

CXL at the Slit Lamp: No Clinically Relevant Changes in Corneal Riboflavin Distribution During Upright UV Irradiation

To the Editor:

Photo-activated chromophore for keratitis cross-linking (PACK-CXL)¹⁻⁴ may become an attractive treatment for developing and emerging countries where access to ophthalmic care and medical equipment is limited.⁵ PACK-CXL treatment has the potential to be performed at the slit-lamp within 3 to 5 minutes.³ We have addressed a remaining concern: is the stromal riboflavin distribution affected by gravity if the ultraviolet irradiation takes place in the upright position?

Freshly enucleated porcine eyes were incubated in 0.1% hypoosmolar riboflavin solution without dextran for 30 minutes and then divided into three groups: corneas fixed in a vertical position for 30 minutes ($n = 4$), corneas fixed in a vertical position for 60 minutes ($n = 8$), and corneas fixed in a horizontal position for 60 minutes ($n = 8$). Four corneas were immersed in 0.9% sodium chloride for 60 minutes and served as fluorescence controls. The fluorescence signal of each cornea was measured with a spectrophotometer. Statistical significance was determined with Student's t tests and a confidence interval of 95%.

After 30 minutes, there was no difference ($P = .22$) between superior and inferior riboflavin saturation, whereas a statistically significant ($P = .002$) gradient of 3.36% was found after 60 minutes (Figure 1).

Gravitational influence on the riboflavin distribution was observed only after 60 minutes of vertical positioning. Given that a PACK-CXL treatment typically lasts for 3 to 30 minutes,²⁻⁴ this difference can be considered not clinically relevant. Limitations of this study include a small sample size and the use of porcine instead of human corneas.

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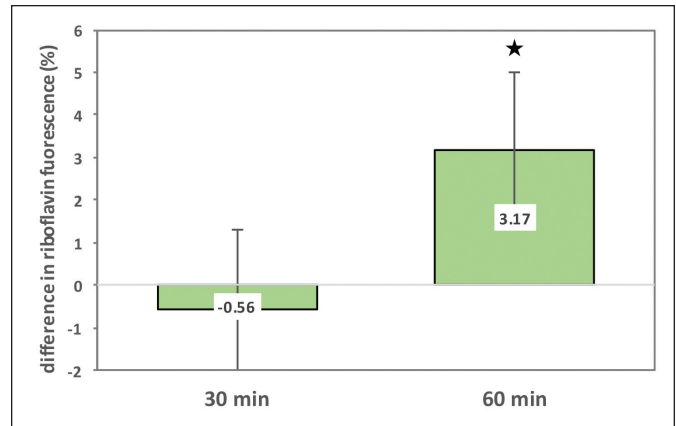


Figure 1. Changes (%) in fluorescence levels along the vertical axis in riboflavin-soaked corneas mounted in a vertical position for 30 and 60 minutes, respectively.

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Basile Salmon
Olivier Richoz, MD, PhD
David Tabibian, MD
Sabine Kling, PhD
Raphael Wuarin
Farhad Hafezi, MD, PhD
 Geneva, Switzerland

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