

EVALUATION OF OCULAR SURFACE CHANGES FOLLOWING LEVATOR RESECTION VS FRONTALIS SUSPENSION OPERATIONS

Al-Shaimaa T. Zaki, Zafer F. Ismail, Dina E. Mansour, Mona M. El-Fiky, and Ahmed S. El-Ridy

Department of Ophthalmology
Faculty of Medicine, Ain-
Shams University, Cairo, Egypt

Corresponding author:

Al-Shaimaa T. Zaki

Email:alshaimaa.taher@outlook.com

Mob. 01006438018

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ABSTRACT:

Background: *Blepharoptosis is abnormal low position of the upper eyelid. The effect of ptosis surgery on ocular surface is not clear and needs more clarification.*

Aim of this Work: *To compare between levator resection and frontalis sling operations regarding tear film and topographic changes in order to minimize postoperative morbidity and increase patient satisfaction.*

Patients and Methods: *This study included 30 eyes of 27 patients with moderate to severe ptosis and levator function within 5-6mm and with the ability to cooperate for examination and investigations. Patients were divided in a randomized manner into Two groups: Levator Resection (LR) group: 15 eyes of 15 patients underwent transcutaneous maximum levator resection. Frontalis Sling (FS) group: 15 eyes of 12 patients underwent frontalis suspension with silicon rods. The patients were subjected to complete ophthalmological examination, special lid examination, tear film examination and corneal topography.*

Results: *In frontalis sling group, Schirmer test was constant in 53.3% of cases and increased in 46.7% of cases, On the other hand, In levator resection group, Schirmer test decreased in 86.7% of cases and was constant in 13.3% of cases with a statistically significant difference (p-value <0.001). Tear Break Up Time test (TBUT) decreased in 100% of frontalis sling group, however, it increased in 60% of levator resection group with a statistically significant difference (p-value <0.001). Topographic analysis revealed increase in topographic astigmatism in both groups with non-statistically significant difference (p-value 0.723).*

Conclusion: *Frontalis sling operation adversely affects tear film quality but increases tear quantity. While levator resection decreases tear volume with improvement of tear film quality. Both operations increase topographic corneal astigmatism.*

Key words: *ocular surface, levator resection, frontalis suspension operations*

INTRODUCTION:

Blepharoptosis leads to both cosmetic and functional problems. It causes a tired, aged appearance and blurry vision that may end by amblyopia⁽¹⁾.

Ptosis repair by levator resection is a versatile procedure. It obviously works best in patients with relatively good levator function (excursion of 7 mm or more), however, it can also be used in patients with poor levator function⁽¹⁾.

Frontalis suspension is the surgery of choice for congenital or acquired blepharoptosis with poor levator function (less than 5 mm). This procedure can be performed unilaterally or bilaterally in both children and adults⁽²⁾.

Dry eye is a frequent condition that is overlooked most of the time, the effect of ptosis surgery on dry eye is not clear; some authors believe this surgery aggravates dry eye, while others have noted no effect on tear condition, still another group believe it can improve dry eye⁽³⁾.

Schirmer's test measures tears quantity while Tear Break Up Time (TBUT) reflects the quality of the tear film⁽³⁾.

Corneal topography is a method that allows both qualitative and quantitative description of the corneal surface. Orbscan is one of elevation-based methods for assessment of corneal topography⁽⁴⁾.

AIM OF THE WORK:

The aim of this Work is to compare between levator resection and frontalis sling operations regarding tear film and topographic changes to minimize postoperative morbidity and increase patient satisfaction.

PATIENTS AND METHODS:

The current study was conducted on 30 eyes of 27 cooperative patients with moderate to severe ptosis and levator function within 5-6mm recruited from outpatient clinic of ophthalmology, Ain Shams University hospitals.

Any eyelid disease rather than ptosis e.g. lid deformity, ectropion, entropion or trichiasis, any severe conjunctival or corneal disease, contact lens use, any corneal or conjunctival surgery, Consumption of drugs which cause dry eye, diabetes mellitus, thyroid eye disease, rheumatologic disorders

and poor cooperation for diagnostic tests were excluded from the study.

All patients underwent the following:

Complete ophthalmological examination: Slit lamp examination. Intraocular pressure measurement and Fundus examination.

Specific lid examination: Lid contour evaluation. Palpebral fissure height measurement: With the eyes in primary gaze, the distance between upper lid margin and lower lid margin is measured with a ruler in pupillary plane. Levator function measurement: Eyebrow is fixed by a finger to eliminate the effect of frontalis muscle. Patient is asked to do maximum downward gaze then maximum upward gaze and maximum lid excursion is measured by a ruler in pupillary plane. Margin-reflex distance 1 (MRD1): With the eyes in primary gaze, the distance between upper eye lid margin and corneal light reflex is measured by a ruler.

Tear film examination: Schirmer test: OpStrip® filter paper is placed in the inferior fornix. The eyes are closed for 5 minutes. Then the amount of moisture is measured. Tear break up time (TBUT): Fluorescein paper was inserted in the lower fornix and slit lamp examination by bright light with Cobalt-blue filter was done and the time till appearance of the first break in the tear film is measured in seconds and documented.

Corneal topography: Using Orbscan 3® anterior segment analyzer in Nour El-Hayah eye Hospital, corneal topography was done for assessment of Topographic Astigmatism.

Patients were divided in a randomized manner into Two groups: **Levator Resection (LR) group:** 15 eyes of 15 patient sunder went transcutaneous maximum levator resection.

Frontalis Sling (FS) group: 15 eyes of 12 patients underwent frontalis suspension with silicon rods.

The operative procedures were carried out at operative theatre of Ophthalmology department, Ain Shams University Hospitals.

All preoperative examination and investigations were repeated after six months postoperatively.

The study was conducted in accordance with the ethical standards stated in the faculty of Medicine-Ain Shams University. Ethics approval was obtained from the institutional review board of Faculty of Medicine, Ain Shams University. An informed consent was taken from patients or their parents.

Statistical analysis:

The collected data were revised, coded, tabulated and introduced to a PC using Statistical Package for Social Science (SPSS 20). Data was analyzed by Chi-square test.

RESULTS:

Demographic data analysis in study groups revealed that; Age range in Frontalis Sling (FS) group was 4-20 years while in Levator Resection (LR) group was 19-28 years, 58.3% of FS group (7 patients) were females and 41.7% (5 patients) were males while 80% of LR group (12 patients) were females and 20% (3 patients) were males. Ocular surface was assessed thoroughly pre-operatively and no marked difference between individuals with different age nor gender was detected.

Table (1): Comparison between groups regarding Schirmer test:

		FS group		LR group		Test value*	P-value
		No.	%	No.	%		
Schirmer	Constant	8	53.3%	2	13.3%	23.600	<0.001
	Decreased	0	0.0%	13	86.7%		
	Increased	7	46.7%	0	0.0%		

*: Chi-square test

We found that Schirmer test was constant in 53.3% of FS group and increased in 46.7%, while it decreased in 86.7% of LR group (Table 1).

Table (2): Comparison between groups regarding TBUT:

		FS group		LR group		Test value*	P-value
		No.	%	No.	%		
TBUT	Constant	0	0.0%	4	26.7%	22.941	<0.001
	Decreased	15	100.0%	2	13.3%		
	Increased	0	0.0%	9	60.0%		

*Chi-square test

Our results revealed that 100% of FS group suffered from decrease in TBUT values, while 60% of LR group showed increase in its value (Table 2).

Table (3): Comparison between groups regarding topographic astigmatism:

		FS group		LR group		Test value*	P-value
		No.	%	No.	%		
Topographic Astigmatism	Constant	2	13.3%	2	13.3%	0.650	0.723
	Decreased	4	26.7%	6	40.0%		
	Increased	9	60.0%	7	46.7%		

* Chi-square test

Also, we found that topographic astigmatism increased in 60% of FS group, decreased in 26.7% and remained constant in only 13.3% of this group, while it increased in 46.7% of LR group, decreased in 40% and was constant only in 13.3% of this group (Table 3).

DISCUSSION:

To our knowledge this is the first prospective study conducted to compare levator resection and frontalis sling operations regarding all aspects of ocular surface changes. In contrast, other studies discussed post-operative ocular surface changes regarding one aspect and without comparison between one type of surgery and another.

In our study, which was a comparative study, Schirmer test showed increase in frontalis sling group and decrease in levator resection group.

This can be compared to what *Bagheri et al.*⁽³⁾, reported that Schirmer test revealed a decrease in tear quantity after surgery (both levator resection and frontalis sling were involved without comparison).

Also, *Watanabe et al.*⁽⁵⁾, studied tear film quantitative changes after transcutaneous levator resection operation using video meniscometry, revealed that long-term tear volume was decreased after blepharoptosis surgery, and even more so in cases with an initial high tear volume.

On our studying, TBUT decreased in frontalis sling group and increased in levator resection group. This was different from results of *Bagheri et al.*,⁽³⁾ who found a decrease in TBUT.

Difference between our results and the above-mentioned results may be due to that they involve both types of surgery without comparison⁽³⁾ or due to different method of evaluation (video meniscometry)⁽⁵⁾.

In our study, both groups showed increase in corneal astigmatism, these results differ from those of *Savino et al.*⁽⁶⁾, who found decrease in corneal astigmatism.

This difference between results in astigmatism may be due to different topography analyzer. *Savino et al.*⁽⁶⁾, used Computerized tomography (Syrius System) while we used Orbscan 3® anterior segment analyzer.

Conclusion:

Frontalis sling operation adversely affects tear film quality but increases tear quantity. while levator resection decreases tear volume with improvement of tear film quality. Both operations increase topographic corneal astigmatism.

Study limitations:

We have to admit few limitations to our study:

- The small sample size of our study group.
- Tear film quality and quantity are influenced by other factors rather than ptosis correction, unfortunately those factors were not addressed in our study.

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تقييم تغيرات سطح العين بعد عملية تقصير العضلة الرافعة مقابل عملية التعليق الجبهي

ظافر فهيم إسماعيل، دينا عزت منصور، منى محمد الفقى،
أحمد شفيق الريدي، الشيماء طاهر ذكي

قسم طب و جراحة العيون

كلية الطب-جامعة عين شمس

المقدمة: سقوط الجفن هو وجود الجفن في موضع منخفض عن موضعه الطبيعي. ولا يزال تأثير جراحة رفع الجفن على سطح العين غير واضح ويحتاج إلي المزيد من الدراسة.

الهدف من الدراسة: المقارنة بين عملية تقصير العضلة الرافعة للجفن و عملية التعليق الجبهي من حيث الطبقة الدمعية والدراسات الطوبوغرافية للقرنية .

المرضى وطرق البحث: شملت هذه الدراسة ٣٠ عين ل ٢٧ مريض يعانون من سقوط الجفن من الدرجة المتوسطة أو الشديدة و درجة عمل العضلة الرافعة من ٥ إلى ٦ مم. وتم تقسيمهم بشكل عشوائي إلي مجموعتين، مجموعة أ تضم ١٥ عين ل ١٥ مريض خضعوا لعملية تقصير العضلة الرافعة ومجموعة ب تضم ١٥ عين ل ١٢ مريض خضعوا لعملية التعليق الجبهي بواسطة رافعة من السليكون. خضع المرضى لكشف رمدي كامل مع تقييم خاص لحالة الجفن، تقييم للطبقة الدمعية ودراسة طوبوغرافية للقرنية.

النتائج: أظهرت نتائج الدراسة انخفاض اختبار وقت تفكك الدموع في كل حالات التعليق الجبهي وزادت قيمته في معظم حالات تقصير العضلة الرافعة ذو دلالة إحصائية. وقد أثبت اختبار شيرمر زيادة كمية الدموع في كل حالات التعليق الجبهي يقابلها نقصانها في حالات تقصير العضلة الرافعة. كما أثبتت الدراسة الطوبوغرافية للقرنية زيادة درجة التحذب في معظم حالات التعليق الجبهي وانخفاضها في جميع حالات تقصير العضلة الرافعة. كما أثبتت عدم وجود فرق ذو دلالة إحصائية بين المجموعتين من حيث درجة اللانقطية.

الخلاصة: تؤثر عملية التعليق الجبهي سلبيًا على جودة طبقة الدموع بينما تزيد من كمية الدموع. ومن ناحية أخرى، تقلل عملية تقصير العضلة الرافعة من حجم طبقة الدموع مع تحسين جودة طبقة الدموع. بينما تزيد كلتا العمليتين من اللانقطية للقرنية بطريقة مماثلة.