Schirmer I Test and Break-Up Time Test
Standardization in Mexican Population Without Dry Eye

Estandarización de las pruebas de Schirmer tipo I y tiempo de ruptura de la película lagrimal en población mexicana sana sin ojo seco

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Abstract

Objective: To standardize the Schirmer test I and tear break up time results in a group of healthy people from a Mexican Ophthalmological Hospital.

Method: A Schirmer test and a tear film break up time test were realized in healthy individuals who had filled out a previous dry eye questionnaire. The results were recorded and a statistical analysis was done.

Results: We collected data from 747 patients, 381 men and 366 women, with an average age of 34.5 years old. Regarding the Schirmer test

Keywords: Schirmer, dry eye, BUT (Break up time), Mexico.

Resumen

Objetivo: Estandarizar los resultados de las pruebas de Schirmer tipo I y el tiempo de ruptura de la película lagrimal en un grupo de pacientes sanos en un hospital de oftalmología mexicano.

Método: Realizamos un cuestionario sobre ojo seco, para incluir en nuestro estudio aquellos pacientes que no presentaban síntomas. Posterior a esto, realizamos la prueba de Schirmer y el tiempo de ruptura de la película lagrimal a aquellos individuos sanos, anotando los resultados y realizando un análisis estadístico.

Keywords: Schirmer, ojo seco, TRPL (tiempo de ruptura de la película lagrimal), México.
we obtained an average of 8.64 mm, while in the break up time test we obtained an average of 7.60 seconds. In the Schirmer test we found an average of 8.59 mm for women and 8.71 mm for men, and for the break up time test we found an average of 7.59 seconds for women and 7.63 seconds for men finding no statistical significance in the difference of these results.

**Conclusion:** We conclude that in Mexican people, the average of the Schirmer test and break up time test is shorter than other reports. We propose to set a new “normal standard” of the test in order to classify dry eye syndromes.

**Resultados:** Obtuimos información de 747 pacientes, 381 hombres y 366 mujeres, con edad promedio de 34.5 años. En cuanto a la prueba de Schirmer se obtuvo un promedio de 8.64 mm, mientras que en el tiempo de ruptura de la película lagrimal se obtuvo un promedio de 7.60 segundos. En la prueba de Schirmer se encontró un promedio de 8.59 mm para mujeres y 8.61 mm para hombres y para el tiempo de ruptura de la película lagrimal se encontró un promedio de 7.59 segundos para mujeres y 7.63 segundos para hombres, sin encontrar una diferencia significativamente estadística en estos resultados.

**Conclusiones:** Se puede concluir que en la población mexicana el promedio de la prueba de Schirmer y el tiempo de ruptura de la película lagrimal es menor que en otros estudios. Proponemos establecer un nuevo “estándar normal” de estas pruebas con el fin de clasificar bien los síndromes de ojo seco.

**Methods**

A study was done at the Instituto de Oftalmología Fundación Conde de Valenciana where we did the Schirmer type I test with topical anesthetic application and a tear film break up time to the patients.
from this hospital. The sample was obtained from those patients with less than 13 points in the dry eye questionnaire. The questionnaire used was the Benitez del Castillo questionnaire (Table 1). We included all patients without dry eye symptoms with a score lower than 13 points, with any visual acuity and any refraction, and willing to be submitted to the study. We excluded all patients with dry eye symptoms, with a score higher than 13 points, patients who were unable to submit to the Schirmer's test or the break up time test, with allergic response to the fluorescein, and patients using any ocular treatment in the last month.

For the making of the Schirmer's test, we anesthetized the patients with sodic propacaine, 1 drop in each inferior cul-de-sac and we did the test ten minutes later. We put the TEAR FLO™ (Rose Stone Enterprises 9622 Baseline Road, Alta Loma, CA 91701) filter paper strips in one or both eyes to the patient while he kept blinking normally for five minutes, sitting in the exploration chair without any heavy lights or air drafts. Five minutes later, we extracted the strip and wrote down the millimeters moistened in the part of the strip that wasn’t inside the eye. If the 30 mm moistened before the five minutes time had passed, then we extracted the strip and wrote down how long it took.

For the tear film break up time test, we put the patient at the biomicroscope, without any air current, with the lid lamp, and looking with 10 magnifications so we could see the whole cornea simultaneously. The patient was asked to blink and we determined how long it took for the first desiccation zone to appear, writing down the number in the data paper.

**Results**

The sample obtained was from 747 patients, 381 men and 366 women, ages going from 18 to 77 years old, with an average of 34.5 years old. Regarding the Schirmer test, we obtained an average of 8.64 mm, with a standard deviation of 1.76 (6.88-10.4). In the tear film break up time test, we obtained an average of 7.60 seconds, with a standard deviation of 1.41 (6.19 - 9.01). The results obtained for women and men for the Schirmer test were an average of 8.59 mm for women and 8.71 mm for men. For the tear film break up time test, the data obtained was an average of 7.59 seconds for women and 7.63 seconds for men. As we can see here, the difference we found in the results for women and men were of no statistical significance (Figures 1-4).

**Discussion**

The best quantitative way to measure the tear production is the Schirmer test and the tear film break up time test. In this study, we chose the type I Schirmer test and the break up time test with local anesthesia, because with anesthesia we can partially isolate the basal secretion from the reflex tearing increasing the sensitivity of our study.

For a long time, the values used for the Schirmer test and the break up time test for diagnosis and for investigation purposes have been higher than those we have found in our study. Due to that in our daily practice we started noticing

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**Table 1.** The questionnaire used was:

<table>
<thead>
<tr>
<th>Eye Redness</th>
<th>Swelling of the lid margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lid scales</td>
<td>Difficulty to open the eyes in the morning</td>
</tr>
<tr>
<td>Eye discharge</td>
<td>Eye dryness</td>
</tr>
<tr>
<td>Foreign body sensation</td>
<td>“Sand-like” sensation</td>
</tr>
<tr>
<td>Burn sensation</td>
<td>Itchiness</td>
</tr>
<tr>
<td>General eye discomfort</td>
<td>Sharp eye pain</td>
</tr>
<tr>
<td>Tearing</td>
<td>Watery eyes</td>
</tr>
<tr>
<td>Discomfort to light</td>
<td>Transient burning vision, improves with blinking</td>
</tr>
<tr>
<td>Tired eyes feeling</td>
<td>Heaviness eye sensation</td>
</tr>
</tbody>
</table>

Each one of these symptoms will be classified according to the severity during the last week using the following scale:

0: Doesn’t have the symptom
1: A few times a week
2: A few times a week but doesn’t create discomfort
3: Frequently, generates discomfort but doesn’t interfere with activities
4: Frequently, generates discomfort and interferes with activities
lower values in healthy patients, and since there isn’t a consensus about what the normal values should be, we decided to perform this study.

Our study showed lower average values, on our population, than those found in the literature, so it might be interesting to perform further studies in different types of population that may suggests that our values can be related to environmental or racial factors.

The normal Gaussian distribution and the correlation between the two tests make us think that the results are statistically significant. It is also interesting to mention that we didn’t find any statistical difference between the two tests, comparing men and women. The Schirmer and the break up time are very easy to test, inexpensive and do not represent any risk for the patient. Also, when made with an adequate normal standard value, the tests can provide very valuable information for the classification of our dry eye patients.

In further studies, we will look for a correlation between these non dry eye patients, the new values we found, conjunctiva cytology and tear osmolarity, so we can try to create a new qualitative, quantitative and histological classification for this group of patients.

References