

# The Missing Piece of the Dry Eye Puzzle

## How InflammDry® MMP-9 testing helps assess ocular surface inflammation

*Victor L. Perez is an established clinician and science investigator in the field of ocular immunology and ocular surface diseases, and Director of the Foster Center for Ocular Immunology at Duke University School of Medicine in Durham, NC, USA.*

Here, Perez presents a case study – the first of a series – exploring how InflammDry® was a key factor in diagnosing a patient's dry eye disease.

InflammDry® is the first commercially available, rapid result, in-office test that detects elevated levels of inflammatory marker MMP-9, helping identify ocular surface inflammation without bias. For patients suffering from dry eye, the answer it provides represents the missing piece of the puzzle.

### Background

The patient is a 64-year-old accountant with no relevant medical or ocular history. He presented to the clinic having experienced fluctuating ocular irritation, discomfort, and redness for over two years, with worsening symptoms during winter. He has previously tried Meibomian gland dysfunction treatments and artificial tears without successful results. He has also been experiencing occasional morning joint pain, and stiffness in his hands.



### Diagnosis

We performed a range of point-of-care tests, revealing the following:

- OSDI questionnaire score: 41 (moderate)
- Osmolarity OD: 302; OS: 297 (borderline)
- Corneal staining: null (see Figure 1)
- Schirmer's testing: positive
- Minor Meibomian gland dysfunction (see Figure 2)
- Slight decrease in tear break-up time

The challenge here lies with having a patient who complains of moderate dry eye symptoms, but presents absent to mild signs of both evaporative and aqueous deficient dry eye during the exam. We therefore performed MMP-9 testing to assess the presence of inflammation on the ocular surface; the result: positive bilaterally.

### Intervention and treatment

The patient was treated with cyclosporine ophthalmic emulsion (Restasis®) 0.05%, along with preservative-free artificial tears, and lid hygiene measures.

### The role of MMP-9

Regardless of the initiating etiology, the consequent pathophysiology involves a cascade of inflammation that causes ocular surface damage, leading to the signs and symptoms of dry eye that the patient experienced. One of the most validated ocular surface inflammation markers is MMP-9, which can be identified by the InflammDry® device (Quidel Corporation, San Diego, CA, USA).

The role of MMP-9 testing in this scenario is crucial; it allows the physician to objectivize the presence of an

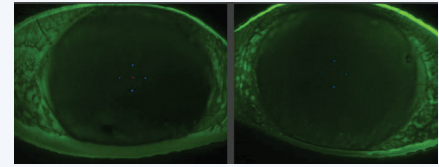


Figure 1. Corneal staining with fluorescein reveals absent epithelial lesions.

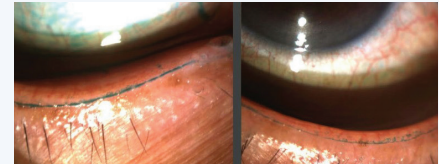


Figure 2. Mild Meibomian gland dysfunction in the right eye.

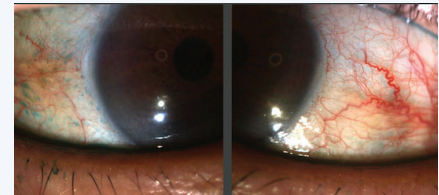


Figure 3. Mild–moderate conjunctival hyperemia.

inflammatory component and to select a specific treatment. MMP-9 positivity encourages the use of anti-inflammatory therapy to regulate the ocular surface inflammatory vicious circle that causes fluctuating dry eye symptoms and signs. The positive result in this case explains why the patient's previous treatment with only artificial tears had no effect on his symptoms.

MMP-9 testing also helps skeptical patients to comprehend why anti-inflammatory medication is beneficial, and enhance compliance with medications and follow-up visits.

### Patient outcome

Five months after his initial visit, the patient was responding well to treatment. His OSDI questionnaire score dropped to 13, indicating dramatic symptomatic improvement. Schirmer's testing and tear break up time increased to normal/borderline values, and his other parameters were stable.