Simplified Repair of Zygomatic Fractures through a Transconjunctival Approach

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Objective: To describe a simplified technique of zygomatic fracture repair.

Design: Retrospective, noncomparative case series with description of a surgical technique.

Participants: Twenty consecutive patients with zygomatic fractures undergoing repair with the described technique.

Intervention: Fracture repair was accomplished with a technique that used a T-bar screw for reduction through a transconjunctival approach.

Main Outcome Measure: Successful fracture reduction.

Results: Twenty patients with zygomatic fractures underwent successful reduction with the simplified technique. No complications were observed.

Conclusions: The use of the T-bar through a transconjunctival approach is a simplified and effective technique for zygomatic fracture repair. *Ophthalmology 2005;112:1302–1309 © 2005 by the American Academy of Ophthalmology.*

Fractures of the orbit often are encountered by surgeons involved in the management of trauma. The magnitude of fractures within the orbit may vary considerably. Simple fractures, such as the common blow-out fracture, may involve only a portion of the internal orbit. More extensive fractures may include simultaneous injury to the rim of the orbit and multiple internal walls. Orbital fractures involving some or all of the zygomatic articulations (zygomatic-sphenoid, zygomatic-frontal, zygomatic-maxillary, and zygomatic-temporal suture lines) commonly are encountered. These fractures of the zygomaticomalar complex (ZMC) should be readily recognized by surgeons managing trauma. Repair should be undertaken with the goal of achieving alignment of the entire lateral orbit, which is a critical component of orbital volume restoration.

Operative exposure of zygomatic fractures has been accomplished through a variety of approaches including the intraoral (Keen), temporal (Gillies), brow incision, and bicoronal flap[1] techniques. In 1973, Tessier[2] and Converse et al[3] introduced the use of the transconjunctival approach in combination with a lateral canthotomy for exposure of the orbital floor and maxilla. Later, Nunery[4] modified the approach to use the lateral canthotomy approach exclusively for repair of zygomatic and orbital floor fractures. Reduction and fixation was accomplished through the lateral canthotomy with the aid of bone clamps and interosseous wiring for fixation. Other techniques that have been used to reposition the zygomatic complex include the use of towel clips,[5] antral balloons,[6] hemostats and clamps, and a variety of elevators.[7,8] The elevator that we have found to be particularly effective is the T-bar screw (Carroll-Girard screw or Byrd screw, Walter Lorenz Surgical, Jacksonville, FL). This corkscrew-shaped instrument has a broad horizontal handle that allows easy manipulation and rotation of the zygoma in all directions. Often used through a cutaneous incision,[9] the combination of a T-bar screw placed percutaneously in conjunction with a lateral canthotomy approach offers a simple and effective method for repair of these fractures.[10] In this article, we describe the use of a T-bar screw used exclusively through a transconjunctival approach for reduction and fixation of zygomatic fractures.

Patients and Methods

A retrospective review of the authors' charts was conducted. Over the previous 10 years, the authors repaired more than 500 orbital fractures, including blow-out fractures, orbital roof fractures, and ZMC fractures. From July 2001 through June 2003, 20 patients with isolated, noncomminuted ZMC fractures underwent reduction and miniplate fixation of their fracture using the following described technique. Seventeen of the patients were men and 3 were women. The average age of the patients was 27 years (range, 14–56 years). The mechanism of injury for the women included 2 motor vehicle accidents, and 1 fall. The mechanism of injury for the men included 11 assaults or fights, 3 sports-related injuries, 1 motor vehicle accident, and 1 industrial accident.

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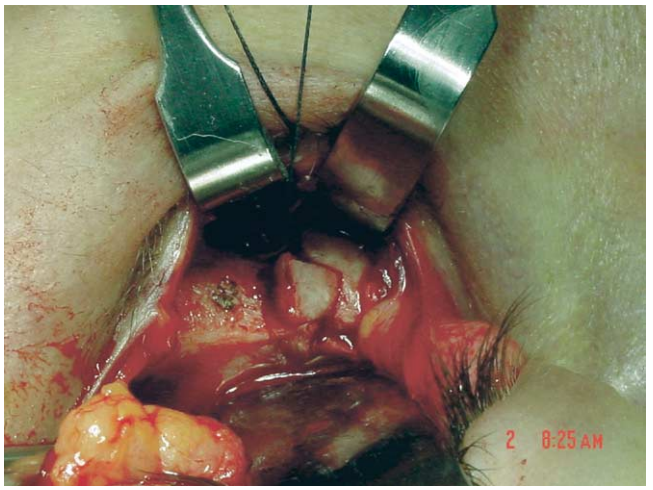

Figure 1. Photograph demonstrating exposure of the inferior orbital rim through a transconjunctival incision. The periosteum has been reflected away to expose fracture in the inferior orbital rim.

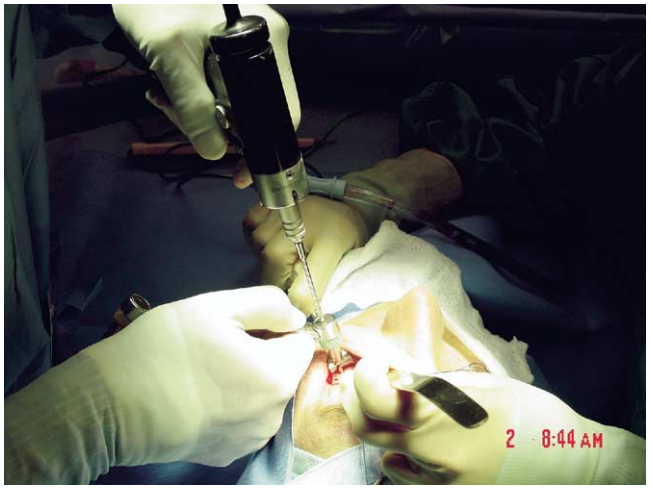

Figure 2. Photograph demonstrating a full-thickness hole drilled through the malar eminence for placement of the screw. Note use of a drill guide for protection of the eye and surrounding soft tissues.

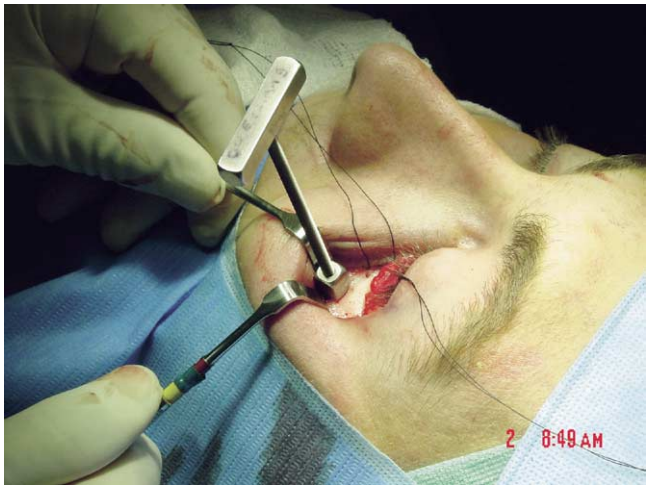

Figure 3. Photograph demonstrating a T-bar screw firmly embedded in the zygomatic complex at the point of the malar eminence.

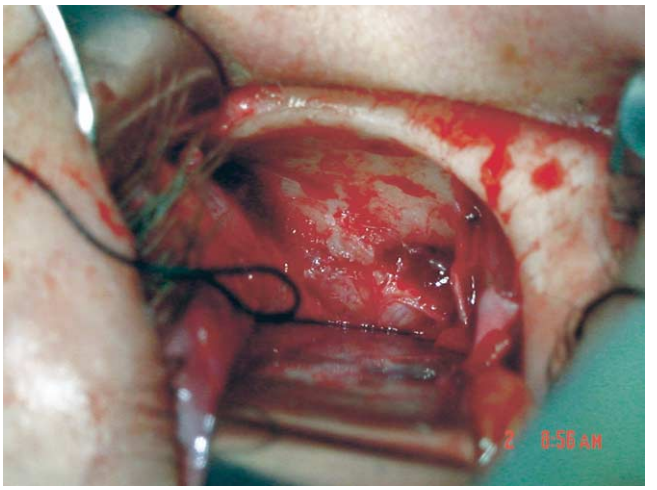

Figure 4. Photograph demonstrating use of a sphenozygomatic suture line for alignment.

In each case, the preoperative work-up included complete ophthalmic examination, exophthalmometry, computed tomographic scan, and photography. The decision to proceed with open reduction and miniplate fixation of the fracture was based on computed tomographic and clinical findings. Other patients identified during this period but having nondisplaced fractures, severely comminuted fractures, or extensive midface trauma (i.e., LeFort II or III fractures) were excluded for the purposes of this article.

Surgical Technique

A forced duction test for ocular motility is conducted at the initiation of the procedure to determine the presence or absence of extraocular muscle entrapment.

A horizontal incision is made extending laterally from the lateral commissure to a length of approximately 5 mm. After this incision, superior and inferior cantholysis is performed to provide wide exposure of the entire lateral orbital rim. The lower eyelid is everted and an incision is made through the conjunctiva and lower

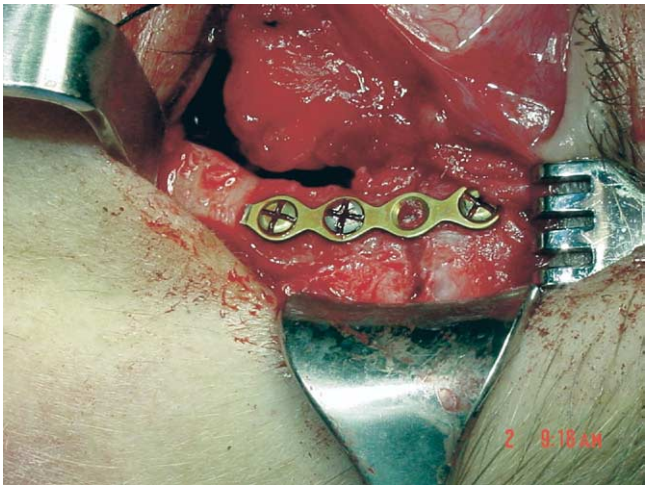

Figure 5. Photograph demonstrating fixation of the zygomatic complex at the frontozygomatic suture line using a semilunar titanium plate and screws, placed across the fracture site on the lateral orbital rim.