Impact of *in vivo* soft contact lens dehydration in perception of light distortion

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Purpose: The purpose of this work was to evaluate if it is possible to detect differences in the perception of luminous distortions (haloes and starburst) between different contact lens materials and different blinking rates as a consequence of surface drying.

Method: Fifteen healthy subjects (12 women and 3 men) with ages between 20 to 23 years (20.7 ± 0.98 years) participated in this study. Light distortion was evaluated under conditions of dim illumination with the Starlights (Novosalud, Valencia, Spain). The measures were obtained with and without two silicone hydrogel soft contact lenses made of different equilibrium water content (ECW=38% for Senofilcon A vs EWC=47% for Galyfilcon A) under two controlled blinking conditions (12 blinks per minute and 4 blinks per minute).

Results: There were statistically significant differences in light distortion between both frequencies of blinking for the naked eye and with both lenses ($p < 0.05$). The lens of lower hydration (Senofilcon A) showed a lower increase of the luminous distortion particularly for the lower blinking rate ($p < 0.001$).

Conclusions: Silicone hydrogel lenses with similar surface treatments and different bulk composition and EWC induce different surface dehydration rates inducing differences in the perceptions of light distortion under dim light conditions. This effect worsens as the blinking rate decreases, presumably due to poorer stability of the pre-lens tear film. This non invasive methodology can be used to determine the impact of contact lens surface dehydration on visual experience of light distortions at night.