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ORIGINAL RESEARCH

# Evaluation of Headache-Related Quality of Life and Dry Eyes Following Dermatochalasis Surgery: A Prospective Clinical Study

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**Purpose:** To evaluate patients' headache-related quality of life and dry eyes before and after dermatochalasis surgery of the upper eyelid.

**Methods:** This prospective clinical trial included 29 patients (58 eyes) who underwent dermatochalasis surgery of the upper eyelid at Sahlgrenska University Hospital. The inclusion criteria were bilateral dermatochalasis of the upper eyelid and preoperative headache. Patients were interviewed using the Headache Impact Test (HIT-6) (Version 1.1) and Dry Eye Questionnaire (DEQ-5) to assess headache impact and dry eyes. Pre- and postoperative examinations also included visual acuity, visual field, Schirmer's test, Break-Up Time (BUT), fluorescein staining, and margin reflex distance (MRD) measurements.

**Results:** Twenty-eight patients (56 eyes) completed the study protocol. The study showed that MRD improved significantly ($p < 0.001$). Visual acuity (logMAR) improved significantly in both the right eye ($p = 0.003$) and the left eye ($p = 0.017$). HIT-6 and DEQ-5 scores also showed significant improvements ($p < 0.001$). No statistically significant differences were observed in the visual field index (VFI) or pattern standard deviation (PSD). The upper visual field improved significantly in the right eye ($p = 0.02$) but not in the left ($p = 0.39$). The Schirmer test showed significant improvement in the left eye ($p = 0.04$). However, no statistically significant changes were observed in BUT or fluorescein staining.

**Conclusion:** Dermatochalasis surgery of the upper eyelid improved headache-related quality of life; however, the effect on dryness of eyes was more complex. DEQ-5 improved, but that result could not be confirmed in more objective examinations. No deterioration of dryness of the eyes could be found despite a larger palpebral fissure. The surgery provides both functional and cosmetic benefits.

**Keywords:** dermatochalasis, headache, quality of life, dryness of eyes

## Introduction

Dermatochalasis is a common sign of aging characterized by loose and excess skin on the upper eyelids. It typically affects middle-aged and older people and is linked to changes in the skin's structure and elasticity.[1] Dermatochalasis can affect several aspects of vision[2] and cause other symptoms such as a narrowed field of vision (especially the upper visual field), heaviness in the eyelids, eczema on the eyelid skin, irritation, itching, fatigue, and headache.[2,3] Headache is supposed to be caused by using the frontalis muscle in the forehead to assist in lifting the drooping eyelids in individuals with dermatochalasis.[3] Dry eye is a common condition in the population and is closely related to aging.[4] Dry eyes are often multifactorial and can be caused by advanced age, female gender, lack of tears, reduced tear fluid quality, or both, a dry environment, and medications.[5] Dry eyes cause discomfort, burning, visual disturbances, and increased blinking, impairing quality of life.[4,5] It can also lead to inflammation and small sores on the ocular surface, which increases the risk of infection.[4]

Dermatochalasis is treated with surgery in which excess skin on the eyelid and underlying orbicularis oculi muscle tissue is removed.[6] Dermatochalasis operation can affect the surface dynamics of the eye, leading to dry eyes, and



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altering the topography of the cornea.[2] It can also improve the field of vision and visual acuity, reduce the feeling of heavy eyelids, reduce the risk of eczema in the eyelids, and relieve headache symptoms caused by frown.[7]

Upper eyelid blepharoplasty can have a positive effect on headache symptoms. Overall, it improves the patient's and headache-related quality of life.[7,8] It is less well-researched how surgery affects dry eyes.[9]

The purpose of this study was to evaluate the patient's headache-related quality of life and dry eyes in the same cohort in connection with dermatochalasis surgery of the upper eyelid since previous studies have been carried out in different groups of patients.

## Methods

This prospective clinical trial was planned to include sixty eyes from thirty patients, each undergoing identical dermatochalasis surgery of the upper eyelid at the Department of Ophthalmology, Sahlgrenska University Hospital. The sample size was based on results from a previous similar study.[10] It was approved by the Swedish Ethical Review Authority (2022–03671-01) and was conducted in compliance with the ethical principles for medical research contained in the Declaration of Helsinki. The included patients provided written informed consent.[11] Twenty-nine patients were enrolled, and one chose to discontinue her participation during the study.

Inclusion criteria for this study required that patients had bilateral dermatochalasis of the upper eyelids in need of surgery,[10,12] were willing to participate, could speak and understand Swedish, had a visual acuity of at least 0.3 in each eye, and had preoperative headaches.[8] Exclusion criteria were using any medication that could affect eye dryness, using eye drops other than tear substitutes without preservatives, eye diseases[11,12] that could affect the peripheral field of vision, and the inability to complete the questionnaire or answer the researcher's questions.

To evaluate the patient's headache-related quality of life, the patient was interviewed by a nurse using the Headache Impact Test questionnaire.[8] The HIT-6 is a validated questionnaire consisting of six questions. Each item is scored from 6 to 13 points, resulting in a total score ranging from 36 to 78. Higher scores indicate greater disability due to headache. To evaluate the patient's dry eyes, the patient was interviewed by a nurse using the DEQ-5.[4] This validated questionnaire includes five items evaluating the frequency and intensity of symptoms. The total score ranges from 0 to 22, with scores ≥12 indicating clinically significant dry eye disease. Both tests were translated into Swedish.

The patients were examined before the operation and approximately two months postoperatively. The examinations were carried out by the same ophthalmologist and nurse together on all occasions. The relevant examinations, in addition to the questionnaires, included visual acuity, visual field using the Humphrey Field Analyzer 3 (SITA Faster 24–2 program), Schirmer's test, Break-Up-Time, grading of superficial fluorescein staining on the surface of the eye, and measurement of MRD. The Schirmer's test was performed without local anesthesia, and the test paper strip was placed under the lower eyelid for five minutes. The length of the strip moistened by the tear fluid was then measured (in millimeters). BUT was measured after staining with fluorescein. The eyelids were held still, and the patient was unable to blink, while the time (in seconds) until the first dry spot appeared on the cornea was recorded. Grading of superficial fluorescein staining on the corneal surface was performed after staining with fluorescein and using a scale from 0 (no staining) to 3 (severe staining). MRD was done by illuminating the eye with a light source directed at the cornea and measuring the distance (in millimeters) from the corneal reflex to the upper eyelid margin. The mean value of the upper visual field was calculated as the mean of all the 27 test points in decibels (dB) in the upper visual field. All examinations were conducted in the same manner two months post-surgery.

Both eyes were operated upon on the same occasion. Initially, the eyes were rinsed with Chlorhexidine 0.5 mg/mL, and the eyelids were cleaned with chlorhexidine alcohol solution 5 mg/mL. The surgeon marked the eyelids to determine the amount of skin to be removed. Local anesthesia was administered using Lidocain-Adrenaline 10 mg/mL + 5 µg/mL buffered with Tribonate® (Fresenius Kabi AB, Uppsala, Sweden). An incision was made with a 15-gauge knife, followed by the removal of excess skin and muscle with scissors. Diathermy was applied if needed to stop bleeding. The surgical area was sutured with 6–0 nylon suture, and postoperative treatment included 1% fucidinic eye drops. Sutures were removed seven days post-surgery. All surgeries were performed by the same surgeon.[10]

Statistical analyses were performed with SPSS version 29.0 IBM, Armonk, NY, USA. All tests were two-sided, and a p-value of $<0.05$ was considered significant. Quantitative variables were presented as mean ± standard deviation.

Otherwise, the median and ranges are given. Student's *T*-test and Wilcoxon's signed-rank test for dependent samples were applied.

## Results

Demographic data, as well as pre-and postoperative outcomes in patients undergoing dermatochalasis surgery of the upper eyelid, is presented in Table 1. Twenty-nine patients were included, and twenty-eight patients, 56 eyes, fulfilled the study protocol. MRD improved ($p < 0.001$) in both the right and left eye after surgery, Table 1. The picture of pre-and postoperative

**Table 1** Demografic Data, Some Pre-and Postoperative Test Results

| | **Preoperatively** | **Postoperatively** | **p-value** |
|---|---|---|---|
| **Age, years** | | | |
| Mean (minimum-maximum) | 61 (45–79) | | |
| **Gender, numbers** | | | |
| Female | 24 | | |
| Male | 4 | | |
| **MRD[a], millimeters** | | | |
| Right eye, mean ±SD | 2.1 ± 1.1 | 3.1 ± 1.2 | p < 0.001 |
| Left eye, mean ±SD | 2.2 ± 0.8 | 3.1 ± 1.0 | p < 0.001 |
| **Visual acuity, logMAR** | | | |
| Right eye, mean ±SD | 0.04 ± 0.1 | 0.00 ± 0.11 | p = 0.003 |
| Left eye, mean ±SD | 0.08 ± 0.12 | 0.03 ± 0.10 | p = 0.017 |
| **VFI[b], percentage** | | | |
| Right eye, mean ±SD | 96 ± 5.5 | 97 ± 4.7 | p = 0.412 |
| Left eye, mean ±SD | 97 ± 6.2 | 97 ± 4.4 | p = 0.688 |
| **PSD[c], dB** | | | |
| Right eye, median (min-max) | 1.93 (0.99–9.26) | 1.69 (1.05–7.90) | p = 0.14 |
| Left eye, median (min-max) | 1.65 (0.92–10.07) | 1.62 (1.02–6.90) | p = 0.50 |
| **Upper visual field, dB** | | | |
| Right eye, median (min-max) | 27.2 (11.1–31.6) | 29.1 (18.3–31.7) | p = 0.02 |
| Left eye, median (min-max) | 28.0 (9.1–32.2) | 28.8 (14.6–32.5) | p = 0.39 |
| **HIT[d]** | | | |
| Median | 62 | 46 | p < 0.001 |
| Minimum-maximum | 46–69 | 36–62 | |
| **DEQ-5[e]** | | | |
| Median | 15 | 8.5 | p < 0.001 |
| Minimum-maximum | 1–20 | 0–15 | |

**Notes**: [a]MRD = marginal reflex distance, [b]VFI = visual field index, [c]PSD = pattern standard deviation, [d]HIT = headache impact test, [e]DEQ-5 = dry eye questionnaire.


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status in one patient is being presented as an example in Figure 1A and B. Visual acuity (logMAR) improved significantly postoperatively in both the right ($p = 0.003$) and the left eye ($p = 0.017$). VFI and PSD showed no statistically significant differences between pre-and postoperative values for either the right or the left eye ($p > 0.05$). Upper visual field, measured in dB, showed a statistically significant improvement in the right eye ($p = 0.02$), but no significant improvement in the left eye ($p = 0.39$). The HIT-6 showed a significant improvement postoperatively ($p < 0.001$), as did the DEQ-5 ($p < 0.001$). The Schirmer test showed no significant difference between pre-and postoperative values for the right eye ($p > 0.05$), but a significant improvement was observed for the left eye ($p = 0.04$), presented in Figure 2. The BUT showed no significant differences for either the right or the left eye ($p > 0.05$) Figure 3. Fluorescein staining showed that 8 patients worsened, 3 improved, and 17 had unchanged results in the right eye. For the left eye, 7 patients worsened, 5 improved, and 16 had unchanged results.

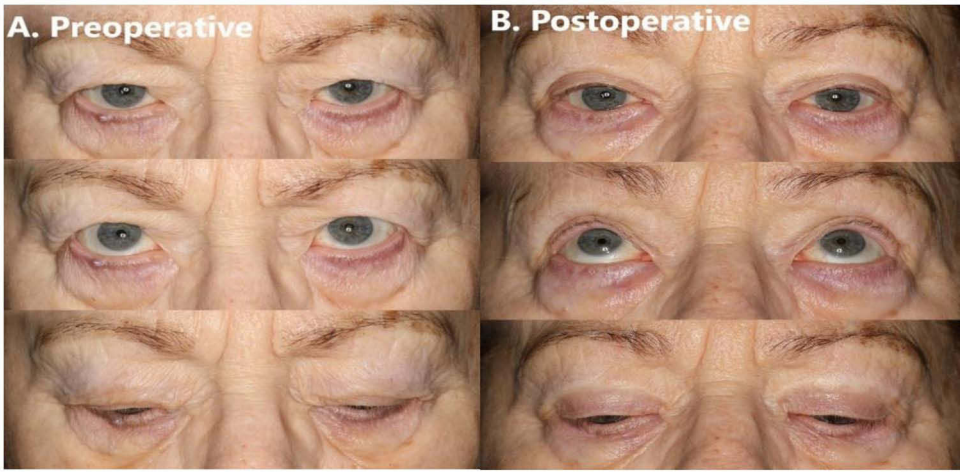


**Figure 1** (**A** and **B)** The patient's pre- and post-operative images show structural changes in the upper eyelid and improvements in Margin Reflex Distance (MRD). Published with permission from the patient.

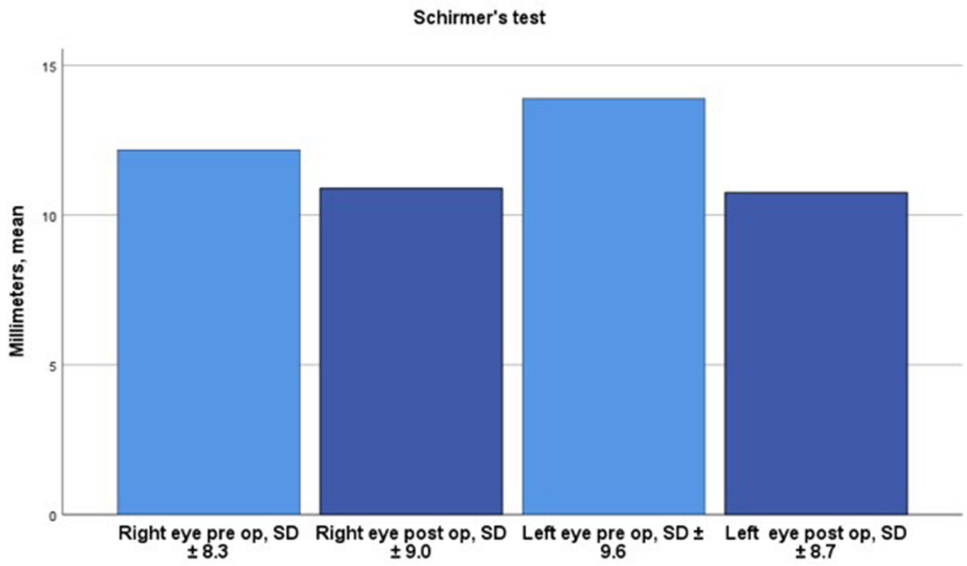


**Figure 2** Schirmer test results: Schirmer test for right eye, preoperative mean was 12 mm ± 8.3 and postoperative 11 mm ± 9.0. For the left eye, the preoperative mean value was 14 mm ± 9.6 and postoperatively 11 mm ± 8.7.

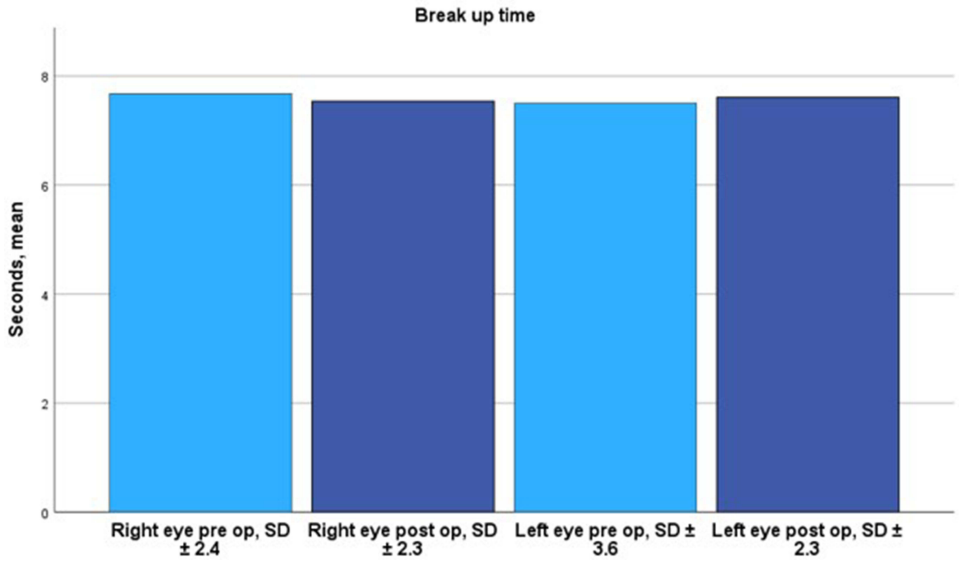


**Figure 3** Break-Up Time (BUT): For the right eye, the preoperative mean was 7.7 seconds ± 2.4 and postoperatively 7.5 seconds ± 2.3. For the left eye, the preoperative mean was 7.5 seconds ± 3.6 and postoperatively 7.6 seconds ± 2.3.

## Discussion

This study evaluated the effects of dermatochalasis surgery of the upper eyelid on headache-related quality of life and dry eyes in a cohort of patients. Headache-related quality of life improved according to the HIT-6,[8] consistent with studies demonstrating that surgery can reduce headache-related symptoms. This finding supports previous research indicating that dermatochalasis surgery of the upper eyelid can relieve symptoms associated with using the frontalis muscle to lift the drooping eyelids, which causes tension and headaches.[3,7,9] An improved quality of life in the form of reduced headaches may, therefore, be an important benefit of this surgery,[8,9,13] strengthens the argument that it offers both cosmetic and functional benefits.[14,15]

The improvement in MRD after surgery for both eyes shows[3,16] that the surgery was successful in lifting the eyelids.

It is reasonable to believe that dryness of the eyes would increase after dermatochalasis surgery of the upper eyelid due to a larger palpebral fissure post-operatively. The results in this study partly contradict this and indicate that the mechanisms behind eye dryness are more complex. The DEQ-5 showed a significant improvement postoperatively, suggesting that the surgery not only improves headache[17] or visual field but also may reduce subjective symptoms of dry eyes. However, previous articles showed that dermatochalasis surgery does not reduce the subjective or objective symptoms of dry eyes,[12,18] while another article showed that further studies on dry eyes are needed.[9] In contrast, the Schirmer test showed a significant improvement only in the left eye, while the BUT did not change significantly.[12,19] Some patients experienced deterioration in fluorescein staining.

The fact that fluorescein staining showed deterioration in some patients indicates[12] that certain individuals may experience adverse effects on the ocular surface postoperatively. This is particularly interesting because dermatochalasis surgery can affect ocular surface dynamics, which, in some cases, has been associated with increasing the dryness of the eyes.[12] Despite this, the results showed some positive effects on dry eyes in this patient cohort. This improvement may partially be attributed to enhanced eyelid function following the removal of excess skin. This finding suggests that the effects of surgery on eye dryness may be asymmetrical.

The results also demonstrated significant improvements in visual acuity (logMAR) for both the right and left eyes. These findings are consistent with previous research emphasizing the positive effects of surgery on functional and aesthetic aspects of eyelid anatomy and visual function.[7,8,20]

In terms of VFI and PSD, there were no statistically significant changes in our study. However, previous research, showed that dermatochalasis surgery has positive effects on the visual field.[9,14,15,21] However, it is noteworthy that the upper visual field improved significantly in the right eye but not in the left in our study. This may be partially explained


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by individual variations in surgical outcomes or preoperative differences, which have not been addressed in this study. Previous research showed that after surgery there was a significant improvement in the upper visual field, suggesting that the surgery may have a positive effect on vision, particularly in removing obstructive tissue from the upper eyelids that can block vision.[22]

The study has several strengths, including its prospective design, the use of validated instruments such as the HIT-6 and DEQ-5, and standardized examination methods. However, there are limitations, including the relatively small sample size and short follow-up period, which may impact the generalizability of the findings. A larger cohort would yield more robust results and allow for a more detailed analysis of variables such as gender, age, and individual differences in dry eye and headache. Additionally, some patients may have experienced subjective improvements that may not be reflected in the objective measurements. While this study focused on a specific surgical approach for dermatochalasis surgery of the upper eyelid, variations in outcomes may occur depending on the surgeon's experience and the technique used.

In conclusion, this study demonstrates that dermatochalasis surgery of the upper eyelid can improve both the headache-related quality of life and certain aspects of dry eyes, although the outcomes vary across between parameters and among patients. Further research involving larger cohorts is needed to better understand the long-term effects of the surgery on dry eyes and headache symptoms.

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## Disclosure

The authors report no conflicts of interest in this work.

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