



DOI: 10.14744/eur.2025.07769
Eur Eye Res 2026;6(1):44–49

EUROPEAN
EYE
RESEARCH

ORIGINAL ARTICLE

Evaluation of tear function after spontaneous granulation healing (laissez-faire technique) in eyelid tumor surgery

 Burak Ulas,  Altan Atakan Ozcan,  Nilufer Topaktas

Department of Ophthalmology, Cukurova University Faculty of Medicine, Adana, Türkiye

Abstract

Purpose: The purpose of this study was to evaluate the tear dynamics and ophthalmological findings in patients who underwent spontaneous granulation healing after eyelid tumor excision.

Methods: Ten eyes of 10 patients with complaints of eyelid tumors were included in the study. Demographic information of the patients, presence of systemic diseases, pathological diagnosis, size of the lesion, size of the excised area, tear dynamics (Schirmer-I test, tear break-up time), and ocular findings of the lid left for secondary healing after excision were evaluated retrospectively.

Results: Ten patients (five females and five males) with a mean age of 68 ± 14.4 years were followed up with spontaneous granulation healing after eyelid excision. The healing time of the eyelids was 21.5 ± 4.9 days. The mean value of the Schirmer-I test was 11.7 ± 1.25 mm before the operation, and the mean Schirmer-I test was 7.42 ± 2.14 mm at the 1st month after the operation ($p < 0.001$). Tear break-up time was found to be 12.8 ± 2.36 s preoperatively and 8 ± 2.51 s at the 1st month postoperatively ($p = 0.003$). A positive correlation was found between age and the length of the eyelid healing time ($r = 0.685$, $p = 0.045$).

Conclusion: Spontaneous granulation healing after eyelid tumor excision may lead to a significant reduction in tear stability. Despite these changes in tear dynamics, the technique appears to be a feasible option for eyelid reconstruction, offering satisfactory healing without major complications.

Keywords: Eyelid tumor; Laissez-Faire technique; spontaneous granulation healing; tear dynamics.

Approximately 5–10% of cutaneous malignancies manifest in the periocular region, necessitating careful clinical management due to the functional and cosmetic significance of the area. Excision of these lesions from the area is used quite frequently in the diagnosis and treatment of the disease.^[1–3] The main function of the eyelids is to protect the conjunctiva and cornea by providing tear dynamics on the ocular surface.^[4,5] Due to previous eyelid surgeries, deterioration in tear dynamics and cosmetic malformations may occur. It is a well-established fact that eyelid tumor surgery can mechanically alter the

corneoscleral and conjunctival interface sufficiently to worsen or aggravate dry eye symptoms.^[4,5] Ocular surface problems may be seen in patients secondary to the deterioration of eyelid function, and ocular complaints such as burning and stinging, foreign body sensation, and blurred vision may occur.^[4–7] To prevent such complications, surgical reconstruction of the eyelid defect following tumor excision has long been the standard and preferred approach.^[7,8] As an alternative to this point of view, it was first described by Brown and Fryer in 1957 that the eyelid defect created to reduce the surgical burden



Cite this article as: Ulas B, Ozcan AA, Topaktas N. Evaluation of tear function after spontaneous granulation healing (Laissez-Faire technique) in eyelid tumor surgery. Eur Eye Res 2026;6(1):44–49.

Correspondence: Burak Ulas, M.D. Department of Ophthalmology, Cukurova University Faculty of Medicine, Adana, Türkiye

E-mail: drburakulas@gmail.com

Submitted Date: 24.06.2025 **Revised Date:** 21.08.2025 **Accepted Date:** 22.09.2025 **Available Online Date:** 29.04.2026

OPEN ACCESS This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



could be left to secondary healing.^[9-12] These investigators were the first to consider secondary healing after eyelid lesion excision as an alternative to surgical repair.^[11-14] Concerns about this technique included disruption of tear dynamics and the development of dry eye syndrome, unpredictability, and long surgical recovery time, as well as poor cosmetic and functional outcomes associated with bleeding and infection.^[12-14] Laissez-Faire technique has some surgical advantages: First, secondary intention healing provides a simple, cost-effective, and time-efficient reconstructive option, eliminating the need for complex flap or graft procedures; second, this technique also allows close post-operative monitoring of the surgical field, which is particularly advantageous in tumors with a high risk of recurrence.

The increase in interest in techniques that reduce the duration of surgery time during the pandemic has led to an increase in studies on this subject. The purpose of the present study is to evaluate the tear dynamics and ophthalmological findings of patients who were left to secondary healing after eyelid tumor excision.

Materials and Methods

Ten eyes of 10 patients who applied to Cukurova University Faculty of Medicine, Department of Ophthalmology, Oculoplasty Unit, with the complaint of eyelid mass in 2021–2024 were included in the study. This study was approved by the Cukurova University Faculty of Medicine Institutional Human Subjects Ethical Committee (Approval number: September 01, 2023-136-25). The present study was conducted in accordance with the principles of the Declaration of Helsinki. All patients' written informed consent was provided for participation in the study. All patients underwent extensive ophthalmological examinations before surgery. All patients were operated on with a wide excision technique under local anesthesia.

The margin of excision was marked with a surgical pencil as 4 mm from the border of the visible mass. The mass was excised by making a pentagonal cut. If necessary, cauterization was performed before the end of the surgery to control bleeding. After removal of the mass, the defect was followed up for secondary healing. It was recommended to use topical tobramycin ointment 3 times a day for proper wound care, and to use artificial tears (polyvinyl alcohol 1.4%; povidone 0.6%) 5 times a day to prevent ocular surface damage. Control examinations of the patients were performed on the 1st day, 1st week, and 1st, 3rd, and 6th months postoperatively.

The pathological diagnoses of the patients, the size of the lesion, the size of the excised area, and the ocular findings of the valve left for secondary healing were evaluated. Healing time, follow-up time, visual acuity, Schirmer-I test, fluorescein tear break-up time, dye area status, presence of complications, surgical margins, and the need for additional surgery were evaluated and recorded. Schirmer-I test was performed without anesthesia using special filter paper strips. The Schirmer test strip was placed beneath the temporal lid margin between the palpebral conjunctiva of the lower eyelid and the bulbar conjunctiva of the eye. The eyes were closed for 5 min, and the wet portion of the Schirmer test strip was measured in millimeters. The measurement of fluorescein tear break-up time was performed after 2% sodium fluorescein solution was instilled onto the inferior conjunctival fornix. After that, the tear film was assessed with a cobalt blue filter of a slit lamp to show the first precorneal hypofluorescent spot. The time to interruption of the normal homogeneous fluorescence pattern was recorded in seconds to define the tear break-up time.

Statistical Analysis

For comparison of two related (paired) continuous variables, the paired samples t-test or the Wilcoxon Signed Rank test was used, depending on whether the statistical hypotheses were fulfilled or not. To evaluate the correlations between measurements, the Pearson Correlation Coefficient or Spearman Rank Correlation Coefficient was used, depending on whether the statistical hypotheses were fulfilled or not. Categorical variables were expressed as numbers and percentages, whereas continuous variables were summarized as mean and standard deviation, and as median and minimum-maximum, where appropriate. All analyses were performed using IBM Statistical Package for the Social Sciences Statistics Version 20.0 statistical software package. The statistical level of significance for all tests was considered to be 0.05.

Results

The secondary healing of 10 patients (five females and five males) with a mean age of 68 ± 14.4 years after eyelid tumor excision was followed. Systemic disease was present in 4 (57.1%) of these patients (benign prostatic hypertrophy, hypertension, and thyroid disease). The anterior segment and fundus were normal on slit-lamp examination. Six (60%) of the masses were in the left eye. All of the masses were in the lower eyelid. Six of them were located on the lateral eyelid. The mean area excised in the operation was 0.35 cm^2 , and the mean lesion size in the excised area was 0.24 cm^2 .

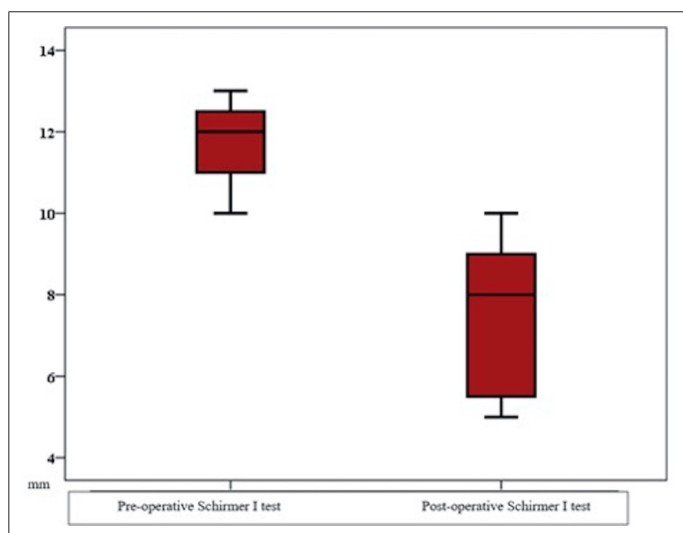


Fig. 1. Pre-operative and post-operative 1st month Schirmer-I test graph of patients operated for eyelid tumor.

After eyelid tumor excision, 7 (70%) patients were diagnosed with basal cell carcinoma nodular type, 1 patient (10%) with squamous cell carcinoma *in situ*, and 2 (20%) with intradermal nevus. The secondary healing time of the eyelids was 21.5 ± 4.9 days. An average follow-up period of 3.1 months was recorded after the surgical procedure.

In the 1st week after the operation, 4 (40%) patients had a corneal dye area, and 2 (20%) had a conjunctival dye area. There was no dye area in 4 patients (40%). There was no difference between best-corrected visual acuity before and after the operation (average LogMAR 0.7). The mean Schirmer-I test was 11.7 ± 1.25 mm before the operation, and 7.42 ± 2.14 mm at the 1st month postoperatively, and it was found to decrease significantly ($p < 0.001$) (Table 1 and Fig. 1).

Tear break-up time was found to be 12.8 ± 2.36 s preoperatively and 8 ± 2.51 s in the 1st month after the operation, and it decreased significantly ($p = 0.003$) (Fig. 2). At the end of the 3rd month, it was observed that all the eyelids reached their natural contour (Figs. 3-5). A significant correlation was found between age and eyelid healing time (correlation coefficient 0.685, $p = 0.045$). It was determined that gender, lesion size, excision size, and

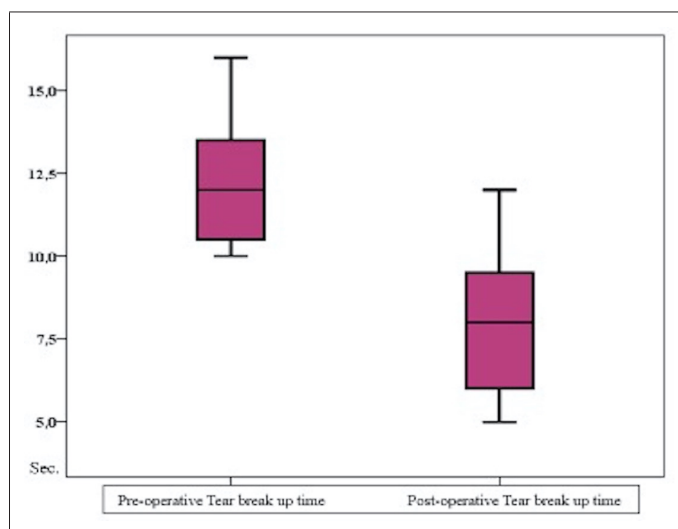


Fig. 2. Pre-operative and post-operative 1st month tear break-up time graph of patients operated for eyelid tumor.

eyelid location (lateral/medial) had no effect on eyelid healing time ($p > 0.05$). None of the patients developed complications during or after the operation, and did not need a secondary operation. Surgical margins were intact in all patients.

Discussion

A variety of techniques have been developed for the reconstruction of eyelid defects following tumor excision. Moesen and Paridaens^[15] and Ding *et al.*^[16] both reported successful outcomes using local tissue flaps and free grafts, respectively, for lower eyelid reconstruction. Bengoa-González *et al.*^[17] described a modified Cutler–Beard technique for upper eyelid reconstruction, which also yielded positive results. These studies collectively suggest that a range of techniques can be effective for eyelid tumor reconstruction, with the choice depending on the specific case and the expertise of the surgeon.^[15-17] Allowing the defect in the tissue to heal without additional procedures after surgical intervention is called secondary granulation healing (Laissez-Faire technique).^[9,12] Secondary intention healing, a method of allowing wounds to heal on their own

Table 1. Preoperative and postoperative first month Schirmer-I test and tear break-up time results of patients operated for eyelid tumor

	Pre-operative Schirmer-I (mm)	Post-operative Schirmer-I (mm) (1 st month)		Pre-operative tear breakup time (sec)	Post-operative tear breakup time (1 st month) (sec)	
Mean	11.71	7.42	$p < 0.001$	12.28	8	$p = 0.003$
±Standart deviation	1.25	2.14		2.36	2.5	
Min-Max	10-13	5-10		10-16	5-12	

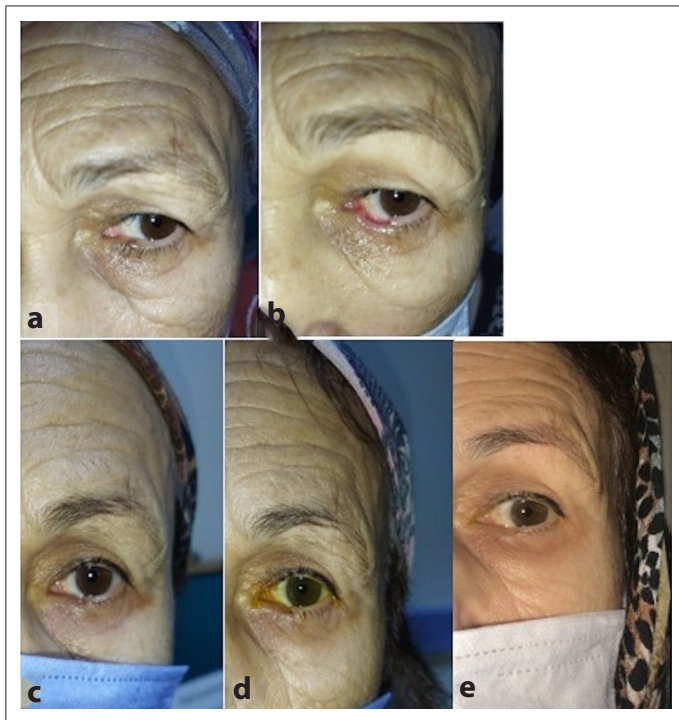


Fig. 3. Our patient followed up with an eyelid tumor (intradermal nevus); in the pre-operative (a), post-operative 1st day (b), post-operative 7th day (c), post-operative 1st month (d), post-operative 3rd month (e) clinical appearance, the improvement pattern, and eyelid contours improved.

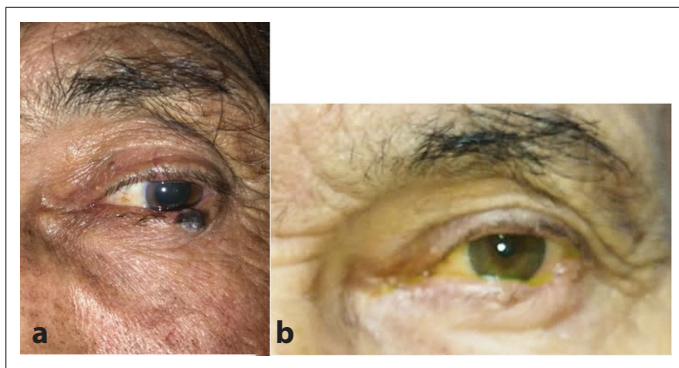


Fig. 4. (a) A 76-year-old male patient complaining of a mass in the lower eyelid, whose biopsy result showed nodular basal cell carcinoma. (b) At the 1st post-operative control, it was observed that the eyelid had healed and had a natural contour.

without surgical reconstruction, has been found to be a safe and effective option for managing defects following the excision of benign lid margin tumors.^[10-14] This technique has also been successfully used in periocular reconstruction, with satisfactory functional and cosmetic results in the majority of cases.^[9-12] In some situations, modifications to the reconstruction technique, such as basal and lateral block resection, may be necessary to ensure complete removal of residual tumor tissue.^[18]

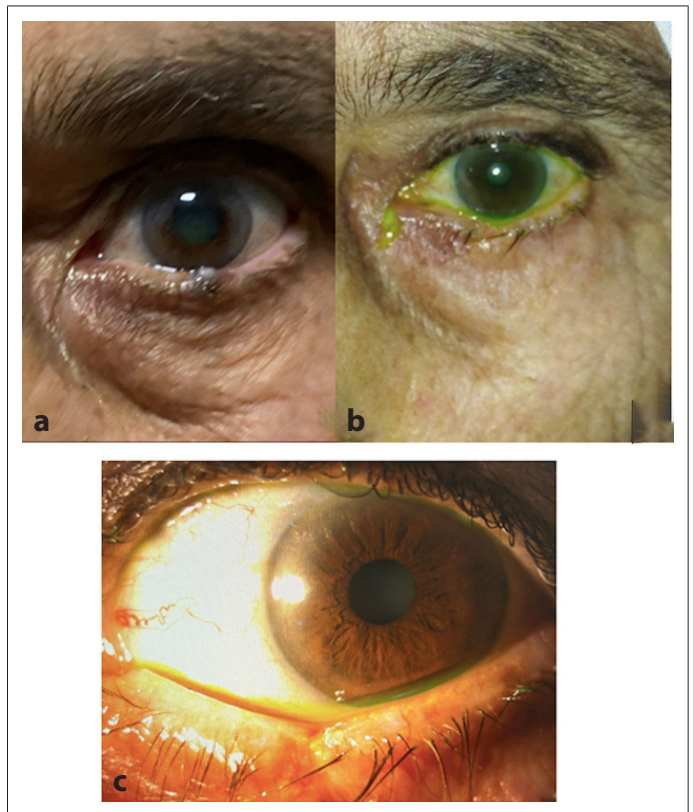


Fig. 5. (a) A 77-year-old female patient had a lesion on her left lower eyelid that has been developing for 3 months (pre-operative). Post-operative recovery is observed at the 2nd week (b) and 1st month (c).

Spontaneous wound healing after excision of lid tumors has also been shown to lead to satisfactory cosmetic and functional outcomes, with no need for secondary surgery in some cases.^[19]

Secondary healing has not been favored as a primary treatment modality, as long recovery times of several weeks are associated with disadvantages such as unpredictable cosmetic results, tissue deterioration, and risk of wound infection.^[9-11] However, with the pandemic period, the approach to patients in need of surgery with short operation time and technique, with easy-to-apply techniques, has gained importance. This idea has also increased the interest in secondary healing practices and results. The advantages of this technique are that it is cost-effective, provides a short surgical time, is comfortable for the patient and the surgeon, allows the follow-up of tumors with a high risk of recurrence, and provides a suitable basis for secondary surgery.

According to Lowry *et al.*,^[11] 83% of patients (49 out of 59) with periocular skin defects achieved satisfactory functional and cosmetic results. They stated that they observed ectropion, trichiasis, and hypertrophic scar as complications in 10 patients.^[11] In their study, Shankar *et al.*^[12] achieved

satisfactory functional and esthetic results in 23 of 25 patients (92%). They stated that there is a need for secondary intervention in a patient with viable granulation tissue. Previous studies have demonstrated that variables including defect location, skin pigmentation, wound dimensions, and depth are valuable in forecasting the success of secondary intention healing.^[10-14] In addition, Lowry *et al.*^[11] described that many of the complications associated with periocular secondary healing were similar and comparable to those reported for primary reconstruction.

In the present study, all 10 patients had good functional and cosmetic results, the surgical margins were intact, and none of them required secondary surgery. In a case series by Mehta,^[13] post-operative ectropion necessitated secondary repair in only one of 11 patients who had undergone excision of lesions at the eyelid margin. All cases demonstrated complete wound healing within 6 weeks, with progressive cosmetic enhancement observed over the following 6–8 weeks. The average recovery period in the present study was 4 weeks, whereas esthetic outcomes continued to improve during the following 6–8 weeks.

Kibbi *et al.*,^[14] in a series of 39 patients, observed that age had no effect on recovery; it was stated that this result could be due to the fact that only three of the patients were 85 years old and over. However, in the present study, it was determined that age may have an effect on the recovery period, and this result was thought to be due to the more balanced age distribution of our cases. Although there was a positive correlation between age and recovery time in our study, the power analyses were around 60% because the sample size was small, which is below the ideal desired power rate. In the study conducted by Kibbi *et al.*,^[14] it was determined that a defect located in the region medial to the healing may cause worse results, and this situation was thought to be due to the wider lesions in that region. Kibbi *et al.*^[14] found that the size of the defect had an effect on healing. However, in the present study, the effect of defect location and defect size on healing was not significant. It was thought that the limited number of our sample may have contributed to this result.

Eyelid surgeries can compromise ocular surface homeostasis by altering key anatomical and functional structures such as the lacrimal gland, meibomian glands, and orbicularis oculi muscle, potentially leading to tear film instability and dry eye symptoms.^[4,5,20] Disruption of the eyelid margin and periocular tissues during tumor excision may negatively affect tear production and distribution, even in the absence of direct trauma to the lacrimal apparatus. In the present

study, tear function was evaluated using the Schirmer-I test and fluorescein tear break-up time, supported by slit-lamp examination of the ocular surface. Both parameters showed a statistically significant decline 1 month postoperatively, indicating an early post-operative deterioration in tear dynamics following secondary healing. Specifically, the Schirmer-I values decreased from a pre-operative mean of 11.7 ± 1.25 mm to 7.42 ± 2.14 mm ($P < 0.001$), whereas tear break-up time dropped from 12.8 ± 2.36 s to 8.0 ± 2.51 s ($p = 0.003$). These findings align with previous reports suggesting that even minimally invasive eyelid procedures may contribute to post-operative dry eye by destabilizing the tear film.^[4,5] While none of the patients in this series developed chronic ocular surface complications, the significant short-term reduction in tear metrics highlights the importance of careful post-operative monitoring and supportive treatment, especially during the early healing phase. Further research is warranted to determine whether these changes persist beyond the early post-operative period and to identify potential protective strategies in eyelid tumor surgeries managed with the Laissez-Faire technique.

The pandemic period has led to an increased need for more comfortable and faster techniques for patients and oculoplasty surgeons. The interest in this technique has increased because it provides a short time in surgery, allows tissue follow-up of the excised area for possible recurrences, and tissue care can be made more simply than large reconstruction techniques such as flaps and grafts.

This study has several limitations that should be acknowledged. First, the retrospective design inherently introduces potential selection and information biases, which may affect the generalizability of the findings. Second, the relatively small sample size limits the statistical power of the analyses, particularly in assessing subgroup effects such as lesion location, lesion size, and systemic comorbidities. Another important limitation of the present study is the relatively short follow-up period (mean: 3.1 months), which does not allow for the assessment of late complications or the persistence of tear dysfunction beyond the early post-operative phase. Finally, the absence of a control group undergoing primary reconstruction prevents direct comparison between Laissez-Faire and other reconstructive approaches. In addition, although no patient required secondary surgery in our series, this finding should be interpreted with caution, as the limited number of cases prevents broader generalization of this result. Moreover, the absence of a control group (e.g., patients undergoing primary reconstruction) restricts the ability to compare the Laissez-Faire technique directly with

standard reconstructive approaches, which would have significantly strengthened the conclusions. Despite these limitations, this study contributes valuable preliminary data on the functional implications of spontaneous granulation healing after eyelid tumor excision and highlights the need for prospective, controlled studies with larger cohorts.

Conclusion

While the Laissez-Faire technique may represent a feasible and well-tolerated alternative for eyelid reconstruction following tumor excision, our findings demonstrate a significant short-term decline in tear function parameters. This highlights the importance of careful patient selection and close post-operative monitoring. Given the small sample size and limited follow-up, further prospective studies with larger cohorts and control groups are needed to clarify the long-term safety, efficacy, and functional outcomes of this approach.

Ethics Committee Approval: This study was approved by Cukurova University Faculty of Medicine Non-Interventional Clinical Trials Ethics Committee (01.09.2023 date; number 136).

Informed Consent: Written informed consent was obtained from the patients.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: A.A.O., B.U. NT; Design: A.A.O., B.U.; Supervision: A.A.O.; Resource: B.U., N.T.; Materials: A.A.O., B.U., NT; Data Collection and/or Processing: A.A.O., B.U., N.T.; Analysis and/or Interpretation: A.A.O., B.U.; Literature Search: A.A.O., B.U., NT; Writing: A.A.O., B.U., N.T.; Critical Reviews: A.A.O, B.U.

Conflict of Interest: The authors declared that they have no conflict of interest.

Use of AI for Writing Assistance: Not declared.

Financial Disclosure: The authors declared that this study received no financial support.

REFERENCES

1. Ulas B, Ozcan A, Sulanc B, Acikalin A. Evaluation of histopathology results in eyelid tumors: 20-year experience at a Turkish tertiary referral center. *J Fr Ophthalmol* 2025;48:104543. [\[Crossref\]](#)
2. Echchaoui A, Benyachou M, Houssa A, et al. Management of eyelid carcinomas: retrospective bicentric study of 64 cases and review of the literature. *J Fr Ophthalmol* 2016;39:187–94. [\[Crossref\]](#)
3. Lasudry J. Management of eyelid tumors: general considerations. *J Fr Ophthalmol* 2011;34:741–54. [\[Crossref\]](#)
4. Gonnermann J, Klein JP, Klamann MKJ, et al. Dry eye symptoms in patients after eyelid reconstruction with full-thickness eyelid defects: using Tomey TG-1000 thermographer. *Ophthalmic Research* 2012;48:192–8. [\[Crossref\]](#)
5. Aksu Ceylan N, Yeniad B. Effects of Upper Eyelid Surgery on the Ocular Surface and Corneal Topography. *Turk J Ophthalmol* 2022;52:50–6. [\[Crossref\]](#)
6. Sendul SY, Akpolat C, Yilmaz Z, Eryilmaz OT, Guven D, Kabukcuoglu F. Clinical and pathological diagnosis and comparison of benign and malignant eyelid tumors. *J Fr Ophthalmol* 2021;44:537–43. [\[Crossref\]](#)
7. Poinet B, Gardrat S, Dendale R, et al. Basal cell carcinomas of the eyelid: results of initial surgical management. *J Fr Ophthalmol* 2019;42:1094–9. [\[Crossref\]](#)
8. Brown JB, Fryer MP. Carcinoma of eyelids and canthal region. *Geriatrics* 1957;12:181–4.
9. DaCosta J, Oworu O, Jones CA. Laissez-faire: how far can you go? *Orbit* 2009;28:12–15. [\[Crossref\]](#)
10. Zitelli JA. Secondary intention healing: an alternative to surgical repair. *Clin Dermatol* 1984;2:92–106. [\[Crossref\]](#)
11. Lowry JC, Bartley GB, Garrity JA. The role of second intention healing in periocular reconstruction. *Ophthalm Plast Reconstr Surg* 1997;13:174–88. [\[Crossref\]](#)
12. Shankar J, Nair RG, Sullivan SC. Management of peri-ocular skin tumours by laissez-faire technique: analysis of functional and cosmetic results. *Eye (Lond)* 2002;16:50–53. [\[Crossref\]](#)
13. Mehta HK. Spontaneous reformation of lower eyelid. *Br J Ophthalmol* 1981;65:202–8. [\[Crossref\]](#)
14. Kibbi N, Khan Y, Leffel DJ, Christensen SR, Suozzi KC. Predicting outcomes following second intent healing of periocular surgical defects, *Arch Dermatol Res.* 2021;313:483–9. [\[Crossref\]](#)
15. Moesen I, Paridaens D. A technique for the reconstruction of lower eyelid. *Br J Ophthalmol* 2007;91:1695–7. [\[Crossref\]](#)
16. Ding JP, Chen B, Yao J. Lateral orbital propeller flap technique for reconstruction of the lower eyelid defect. *Ann R Coll Surg Engl* 2018;100:e103–5. [\[Crossref\]](#)
17. Bengoa-González A, Laslau BM, Martin-Clavijo A, Mencia-Gutierrez E, Lago-Llinas MD. Reconstruction of upper eyelid defects secondary to malignant tumors with a newly modified Cuttler-Beard technique with tarsoconjunctival flap. *J Ophthalmol* 2019;6838415. [\[Crossref\]](#)
18. Sharma RL, Sharma ML, Mahajan D. Basal and lateral block resection for residual eyelid tumor during second stage reconstruction at 3 weeks. *Archives of International Surgery* 2015;5:177.
19. Lee JM, Lee H, Lee TE, Park M, Baek S. Second intention healing after shave excision of benign tumors on the lid margin. *Ann Dermatol* 2011;23:463–7. [\[Crossref\]](#)
20. Ulas B, Ozcan A, Yar K, Kaya I, Binokay H. Evaluation of visual field and ocular surface parameters by clinical comparison after blepharoplasty for dermatochalasis. *J Fr Ophthalmol* 2024;47:104135. [\[Crossref\]](#)