When repairing a zygomatic fracture, the inferior orbital rim and floor needs to be exposed. For that exposure, either a transcutaneous or transconjunctival approach is taken. The transconjunctival approach was first described by Bourquet in 1924 for removal of lower-eyelid fat. Tessier later advocated this approach, in 1973, for exposure of the orbital floor and maxilla for the treatment of facial trauma and maxillofacial anomalies. The transconjunctival approach provides the.

**Background:** To let experts evaluate a single surgeon’s experience with a combined transconjunctival and intraoral upper vestibular approach in the repair of zygomatic fractures encountered in 46 East Asian patients whom he treated over the past 20 years.

**Methods:** Patients were identified from a database, and a retrospective case note review was conducted. A total of 67 conjunctival and secondary incisions were made on 46 patients for repair of zygomatic fractures. All operative procedures were performed using a combination of transconjunctival and intraoral upper vestibular approaches to repair zygomatic fractures.

**Results:** The infraorbital rim and/or lateral buttress and/or lateral orbit was stabilized with titanium miniplates in 28 patients and absorbable miniplates in 11 patients. Seven patients required only reduction technique with no need of plates. Four cases needed additional canthotomy besides a conjunctival approach. No ectropion or entropion developed in any of the patients. Complications included eyelid laceration during surgery (n = 1), herniation of the conjunctiva (n = 1), temporary pyogenic granuloma of the conjunctiva after surgery (n = 1), and temporary entropion in a secondary incision (n = 1).

**Conclusions:** A combined transconjunctival and intraoral upper vestibular approach in repairing zygomatic fractures is simple, easy, and effective, leaving no conspicuous facial scars. It is vitally important, however, that the surgeon masters the technique of transconjunctival approach well before he has good results in East Asian patients. (Plast Reconstr Surg Glob Open 2016;4:e757; doi: 10.1097/GOX.0000000000000748; Published online 21 June 2016.)

Transconjunctival Approach for Zygomatic Fracture: A Single Surgeon’s Experience of More Than 20 Years

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**Disclosure:** The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.

Supplemental digital content is available for this article. Clickable URL citations appear in the text.
surgeon with an ample surgical site in which to work on the inferior orbit, leaves no visible scarring, and reduces the risk of complications associated with transcutaneous techniques.3

Despite the cosmetic and other advantages the transconjunctival approach offers, Japanese plastic surgeons typically do not opt for this approach. That is partly because their East Asian patients are anatomically different from Caucasians as their lower eyelids are characterized by puffiness. There is also a lack of experience on the part of Japanese surgeons, keeping them unaware of the advantages of this technique. In what follows, we shall describe our experiences, for scrutiny by experts, with reduction and fixation techniques in the treatment of zygomatic fractures among Japanese patients over the past 20 years. We adopted a combination of transconjunctival and intraoral upper vestibular approaches. Our technique is based on what Uemura, the first author of this article, had acquired while he trained under Dr. David J. David of the Australian Craniofacial Unit in Adelaide between November 1993 and March 1994.

PATIENTS AND METHODS

We conducted a retrospective review of the data file of all patients inflicted by acute unilateral zygomatic fracture who were treated with a combination of transconjunctival and intraoral upper vestibular approaches. Two groups of patients were included: (1) those treated at St. Mary’s Hospital (Kurume City, Japan) during July 1994 to March 2000 and (2) those treated at Saga University Hospital (Saga City, Japan) during April 2000 to present. Patients were identified from a clinical database. The data collected included patient name; age; hospital number; sex; diagnosis; laterality; day of surgery; surgical details including time of operation, additional incisions (eg, lateral canthotomy), duration of follow-up, and intraoperative injury to the globe, lacrimal sac, and/or eyelid; and postoperative complications if any. Zygomatic fractures associated with other fractures were not included in this series.

All operations were performed by a single plastic surgeon (Uemura), who also reviewed all patients himself after surgery.

The Surgical Procedure for Acute Zygomatic Fracture

The lower eyelid is everted using 2 traction stitches with 6-0 nylon through the tarsal plate. Next, 1 to 2 mL of 1:100,000 epinephrine solution with 1% lidocaine is injected into the subconjunctival space and toward the inferior orbital rim of the affected orbit. The same anesthetic solution is also injected into the upper vestibular area of the affected side. A minimum of 10 minutes is allowed for epinephrine-induced homeostasis to take effect before surgery. The conjunctiva in the lower eyelid is incised widely, at 2 to 3 mm below the rim of the tarsus, starting medially at the precise point of the lacrimal punctum to proceed to the canthal space at the lateral end (Fig. 1A). A single traction stitch of 6-0 nylon is placed on the cranial side of the conjunctival incision. In the treatment of East Asian patients, it is highly important to prevent exposure of the orbital fat on blunt dissection. A thin cranial part of the capsulopalpebral fascia is spread by blunt dissection above the lower-lid retractor muscles in the direction of the anterior side of the orbital rim (Fig. 1B). Dissection is usually done bloodlessly in the surgical field. The orbital rim is palpated with a periosteal elevator before the periosteum is incised and elevated widely. The fractured area of the orbital rim and floor is then exposed widely.

Next, the upper vestibular mucosa is incised widely. Subperiosteal dissection is spread widely to the cranial side of the orbital rim and lateral buttress to the zygoma. Reduction of the zygoma is performed through the oral side using a U-shaped retractor. Miniplates are inserted at the infraorbital rim and/or lateral buttress, as necessary. Postoperatively, the conjunctiva is closed with a running 6-0 fast resorbable suture, and the oral mucosa is closed using 4-0 resorbable sutures. Finally tarsorrhaphy using 2 traction stitches with 6-0 nylon through the tarsal plate is done for 2 days after surgery in most cases or for 4 days to reduce the risk of inflammation of the conjunctiva in cases of additional lateral canthotomy. (See video, Supplemental Digital Content 1, which displays an 18-year-old female patient with zygomatic fracture in the right side. The surgical procedure is our standard transconjunctival approach and upper vestibular incision for the fixation to the orbital rim and lateral buttress using absorbable miniplate and screws. The overall surgical time is 77 minutes. This video is available in the “Related Videos” section.
RESULTS

Mean age of the 46 patients at the time of surgery was 27.2 years (range, 8–67 years) (See Table, Supplemental Digital Content 2, http://links.lww.com/PRSGO/A207). A total of 67 conjunctival incisions were made primarily for unilateral zygomatic fractures and secondarily for removal of miniplates. All operative procedures were performed using a combination of transconjunctival and intraoral upper vestibular incision for the fixation to orbital rim and lateral buttress using absorbable miniplate and screws. The overall surgical time is 77 minutes. This video is available in the “Related Videos” section of the Full-Text article on PRSGlobalOpen.com or available at http://links.lww.com/PRSGO/A206.

DISCUSSION

Bourquet first reported the transconjunctival approach in 1924 as an approach he pioneered for the removal of lower-eyelid fat. As the size of the incision in his original method was too small, a favorable visual field could not be obtained. Tessier conducted a follow-up study and expressed initial hesitation regarding the use of the approach. In 1973, however, Tessier did employ the Bourquet technique to approach the orbital floor and maxilla in the treatment of maxillofacial anomalies and traumas in 20 patients. He described in detail the methods for approaching the orbital floor, medial wall, lateral wall, maxilla, and zygoma and documented the usefulness of the approach. Converse et al and David conducted follow-up studies and reported the advantages, disadvantages, and complications associated with the transconjunctival approach.

Converse et al divided the transconjunctival approach into retroseptal and preseptal routes based on the incision layer. The retroseptal approach is easy, and the orbital floor can be reached under direct visualization, but because the orbital fat is exposed, its exclusion is necessary. With the preseptal approach, a favorable field of view can be obtained in the orbit.
al rim and floor without exposing the orbital fat. The biggest advantage of the transconjunctival approach is that no visible scar remains postoperatively in the lower eyelid. Thus, this approach is particularly useful in young persons and children.

David reported complications that he experienced in the transconjunctival approach. There were 2 cases of transient, although severe, chemosis and 2 cases of entropion, both because of improper suturing of the orbital septum and periorbital among 14 patients evidentially given improper suturing. David also recommended that the surgeon take sufficient precautionary measures to protect the cornea and eyeball from surgical procedures.

Compared with the subciliary approach, the transconjunctival approach is generally associated with a lower incidence of postoperative complications such as scleral exposure and entropion. Lorenz et al called attention to the advantage of using the transconjunctival approach in secondary orbital surgery. They reported that the incidence of postoperative entropion in the subciliary approach to the lower eyelid was high at 23%, whereas the risk for the same complication was low in the transconjunctival approach.

In our present study, a titanium miniplate was placed in the infraorbital rim during primary surgery, and the miniplate and screws were removed in 21 patients in a secondary transconjunctival incision. Although transient entropion occurred after surgery in 1 patient, no permanent entropion or ectropion was encountered. It goes to support the safety of placing a secondary incision in the conjunctiva.

Studies by Zingg et al and Lorenz et al lent support to the idea that adequate exposure for the treatment of zygomatic fracture not associated with other fractures can safely be obtained using a transconjunctival approach without lateral canthotomy or cantholysis.

Regarding complications associated with the transconjunctival incision, Patel et al noted in 1998 that they tend to occur when the incision is combined with lateral canthotomy/cantholysis. Complications include entropion, canthal malpositioning, lid laceration, and pyogenic granuloma formation. Recent meta-analytic evidence about the transconjunctival approach for orbital fracture, including zygomatic fracture and blow-out fracture, points to the advantage that the transconjunctival approach offers, precisely because it is less complication prone, especially in the treatment of blow-out fracture. However, these articles reported the evidence from white, or non-Asian, patients treated with the transconjunctival approach. Recently, several articles by East Asian authors arguing for the transconjunctival approach have been published.

At this point, we would like to give our own assessment of the transconjunctival approach. No surgical technique is totally free from complications, and at times the transconjunctival approach calls for additional lateral paracanthal incisions. Previous authors, however, got good results with the transconjunctival approach alone for orbital fracture.

In his 20 odd years’ experiences with East Asian patients, Uemura has kept the following 3 points in mind to ensure good results. First, it is vitally important that a surgeon understand the anatomic differences between East Asian and non-Asian lower-eyelid makeups when he/she exposes the orbital rim using the preseptal approach. In East Asian lower eyelids, the orbital fat projects further anteriorly with respect to the orbital rim (Fig. 2). If there are signs of exposure of the orbital fat in a maneuver, the quality of the surgical field deteriorates, and the overall surgical time gets longer before wound closure. As a result, it takes much longer for the lower-eyelid inflammation to heal, often leading to a complication that would never have been there.

The second point to remember is to keep the tarsoconjunctival approach after transconjunctival approach for a few days. Because the orbital fat is easily exposed in an East Asian patient, as said earlier, it is important to prevent the swelling of the conjunctiva and the orbital fat in the lower lid. High tarsoconjunctival skills surely help the surgeon succeed there. If the surgeon is successful, he or she is assured to see a lower risk of complications, such as entropion or ectropion, either of which calls for additional lateral cantotomy.

The third and last point that the surgeon should keep in mind, which may go without saying in any surgical branch, is the need of training him-/her-
self thoroughly in several approaches, in our case, including subciliary approach, transtarsal approach, and transconjunctival approach for orbital fracture.

When he opts for the transconjunctival approach for a zygomatic fracture, Uemura always keeps in mind that he should try to finish the surgery as quickly as possible, within the maximum of 120 minutes overall. Besides the transconjunctival approach, he readies himself for an additional approach including lateral canthotomy, lateral orbital skin incision, and Gilles approach. He is always psychologically ready for any one of those techniques stored in his series, and if the surgery lasts longer than planned, then the complication rate rises.

The absence of a visible scar represents the biggest advantage of the transconjunctival approach. To reduce the risk of complications, surgery needs to be completed without lateral canthotomy from an aesthetic perspective. If lateral canthotomy is required, lateral paracanthal incision would aesthetically be a better choice. The only long-lasting complication Uemura experienced in his career is a lower-eyelid gray line laceration in the lateral paracanthal area, which occurred during surgery and was brought on by using a skin hook. The scar looked like a scar of a lateral paracanthal incision.

Finally, repositioning a zygomatic fracture using the intraoral upper vestibular approach followed by the repositioning of the zygoma itself using a U-shaped intraoral upper vestibular approach facilitates the placement of a miniplate at the infraorbital rim and lateral buttress and also placement of a bone graft onto the orbital floor when necessary. The combination of the 2 approaches facilitates the placement of a miniplate at the infraorbital rim and lateral buttress and also placement of a bone graft onto the orbital floor when necessary.

The combination of transconjunctival and intraoral upper vestibular approaches for the repair of zygomatic fractures allows the surgeon to proceed with a simple, easy, and effective surgery with no conspicuous scarring left on the face of the patient.

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ACKNOWLEDGMENTS
We would like to thank Nao Itoh and Atsuomi Saiga, both plastic surgeons, and the medical staff at St. Mary’s Hospital, Kurume, Japan. We also thank Kyoko Ohkubo, our secretary at Saga University Hospital, for arranging a big database for this research. Finally, but not least, we appreciate the expert advice offered by David J. David, Uemura’s mentor, before submission of this manuscript.

PATIENT CONSENT
The patient provided written consent for the use of her image.

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