

# Laboratory Measurement of UVA irradiation levels employed in Clinical Corneal Collagen Cross-Linking Devices



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# Purpose

To independently  
confirm  
measurement of  
the irradiation  
levels used in  
clinical corneal  
collagen cross-  
Linking devices.



# Methods

We employed independent laboratory-graded UVA digital light radiometers: (DigiProbe, sglux SolGel Technologies GmbH, Berlin, Germany) to independently measure UVA (365 nm – average) irradiation levels in four CXL devices in current clinical use:

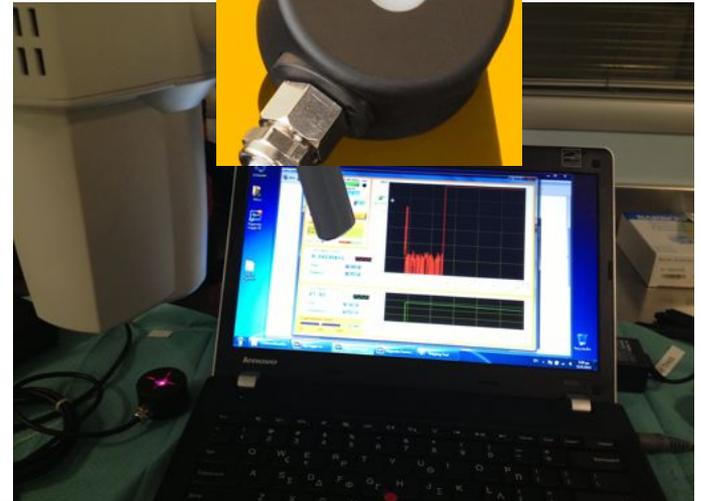
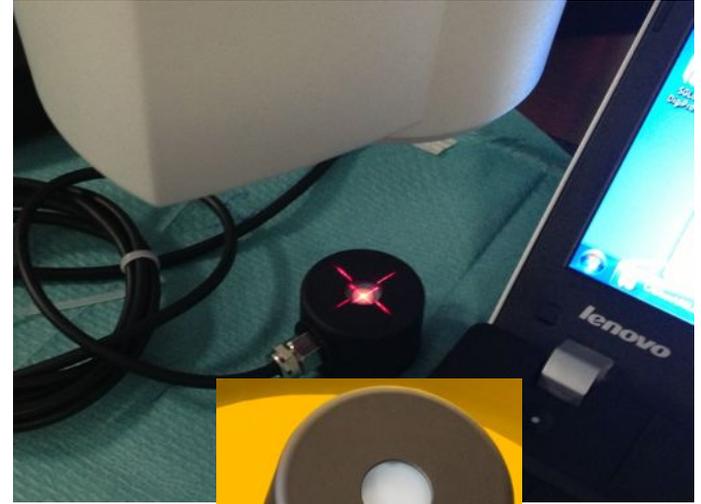
- KXL I (Avedro, Waltham, MA)
- KXL II (Avedro, Waltham MA),
- Vega (CSO, Scandicci Firenze, Italy), and the
- UVX 2000, (IROC Innocross AG, Zug, Switzerland).

The manufacturer suggested working distances and other environmental parameters were observed.

Temporal variations during measurement, as well as comparison of averages between different-session measurements were recorded.



# Materials: clinical devices and objective UV measuring devices



# Results

Average fluence measured were,

- for the KXL system,  $29.5 \pm 1.3$  mW/cm<sup>2</sup> (manufacturer-released, 30 mW/cm<sup>2</sup>),
- for the Vega system,  $2.8 \pm 0.3$  mW/cm<sup>2</sup> (manufacturer-released, 3 mW/cm<sup>2</sup>), and
- for the UVX system,  $2.6 \pm 0.7$  mW/cm<sup>2</sup> (manufacturer-released, 3 mW/cm<sup>2</sup>).



# Conclusions

Independent, laboratory investigation of clinical CXL devices reveals that the KXL systems are closely-matched to manufacturer-released fluence values with little intra-operating deviations. It should be noted that both the Avedro devices (KXL I and KXL II) were more accurately placed possibly due to their real time dynamic internal fluence measuring and adjustment

