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Dissertation Thesis

Comparision Between Normal Values of 2 and 5 Minutes Schirmer's Test with and without Anesthesia

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Introduction

- The tear film or the pre-corneal tear film is a very thin fluid layer over the corneal surface [1] which consists of the mixture of the substance secreted by the lacrimal gland, accessory lacrimal gland, meibomian glands and the Goblet cells [2].
- Tears are the watery fluid which is secreted by the lacrimal gland and accessory lacrimal glands that moistens and lubricates the ocular surface. It gives a good vision and protects our eyes from irritants [4].
- Dry eye occurs when the quantity and/or quality of tears fail to keep the surface of the eye adequately lubricated [6]. It results in several ocular symptoms leading to discomfort and visual impairment.
- The measurement of tear secretion is used for the diagnosis of dry eye which is mainly done by Schirmer Test [7]. It was described in 1903 and it measures the quantity of tears produced by one's eyes to keep the eyes moist and healthy [3,5,8-10].

Review of Literature

Figure a

Need of the study

The study was conducted with the need to reduce the test time so as to decrease the amount of discomfort experienced by the patients as well as to make the testing procedure comparatively faster without compromising the statistical data.

Aim and Objectives

The aim of this study was to:

- To determine the amount of tear secretion in 2 minutes using Schirmer's test in healthy individuals.
- To compare the results obtained in 2 minutes with the standard 5 minutes Schirmer's test so as to develop the possibilities of using 2 minutes Schirmer's test instead of 5 minutes.

Research question

- Is there any correlation between the standard 5 minutes Schirmer's test and 2 minutes Schirmer's test?
- If yes, can the 5 minutes Schirmer test be replaced by the 2 minutes Schirmer's test?

Methodology

Duration: The study period was from January 2018 to June 2018.

Study design: Simple Randomized prospective study

Study area: The study was conducted in Nethradhama School of Optometry, in association with Nethradhama Super-specialty Eye Hospital, 7th block, Jayanagar, Bengaluru-560082.

Study population: 80 healthy individuals aged between the range of 18 to 30 yrs.

Data collection technique

Based on Inclusion and Exclusion criteria subjects were enrolled in this study.

Inclusion criteria

- Schirmer I value > 10 mm
- Schirmer II value > 5 mm
- Patients willing to give consent or participate for study
- Age group between 18 - 30 years.

Exclusion criteria

- Smokers and alcohol consumers
- History of patients with dry eye disease
- History of drug abuse
- History of systemic diseases
- History of patients using topical and systemic medications
- Pregnant/lactating women
- History of patients using contact lens
- History of ocular surgery
- Sjogren's syndrome
- History of vitamin A deficiency
- Allergies
- Steven-Johnson syndrome
- History of trauma.

Study instruments

- Schirmer's test strips
- Stopwatch
- Pen.

Drug used

Topical Anesthetics (Proparacaine 0.5%).

Statistical analysis

Statistical analysis was done by using IBM SPSS statistics version 20.0. Data was analyzed using Paired t test for seeing variances between 2 and 5 minutes Schirmer I and II and found a p value of 0.00. A p value of <0.05 is considered as a statistically significant value.

Result

Tests	2 minutes (mm)		5 minutes (mm)		P value
	OD	OS	OD	OS	
Schirmer I	24.9875 ± 4.468	24.8625 ± 4.924	31.55 ± 4.056	31.6375 ± 3.972	0.00
Schirmer II	15.0625 ± 5.788	14.3 ± 6.3333	21.7125 ± 6.159	21.0875 ± 6.762	0.00

Table a

It denotes the descriptive statistics of the mean values of Schirmer I and II for OD and OS in 2 and 5 minutes.

Figure b

The graph indicates the mean values of Schirmer I in 2 minutes (both OD and OS) which were higher than 10 mm (24.9875 ± 4.468 mm and 24.8625 ± 4.924 mm, respectively), and in the 5 minutes were 31.55 ± 4.056 mm and 31.6375 ± 3.972 mm, respectively.

Figure c

The graph indicates the mean values of Schirmer II in 2 minutes (both OD and OS) which were higher than 5 mm (15.0625 ± 5.788 mm and 14.3 ± 6.333 mm, respectively), and in the 5 minutes were 21.7125 ± 6.159 mm and 21.0875 ± 6.762 mm, respectively.

Discussion

- Tear production is essential for the proper functioning of the eyes and protection of the ocular surface and the Schirmer's test is the most commonly performed test for the determination of tear production which is normally performed for a period of 5 minutes.
- Due to the long testing period, it becomes very difficult and uncomfortable for the patients to have those strips in the eyes for such a long period of time.

- This study was conducted with the objective of reducing the test time so as to decrease the amount of discomfort experienced by the patients. The time considered for the study was 2 minutes and it was aimed to determine whether or not the tear secretion in 2 minutes is above 10 mm which is considered as normal value for 5 minutes Schirmer's I test. Similarly, the test time of Schirmer's II was also reduced to 2 minutes and the normal value was considered to be more than 5 mm as per the normal values for the 5 minutes Schirmer's II test.
- It was observed that in the initial 2 minutes wetting of the filter paper strips was accelerated but in next 3 minutes, it seemed to decrease significantly. The initial acceleration could be due to the pre-existing tears in the fornix and also it is found in few studies that as the wetting length increases, the evaporation of the paper strip also increases causing a decrease in wetting after 2 minutes. So the 2 minutes time was considered as the safe time limit for the evaluation of normal tear secretion.
- In this study, it was found that the 2 minutes Schirmer test both with and without anesthesia correlates highly with the 5 minutes test.

Conclusion

The present study concludes that the amount of tear secretion in 2 minutes is found to be more than 10 mm without anesthesia and more than 5 mm after the installation of anesthesia. The values of 2 minutes Schirmer test I and II correlates highly with the 5 minutes test. Hence, 2 minutes test can be considered as alternative for the 5 minutes test.

Limitations of the Study

- The current study included population aged between 18-30 years of age. Wide range of population can be included in further studies.
- The study did not include diurnal variations as well as different climatic conditions and included only limited population area. Schirmer test can be performed considering diurnal variations and different climatic conditions as well as larger population area can be considered in future studies.
- The test was performed at constant room temperature in this study which can be performed at different room temperatures in further studies.

Performa date

Personal Information Time:

Name:

Op number:

Age: Sex: M/F DOB:

Subject history:

Has the subject undergone any ocular surgery? Yes/No

Is the subject under the influence of any drug? Yes/No

Does the subject have dry eye? Yes/No

Does the subject have any ocular pathology? Yes/No

Is the patient allergic to proparacaine eye drops? Yes/No

Is the patient using contact lens? Yes/No

If YES, for how long?

Preliminary ocular examination:

History:

Uncorrected visual acuity: OD, OS

Fundus: OD, OS

Schirmer I (without anesthesia)

Eye	2 minutes (mm)	5 minutes (mm)
OD		
OS		

Table 1

Schirmer II (with anesthesia)

Eye	2 minutes (mm)	5 minutes (mm)
OD		
OS		

Table 2

Nethradhama hospitals private limite

Regd. Office: #256/14, Kanakapura Main Road, 7th Block, Jayanagar, Bangalore -560 082.

Ph. No. 080-2663 3533/2663 3609/2655 9868/2663 4202/03 Fax: 080-2663 3770

Patient consent form

Consent form No**:** ___

Subject Identification number for this trial/OP No: _____

Study Title: Comparison between normal values of 2 and 5 minute Schirmer's test with and without anesthesia.

Name of the Principal Investigator: _____Tel No: _____

I have received the information sheet on the above study and have read and / or understood the written information.

I have been given the chance to discuss the study and ask questions.

I consent to take part in the study and I am aware that my participation is voluntary.

I understand that I may withdraw at any time without this affecting my future care.

I understand that the information collected about me from my participation in this research and sections of any of my medical notes may be looked at by responsible persons (ethics committee members/ regulatory authorities). I give consent to these individuals to have access to my records and for the use of data obtained from my procedure in any form after deleting all the identifying data.

I understand that I will receive a copy of the patient information sheet and the patient informed consent form.

Name	Signature	Date	Time
Subject			
Witness/Legally acceptable representative if subject is a minor			
Principal investigator/ Doctor			

Table 3

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