Novel Light Intensity Device (LID) for Quantitative Evaluation of Dry Eye Syndrome

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Purpose:
To evaluate the effectiveness of a novel device that quantifies light sensitivity in patients reporting Dry Eye Syndrome (DES) symptoms, and whether light sensitivity measurement is an effective indicator of DES.

Methods:
15 patients reporting DES symptoms were recruited during their regularly scheduled visit to a Dry Eye clinic. A routine screening exam was conducted, including Non-Invasive Tear Break-up Time (NIBUT), Schirmer strips, and Osmolarity. In addition, each patient was asked to adjust a Light Intensity Device (LuxIQ™, Jasper Ridge Inc.) to their preferred illuminance and white light color temperature on a 40-cm near vision chart (Colenbrander Mixed Contrast), over an illuminance range of 0-5000 lux and color temperature range of 2,700 to 6,500°K. Measurement was bilateral (both eyes open) Patients were not told the purpose of this measurement. 8 control subjects, who did not report DES symptoms, were also measured for illuminance and color temperature preference.

Results:
The average illuminance and color temperature for the DES patients was 1750±753 lux and 4507±784°K, and for the controls 2643±1435 lux and 5000±852°K (see figure 1). The DES distribution shows a strong peak between 1000 and 2000 lux, and is significantly lower than the control ($p=.21$). The NIBUT, Schirmer and Osmolarity scores showed no correlation to one another. Interestingly, the sole correlation between methods seen is between illuminance using the LID and the NIBUT for patients with illuminance <3000 lux and the time in both eyes <5 seconds, with a linear r^2 correlation of 0.91.

Conclusion:
We observed strong evidence of a measurable relation between preferred illuminance and DES symptoms. Of the four diagnostic methods used in this study, preferred illuminance was the most consistent, a promising result as the Lux/IQ is also the quickest, simplest, and least invasive of the methods. The correlation between short NIBUT times and preferred illuminance further supports the conclusion that preferred illuminance is a valid indicator of DES. We are continuing this IRB-approved study, and expect to evaluate significantly more patients.

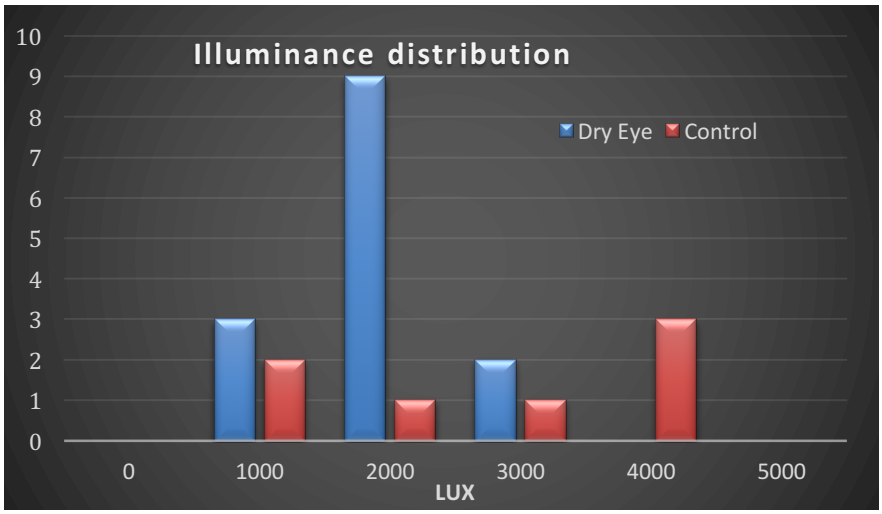

Figure 1, showing the frequency distribution for preferred lux for both the dry eye and control subjects.