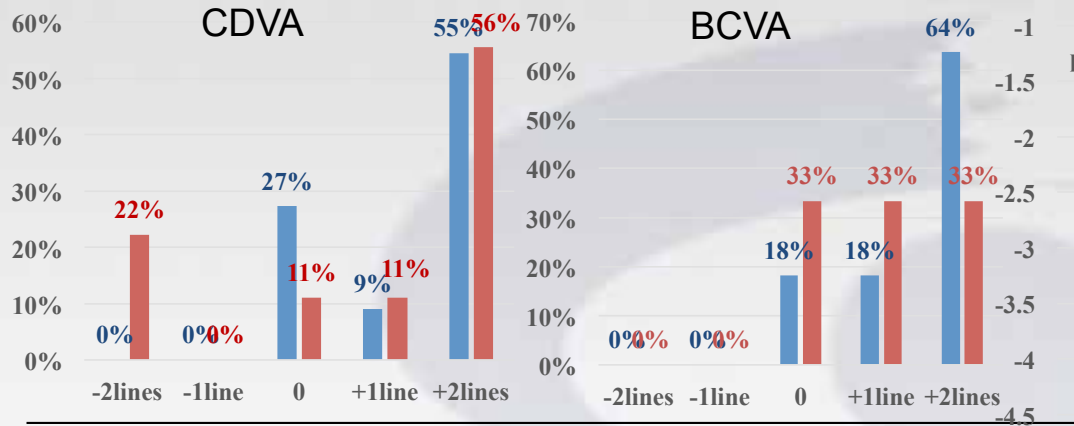


Method

- **Case series research**
- **Two groups:** 45mW/cm² group and 20mW/cm² group (total irradiation 7.2J/cm²)
 - Patients in the same grade of keratoconus classification were randomly distributed into two groups.
- **Parameters:** vision acuity (UCVA & BCVA), K (K1,K2,Kmax), anterior & posterior elevation, IVA,KI,CKI...
- 20 keratoconous eyes of 20 patients.
- Male : Female = 18:2, average age 20
- 45mW/cm² group 11 eyes, 20mW/cm² group 9 eyes.
- Follow up: 2 years



REFRECTION—Sph、Cyl、SE

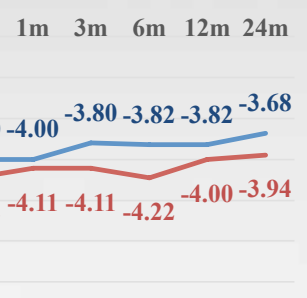


Sph

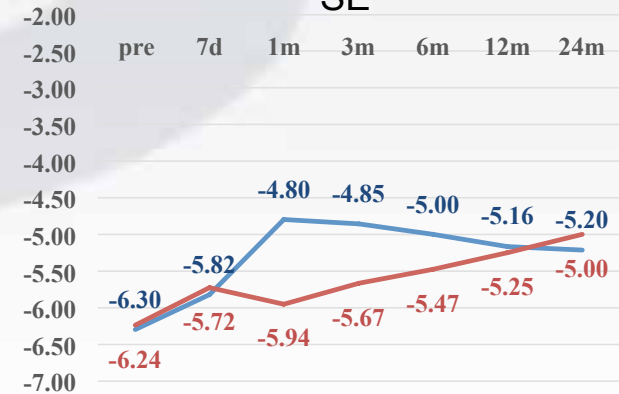


Results

45mW/cm²
20mW/cm²



SE

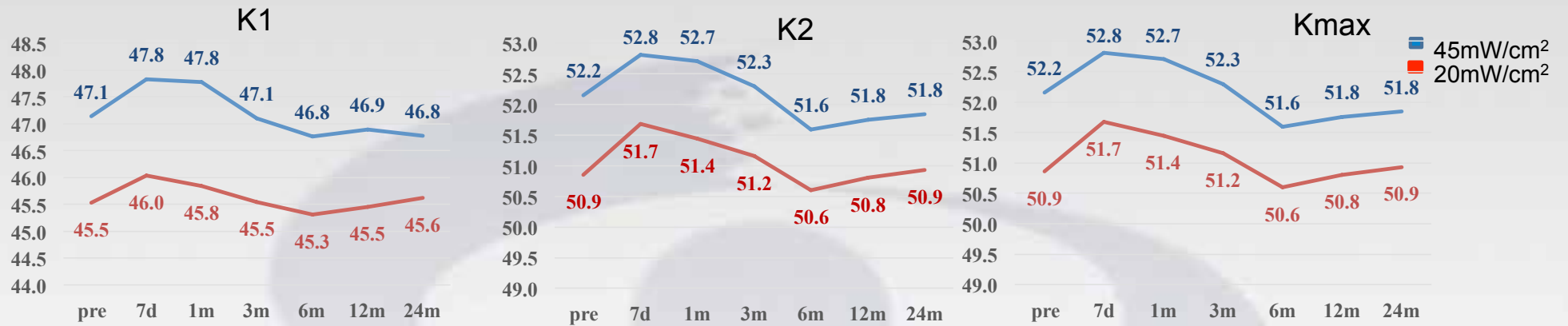


Δ Refraction

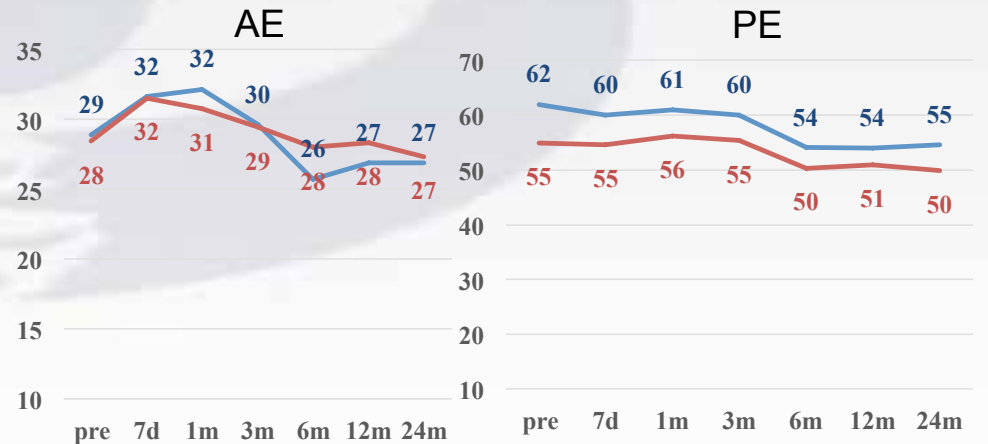
| | 45mW/cm ² | P1 | P2 | 20mW/cm ² | P3 | P4 | P |
|------|----------------------|-------|-------|----------------------|-------|-------|-------|
| UCVA | -0.16±0.35 | 0.032 | 0.152 | -0.10±0.23 | 0.201 | 0.224 | 0.652 |
| BCVA | -0.10±0.06 | 0.000 | 0.000 | -0.10±0.12 | 0.056 | 0.041 | 0.852 |
| Sph | 0.82±1.47 | 0.000 | 0.050 | 0.78±1.11 | 0.093 | 0.070 | 0.947 |
| Cyl | 0.55±0.66 | 0.050 | 0.164 | 0.92±1.91 | 0.264 | 0.188 | 0.591 |
| SE | 1.09±1.56 | 0.164 | 0.039 | 1.24±1.61 | 0.088 | 0.050 | 0.841 |



Corneal Curvature: Kf, Ks, Kmax ^{Results}



| | Δ | | | | | | |
|------|----------------------|--------------|--------------|----------------------|-------|-------|--------------|
| | 45mW/cm ² | P1 | P2 | 20mW/cm ² | P3 | P4 | P |
| K1 | -0.36±0.43 | 0.087 | 0.019 | 0.09±0.38 | 0.700 | 0.505 | 0.025 |
| K2 | -0.31±0.51 | 0.014 | 0.074 | 0.08±0.41 | 0.679 | 0.584 | 0.084 |
| Kmax | -0.85±0.90 | 0.001 | 0.011 | -0.48±1.07 | 0.146 | 0.218 | 0.416 |
| AE | -2±4 | 0.047 | 0.100 | -1±3 | 0.931 | 0.341 | 0.579 |
| PE | -7±5 | 0.001 | 0.001 | -5±7 | 0.171 | 0.054 | 0.362 |
| IVA | -0.03±0.11 | 0.807 | 0.437 | -0.02±0.06 | 0.379 | 0.383 | 0.833 |
| KI | 0.01±0.03 | 0.938 | 0.523 | 0.02±0.05 | 0.245 | 0.344 | 0.552 |
| CKI | -0.01±0.01 | 0.053 | 0.006 | -0.00±0.01 | 0.179 | 0.799 | 0.358 |



Discussion

- There was no significant inter-group difference in any parameter before CXL. (all $P_s > 0.05$)
- In accordance with previous reports¹⁻³, our study showed corneal flattening in both groups.
- Although no inter-group significant difference was found in any parameter, 20 mW/cm² group appeared to be more effective.

1 Cinar Y, Cingu AK, Turkcu FM, et al. comparison of accelerated and conventional corneal collagen cross-linking for progressive keratoconus. *Cutan Ocul Toxicol* 2014;33(3):218-22.

2 Asri D, Touboul D, Fournie P, et al. Corneal collagen crosslinking in progressive keratoconus. *JCRS* 2011;37(12):2137-43.

3 Mita M, Waring IV Go, Tomita M. High-irradiance accelerated collagen cross-linking for the treatment of keratoconus: Six-month results. *JCRS* 2014;40(6):1032-40.



Conclusion

- Epithelium-on accelerated CXL with both 45 mW/cm² and 20 mW/cm² UVA intensity showed to be comparably effective and safe in treating primary keratoconus.
- Further long-term follow-up will show whether this reduced effect will still be sufficient to arrest keratoconus progression.

