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Evolution of the surgical approach to the orbitozygomatic fracture: From a subciliary to a transconjunctival and to a novel extended transconjunctival approach without skin incisions☆

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Summary *Background:* In the last 20 years, surgical approach to the orbitozygomatic fracture has evolved to limit skin incisions and minimize external scars.
Methods: The treatment approach to the orbitozygomatic fracture was evaluated by a retrospective chart review from 1992 to 2012, and advantages, disadvantages, and complications were studied.
Results: Surgical approach to the orbitozygomatic fracture has evolved from a subciliary to a transconjunctival approach and to a novel extended transconjunctival approach without skin incisions in the last 20 years. The greatest advantage of using an extended transconjunctival approach is the wide exposure of the inferior orbital rim, orbital floor, lateral orbital wall, and the frontozygomatic suture in an unobstructed operative field without any skin incisions. Precise assessment of the reduction at the sphenozygomatic suture is possible with a wide exposure of the lateral orbital wall. As the dissection plane in a transconjunctival approach is entirely posterior to the lacrimal apparatus, the medial incision can be placed medially beyond the lacrimal punctum and by combining this approach with the transcaruncular approach, a wide operative field for the medial orbital wall can be obtained, which is the most advantageous point for choosing a transconjunctival approach over a subciliary approach. The complication rate was comparable to a subciliary approach.

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Conclusions: The author advocates an extended transconjunctival approach for orbitozygomatic fractures to avoid skin incisions and to precisely assess the reduction status.

Introduction

Although three-point fixation has been the traditional gold standard for zygomaticomaxillary complex (ZMC) fracture fixation, the recent trend toward minimally invasive approach has been to limit skin incisions to minimize external scars.[1–3] A transconjunctival approach has been shown to be superior to a lower eyelid approach in terms of postoperative lower lid deformity[4–6]; it has been criticized for poor exposure of the lateral orbital wall and the lateral orbital rim without a lateral canthotomy.[7]

An extended transconjunctival approach has been developed to overcome this limitation of restricted operative field and to enable fixation of the frontozygomatic suture without any skin incisions. This study was carried out to review the evolution of the surgical approach to the orbitozygomatic fracture and to evaluate its advantages, disadvantages, and complications.

Surgical technique

Extended transconjunctival approach

A generous conjunctival incision was made from the lacrimal punctum to the lateral edge of the tarsal plate just inferior to the inferior tarsal margin, which is about 5 mm from the lid margin. Then the dissection is anterior to the orbital septum (preseptal approach) to avoid a prolapse of the intraorbital fat. A periosteal incision was carried out inferior to the arcus marginalis, the lateral periosteal incision is extended superolaterally along the lateral orbital rim, and the conjunctival incision is also extended accordingly. By retracting the orbital content medially with a malleable retractor and the soft tissue lateral to the lateral orbital rim laterally with a Ragnell retractor, the lateral orbital rim appears as a ridge line. The periosteum along the lateral orbital rim will be incised by inserting one blade of scissors under the periosteum and cutting this ridge line until the frontozygomatic suture is reached (Figure 1). Although the anterior limb of the lateral canthal ligament is not disturbed, the posterior limb of the lateral canthal ligament is either transected or stripped off (Figure 2), and by subperiosteal dissection the tight attachment of the lateral canthal area is freed from the lateral orbital rim. Further subperiosteal dissection beyond the frontozygomatic suture offers a wide operative field of the lateral orbital wall (Figure 3).

No Frost sutures are placed to support the lower eyelid postoperatively. In order to prevent postoperative lower eyelid descent, the periosteum is closed at the inferior orbital rim and the lateral orbital rim. If the periosteum is found to be fragile or severely torn and does not support the lower eyelid, the soft tissue around the periosteum of the lower eyelid is sutured to drill holes made at the inferior orbital rim to prevent lower eyelid or cheek sagging. When postoperative chemosis is anticipated, lateral and sometimes medial temporary tarsorrhaphy is performed for several days.

Patients and methods

All orbitozygomatic fractures treated by the Department of Plastic and Reconstructive Surgery at Okinawa Chubu Hospital, Uruma City, Japan were evaluated by a retrospective chart review. Institutional review board approval was obtained. All facial fracture cases were extracted from the prospectively maintained operating room database from 1992 to 2012 with keywords of "facial fracture" or "orbital fracture." A total of 339 cases were found excluding an isolated nasal fracture. Of these 339 cases, a retrospective chart review was carried out and fracture sites, fixation sites, operative approaches, mechanism of injury, follow-up period, complications, and outcomes were input into a FileMaker Pro 12 database, FileMaker, Inc. CA, USA. Fractures involving ZMCs (195), orbital floor (139), and medial orbital wall (32) accounted for 275 cases. Of these 275 cases, 15 secondary reconstruction cases were excluded, with the remaining 260 being acute orbitozygomatic fractures. One case with excessive bleeding for which transarterial embolization and an open reduction along with internal fixation of only the lateral buttresses was carried out without orbitozygomatic exploration was excluded. Two cases with minimally displaced ZMC that did not

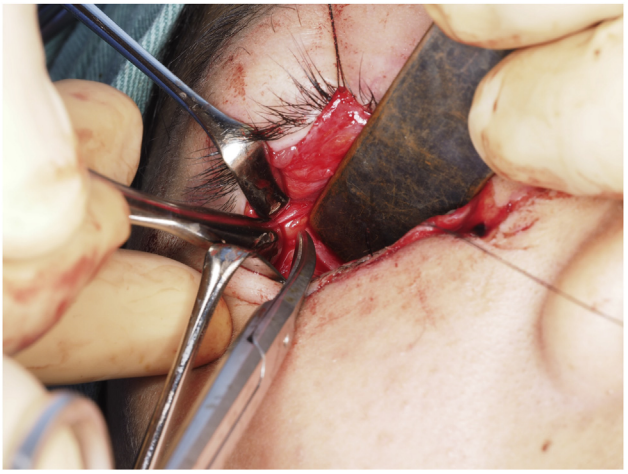

Figure 1 Intraoperative view showing that the periosteal incision is being extended superolaterally by inserting one blade of scissors under the periosteum and cutting the ridge line toward the frontozygomatic suture.