

Subciliary versus Subtarsal Approaches to Orbitozygomatic Fractures

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Learning Objectives: After studying this article, the participant should be able to: 1. Describe the anatomic differences in the subciliary versus the subtarsal approach. 2. Discuss the difference between the “skin-only” and the “skin-muscle flap” variations of the subciliary approach. 3. Discuss the potential complications of both approaches. 4. Discuss the advantages of the subtarsal approach versus the subciliary approach.

Many incisions have been described for approaches to orbitozygomatic fractures, the most frequently used being the subciliary incision with its modifications, the subtarsal incision, and the transconjunctival incision with or without lateral canthotomy. Each of these approaches has its advantages and disadvantages that may make it more or less appealing to use depending on the patient's age and severity of fracture. A balance must be struck between adequate exposure and acceptable cosmetic result. This article reviews the literature with particular respect to the transcutaneous approaches of subciliary versus subtarsal techniques in the treatment of orbitozygomatic fractures. (*Plast. Reconstr. Surg.* 111: 1708, 2003.)

SUBCILIARY APPROACH

The use of the subciliary incision to address fractures of the orbital floor was introduced by Converse in 1944.¹ It is classically described as a cutaneous incision placed in a skin crease several millimeters below (and parallel to) the lash line, after infiltration with 1% lidocaine hydrochloride with 1:100,000 epinephrine solution. This incision begins at the punctum medially and is continued laterally for about 15 mm beyond the lateral canthus. The skin is dissected from the orbicularis to a level just beneath the tarsal plate before traversing the orbicularis muscle fibers down to the orbital septum. The septum is then followed to the infraorbital rim. The periosteum is subsequently incised and access is gained to the fracture site. This stair-stepping helps prevent direct scarring of the eyelid, which can result in scar inversion.

The skin-only modification divides the orbicularis fibers at the level of the infraorbital rim at the same level as the periosteal incision, rather than subtarsally. This technique, however, has been associated with several problems, including skin necrosis, ecchymosis, and ectropion.²

The skin-muscle flap technique was subsequently devised. In the *nonstepped* skin-muscle approach, the cutaneous incision is placed 2 mm below the lash line and traverses not only skin but also orbicularis muscle at the same level. This incision is carried down to the tarsal plate, which is followed in a preseptal plane to the level of the infraorbital rim. The periosteum is then incised and exposure to the fracture is obtained. The *stepped* skin-muscle approach divides the orbicularis muscle in line with its fibers approximately 2 to 3 mm below the level of the skin incision, then follows a preseptal plane to the rim and then through periosteum to the orbital floor.³ This results in a strip of pretarsal orbicularis supporting the lower eyelid. This skin-muscle approach has yielded more favorable long-term results with excellent aesthetic outcomes, decreased skin necrosis as compared with the skin-only approach, decreased ecchymosis, and a lower incidence of ectropion (which was usually temporary).^{4,5} This approach is also technically easier in most hands. However, as compared

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with other incisions placed lower in the eyelid, the subciliary approach generally has a higher incidence of denervation of the pretarsal orbicularis (because only a thin strip remains between the lid margin and the incision) and more postoperative ecchymosis (Fig. 1).

SUBTARSAL APPROACH

The subtarsal incision was also popularized by Converse⁶ and is a variation of the skin-muscle subciliary technique. After infiltration with 1% lidocaine with epinephrine, the incision is made along the lower border of the tarsal plate in the subtarsal fold. If the fold is obscured by edema, the incision is made approximately 5 to 7 mm from the lower eyelid margin following an inferolateral cant approximating the normal subtarsal crease.⁶ The orbicularis muscle is then encountered and divided in the direction of its fibers a few millimeters below the skin incision, again to prevent scar inversion. This also preserves all of the innervation to the pretarsal orbicularis and much of the preseptal orbicularis. The incision is then carried down to the level of the infraorbital rim in a preseptal plane. The periosteum is incised and the fracture is exposed. In both

the subtarsal and the subciliary incisions, it is important to incise the periosteum on the anterior surface of the rim away from the orbital septum (a few millimeters below the rim) to avoid vertical lid shortening (Fig. 2).⁷

COMPARISON OF SUBCILIARY VERSUS SUBTARSAL INCISIONS

Although many studies have compared transconjunctival versus transcutaneous approaches,^{2,8-11} few have directly addressed transcutaneous approaches, specifically, subciliary versus subtarsal. However, Bähr et al.¹² published a comparison of transcutaneous techniques in 1992, retrospectively comparing subciliary, subtarsal, and infraorbital incisions in 105 patients. They found that, overall, the incidence of impairments in the subtarsal approach (8.8 percent) was significantly lower than that of the subciliary approach (25 percent), though it should be noted far fewer subjects were in the subciliary group than in the subtarsal group (16 versus 91 subjects). Specifically, the incidence of scleral show and ectropion was significantly lower for the subtarsal approach versus the subciliary approach. The amount of edema, however, was higher in

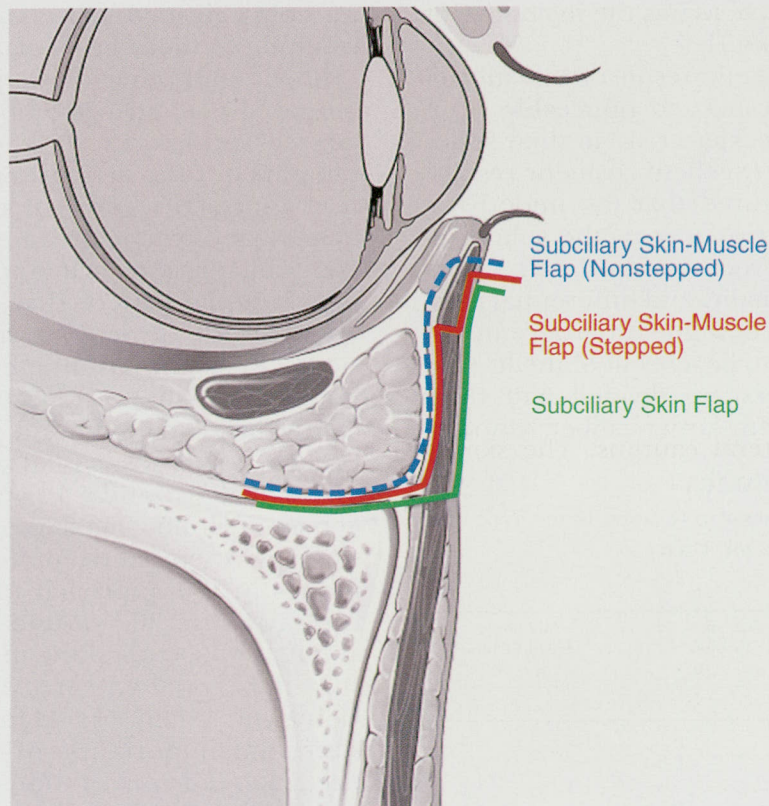


FIG. 1. Different subciliary approaches.

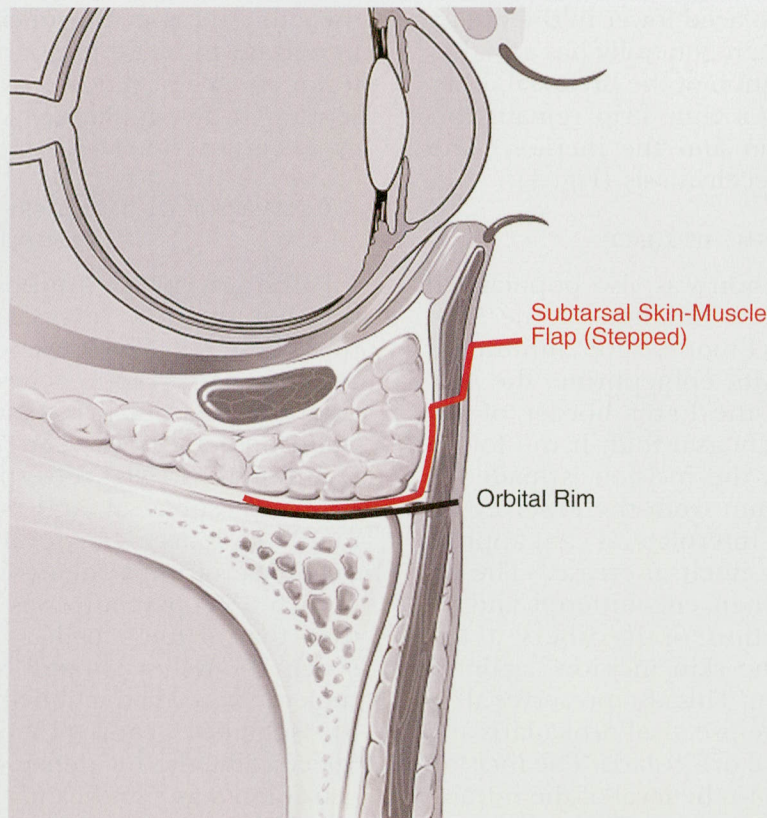


FIG. 2. The subtarsal approach.

the subtarsal approach, as was the incidence of noticeable scar (Table I).

The superior aesthetic result of the subciliary incision (with respect to noticeable scar) was confirmed by Heckler et al.⁵ in their series of 154 patients, with excellent cosmetic results. Bähr et al.¹² conjectured that the underlying reason for the superior scar in the subciliary versus the subtarsal (versus infraorbital) relates to two factors: skin quality and differential muscle mobility. They believe the difference in the incidence of edema to be a result of the level at which the lymphatics are divided and their associated caliber, with larger-caliber lymphat-

ics being divided more caudally on the lid, resulting in more lid edema.

Loeb¹³ and others have questioned whether scleral show and ectropion are just varying degrees of severity on a continuum or are separate entities altogether. Both result from scar contracture, loss of muscle tonus, and abnormal cicatricial connections between the orbicularis muscle and surrounding elements. Some believe that ectropion is just a severe form of scleral show with lid eversion.¹² Regardless of nomenclature, however, both scleral show and ectropion are significantly more common in the subciliary approach versus the subtarsal approach. Holtmann et al.¹⁰ found a 42 percent incidence of ectropion following skin-only subciliary incisions in their study of four incision techniques in the approach to orbital fractures. Antonyshyn et al.¹⁴ found a 16.6 percent incidence of scleral show in their data on the subciliary approach. Many authors, including Converse, Loeb, and Manson, have emphasized the importance of preservation of a pretarsal portion of the orbicularis in the maintenance of proper lower lid tonus.^{3,6,15-17} This was the impetus behind the stepped

TABLE I
Distribution of Impairments in Relation to the Type of Incision Used

Impairment	Subciliary Incision (n = 16)		Mid-Lower Eyelid Incision (n = 91)	
	n	%	n	%
Noticeable scar	0	0	2	2.2
Scleral show	3	18.8	4	4.4
Ectropion	1	6.3	1	1.1
Edema	0	0	1	1.1
Total	4	25	8	8.8



FIG. 3. Anterior, oblique, and lateral photographs of a 44-year-old man with a left orbitozygomatic fracture performed by means of a subtarsal approach. (*Left column*) Preoperative views; (*right column*) 15-week postoperative views.

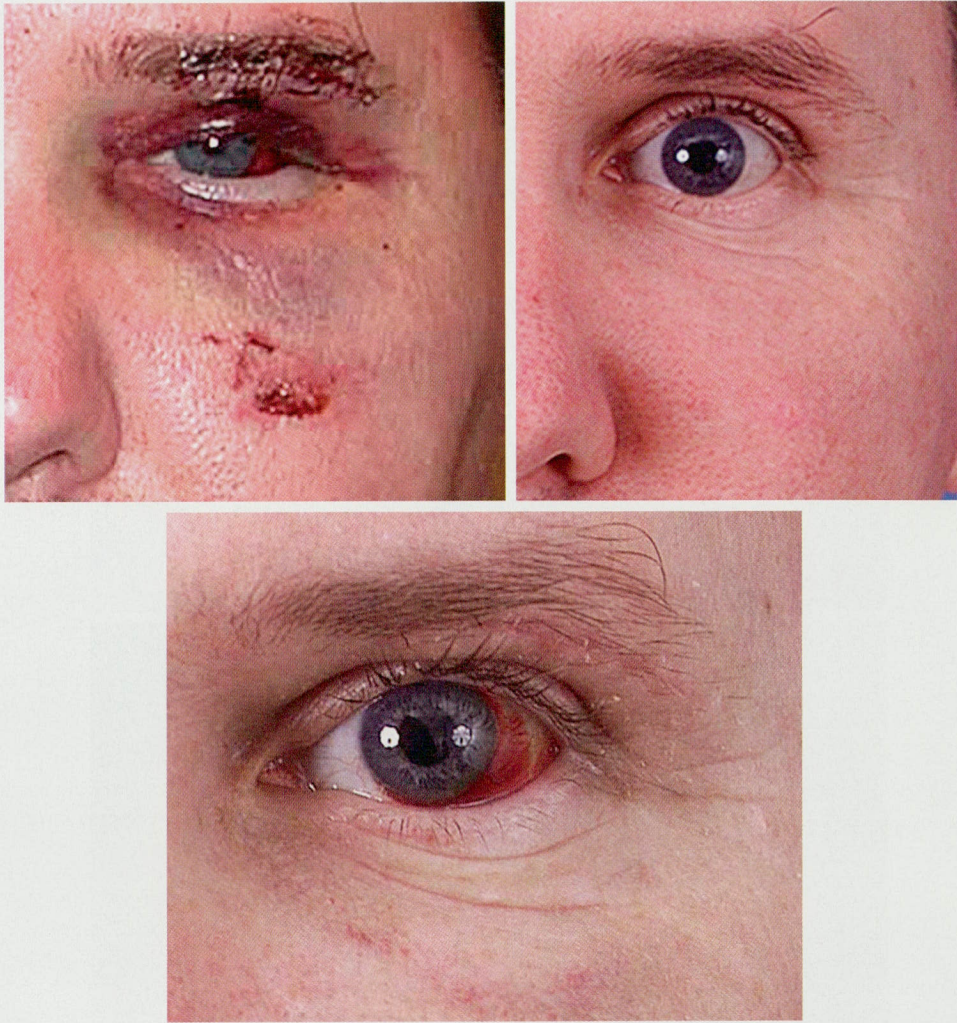


FIG. 4. Isolated left orbit views, preoperatively (*above, left*) and 15 weeks postoperatively (*above, right*). (*Below*) Close-up view of the result 15 weeks postoperatively.

subciliary incision, so as to take advantage of the cosmetic result of the subciliary approach and combine it with the decreased scleral show and ectropion rates of the subtarsal approach. However, even this modification does not obviate these complications in the subciliary approach. Appling et al.,⁹ in their study of transconjunctival versus subciliary skin-muscle flap approaches, found a 12 percent rate of transient ectropion and a 28 percent rate of permanent scleral show with the subciliary skin-muscle flap technique.

Holtmann et al.¹⁰ also demonstrated longer operating times with the subciliary versus the subtarsal approach. They found that the subciliary approach took 15 minutes of operating time versus 8 minutes in the subtarsal approach. The significance of this, however, is in question.

CASE ANALYSIS

A 44-year-old, otherwise healthy, white man who suffered a severely comminuted left orbitozygomatic fracture with enophthalmos and diplopia with upward gaze is shown in Figure 3. He underwent open reduction and internal fixation of his fracture, including exposure through a left subtarsal incision. The patient's 15-week postoperative views are shown, demonstrating an excellent functional and aesthetic result (Fig. 3, *right column*, and Fig. 4, *above, left* and *below*).

CONCLUSIONS

Many incision techniques are available for the treatment of orbitozygomatic fractures, but one incision type has not been clearly demonstrated to be superior to another. Many factors must be considered and the

advantages and disadvantages weighed. Overall, however, it seems that the subtarsal approach produces less risk for vertical shortening of the lid and a decreased incidence of scleral show and ectropion compared with the subciliary approach. Additional advantages include generous exposure and, in some hands, decreased operative time to access the fracture site. Potential drawbacks include a more obvious scar (though still barely perceptible in the absence of complications) and a higher incidence of edema.

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**Self-Assessment Examination follows on
the next page.**