Quadrilateral Surface Plates 3.5. Part of the Low Profile Pelvic System 3.5.

Surgical Technique

This publication is not intended for distribution in the USA.

Instruments and implants approved by the AO Foundation.

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Image intensifier control

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance

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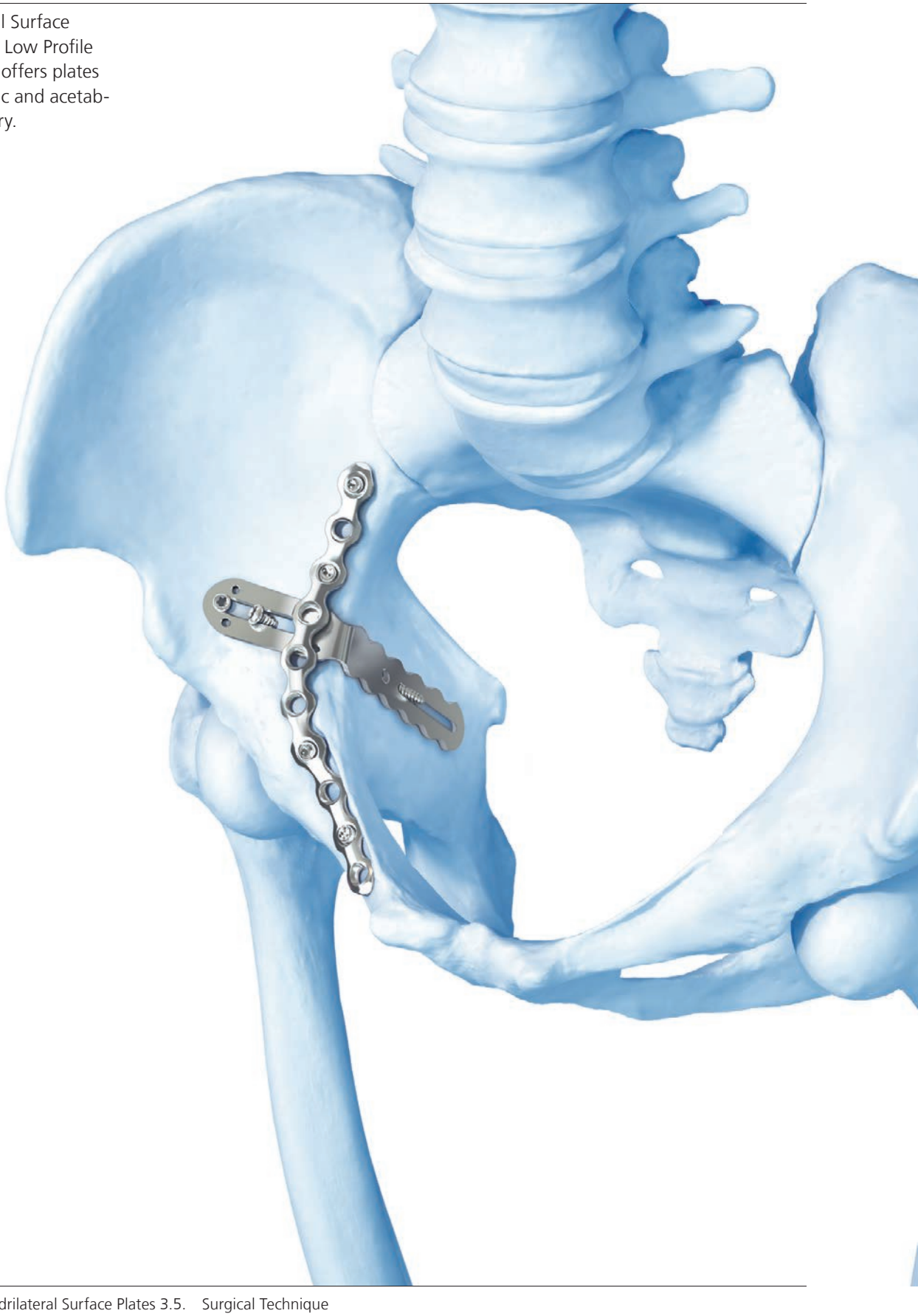
Quadrilateral Surface Plates 3.5.
Part of the Low Profile Pelvic System 3.5.

The Synthes Quadrilateral Surface Plates 3.5 are part of the Low Profile Pelvic System 3.5, which offers plates and instruments for pelvic and acetabular reconstructive surgery.



Features

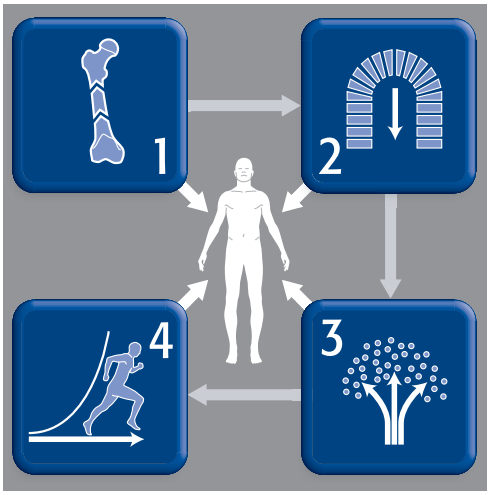
- 3 sizes: short, standard and long
- Reconstruction plate can be placed on the pelvic brim or the endopelvic surface
- Made of 316L stainless steel

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation[1,2].

Anatomic reduction
Fracture reduction and fixation to restore anatomical relationships.

Early, active mobilization
Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.



Stable fixation
Fracture fixation providing absolute or relative stability, as required by the patient, the injury, and the personality of the fracture.

Preservation of blood supply
Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.

[1] Müller ME, Allgöwer M, Schneider R, Willenegger H. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer. 1991.
[2] Rüedi TP, Buckley RE, Moran CG. AO Principles of Fracture Management. 2nd ed. Stuttgart, New York: Thieme. 2007.

Intended Use, Indications and Contraindications

Intended use
Pelvic implants are intended for temporary fixation, correction or stabilization of bones in the pelvis.

Indications
The Synthes Quadrilateral Surface Plates 3.5 are indicated for quadrilateral surface comminution associated with acetabular fractures when used in conjunction with Synthes Pelvic Reconstruction Plates.

Contraindications
No specific contraindications.

Preparation

Required sets	
01.100.002	Low Profile 3.5 Pelvic Implants with Screws in Graphic Case
01.100.003	Low Profile 3.5 Pelvic Reduction Instruments in Graphic Case
01.100.004	Low Profile 3.5 Pelvic Retractors in Graphic Case
01.100.013	Low Profile 3.5 Pelvic Instrument Set in Graphic Case

Note: Please refer to Pelvic Implants and Instruments technique guide DSEM/TRM/1214/0255 for further information.


01.100.002


01.100.003


01.100.004


01.100.013

Approach and fracture reduction

1
Approach

An ilioinguinal and/or a modified Stoppa approach is recommended.

2
Reduction

Instruments	
03.100.019	Ball Spike, straight, long, with pointed ball tips ∅ 6.5 mm, length 400 mm
294.680	Schanz Screw ∅ 6.0 mm, length 190/50 mm, Stainless Steel
398.740	Pelvic Reduction Forceps, small, length 190 mm, for use with Cortex Screws ∅ 3.5 and 4.5 mm
399.980	Reduction Forceps, large, with Points, ratchet lock, length 200 mm

Reduce the fracture.

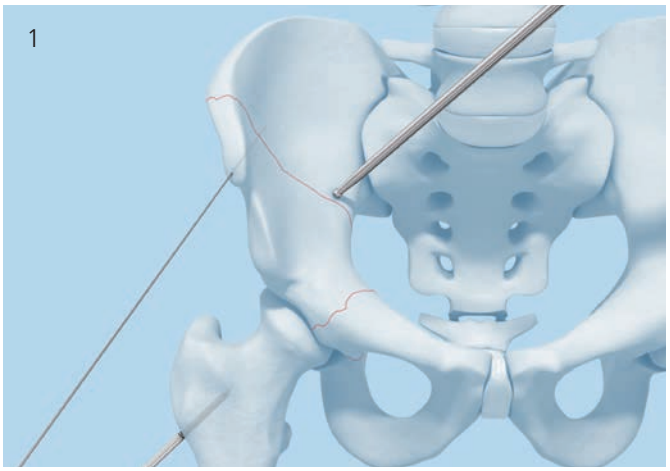
Insert a Schanz screw into the proximal femur to allow intraoperative manual traction.

Confirm anatomic reconstruction of the different fracture fragments. Fragments may be temporarily fixated with Kirschner wires. (1)

Different reduction instruments (e.g. ball spike, reduction forceps) may aid in achieving appropriate reduction. (1,2)

Note: For a detailed handling description of the Schanz screws, refer to the corresponding Surgical Technique (DSEM/TRM/0516/0677)

1



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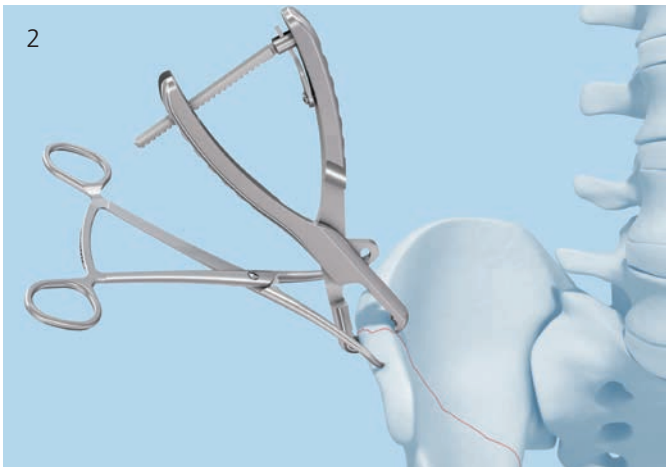


Fracture fixation

1
Temporarily affix plate

Instruments	
292.200.01	Kirschner Wire ∅ 2.0 mm with trocar tip, length 150 mm, Stainless Steel
329.080	Bending Iron for Reconstruction Plates 3.5 and 4.5, length 190 mm
Alternative instrument	
292.790.01	Kirschner Wire ∅ 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel

Position the quadrilateral surface plate 3.5 just posterior to the inferior iliac spine. If needed, use bending irons for intraoperative contouring.

Precaution: Reverse bending or use of the incorrect instrumentation for bending may weaken the plate and lead to premature plate failure (e.g. breakage). Do not bend the plate beyond what is required to match the anatomy.

Note: Make sure not to deform connecting screw slot and serrated teeth slot.

Temporarily affix the quadrilateral surface plate to the anterior column with two parallel Kirschner wire ∅ 2.0 mm through the Kirschner wire holes.

Note: Check plate position.

Fixation of Pelvic Reconstruction Plate

1
Position reconstruction plate

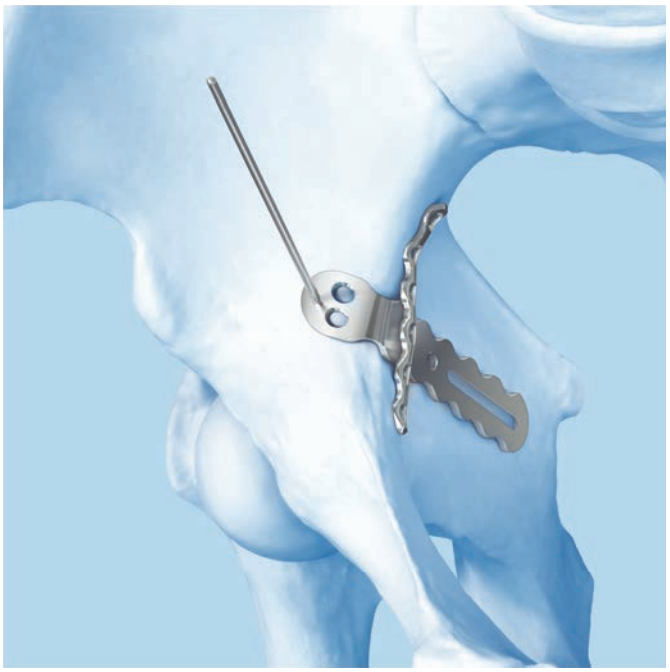
Instruments	
03.100.031	Bending Pliers for Reconstruction Plates 3.5
329.080	Bending Iron for Reconstruction Plates 3.5 and 4.5, length 190 mm (two required)

Position an appropriate length reconstruction plate along the pelvic brim, overlying the quadrilateral surface plate. Contour the reconstruction plate if needed.

Alternative plate placement
An appropriate length reconstruction plate can be contoured to the internal (endopelvic) surface. If choosing this option, the modified Stoppa or expanded ilioinguinal third window approach is necessary.

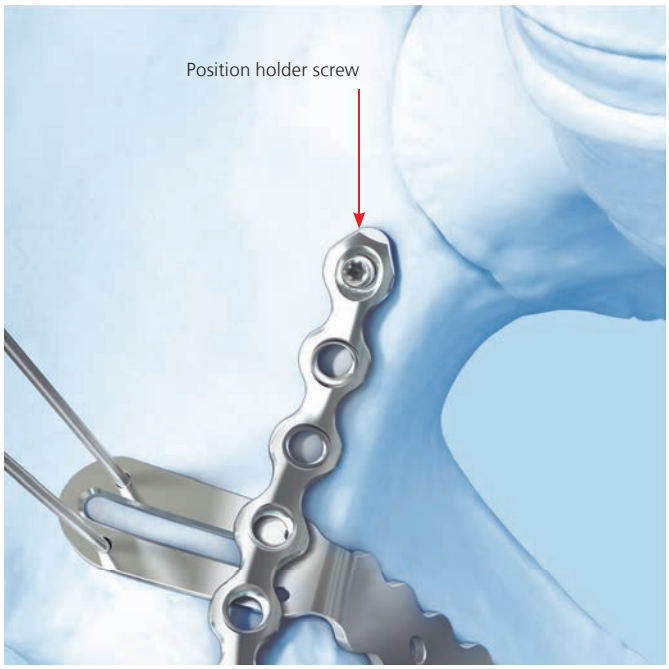
Note: When determining reconstruction plate length, the anterior column or brim plate should extend as far as the pubic tubercle.

Precaution: Reverse bending or use of the incorrect instrumentation for bending may weaken the plate and lead to premature plate failure (e.g. breakage). Do not bend the plate beyond what is required to match the anatomy.



2
Insert position holder screw

Instruments	
03.100.032	Ratcheting Handle with AO/ASIF Quick Coupling
03.100.033	Screwdriver Shaft, hexagonal, for Screws ∅ 3.5 mm, length 250 mm
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm
315.920	Drill Bit ∅ 2.5 mm, calibrated, length 230/205 mm, 3-flute, for Quick Coupling
Alternative instruments	
03.100.045	Screwdriver Shaft Stardrive 3.5, T15, length 250 mm, for AO/ASIF Quick Coupling
311.431*	Handle with Quick Coupling
314.090	Holding Sleeve, for Nos. 314.070, 314.550 and 314.570
319.091	Depth Gauge for Cortex Screws ∅ 3.5 mm, measuring range up to 150 mm



In the most posterior hole of the reconstruction plate, drill toward the sciatic buttress with a drill bit ∅ 2.5 mm. Measure and insert an appropriate length cortex or pelvic screw ∅ 3.5 mm. This “position holder” screw secures the plate to the bone, maintaining both the brim plate and the quadrilateral surface plate positions.

Note: Choice of instruments depends on selection of cortex screws ∅ 3.5 mm (hex or Stardrive recess).

Precaution: Check appropriate length and position of screw under image intensifier control.

Precaution: If the screw is too long it can lead to joint penetration.

* Also available

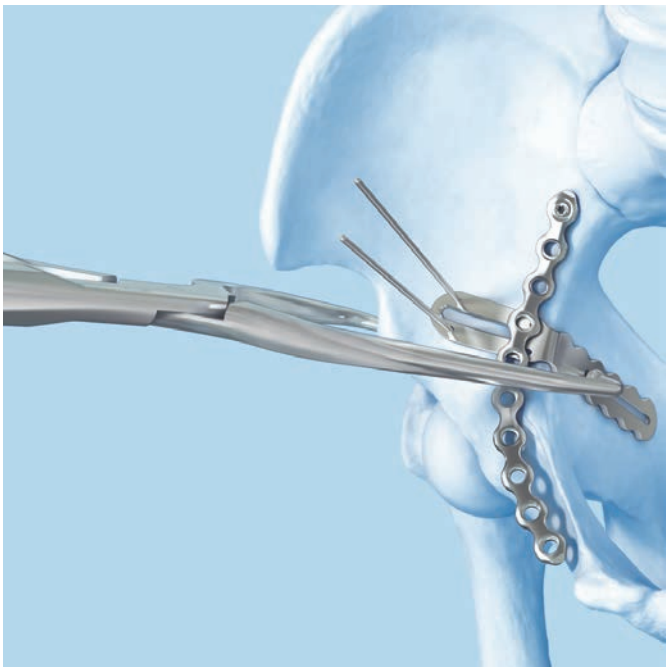
3
Secure quadrilateral surface plate

Instrument	
03.100.024	Pelvic Reduction Forceps, asymmetric, with pointed ball tips ∅ 6.5 mm

Use the asymmetric pelvic reduction forceps to assist the position holder screw in securing the quadrilateral surface plate to the pelvis.

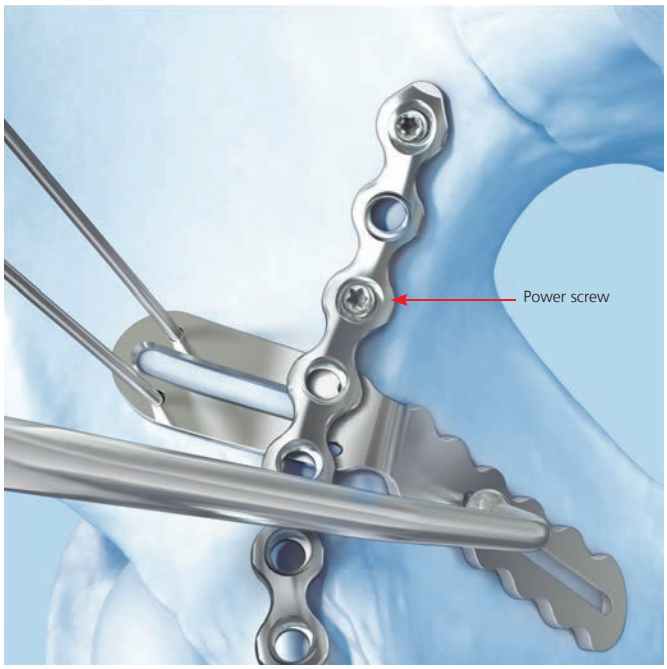
Note: Make sure the tip of the forceps is properly positioned in the serrated teeth slot.

Precautions:
- Instruments and screws may have sharp edges or moving joints that may pinch or tear user's glove or skin.
- Handle devices with care and dispose worn bone cutting instruments in an approved sharps container.



4
Insert power screw

Instruments	
03.100.032	Ratcheting Handle with AO/ASIF Quick Coupling
03.100.033	Screwdriver Shaft, hexagonal, for Screws ∅ 3.5 mm, length 250 mm
314.090	Holding Sleeve, for Nos. 314.070, 314.550 and 314.570
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm
315.920	Drill Bit ∅ 2.5 mm, calibrated, length 230/205 mm, 3-flute, for Quick Coupling
319.091	Depth Gauge for Cortex Screws ∅ 3.5 mm, measuring range up to 150 mm



Drill for a second cortex or pelvic screw ∅ 3.5 mm in the third posterior hole, using a drill bit ∅ 2.5 mm. Measure and insert an appropriate length screw. During insertion, be sure to angle the screw toward the first screw to engage the sciatic buttress. This "power" screw compresses the quadrilateral surface plate to the bone.

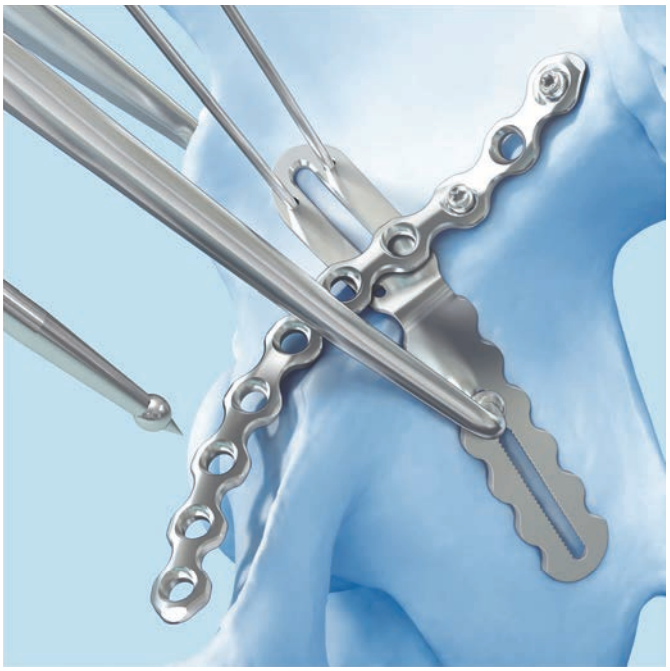
Note: Check the fit of the plate to the bone.

5
Contour reconstruction plate

Instrument	
03.100.018	Ball Spike, straight, with pointed ball tips ∅ 6.5 mm, length 300 mm
Alternative instruments	
03.100.019	Ball Spike, straight, long, with pointed ball tips ∅ 6.5 mm, length 400 mm
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm
399.270	Bone Lever, long narrow tip, width 18 mm, length 235 mm

The pelvic reconstruction plate may need additional in-situ contouring after the first two screws have been inserted. The straight ball spike can be used for this purpose. A bone lever or screwdriver can also be used to twist the plate slightly.

Note: The anterior column or brim plate should extend as far as the pubic tubercle.



6
Place anterior screws

Instruments	
03.100.032	Ratcheting Handle with AO/ASIF Quick Coupling
03.100.033	Screwdriver Shaft, hexagonal, for Screws ∅ 3.5 mm, length 250 mm
314.090	Holding Sleeve, for Nos. 314.070, 314.550 and 314.570
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm
315.920	Drill Bit ∅ 2.5 mm, calibrated, length 230/205 mm, 3-flute, for Quick Coupling
319.091	Depth Gauge for Cortex Screws ∅ 3.5 mm, measuring range up to 150 mm

Place screws anterior to the quadrilateral surface plate to complete the buttressing function of the pelvic reconstruction plate. Use a drill bit ∅ 2.5 mm to drill for the third cortex or pelvic screw ∅ 3.5 mm, through the ischium towards the ischial tuberosity. Measure and insert an appropriate length screw.

Skip a hole and use a drill bit ∅ 2.5 mm to drill for the final screw, through the pubic body. Measure and insert an appropriate length screw.

Fixation of Quadrilateral Surface Plate 3.5

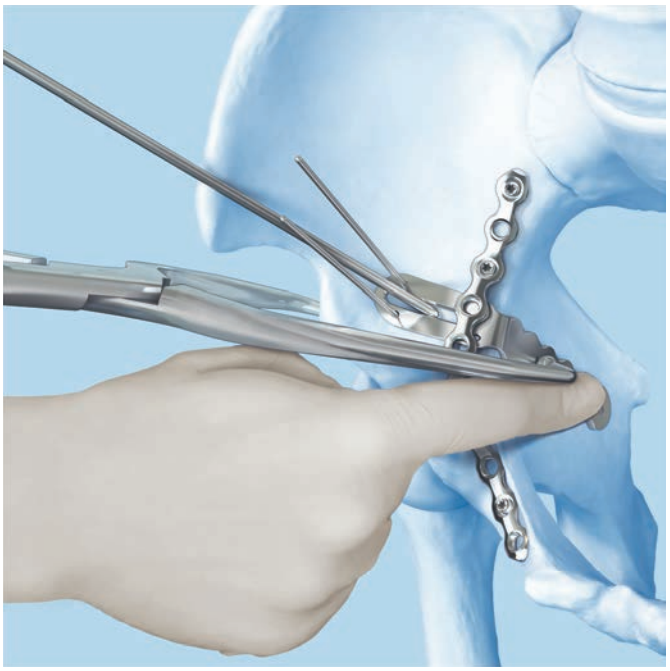
1
Drill gliding hole

Instrument	
310.370	Drill Bit ∅ 3.5 mm, length 195/170 mm, 2-flute, for Quick Coupling

Predrill a 3.5 mm gliding hole through the screw slot of the quadrilateral surface plate at the third window, between the two Kirschner wires.

Aim the drill bit toward the serrated teeth slot of the plate that lies on the quadrilateral surface.

Precaution: Alternatively, drill and carefully palpate with index finger. Remove the finger when the bulge is felt as the drill starts to penetrate the second cortex.



2
Insert connecting screw

Instruments	
03.100.032	Ratcheting Handle with AO/ASIF Quick Coupling
03.100.033	Screwdriver Shaft, hexagonal, for Screws ∅ 3.5 mm, length 250 mm
314.090	Holding Sleeve, for Nos. 314.070, 314.550 and 314.570
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm
315.920	Drill Bit ∅ 2.5 mm, calibrated, length 230/205 mm, 3-flute, for Quick Coupling
319.091	Depth Gauge for Cortex Screws ∅ 3.5 mm, measuring range up to 150 mm

Measure and insert an appropriate length cortex or pelvic screw ∅ 3.5 mm.

Precaution: The screw should be 2 mm longer than the actual length measured to ensure the screw engages the serrated teeth of the plate. If the screw is not long enough, it will not serve its function.

3
Insert a second screw

Instruments	
03.100.032	Ratcheting Handle with AO/ASIF Quick Coupling
03.100.033	Screwdriver Shaft, hexagonal, for Screws ∅ 3.5 mm, length 250 mm
314.090	Holding Sleeve, for Nos. 314.070, 314.550 and 314.570
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm
315.920	Drill Bit ∅ 2.5 mm, calibrated, length 230/205 mm, 3-flute, for Quick Coupling
319.091	Depth Gauge for Cortex Screws ∅ 3.5 mm, measuring range up to 150 mm

Drill with a drill bit ∅ 2.5 mm through the end of the slot for a second screw. This screw should be angled laterally. Measure and insert an appropriate length cortex or pelvic screw ∅ 3.5 mm.

Before tightening this screw, complete final tightening of the pelvic brim plate screws.

Remove the pelvic reduction forceps and Kirschner wires.

Optional
If needed, an additional cortex or pelvic screw ∅ 3.5 mm can be inserted through the screw hole above the serrated teeth on the quadrilateral surface.

Implant Removal

Unlock all screws from the plate, then remove the screws completely from the bone. This prevents simultaneous rotation of the plate when unlocking the last locking screw.

For details regarding implant removal refer to the Surgical Technique “Screw Extraction Set” DSEM/TRM/0614/0104.

Plates

Quadrilateral Surface Plates 3.5

02.100.325S Standard, sterile

02.100.326S Long, sterile

02.100.327S Short, sterile

Screws

02.200.010 – 02.200.150	Cortex Screw Stardrive ∅ 3.5 mm, self-tapping, length 10 – 150 mm,* Stainless Steel	
204.630 – 204.750	Pelvic Cortex Screw ∅ 3.5 mm, self-tapping, head height 2.75 mm, length 30 – 150 mm,* Stainless Steel	
204.810 – 204.838	Cortex Screw ∅ 3.5 mm, selftapping, length 10 – 38 mm,* Stainless Steel	
213.010 – 213.095	Locking Screw ∅ 3.5 mm, selftapping, length 10 – 95 mm,* Stainless Steel	
02.200.003	Threaded Pin Stardrive ∅ 3.5 mm,* Stainless Steel	
294.680	Schanz Screw ∅ 6.0 mm, length 190/50 mm, Stainless Steel	

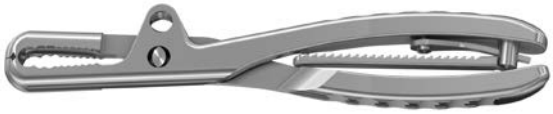
Locking Screw Stardrive ∅ 3.5 mm, self-tapping*
– Stainless steel

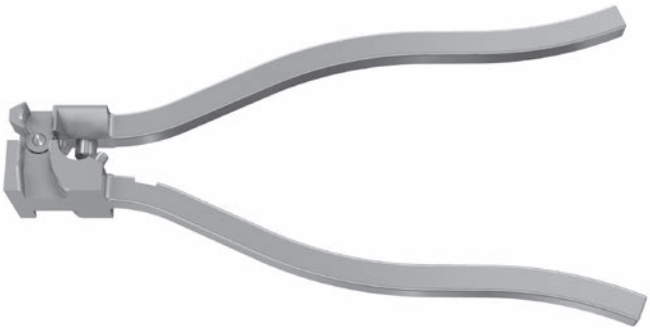
Art. No.	Length (mm)
212.101	10
212.102	12
212.103	14
212.104	16
212.105	18
212.106	20
212.107	22
212.108	24
212.109	26
212.110	28
212.111	30
212.112	32
212.113	34
212.115	36

Art. No.	Length (mm)
212.116	38
212.117	40
212.119	45
212.121	50
212.123	55
212.124	60
212.125	65
212.126	70
212.127	75
212.128	80
212.129	85
212.130	90
212.131	95

* All implants are available sterile packed. For sterile implants add suffix "S" to article number.

Selected Instruments

03.100.018	Ball Spike, straight, with pointed ball tips ∅ 6.5 mm, length 300 mm	
03.100.019	Ball Spike, straight, long, with pointed ball tips ∅ 6.5 mm, length 400 mm	
03.100.024	Pelvic Reduction Forceps, asymmetric, with pointed ball tips ∅ 6.5 mm	
398.740	Pelvic Reduction Forceps, small, length 190 mm, for use with Cortex Screws ∅ 3.5 and 4.5 mm	
399.980	Reduction Forceps, large, with Points, ratchet lock, length 200 mm	
03.100.032	Ratcheting Handle with AO/ASIF Quick Coupling	
311.431	Handle with Quick Coupling	
03.100.033	Screwdriver Shaft, hexagonal, for Screws ∅ 3.5 mm, length 250 mm	
292.200.01	Kirschner Wire ∅ 2.0 mm with trocar tip, length 150 mm, Stainless Steel	
292.790.01	Kirschner Wire 2.0 mm with threaded tip, length 150/15 mm, Stainless Steel	
310.370	Drill Bit ∅ 3.5 mm, length 195/170 mm, 2-flute, for Quick Coupling	

314.090	Holding Sleeve, for Nos. 314.070, 314.550 and 314.570	
314.570	Screwdriver, hexagonal, small, ∅ 2.5 mm, length 270 mm	
315.920	Drill Bit ∅ 2.5 mm, calibrated, length 230/205 mm, 3-flute, for Quick Coupling	
319.091	Depth Gauge for Cortex Screws ∅ 3.5 mm, measuring range up to 150 mm	
329.080	Bending Iron for Reconstruction Plates 3.5 and 4.5, length 190 mm	
03.100.031	Bending Pliers for Reconstruction Plates 3.5	
399.270	Bone Lever, long narrow tip, width 18 mm, length 235 mm	

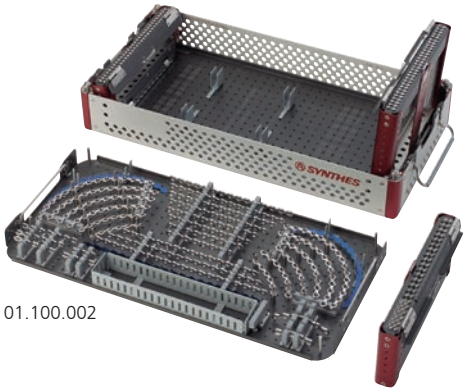
Set Information

Implants

02.100.325S	Quadrilateral Surface Plate, standard, sterile
02.100.326S	Quadrilateral Surface Plate, long, sterile
02.100.327S	Quadrilateral Surface Plate, short, sterile

Sets

01.100.002	Low Profile 3.5 Pelvic Implants with Screws in Graphic Case
01.100.003	Low Profile 3.5 Pelvic Reduction Instruments in Graphic Case
01.100.004	Low Profile 3.5 Pelvic Retractors in Graphic Case
01.100.013	Low Profile 3.5 Pelvic Instrument Set in Graphic Case



01.100.002

01.100.003

01.100.004

01.100.013

Also Available

Sets

01.100.022	Low Profile 3.5 Reconstruction Plate Set with wide Angle, for Graphic Case Nos. 690.912 and 690.913
01.100.032	Low Profile 3.5 Reconstruction J-Plate Set, for Graphic Case Nos. 690.912 and 690.913
01.100.042	Low Profile 3.5 Reconstruction Plate Set with coaxial Combi Holes, for Graphic Case Nos. 690.912 and 690.913
01.100.132	Low Profile 3.5 Screw Set Stardrive, for Graphic Case Nos. 690.912 and 690.913

Lids and Graphic Cases

690.429	Lid for Low Profile 3.5 Pelvic System, for Graphic Case
690.911	Graphic Case for 1 Insert, without Contents
690.912	Graphic Case for 2 Inserts, without Contents
690.913	Graphic Case for 3 Inserts, without Contents

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F2119-07

Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F2182-11a

Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils [whole body averaged specific absorption rate (SAR) of 2 W/kg for 6 minutes (1.5 T) and for 15 minutes (3 T)].

Precautions: The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:

- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermoregulation or temperature sensation should be excluded from MR scanning procedures.
- Generally, it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.

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