Use of Copolymer Polylactic and Polyglycolic Acid Resorbable Plates in Repair of Orbital Floor Fractures

Jonathan Lin, MD, MBA1 Michael German, MD2 Brian Wong, MD, PhD1,3

1 Department of Otolaryngology-Head and Neck Surgery, Irvine School of Medicine, University of California, Irvine, California
2 Department of Otolaryngology-Head and Neck Surgery, Central Coast Head and Neck Surgeons, St. Monterey, California
3 Department of Otolaryngology-Head and Neck Surgery, Beckman Laser Institute and Medical Clinic, University of California, Irvine, California


Abstract

The fractures of the orbital floor are common after craniofacial trauma. Repair with resorbable plates is a viable reconstructive option; however, there are few reports in the literature. This study describes our experience using copolymer polyglycolic and polyactic acid (PLLA/PGA) orbital reconstruction plates (LactoSorb, Lorenz Surgical, Jacksonville, FL) in 29 cases of the orbital floor fracture repair. We conducted a retrospective review of 29 orbital floor fractures at a single institution repaired through transconjunctival, preseptal dissection using PLLA/PGA plates fashioned to repair the orbital floor defect. Associated fractures included zygomaticomaxillary, LeFort, and nasoethmoid fractures. There were six patients with complications. Four patients had transient diplopia with complete resolution of symptoms within 1 year. One patient had diplopia postoperatively, but was later lost to follow-up. Two patients have had persistent enophthalmos since 1 year. In each of these cases, the floor fracture was coincident with significant panfacial or neurotrauma. We did not encounter any adverse inflammatory reactions to the implant material itself. The study concluded that orbital floor fracture repair with resorbable plates is safe, relatively easy to perform, and in the majority of cases was effective without complications. In the presence of severe orbital trauma, more rigid implant materials may be appropriate.

Keywords

► implant
► orbital
► PLLA/PGA
► LactoSorb
► resorbable

Orbital floor fractures commonly occur following trauma to the facial skeleton. The thin walls of the orbit make it susceptible to injury when hydraulic forces are created by blunt trauma to the eye. Increased orbital pressure causes the orbital contents to “blow out” into the sinus cavities. Alternatively, a blow to the inferior orbital rim may cause buckling and fracture of the orbital floor. These fractures can be isolated or associated with other facial fractures. The majority of etiologic injuries stems from assaults or motor vehicle accidents usually in males age ranging from 20 to 40 years. Presenting patients may complain of orbital pain and diplopia, and have signs ranging from periorbital ecchymosis and edema to V2 hyperesthesia.1,2 A computed tomography (CT) scan can confirm the diagnosis, assess herniation, measure defect size, and identify entrapment with the aid of forced duction testing.1–3

The goals of orbital floor fracture repair are to reduce orbital contents thus relieving entrapment, restore orbital volume, and repair the fracture segment by placing an orbital implant to support the orbital contents. Many materials have
been used as orbital implants, including autogenous, allogeneic, alloplastic (both resorbable and nonresorbable), and xenograft materials.\(^4\)\(^{-7}\) Alloplastic nonresorbable materials, such as titanium, have been studied previously, but more studies are beginning to address resorbable implants.\(^7\)\(^{-12}\) The potential complications using nonresorbable alloplastic implants include infection, extrusion, migration, and foreign body reaction. Autologous implants help to avoid these complications; however, they add surgical time and donor site morbidity. All implant types may become palpable over the orbital rim postoperatively, depending on placement and healing.

The LactoSorb (Biomet Microfixation, Jacksonville, FL) is a bioresorbable copolymer composed of 82% polylactic acid (PLLA) and 18% polyglycolic acid (PGA) that has been approved for use in orbital blow-out fractures.\(^8\,\,10\) It has been shown to completely hydrolyze with 12 months following implantation and is available in preformed shapes that conform to the geometry of the orbital floor. The material can be further reshaped operatively using a heat pen or a warm water bath. We present the results of our experience with PLLA/PGA implants in the treatment of orbital floor fractures in 29 patients at a single tertiary care center.

**Patients and Methods**

The medical record and imaging studies of all patients who had undergone orbital floor fracture repair by the senior author (BW) were reviewed. Only patients who had an orbital floor fracture repair with PLLA/PGA implants were included in the study. All patients had preoperative CT imaging demonstrating orbital floor fractures and all patients underwent ophthalmology consultation before surgery. In general, our operative technique included stabilization of associated facial fractures before orbital floor repair, although exposure of the floor was obtained in each case before reduction and fixation. All patients underwent transconjunctival approach to the orbital floor.

Lateral canthotomy and cantholysis were performed in only four instances as access using only the transconjunctival incision was in general more than adequate. Dissection was carried down in a preseptal plane until the arcus marginalis was identified and incised to the orbital rim using cautery or sharp dissection. Orbital exploration and reduction of orbital contents from the maxillary sinus was performed, followed by orbital rim plating when necessary. Every attempt was made to reduce the depressed or comminuted bone fragments. If the reduction resulted in a perfect reapproximation of the fragments with significant mechanical stability, then a PLLA/PGA plate was not placed and these patients were not included in this review. In most cases, a PLLA/PGA implant was placed to cover the defect or protect a mobile orbital floor fragment from falling out of reduction into the sinus. For example, a defect that would be amenable to placement of an orbital floor implant to prevent continued bone depression is shown in - Fig. 1. In addition, a preoperative CT scan showing a right-sided orbital floor fracture later repaired using a PLLA/PGA plate is shown in - Fig. 2.

Once the decision was made to pursue repair of the orbital floor fracture using a PLLA/PGA plate, the orbital floor plate was cut to size and if required further contoured in a 60°C water bath before placement. The plate is designed to span the anterior, posterior, lateral, and medial edges of the floor fracture. While the orbital floor plate does have a flange that can be used to rigidly secure it to the orbital rim, we opted to cut the segment off in each case and place the prosthesis without any rigid fixation. An intraoperative image of the plate in place is seen in - Fig. 3. The incisions were closed with absorbable sutures and forced duction testing was done to confirm ocular mobility. No plates were rigidly fixed to the craniofacial skeleton. Lateral canthotomy and cantholysis were performed in four instances. Antibacterial ointment was placed in the eye for several days postoperatively.

**Results**

Of the 29 patients included in this study, 25 (86.2%) were males and 4 (13.8%) were females. The mean age of all
Patients was 32.8 years (median, 28 years). The most common associated fractures included, 19 (66%) zygomaticomaxillary, 8 (28%) nasal bone, 4 (14%) LeFort, and 2 (6.9%) nasoorbitoethmoidal fractures. According to the operative estimations and imaging studies, the average defect size was determined to be 1.0 × 1.0 cm. Defect size ranged from 2 × 2 mm to 2 × 1.5 cm. The average length of hospitalization was 4.0 days (median, 1 day) and average follow-up time was 5.4 months (median, 1.9 months).

Preoperatively, one patient (3.4%) had a globe injury. 18 (62%) patients had CT evidence of herniation of orbital contents, 7 (24%) had physical examination findings of entrapment, and 17 (41%) patients complained of numbness in the V2 distribution. Operative approach was always trans-conjunctival and five patients (17.2%) also had coronal incisions for repair of associated facial fractures. Four (13.8%) of the operated orbits underwent canthotomy and 14 (48.3%) had a rim plating. There were no intraoperative complications.

There were six (20.7%) postoperative complications. Of these, four (13.8%) patients had complete resolution of symptoms within 1 year. One (3.4%) patient was lost to follow-up, and two (6.9%) patients had persistent symptoms since 1 year. Patient 5 in -Table 1 underwent repair of bilateral orbital floor fractures in conjunction with repair of bilateral nasoorbitoethmoidal, frontal sinus, LeFort, zygomaticomaxillary complex, complete nasal bone comminution (shattered), and complex midfacial lacerations resulting from severe midfacial trauma. He developed clinically evident unilateral enophthalmos, bilateral lower lid ecropison, bilateral epiphora, and bicoronal incision methicillin-resistant Staphylococcus aureus wound infection. Ectropion and epiphora were surgically corrected with skin grafts and at 16.6 months follow-up time he had persistent enophthalmos without diplopia, and a satisfactory cosmetic result. Patient 4 had a mild diplopia at 16 days after surgery, but was lost to follow-up thereafter. Patient 7 sustained severe orbital trauma, with significant nasoorbitoethmoidal components, and developed 4 mm of enophthalmos postoperatively. At initial presentation patient 18 had diplopia following assault, this patient experienced a second orbital trauma at 7 months following trauma during an engagement in collegiate lacrosse and subsequently developed hyperophthalmos and CT evidence of hematoma formation below the implant. The patient was treated with oral steroids and antibiotics. All symptoms and hyperophthalmos completely resolved 1 year postoperatively. Patients 22 and 26 both had mild diplopia following a fall and a motor vehicle accident, respectively. For both the patients, diplopia resolved within 6 months. There was no infection, extrusion, or indication for explantation associated with orbital implants in any patient in this series.

Discussion

This series describes our experience using PLLA/PGA plates for orbital floor reconstruction in 29 patients. This study represents the largest series of cases utilizing the PLLA/PGA implant reported in the English language literature. Three other published studies combine for a total of 19 patients. Our study presents a comparable follow-up interval and shows similar rates of complications to other studies evaluating similar materials. There exists some controversy regarding the “ideal” orbital implant material, as all have distinct advantages and disadvantages. Our series is by no means definitive; however, it does lend support for PLLA/PGA as a reasonable material for this purpose.

In our study population, the most common mechanisms of injury were falls and assaults. This differs from other reports, in which motor vehicle collision and assault were the most common etiology. Similar to other published data, patients were typically male in their late 20s or early 30s, and “pure” orbital blow-out fractures were found 24% of the time. The incidence of intracranial and cervical spine injuries was 7 and 3%, respectively, as compared with 10 and 0.4% found in a large study of 1,141 blow-out fractures in military servicemen. The discrepancy in spine injuries is not clear, but is probably due to sampling error.

All operations were performed via a transconjunctival approach with four patients additionally requiring lateral canthotomy secondary to pronounced peri orbital edema, in one case due to nasoorbitoethmoidal and LeFort III fractures. In another case, the patient had bilateral mixed LeFort II/III complex fractures, mandible fractures, zygomaticomaxillary complex fractures, and bilateral nasal fractures. In all these patients, the orbits were comminuted on multiple sides and fracture reduction. The posterior orbital floor is readily accessible and it offers good visualization of fracture planes and bony fragments. Orbital rim fractures can be plated as well. The transconjunctival approach is appropriate for access to a variety of orbital fracture sites, although in this series, we used it only for floor fractures. This approach has also been associated with lid retraction or laceration, however we had no complications attributable to this approach. We emphasize the importance of maintaining a preseptal plane with preservation of the orbital septum and peristomeum to prevent complications.
<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (y)</th>
<th>Gender</th>
<th>Mechanism</th>
<th>Orbit</th>
<th>Fracture type</th>
<th>Preoperative findings</th>
<th>Approach</th>
<th>Follow-up time</th>
<th>Early (&lt; 2 wks)</th>
<th>Late (&gt; 2 wks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>61</td>
<td>M</td>
<td>Assault</td>
<td>Left</td>
<td>Panfacial</td>
<td>D</td>
<td>T, Sb</td>
<td>2 d</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>48</td>
<td>F</td>
<td>Fall</td>
<td>Right</td>
<td>OZ</td>
<td>D</td>
<td>T, Sb</td>
<td>3 d</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>39</td>
<td>M</td>
<td>Assault</td>
<td>Left</td>
<td>OZ</td>
<td>D, N</td>
<td>C, T</td>
<td>0.5 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>M</td>
<td>Bicycle accident</td>
<td>Right</td>
<td>Pure orbital</td>
<td>H, En</td>
<td>T</td>
<td>0.5 mo</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>68</td>
<td>M</td>
<td>Fall</td>
<td>Bilateral</td>
<td>Panfacial</td>
<td>H, En, N, E</td>
<td>Bc, T, Sb</td>
<td>16.6 mo</td>
<td>En, GR, Ex, Ep</td>
<td>Same as early</td>
</tr>
<tr>
<td>6</td>
<td>50</td>
<td>M</td>
<td>Fall</td>
<td>Left</td>
<td>Pure orbital</td>
<td>H</td>
<td>T</td>
<td>16.8 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>M</td>
<td>Fall</td>
<td>Right</td>
<td>OZ</td>
<td>H</td>
<td>Bc, T, Sb</td>
<td>11.7 mo</td>
<td>No</td>
<td>En</td>
</tr>
<tr>
<td>8</td>
<td>51</td>
<td>M</td>
<td>Fall</td>
<td>Left</td>
<td>OZ</td>
<td>D, N</td>
<td>T</td>
<td>2.4 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>M</td>
<td>Fall</td>
<td>Left</td>
<td>OZ</td>
<td>H, N</td>
<td>Bc, T, Sb</td>
<td>5.9 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td>21</td>
<td>M</td>
<td>Fall</td>
<td>Left</td>
<td>OZ</td>
<td>H, N</td>
<td>T</td>
<td>0.5 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>11</td>
<td>19</td>
<td>M</td>
<td>Sports trauma</td>
<td>Left</td>
<td>Pure orbital</td>
<td>H, En, N</td>
<td>T, Caldwell-Luc</td>
<td>5 d</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>12</td>
<td>26</td>
<td>F</td>
<td>Horse kick</td>
<td>Right</td>
<td>Panfacial</td>
<td>D, N</td>
<td>T, Sb</td>
<td>3 d</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>13</td>
<td>12</td>
<td>M</td>
<td>Sports trauma</td>
<td>Left</td>
<td>Pure orbital</td>
<td>D</td>
<td>T</td>
<td>1.5 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>14</td>
<td>27</td>
<td>M</td>
<td>Industrial accident</td>
<td>Left</td>
<td>OZ</td>
<td>H, N</td>
<td>T, PBH</td>
<td>43.6 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>15</td>
<td>29</td>
<td>M</td>
<td>Assault</td>
<td>Right</td>
<td>OZ</td>
<td>H, N</td>
<td>T, Bc</td>
<td>12.2 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>16</td>
<td>9</td>
<td>M</td>
<td>Sports trauma</td>
<td>Right</td>
<td>Pure orbital</td>
<td>H, En</td>
<td>T</td>
<td>6 d</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>17</td>
<td>48</td>
<td>M</td>
<td>Assault</td>
<td>Left</td>
<td>OZ</td>
<td>H</td>
<td>T, PGS, Br</td>
<td>3.2 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>18</td>
<td>21</td>
<td>M</td>
<td>Assault</td>
<td>Right</td>
<td>OZ</td>
<td>D, H, anisocoria</td>
<td>T</td>
<td>16.4 mo</td>
<td>No</td>
<td>D, Dis</td>
</tr>
<tr>
<td>19</td>
<td>18</td>
<td>M</td>
<td>Assault</td>
<td>Left</td>
<td>OZ</td>
<td>N</td>
<td>T</td>
<td>4.3 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>20</td>
<td>52</td>
<td>M</td>
<td>Assault</td>
<td>Bilateral</td>
<td>Panfacial</td>
<td>En</td>
<td>C, T, Sb, Br</td>
<td>11 d</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>21</td>
<td>27</td>
<td>M</td>
<td>Sports trauma</td>
<td>Left</td>
<td>Pure orbital</td>
<td>H, N</td>
<td>T</td>
<td>16 d</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>22</td>
<td>41</td>
<td>F</td>
<td>Fall</td>
<td>Left</td>
<td>Pure orbital</td>
<td>N</td>
<td>T</td>
<td>5.2 mo</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>23</td>
<td>35</td>
<td>M</td>
<td>Fall</td>
<td>Left</td>
<td>OZ</td>
<td>H, En, N</td>
<td>T</td>
<td>21 d</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>24</td>
<td>27</td>
<td>M</td>
<td>Assault</td>
<td>Right</td>
<td>OZ</td>
<td>GR, N</td>
<td>T, Sb</td>
<td>7 d</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>25</td>
<td>37</td>
<td>M</td>
<td>Fall</td>
<td>Right</td>
<td>Pure orbital</td>
<td>H, En, GR</td>
<td>T</td>
<td>1.9 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>26</td>
<td>18</td>
<td>F</td>
<td>Motor vehicle accident</td>
<td>Right</td>
<td>Pure orbital</td>
<td>D, En, H</td>
<td>T</td>
<td>2.6 mo</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>27</td>
<td>16</td>
<td>M</td>
<td>Sports trauma</td>
<td>Left</td>
<td>Pure orbital</td>
<td>D, En, H</td>
<td>T</td>
<td>4.2 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>28</td>
<td>21</td>
<td>M</td>
<td>Assault</td>
<td>Right</td>
<td>OZ</td>
<td>N</td>
<td>T</td>
<td>7.2 mo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>29</td>
<td>48</td>
<td>F</td>
<td>Assault</td>
<td>Left</td>
<td>OZ</td>
<td>GR</td>
<td>Bc</td>
<td>28 d</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Abbreviations: Bc, bicoronal; Br, brow incision; C, canthotomy; D, diplopia; Dis, displacement; E, enophthalmos; En, entrapment; Ep, epiphora; Ex, exotropion; GR, gaze restriction; H, hemiation; N, numbness; OZ, orbitozygomatic; PBH, percutaneous bone hook; PGS, percutaneous Gerard screw; Sb, sublabial; T, transconjunctival.
Use of PLLA/PGA Resorbable Plates in Repair of Orbital Floor Fractures  
Lin et al.  

orbital fat from entering the field, though others maintain 
primacy of the transseptal approach. 

PLLA/PGA plates are easily heat contoured to fit a tem-
plate-shaped along the orbital floor. A hot water bath is ideal 
to soften the plate and allow sculpting, but a heat pen can also 
be used. Placement is accomplished without rigid fixation; 
rather the mass of the orbital contents maintains implant 
position during the immediate postoperative period, and 
later the implant in turn acts as a shelf or sling to support 
the contents by straddling the fracture edges. In this series, 
we did not encounter any orbital floor fractures too large to 
bridge with the implant given a mean defect size of 
1.0 × 1.0 cm. However, the defect size may be misleading, 
as the issue at hand is not the absence of bone, but rather the 
absence of a mechanically stable platform that will remain in 
reduction while supporting the globe. Recent studies have 
supported this and shown that PLLA/PGA implants are ade-
quate for defects over a range of 1 to 4.8 cm². It has been 
recommended that bone or titanium be used for large floor 
defects, though fears of inflammation and migration re-
main. In addition, the indications for their use are still 
unclear and there is a broad range of clinical practice guide-
lines. Moreover, although agreement exists over emer-
gency treatment for patients that demonstrate specific 
clinical and imaging findings, recent studies have shown 
the lack of consensus across the different specialties that 
address orbital fractures and the absence of randomized 
prospective studies.

Indications for repair of orbital fractures remain contro-
versial. In general, surgical intervention is indicated when 
immediate functional or cosmetic impairment is present, or 
to prevent late term sequelae. Fractures should be repaired 
when accompanied by extraocular muscle entrapment, 
enophthalmos greater than 2 mm, or large fracture area 
(> 50% of the floor) that will most likely lead to enophthal-
mos or globe malposition. Timing of repair is also under debate. 
Recent studies have shown a lowered risk of postoperative 
complication with repair within 2 weeks. Early or immedi-
ate repair is also recommended when entrapment is present 
to avoid ischemic injury to extraocular muscles and to relieve 
the oculocardiac reflex (bradycardia, nausea, and syncope). 
Although, evidence is lacking and often contradictory, recent 
data support early operation to prevent complications, such 
as late enophthalmos. As the most recent systematic review 
reveals, numerous biomaterials have shown promising re-
sults and efforts at improving outcomes should involve 
consideration of defect size or orbital volume when deciding 
on a specific biomaterial. There have been reports of complications attributable to 
PLLA/PGA implants in the literature. Uygur et al proposed 
that resorbable mesh copolymer plates may cause gaze 
restriction owing to fibrotic bands that interdigitate between 
holes in the plate. They assert that the presence of the mesh 
plate incites a local inflammatory response leading to the 
creation of the scar bands. All plates in our study were solid 
without holes or meshing. We did not find evidence that the 
plates led to gaze restriction by this or any other mechanism. 
Others have reported postoperative inflammation along the 

inferior orbital rim after placement of resorbable mesh for 
treating orbital blow-out fractures. In these cases, the 
implant was contoured over the orbital rim, with or without 
rigid fixation. Furthermore, the plates we used are manufac-
tured with an anterior flange that sits over the orbital rim. We 
trimmed the rim contour off before placement, and the plate 
itself was confined to within the orbit. Although, we also 
plated the orbital rim with traditional low profile titanium 
plates and screws in 14 (48%) of the cases, we did not observe 
inflammatory reactions. Two patients (6.9%) in our series 
developed enophthalmos postoperatively. Both of these pa-
tients had severe orbital trauma from high velocity mech-
anisms with fractures of multiple orbital walls, and the origin 
of their enophthalmos may be due to imperfect reconstruc-
tion of other regions of the orbit and facial skeleton besides 
the floor. In these cases, a more rigid material may be 
appropriate to reconstitute the orbital walls to prevent 
enophthalmos, especially if lateral, medial, anterior, and 
posterior osseous platform on which to suspend the implant 
may be unstable or not exist.

Our data showed no confirmed cases of persistent diplopia. 
Four cases resolved a few months following surgery and one 
case was lost to follow-up. A recent systematic review found 
the incidence of persistent diplopia to be 18.3% with data 
from all materials and less than 1% for PLLA/PLLA-composite 
and PLLA/PGA implants. For all materials, the incidence of 
persistent enophthalmos was 29.8%. For PLLA/PLLA-composite 
implants and PLLA/PGA implants, persistent enophthal-
mos was found in less than 1% and 10.5% of the cases, 
respectively. Incidence of infection, entrapment, and graft 
extrusion was very rare across all materials. Studies suggest 
that the copolymer PLLA/PGA implant combines the benefit 
of sufficient strength with rapid resorption compared with 
pure PLLA and is adequate to cover defects up to 4.8 cm².

Our study is somewhat limited by the size and its ret-
spective nature with 29 operated orbits; regardless, it is the 
largest series till date to examine the PLLA/PGA resorbable 
orbital implant material. Still, more experience is needed to 
adequately address the concerns of postoperative inflamma-
tion described by other authors. Patient follow-up in these 
patients has been always a challenge, as in many studies 
involving trauma patients. Lastly, we did not have Hertel 
exophthalmometry measurements in most cases, as many 
subjects had limited access to health care. These data would 
allow for quantification of pre- or postoperative enophthal-
mos, a known sequelae of orbital blow-out fractures.

Conclusion

Nonmeshed PLLA/PGA orbital floor plates are safe and effec-
tive for use in the majority of orbital floor fracture repairs and 
comparable to other implant devices reported in the litera-
ture. The transconjunctival approach to the orbit allows for 
outstanding exposure of the orbital floor and easy placement 
of the implant. The implant as we use it does not require rigid 
fixation into the orbital rim to maintain stability. While a 
larger series is necessary to confirm our findings, we feel that 
PLLA/PGA is an acceptable alloplastic bioresorbable...
copolymer for the purpose of repairing fractures of the orbital floor. Discretion should be used in cases of severe orbital trauma with comminution of multiple walls, as a traditional nonresorbable rigidly secured implant with or without bone grafting may be appropriate.

References