

## Reconstruction Plates



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### **Note:**

The surgical technique outlined below reflect the surgical procedure usually chosen by the clinical advisor. However, each surgeon must decide which surgical method and which approach is the most successful for his patient.

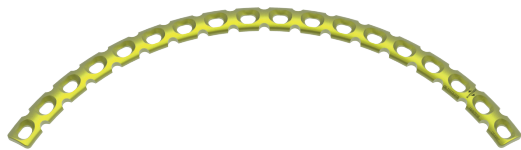
## ► Introduction

### Plates

Straight



Curved



#### Reconstruction Plate 3.5

- Indication: As a neutralization plate or tension band plate for: Pelvis, Acetabulum, distal Humerus, Clavicle and Calcaneus.
- Due to the notches on the plate side, the plate can be bent in all 3 dimensions.
- Allows angulation of the cortical screw to the longitudinal and to the transverse axis.

#### Note:

- It should be noted that the relatively low stiffness of the plate is further reduced by the bending.



#### Locking Reconstruction Plate 3.5

- Indication: As a neutralization plate or tension band plate for: Pelvis, Acetabulum, distal Humerus, Clavicle and Calcaneus.
- Due to the notches on the plate side, the plate can be bent in all 3 dimensions.
- Allows angulation of the cortical screw to the longitudinal and to the transverse axis.

#### Note:

- It should be noted that the relatively low stiffness of the plate is further reduced by the bending.



#### Reconstruction Plate 4.5

- Indication: Fixation of pelvis fractures.
- Due to the notches on the plate side, the plate can be bent in all 3 dimensions.
- Allows angulation of the cortical screw to the longitudinal and to the transverse axis.

#### Note:

- It should be noted that the relatively low stiffness of the plate is further reduced by the bending.

## ► Surgical Technique

### Introduction

The technique described below is applicable to the Marquardt Medizintechnik GmbH reconstruction plates. As an example, an locking reconstruction plate was chosen because it can accommodate both cortical and locking cortical screws.

### 1. Selection of the Plate

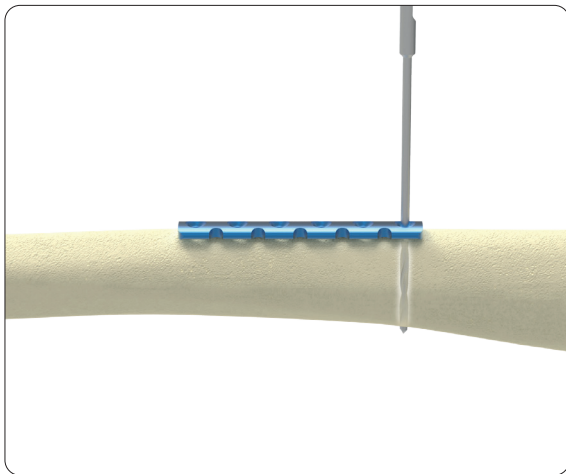
- The plates are available in various length.
- After performing the preoperative radiographic assessment, the appropriate plate length will be determined.

### 2. Determination of the Plate Shape

#### Instruments

REF 06.20110.034      *Bending Iron for Reconstruction Plates 3.5 and 4.5*

- The bending irons will be used to adjust the reconstruction plates to the anatomy of the bone.
- To bend the plate, place the bending irons on two adjacent plate holes to eliminate the deformation of the threaded holes.
- Significant deformation of the locking plate holes affects the stability of the locking plate system.
- Multiple bending of the plates reduces the stability of the implant and should be avoided.



### 3. Reposition and Plate Fixation

#### Instruments

REF 06.20010.025      Drill Bitt  $\varnothing$  2.5 mm

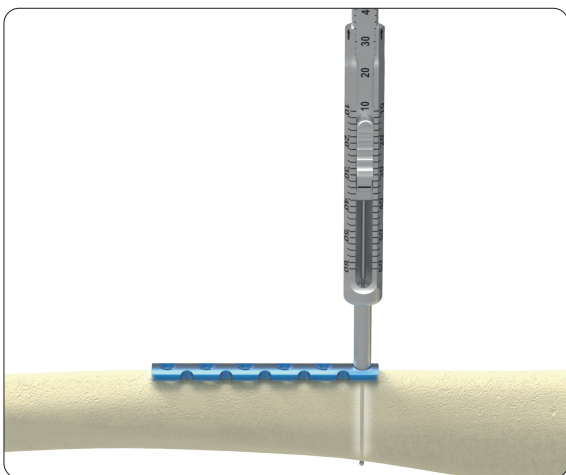
- The bone is closed or open repositioned.
- When repositioning, make sure that the correct anatomical position is restored in relation to length and axis.
- First, fix the plate to the bone with a non-locking cortical screw.
- The screw hole is pre-drilled with the drill bit.

#### Note:

#### Instruments

REF 03.20020.135      Tap  $\varnothing$  3.5 mm

If a non-self-tapping cortical screw is used, a thread must be cut into the hole with the appropriate tap.



#### Instruments

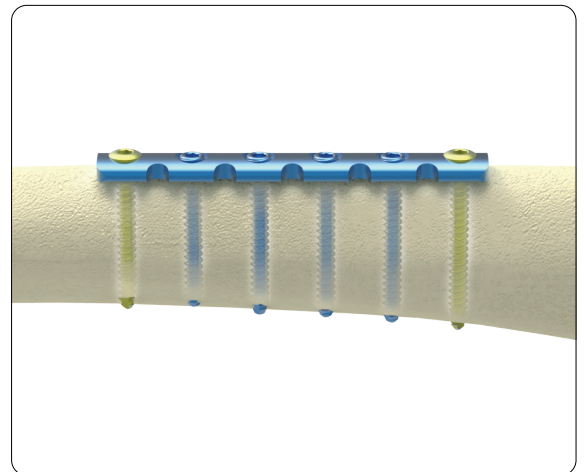
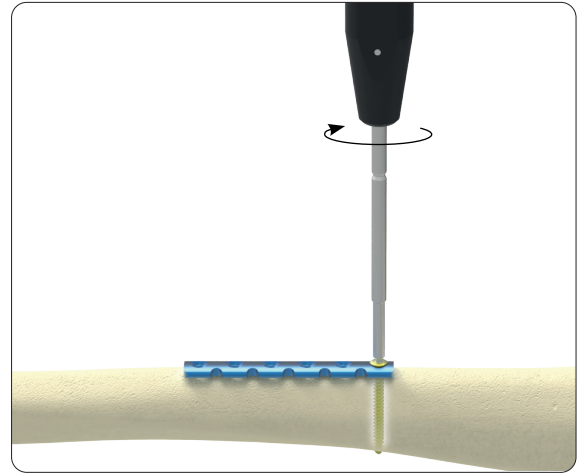
REF 06.20100.120      Depth Gauge, range up to 120mm

- The length measurement takes place with the help of the depth gauge.
- The hook of the depth gauge is hooked into the counter-cortex and the required screw length is read from the scale.
- Care should be taken that the screws pass through both cortical layers to achieve bicortical fixation.

## Instruments

REF 06.20040.025 Screwdriver, hex 2.5mm

- A screw of measured length is inserted with the screwdriver.
  - The length and position of the screw is checked under radiological control and corrected if necessary.
- 
- After all the plate holes have been fixed with screws, a final radiological check is performed, in which the plate position, the anatomical reduction of the fracture and the lengths of the screws are checked.



# Reconstruction Plates

## Product Informations

### Implants

#### Reconstruction Plate 3.5, straight

- Thickness: 3.1 mm
- Width: 10.0 mm
- Hole Distance: 12.0 mm



06.10103.003 - 06.10103.018



06.11103.003 - 06.11103.018

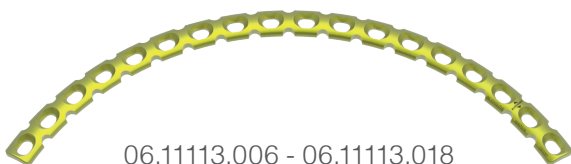
Article Number Stainless Steel	Article Number Titanium	Holes	Length
06.10103.003	06.11103.003	3	34 mm
06.10103.004	06.11103.004	4	46 mm
06.10103.005	06.11103.005	5	58 mm
06.10103.006	06.11103.006	6	70 mm
06.10103.007	06.11103.007	7	82 mm
06.10103.008	06.11103.008	8	94 mm
06.10103.009	06.11103.009	9	106 mm
06.10103.010	06.11103.010	10	118 mm
06.10103.011	06.11103.011	11	130 mm
06.10103.012	06.11103.012	12	142 mm
06.10103.013	06.11103.013	13	154 mm
06.10103.014	06.11103.014	14	166 mm
06.10103.015	06.11103.015	15	178 mm
06.10103.016	06.11103.016	16	190 mm
06.10103.018	06.11103.018	18	214 mm

#### Reconstruction Plate 3.5, curved

- Thickness: 3.1 mm
- Width: 10.0 mm
- Hole Distance: 12.0 mm



06.10113.006 - 06.10113.018



06.11113.006 - 06.11113.018

Article Number Stainless Steel	Article Number Titanium	Holes	Length
06.10113.006	06.11113.006	6	70 mm
06.10113.008	06.11113.008	8	94 mm
06.10113.010	06.11113.010	10	118 mm
06.10113.012	06.11113.012	12	142 mm
06.10113.014	06.11113.014	14	166 mm
06.10113.016	06.11113.016	16	190 mm
06.10113.018	06.11113.018	18	214 mm



Article Number * Titanium	Holes	Length
06.15103.003	3	34 mm
06.15103.004	4	46 mm
06.15103.005	5	58 mm
06.15103.006	6	70 mm
06.15103.007	7	82 mm
06.15103.008	8	94 mm
06.15103.009	9	106 mm
06.15103.010	10	118 mm
06.15103.011	11	130 mm
06.15103.012	12	142 mm
06.15103.013	13	154 mm
06.15103.014	14	166 mm
06.15103.015	15	178 mm
06.15103.016	16	190 mm
06.15103.018	18	214 mm

## Locking Reconstruction Plate 3.5, straight

- Thickness: 3.1 mm
- Width: 10.0 mm
- Hole Distance: 12.0 mm



Article Number Stainless Steel	Article Number Titanium	Holes	Length
06.10123.003	06.11123.003	3	45 mm
06.10123.004	06.11123.004	4	61 mm
06.10123.005	06.11123.005	5	77 mm
06.10123.006	06.11123.006	6	93 mm
06.10123.007	06.11123.007	7	109 mm
06.10123.008	06.11123.008	8	125 mm
06.10123.009	06.11123.009	9	141 mm
06.10123.010	06.11123.010	10	157 mm
06.10123.011	06.11123.011	11	173 mm
06.10123.012	06.11123.012	12	189 mm
06.10123.013	06.11123.013	13	205 mm
06.10123.014	06.11123.014	14	221 mm
06.10123.015	06.11123.015	15	237 mm
06.10123.016	06.11123.016	16	253 mm

## Reconstruction Plate 4.5, straight

- Thickness: 2.8 mm
- Width: 12.0 mm
- Hole Distance: 16.0 mm



06.10123.003 - 06.10123.016



06.11123.003 - 06.11123.016

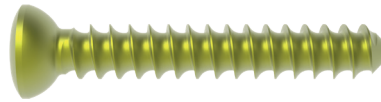
\* All implants are also available in sterile. Therefore, add suffix "S" to article number.

## Cortical Screw Ø 3.5 mm

- Screw Diameter: 3.5 mm
- Core Diameter: 2.4 mm
- Head Diameter: 6.0 mm
- Hexagon Socket: 2.5 mm



03.00612.010 - 03.00612.110



03.01612.010 - 03.01612.110

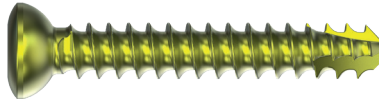
Article Number Stainless Steel	Length (mm)	Article Number Stainless Steel	Length (mm)	Article Number Titanium	Length (mm)	Article Number Titanium	Length (mm)
03.00612.010	10	03.00612.044	44	03.01612.010	10	03.01612.044	44
03.00612.012	12	03.00612.046	46	03.01612.012	12	03.01612.046	46
03.00612.014	14	03.00612.048	48	03.01612.014	14	03.01612.048	48
03.00612.016	16	03.00612.050	50	03.01612.016	16	03.01612.050	50
03.00612.018	18	03.00612.055	55	03.01612.018	18	03.01612.055	55
03.00612.020	20	03.00612.060	60	03.01612.020	20	03.01612.060	60
03.00612.022	22	03.00612.065	65	03.01612.022	22	03.01612.065	65
03.00612.024	24	03.00612.070	70	03.01612.024	24	03.01612.070	70
03.00612.026	26	03.00612.075	75	03.01612.026	26	03.01612.075	75
03.00612.028	28	03.00612.080	80	03.01612.028	28	03.01612.080	80
03.00612.030	30	03.00612.085	85	03.01612.030	30	03.01612.085	85
03.00612.032	32	03.00612.090	90	03.01612.032	32	03.01612.090	90
03.00612.034	34	03.00612.095	95	03.01612.034	34	03.01612.095	95
03.00612.036	36	03.00612.100	100	03.01612.036	36	03.01612.100	100
03.00612.038	38	03.00612.105	105	03.01612.038	38	03.01612.105	105
03.00612.040	40	03.00612.110	110	03.01612.040	40	03.01612.110	110
03.00612.042	42			03.01612.042	42		

## Cortical Screw Ø 3.5 mm, self-tapping

- Screw Diameter: 3.5 mm
- Core Diameter: 2.4 mm
- Head Diameter: 6.0 mm
- Hexagon Socket: 2.5 mm



03.02612.010 - 03.02612.110



03.03612.010 - 03.03612.110

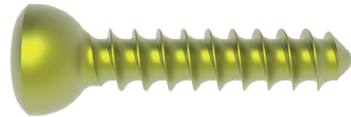
Article Number Stainless Steel	Length (mm)	Article Number Stainless Steel	Length (mm)	Article Number Titanium	Length (mm)	Article Number Titanium	Length (mm)
03.02612.010	10	03.02612.044	44	03.03612.010	10	03.03612.044	44
03.02612.012	12	03.02612.046	46	03.03612.012	12	03.03612.046	46
03.02612.014	14	03.02612.048	48	03.03612.014	14	03.03612.048	48
03.02612.016	16	03.02612.050	50	03.03612.016	16	03.03612.050	50
03.02612.018	18	03.02612.055	55	03.03612.018	18	03.03612.055	55
03.02612.020	20	03.02612.060	60	03.03612.020	20	03.03612.060	60
03.02612.022	22	03.02612.065	65	03.03612.022	22	03.03612.065	65
03.02612.024	24	03.02612.070	70	03.03612.024	24	03.03612.070	70
03.02612.026	26	03.02612.075	75	03.03612.026	26	03.03612.075	75
03.02612.028	28	03.02612.080	80	03.03612.028	28	03.03612.080	80
03.02612.030	30	03.02612.085	85	03.03612.030	30	03.03612.085	85
03.02612.032	32	03.02612.090	90	03.03612.032	32	03.03612.090	90
03.02612.034	34	03.02612.095	95	03.03612.034	34	03.03612.095	95
03.02612.036	36	03.02612.100	100	03.03612.036	36	03.03612.100	100
03.02612.038	38	03.02612.105	105	03.03612.038	38	03.03612.105	105
03.02612.040	40	03.02612.110	110	03.03612.040	40	03.03612.110	110
03.02612.042	42			03.03612.042	42		

## Cortical Screw Ø 4.5 mm

- Screw Diameter: 4.5 mm
- Core Diameter: 3.0 mm
- Head Diameter: 8.0 mm
- Hexagon Socket: 3.5 mm



04.00845.014 - 04.00845.140

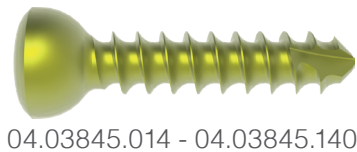


04.01845.014 - 04.01845.140

Article Number Stainless Steel	Length (mm)	Article Number Stainless Steel	Length (mm)	Article Number Titanium	Length (mm)	Article Number Titanium	Length (mm)
04.00845.014	14	04.00845.060	60	04.01845.014	14	04.01845.060	60
04.00845.016	16	04.00845.062	62	04.01845.016	16	04.01845.062	62
04.00845.018	18	04.00845.064	64	04.01845.018	18	04.01845.064	64
04.00845.020	20	04.00845.066	66	04.01845.020	20	04.01845.066	66
04.00845.022	22	04.00845.068	68	04.01845.022	22	04.01845.068	68
04.00845.024	24	04.00845.070	70	04.01845.024	24	04.01845.070	70
04.00845.026	26	04.00845.072	72	04.01845.026	26	04.01845.072	72
04.00845.028	28	04.00845.074	74	04.01845.028	28	04.01845.074	74
04.00845.030	30	04.00845.076	76	04.01845.030	30	04.01845.076	76
04.00845.032	32	04.00845.078	78	04.01845.032	32	04.01845.078	78
04.00845.034	34	04.00845.080	80	04.01845.034	34	04.01845.080	80
04.00845.036	36	04.00845.085	85	04.01845.036	36	04.01845.085	85
04.00845.038	38	04.00845.090	90	04.01845.038	38	04.01845.090	90
04.00845.040	40	04.00845.095	95	04.01845.040	40	04.01845.095	95
04.00845.042	42	04.00845.100	100	04.01845.042	42	04.01845.100	100
04.00845.044	44	04.00845.105	105	04.01845.044	44	04.01845.105	105
04.00845.046	46	04.00845.110	110	04.01845.046	46	04.01845.110	110
04.00845.048	48	04.00845.115	115	04.01845.048	48	04.01845.115	115
04.00845.050	50	04.00845.120	120	04.01845.050	50	04.01845.120	120
04.00845.052	52	04.00845.125	125	04.01845.052	52	04.01845.125	125
04.00845.054	54	04.00845.130	130	04.01845.054	54	04.01845.130	130
04.00845.056	56	04.00845.135	135	04.01845.056	56	04.01845.135	135
04.00845.058	58	04.00845.140	140	04.01845.058	58	04.01845.140	140

## Cortical Screw Ø 4.5 mm, self-tapping

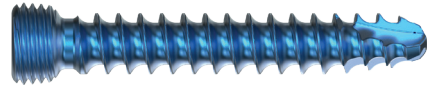
- Screw Diameter: 4.5 mm
- Core Diameter: 3.0 mm
- Head Diameter: 8.0 mm
- Hexagon Socket: 3.5 mm



Article Number Stainless Steel	Length (mm)	Article Number Stainless Steel	Length (mm)	Article Number Titanium	Length (mm)	Article Number Titanium	Length (mm)
04.02845.014	14	04.02845.060	60	04.03845.014	14	04.03845.060	60
04.02845.016	16	04.02845.062	62	04.03845.016	16	04.03845.062	62
04.02845.018	18	04.02845.064	64	04.03845.018	18	04.03845.064	64
04.02845.020	20	04.02845.066	66	04.03845.020	20	04.03845.066	66
04.02845.022	22	04.02845.068	68	04.03845.022	22	04.03845.068	68
04.02845.024	24	04.02845.070	70	04.03845.024	24	04.03845.070	70
04.02845.026	26	04.02845.072	72	04.03845.026	26	04.03845.072	72
04.02845.028	28	04.02845.074	74	04.03845.028	28	04.03845.074	74
04.02845.030	30	04.02845.076	76	04.03845.030	30	04.03845.076	76
04.02845.032	32	04.02845.078	78	04.03845.032	32	04.03845.078	78
04.02845.034	34	04.02845.080	80	04.03845.034	34	04.03845.080	80
04.02845.036	36	04.02845.085	85	04.03845.036	36	04.03845.085	85
04.02845.038	38	04.02845.090	90	04.03845.038	38	04.03845.090	90
04.02845.040	40	04.02845.095	95	04.03845.040	40	04.03845.095	95
04.02845.042	42	04.02845.100	100	04.03845.042	42	04.03845.100	100
04.02845.044	44	04.02845.105	105	04.03845.044	44	04.03845.105	105
04.02845.046	46	04.02845.110	110	04.03845.046	46	04.03845.110	110
04.02845.048	48	04.02845.115	115	04.03845.048	48	04.03845.115	115
04.02845.050	50	04.02845.120	120	04.03845.050	50	04.03845.120	120
04.02845.052	52	04.02845.125	125	04.03845.052	52	04.03845.125	125
04.02845.054	54	04.02845.130	130	04.03845.054	54	04.03845.130	130
04.02845.056	56	04.02845.135	135	04.03845.056	56	04.03845.135	135
04.02845.058	58	04.02845.140	140	04.03845.058	58	04.03845.140	140

## Locking Cortical Screw Ø 3.5 mm, self-tapping

- Screw Diameter: 3.5 mm
- Core Diameter: 2.4 mm
- Head Diameter: 4.7 mm
- Hexagon Socket: 2.5 mm



Article Number Titanium	Length (mm)	Article Number Titanium	Length (mm)
03.05612.010	10	03.05612.042	42
03.05612.012	12	03.05612.044	44
03.05612.014	14	03.05612.046	46
03.05612.016	16	03.05612.048	48
03.05612.018	18	03.05612.050	50
03.05612.020	20	03.05612.052	52
03.05612.022	22	03.05612.054	54
03.05612.024	24	03.05612.055	55
03.05612.026	26	03.05612.056	56
03.05612.028	28	03.05612.058	58
03.05612.030	30	03.05612.060	60
03.05612.032	32	03.05612.065	65
03.05612.034	34	03.05612.070	70
03.05612.036	36	03.05612.075	75
03.05612.038	38	03.05612.080	80
03.05612.040	40		

## Instruments

03.20010.135 Drill Bit  $\varnothing$  3.5mm, 2-flute, AO Coupling, L 195/165mm



04.20010.145 Drill Bit  $\varnothing$  4.5mm, 2-flute, AO Coupling, L 195/165mm



06.20010.025 Drill Bit  $\varnothing$  2.5mm, 3-flute, calibrated, AO Coupling, L 230/200mm



06.20010.032 Drill Bit  $\varnothing$  3.2mm, 3-flute, calibrated, AO Coupling, L 230/200mm



06.20010.045 Drill Bit  $\varnothing$  4.5mm, 3-flute, AO Coupling, L 195/165mm



03.20020.135 Tap  $\varnothing$  3.5mm, calibrated, AO Coupling, L 175/50mm



04.20020.145 Tap  $\varnothing$  4.5mm, calibrated, AO Coupling, L 175/140mm



06.20040.025 Screwdriver, hex 2.5mm, L 270/160mm



06.20040.035 Screwdriver, hex 3.5mm, L 300/190mm



06.20040.125 Screwdriver Shaft, hex 2.5mm, AO Coupling, L 165/135mm



06.20040.135 Screwdriver Shaft, hex 3.5mm, AO Coupling, L 165/135mm



03.20041.135 Holding Sleeve for Screws, Head diameter  $\varnothing$  6.0mm



04.20041.045 Holding Sleeve for Screws, Head diameter  $\varnothing$  8.0mm



06.20100.120 Depth Gauge for Screws, range up to 120mm



06.20110.040 Bending Pliers for Reconstruction Plates 2.7 and 3.5



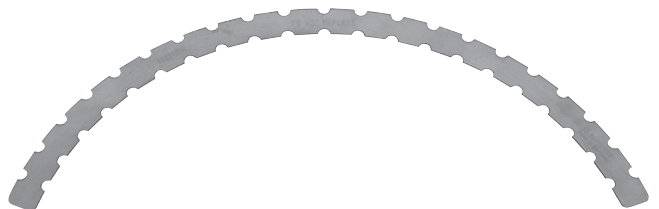
06.20110.034 Bending Iron for Reconstruction Plates 3.5 and 4.5



06.20110.035 Bending Template for Straight Reconstruction Plates 3.5



06.20110.135 Bending Template for Curved Reconstruction Plates 3.5



06.20110.045 Bending Template for Straight Reconstruction Plates 4.5



06.20050.045 Universal Chuck, T-Handle, cannulated



# Reconstruction Plates

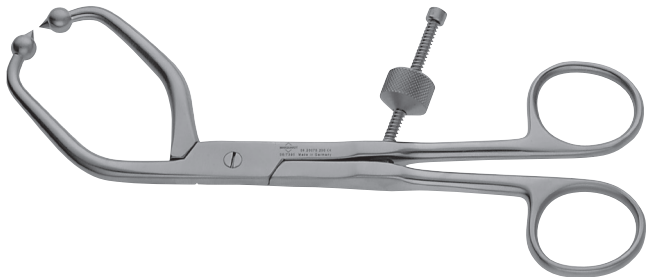
06.20070.190 Pelvic Reduction Forceps, small, L 190mm



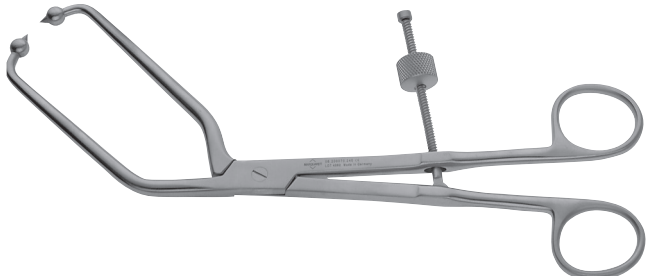
06.20070.260 Pelvic Reduction Forceps, medium, L 260mm



06.20070.200 Pelvic Reduction Forceps, angled, pointed ball tips, speed lock, L 200mm



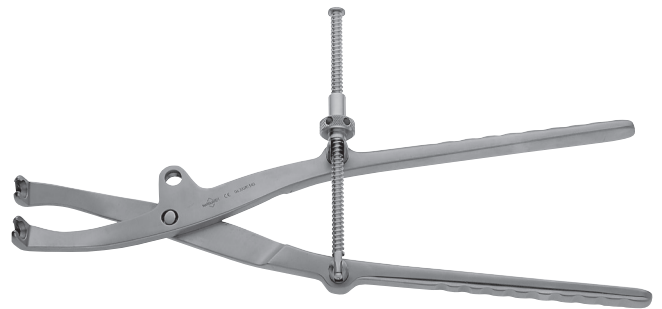
06.20070.240 Pelvic Reduction Forceps, angled, pointed ball tips, speed lock, L 250mm



06.20070.250 Pelvic Reduction Forceps, pointed ball tips, speed lock, L 250mm



06.20070.340 Pelvic Reduction Forceps, large, adjustable, speed lock, L 340mm



06.20070.400 Pelvic Reduction Forceps, long, pointed ball tips, speed lock, L 400mm



06.20070.410 Pelvic Reduction Forceps, long, three pointed ball tips, speed lock, L 400mm



06.20070.420 Pelvic Reduction Forceps, asymmetric, pointed ball tips, L 400mm





04.20070.133 Reduction Forceps, large, with Points, ratchet lock, L 200mm



06.20090.200 Bone Hook with T-Handle, sharp, large, L 200mm



06.20090.230 Bone Hook, sharp, medium, L 230mm



06.20090.270 Pelvic Retractor, blunt, L 270mm



06.20120.025 Spiked Disc, for Reduction Forceps



06.20120.300 Ball Spike, with pointed ball tip, L 300mm



06.00600.190 Schanz Screw  $\varnothing$  6.0mm, L 190mm





## MRI Safety Information

Non-clinical testing has demonstrated that the plates range from Marquardt Medizintechnik is MR Conditional in accordance with the ASTM F2503 standard definitions. A patient with this device can be safely scanned in an MR system meeting the following conditions:

- Cylindrical-bore
- Horizontal magnetic field ( $B_0$ )
- Spatial field gradient lower than or equal to
  - **1.5 T:** 23.45 T/m (2345 G/cm)
  - **3.0 T:** 11.75 T/m (1175 G/cm)
- Radiofrequency (RF) field exposure:
  - RF excitation: Circularly Polarized (CP)
  - RF transmit coil: whole-body transmit coil
  - RF receive coil type: whole-body receive coil
  - Maximum permitted whole-body averaged specific absorption rate (SAR): Normal Operating Mode, 2 W/kg.
  - Scan duration and wait time:
    - 1.5 T:** 2 W/kg whole-body average SAR for **8min and 15s** of continuous RF (a sequence or back-to-back series/scan without breaks) followed by a wait time of **8min and 15s** if this limit is reached.
    - 3.0 T:** 2 W/kg whole-body average SAR for **6min and 19s** of continuous RF (a sequence or back-to-back series/scan without breaks) followed by a wait time of **6min and 19s** if this limit is reached.
- The plates are expected to produce a maximum temperature rise of 8.5 °C at 1.5 T and 6.9 °C at 3 T both after the scanning periods presented above.
- The presence of this implant may produce an image artifact. Some manipulation of scan parameters may be needed to compensate for the artifact. In non-clinical testing, the image artifact caused by the device extends approximately 83 mm from the device edge when imaged with a spin echo pulse sequence and 65 mm with a gradient echo, both at 1.5 T.
- Patients with uncompromised thermoregulation and under uncontrolled conditions or patients with compromised thermoregulation (all persons with impaired systemic or reduced local thermoregulation) and under controlled conditions (a medical doctor or a dedicated trained person can respond instantly to heat induced physiological stress).

### Note:

Undergoing an MRI scan, there is a potential risk for patients with a metallic implant. The electromagnetic field created by an MRI scanner can interact with the metallic implant, resulting in displacement of the implant, heating of the tissue near the implant, or other undesirable effects.





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