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Short Communication

Standardized reattachment of the lateral canthal tendon in the swinging lower eyelid approach: A step-by-step technique

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ABSTRACT

Lateral canthotomy is a commonly used adjunctive technique to the transconjunctival approach in the so-called "swinging lower eyelid" procedure to enhance orbital exposure. Despite its widespread use, the closure phase remains sparsely detailed in the literature, although it is critical for accurate restoration of the lateral canthal anatomy and prevention of eyelid malposition. This technical note details a step-by-step method for lateral canthotomy closure designed to achieve anatomic reconstitution of the native canthal architecture while preserving the exposure benefits of canthotomy. The protocol emphasizes identification and sequential reattachment of the inferior limb of the lateral canthal tendon. Key anatomical landmarks, technical pearls, and common pitfalls are highlighted to enhance reproducibility and facilitate surgical teaching. This standardized closure approach may improve consistency in surgical practice and provide a framework for future studies correlating closure techniques with functional and aesthetic outcomes.

1. Introduction

Lateral canthotomy was first described by Jafek et al. in 1973 [1], as an emergency decompression technique for acute intraorbital hemorrhage and was later refined by Thompson et al. in 1990 [2], into the form in which it is currently performed. Its role expanded with the report of McCord and Moses, who combined it with a transconjunctival inferior fornix incision to create the "swinging lower eyelid flap" procedure providing excellent exposure of the orbital floor, rim, lateral orbit, and zygomaticofrontal suture without the need for extensive skin incisions [3]. Since then, lateral canthotomy has become an invaluable adjunct in orbital and midfacial surgery, particularly for zygomaticomaxillary complex and orbital blowout fractures where visualization and precise implant placement are essential [4–6].

Despite its widespread adoption, concerns have persisted regarding postoperative sequelae—such as rounding of the canthal angle, scleral show, and mild ectropion—largely related to the difficulty of resuspending the lateral canthal tendon after division [7–13]. Over the decades, refinements in technique have improved surgical access and reduced complication rates; however, the literature provides little systematic guidance on closure and lateral canthal reattachment, with most reports offering incomplete or vague descriptions [7–13]. This lack of standardization stands in contrast to the critical importance of precise restoration of the canthal angle in contemporary orbital and maxillofacial surgery.

The purpose of this report is to provide a clear, step-by-step description of lateral canthotomy performed in conjunction with a transconjunctival approach as part of the "swinging lower eyelid flap", with particular emphasis on the closure phase and precise reattachment of the lateral canthal tendon.

2. Materials and methods

To address the research aim, an experimental study was designed and conducted using three fresh human cadaver heads. The specimens were provided by the SWISS Foundation for Innovation and Training in Surgery, Geneva (SFITS; https://www.sfits.ch/), in collaboration with our hospital and university. All specimens were acquired following the required institutional procedures, with prior written authorization obtained from the legally responsible individuals.

3. Surgical technique

3.1. Transconjunctival approach

The surgical technique used here follows the sequence exhaustively described by Bruneau and Scolozzi (2015) and is therefore not reported again in detail [14].

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3.2. Lateral canthotomy approach

Given the specific focus of the present technical note, only the cantholysis and the posterior fixation of the inferior limb of the lateral canthal tendon (canthopexy) are illustrated in detail. These steps are demonstrated on a cadaveric specimen and accompanied by corresponding schematic illustrations to optimize clarity and teaching value.

3.2.1. Cutaneous, subcutaneous and subperiosteal steps

A cutaneous incision of approximately 1 cm in length is performed with a long-handled No. 15 scalpel blade. The incision is oriented horizontally within a "crow's foot" or natural skin crease, extending from the lateral palpebral commissure. The subcutaneous plane is divided using Stevens scissors, and dissection is carried down to the periosteum of the lateral orbital bone. Dissection progresses medially toward the superolateral and inferolateral orbital rims. The periosteum and orbicularis muscle fibers are incised with guarded needle-tip electrocautery or a long-handled No. 15 scalpel. The incision is placed directly on bone, slightly posterior to the lateral orbital rim on the zygomatic bone.

The periosteum is elevated with a Freer elevator, and dissection proceeds along the lateral orbital wall and floor, releasing soft-tissue attachments at the lateral canthus. Further dissection over the inferolateral orbital floor allows continuity with the inferomedial orbital floor, previously exposed through the transconjunctival approach.

3.2.2. Conjunctival flap release and cantholysis step

The caudal conjunctival flap, covered by the orbicularis fascia, is elevated and released using Stevens scissors. Subperiosteal dissection progresses superiorly until the insertion of the common lateral canthal tendon at Whitnall's tubercle (WT), a predominantly oval-shaped bony prominence located on the orbital surface of the zygomatic bone. WT classically lies approximately 4–7 mm medial to the frontozygomatic suture and 9–11 mm posterior to the lateral orbital rim, although its position may vary according to age, sex, ethnicity, and individual anatomy [15].

WT serves as the attachment site for the lateral canthal tendon and the Whitnall ligament, the latter acting as a suspensory sling beneath the levator aponeurosis during eyelid elevation. More superficial layers of the lateral canthal complex include the superficial lateral palpebral ligament and the lateral palpebral raphe formed by the orbicularis oculi muscle fibers. WT may be identified visually or by gentle palpation with a periosteal elevator as a point of resistance along the otherwise relatively smooth lateral orbital wall.. Because it lies deep to the periosteal plane, controlled progressive subperiosteal dissection is essential to avoid injury or stripping of the ligamentous insertions.

At this stage, the three components of the lateral canthal tendon (common tendon, superior limb, and inferior limb) together with the upper and lower tarsal plates are clearly exposed (Fig. 1). To widen surgical exposure, the restraining orbicularis band and inferior limb of the lateral canthal tendon are divided from the lateral aspect of the inferior orbital rim using Stevens scissors (Fig. 2). This maneuver achieves cantholysis, increases lower eyelid mobility, and permits complete eversion of the lid.

3.2.3. Reattachment of the lateral canthal tendon (canthopexy)

The inferior limb of the lateral canthal tendon is reattached to the common lateral canthal tendon using a 4-0 Maxon suture, placed sequentially as follows:

1. through the common lateral canthal tendon (Fig. 3).
2. through the inferior limb of lateral canthal tendon and lateral border of the lower eyelid tarsal plate (Fig. 4).
3. through the lateral border of the upper eyelid tarsal plate (Fig. 5).
4. and finally, through the common lateral canthal tendon again (Fig. 6).

The suture is left untied until completion of conjunctival closure, which is performed using a running 6-0 Maxon suture. The canthopexy suture is then tied, adapting the lower eyelid to the globe with slight overcorrection of the palpebral fissure to minimize postoperative inferior scleral show and lateral canthal rounding (Fig. 7).

Final layered closure is performed with subcutaneous interrupted 4-0 Vicryl sutures and cutaneous interrupted 6-0 Prolene sutures (Fig. 8).

3.3. Choice of suture materials

- 4-0 Maxon: provides prolonged absorbable tensile strength while minimizing long-term palpability or irritation at the lateral canthus area, covered by a thin cutaneous layer.
- 6-0 Maxon: reduce conjunctival irritation and avoid the need for suture removal
- 6-0 Prolene: optimize precise skin edge adaptation and scar quality.

Tips and pitfalls for lateral canthotomy with transconjunctival approach ("swinging lower eyelid flap" procedure):

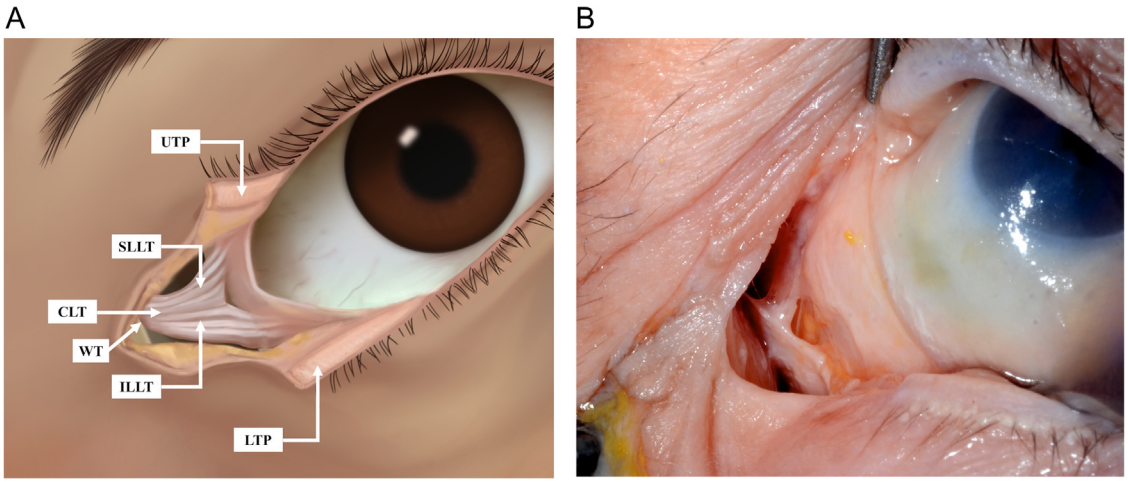

Fig. 1. Illustration (A) and photograph (B) showing the anatomy of the lateral canthal tendon the three components (common tendon (CLT), superior limb (SLLT), and inferior limb (ILLT) and both the upper (UTP) and lower tarsal plates (LTP), which serve as essential anatomical landmarks for accurate closure. WT: Whitnall's tubercle.

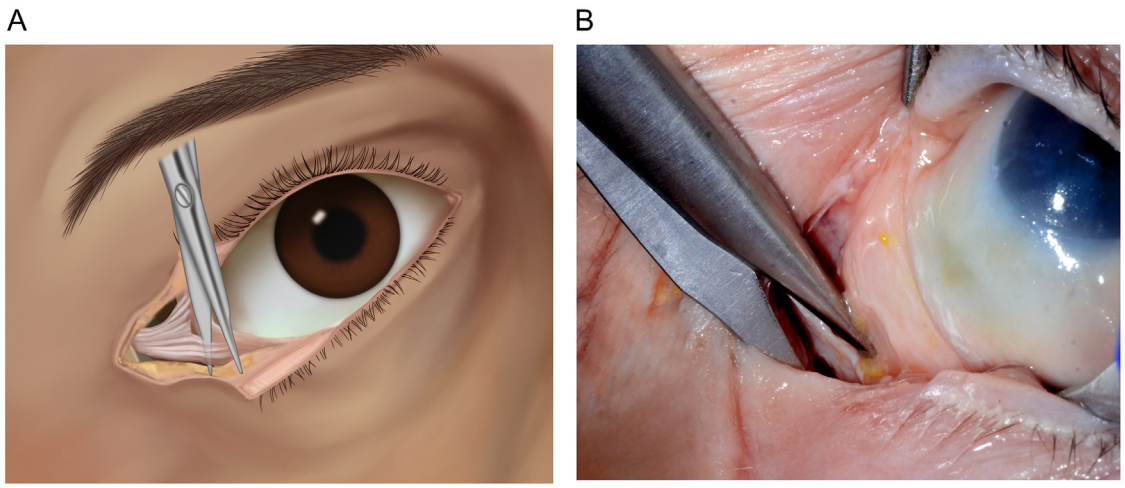

Fig. 2. Illustration (A) and photograph (B) showing the suture division of the inferior limb of the lateral canthal tendon with Stevens scissors.

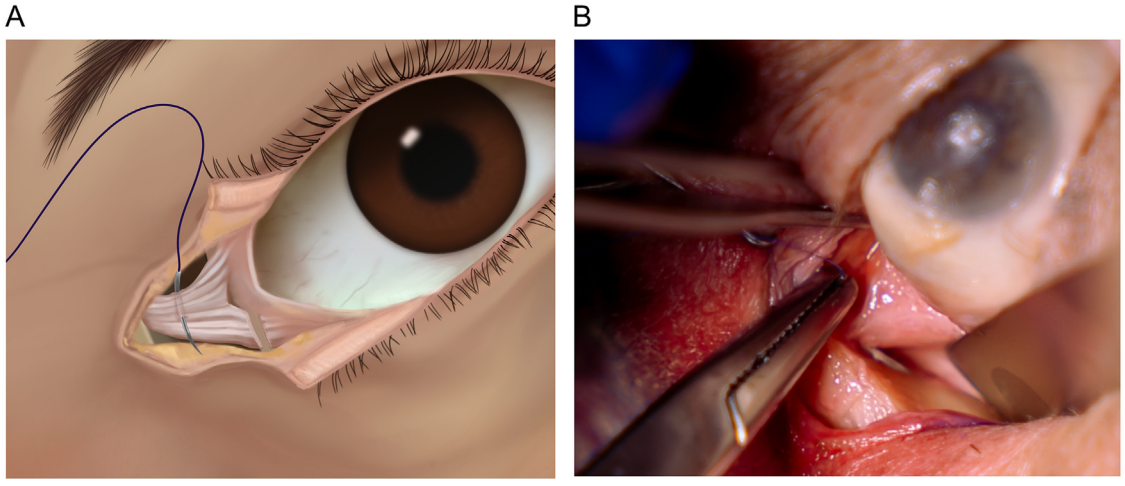

Fig. 3. Illustration (A) and photograph (B) showing the suture through the common lateral canthal tendon.

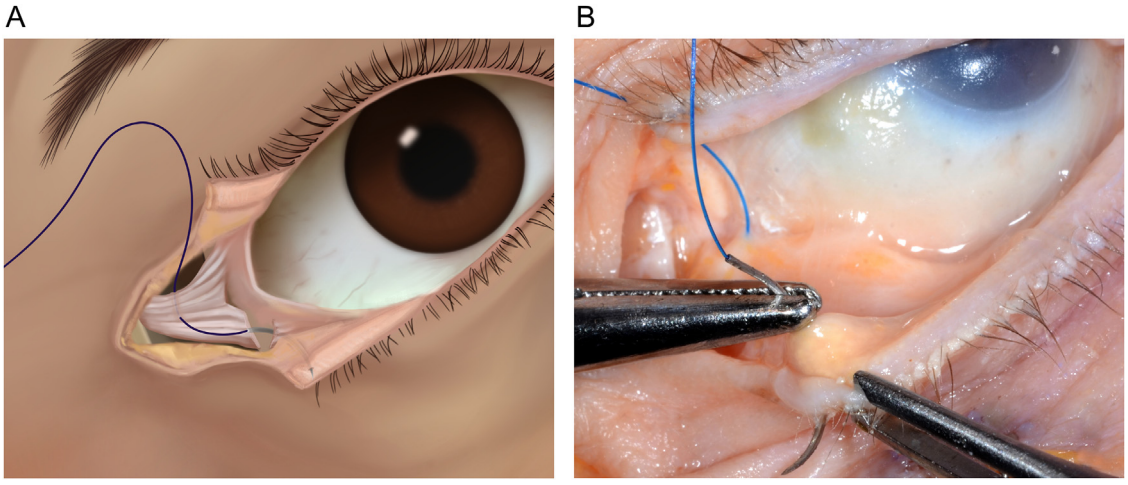

Fig. 4. Illustration (A) and photograph (B) showing the suture through the inferior limb of lateral canthal tendon and lateral border of the lower eyelid tarsal plate.

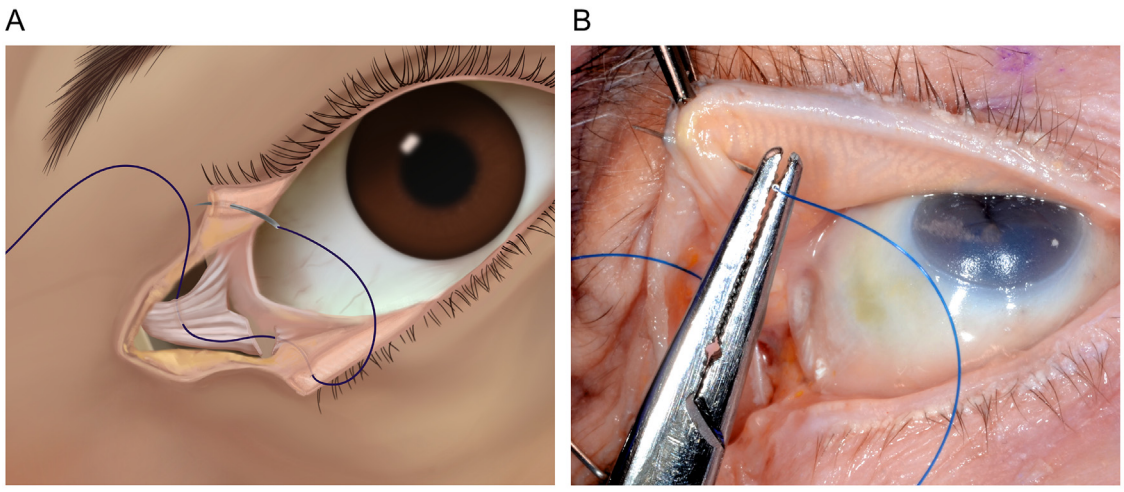

Fig. 5. Illustration (A) and photograph (B) showing the suture through the lateral border of the upper eyelid tarsal plate.

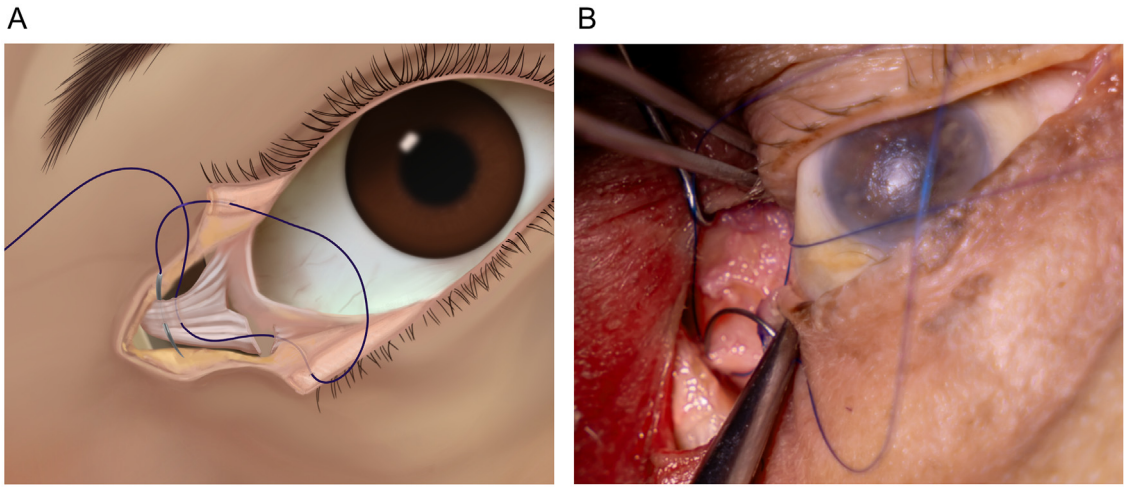

Fig. 6. Illustration (A) and photograph (B) showing the suture through the common lateral canthal tendon.

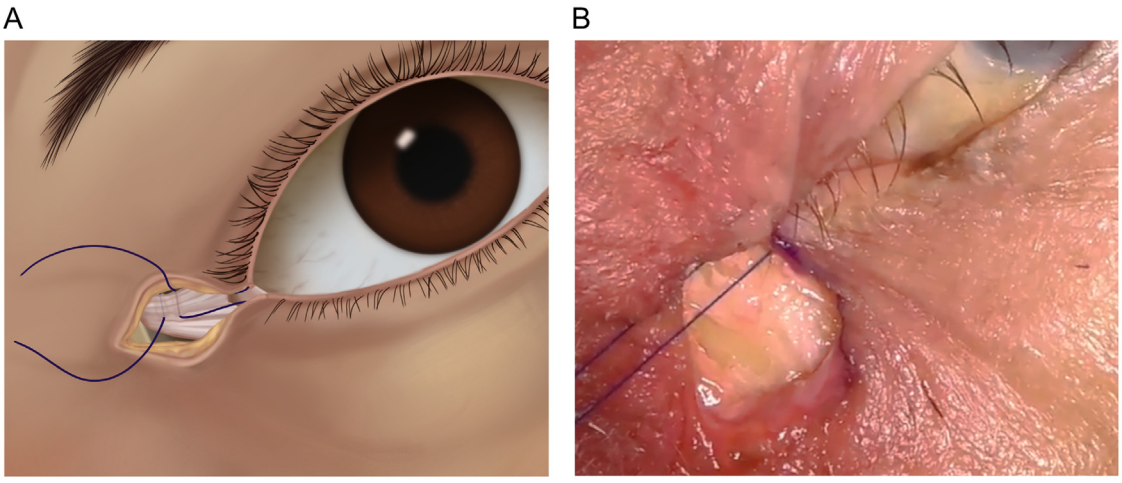

Fig. 7. Illustration (A) and photograph (B) showing the canthopexy suture tied, adapting the lower eyelid to the globe.

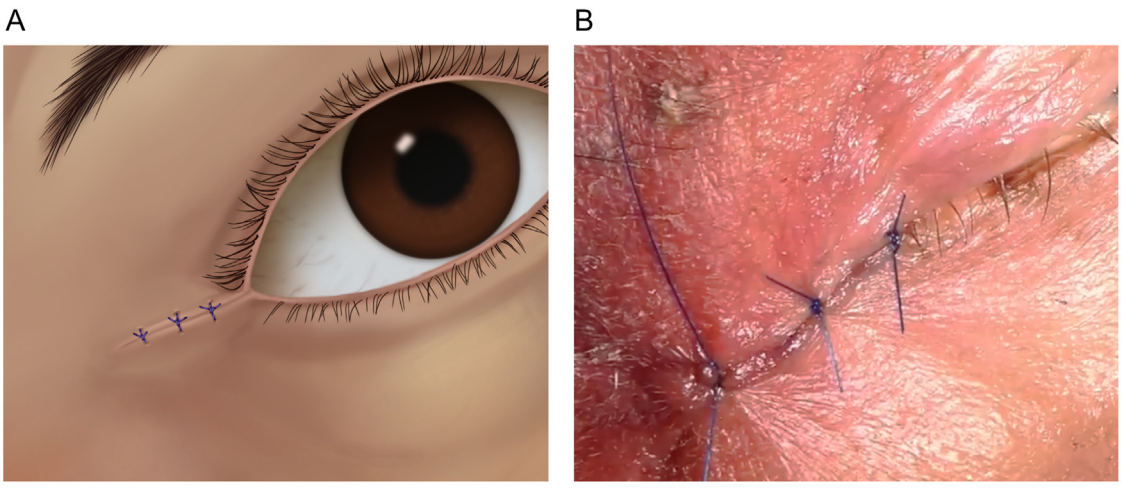

Fig. 8. Illustration (A) and photograph (B) showing final layered closure with cutaneous interrupted sutures.

3.4. Tips

- Use a natural crow's foot crease for the skin incision to minimize visible scarring.
- Keep periosteal incision close to bone to avoid unnecessary soft-tissue injury.
- Preserve the common lateral canthal tendon (Whitnall's tubercle) as the critical landmark for accurate reattachment.
- Leave the canthopexy suture untied until conjunctival closure is complete to maintain proper tension.
- Slight overcorrection of the palpebral fissure helps reduce postoperative inferior scleral show and canthal rounding (Figs. 9).

3.5. Pitfalls

- Excessive dissection or injury to orbicularis fibers may compromise lid support.
- Inadequate release of the inferior canthal limb may limit exposure and restrict lower lid mobility.
- Misplacement of the canthopexy suture can lead to asymmetry, ectropion, or canthal malposition.
- Insufficient overcorrection at closure may result in postoperative scleral show.
- Tension on skin sutures should be avoided to prevent widening of the scar.

4. Discussion

The purpose of this report is to describe a standardized step-by-step lateral canthotomy technique integrated into the "swinging lower eyelid" procedure as performed in our department, with particular emphasis on the closure phase and precise reattachment of the lateral canthal tendon.

The proposed technique is specifically indicated when extension of a transconjunctival approach is required to obtain wide exposure, deep posterior access, and stable fixation, particularly in complex orbital or orbitozygomatic fractures and post-traumatic orbital reconstruction requiring wide surgical exposure or placement of large implants. It should therefore be regarded as a restorative reconstruction of the native lateral canthal anatomy after iatrogenic division of the inferior canthal limb rather than as a tightening or reshaping procedure. This distinction is clinically important when comparing the present method with alternative canthopexy or canthoplasty techniques. Conventional canthopexy procedures are generally designed to suspend or reinforce an intact but lax lateral canthus, whereas canthoplasty techniques often involve more extensive tendon mobilization, shortening, or repositioning to correct eyelid malposition, involutional laxity, cicatricial deformity, or aesthetic canthal asymmetry. Lateral canthotomy combined with inferior cantholysis had evolved from an emergency decompression technique into a well-established adjunct in elective orbital and maxillofacial surgery [1–6]. Progressive refinements in incision design and a more detailed understanding of lateral canthal anatomy have improved surgical exposure while reducing approach-related morbidity. However, these advances have simultaneously shifted the critical challenge of the technique from access to closure [7–13].

Although the transconjunctival approach is considered scar-sparing, its limited orbital exposure is well recognized, particularly in extensive orbital fractures or when large reconstructive implants are required. In such situations, surgical access frequently necessitates adjunctive lateral canthotomy and inferior cantholysis, with reported utilization rates ranging from 55% to 83% of cases [7–13].

Therefore, successful outcomes increasingly depend not only on fracture reduction and implant positioning but also on precise restoration of the lateral canthal anatomy during closure. Reattachment of the lateral canthal tendon—particularly its inferior limb—represents the most technically demanding step of the procedure and one that remains insufficiently detailed in the maxillofacial literature. Inadequate reconstruction may result in eyelid malposition, blunting or displacement of the lateral canthal angle, and functional complications such as epiphora, ectropion, or lagophthalmos, as well as unfavorable aesthetic outcomes [12–13].

For these reasons, meticulous identification of the lateral canthal tendon components, accurate posterior fixation at the appropriate anatomical level, and strict control of eyelid tension during closure are essential to restore both form and function. Emphasizing these closure principles is therefore critical when lateral canthotomy is incorporated into orbital fracture management, as the quality of canthal reconstruction ultimately determines the functional and aesthetic success of the approach.

In a retrospective study, Salgarelli et al. evaluated aesthetic outcomes and complications associated with three surgical approaches commonly used for orbital trauma repair (subciliary, transconjunctival, and transconjunctival with additional lateral canthotomy) [12]. They reported significantly higher eyelid complication rates (34.8%)—including 8.7% scleral show and ectropion—when a lateral canthotomy was added to the transconjunctival approach, compared with less than 1% when using the transconjunctival approach alone [12].

This relative discomfort with lateral canthotomy closure is also reflected in the maxillofacial literature, in which this step is generally addressed only briefly and with considerable variability, underscoring the need for a standardized and reproducible closure technique.

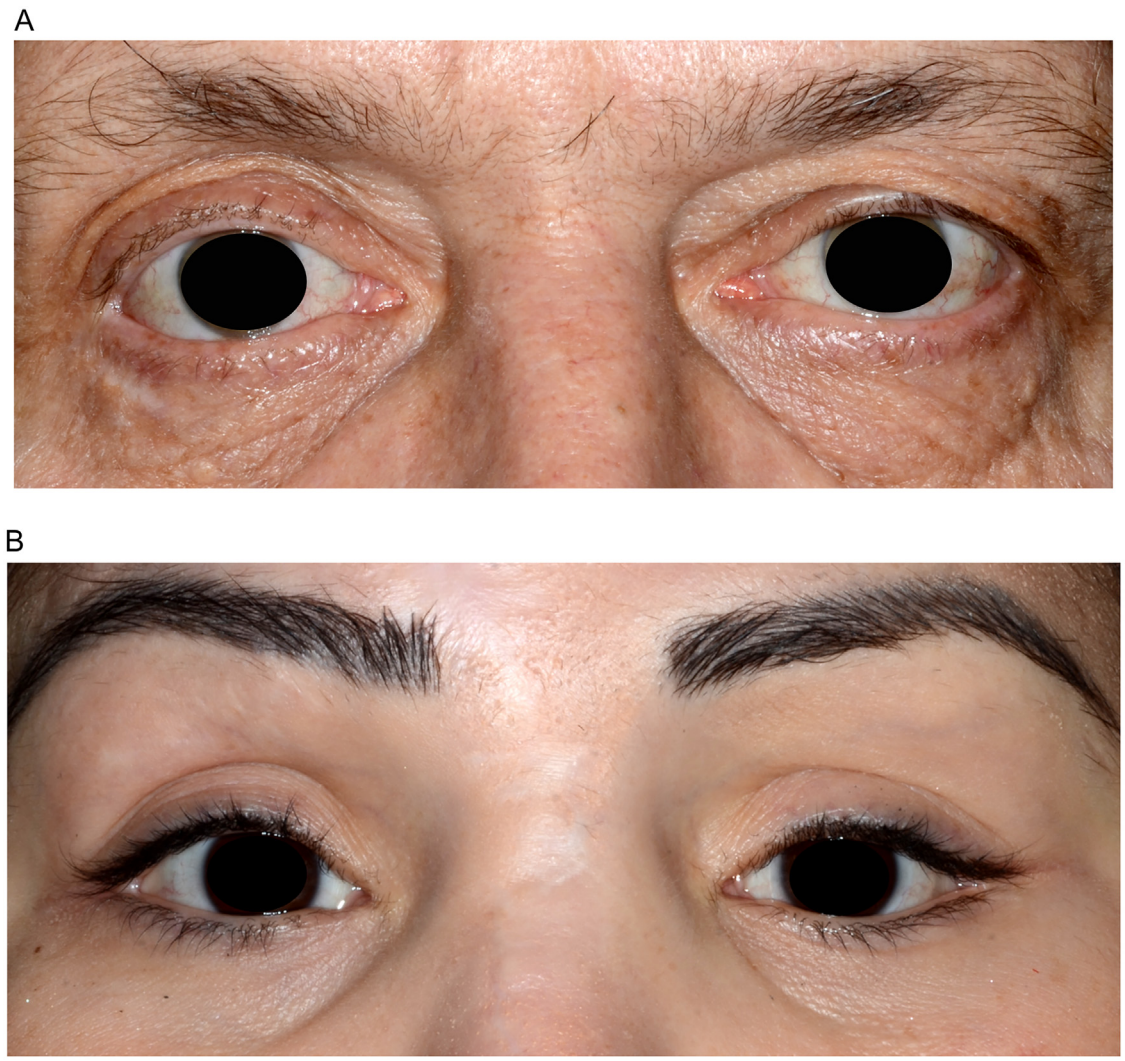

Fig. 9. One-year postoperative views following lateral canthotomy combined with a transconjunctival inferior fornix approach: (A) open reduction and internal fixation of a right complex comminuted orbitozygomatic fracture; and (B) correction of post-traumatic left enophthalmos using a patient-specific orbital implant. In both cases, eyelid contour and canthal symmetry are preserved, there is no ectropion, and the lateral canthal scar is inconspicuous.

The present technical report addresses this gap by introducing a reproducible closure technique designed to restore eyelid anatomy as closely as possible to its native configuration, thereby balancing maximal surgical exposure with the preservation of the functional and aesthetic integrity of the lateral canthus.

The main strength of this report lies in providing a structured and reproducible closure protocol that may facilitate teaching and training. However, accurate identification of the lateral canthal tendon components and appropriate tensioning during closure remain technique-sensitive steps that may be influenced by surgeon experience and the learning curve, particularly during the early phases of training.

At the same time, this report must be interpreted in light of its principal limitation: it presents a technical description rather than a comparative clinical study. Although several studies have reported complications and outcomes after lateral canthotomy, few have systematically correlated these findings with specific closure techniques.

5. Conclusion

Although lateral canthotomy is a well-established adjunctive procedure in orbital surgery, the technical aspects of its closure remain inadequately detailed in the literature. The step-by-step technique presented herein addresses this gap by offering a practical, reproducible, and anatomically sound approach to lateral canthal reconstruction, enabling both optimal exposure of the operative field and reliable restoration of canthal anatomy.

Authorship statement

The author has reviewed and approved of the manuscript prior to submission.

Patient consent

All patients provided written informed consent for the use of their anonymized clinical data for research.

Declaration of competing interest

The author declare that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Paolo Scolozzi: Writing – original draft, Investigation, Data curation, Conceptualization.

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References

[1] Jafek BW, Kreiger AE, Morledge D. Proceedings: blindness following blepharoplasty. Arch Otolaryngol. 1973;98:366–9.
[2] Thompson RF, Gluckman JL, Kulwin D, Savoury L. Orbital hemorrhage during ethmoid sinus surgery. Otolaryngol Head Neck Surg 1990;102:45–50. doi: 10.1177/019459989010200108.
[3] Jr McCord CD, JL Moses. Exposure of the inferior orbit with fornix incision and lateral canthotomy. Ophthalmic Surg 1979;10:53–63.
[4] Whitaker LA. Selective alteration of palpebral fissure form by lateral canthopexy. Plast Reconstr Surg 1984;74:611–9. doi: 10.1097/00006534-198411000-00004.
[5] Manson PN, Ruas E, Iliff N, Yaremchuk M. Single eyelid incision for exposure of the zygomatic bone and orbital reconstruction. Plast Reconstr Surg 1987;79:118–26.
[6] Eppley BL, Custer PL, Sadove AM. Cutaneous approaches to the orbital skeleton and periorbital structures. J Oral Maxillofac Surg 1990;48:842–54. doi: 10.1016/0278-2391(90)90344-2.
[7] Wray RC, Holtmann B, Ribaudo JM, Keiter J, Weeks PM. A comparison of conjunctival and subciliary incisions for orbital fractures. Br J Plast Surg 1977;30:142–5. doi: 10.1016/0007-1226(77)90009-1.
[8] Holtmann B, Wray RC, Little AG. A randomized comparison of four incisions for orbital fractures. Plast Reconstr Surg 1981;67:731–5. doi: 10.1097/00006534-198106000-00003.
[9] Patel PC, Sobota BT, Patel NM, Greene JS, Millman B. Comparison of transconjunctival versus subciliary approaches for orbital fractures: a review of 60 cases. J Craniomaxillofac Trauma 1998;4:17–21.
[10] Wilson S, Ellis 3rd E. Surgical approaches to the infraorbital rim and orbital floor: the case for the subtarsal approach. J Oral Maxillofac Surg 2006;64:104–7. doi: 10.1016/j.joms.2005.09.018.
[11] Ridgway EB, Chen C, Colakoglu S, Gautam S, Lee BT. The incidence of lower eyelid malposition after facial fracture repair: a retrospective study and meta-analysis comparing subtarsal, subsidiary, and transconjunctival incisions. Plast Reconstr Surg 2009;124:1578–86. doi: 10.1097/PRS.0b013e3181babb3d.
[12] Salgarelli AC, Bellini P, Landini B, Multinu A, Consolo U. A comparative study of different approaches in the treatment of orbital trauma: an experience based on 274 cases. Oral Maxillofac Surg 2010;14:23–7. doi: 10.1007/s10006-009-0176-2.
[13] Nguyen MV. A historical perspective of lateral canthotomy and its adoption as an emergency medicine procedure. J Emerg Med 2019;56:46–52. doi: 10.1016/j.jemermed.2018.09.043.
[14] Bruneau S, Scolozzi P. Preseptal transconjunctival approach to the orbital floor fractures. Surgical technique. Rev Stomatol Chir Maxillofac Chir Orale 2015;116:362–7. doi: 10.1016/j.revsto.2015.10.004.
[15] Malakhov S, Lukacikova P, Shmarhalov A, et al. Morphological analysis of Whitnall's tubercle: an anatomical landmark in orbital surgery. Anat Cell Biol 2025;58(58):521–7. doi: 10.5115/acb.25.130.