KLS martin GROUP

A comprehensive Approach towards Orbital Trauma Reconstruction

www.klsmartin.com

Oral and maxillo-facial surgery is our passion! Its further development, together with our customers, is our ambition. Every day we work on developing innovative products and services which meet the highest demands on quality, and which contribute to the wellbeing of the patient.

Orbital Reconstruction

Orbital reconstruction is a persistent challenge for every CMF surgeon as it comes in a multitude of different forms. Usually it is impossible to accurately reposition every bony fragment, leading to impairment and compromised aesthetic and functional outcomes. Another key question is, which material is better for a given defect? Certainly, biodegradable implants have an advantage because they give a clear answer on the subject whether or not to remove metallic implants in the orbits.

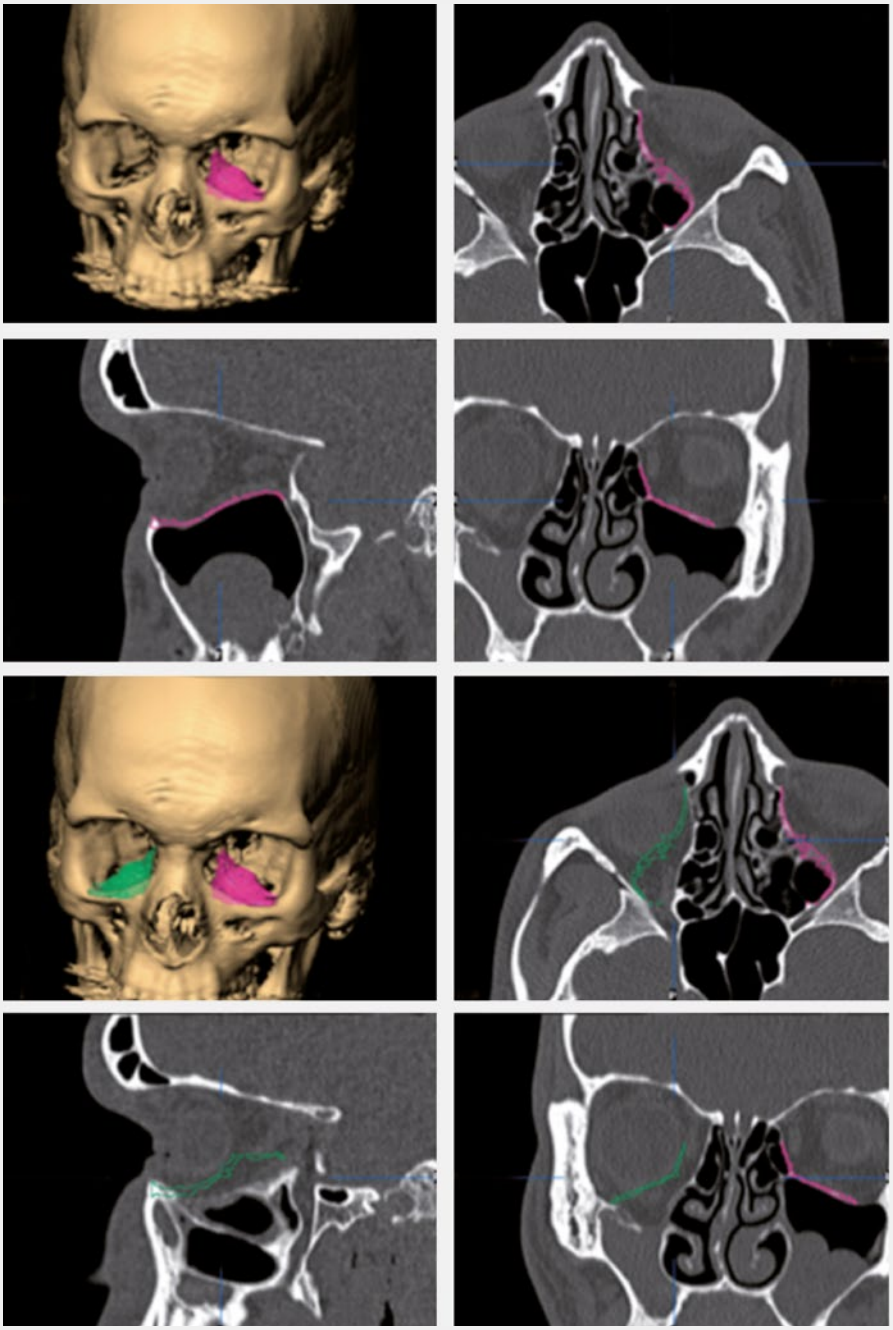
But do they maintain sufficient support for a stable and parallel position of the eye over time? On the other hand titanium as well as all further alloplastic materials also have their disadvantages: Bony overgrowth may result in virtual impossibility to remove the osteosynthesis material. Finetuning of many existing alloplastic implants may lead to sharp crests or edges, which could then lead to complications with the delicate soft tissue structures close by.

In cooperation with the trauma section of the Strasbourg Osteosynthesis Research Group (S.O.R.G.), KLS Martin was seeking for a comprehensive approach to the management of orbital trauma.

Based on the recognized classification of Jaquiéry et al. the trauma section has evaluated treatment principles according to size and extension of the fracture site. Additional instruments and tools are there to aid reconstruction in the operating room.

Case pictures

Today's imaging possibilities have increased surgeon's possibilities and patient's expectations considerably. The pictures show a large defect on patient's right side. Mirroring the intact left side (pink color) on the defective side (green color) shows the discrepancy between a symmetrical appearance and the existing fracture. The complex 3D-structure of the orbita floor is also clearly visible.

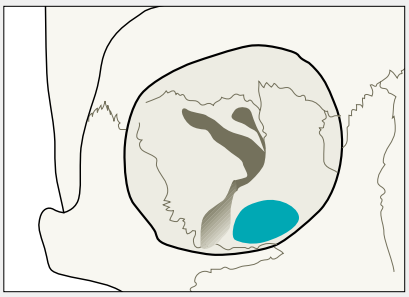


Case pictures courtesy of Prof. Jürgen Hoffmann, University Hospital Heidelberg

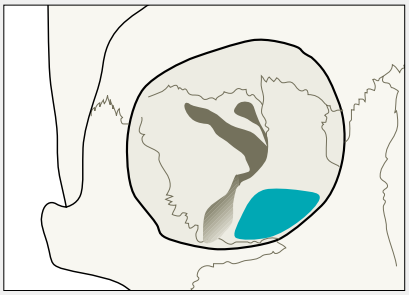
Classification of Orbital Trauma

Jaquiéry et al. differentiated between the following classes in orbital trauma:

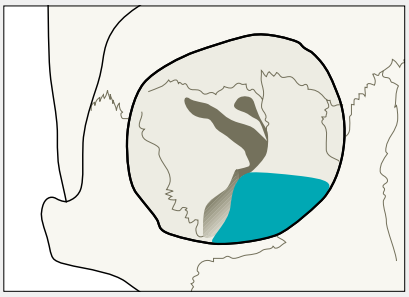
- **Class I** Small, isolated defects of the orbital floor or the medial orbital wall of approx. 1 – 2 cm^2.



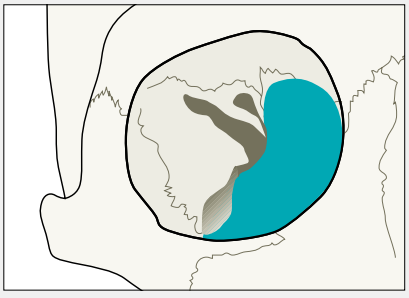
- **Class II** Defects of the orbital floor and/or the medial orbital wall > 2 cm^2. Bony structures of the medial wall of the infraorbital fissure are intact.



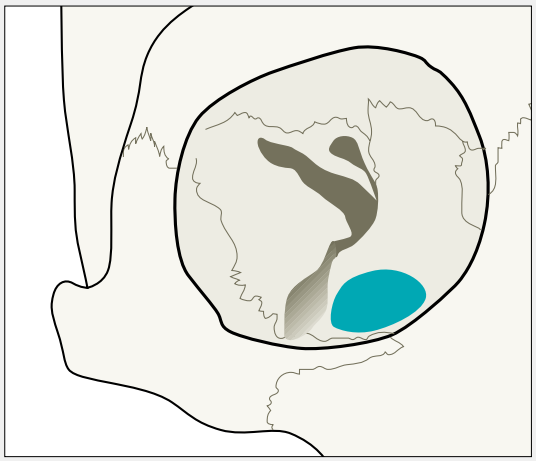
- **Class III** Defects of the orbital floor and/or the medial orbital wall > 2 cm^2, without bony structures of the infraorbital fissure.



- **Class IV** Defects of the whole orbital floor and the medial wall to the infraorbital fissure.



Source:
Jaquiéry, C., et al.,
Reconstruction of orbital wall defects: critical review of 72 patients.
Int J Oral Maxillofac Surg, 36(3), 2007, S. 193 –199



Class I Defects

- Small, isolated defects of the orbital floor or the medial orbital wall of approx. 1 – 2 cm^2.
- Defects of this size are the most frequent ones. They represent approx. 90% of all internal orbital trauma cases.
- As the bony support of the fracture site is still present, small biodegradable implants are usually the material of choice for reconstruction.
- Diplopia is usually not to be expected.
- The operation will usually be straight forward and should require minimal hardware involvement.

Biodegradable Solutions

1/1

Inferior support of the globe in cases with a small defect, round edge geometry, fixation is usually not required

52-306-17-04

Resorb x® foil 17 x 17 mm

= 0.1 mm

1/1

52-301-28-04

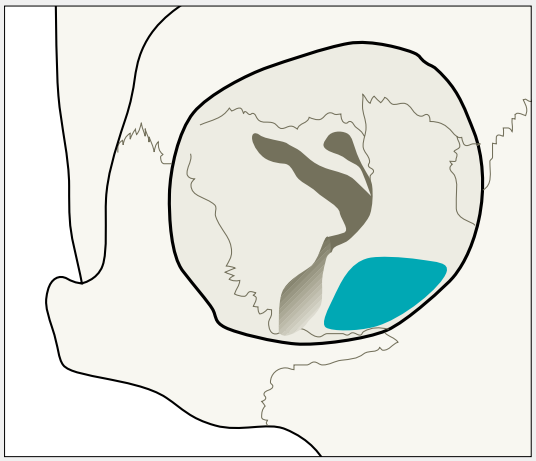
Membrane 25 x 25 mm

= 0.1 mm

52-301-38-04

Membrane 25 x 25 mm

= 0.1 mm



Class II Defects

- Defects of the orbital floor and/or the medial orbital wall > 2 cm². Bony structures of the medial wall of the infraorbital fissure are intact.
- For defects of this extension resorbable material is usually the method of choice as a bony support is still to be expected.
- Because of the larger extension and the sometimes already complexer forms the use of the Xcelsior waterbath should be considered.

Explanation of icons

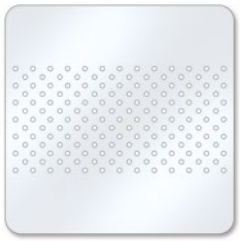
- Resorb x®
- 1 Units/pack
- Plate profile
- STERILE R Sterile packed implants

Biodegradable Solutions

1/1

52-306-23-04 x 1
Mesh for orbital floor
Ø = 23 mm
= 0.6 mm

52-306-19-04 x 1
Mesh
= 0.3 mm
Tip in order to protect the posterior optic nerve. Fixation by SonicPins Rx®



52-302-31-04 x 1
30 x 30 mm
= 0.2 mm
With more rounded tip to reduce risk to the optic nerve. Fixation by SonicPins Rx®

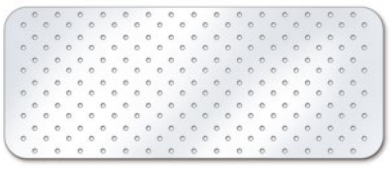
52-302-41-04 x 1
40 x 40 mm
= 0.2 mm
With more rounded tip to reduce risk to the optic nerve. Fixation by SonicPins Rx®

1/1

52-301-28-04 x 1
Membrane 25 x 25 mm
= 0.1 mm

52-301-38-04 x 1
Membrane 25 x 25 mm
= 0.1 mm

52-301-20-04 x 1
Membrane 50 x 20 mm
= 0.1 mm



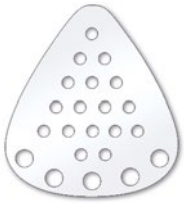
52-302-30-04 x 1
Membrane 50 x 20 mm
= 0.2 mm

Class III Defects

- Defects of the orbital floor and/or the medial orbital wall > 2 cm², with loss of the bony structures of the infraorbital fissure.
- This defect is certainly on the borderline between biodegradable (Resorb x®) and titanium reconstructions.
- Depending on the surgical technique and the access used, the surgeon will choose either resorbable or metal implant.
- Consequently, the KLS Martin product portfolio includes both kinds of products.

Biodegradable Solutions

1/1



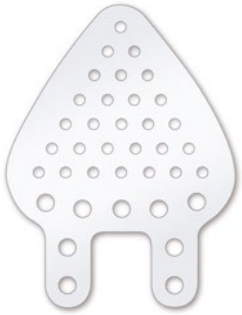
52-306-23-04 1

Mesh for orbital floor
Ø = 23 mm
= 0.6 mm

With reduced tip in order to protect the posterior optic nerve. Fixation by SonicPins Rx®

52-306-19-04 1

Mesh
= 0.3 mm



52-306-30-04 1

Mesh for orbital floor
Ø = 30 mm
= 0.6 mm

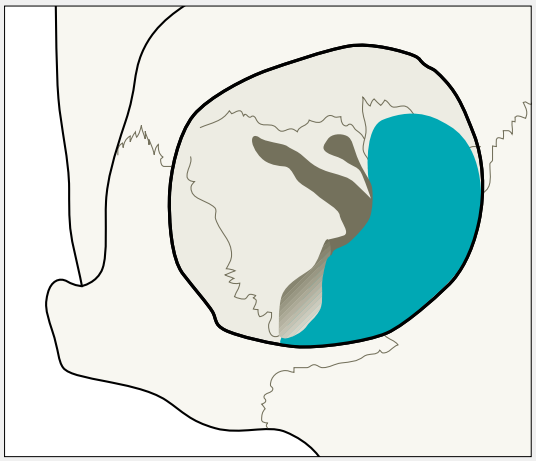
1/1

52-306-24-04 1

Mesh for orbital floor
Ø = 30 mm
= 0.6 mm

52-306-40-04 1

Mesh for orbital floor
40 x 40 mm
= 0.6 mm



Class IV Defects

- Defects of the whole orbita floor and the medial wall to the infraorbital fissure.
- Lazy-S-geometry requires accurate contouring.

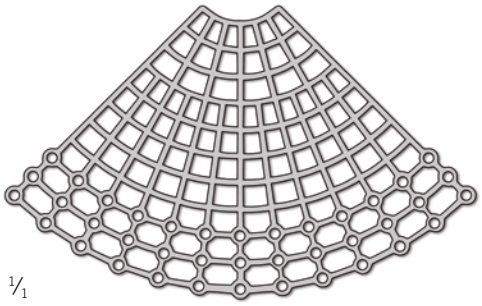
Class IV defects always show lack of bony support for any kind of implant. They may differ considerably in form and extension. Therefore only titanium implants are suggested. They should be easy to bend and cut, without leaving sharp edges, which could interfere with surrounding soft tissues.

Titanium Solutions – for Class III and Class IV Defects

Explanation of icons

- Resorb x®
- Titanium
- Units/pack
- Plate profile
- STERILE R Sterile packed implants

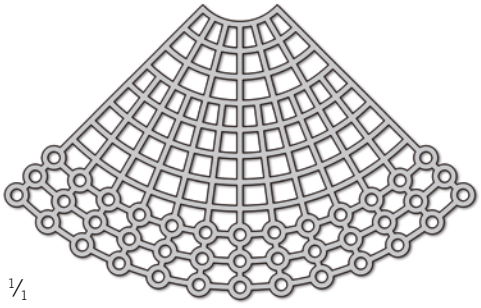
1.0 mm Micro System



1/1

25-043-06-09 Ti 1 = 0.2 mm
25-043-07-09 Ti 1 = 0.3 mm
Mesh for orbital floor, fan-shaped

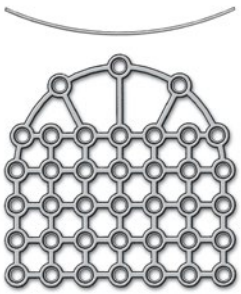
1.5 mm Micro System



1/1

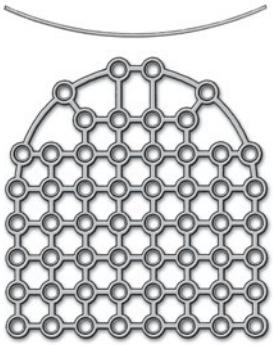
25-043-16-09 Ti 1 = 0.2 mm
25-043-17-09 Ti 1 = 0.3 mm
Mesh for orbital floor, fan-shaped

1.5 mm Micro System

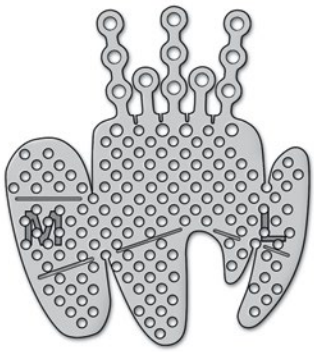


1/1

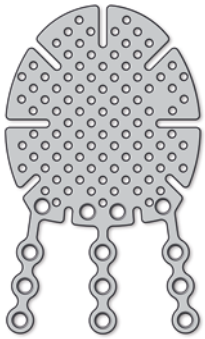
25-042-15-09 Ti 1 = 0.3 mm
25-042-15-71 Ti 1 = 0.3 mm
Mesh for orbital floor, contoured



25-042-16-09 Ti 1 = 0.3 mm
25-042-16-71 Ti 1 = 0.3 mm
Mesh for orbital floor, contoured



25-043-01-09 Ti 1 = 0.3 mm
25-043-01-71 Ti 1 = 0.3 mm
25-043-02-09 Ti 1 = 0.5 mm
25-043-02-71 Ti 1 = 0.5 mm
Mesh for orbital floor



25-043-09-09 Ti 1 = 0.3 mm
25-043-09-71 Ti 1 = 0.3 mm
Mesh for orbital floor

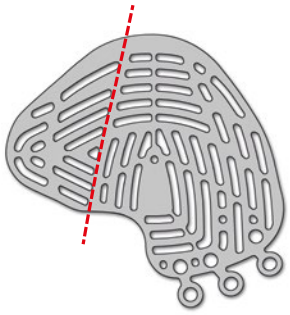
Orbital Groove Plate

25-044-04-09 Ti 1
25-044-04-71 Ti 1
Orbital plate, Groove,
non-preshaped, symmetrical
= 0.3 mm

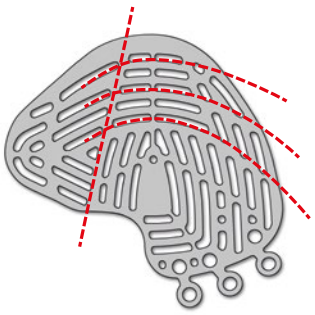
One implant with a lot of options!
While still easy to insert, the optimized “Groove Plate” offers a considerable support to the eye globe. Various cutting options allow you to start with a full size implant, then remove sections easily. Below you will find some of the possible modifications which correspond to variation of the orbital trauma encountered. The implant can be applied on both sides of the orbit. In cases with lacking bony support, the central medial bar can be seated posteriorly in order to additionally stabilize the position of the eye.

New Titanium Solutions for Class III and Class IV Defects

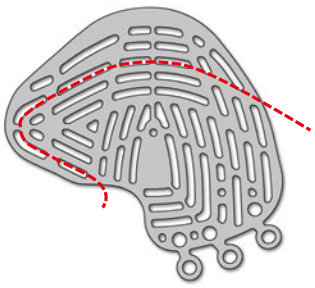
Standard Implants
Cutting Options



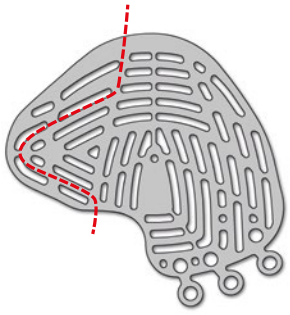
Complete reduction of the medial wing



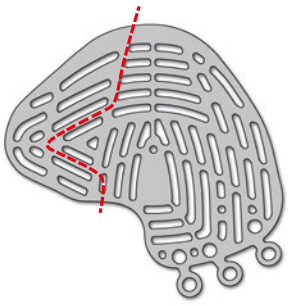
Cutting options of the posterior segment



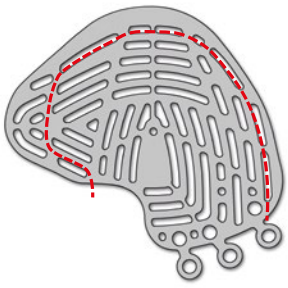
Partial cutting back of the medial wall and the posterior segment



Partial reduction of the medial wing



Partial reduction of the medial wing



Lateral, medial and posterior reduction

Smart Orbital Groove Plate

Explanation of icons

Ti Titanium

1 Units/pack

Plate profile

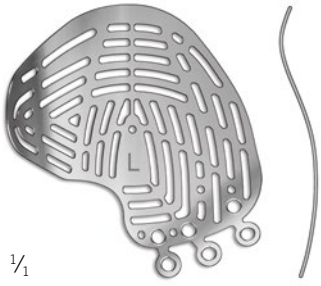
STERILE R Sterile packed implants

Smart Implants

In close colaboration with the University of Amsterdam KLS Martin has improved the first generation of preformed orbital floor plates with regard to the outline as well as the bending of the plates.
The shape of the new Smart Groove Plate was created using a compilation of 174 adult CT scans to develop the best possible “average” fit.

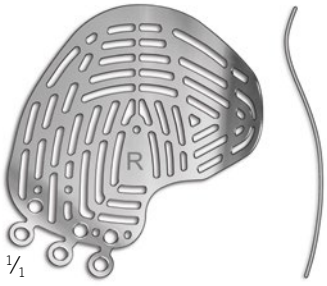
Smart Implants bear the name „Smart“ as they have a preformed shape based on a scientific background whereas conventional standard implants have a simple flat shape.

Page 10 also shows the cutting options for the „Smart Groove Plate“.



1/1

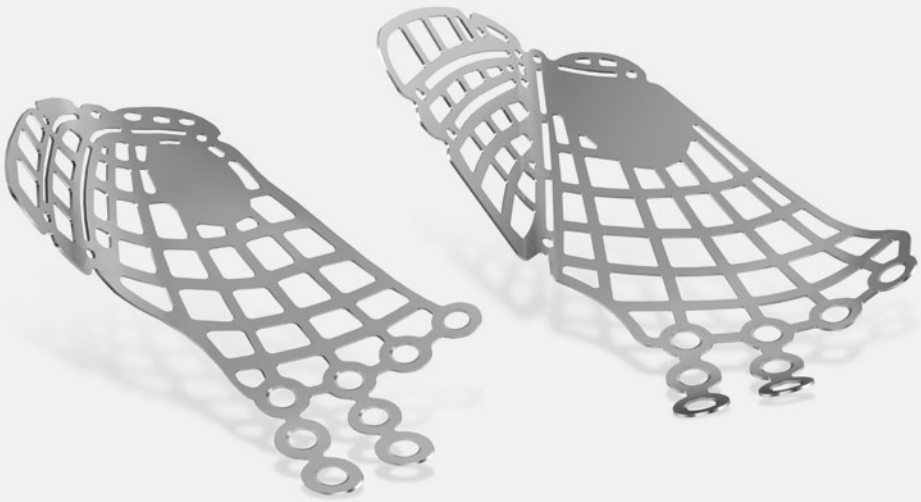
25-044-32-09 Ti 1
25-044-32-71 Ti 1
Smart Orbital Plate, Groove
3D-preshaped, for patient’s left side
= 0.4 mm



1/1

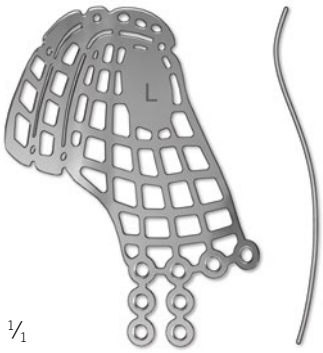
25-044-33-09 Ti 1
25-044-33-71 Ti 1
Smart Orbital Plate, Groove
3D-preshaped, for patient’s right side
= 0.4 mm

Smart Orbital Grid Plate



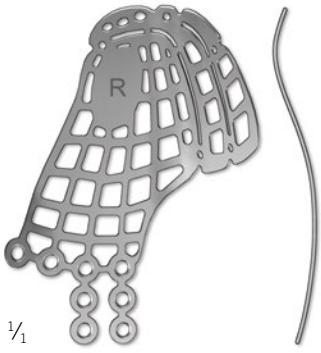
New Titanium Solutions for Class III and Class IV Defects

Smart Implants



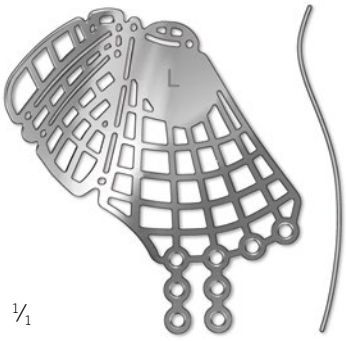
1/1

25-045-35-09 Ti 1
25-045-35-71 Ti 1
Smart Orbital Plate, Grid, size S
3D-preshaped, for patient's left side
= 0.5 mm



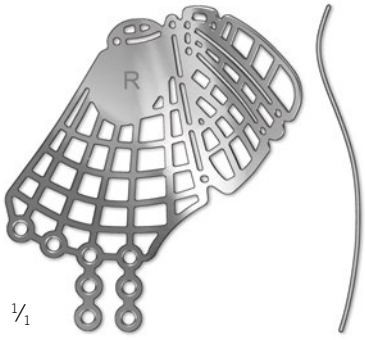
1/1

25-045-36-09 Ti 1
25-045-36-71 Ti 1
Smart Orbital Plate, Grid, size S
3D-preshaped, for patient's right side
= 0.5 mm



1/1

25-045-40-09 Ti 1
25-045-40-71 Ti 1
Smart Orbital Plate, Grid, size L
3D-preshaped, for patient's left side
= 0.5 mm



1/1

25-045-41-09 Ti 1
25-045-41-71 Ti 1
Smart Orbital Plate, Grid, size L
3D-preshaped, for patient's right side
= 0.5 mm

Orbital Rim Fractures

Explanation of icons

- Resorb x®
- Titanium
- Units/pack
- Plate profile
- STERILE R Sterile packed implants

Biodegradable Solutions

1/1

52-076-08-04 X 1
Orbita plate, 8-hole
= 1.0 mm

52-176-08-04 Al 1
Matching bending template

Titanium Solutions

1.0 mm Micro System

1/1

25-332-08-09 Ti 1
25-332-08-71 Ti 1
= 0.6 mm

1.5 mm Micro System

25-325-06-09 Ti 5
25-325-06-91 Ti 1
25-325-06-71 Ti 1
= 0.6 mm

25-325-08-09 Ti 5
25-325-08-91 Ti 1
25-325-08-71 Ti 1
= 0.6 mm

25-325-10-09 Ti 5
25-325-10-91 Ti 1
25-325-10-71 Ti 1
= 0.6 mm

2.0 mm Mini System

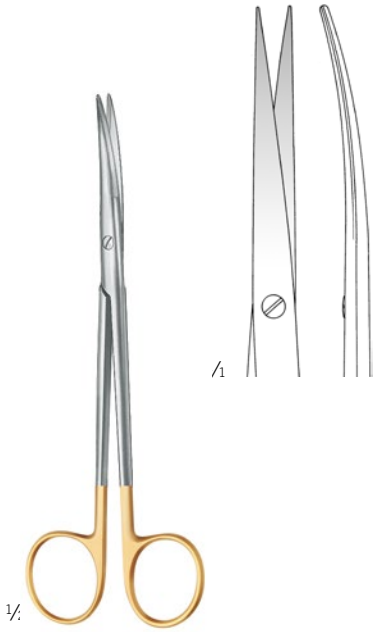
1/1

50-400-06-09 Ti 5
50-400-06-91 Ti 1
50-400-06-71 Ti 1
= 0.6 mm

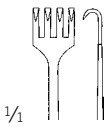
50-400-08-09 Ti 5
50-400-08-91 Ti 1
50-400-08-71 Ti 1
= 0.6 mm

50-405-12-09 Ti 1
50-405-12-71 Ti 1
= 0.7 mm

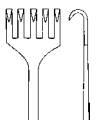
Instruments, Tools and Helpers



Metzenbaum-Lahey
11-965-14-07
14.5 cm / 5 6/8“
slender pattern
St 1 Set
TC GOLD

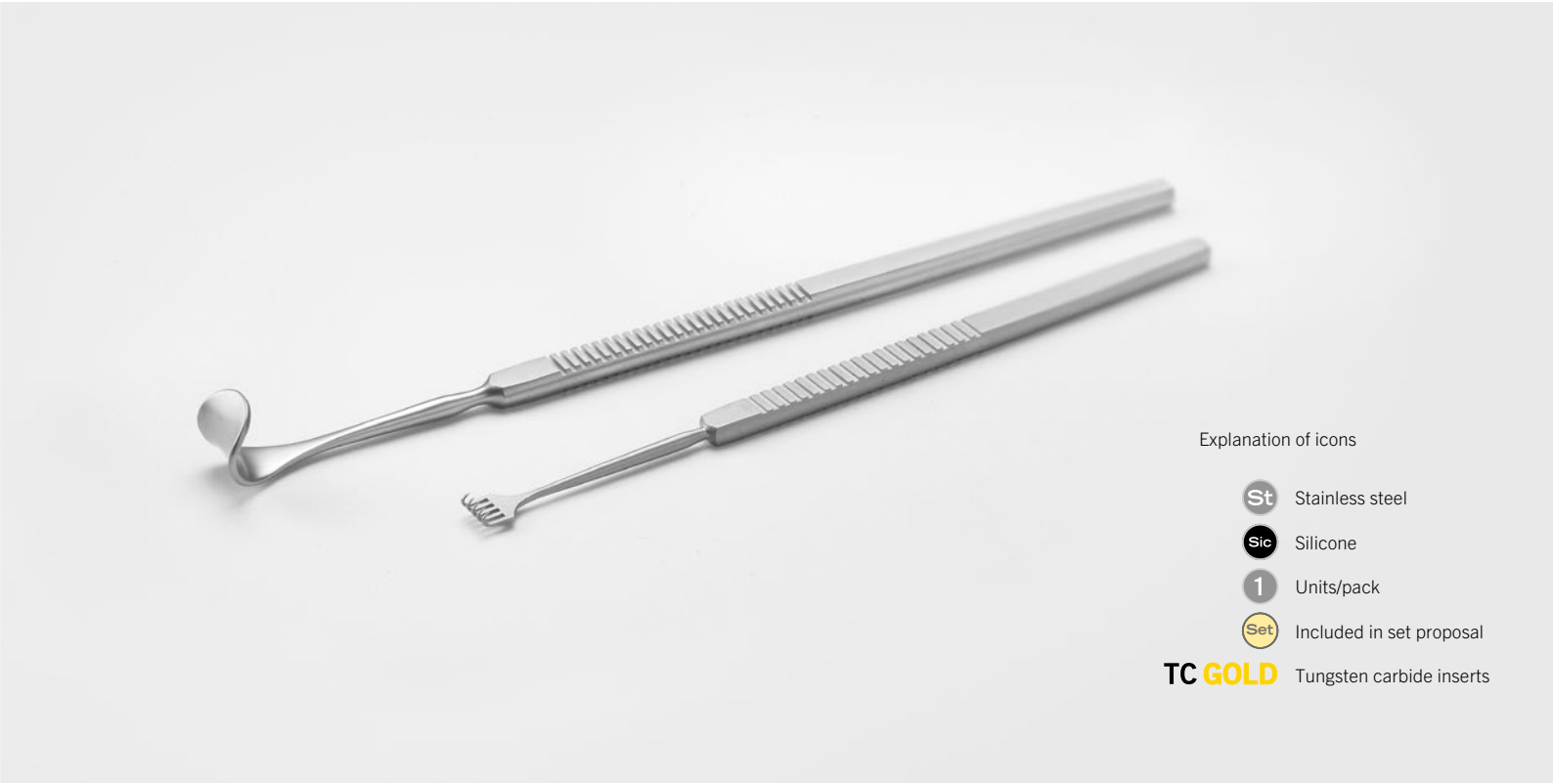


28-215-03-07



28-215-04-07
Set

Kaye
28-215-03-07 -
28-215-04-07
13 cm / 5 1/8“
St 1



Explanation of icons

St Stainless steel

Sic Silicone

1 Units/pack

Set Included in set proposal

TC GOLD Tungsten carbide inserts

½

Desmarres
15-091-08-07 -
15-091-18-07

16 cm / 6 2/8“

St 1

1/1

15-091-08-07
8 mm

15-091-10-07
10 mm

1/1

15-091-12-07
12 mm

15-091-14-07
14 mm

Set

1/1

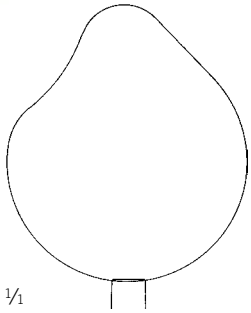
15-091-16-07
16 mm

15-091-18-07
18 mm

Instruments, Tools and Helpers

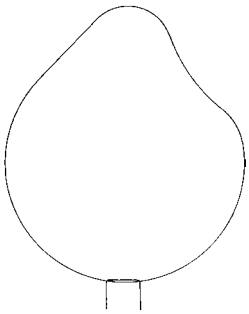
½

Rowe
38-691-01-07 -
38-691-02-07
19 cm / 7 4/8“
St 1



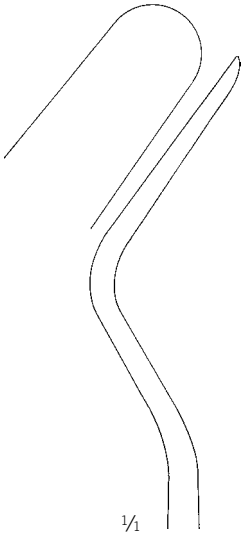
1/1

38-691-01-07
left



38-691-02-07
right

½

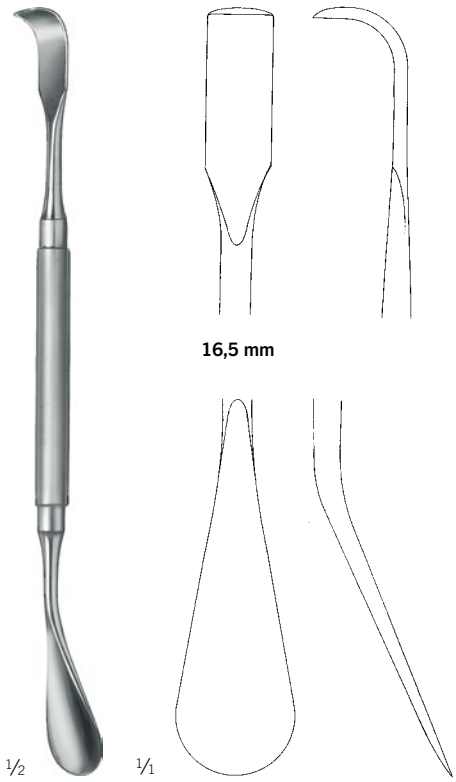


1/1

38-693-19-07
20 cm / 7 7/8“
St 1

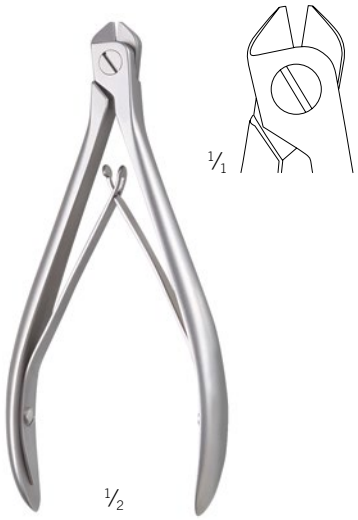
Explanation of icons

- St — Stainless steel
- Sic — Silicone
- 1 — Units/pack
- Set — Included in set proposal
- TC GOLD — Tungsten carbide inserts



Donovan
38-694-20-07
19.5 cm / 7 5/8“

St 1 Set



25-050-13-07
13 cm / 5 1/8“
Cutter

St 1 Set

25-052-13-07
12.5 cm / 4 7/8“
Mesh cutter

St 1 Set

Instruments, Tools and Helpers

½

Or alternatively:

Byrd
25-438-35-07

8 cm / 3 1/8“

Reduction screw for
big screwdriver handle

St 1 Set

½

Byrd
38-709-03-07

10 cm / 4“

Zygoma reduction screw

St 1 Set

½

25-407-04-04

12 cm / 4 6/8“

Screwdriver handle

St 1 Set

Explanation of icons

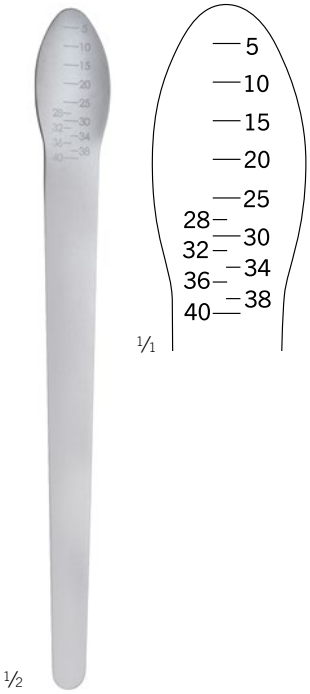
- St — Stainless steel
- Sic — Silicone
- 1 — Units/pack
- Set — Included in set proposal

38-697-01-07

20 cm / 7 7/8“

Spatula, orbital, straight, malleable, 2 different working ends

St 1 Set



38-697-02-07

18 cm / 7 1/8“

Spatula, orbital, straight, malleable

St 1 Set

38-695-21-07

20 cm / 7 7/8“

Left spatula, orbital, contoured, malleable, small and large working end

St 1

38-696-21-07

20 cm / 7 7/8“

Right spatula, orbital, contoured, malleable, small and large working end

St 1

Orbital Reconstruction Set

Suggestion for the Set Configuration

Description	Item No.	Qty:
Kaye Face-lift Hooklet, 13 cm / 5 1/8“, 5-pronged	28-215-04-07	1
Desmarres Saddle Hook, 12 mm, 16 cm / 6 2/8“	15-091-12-07	1
Desmarres Saddle Hook, 14 mm, 16 cm / 6 2/8“	15-091-14-07	1
Desmarres Saddle Hook, 16 mm, 16 cm / 6 2/8“	15-091-16-07	1
Metzenbaum-Lahey Dissecting Scissors	11-965-14-07	1
Donavan Orbital Rim Retractor, 19.5 cm/ 7 5/8“	38-694-20-07	1
Cutter, 13 cm / 5 1/8“	25-050-13-07	1
Mesh Cutter, 13 cm / 5 1/8“	25-052-13-07	1
Orbita Retractor, straight, malleable, 2 different working ends	38-697-01-07	2
Orbita Retractor, straight, malleable	38-697-02-07	1
Byrd Zygoma Reduction Screw	38-709-03-07	1

Storage

Storage Proposal

Description	Item No.	Qty
Storage Tray for miniSet Container 277 x 171 x 54 mm	55-804-15-01	1
Silicone Mat for miniSet Container	55-009-08-04	1
Microstop® miniSet Container 310 x 189 x 90 mm	55-861-51-04	1
Logistic Frame red for Container	55-864-12-04	1
Coding Label w/o hole for the Lid - to be marked “Orbita Trauma” -	55-864-01-04	1
Coding Label for the Front - to be marked “Orbita Trauma” -	55-864-05-04	1

In addition		
Storage Solution for 1.0 mm micro, 1.5 mm micro, 2.0 mm Mini and/or SonicWeld® Implants		

*according to components selected

- Jaquiéry, C., et al.,
  Reconstruction of orbital wall defects: critical review of 72 patients.
  Int J Oral Maxillofac Surg, 36(3), 2007, S. 193 –199

- Gear, A. J. L., et al.,
  Safety of titanium mesh for orbital reconstruction.
  Ann Plast Surg, 48(1), 2002, S. 1 – 9

- Kamer, L., et al.,
  Orbital form analysis: problems with design and positioning
  of precontoured orbital implants: a serial study using
  post-processed clinical CT data in unaffected orbits.
  Int J Oral Maxillofac Surg, 39(7), 2010, S. 666 – 672

- Lamecker, H., et al.,
  A method for the three-dimensional statistical shape analysis
  of the bony orbit.
  Proc Computer Aided Surgery Around the Head, 2007,
  S. 94 – 97

SonicWeld Rx®

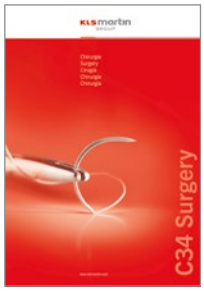
Individual Patient Solutions

Osteosynthesis 1.0 Micro

Osteosynthesis 1.5 Micro

Osteosynthesis 2.0 Mini

Sterile Technology
Sterilization Container- and Tray Systems



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