

# The Efficacy of Corneal Cross-Linking Shows a Sudden Decrease with Very High Intensity UV Light and Short Treatment Time

*Paolo Vinciguerra*

Istituto Clinico Humanitas Via Manzoni, 56. Comune, Rozzano (MI) Italy; info@vincieye.it

Several papers have been published in previous years regarding cross-linking and the effect of the procedure on corneal ectasia. Different protocols of cross-linking have been described with or without corneal epithelium removal, with different kinds of riboflavin solution (e.g., hypo-, iso—hyper-osmolar), different impregnation times, and different lengths of UV-A illumination and irradiation power. The huge amount of information could disorient the general ophthalmologist, who has to choose the proper procedure and, moreover, decide the best protocol to treat the patient.

The study by Wernli et al.<sup>1</sup> shows in a large number of cases, the biomechanical strengthening effect of cross-linking with various irradiances ranging from 3 to 90 mW/cm<sup>2</sup> with illumination times from 30 minutes to 1 minute, respectively. These results show that for irradiances larger than 45 mW/cm<sup>2</sup>, corresponding to an illumination time of about 2 minutes, there is no significant increase in corneal strengthening.

Considering the different tools commercially available and the various ranges of UV-A irradiances, the ophthalmologists, who are not accustomed with cross-linking procedure, could find the approach to cross-linking difficult and confusing; they could erroneously think that a faster procedure would be effective enough and without any side effect, like the original Seiler's protocol.

This paper is crucial because it gives precise information regarding the effective strengthening of the cornea at various irradiances.

As the authors suggested, other papers will be needed to validate these results in vivo, study the possible side effects of higher doses of UV light at lower exposure times and consider the flattening effect of the different protocols. The flattening effect of cross-linking over the corneal stroma tended to regularize the corneal shape and allow variation in refraction with increase in best spectacle-corrected visual acuity in several patients. It was not necessarily related to the increase of the biomechanical strengthening of the cornea.

## References

1. Wernli J, Schumacher S, Spoerl E, Mrochen M. The efficacy of corneal cross-linking shows a sudden decrease with very high intensity UV light and short treatment time. *Invest Ophthalmol Vis Sci.* 2013;54:1176–1180.