Effectiveness of a Singular Ocular Rinse via Irrigating Eyelid Retractor to Reduce MMP-9 in Patients with Dry Eye Disease

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NM: None
Eye rinsing has been an effective method to reduce Matrix Metalloproteinase-9 (MMP-9), a hallmark of surface inflammation.
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Frequent, daily, patient-directed eye rinsing

High patient burden

Poor real-world compliance
Objective

Eye rinsing has been an effective method to reduce Matrix Metalloproteinase-9 (MMP-9), a hallmark of surface inflammation.

A *single* ocular rinse assisted via *irrigating eyelid retractor* effect on MMP-9
Study Design

Randomized Controlled Trial of Patients with Dry Eye Disease & Positive MMP-9 via POC Testing (n=88)

Device rinse with 15mL of irrigating solution
n=46

Standard rinse with 15mL of irrigating solution
n=42

Three Hours Post-Rinse
Primary Endpoint: Change in MMP-9 POC Testing
Secondary Endpoint: Percentage of patients negative MMP-9

1 week & 4-12 weeks Post-Rinse
Exploratory EPs: Percentage of patients negative MMP-9 in Device Arm; Results of CDES-Q*
## Eligibility Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tr>
<td>• ≥18 years of age with dry eye complaints</td>
<td>• Anti-inflammatory medication usage</td>
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<td>• Positive MMP-9 via Point-of-care testing</td>
<td>• Artificial tear or topical ocular medication usage within the past 14 days</td>
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<td>• Intraocular surgery within the past 6 months</td>
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<td>• Contact lens wear within past 12 hours</td>
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<td>• Contraindication to MMP-9 POC testing</td>
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<td>• Acute allergic or infectious conjunctivitis</td>
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<td>• History of SJS or cicatricial conjunctival disease</td>
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<td>• Severe dry eye preventing wetting of the POC testing</td>
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### Baseline Characteristics

<table>
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<tr>
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<th>Device Arm (n=46)</th>
<th>Standard Arm (n=42)</th>
<th>Total (n=88)</th>
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<tbody>
<tr>
<td><strong>Sex, n (%)</strong></td>
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<td></td>
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<tr>
<td>Male</td>
<td>10 (22%)</td>
<td>6 (14%)</td>
<td>16 (18%)</td>
</tr>
<tr>
<td>Female</td>
<td>36 (78%)</td>
<td>36 (86%)</td>
<td>72 (82%)</td>
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<td><strong>Race, n (%)</strong></td>
<td></td>
<td></td>
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<tr>
<td>White</td>
<td>43 (94%)</td>
<td>40 (95%)</td>
<td>83 (94%)</td>
</tr>
<tr>
<td>Age, Mean, (SD), years</td>
<td>47.4 ± 3.4</td>
<td>45.9 ± 4.2</td>
<td>46.6 ± 3.2</td>
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Irrigating Eyelid Retractor

Fixed to a syringe, the retractor has 5 ports which aim fluid at the palpebral conjunctiva, bulbar conjunctiva and conjunctival fornix.
Standard photographs were obtained at specified time points.

Photographs were randomized, compiled and sent to four blinded graders who graded each image on a 0-4 scale.
Assessment of reliability and validity of the 5-scale grading system of the point-of-care immunoassay for tear matrix metalloproteinase-9

Minjeong Kim, Ja Young Oh, Seon Ha Bae, Seung Hyeun Lee, Won Jun Lee, Yeoun Sook Chun & Kyoung Woo Kim

**Table**: Standard photographs for 5-scale grades ranging from 0 to 4 along with the color density of the red band in the readout window of the point-of-care matrix metalloproteinase (MMP)-9 immunoassay.

**Figure 4**: Standard photographs for 5-scale grades ranging from 0 to 4 along with the color density of the red band in the readout window of the point-of-care matrix metalloproteinase (MMP)-9 immunoassay.
Results
Results—Primary Endpoint

Two-way ANOVA: decreased MMP-9 expression in device group compared to standard (p<0.0001).

Paired t-test: decreased MMP-9 expression in both standard and device groups with greater attenuation in the device rinse group.
Results—Secondary Endpoint

44% of patients converted to negative
Conclusion

A novel irrigating eyelid retractor rinse of the ocular surface statistically reduces MMP-9 levels compared to baseline and is superior to a standard eye rinse.

Use of an irrigating eyelid retractor may be a therapeutic avenue for those patients with dry eye disease.

Further work on the durability of these findings is ongoing.