

# Correlation between meibomian gland appearance and tear breakup time using a slit scanning ophthalmoscope

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## PURPOSE

Meibomian gland dysfunction (MGD), a significant component in dry eye disease, is characterized by blockage of meibomian gland ducts, thickening of gland contents, cysts, and the eventual disappearance of damaged glands. Tear breakup time (TBUT) is a clinical test used to assess evaporative dry eye disease. In this study, we aim to determine the correlation between meibomian gland dropout and TBUT using a slit-scanning ophthalmoscope for both measurements .

## METHODS

- Recruited self-described dry eye subjects
- Applied topical sodium fluorescein
- Video sequence of fluorescent images (4 frames per second) of the ocular surface was recorded using a slit-scanning ophthalmoscope ( CLARUS™ 500, ZEISS, Dublin, CA) with prototype software
- Everted lower lids and imaged meibomian glands using near-infrared illumination
- Graded using the following criteria: 0 = no MGD, 1 = Mild MGD, 2 = Moderate MGD, 3 = Severe MGD.
- Observed sequential fluorescent images and noted TBUT when dyed tear film breaks

## CONCLUSION

In this study, the appearance of meibomian glands directly correlates with TBUT, with more severe MGD associated with shorter TBUT. It is likely that MGD drop-out contributes to the amount and quality of the meibum. An ophthalmic imaging system with the facility to record fluorescence image sequences of the ocular surface, in conjunction with the ability to capture near-IR reflectance images, was used for documentation of dry-eye disease. Such functionality may benefit clinical workflow in the management of dry-eye symptoms, as well as patient education.

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## RESULTS

Sixteen eyes of 8 subjects (mean age 43.29, SD 14.89, range 24-63) were imaged. Figure 1 displays the TBUT values for different levels of MGD. Figure 2 displays an example of tear film breakup in a normal and severe MGD case. The white arrow indicates the area of tear breakup. More meibomian gland drop out was associated with a shorter tear breakup time.

Figure 1

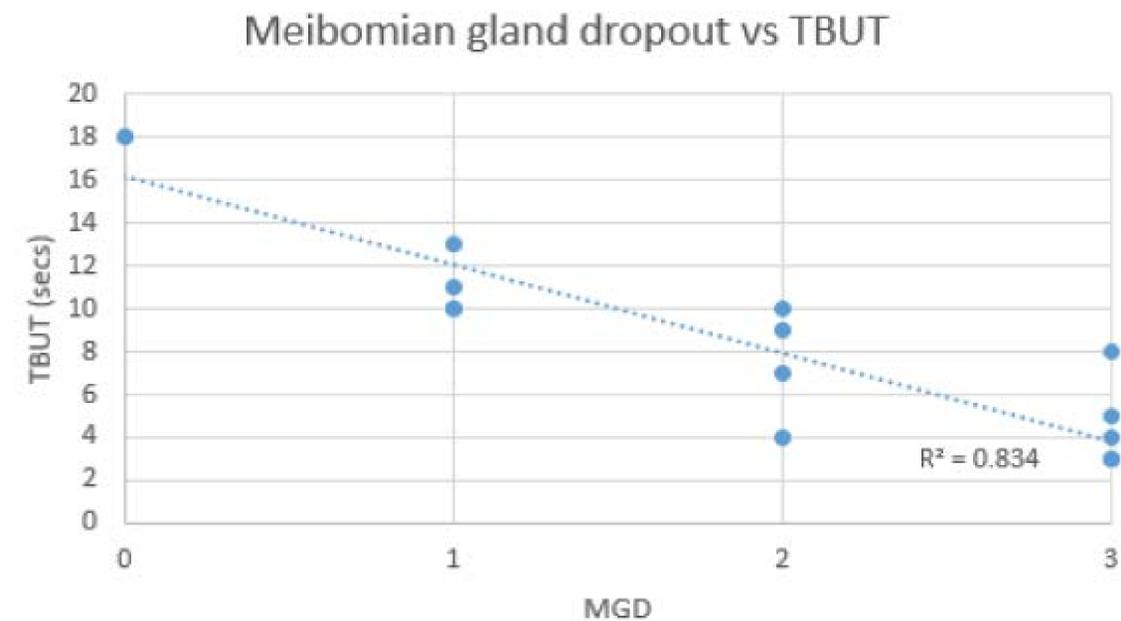


Figure 2

