

Measurement of Tear Meniscus Height with the Kowa DR-1 α Tear Interferometer

Reiko Arita (Itoh Clinic, LIME Working Group), Katsumi Yabusaki (Kowa), Takanori Yamauchi (Kowa), Tadashi Ichihashi (Kowa), Shima Fukuoka (Omiya Hamada Eye Clinic, LIME Working Group), Naoyuki Morishige (Ohshima Eye Hospital, LIME Working Group)

Study design: Observational cross-sectional study

Purpose: To develop a method for quantitation of tear meniscus height (TMH) with the Kowa DR-1 α tear interferometer. **Methods:** We developed software to measure TMH based on TMH image intensity obtained with DR-1 α . TMH of 30 eyes of 30 healthy subjects was measured with DR-1 α and by optical coherence tomography (OCT) with CASIA2 (Tomey). Measurements were made four times by each of two observers. Intraobserver repeatability and interobserver and intersession reproducibility were assessed based on the standard deviation (SD), coefficient of variation (CV), and intraclass correlation coefficient (ICC), respectively. **Results:** The mean \pm SD for TMH of the 30 eyes was $212 \pm 69 \mu\text{m}$ by DR-1 α and $228 \pm 71 \mu\text{m}$ by OCT. Repeatability and reproducibility for DR-1 α (SD 26.7; CV 12.7%; ICC 0.77 [95% confidence interval 0.67–0.84]) were similar to those for OCT. A scatter plot showed marked agreement between the two methods ($R^2 = 0.5189$). **Conclusion:** DR-1 α is able to measure TMH as effectively as OCT.

Précis

The Kowa DR-1 α tear interferometer allows evaluation of the lipid layer of the tear film. Given that the balance between the lipid and aqueous layers of the tear film is key to tear film homeostasis, evaluation of both these layers is important. We have now developed software to allow measurement of tear meniscus height with DR-1 α as effectively as by optical coherence tomography. DR-1 α is thus applicable to evaluation of tear film homeostasis.

Background Statement

Evaluation of dry eye disease requires examination of both lipid and aqueous layers of the tear film. The Kowa DR-1 α tear interferometer allows evaluation of the lipid layer but has not been previously shown to allow that of the aqueous layer.