



Technical note

Modification of orbital retractor to facilitate the insertion of orbital wall implants

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Accepted 2 April 2017

Keywords: Orbital fracture; patient-specific implants; titanium mesh; orbital retractor

The reconstruction of a fractured orbital wall requires both the adaptation and correct positioning of an orbital implant.¹ Patient-specific, 3-dimensional, printed models are helpful in the adaptation of the titanium mesh and for navigation inside the orbit. The ideal position of the implant, however, can be challenging.

To reconstruct the lower orbital wall we use a transconjunctival retroseptal lower-eyelid approach, and then dissect subperiosteally in the usual fashion. We try to find the orbital process of the palatine bone, which is usually intact,² and placing the retractor in the deep orbit will help to visualise the fracture and surrounding bone. A small modification of

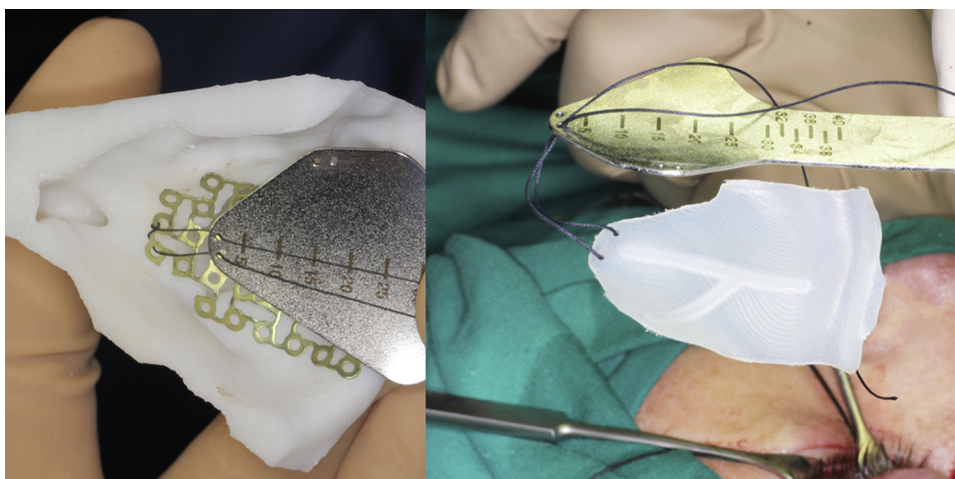


Fig. 1. On the left: Resorbable 3/0 thread dragged through holes in the modified orbital retractor and through conical part of titanium mesh. On the right: Resorbable 3/0 thread dragged through hole in the modified orbital retractor and through conical part of patient specific implant made from ultra-high molecular weight polyethylene [Humanprototypes Sp z o.o. Pulawy, Poland]. It is possible to position the implant with (left) or without (right) the knot on the used string.

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<http://dx.doi.org/10.1016/j.bjoms.2017.04.001>

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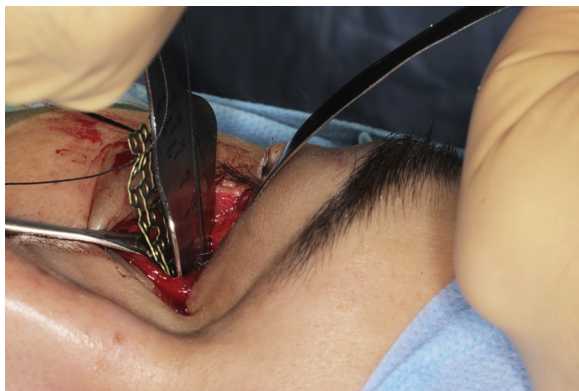


Fig. 2. Placement of the retractor and the titanium mesh inside the orbit through a transconjunctival retroseptal approach.

a normal orbital retractor helps to position the mesh on the posterior ledge of the orbit.³

We drill holes 1 mm in diameter near the edges of the retractor (DePuy Synthes, Zuchwil, Switzerland) (Fig. 1), and then pull 3/0 resorbable thread through them and the conical part of the prebent mesh (ChM, Lewickie, Poland). We place the retractor on the orbital process of palatine bone, slightly deeper than the predicted location of the titanium mesh, and use the loose ends of the thread to pull the implant into the orbit until it reaches the drilled holes on the top of the retractor (Fig. 2). We control the correct position of the mesh, and after a forced duction test, fix the mesh with two screws (ChM, Lewickie, Poland). Three-dimensional printed models of the fractured orbit can be used to adapt the titanium mesh so that it fits accurately when placed in the correct position. Finally, the thread is pulled out (Fig. 3) and we suture the conjunctiva.

It is always difficult to see the conical part of the orbit, and there is a risk that the conical part of the mesh could be placed in the maxillary sinus below the posterior ledge of the orbit or penetrate the inferior rectus muscle. It is possible to control the position of the mesh using intraoperative navigation and imaging,⁴ but both methods require expensive equipment, and are not particularly accurate.⁵ The edges of the implant

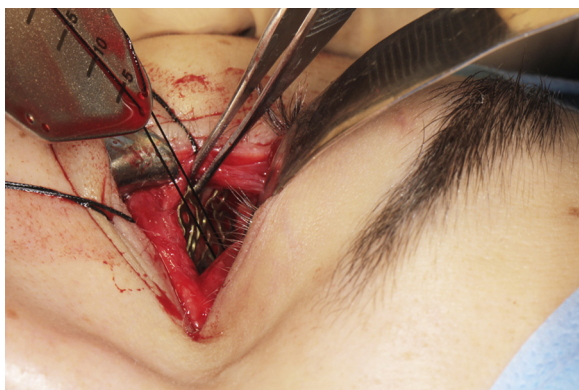


Fig. 3. Titanium mesh placed inside the orbit to reconstruct the lower orbital wall. The 3/0 resorbable thread is still attached to the conical part of the implant while the retractor is removed from the operative field.



Fig. 4. Postoperative computed tomogram confirming the correct position (on the posterior ledge of the orbit) and S-shape of the orbital mesh.

can also be checked with a small endoscope if one is available. We think that our technique greatly reduces the possibility of placing the implant in the maxillary sinus, visual canal, or superior orbital fissure (Fig. 4) with minimal expenditure.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patients' permission

We confirm that any aspect of the work covered in this manuscript has been conducted with the ethical approval of the relevant bodies and the patient.

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