

Free papers: Dry Eye

A new method for measuring the Pre-Lens Non-Invasive Tear Break Up Time (PLNIBUT)

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Purpose

Developing a new method for measuring in-vitro and in-vivo contact lens wettability based on PLNIBUT and detecting the changes in it under different conditions.

Method

A newly developed optical setup used for the assessment of the tear film stability based on the corneal reflex image degradation due to break ups happening on the anterior surface of the cornea was adopted for the PLNIBUT measurement in contact lenses. The method was applied in vitro for three contact lens materials (Delefilcon A (CL1), Omafilcon B (CL2), and Comfilcon A (CL3)) under normal environmental condition and when exposed to hot dry air. PLNIBUT was considered as the appearance of the first degradation in the reflex image. In vivo PLNIBUT was also measured in two materials (Delefilcon A and Omafilcon A (CL4)).

Results

The three tested materials showed reduced in vitro PLNIBUT when exposed to hot dry air (CL1 13.33 ± 7.64 , CL2 21.33 ± 7.09 , and CL3 8.00 ± 3.61) compared to normal condition (CL1 45.33 ± 13.05 , CL2 49.67 ± 9.50 , and CL3 46.33 ± 11.59). Materials of higher water content (CL2 62%) showed higher PLNIBUT compared to the lower water content materials (CL3 48%, and CL1 33%). The in vivo PLNIBUT measurements showed longer values for CL1 8.33 ± 3.06 compared to CL4 3.50 ± 0.50 .

Conclusion

A new method for in vitro and in vivo assessment of contact lens wettability by measuring the PLNIBUT was presented. A demonstration of PLNIBUT measurements showed that the method can detect the difference in BUT results for different contact lens materials surface under different conditions. The results are in good agreement with previously reported data, showing the potential of the method as a tool to determine the contact lens wettability.