Comparative Tests of the Canine Tear Film Using the I-TEAR® Test and the Schirmer Tear Test

Tom Miller, Ilan Hofmann, James Dunbar
Meniscometry I-TEAR® Test Strip

- Graduated capillary tube
  - Double-ended
  - Dye marker
  - 5 second test
  - Approximately 1/2 - 2/3 of STT reading
  - > 5 normal
I-TEAR® Test

Touch end to tear film meniscus

(Not under eyelid)
Hypothesis

I-TEAR® Test is a clinically valid assessment of the canine pre-corneal tear film
Study Design

- 100 dogs / 200 eyes
  - Clinical patients undergoing routine STT testing
  - Owners consented to ITT testing
- No artificial tears the day of the exam
- No topical medications within 1 hour
- Dogs with corneal ulcers were exclude
Study Design

- ITT and STT performed on all eyes as a paired sample.
- ITT performed first on all eyes
- STT performed after 5 minute interval
  - STT performed for 60 seconds
  - 15 or greater considered normal
Results

- 205 eyes of 105 dogs
- Age ranged from 4 months to 18 years, mean 9.0 years
- Weight ranged 1.5 - 46.1 kg, mean 10.4
Results
(31 Breeds Represented)

- 14 shih tzu
- 11 yorkies
- 9 mixed
- 8 English bulldogs
- 7 pugs
- 6 poodles
- 4 pekes, cockers
- 3 CKCS, schnauzers, Lhasa
- Rest misc
Results

- 56 dx or history of KCS
  - 50 previously on CSA or tacrolimus
    - 24 on artificial tears
- 13 diabetics
- 42 bracycephalics
Results

- ITT ranged from 0-20
- STT ranged from 0-30
  - ITT / STT ‘in agreement’ 86.3%
- Two variables
  - Dogs with ‘viscus’ tear film
  - Eyelid abnormalities that prevent eyelid margin contact with globe
## Results

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>ITT - Mean</th>
<th>ITT - Range</th>
<th>STT - Mean</th>
<th>STT - Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD - Normal</td>
<td>77</td>
<td>11.7</td>
<td>5-20</td>
<td>20.2</td>
<td>5-29</td>
</tr>
<tr>
<td>OD - Affected</td>
<td>24</td>
<td>2</td>
<td>0-4</td>
<td>7.2</td>
<td>0-14</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OS - Normal</td>
<td>79</td>
<td>11.2</td>
<td>10-30</td>
<td>20.3</td>
<td></td>
</tr>
<tr>
<td>OS - Affected</td>
<td>25</td>
<td>1.6</td>
<td>0-14</td>
<td>6.9</td>
<td>0-16</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results

- Predictive Value
  - ITT 98% specificity / 98% sensitivity
  - STT 96% specificity / 94% sensitivity
Results

Correlation with Diagnosis

- **ITT**: .880, 95%CI: .804-.956
- **STT**: .660, 95%CI: .542-.778

Cohen’s Kappa test
Conclusions

- ITT is an accurate assessment of tear volume
- ITT has better correlation with clinical signs than STT
- Easily performed
- Perceived by clients as ‘less invasive’ than STT