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## Methods and devices to measure the dynamics of tear film and its components

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### BRIEF DESCRIPTION

Researchers at the University of California, Irvine (UCI) have developed a non-invasive method to measure the dynamics of tear film and its components in the human eye. Specifically, it can be used to detect and diagnose keratoconjunctivitis or dry eye syndrome.

### FULL DESCRIPTION

Keratoconjunctivitis or dry-eye syndrome (DES) is an eye disease mainly caused by decreased tear production or increased tear evaporation due to lipid production deficiency in the tear film. In order to diagnose DES, the components (ie lipid and aqueous layers) and moisture level or thickness of the tear film of the eye must be measured. Currently, the most common methods used to measure the thickness of the tear film are not quantitative, invasive, subjective, and they exhibit poor repeatability. Schirmer test, Rose Bengal and Fluorescein staining are amongst the invasive techniques that an optometrist would perform to qualitatively measure the tear film thickness. Interferometry is the only non-invasive method currently used to assess the thickness of the tear film but it is bulky, optically complex, the alignment is difficult and the setup is very expensive. In addition, direct readout of the tear film thickness using interferometry is not possible because it requires fitting the reflection spectrum to a mathematical model.

Researchers at the University of California, Irvine (UCI) have developed a non-invasive method to measure the dynamics of tear film and its components in the human eye. The purpose of this invention is to develop a system that evaluates the pre-corneal tear-film. This method provides a new modality that offers distinctive advantages over previous methods. The advantages include: (1) non-invasive technique; (2) portable setup; (3) inexpensive instrumentation (4) easy to align and compatible with current instruments used in an optometrist's office; (5) faster data acquisition and analysis as compared with interferometry; and (6) real time data and analysis.

### SUGGESTED USES

This invention can be used to measure and quantify the dynamics of tear film and its components. With this technique we can measure the thickness of tear film in the eye and characterize the dynamics of its components such as the lipid layer and the aqueous layer. Specifically, it can be used to detect and diagnose keratoconjunctivitis or dry eye syndrome.

### ADVANTAGES

This method provides a new modality that offers distinctive advantages over previous methods.

The advantages include:

non-invasive technique;portable setup;inexpensive instrumentation  
easy to align and compatible with current instruments used in an optometrist's office;  
faster data acquisition and analysis as compared with interferometry; andreal time data and analysis.

### CONTACT

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### OTHER INFORMATION

#### KEYWORDS

keratoconjunctivitis, dry-eye syndrome, DES, eye disease, tear film, Schirmer test, Rose Bengal stain, Fluorescein staining, Interferometry, cornea, pre-cornea, optometry, ophthalmology

#### CATEGORIZED AS

- » **Optics and Photonics**
  - » All Optics and Photonics
- » **Imaging**
  - » Medical
  - » Other
- » **Medical**
  - » Devices

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,256,898	09/04/2012	2009-681

- » Diagnostics
- » Disease:  
Ophthalmology and  
Optometry
- » Imaging

## RELATED CASES

2009-681-0

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