MatrixORBITAL. Anatomical reconstruction of medial wall and orbital floor fractures.

Technique Guide

CMF Matrix

SYNTHES Instruments and implants approved by the AO Foundation
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MatrixORBITAL.
Anatomical reconstruction of medial wall and orbital floor fractures.

Features and benefits

Designed from CT-scan data, the three-dimensional implants closely approximate the topographical anatomy of the human orbital floor and medial wall, to provide accurate reconstruction even after significant two-wall fractures.¹ ²

Preformed three-dimensional shape
– For minimal bending and cutting which reduces the amount of time needed to contour plate

Contoured plate edges
– For easier plate insertion through skin incision and less interference between the plate and surrounding soft tissue

Segmented design
– To customize plate size to address orbital topography and to maintain contoured plate borders with minimal sharp edges

Rigid zone
– Restores the shape of the posterior orbital floor to help maintain the correct position of the globe

Intersection bars for minimal cutting and contoured plate borders

Medial wall

Rigid zone ensures consistent form in the posterior orbit

Orbital floor

Fixation arms

Screw hole pattern

Lateral edge

S-shape to match the contour of the orbital floor
Introduction

Orbital floor fractures are frequently associated with medial wall fractures. The complex geometry of the bony orbit makes anatomical reconstruction extremely challenging, particularly in two-wall fractures and when the deep orbital cone is affected.

The orbital floor has an initial shallow convex section behind the rim, then inclines upward behind the globe, and inclines upward to meet the medial wall, creating a distinct bulge behind the globe. These convex curves of the medial wall and floor create a “postbulbar constriction” of the orbital cavity, which must be reconstructed when the orbit is rebuilt following fractures. Treatment is directed at precise anatomical reconstruction of orbital shape and volume in order to restore the correct position of the eye.

The MatrixMIDFACE Preformed Orbital Plates may be used for acute orbital fractures or in secondary reconstruction of enophthalmos and dystopia.

Indications

Synthes MatrixMIDFACE Preformed Orbital Plates are intended for use in selective trauma of the midface and craniofacial skeleton, craniofacial surgery, reconstructive procedures and selective orthognathic surgery of the maxilla and chin.
**Clinical Case**

**Preoperative CT**

25-year-old male sustaining blunt trauma to left orbit. Ophthalmological exam unremarkable except for severe soft tissue swelling and bruising. CT demonstrated severe displacement of medial wall and floor, putting the patient at risk for late enophthalmos and dystopia as well as strabismus.

**Postoperative CT**

Orbit approached through transconjunctival incision with lateral canthotomy. MatrixMIDFACE Preformed Orbital Plate, large, left, placed without modification except slight bending and trimming of some fixation holes. The implant was fixed to the inferior orbital rim with two MatrixMIDFACE screws.

*Clinical case and all images are courtesy of Dr. Scott Bartlett, Children’s Hospital of Philadelphia, University of Pennsylvania, USA.*
Orbital Landmarks

### Implant placement according to the orbital landmarks

1. Inferior orbital rim  
2. Inferior orbital fissure  
3. Posterior orbital ledge  
4. Transition zone between the medial wall and orbital floor  
5. Optic canal  
6. Lacrimal fossa

* Transition zone is located at the infero-medial aspect of the orbital floor and refers to an inner buttress at the junction to the lower end of the medial orbital wall.

### Preoperative planning*

* All images are courtesy of Prof. Dr. R. Schmelzeisen and Dr. Dr. M.C. Metzger, Department of Craniomaxillofacial Surgery, University of Freiburg, Germany.
Orbital Retractors

- Minimize orbital soft tissue prolapse
- Provide soft tissue protection
- Large and small retractor ends
- Right and left retractors
- Stainless steel, malleable

Calibration scale on both sides

Concave ends

Design follows orbital anatomy
Surgical Technique

1 Select implant

Implants

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>04.503.801</td>
<td>Preformed Orbital Plate, small, left</td>
</tr>
<tr>
<td>04.503.802</td>
<td>Preformed Orbital Plate, large, left</td>
</tr>
<tr>
<td>04.503.811</td>
<td>Preformed Orbital Plate, small, right</td>
</tr>
<tr>
<td>04.503.812</td>
<td>Preformed Orbital Plate, large, right</td>
</tr>
</tbody>
</table>

Select the MatrixMIDFACE Preformed Orbital Plate that best suits the patient’s orbital anatomy, the fracture type and extent, and which is based on the preoperative plan.

**Note:** In three-wall fractures involving the lateral wall, an additional orbital implant must be used (e.g. Synthes orbital mesh plate).

2 Size implant (if required)

Instruments

<table>
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<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>03.503.033</td>
<td>Cutting Scissors for Mesh Plates, short</td>
</tr>
<tr>
<td>03.503.037</td>
<td>Cutting Scissors for Mesh Plates, long</td>
</tr>
</tbody>
</table>

Reduce the height of the medial wall and/or the orbital floor when not used for bridging the fracture. Always cut the implant along the cutting lines to ensure smooth edges, using scissors or mesh cutters.
3

Contour implant (if required)

Instrument

| 03.503.038 | Bending Pliers for MatrixMIDFACE Plates |

The implant can be further contoured to match patient anatomy.

Notes

– Avoid contouring of the implant in situ, that may lead to implant malposition and/or posterior cantilever effect
– The lateral anterior part of the plate (circled right) is intentionally prebent higher than the orbital rim anatomy, to allow free plate movement during plate positioning. The lateral anterior part can be further contoured to match patient anatomy
– Excessive and repetitive bending of the implant increases the risk of implant breakage
**Retract soft tissue**

**Instruments**

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<tr>
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<tbody>
<tr>
<td>03.503.801</td>
<td>Orbital Retractor, left</td>
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<tr>
<td>03.503.802</td>
<td>Orbital Retractor, right</td>
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</tbody>
</table>

The malleable orbital retractors can be used to retract the soft tissue as well as size the defect.

The spoon shaped shield of the malleable retractors is bent perpendicular to the handle.

Fat prolapsing beside the retractor shield can be retracted by the additional insertion of a flexible foil.

**Technique tip:** Make an angled bend (red line) to allow the hand position to rest conveniently and away from the surgical view on the patient’s forehead. Twisting of the bent end can further improve or facilitate the handling.
5

Insert implant

Position the lateral edge of the plate along the inferior orbital fissure. Since the implant is anatomic and preformed, it should be positioned in the same location for every patient. The orientation of the implant does not need to change based on the anatomy of the fracture. Place the plate on the stable bony contour.

**Technique tip:** Confirm appropriate dissection. Insert the medial wall section of the plate first (Figure 1). While inserting the rest of the plate, turn the plate (Figure 2) until the implant is in the correct anatomical position (Figure 3). (Refer to page 6 for orbital landmarks).
Secure implant

Stabilize the implant with MatrixMIDFACE screws inserted through selected screw holes in the plate. Fixation arms should be removed when not used for fixation.

Note: Test for impingement
A forced duction test must be completed to ensure unrestricted lateral and medial movement of the globe.

Caution: Drill rate should never exceed 1800 RPM. Higher rates can result in thermal generated necrosis of the bone and an oversized hole to be drilled. The detriments of an oversized hole include reduced pullout force, increased ease of screws stripping in bone, and/or suboptimal fixation. Always irrigate during drilling.
Confirm plate placement*

Sagittal view of the correct plate placement is demonstrated in the image. Placement on the posterior ledge should be confirmed intraoperatively.

* Image courtesy of Prof. Dr. M. Rasse, Department of Craniomaxillofacial Surgery, University of Innsbruck, Austria.
Titanium MatrixMIDFACE Preformed Orbital Plates, 0.4 mm thick

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Size</th>
<th>Side</th>
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<tbody>
<tr>
<td>04.503.801</td>
<td>small</td>
<td>left</td>
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<tr>
<td>04.503.802</td>
<td>large</td>
<td>left</td>
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<tr>
<td>04.503.811</td>
<td>small</td>
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</tr>
<tr>
<td>04.503.812</td>
<td>large</td>
<td>right</td>
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Note: MatrixMIDFACE plates are commercially pure titanium. MatrixMIDFACE screws are titanium alloy (Ti-6Al-7Nb).
◊ Available nonsterile or sterile-packed. Add S to catalog number for steriele product.
## Titanium MatrixMIDFACE Preformed Orbital Plate Set (01.503.801)

### Modules
- 306.610  Auxiliary Module, for MatrixMIDFACE System
- 306.640  Plate Insert, for MatrixMIDFACE System
- 306.641  Label Sheet, for Preformed Orbital Plates

### Plates
- **Titanium MatrixMIDFACE Preformed Orbital Plates, 2 each**
  - 04.503.801  Small, left
  - 04.503.802  Large, left
  - 04.503.811  Small, right
  - 04.503.812  Large, right

### Instruments
- **Orbital Retractors, 1 each**
  - 03.503.801  Left
  - 03.503.802  Right

### Also Available
- **MatrixMIDFACE Plating System Set**
  - Titanium MatrixMIDFACE Screws, self-tapping (5/pkg.)
    - Length
      - 04.503.204.05  4 mm
      - 04.503.205.05  5 mm
      - 04.503.206.05  6 mm
      - 04.503.208.05  8 mm
  - Titanium MatrixMIDFACE Screws, self-drilling (5/pkg.)
    - Length
      - 04.503.224.05  4 mm
      - 04.503.225.05  5 mm
      - 04.503.226.05  6 mm
      - 04.503.228.05  8 mm
- **Titanium MatrixMIDFACE Emergency Screws (1/pkg.)**
  - Length
    - 04.503.234.01  4 mm
    - 04.503.235.01  5 mm
    - 04.503.236.01  6 mm
    - 04.503.238.01  8 mm

Note: The MatrixMIDFACE Preformed Orbital Plate Set can be stored on the top level of the MatrixMIDFACE Graphic Case (306.601).

Note: For additional information, please refer to package insert.
For detailed cleaning and sterilization instructions, please refer to [http://www.synthes.com/cleaning-sterilization](http://www.synthes.com/cleaning-sterilization) or to the below listed inserts, which will be included in the shipping container:
- Processing Synthes Reusable Medical Devices - Instruments, Instrument Trays and Graphic Cases—DJ1305
- Processing Non-sterile Synthes Implants—DJ1304
References


Additional Reading
