Background: Skin adhesives provide an alternative to sutures for skin closure. The use of octyl-2-cyanoacrylate in blepharoplasty has been reported by some authors, but difficulties in applying the product and the real benefits of its use are still controversial.

Objective: The purpose of this study is to show a simple technique for closing the upper incision in blepharoplasty with octyl-2-cyanoacrylate instead of sutures and to discuss its benefits.

Methods: Eight female patients who underwent blepharoplasty had the upper incision closed with octyl-2-cyanoacrylate, for a total of 16 eyelids studied. Temporary stitches were placed along the incision and pulled by traction to approximate the skin borders. After apposition of the skin borders, high viscosity octyl-2-cyanoacrylate (Dermabond; Johnson & Johnson, New Brunswick, NJ) was used to close the incision. The stitches were removed immediately after glue crust formation, leaving the incision without sutures. The procedure was timed and a Hollander wound scale was used to evaluate the aesthetic results.

Results: Approximation of the skin borders with temporary stitches made it easier to apply octyl-2-cyanoacrylate. The average gap between the skin borders was 1.0 cm. No major complications were encountered, although minor wound dehiscence occurred in 2 eyelids (12.5%). The closure time averaged 6.9 minutes and the aesthetic results were considered very good or excellent.

Conclusions: Closure of the upper eyelids using octyl-2-cyanoacrylate and temporary stitches removed immediately after glue crust formation is a safe and easily reproduced technique, with no differences in aesthetic outcome compared with suture closure. (Aesthetic Surg J 2009;29:87–92.)

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In 1998, the US Food and Drug Administration (FDA) approved octyl-2-cyanoacrylate (Dermabond; Ethicon, Johnson & Johnson, New Brunswick, NJ) for both wound closure and as a bacterial barrier. This newer-generation cyanoacrylate improves closure strength and flexibility and also has the benefits of reduced histotoxicity and a bactericidal effect.5,6

In 1999, Greene et al7 compared cosmetic and functional outcomes in a patient who underwent blepharoplasty with the upper eyelids closed on one side with octyl-2-cyanoacrylate and on the other side with 6.0 sutures. This study was the first to show that traction sutures provide adequate approximation of the skin edges for the application of tissue glue. Although the authors experienced some difficulties in using the product, their results showed an equivalent quality of closure in both sides with no differences in the aesthetic results.

The purpose of this study is to describe a simple technique for applying octyl-2-cyanoacrylate for closure of the upper incision in blepharoplasty and to evaluate both closure time and aesthetic outcome.

A

Alternatives to sutures, such as tissue glues, have been investigated for more than 30 years. Although cyanoacrylate, a polymer tissue adhesive, was first formulated in 1919, it was only after the development of butyl-2-cyanoacrylate (Histoacryl; B. Brown Medical Inc., Sheffield, England) in the 1970s that it began to be used in wound closures.1 The possibility of reduced surgical time, faster healing, and greater comfort for patients (especially when treating sensitive areas such as the eyelids) has encouraged several studies since that time.

Torumi et al2 reported some uses of tissue adhesives with no clinically significant adverse effects for treatments ranging from blepharoplasties to lacerations. However, the histotoxicity of cyanoacrylates when in contact with subcutaneous tissue has also been reported.3,4

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Preliminary Report

Sutureless Closure of the Upper Eyelids in Blepharoplasty: Use of Octyl-2-Cyanoacrylate
METHODS

A prospective study of 8 female patients who underwent a standard blepharoplasty was performed. After planning the exact height of the new eyelid fold (7.0 mm on average from the tarsal border), the skin excess of the upper eyelids was marked in a curvilinear shape with a slight flaring in the lateral portion (Figure 1).

Under intravenous sedation with appropriate monitoring, local infiltration was performed and the redundant skin was excised, preserving the orbicularis oculi muscle. After hemostasis with a pinpoint electrocautery, the orbital septum was opened and the protuberant orbital fat resected (Figure 2).

Once fat removal was deemed complete and meticulous hemostasis was achieved, the incisions on both sides were closed with octyl-2-cyanoacrilate. No subcutaneous sutures were placed to approximate the wound edges, although 4 temporary 6–0 nylon sutures were placed along the incision without knots and pulled gently as handles to provide adequate apposition of the skin edges. After holding traction in place for 30 seconds and releasing the stitches, the skin margins remained closed, facilitating the use of the tissue adhesive (Figure 3).

In all cases, 2 coats of high-viscosity Dermabond was applied with a precision tip and all stitches were removed immediately after the glue’s crust formation (Figure 4). In the lower eyelids, a subciliary incision was

Figure 1. Preoperative markings.

Figure 2. Excision of redundant skin.

Figure 3. A, B, The placement of temporary stitches provides adequate apposition of the skin edges.

Figure 4. A, Tissue glue is applied with a precision tip. B, Stitches are removed immediately after the formation of glue crust.
made and a skin muscle flap was undermined, exposing the lateral, central, and medial fat compartments. The orbital septum was opened with sharp dissection and only the fat that easily flowed into the wound was resected. With flap reposition, a vertical skin incision was made and a key suture was placed at the level of the lateral canthus, facilitating a conservative trimming of the medial and lateral skin redundancy. The incision was then closed with a running 6-0 nylon suture to avoid gluing the eyelashes.

Closure of the upper eyelids was timed with a chronograph by the same resident staff. Follow-up consisted of examinations at 1 week and 1, 3, and 6 months postoperatively (Figure 5). Aesthetic evaluation was performed by 3 plastic surgeons blinded to the method of closure who analyzed standardized patient photographs taken 10 days and 6 months postoperatively and answered a Hollander scale questionnaire for wound cosmetic appearance (Table).

RESULTS

The average gap between the skin borders after the excess skin removal was 1.0 cm. Closure time with this technique ranged from 5.3 to 8.2 minutes, with an average time of 6.9 minutes, and the glue’s crust remained for 7 days.

No major intraoperative wound closure complications occurred in our patient series. A minor wound dehiscence (2.0 to 3.0 mm) occurred in 2 eyelids (12.5%); in one case because of an infiltration of the glue between the skin edges and in the other case because of a poor juncture with inversion of the skin edges in the lateral portion of the incision (Figure 6).

Photographic analysis of the cosmetic outcomes revealed mean scores of 5.5 (maximum score 6.0) at 10 days postoperatively and 5.9 at 6 months postoperatively. Typical results are shown in Figures 7 and 8.

Table. Hollander scale for cosmetic appearance*

<table>
<thead>
<tr>
<th>Clinical appearance</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step-off borders (edges not on the same plane)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Contour irregularities (wrinkled skin near wound</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Margin separation (gap between sides)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Edge inversion (wound not properly everted)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Excessive distortion (swelling, edema, infection</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Overall appearance (subject appearance)</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td>(0)</td>
<td></td>
<td>(1)</td>
</tr>
</tbody>
</table>

Total cosmetic score (0 to 6)

*Each category in the Hollander scale is assigned a value of “0” if present and “1” if not present; for the category of “Overall appearance,” “Poor” is considered “0” and “Good” is considered “1.” The sum of all items is the score; a score of 6.0 would signify an optimal result.
DISCUSSION

Initially, pediatric patients with small traumatic lacerations requiring sutures were considered good candidates for treatment with octyl-2 cyanoacrylate. However, many trauma surgeons were encouraged to adopt this procedure because it eliminated the need for postoperative suture removal and provided good aesthetic results.\(^2,8\)

Because of these advantages, some authors also carried out studies for cosmetic surgery.\(^1,7\)

Veloudios et al\(^9\) compared glue and suture closures using blepharoplasty sites in an experimental study with pigs and concluded that tissue adhesive closure had a significant long-term advantage in tensile strength over sutures.

Figure 6. Two cases of minor wound dehiscence occurred. One was caused (A) by infiltration of glue between the skin edges and the other (B) by inversion of skin edges in the lateral portion of the incision. Photos were taken 7 days postoperatively.

Figure 7. A, C, Preoperative views of a 51-year-old woman. B, D, Postoperative views 180 days after blepharoplasty and wound closure with tissue glue.
Since Greene et al’s 1999 paper, no reports in the literature have described in detail a surgical technique for promoting a reliable and consistent approximation of the skin edges in wounds without subcutaneous closure, especially in blepharoplasty. The use of forceps as described by other authors may lead to a suboptimal approximation of the borders, in which small amounts of the cyanoacrylate can infiltrate between the skin edges, acting as a barrier to the healing process and worsening the aesthetic outcome.

Placing temporary stitches and using them as handles, as described by Greene et al, is the best way to achieve a good apposition of the skin edges. After holding for 30 seconds and releasing traction, the apposition stays in place, facilitating the use of the cyanoacrylate. However, no knots should be tied because their removal from under the glue’s crust could cause small dehiscences.

We understand that the 2 minor dehiscences encountered in our series were related to a learning curve process. The first case occurred when the tied knot was cut under the glue’s crust and the second occurred because of malpositioned skin edges.

With respect to closing time, achieving a good apposition of the borders takes as much time as performing a good running suture. Aesthetic outcomes were very similar to those obtained with sutures, but avoiding suture removal provides a convenience for both the surgeon and the patient and is considered the main advantage of this technique. The cost of the tissue glue is on average about $58 per side ($116 total).

CONCLUSIONS

Closure of the upper eyelids without sutures by use of tissue glue is a relatively safe technique that can be easily performed. It provides the same closure time and aesthetic results as conventional suturing techniques. Additional benefits potentially include postoperative convenience for both patient and surgeon.

DISCLOSURES

Dr. Perin had no financial relationship with Johnson & Johnson at the time this paper was first presented in conjunction with the International Society for Aesthetic Plastic Surgery Meeting in Melbourne, February 2008. Following this presentation, he became a paid consultant for Johnson & Johnson. The other authors have no financial interest in and receive no compensation from manufacturers of products mentioned in this article.

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