Quantified Incision Placement for Postseptal Approach Transconjunctival Blepharoplasty

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Purpose: This study quantifies the incision location in transconjunctival lower eyelid blepharoplasty to optimize postseptal (direct) access to the eyelid/orbital fat.

Methods: A retrospective chart review of patients undergoing transconjunctival blepharoplasty by one surgeon (GGM) from January 2013 to January 2014 was performed. Simultaneous globe retropulsion and lower eyelid inferior displacement was used to balloon the conjunctiva forward to maximally visualize the transconjunctival surface anatomical landmarks of importance. A caliper was used to measure the distance in millimeters from the inferior tarsus to the most superior projection of visible fat. The conjunctival incision was made 0.5 mm posterior to this measured distance. For each procedure it was noted whether the preseptal or postseptal plane was entered.

Results: Sixty-six patients were assessed. Fifty patients were women, and the mean patient age was 54 years (range 36–71 years). The mean distance from the inferior tarsus to the visualized superior tip of fat was 6.03 mm (range 5.7–7 mm) and the mean incision placement was 6.53 mm (range 5.5–7.5 mm). The postseptal space (direct access to fat) was entered in 54 cases (82%). The inferior vascular arcade was identified in 23 cases (35%) cases. In this instance, the incision was placed below this landmark in 16 cases (70%). There were 5 cases (7.6%) of postoperative chemosis which all resolved within 2 months with conservative measures. There were no other complications related to the conjunctival incision.

Conclusion: Placing the conjunctival incision for postseptal approach transconjunctival blepharoplasty 0.5 mm posterior to the most superior projection of clinically visible fat (with adjunctive globe retropulsion and lower eyelid infraplacement) accesses the postseptal space directly in 82% of cases. Previously suggested incision placements: between 2 and 5 mm below the tarsus, at the fornix, or at the inferior vascular arcade are subjective/anecdotal at best and without similar quantitative validation.

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The transconjunctival approach for lower blepharoplasty (TCB) was first described by Bourguet1 in 1924 in the French literature, but generally fell into disfavor for 50 years until it was reintroduced by Tessier2 in 1973 in selected patients. Soon after, in an effort to reduce the incidence of postoperative eyelid malposition associated with traditional transcutaneous surgery, the technique was further elaborated on by various authors.3-5 First, Tomlinson and Hovey3 described a preseptal approach to access orbital fat, and later Baylis et al.,4 a postseptal technique. Since then transconjunctival surgery has been refined and is now a standard part of the aesthetic eyelid surgeon’s armamentarium.5-21

As the orbital septum fuses with the lower eyelid retractors approximately 5 mm below the inferior tarsus,22-25 it is known that a conjunctival incision above this fusion point will provide preseptal access (between orbicularis muscle and orbital septum) to the fat pads. However, what is not so clear cut, or been analyzed in an evidence-based manner, is where to optimally place the conjunctival incision for the postseptal approach to fat.

In this report, the authors evaluate a series of patients undergoing a postseptal approach TCB. With adjunctive globe retroplacement and inferior eyelid distraction,26 the orbital fat and conjunctiva are ballooned forward to maximally delineate and expose the posterior eyelid anatomy. The authors measured the distance from the inferior tarsus to the most superior visible yellow fat seen through the conjunctiva (postseptal space). This point was recorded, and in each case, a conjunctival incision was made just posterior (0.5 mm) to this location. The data show the mean incisional location to be 6.5 mm, and that fat was directly accessed in 82% of cases. To the best of authors’ knowledge, this is the first quantitative study assessing the conjunctival entry point for postseptal fat access during blepharoplasty.

METHODS

A retrospective chart review of patients undergoing lower TCB from January 2013 to January 2014 was performed. All surgeries were performed by the senior author (GGM) in a private practice outpatient setting. None of the patients, or their medical records, was associated with the institution for which GGM has privileges, therefore institutional review board approval was not required. Informed consent was obtained for each procedure, and the review adhered to the standards of the Declaration of Helsinki and was compliant with the Health Insurance Portability and Accountability Act. All patients had a detailed ocular examination prior to surgical intervention and risks/benefits were reviewed. Patients included for study underwent TCB with or without fat transposition for relative lower eyelid fat herniation. Patients were excluded if they had prior lower eyelid surgery, thyroid-associated orbitopathy, previous eyelid or orbital trauma, or eyelid malposition. The intraoperative distance in millimeters from the inferior tarsal edge to the superior tip of visualized fat was documented, as was the corresponding incision placement 0.5 mm posterior to this location. The percentage of
patients for whom this incision allowed direct entry to the postseptal fat compartment was also documented.

SURGICAL TECHNIQUE

All procedures were performed under conscious sedation or general anesthesia. A transconjunctival injection of 2 ml of 1% lidocaine with 1:100,000 of epinephrine was given. Simultaneous globe retropulsion and lower eyelid inferior displacement, as previously described, was used to balloon the conjunctiva forward for better exposure of posterior eyelid anatomy (Fig. 1).

This maneuver allowed a clear view of the relevant subconjunctival postseptal eyelid landmarks of importance: the tarsus, lower eyelid retractors/orbital septal fusion, and the eyelid/orbital fat. A caliper was used to measure the distance in millimeters from the inferior tarsus to the most superior visible (yellow) projection of fat (Fig. 1, top). A Colorado tip electrocautery was used to make an incision through the conjunctiva and lower eyelid retractors just posterior (approximately 0.5 mm) to this location. A 4-0 silk traction suture engaged the conjunctiva and lower eyelid retractors and was secured to the head drape, while a Desmarres retractor inferiorly displaced the lower eyelid. One of the 3 scenarios was then recorded: 1) Free fat prolapse through the wound (Fig. 1, below); 2) Fat prolapse covered by a thin capsule not connected to the inferior orbital rim (determined by traction on this tissue plane); and 3) A whitish firm tissue overlying fat, which, by traction testing, was fixed to the inferior orbital rim. The authors considered scenario 1 and 2 as postseptal fat access and scenario 3 as access to the preseptal space. In scenario 3, lysis of the white tissue overlying fat was required to enter the fat compartment confirming it to be the orbital septum. Surgery then proceeded in the standard way.

FIG. 1. Simultaneous globe retropulsion and eyelid depression (GRED maneuver) to balloon conjunctiva forward and expose posterior eyelid anatomy. Top left Surgeon’s view of mean 6.5 millimeter (mm) incision distance from inferior tarsus to superior tip of visible fat (both delineated with dark black line). Top right Artists drawing (sagittal view) showing black arrows depicting same landmarks and distance. Below left Surgeon’s view after conjunctival incision demonstrating free fat prolapse to postseptal space. Below right Artists drawing (sagittal view) of same. Modified with permission from Lippincott-Raven Publishers, Peng GL, Jacono A, Massry, GG. Re: “Globe Retropulsion and Eyelid Depression (GRED)” - A surgeon controlled, unimanual maneuver to access post-septal fat in transconjunctival lower blepharoplasty. Ophth Plast Reconst Surg 2014;30:273–4.

RESULTS

A total of 66 patients met inclusion criteria for review. Fifty patients (76%) were female and the mean patient age was 54 years (range 36–71 years). The measured distance from inferior tarsus to the superior most tip of fat viewed intraoperatively, and the location of the incision placement (0.5 mm posterior to this) are detailed in Table. These mean distances are 6.03 mm and 6.53 mm, respectively. With this conjunctival incision, the postseptal space was entered in 82% of cases (Fig. 2). This included scenarios 1 and 2 described in surgical technique section (free fat or fat covered with thin capsule). In 23 cases (35%), the inferior vascular arcade was visualized surgically. In 16 of these cases (70%), the inferior vascular arcade was above the incision placement. There were 5 cases of chemosis (described as more than minor). All cases resolved within 2 months with conservative management with topical lubricants and antiinflammatory agents. No other complications occurred.

DISCUSSION

Transconjunctival blepharoplasty has evolved since its early descriptions, with refinements in technique, and the addition of fat preservation adjuncts and detailed analysis, adding greatly to the authors understanding and usefulness of the procedure. One area which has not been studied is identification of the most appropriate location for the conjunctival incision. There are 2 general approaches to accessing orbital fat in TCB: pre- and postseptal. The primary benefit of the postseptal approach is preservation of the orbital septum. It has long been thought that maintaining septal integrity is important to prevent postoperative lower eyelid lower eyelid retraction. While this may be true with transcutaneous surgery, a recent report has shown that septal violation in TCB does not lead to an increased incidence of lower eyelid malposition. That notwithstanding, many still prefer the postseptal approach to access fat during TCB.

The preseptal approach proceeds with dissection between the orbicularis muscle and the orbital septum. This requires an incision between the inferior tarsal edge and the fusion point of the orbital septum and lower eyelid retractors. The literature has defined this distance as approximately 5 mm. Thus, an incision 1–4 mm below the inferior tarsal edge should enter the preseptal plane. While anatomically it makes sense that an incision greater than 5 mm below the inferior tarsus is needed for

<table>
<thead>
<tr>
<th>Distance measured in millimeters from inferior tarsus</th>
<th>Superior tip of visible fat from inferior tarsus: number of patients (%)</th>
<th>Distance to incision from inferior tarsus: number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mm</td>
<td>2 (3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>5.5 mm</td>
<td>6 (9%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>6 mm</td>
<td>45 (68%)</td>
<td>6 (9%)</td>
</tr>
<tr>
<td>6.5 mm</td>
<td>12 (18%)</td>
<td>45 (68%)</td>
</tr>
<tr>
<td>7 mm</td>
<td>12 (18%)</td>
<td>12 (18%)</td>
</tr>
<tr>
<td>7.5 mm</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Results</td>
<td>Mean 6.03 mm Range (5.0–7.0 mm)</td>
<td>Mean 6.53 mm Range (5.5–7.5 mm)</td>
</tr>
</tbody>
</table>
In this study was 4.4 mm. Thus, a distance of 5.1 mm below the eyelid margin, when the lower eyelid is stretched inferiorly as occurs in TCB surgery. The mean inferior tarsal height in eyelid margin, when the lower eyelid is stretched inferiorly as occurs in TCB surgery. The mean inferior tarsal height in this study was 4.4 mm. Thus, a distance of 5.1 mm below the inferior tarsus should be measured to the superior projection of fat. The authors elaborate that this distance can be up to 6 mm. While direct extrapolation from cadaver to live tissue cannot be assumed, this at least provides guidance.

In this report, the authors utilized the most obvious transconjunctival anatomical landmark to optimize incision placement for postseptal fat access. With maximal exposure of the posterior eyelid anatomical landmarks, the most superior tip of orbital fat could clearly be visualized. An incision was made just posterior (0.5 mm) to this location. In this scenario, direct entry to the orbital fat compartment (postseptal plane) was noted in 82% of cases. This meant direct visualization of free fat, or fat covered by a thin connective tissue layer not attached to the inferior orbital rim (confirmed by traction testing). The assumption was that this thin tissue substrate was a "fatty capsule" surrounding the fat. If tissue overlying fat was present and fixed to the orbital rim (orbital septum) a preseptal plane was recorded. The authors, unfortunately, did not subdivide the postseptal group into those who did, or did not, have a "capsule" anterior to fat. However, the authors do not think this biases the study findings as the "fat capsule" was free of orbital rim attachments, and thus a postseptal structure.

The significance of the study findings is that it provides guidance as to what has been ambiguously described in the literature in regards to postseptal approach TCB. The data suggest that making an incision 2 to 5 mm inferior to the tarsus should not enter the postseptal plane. While this makes intuitive sense, older reports with clearly delineated anatomy still suggested this incision location.3,26,27 In this series, fat was visualized 5 mm from the inferior edge of tarsus in only 2 cases (3%) with a subsequent conjunctival incision made 5.5 mm inferior to the tarsus. The postseptal compartment was not accessed in either case (Table). The authors feel certain that making a conjunctival incision above this level will not enter the postseptal plane, unless an anatomical variant exists. This is further suggested by the findings in the anatomical study described.24 With regards to a more inferiorly placed or "fornix" incision, the authors agree, with typical anatomy, an incision in this general area is appropriate. However, this encompasses a broad area without clear definition, and provides no concrete guidance as to location of incision placement. Finally, the study is limited in determining the value of placing an incision at the inferior vascular arcade. Prior to initiating the study, the authors, in error, did not define recording the location of the inferior arcade as a study parameter. This was not documented until after the study began when the authors identified its value. Also, the authors routinely injected anesthetic agent with epinephrine prior to initiating surgery. In many cases, this blanched the presence of the vasculature, masking the location of the arcade. As such in only 35% of cases was the arcade noted, and in 70% of these cases the incision placement was below this level. The authors think it is important to note that in the upper eyelid a marginal and peripheral arcade are generally consistently present, but in the lower eyelid the peripheral arcade is often less well defined, discontinuous, or absent. As such the true value of this landmark is unknown. In addition, this vessel, when present, has been shown on average to be between 4 and 5 mm below the lower eyelid margin, above where anatomy would dictate incision placement for postseptal fat access in TCB. However, the authors concede that a definitive association of the peripheral arcade and postseptal incision placement cannot be made without its definitive and consistent identification and measurement prior to administering injected epinephrine. As such any conclusions drawn from this report with regards to the lower peripheral arcade are inconclusive.

Transconjunctival blepharoplasty is now a mainstream part of aesthetic eyelid surgery. Over the years much has been learned regarding the surgical plane of dissection, the addition of fat transposition, the significance of septal violation, and patient satisfaction, and outcomes to surgery. What has remained unclear is the optimal location of conjunctival incision placement. This is especially important for the postseptal approach to surgery for those desiring to spare the orbital septum. In this report, the authors provide quantitative data demonstrating that when the incision is placed just posterior (0.5 mm) to the most superiorly visualized fat, when posterior anatomy is maximally exposed, that the postseptal space is entered in 82% of cases. An incision in this location, with the exposure technique described, has not led to an increased incidence of eyelid/globe complications. In this series, the mean incision placement was 6.5 mm inferior to the inferior tarsal edge, close to what has been seen in cadaveric study. However, the authors stress that surgeons base the location of incision on posteriorly visualized fat, and not on a defined distance, as anatomical variations will guide this location.

REFERENCES


20. Hartstein ME, Little WJ. Volumetric rejuvenation of the lower lid region with the orbicularis hitch. Paper presented at: Annual European Society of Ophthalmic Plastic and Reconstructive Surgery Meeting; September 2011; Lake Como, Italy.


