ITS.

Implants for Trauma Surgery

SURGICAL TECHNIQUE

Pelvic Reconstruction System PHOENIX

ITS.
Implants for Trauma Surgery

The Art of Trauma Surgery is a collaborative project between ITS. and Austrian artist Oskar Stocker that celebrates the skill, perseverance, and artistry of engineers and surgeons who work tirelessly to improve outcomes for trauma patients.

At ITS., we stand for long-term, trusting relationships with our customers, suppliers, and development partners. Through our devotion to innovation and development, we continuously seek to improve and optimize products and techniques in the field of traumatology.

We believe that the success of our mission lies in the combination of the technical expertise, compassion, and dedication of surgeons and engineers to help patients regain their health and well-being. Join us in celebrating these remarkable individuals and *The Art of Trauma Surgery*!

About the Artist

The Austrian artist Oskar Stocker (b. 1956) lives and works in Graz, Austria. He has become known internationally through the exhibition Facing Nations, which consists of portraits of more than 120 people of various nationalities living in Graz; it was shown first in Graz itself, then in Vienna, and later culminated in 2010 with its display at the UN Headquarters in New York City.

In addition to the portraits of individual people, he devotes himself to the depiction of landscapes and objects, down to the smallest detail.

Caution: Federal Law (USA) restricts this device to sale by or on the order of a board certified physician.
Warning: If there is no sufficient bone healing, wrong or incomplete postoperative care, plate might break.

All ITS plates are preformed anatomically as a matter of principle. If adjustment of the plate to the shape of the bone is required, this is possible by carefully bending gently in one direction once. Particular care is required when bending in the region of a plate hole, as deformation of the plate may lead to a failure of the locking mechanism. The plate must not be buckled or bent several times. This is particularly important in the case of titanium implants, to prevent material fatigue and subsequent failure. The method of bending is the conscious responsibility of the operating doctor; I.T.S. GmbH can accept no liability whatsoever for this.

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Susanna
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Figaro
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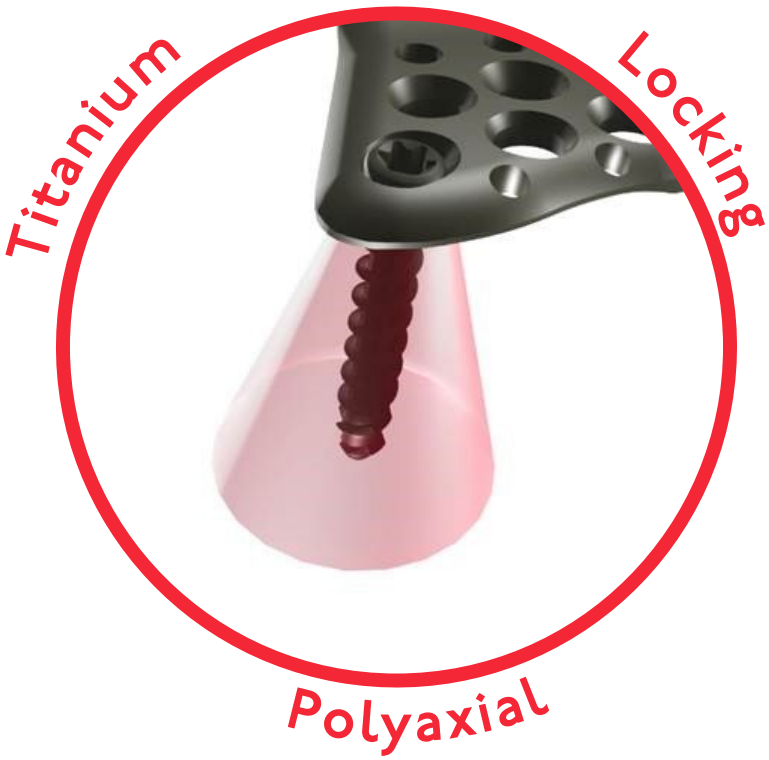
Introduction

Plate Technology

At ITS., we stand for long-term, trusting relationships with our customers, suppliers, and development partners. Through our dedication to innovation and development, we continuously seek to improve and optimize products and techniques for trauma surgery.

ONE Technology for all implants

All ITS. plates are made from Titanium Grade 2, whereas the screws are made of a harder titanium alloy. This allows the plates to have only non-threaded holes, which all (with the exception of oblong holes) accept both non-locking and locking screws.



When a locking screw is inserted, it forms threads into the plate. There is no cutting and thus no debris is created. Each locking screw can be locked at a free placement within a cone of angulation up to ± 15° and can be re-positioned up to three times.

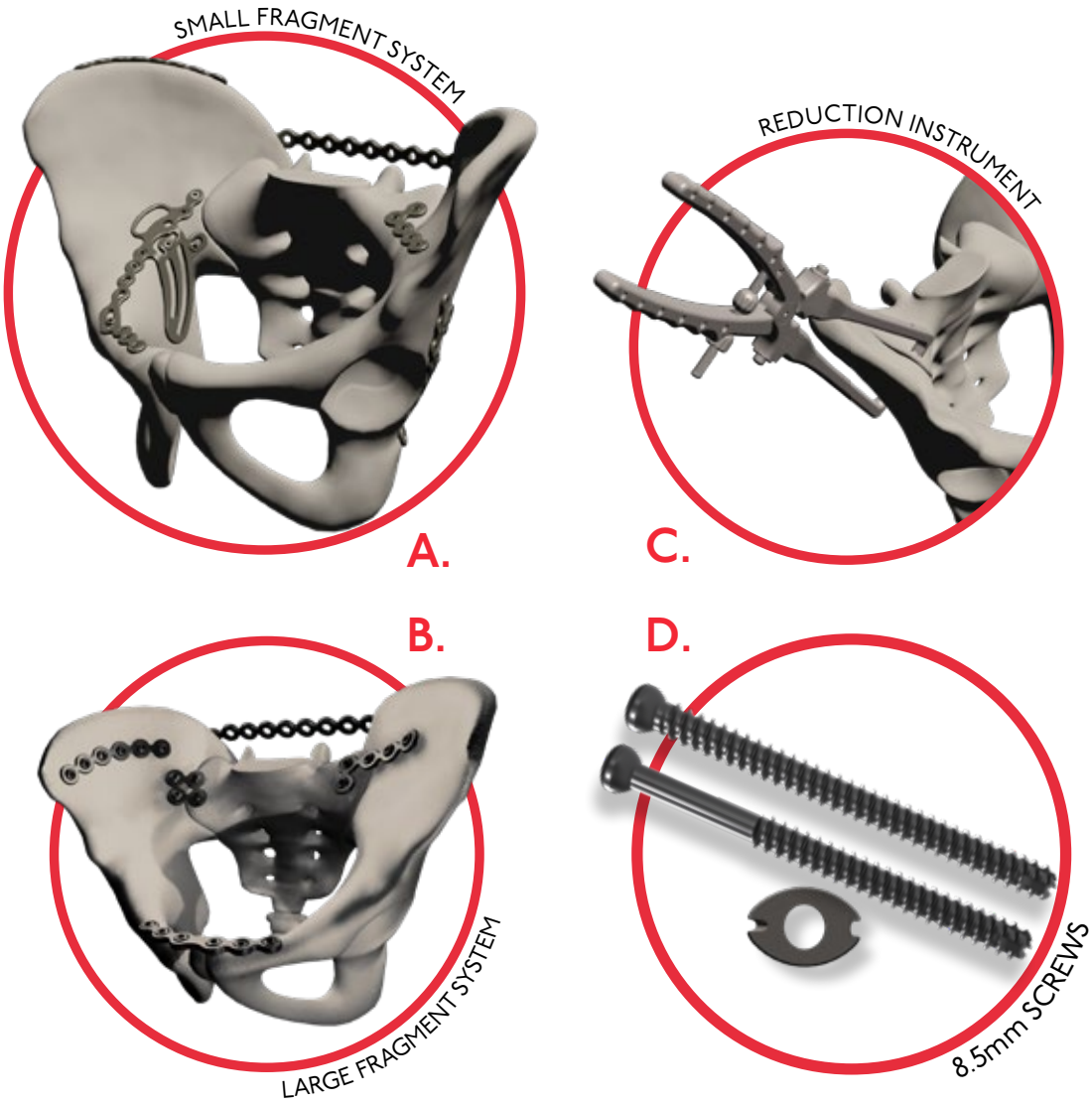
System Overview

The ITS. Pelvic Reconstruction System – Phoenix is a third-generation comprehensive system for the treatment of different fractures of the pelvis, including pelvic ring injuries and fractures of the acetabulum. Adhering to the technology principles of all ITS. plates, this system offers anatomically pre-contoured plates with the option of polyaxial locking capabilities.

Should there be a need to adapt the plates to the specific patient anatomy, the plates can be further contoured using the dedicated plate benders (see p.29).

The full ITS. Pelvic Reconstruction System consists of four sets:

- **A.** a Small Fragment Pelvic Set
- **B.** a Large Fragment Pelvic Set
- **C.** a Pelvic Reduction Instrumentation
- **D.** an 8.5mm Cannulated Screw Set

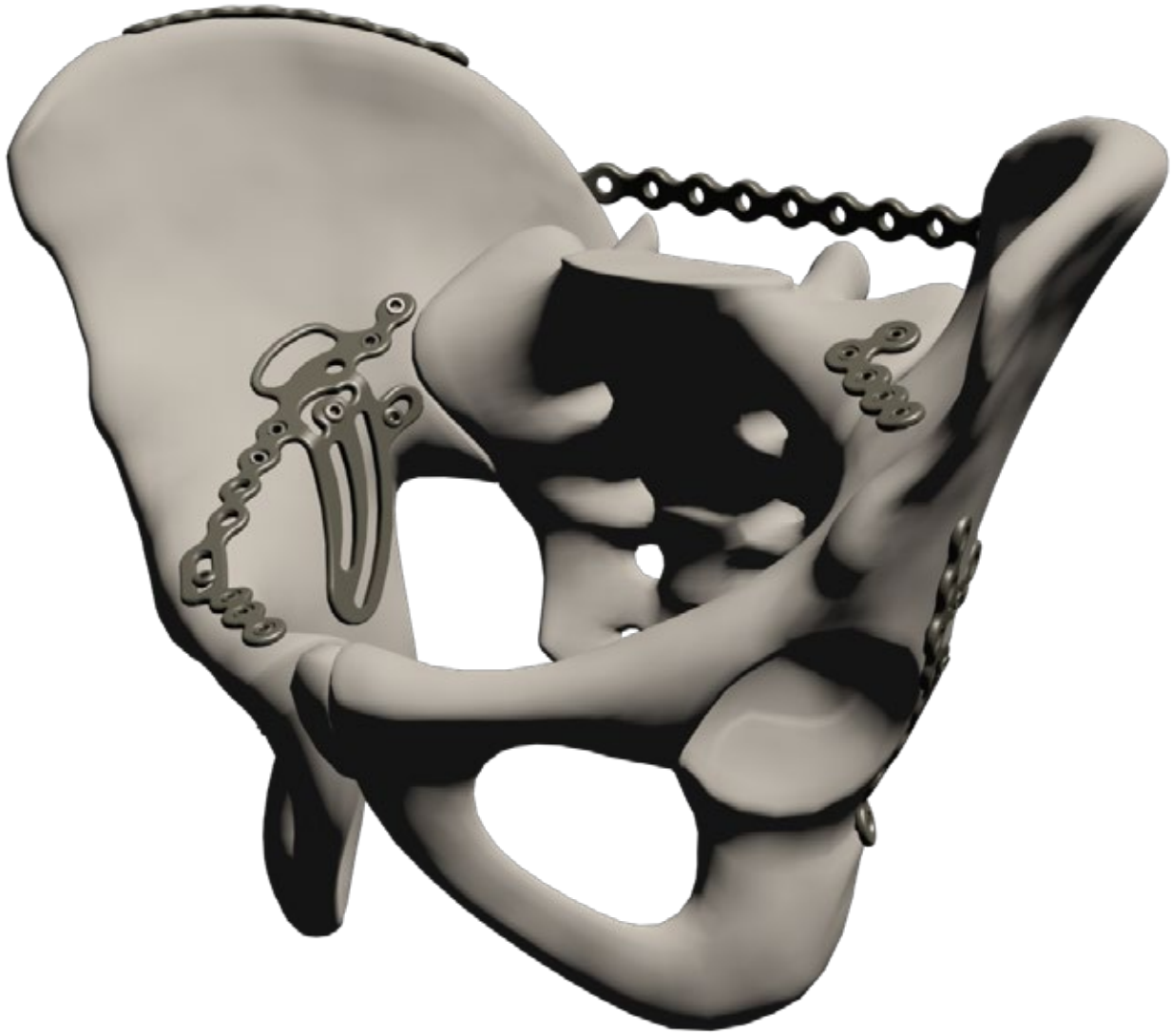


Third Generation Pelvic System

Based on collected experience from previous generations (PRS and PRS RX) along with the expert guidance from Peter Bates, M.D., Paul Culpan, M.D., Georg Thewanger, M.D., and Florian Baumann M.D., the new PRS Phoenix system includes updated plates, instruments, and techniques.

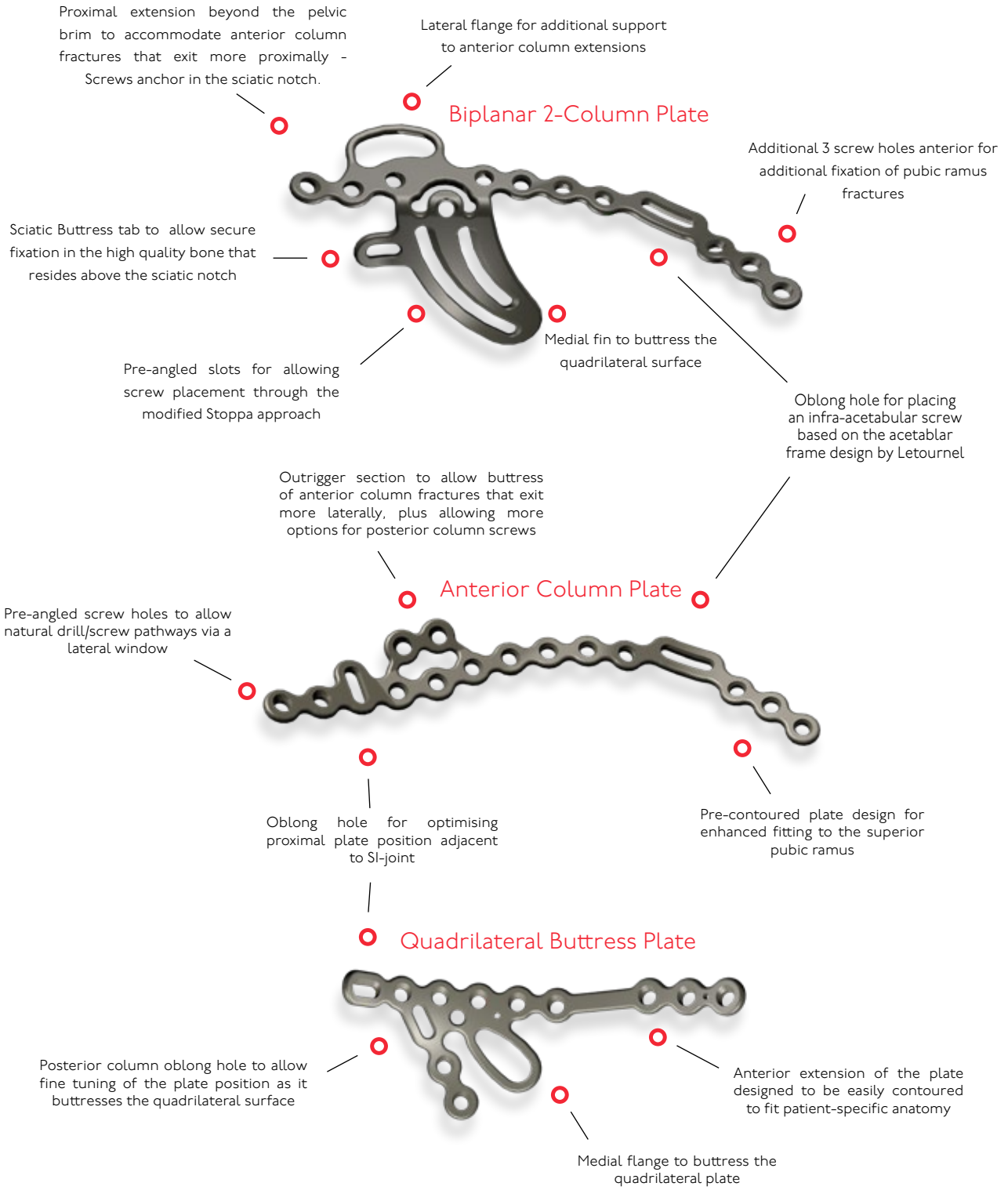
3 main benefits of the third-generation system:

- Ease of plate insertion using the Stoppa approach
- Placement of screw hole options in areas with increased probability of high-quality bone
- Improved instrumentation for fracture reduction



PRS Phoenix - Small Fragment System (A)

Three updated plate designs have been added to the Small Fragment System.



All three plates come with pre-angled holes (or slots) to allow screw placement from all commonly used anterior approaches.

Small Fragment System Plates

The small fragment system consists of anatomically shaped plates.

Anterior Column Plate

Thickness: 2.5mm

14 Hole, Left
16 Hole, Left
14 Hole, Right
16 Hole, Right

Biplanar 2-Column Plate

Thickness: 2.5mm

10 Hole, Left
12 Hole, Left
10 Hole, Right
12 Hole, Right

Quadrilateral Buttress Plate

Thickness: 2.5mm

10 Hole, Left
12 Hole, Left
10 Hole, Right
12 Hole, Right

Posterior Wall Plate

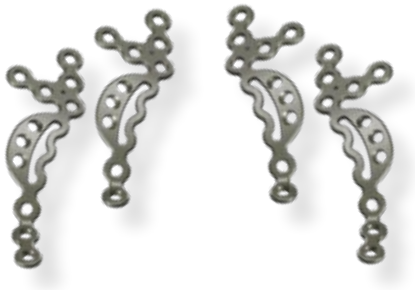
Thickness: 2.5mm

7 Hole, Left
8 Hole, Left
7 Hole, Right
8 Hole, Right

Posterior Column Plate

Thickness: 2.5mm

6 Hole, Left
6 Hole, Right



Posterior Wall Plate Extended

Thickness: 2.5mm

Plate Small, Left
Plate Large, Left
Plate Small, Right
Plate Large, Right

Pelvic Reconstruction Plate Curved

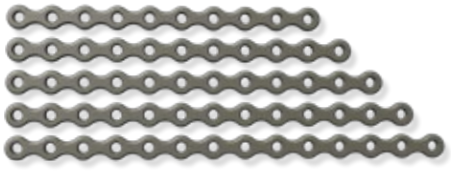
Thickness: 2.5mm

2 Hole	6 Hole	12 Hole
3 Hole	7 Hole	14 Hole
4 Hole	8 Hole	16 Hole
5 Hole	10 Hole	20 Hole

Rim Plate

Thickness: 2.5mm

14 Hole, Left	14 Hole, Right
16 Hole, Left	16 Hole, Right



Pelvic Reconstruction Plate Straight

Thickness: 3.5mm

10 Hole	12 Hole	14 Hole
11 Hole	13 Hole	

Symphysis Plate Curved

Thickness: 4mm

6 Hole 8 Hole

Symphysis Plate

Thickness: 4mm

4 Hole 6 Hole

SIJ Plate

Thickness: 2.5mm

5 Hole

SIJ Plate

Thickness: 2.5mm

Closed

Dedicated plate benders are provided, and can be used to contour these heavier grade (thicker) plates to fit specific patient anatomies (see p.29).

Small Fragment System Screws

The 3.5mm non-locking cortical screws for the small fragment system have been redesigned with a deeper hex cut-out, allowing the screwdriver to be more securely seated in the screw. Additionally, the new screws are Type II anodized, enhancing the wear properties of the screws. The combination of these new features allows the screw head hex to withstand more torque during screw insertion, which is especially important during the insertion of long screws as often used in pelvic plating procedures.

3.5mm non-locking cortical screws:

- Type II anodized → enhanced fatigue and wear properties (see p. 52)
- Deeper hex cut-out → screwdriver more securely seated in screw
- More rounded screw heads → minimized risk of tissue irritation when placed at larger angles

A unique feature of this pelvic plating system is the possibility of using locking screws. In addition to accepting the 3.5mm non-locking cortical screws (described above), all-round screw holes also allow for the possibility of placing 4.2 multi-directional cancellous locking screws.

4.2mm multi-directional cancellous locking screws:

- Type II anodized → enhanced fatigue and wear properties (see p. 52)
- Harder material than plate allows screw head to form threads into the plate → multidirectional, locking (within a a cone of angulation up to ± 15°)

PRS Phoenix - Small Fragment Indications

Fractures involving the Posterior Wall & Posterior Column

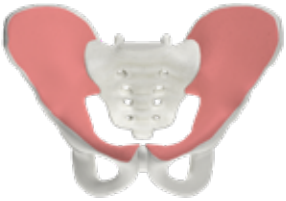
Posterior Wall Plate Ext.

Posterior Wall Plate

Posterior Column Plate

Curved Reconstruction Plate

Fractures involving the Anterior Column of the Acetabulum

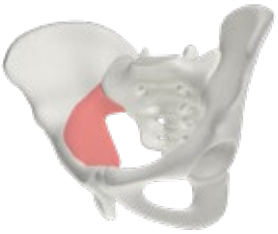


Rim Plate

Anterior Column Plate

Curved Reconstruction Plate

Fractures involving the Quadrilateral Surface



Biplanar 2-Column Plate

Quadrilateral Buttress Plate

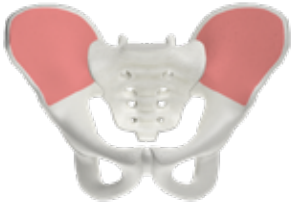
Rim Plate

Symphyseal Disruptions & Para-symphyseal Fractures

Symphysis Plate

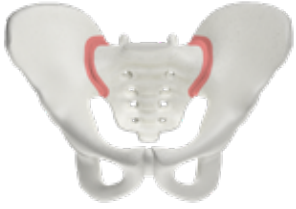
Symphysis Plate Curved

Fractures of the Ilium



Curved Reconstruction Plate

Disruptions of the SIJ



SIJ Plate Closed

SIJ Plate 5-hole

Dorsal neutralisation plating for posterior pelvic ring fractures

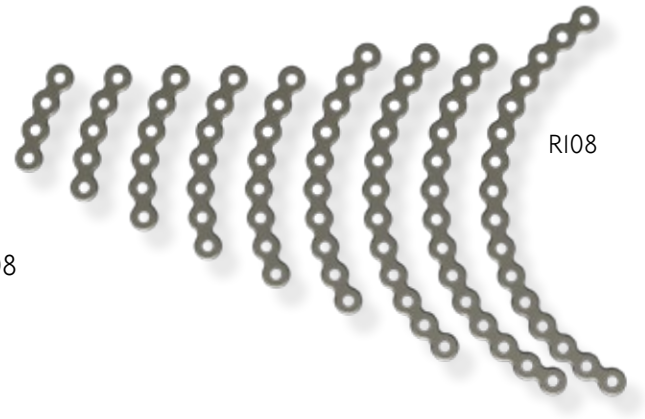
Straight Reconstruction Plate

PRS Phoenix - Large Fragment System (B)

Large Fragment System Plates

The PRS Large Fragment System is designed for intraoperative flexibility, allowing the surgeon to contour the plate to the patient's specific anatomy.

The system contains a set of templates, which can be trialed on the bone and bent to match the patient's anatomy by using the Bending Heavers/Irons and Bending Forceps. To determine the required length for a plate, the template can be placed on the bone, and after being shaped accordingly, can also serve as a template for bending the plate.



Pelvic Reconstruction Plate Curved R88 & RI08

Thickness: 2.5mm

4 Hole
5 Hole
6 Hole
7 Hole
8 Hole
10 Hole
12 Hole
14 Hole
16 Hole

Symphysis Plate

Thickness: 4mm

4 Hole
6 Hole

SIJ Plate

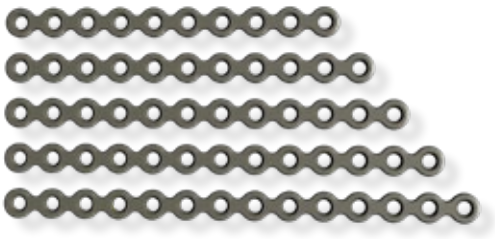
Thickness: 2.5mm

5 Hole, Left
5 Hole, Right

SIJ Plate

Thickness: 2.5mm

Closed



Pelvic Reconstruction Plate Straight

Thickness: 4mm

10 Hole
11 Hole
12 Hole
13 Hole
14 Hole

Large Fragment Screws

Both locking and non-locking screws are available as part of the system. The multi-directional locking screws can be locked into any round hole in any plate (within a cone of angulation up to ± 15°).

NON-LOCKING, Cortical
D=4.5

NON-LOCKING, Cancellous
D=5.9

LOCKING, Cancellous
D=5.9

OPTIONAL
(ON REQUEST)

LOCKING, Cortical
D=4.5

PRS Phoenix - Large Fragment Indications

For all pelvic injuries, including pelvic ring injuries and acetabular fractures.

Symphysis pubis disruptures, osteotomies, arthrodesis, and sacroiliac joint dislocations.
Revision surgery of pseudoarthrosis, non-unions, and mal-unions.

PRS Phoenix - Reduction Instrumentation (C)

The Reduction Instrumentation for the Pelvic Reconstruction System contains both malleable as well as radiolucent retractors, a plate holder, ball spikes, in situ benders, and a universal handle with a series of reduction clamp attachments.

Malleable Retractors

The malleable retractors are easily modified, e.g. to an S-bend, to create a wide, unobstructed field of view through the Stoppa, or chosen approach.
The broad surface of the retractors is ideal for attaching an adhesive light strip, providing additional illumination of the surgical field.

The malleable retractors come in three widths: 25mm, 30mm and 45mm.

Radiolucent Retractors

In order to allow for the use of fluoroscopy without the removal of retractors, radiolucent Hohmann retractors* are included as part of the PRS Phoenix Reduction Instrumentation.

These carbon fiber PEEK composite retractors come in four different variations:
Standard, Blunt, Narrow Bent, and Narrow 90°.

* Ortholucent™ Hohman Retractors from Innomed Inc.

Reduction Instrumentation

The new reduction clamps have been designed for versatility, ease of use, and minimally invasive insertion.

The instrument centers around a universal handle, into which different attachments/ tines can be attached for different fracture reductions. Each tine can be positioned independently on the bone first and then connected to the handle or pre-assembled with the handle and then introduced into the wound.

The crown tip of the attachments engages onto screw heads and bone for an effective transfer of force during the fracture reduction.

Universal Handle

Standard Straight Attachment
"Long Reacher"

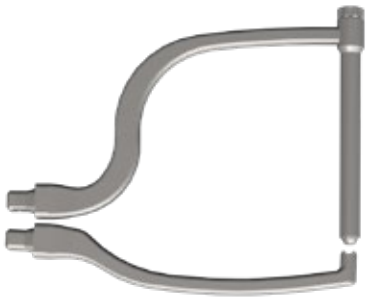
Jungbluth Attachment

Weber Attachment
(Designed for percutaneous insertion)

Standard Curved Attachment
"Curved Long Reacher"

Angled Attachment
"Gooseneck"

Pelvic Linear Hook Attachment
"Bead-hook Clamp"



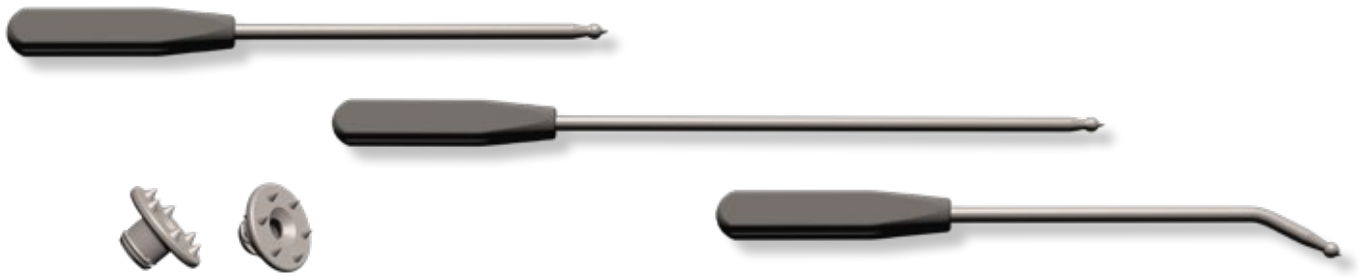
Posterior Wall Clamp
"Moby Dick"

Ball Spikes

Three ball spikes (straight 200mm, straight 300mm, and angled) are available to aid in the reduction of the fracture. A Pushing Plate, Ballspike can be attached to the tip of the ball spike in order to distribute the force across a wider area.
The ball spikes can additionally be used in the plate holes to push the plate into position on the bone, or in using the plate itself as a reduction tool (e.g. the Biplanar 2-Column Plate - *see p.37*).

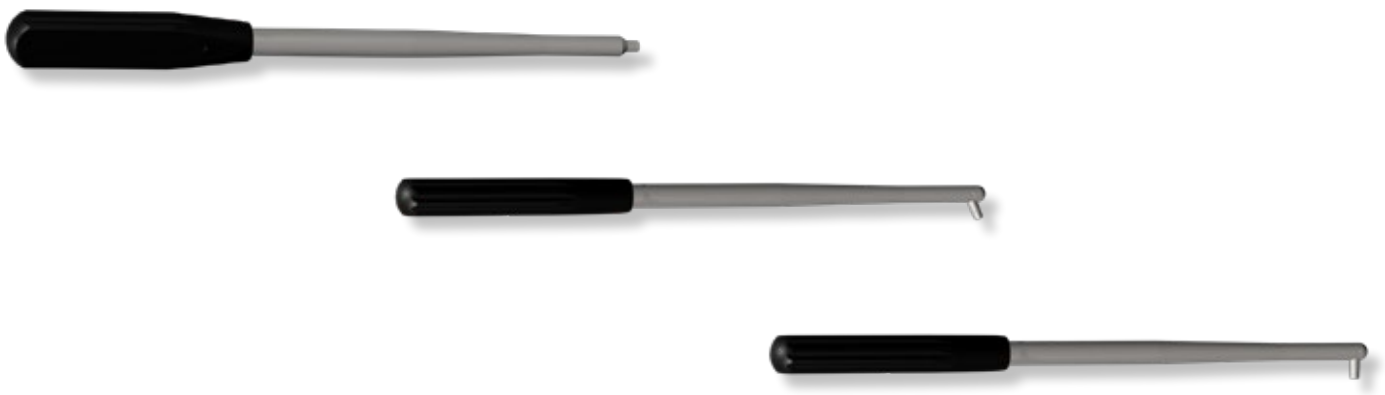
TIP: When pushing on areas of bone that are angled or less accessible, uni-cortical drill holes can be made, in which to anchor the ball spike to prevent it from skiding off or displacing.

TIP: When squeezing down a plate onto a fracture line (in buttress mode) by tightening screws, plate apposition to bone and micro-reduction can be improved with light hammer taps through a ball spike pusher, anchored in one of the empty screw holes.



In Situ Benders

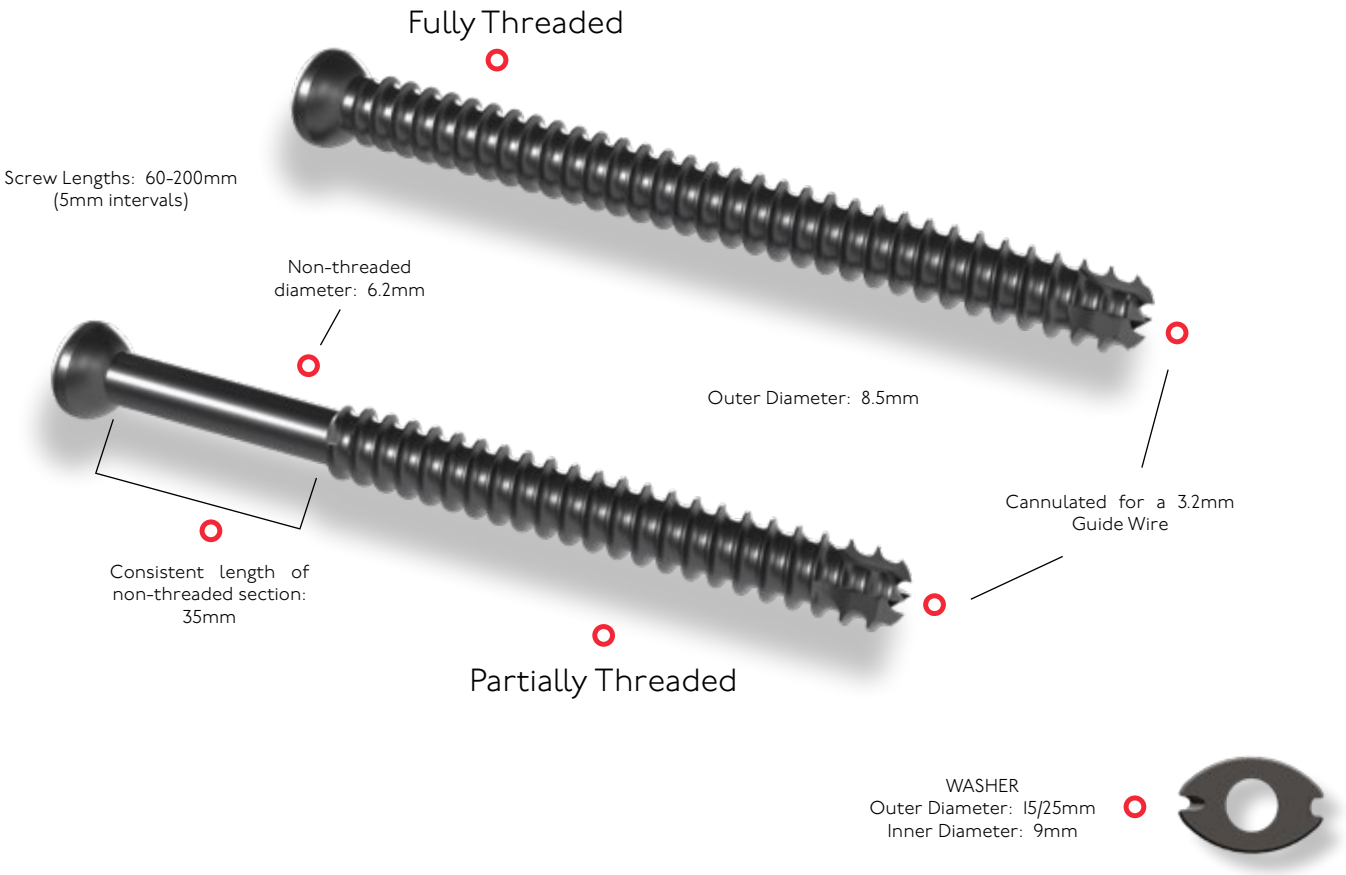
The reduction instrumentation set includes three in situ benders (Straight, Oblique, and 90°) for fine-tuning the contouring of the small fragment plates to adapt to the patient-specific anatomy. The In Situ Benders must be used with adjacent holes. Do not skip holes as this increases the risk of hole deformation.



PRS Phoenix - 8.5mm Cannulated Screws (D)

It is at times necessary to place an independent screw in the treatment of complex pelvic fractures. With this in mind, the ITS. Cannulated Screw range has been expanded to include the larger screw diameter, 8.5mm.

The low profile, small diameter screw heads help minimize soft tissue irritation and are suitable for minimally invasive methods, as well as placement through an open approach.
Additionally, the system contains washers for optimal contact with the bone surface, especially in osteoporotic patients.



8.5mm Cannulated Screws Indications

The I.T.S. Pelvic Reconstruction Systems (PRS-RX & PRS-Phoenix) are indicated to stabilize one or more pelvic bone fractures in the pelvis in an adult patient.

Indications for use of the I.T.S. 8.5mm Cannulated Screws & Washer include:

- Pelvic Fractures

PRS Phoenix - Contraindications & Time of operation

Contraindications:

- Existing infections in the fracture zone and operation area
- Common situations that do not allow osteosynthesis
- Obesity
- Lack of patient compliance
- The I.T.S. PRS Phoenix System is not intended for spinal use!

Time of operation:

- Immediately after trauma or delayed


Nº 26. DUETT
Allegretto.
Oboe.
Violino I.
Violino II.
Viola.
La Contessa.
Die Gräfin.
Violoncello
e Basso.
se - ra spi - re - rà,
un - sre Flu - ren wehn,
sot - - to i pi
wol - - ten
del bo - schet - to,
sü - - sse Düf - te,
que-sta
ü - ber

Surgical Technique

2.

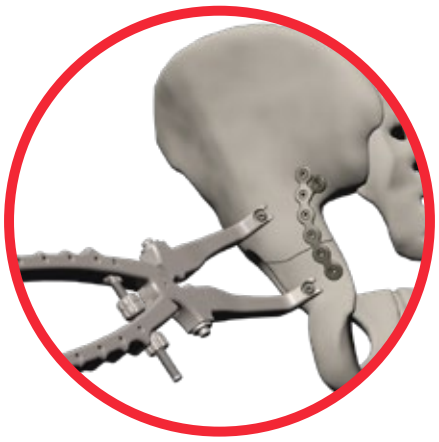
Fracture Reduction

The PRS Phoenix Reduction Instrument is a versatile instrument for reducing various fractures of the pelvis

Markings on the handle and tines/attachments indicate the correct sides. Tines without markings can be inserted into either side of the Universal Handle.

To assemble, each tine/attachment arm is "clicked" into the Universal Handle upon insertion. Once secured, the two buttons on the side of the handle should protrude completely (approx. 4mm).

Jungbluth Clamp



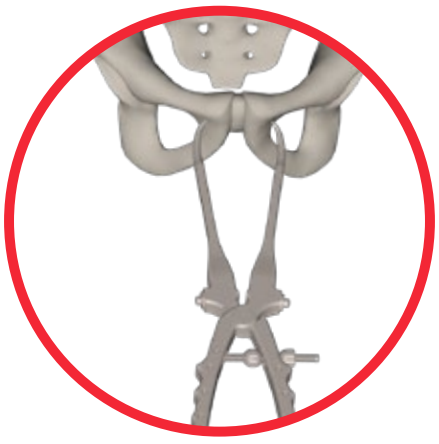
Example use:

Reduction of a posterior column fracture or pubic diastasis

Example Placement:

Insert a screw on each side of the fracture
Attach each tine to one of the screws and compress the fracture

Weber Clamp



Example use:

Percutaneous symphysis reduction

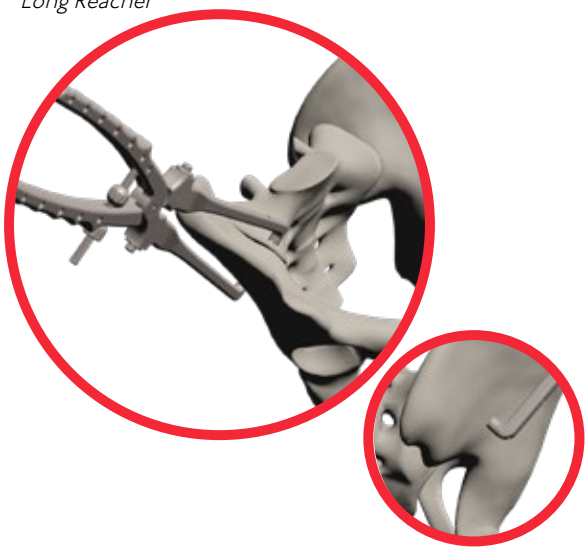
Example Placement:

Create two anterior stab incisions to insert the two tines, allowing a small skin bridge to avoid crushing the intervening soft tissue

The reacher clamps have been designed with a narrow offset with a crowned tip that allows the instrument to engage more effectively with the bone, even at an angle, as well as with the screw heads and plate.

Standard Straight Reacher Clamp

"Long Reacher"



Example use:

Minimally invasive and open SIJ reduction and anterior column reduction

Example Placement:

Tine A: anterior corner of the lateral sacrum
Tine B: posterior surface of ilium
Action: compress an SIJ dislocation

Standard Curved Reacher Clamp

"Curved Reacher"

Example use:

Anterior column reduction

Example Placement:

Tine A: greater sciatic notch
Tine B: onto the anterior column
Action: compress down an anterior column fracture, either directly or through one of the anterior surface plates

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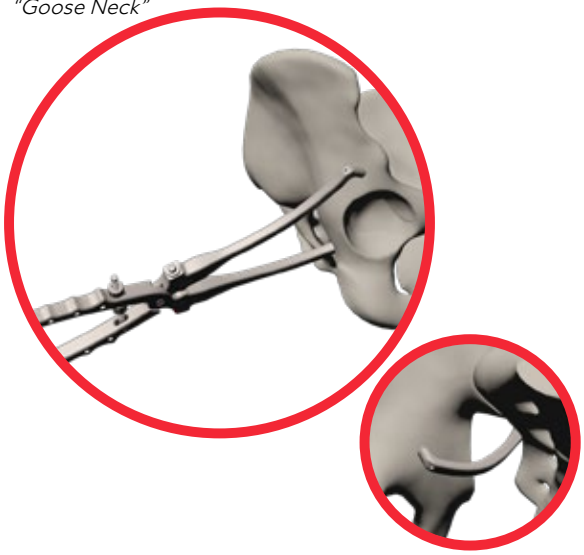
Angled Reacher Clamp

"Goose Neck"



Example use:

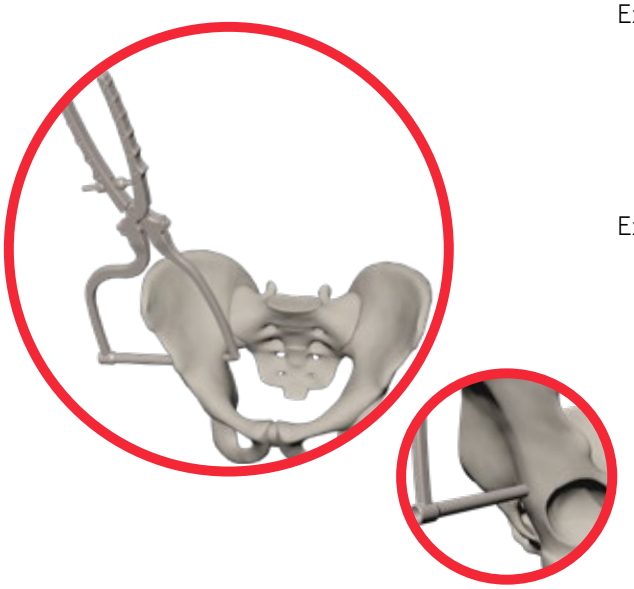
Reduction of displaced transverse fracture via the Kocher-Langenbeck approach

Example Placement:

Tine A: lateral supra-acetabular surface of the ilium (beneath the glutei)
Tine B: quadrilateral surface (behind the sciatic notch)

Posterior Wall Clamp

"Moby Dick"



Example use:

Percutaneous reduction of a displaced posterior wall fracture (maybe after anterior fixation of an ABC fracture)

Example Placement:

Straight Tine: Through lateral window above the sciatic notch

Wide Tine: Percutaneously through buttock onto posterior wall

TIP: The percutaneous element is cannulated, allowing for the insertion of a 6.5mm cannulated screw. (6.5mm cannulated screw system available as optional)

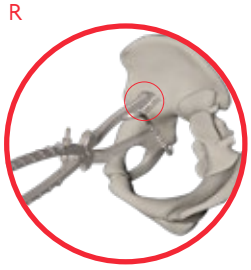
Pelvic Linear Hook Clamp

"Bead Hook"

Assembly:

The Pelvic Linear Hook attachments are available for both the right and left sides of the pelvis. The Pelvic Ring Thrust pad (toothed 64006-6 or ball spike 64006-7) must always be able to rest on the pelvic rim. This piece is screwed laterally into the clamp attachment (right 64006-3 / left 64006-2) so that the contact surface is medial to the attachment arm.

R



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Example use:

Dissociation between anterior and posterior column - applied through a modified Stoppa approach

Example Placement:

Paddle: On the anterior column, above the terminal line

Hook: In the lesser sciatic notch

Plate Contouring and Bending

Should there be a need to adapt the plates to the specific patient's anatomy, the plates can be further contoured using plate benders and irons provided with the system.

NOTE: The plates must not be bent back and forth, but rather only by small bends in the same direction. Locking screws can be locked into the plate within a cone of angulation up to ± 15°

For out-of-plane bending or twisting along the main axis of the plates, use the Bending Irons (KJ.207.14, included in the Small Fragment Set or 66252-14, included in the Large Fragment Set).

Fix the Bending Irons to the plate above two consecutive holes, and proceed to bend or twist the plate. Always using consecutive holes creates the most even bend and avoids hole deformation.

To change the in-plane curvature of a plate, insert the plate into the Bending Forceps (64007), and adjust, increasing or decreasing the curvature.

The Bending Forceps are designed to fit the Small Fragment Plates on one side, and the Large Fragment Plates on the other. A smooth bend is best achieved by creating many small bends in the same direction at several points along the plate. This reduces the risk of deforming the holes in the plate.

For small adjustments of the plate on the bone, the In Situ Benders (66261, 66262, and 66263, included in the Reduction Instrumentation Set) can be used.

The In Situ Benders must be used with adjacent holes. Do not skip holes as this increases the risk of hole deformation.

Screw Insertion

All screw holes for the ITS. Pelvic Reconstruction System – Phoenix will accept both locking and non-locking screws (except for the oblong holes of the Anterior Column Plate, the Biplanar 2-Column Plate, and the Quadrilateral Buttress Plate, which will only accept non-locking screws).

1. Place the drill guide onto the plate in the hole selected to be drilled, at the desired angle for the screw.

NOTE: Locking screws can be locked into the plate within a cone of angulation up to ± 15°

2. Drill through the drill guide to the desired depth (bicortical or unicortical) using the appropriate drill, based on the system used and desired screw type.

3. Read the required screw length from the line on the calibrated spiral drill closest to the edge of the drill sleeve, and select the appropriate screw.

4. Alternatively, a separate depth gauge can be used to measure the required screw length based on the drill hole.

5. Insert the screw using the driver corresponding to the system used.

SMALL FRAGMENT

32352-XX
NON-LOCKING
Cortical Screw, D=3.5mm
Spiral Drill, D=2.7mm
Hexagon-Shank, W.S. 2.5

37422-XX-N
LOCKING
Cancellous Screw, D=4.2mm
Spiral Drill, D=2.5mm
Hexagon-Shank, WS 2.5

LARGE FRAGMENT

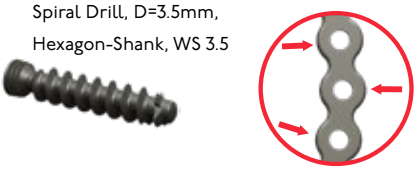
32455-XX
NON-LOCKING
Cortical Screw, D=4.5mm
Spiral Drill, D=3.2mm,
Hexagon-Shank, WS 3.5

30591-XX
NON-LOCKING
Cancellous Screw, D=5.9mm
Spiral Drill, D=3.5mm
Hexagon-Shank, WS 3.5

37455-XX
LOCKING
Cortical Screw, Locking, D=4.5mm
Spiral Drill, D=3.2mm,
Hexagon-Shank, WS 3.5

OPTIONAL (ON REQUEST)

37592-XX
LOCKING
Cancellous Screw, D=5.9mm
Spiral Drill, D=3.5mm,
Hexagon-Shank, WS 3.5



8.5 mm Cannulated Screws

MIS Tissue Protection Sleeve

Guide Wire Insertion:

1. Insert the 3.2mm guide wire (35321-435) through the K-wire sleeve within the MIS tissue protection sleeve (64018) via either an open approach or after placing a stab incision. Control its correct position under fluoroscopy.

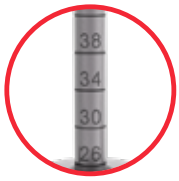
Identification of Screw Length:

2. Remove the K-wire sleeve and place the screw depth gauge (59328) over the guide wire and insert it through the tissue protection sleeve down to the bone. Then read off the required length measurement at the end of the calibrated guide wire.

TIP: If desired, the depth gauge can be used as a stand-alone without the MIS Tissue Protection Sleeve. Also, in this case, the depth gauge should be pushed down to the bone.

Predrilling (Optional):

3. Predrilling is possible if needed in strong cortical bone. When drilling, insert the drill (61620-420) through the tissue protection sleeve, and drill to the desired depth. Control through fluoroscopy.



TIP: As an alternative when predrilling, the screw length can be read off the calibrated markings on the drill against the drill sleeve.

Washer (Optional):

4. When needed, a washer can be inserted along with the screw, by preloading the washer onto the MIS tissue protection sleeve. When the screw is inserted, the washer becomes released onto the bone.

NOTE: Through the additional bone contact surface, the screw load will be distributed across a larger area and reduce countersinking of the screw head into osteoporotic bone.

Placement of the Screw:

5. Place the D=8.5mm cannulated Cancellous Screw (partially threaded or fully threaded) over the guide wire and insert it using the cannulated screwdriver (54502-250 or 56502-220). Finally, remove the guide wire and confirm the correct position under fluoroscopy.

Fractures Involving the Posterior Wall & Posterior Column


Posterior Wall Plate Extended


Posterior Wall Plate


Posterior Column Plate

Curved Reconstruction Plate

Approach:

1. Access by the Kocher-Langenbeck approach, and possibly Trochanteric osteotomy with surgical hip dislocation.

NOTE: The Gibson modification to the approach allows easier access anteriorly, helpful for posterior wall fractures that extend anterosuperiorly above the joint.

NOTE: The Adelaide modification allows extended exposure above the Sup. Gluteal NV bundle, making a separate window into the glutei above them. This is helpful for fractures that extend proximal to this critical leash that has to be preserved.

TIP: Excision of contused muscle, particularly G. minimus, may reduce the incidence and severity of heterotopic ossification (HO)

TIP: A trochanteric osteotomy (flip or slide) may provide additional exposure of the superior acetabular region, useful for large posterior wall fractures that extend superiorly and anteriorly. The osteotomy may help prevent retractor damage to the abductor muscle mass.

TIP: A trochanteric osteotomy with surgical hip dislocation may be effective for treating more complex fracture situations of the acetabulum or pipkin fractures. Through the osteotomy, the anterior column can be visualized from a posterior approach.

Fracture reduction:

Posterior Wall

2. After exposure of the posterior wall fracture, it can be elevated to reveal the femoral head and (if not already torn) the labrum.

NOTE: When there is a posterior wall marginal impaction (visible on CT), this must be elevated and realigned to its anatomic position and stabilized during surgery (either with bone graft, substitute, or metalwork) prior to the repositioning and stabilization of the posterior wall fragment.

Posterior Column

2. Reduce the posterior column or transverse fracture with a combination of clamps. (see p.26-29)

TIP: The Jungbluth clamp is a powerful multiplanar reduction device that may be especially useful in reducing posterior column fractures. When inserting the screws on either side of the fracture, be mindful of where the plate is going to sit. The plate should be able to go on easily with the deployed clamp in place.

3. Verify reduction under fluoroscopy or x-ray inspection.

Retaining Screw (Spike)

Fixation Spike
(Optional)

Plate application:

4. Determine the correct plate type and size depending on the pelvic dimensions.

   NOTE: An anatomically pre-formed plate can be used or a curved recon plate can be contoured (generally 7-10 holes depending on patient anatomy and whether using the Large or Small Fragment systems).

5. The plate can be temporarily fixed with small retaining screws (spikes) or K-wires for verification under fluoroscopy or x-ray inspection.

6. Fix the plate first with two screws in the area of the ischial tuberosity, followed by the screws above the acetabulum - *see p. 30 for screw insertion instructions.*

TIP: First fixing at the ischium in combination with an under-bent plate leaves the plate off the bone anterosuperiorly. When subsequently fixated with screws, it applies a forceful tension band over the fracture.

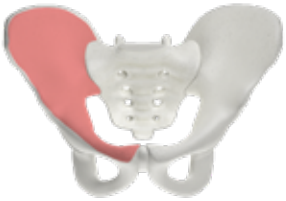
TIP: For additional fixation of shell-shaped fragments, (optional) fixation spikes can be screwed into the plate to prevent the posterior wall fragment from slipping.

Fractures Involving the Anterior Column of the Acetabulum

Anterior Column Plate

Curved Reconstruction Plate

Rim Plate



Approach:

1. Anterior surgical approach as per surgeon preference (modified Stoppa / para-rectus / ilioinguinal)

Fracture reduction:

2. Reduce fracture before or after plate placement using traction and clamp application.

> **NOTE**: Clamps deployed through a loosely secured plate allow for optimal placement and may prevent comminution of the underlying bone as the force is spread out beneath the plate.

3. Verify reduction under fluoroscopy or x-ray inspection.

Plate application:

4. Determine the correct plate type and size depending on the pelvic dimensions.

5. Pass the plate under the vessels and iliopsoas, onto the surface of the anterior column.

6. Identify the symphysis (midline) and loosely secure the anterior part of the plate just lateral to it, with either a K-wire or an untightened screw, or small retaining screws (spikes.)

7. Secure the plate proximal to the anterior column fracture, either through modified Stoppa or lateral window approaches.

8. Insert screws from the proximal end, working distally, getting progressively closer to the anterior column fracture line - *see p. 30 for screw insertion instructions.*

9. When using the Anterior Column Plate ("Crocodile Plate"), posterior column screws can be placed through the holes in the lateral flange. This is a cluster of 5 screw holes, specifically designed for placing posterior column screws and spreading the area of the plate in the zone where anterior column fractures commonly exit.

Fractures Involving the Quadrilateral Surface of the Acetabulum

Biplanar 2-Column Plate

Quadrilateral Buttress Plate

Rim Plate

Approach:

1. Anterior surgical approach as per surgeon preference (modified Stoppa / para-rectus / ilioinguinal.)
2. Identify and ligate the corona mortis vessels and identify the obturator nerve/vessels.
3. The surgical exposure should identify the bone overlying the greater sciatic notch, just adjacent to the SI joint – this is where the most posterior screws will be sited.

TIP: A ring spike or Hohman can be gently knocked into the anterior aspect of the SIJ and then pulled medially, exposing the bone surface to be drilled.

TIP: A retractor passed down into the lesser notch exposes the quad surface. This can be placed either outside (lateral to) or inside (medial to) the obturator structures, depending on surgeon preference.

TIP: A detachable light strip can be attached to any retractor to provide better illumination of the surgical exposure.

4. Identify and retract the obturator structures medially to allow the plate to sit against the bone just lateral to them.

Quadrilateral Buttress Plate

"Dragon Fly"

Fracture reduction:

5. Reduce fracture before or after plate placement using traction and clamp application.

NOTE: Clamps deployed through a loosely secured plate allow for optimal placement and may prevent comminution of the underlying bone as the force is spread out beneath the plate.

6. Verify reduction under fluoroscopy or x-ray inspection.

Plate application:

7. Determine the correct plate size depending on the pelvic dimensions.

NOTE: The Quadrilateral Buttress Plate ("Dragon Fly Plate") is designed to facilitate some contouring prior to insertion. The anterior end of the plate should be contoured with a 30-40° twist according to specific patient anatomy, so that it sits on the postero-superior surface of the sup. pubic ramus.

TIP: The 'loop' on the inferior part of the plate can be curved medially by 20 degrees to achieve maximal contact with the quadrilateral surface. (Pre-contouring the loop of the plate AND the posterior column tab by 20° provides additional buttressing power to the plate.)

8. Pre-drill a hole approximately Icm lateral to the anterior SIJ, which will engage the most proximal slotted hole.

9. After contouring, pass the plate down the quadrilateral surface, medial to the obturator NV structures.

NOTE: A Cobb elevator should be passed over the medial aspect of the sciatic buttress, towards the SIJ before passing the pate. In this way, no structures will end up being trapped beneath the proximal end of the plate.

10. Holding the plate anteriorly, advance the plate such that the most proximal (slotted) hole sits on the medial aspect of the bone overlying the GS notch, immediately lateral to the anterior face of the SIJ.

11. Loosely insert the proximal screw (usually 30-38mm long, depending on patient anatomy) into the pre-drilled hole - *see p. 30 for screw insertion instructions*.

NOTE: Fully tightening this screw immediately may compromise the medialising power of the plate.

12. Secure the anterior part of the plate to the post/sup surface of the ramus, either with a K-wire or a clamp.

13. Using the long, curved ball-spike, push the inferior part of the plate laterally.

14. Drill the next screw into the slotted hole of the posterior column tab and tighten fully, while also pushing hard with the ball-spike.

TIP: Gentle tapping on the ball-spike allows cinching down of the plate and final micro-reduction of the fracture.

NOTE: Ensure the screw direction is as perpendicular as possible to the plate in order to optimase the correction acheivable (i.e. correcting the medial displacement.)

15. Place additional screws as needed, passing medial to lateral, via the Stoppa window.

16. Securely fix the plate anteriorly in the ramus.

Biplanar 2-Column Plate

"Shark Fin"

Fracture reduction and Plate Application:

5. Determine the correct plate type and size depending on the pelvic dimensions.

   TIP: The fracture reduction can be fine-tuned with the plate loosely secured in place. By using reduction instruments through the plate, it can act as a reduction aid.

6. Insert the "Shark Fin" just medial to the obturator vessels and advance the plate proximally, using the long angled ball-spike in the posterior hole of the rainbow slot surrounding the 45° center hole.

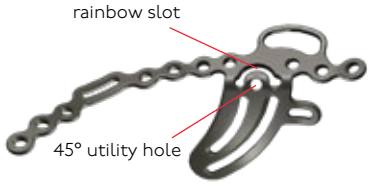
7. Push the plate laterally and downward using the ball spike. (verify direction)

8. Stabilize the plate anteriorly in the pubic ramus, either with a K-wire or an untightened screw or spike.

   NOTE: Before inserting screws into the main body of the plate, ensure that there are no soft tissues beneath the sciatic buttress tab.

9. Verify a reasonable position of the plate under fluoroscopy. The plate should be pushed down through one of the holes, although avoiding the 45° utility hole.

   NOTE: The 45° utility hole must sit above the hip joint in the AP view.



10. Insert a screw into the 45° center hole in the center of the plate - *see p. 30 for screw insertion instructions.*

    TIP: The more orthogonal to the plate, the more powerful the effect of the screw.

    NOTE: This screw aims to bring reduction forces in both planes of the plate, both down against the anterior column and in against the quadrilateral surface/posterior column.

11. Further screws can be placed each side of the 45° centre hole.

    TIP: Now, the quadrilateral reduction can be improved by placing a screw into the gluteal buttress tab or into the "Shark Fin" itself.

12. To improve the anterior column reduction, place screws into the top of the plate.

13. Place additional screws as needed, and tighten any loose screws.

Infra-acetabular Screw Placement

The Biplanar 2-Column plate and the Quadrilateral Buttress plates have been designed to include an oblong hole for placing an infra-acetabular screw based on the acetabular frame design by Letournel.

Biplanar 2-Column Plate

Anterior Column Plate

An infra-acetabular screw is a useful tool to fix the anterior column to the posterior column by constructing a "peri-acetabular frame", as Letournel called a fixation of both columns above and below the acetabulum. Reconstruction of the physiological distance between the anterior and posterior column is crucial to avoid intra-pelvic protrusion of the femoral head. The infra-acetabular screw corridor corresponds with Kohler's teardrop in an AP view of the pelvis.

Indication

- Fractures involving the anterior column, e.g. anterior column, anterior column plus posterior hemi-transverse (ACPH), and associated both column (ABC) fractures.
- In patients with reduced bone quality (typically in geriatric fractures), the infra-acetabular corridor is a good anchoring option because the mean length of the corridor is around 80mm and there is strong cortical bone around the ischium even in osteoporotic patients.

Contraindication

- Patients with compromised bony infra-acetabular corridor due to e.g. skeletal dysplasia or extended acetabular protrusion.

Approach:

1. A pre-operative identification of the bony corridor is mandatory to reduce the risk of intra-pelvic or even intra-articular screw penetration (a fluoroscopic check in the direction of the screw is essential.)

2. Anterior surgical approach as per surgeon preference (modified Stoppa / para-rectus / ilioinguinal.)

NOTE: The surgical exposure should include the tip of the ilio-pectineal eminence since this is the best reference point for identification of the infra-acetabular corridor.

NOTE: The ideal entry point for the infra-acetabular screw is around 1 cm below and 1 cm medial to the tip of the ilio-pectineal eminence.

Fracture reduction and plate application:

3. Use the ilio-pectineal eminence as a landmark for the placement of the plate.

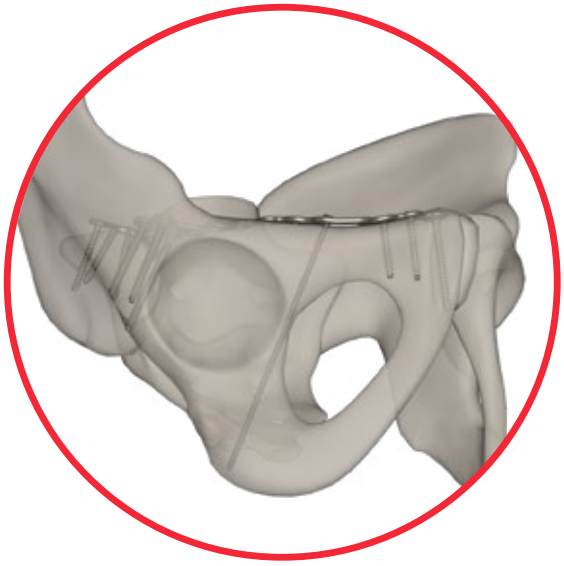
NOTE: The position of the plate can be referenced by matching the curvature of the plate proximal to the long hole to the ilio-pectineal eminence.

4. The offset of the long hole will provide access to the ideal entry point of the infra-acetabular screw 1 cm below and 1 cm medial to the tip of the ilio-pectineal eminence.

5. Based on the pelvis inlet plane, a plane along the pelvic brim dividing the lesser and the greater pelvis, orient the drill in an angulation of 10° in the sagittal and 70° in the axial direction.

6. The surgeon can feel the vibration of the drill by palpation of the corresponding bony surface on the caudal border of the quadrilateral surface.

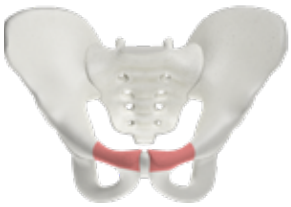
7. After placement of the screw, a fluoroscopic assessment of the screw position is necessary to exclude an intra-articular or intra-pelvic screw position.



Symphyseal Disruptions & Para-symphyseal Fractures

Symphysis Plate

Symphysis Plate Curved



Approach:

1. Surgical access via Pfannenstiel or anterior midline incision and rectus split.
2. Exposure of the rami on either side, taking care to push the bladder and peritoneum away with a large swab.

Fracture reduction

3. Reduce fracture using e.g. Weber forceps inserted into the obturator foramina on both sides - *see p.26-28 for imformation on usage of Reduction Instrumentation*

> **TIP:** For pure diastasis, the symphysis can be reduced percutaneously with the long-armed Weber clamp (*see p. 26*), applied through anterior stab incisions. By using the clamp in this mode, it is left entirely clear of the surgical site, enabling easy plate placement.

4. Alternatively, insert two short screws near the symphysis from the front, and reduce fracture using Jungbluth forceps or a system of forceps that can be supported on the screws (*see p. 26*).

> **NOTE**: The Jungbluth clamp allows multi-directional correction of deformity at the symphysis

5. Verify reduction under fluoroscopy or x-ray inspection

Plate application

6. Determine the correct plate type and size depending on the pelvic dimensions.
7. Position the 4, 6, or 8-hole straight or curved plate superiorly.

> **NOTE:** Plates are anatomically pre-shaped, an adjustment is usually not necessary. However, if needed, the plates can be further contoured using plate benders - see *p. 29 for plate contouring and bending instructions.*

8. The plate can be provisionally secured in place using temporary retaining screws (spikes) or K-wires before definitive screw fixation.
9. Verify plate position under fluoroscopy or x-ray inspection.
10. Once positioned correctly, drill and insert the two screws near the symphysis parallel to the symphysis - *see p. 30 for screw insertion instructions.*

> **TIP:** The posterior wall of the symphysis can be palpated with the finger to indicate the correct drilling direction.

11. Tighten the two screws to compensate for any remaining translational misalignments.

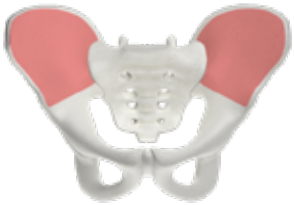
12. Drill the two outer screws slightly converging towards the center to accommodate the greatest possible screw length.

NOTE: If a 6- or 8-hole plate is used, the two outermost screws are usually shorter screws above the obturator foramen.

13. Insert additional screws as needed and applicable.

Fractures of the Ilium

Curved Reconstruction Plate



Approach:

1. Lateral window or Pararectus approach.

Fracture reduction

2. Reduce fracture using Weber or Jungbluth forceps, and temporary k-wire fixation if required.

> **TIP:** A Schanz screw placed in the anterior superior iliac spine may be helpful as well.

3. Verify reduction under fluoroscopy or x-ray inspection.

Plate application

4. Select the appropriate plate based on the patient's anatomy.

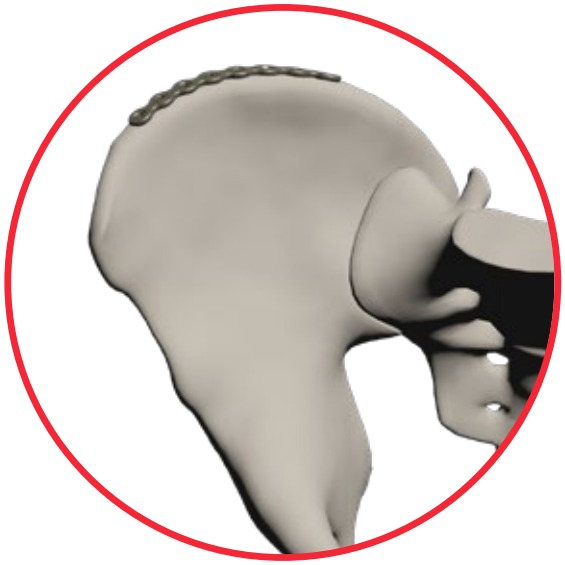
5. Adjust and set reconstruction plate as needed using bending irons.

6. Position the plate and temporarily fixate using spikes.

7. Verify plate position under fluoroscopy or x-ray inspection.

8. Insert cortical or cancellous screws (either locking or non-locking) into the holes of the plate.

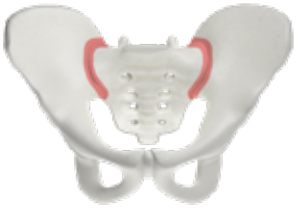
> **TIP:** For anterior column fractures extending out through the iliac crest, temporary fixation with k-wires passed down the crest allows clamps to be removed prior to plate fixation.



Disruptions of the SIJ

SIJ Plate Closed

SIJ Plate 5-hole



Approach:

1. Antero-lateral approach or first window in the context of an ilioinguinal approach.

Fracture reduction

2. Adjust the sacroiliac joint with Hohman retractors.

3. Reduce fracture using pointed reduction or pelvic reduction forceps.

> **TIP:** The long-reacher clamps can be placed with one tine on the lateral edge of the sacrum and the other posteriorly on the ilium, having been poked through the glutei. (see p.27)

> **NOTE:** When placing clamps across the SIJ, the L5 nerve root is at risk and so any clamps/ screws/plates must not extend more than 1.5 cm medial from the SIJ.

4. Verify reduction under fluoroscopy or x-ray inspection.

Plate application

5. Determine the type of plate depending on anatomy and fracture (SIJ plate closed or 5-hole.)

6. Temporarily fixate using spikes.

7. Verify plate position under fluoroscopy or x-ray inspection.

8. Insert cortical or cancellous screws (either locking or non-locking) into the holes of the plate - *see p. 30 for screw insertion instructions.*

> **NOTE:** The SI-Joint is angulated 20° from posterior medial to posterior lateral. To be sure screws don't cross the joint, the image intensifier has to be placed in exactly that inclination angle (20°)

Dorsal Neutralisation Plating for Posterior Pelvic Ring Fractures

Straight Reconstruction Plate

Approach:

1. Prone the position of the patient.
2. Create skin incisions on both sides, somewhat lateral to the posterior superior iliac spine in a cranial direction, each about 5-6 cm long.

Fracture reduction

3. Bilateral exposure of the rear iliac crest and reduction using a Schanz screw, longitudinal traction on the leg, if necessary, with the help of reduction forceps.

Plate application

4. Insert a straight plate of any length, chosen based on specific patient anatomy.
5. Align the plate horizontally under fluoroscopy, and mark the position on the bone.
6. Determine the required plate length.

NOTE: The length of the definitive plate is 4 more holes than the distance between the iliac crests in the reduced state requires.

7. Remove the plate and pre-bend the final selected about 60° between the second and third hole using the plate benders. (see p. 29)
8. Countersink the bone by approximately 0.5 cm, using a bone nibbler or osteotome, to allow the plate to bury within the posterior superior iliac spine .(PSIS)

NOTE: This serves to avoid the problem of metal prominence post-operatively.

9. Insert the plate with the straight leg and advance to the second incision.
10. Bend the plate 60° on the second side in situ between the second and third hole.
11. Rotate the plate 180° so that the bent ends come into contact with the outside of each corresponding side of the ilium.
12. After pre-drilling, fill the two holes located on the dorsal side above the iliac crest.

TIP: By drilling at an inclination outward by approx. 20°, non-locking screw lengths of more than 80mm can be used, depending on the patient's anatomy.

13. Tighten the screws to bring the plate closer to the bone.
14. Insert screws into the remaining four holes in the short ends.

NOTE: If possible, ensure that the screws do not touch the sacrum and iliac joint.

TIP: A very high torsional stiffness can be achieved by using short angular stable screws from the outside.

Postoperative treatment

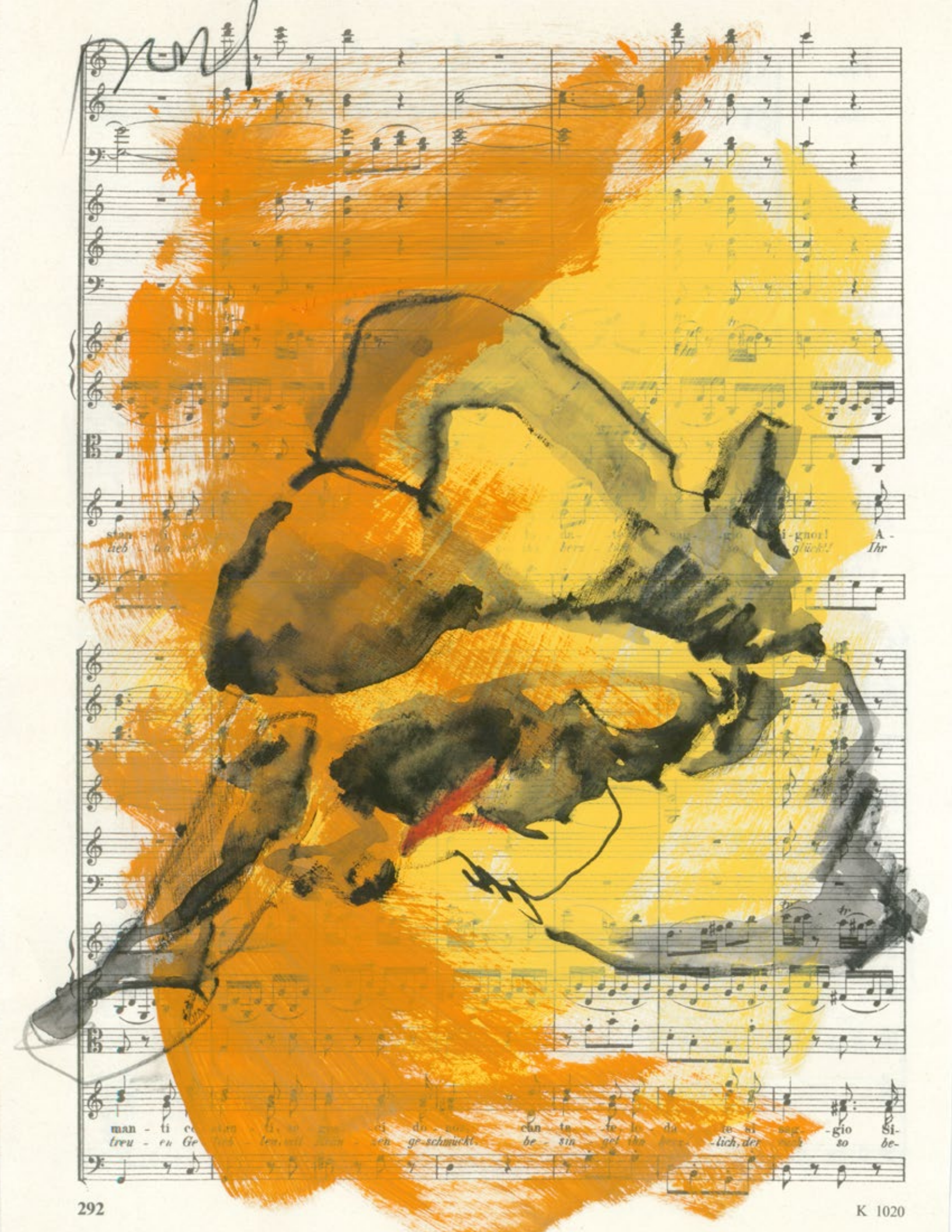
The postoperative treatment may vary depending on the patient's age, bone quality, or type of fracture.

Explantation

Removal is possible if desired by the patient. This is facilitated by the fact that, due to different materials of plate and screws, cold welding rarely occurs.

Removal should be performed only after radiographic verification of the healed bone.

The occurrence of cold welding is reduced by a special surface treatment (for further information see page 52).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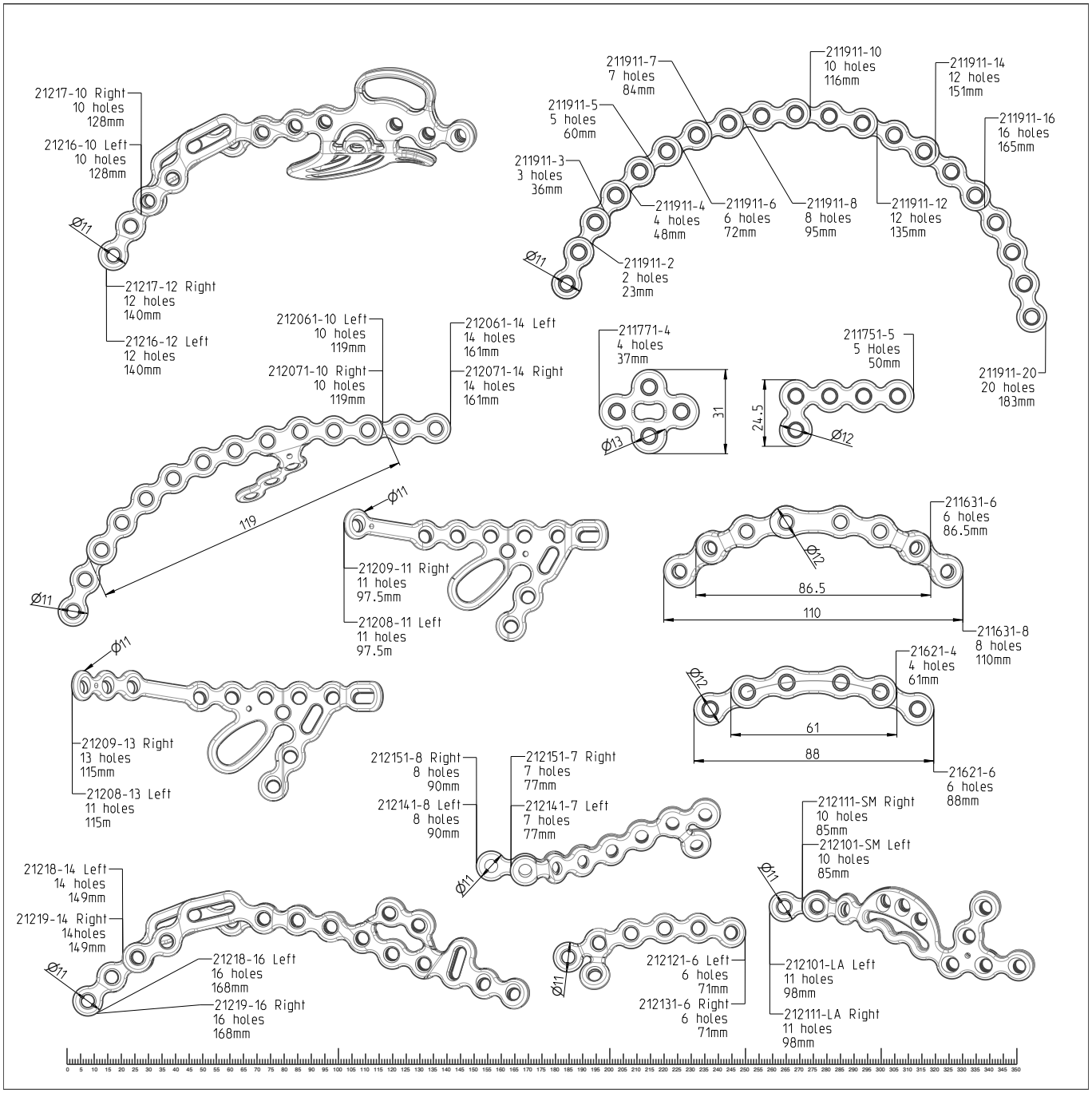
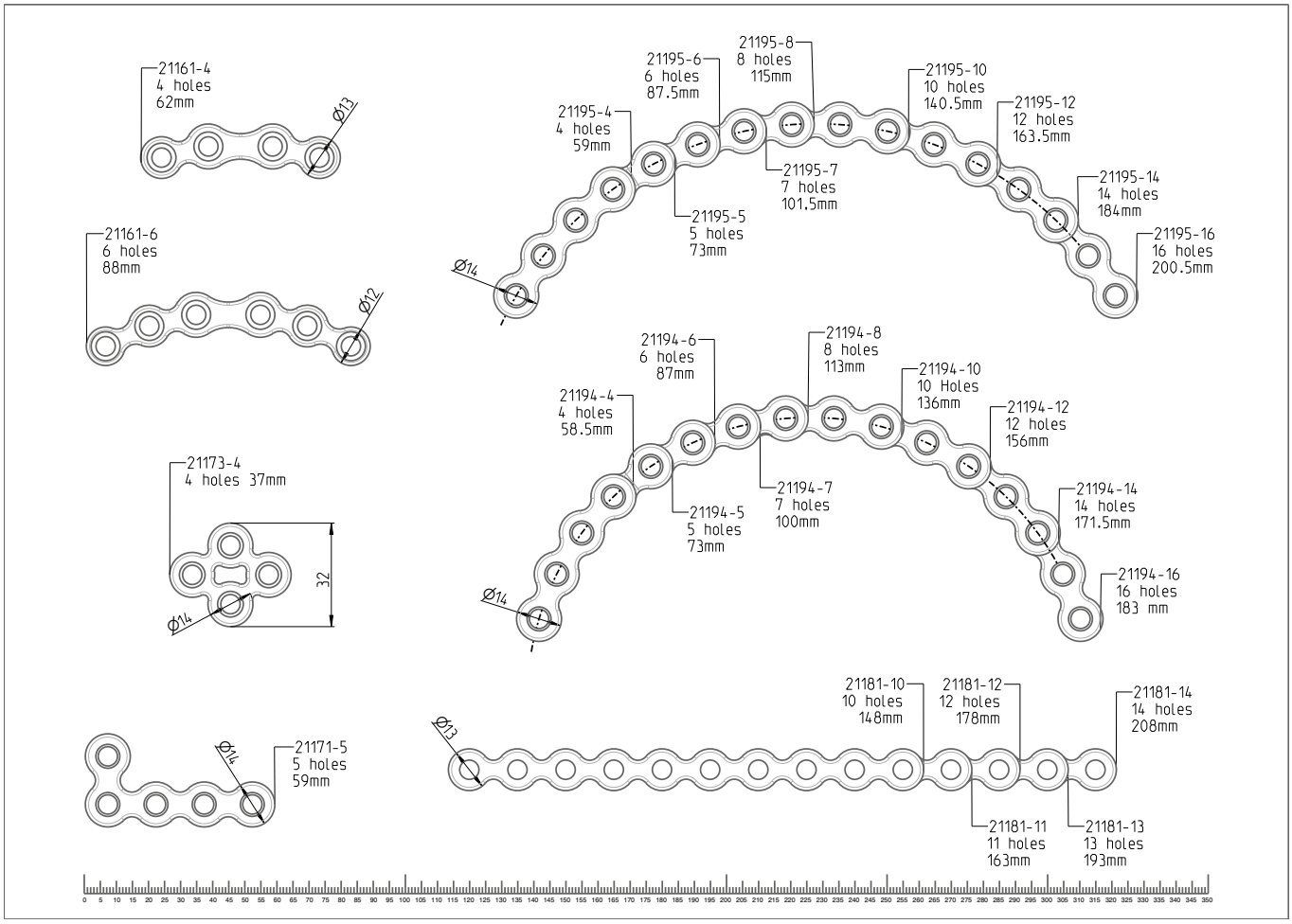
Technical Information

Small Fragment Plates (A)



For detailed cleaning and sterilization instructions, please refer to package insert.

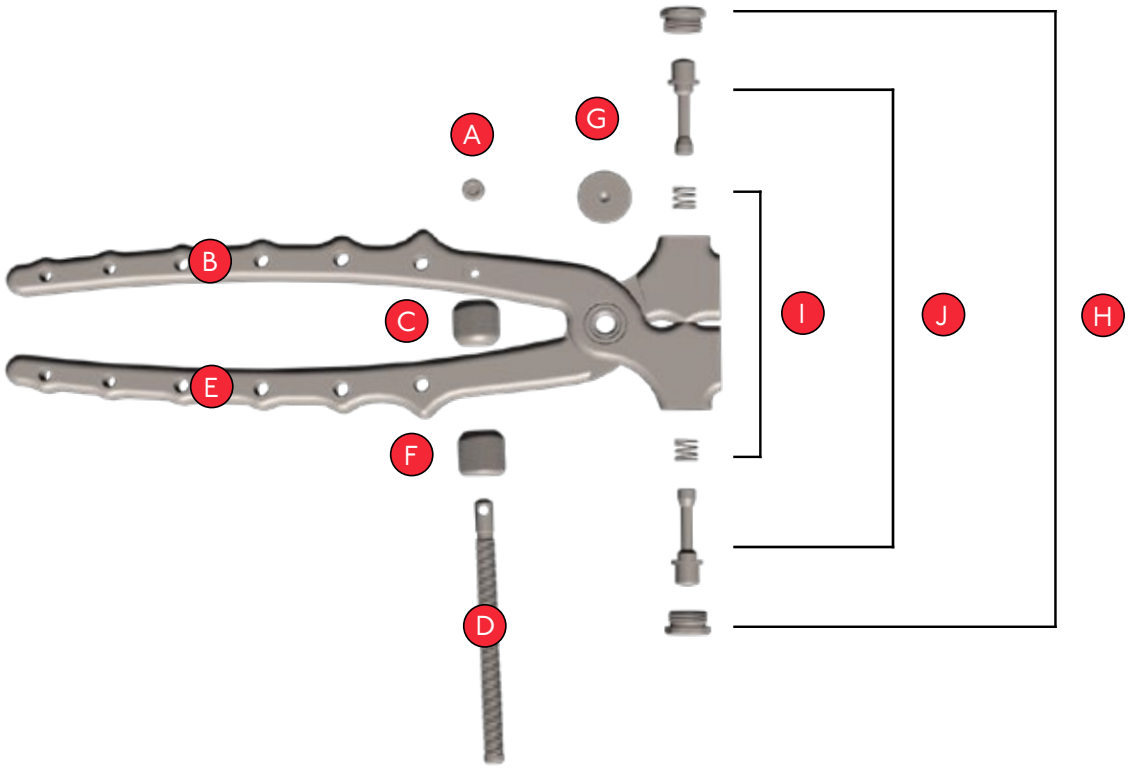
Large Fragment Plates (**B**)



For detailed cleaning and sterilization instructions, please refer to package insert.

Assembly/ Disassembly

Universal Handle for Reduction Instrument



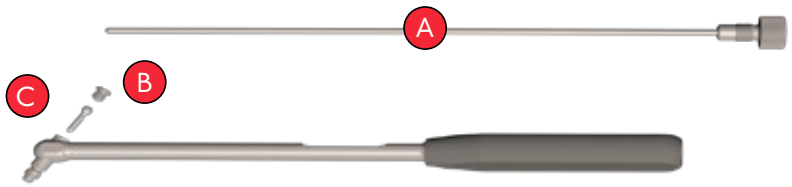
Assembly

1. Unscrew the small grub screw (A) and remove the slide bar from the fastening site (on B).
2. Unscrew the middle nut (C).
3. Slide out the threaded bar (D) from the other side of the handle (E).
4. Unscrew the first nut (F).
5. Unscrew the center fixation screw (G) to disassemble the two parts of the handle (B & E).
6. Push buttons: unscrew the fixation nut (H) and disassemble the coil spring (I) from the pusher (J).

Assembly

1. Attach the two screw handle sides (B & E) with the center fixation screw (G).
2. Screw the first nut (F) onto the threaded bar (D).
3. Slide the threaded bar through the first part of the handle (E) and then screw on the middle nut (C).
4. Slide the bar to the fastening site (on B) and fix the bar with the small grub screw (A).
5. Push buttons: slide the coil spring (I) onto the pusher (J) and fix it with the nut (H).

Plate Holder



Disassembly

1. Unscrew and remove the long rod pusher (A).
2. Unscrew the fixation screw (B) and remove the pin (C).

Assembly

1. Insert the pin (C) and close it with the fixation screw (B).
2. Screw in the long rod pusher (A).

Type II Anodization

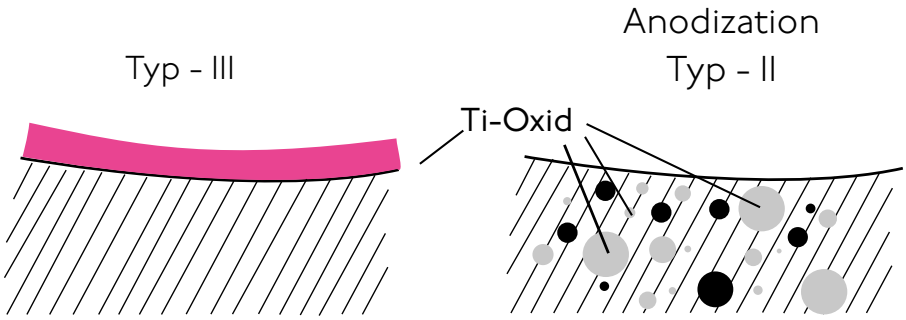
Chemical process - anodization in a strong alkaline solution*

Type III anodization

- Layer thickness 60-200nm
  - \+ Different colors
  - \- Implant surface remains sensitive to:
    Chipping
    Peeling
    Discoloration

Type II anodization

- Layer thickness 2000-10 000nm
  - \+ Film becomes an interstitial part of the titanium
  - \- No visible cosmetic effect



Anodization Type II leads to following benefits*

- Oxygen and silicon absorbing conversion layer
- Decrease in protein adsorption
- Closing of micropores and microcracks
- Reduced risk of inflammation and allergy
- Hardened titanium surface
- Reduced tendency of cold welding of titanium implants
- Increased fatigue resistance of implants
- Improved wear and friction characteristics

* White Paper: Ti6Al4V with Anodization Type II: Biological Behavior and Biomechanical Effects; Axel Baumann, Nils Zander

Ordering Information

Small Fragment Plates (A)

Symphysis Plate	Holes	Article Number
	4	211621-4
	6	211621-6

Symphysis Plate Curved	Holes	Article Number
	6	211631-6
	8	211631-8

SIJ Plate	Description	Article Number
	5-hole	211751-5
	Closed	211771-4

Curved Plate	Holes	Article Number
	2	211911-2
	3	211911-3
	4	211911-4
	5	211911-5
	6	211911-6
	7	211911-7
	8	211911-8
	10	211911-10
	12	211911-12
	14	211911-14
	16	211911-16
	20	211911-20

Straight Plate	Holes	Article Number
	10	211821-10
	11	211821-11
	12	211821-12
	13	211821-13
	14	211821-14

Posterior Column Plate	Description	Holes	Article Number
	Left	6	212121-6
	Right	6	212131-6

Posterior Wall Plate	Description	Holes	Article Number
	Left	7	212141-7
	Right	7	212151-7
	Left	8	212141-8
	Right	8	212151-8

Posterior Wall Plate Extended	Description	Size	Article Number
	Left	Small	212101-SM
	Right	Small	212111-SM
	Left	Large	212101-LA
	Right	Large	212111-LA

Anterior Column Plate	Description	Size	Article Number
	Left	14	21218-14
	Right	14	21219-14
	Left	16	21218-16
	Right	16	21219-16

Biplanar 2-Column Plate	Description	Holes	Article Number
	Left	10	21216-10
	Right	10	21217-10
	Left	12	21216-12
	Right	12	21217-12

Quadrilateral Buttress Plate	Description	Holes	Article Number
	Left	11	21208-11
	Right	11	21209-11
	Left	13	21208-13
	Right	13	21209-13

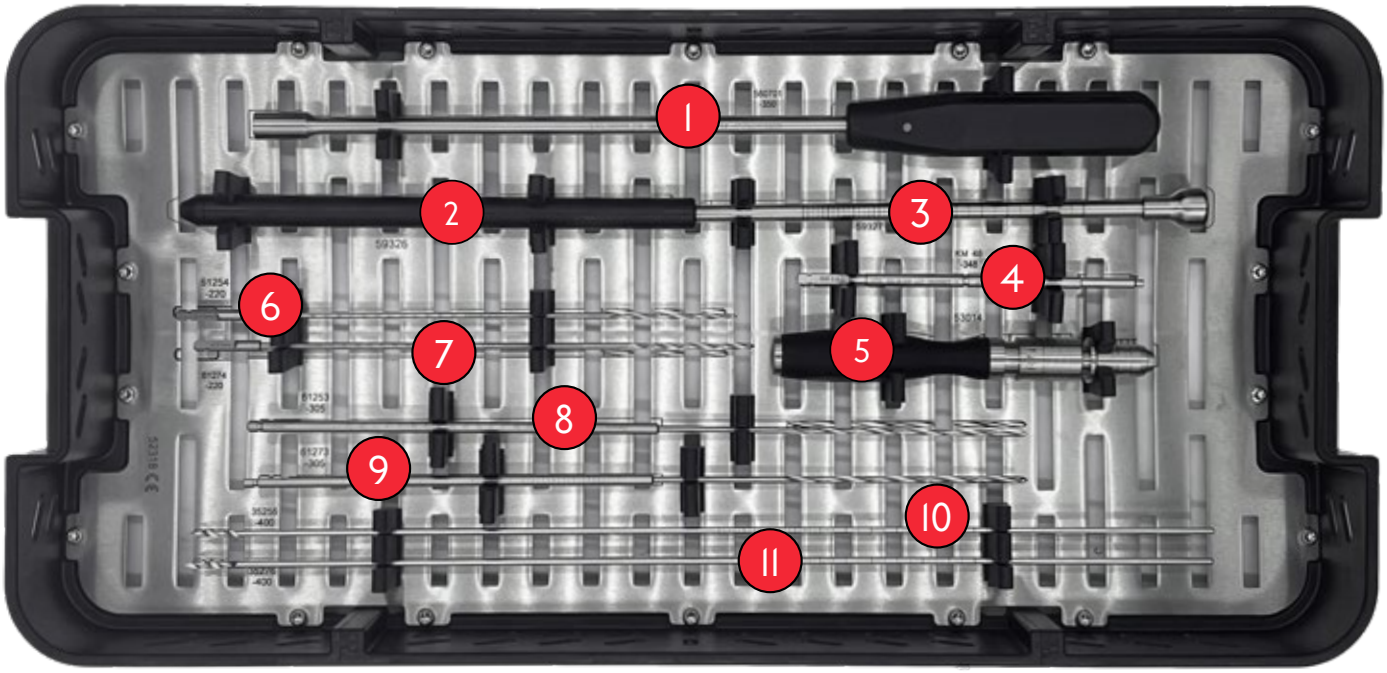
Rim Plate	Description	Size	Article Number
	Left	10	212061-10
	Right	10	212071-10
	Left	14	212061-14
	Right	14	212071-14

Small Fragment Screws (A)

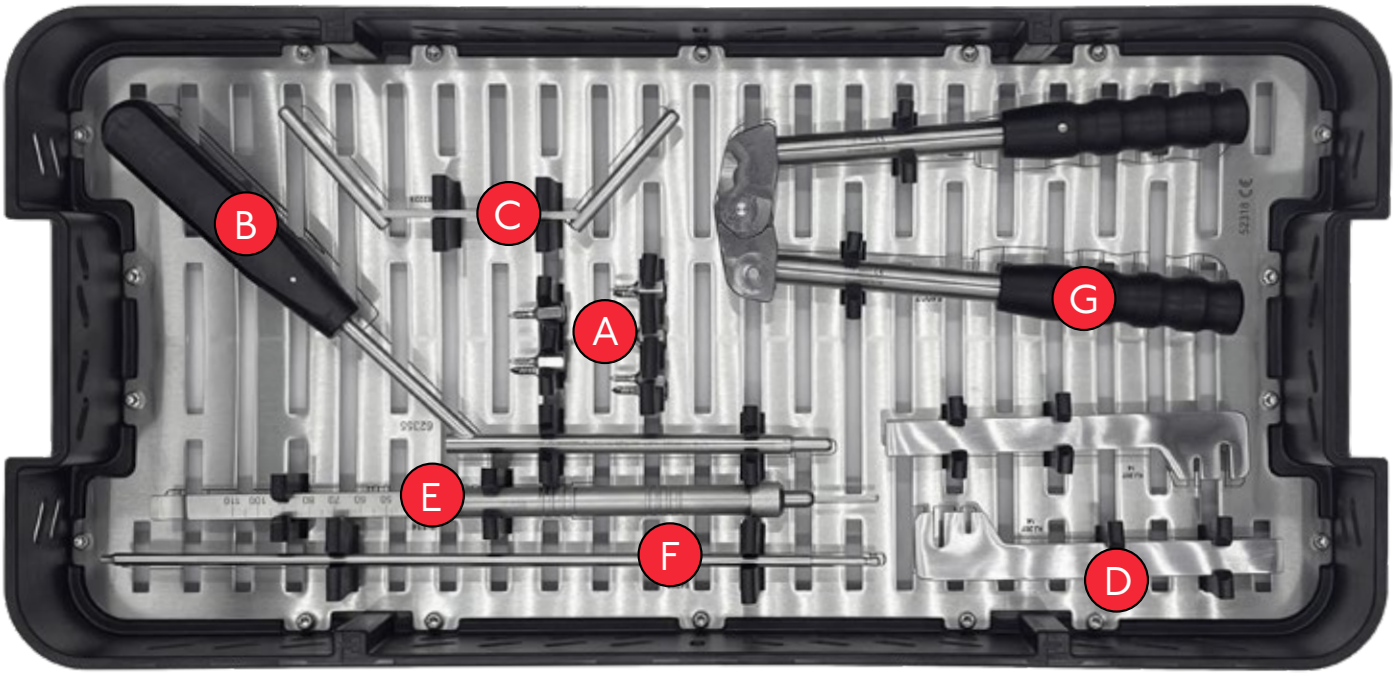
Cancellous Screw, D=4.2	Length	Article Number
Locking	16	37422-16-N
	18	37422-18-N
	20	37422-20-N
	22	37422-22-N
	24	37422-24-N
	26	37422-26-N
	28	37422-28-N
	30	37422-30-N
	32	37422-32-N
	34	37422-34-N
	36	37422-36-N
	38	37422-38-N
	40	37422-40-N
	42	37422-42-N
	44	37422-44-N
	46	37422-46-N
	48	37422-48-N
	50	37422-50-N
	55	37422-55-N
	60	37422-60-N
	65	37422-65-N
	70	37422-70-N
	75	37422-75-N
	80	37422-80-N
	85	37422-85-N
	90	37422-90-N
	95	37422-95-N
	100	37422-100-N
	105	37422-105-N
	110	37422-110-N
	115	37422-115-N
	120	37422-120-N

Cortical Screw, D=3.5	Length	Article Number
Non-locking	16	32352-16
	18	32352-18
	20	32352-20
	22	32352-22
	24	32352-24
	26	32352-26
	28	32352-28
	30	32352-30
	32	32352-32
	34	32352-34
	36	32352-36
	38	32352-38
	40	32352-40
	42	32352-42
	44	32352-44
	46	32352-46
	48	32352-48
	50	32352-50
	55	32352-55
	60	32352-60
	65	32352-65
	70	32352-70
	75	32352-75
	80	32352-80
	85	32352-85
	90	32352-90
	95	32352-95
	100	32352-100
	105	32352-105
	110	32352-110
	115	32352-115
	120	32352-120

Small Fragment Instruments (A)



	Description	Article Number
1	Socket Spanner with Handle	560701-350
2	Measuring Sleeve	59326
3	Measuring Rod	59327
4	Hexagon Shank, WS 2.5, L=135mm, AO Connector	KM 48-348
5	Ratchet Handle, AO Connector	53014
6	Spiral Drill, D=2.5mm, L=220mm, AO Connector	61254-220
7	Spiral Drill, D=2.7mm, L=220mm, AO Connector	61274-220
8	Spiral Drill, D=2.5mm, L=305mm, AO Connector	61253-305
9	Spiral Drill, D=2.7mm, L=305mm, AO Connector	61273-305
10	Guide wire, Drill tip, D=2.5mm, L=400mm	35256-400
11	Guide wire, Drill tip, D=2.7mm, L=400mm	35276-400



	Description	Article Number
A	Spike	70301-7
B	Drill Guide, Long	62355
C	Drill Guide	62223
D	Bending Irons	KJ.207.14
E	Measuring Gauge	9-114
F	Hexagon Shank, WS 2.5, L=300mm, AO Connector	54253-300
G	Bending Forceps	64007
	Sterilization Tray	50313-PHX

All instrumentation is surface contacting only

(OPTIONAL IMPLANTS)

Optional Implants	Article Number
Fixation Spike Short	70314

Large Fragment Plates (B)

Symphysis Plate	Holes	Article Number
	4	21161-4
	6	21161-6

SIJ Plate	Description	Article Number
	5-hole - Right	21171-5
	5-hole - Left	21172-5
	Closed	21173-4

Straight Plate	Holes	Article Number
	10	21181-10
	11	21181-11
	12	21181-12
	13	21181-13
	14	21181-14

Curved Plate RI08	Holes	Article Number	Template Article Number
	4	21194-4	67194-4
	5	21194-5	67194-5
	6	21194-6	67194-6
	7	21194-7	67194-7
	8	21194-8	67194-8
	10	21194-10	67194-10
	12	21194-12	67194-12
	14	21194-14	67194-14
	16	21194-16	67194-16

Curved Plate R88	Holes	Article Number	Template Article Number
	4	21195-4	67195-4
	5	21195-5	67195-5
	6	21195-6	67195-6
	7	21195-7	67195-7
	8	21195-8	67195-8
	10	21195-10	67195-10
	12	21195-12	67195-12
	14	21195-14	67195-14
	16	21195-16	67195-16

Large Fragment Screws (B)

Cancellous Screw, D=5.9	Length	Article Number
Locking	16	37592-16
	20	37592-20
	24	37592-24
	28	37592-28
	32	37592-32
	36	37592-36
	40	37592-40
	44	37592-44
	48	37592-48
	52	37592-52
	56	37592-56
	60	37592-60

Cancellous Screw, D=5.9	Length	Article Number
Non-Locking	16	30591-16
	20	30591-20
	24	30591-24
	28	30591-28
	32	30591-32
	36	30591-36
	40	30591-40
	44	30591-44
	48	30591-48
	52	30591-52
	56	30591-56
	60	30591-60

Cortical Screw, D=4.5	Length	Article Number
Non-Locking	16	32455-16
	20	32455-20
	24	32455-24
	28	32455-28
	32	32455-32
	36	32455-36
	40	32455-40
	44	32455-44
	48	32455-48
	52	32455-52
	56	32455-56
	60	32455-60

(OPTIONAL)

Cancellous Screw, D=5.9	Length	Article Number
Locking	65	37592-65
	70	37592-70
	75	37592-75
	80	37592-80
	85	37592-85
	90	37592-90
	95	37592-95
	100	37592-100
	105	37592-105
	110	37592-110
	115	37592-115
	120	37592-120

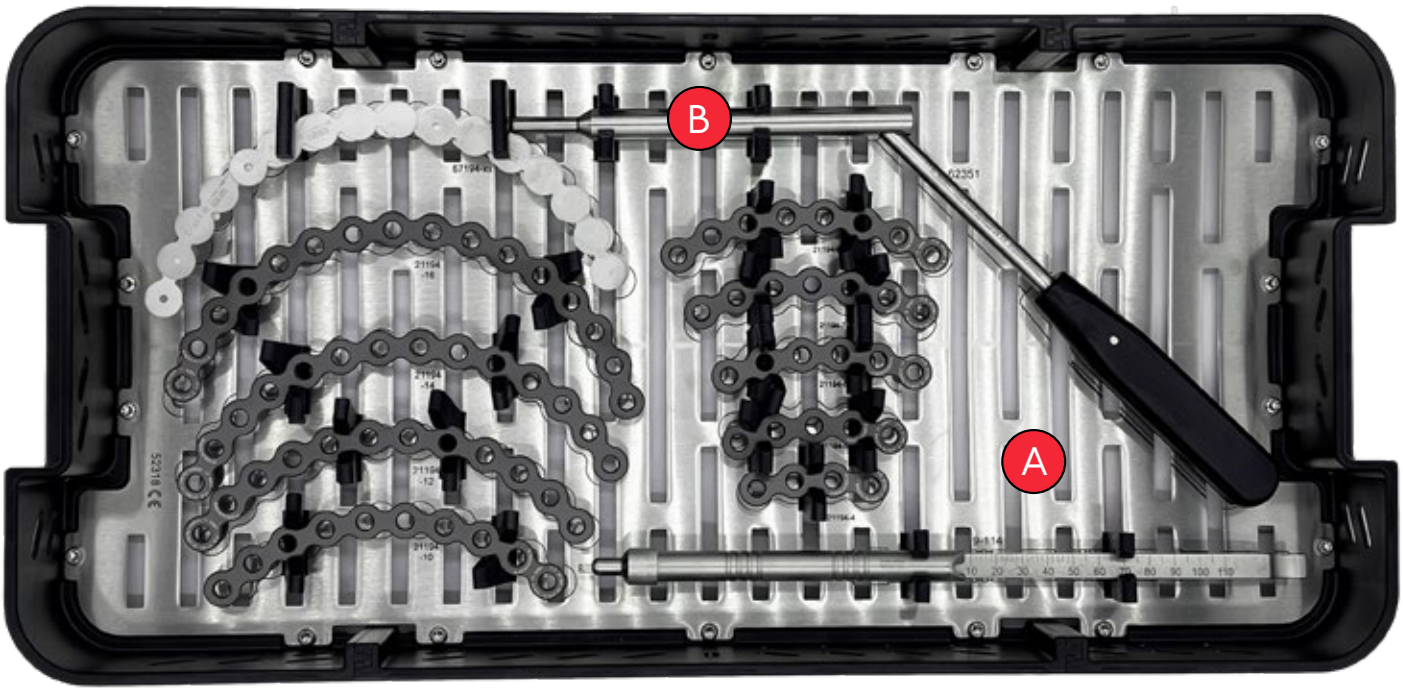
Cortical Screw, D=4.5	Length	Article Number
Non-Locking	65	32455-65
	70	32455-70
	75	32455-75
	80	32455-80
	85	32455-85
	90	32455-90
	95	32455-95
	100	32455-100
	105	32455-105
	110	32455-110
	115	32455-115
	120	32455-120

Cancellous Screw, D=5.9	Length	Article Number
Non-Locking	65	30591-65
	70	30591-70
	75	30591-75
	80	30591-80
	85	30591-85

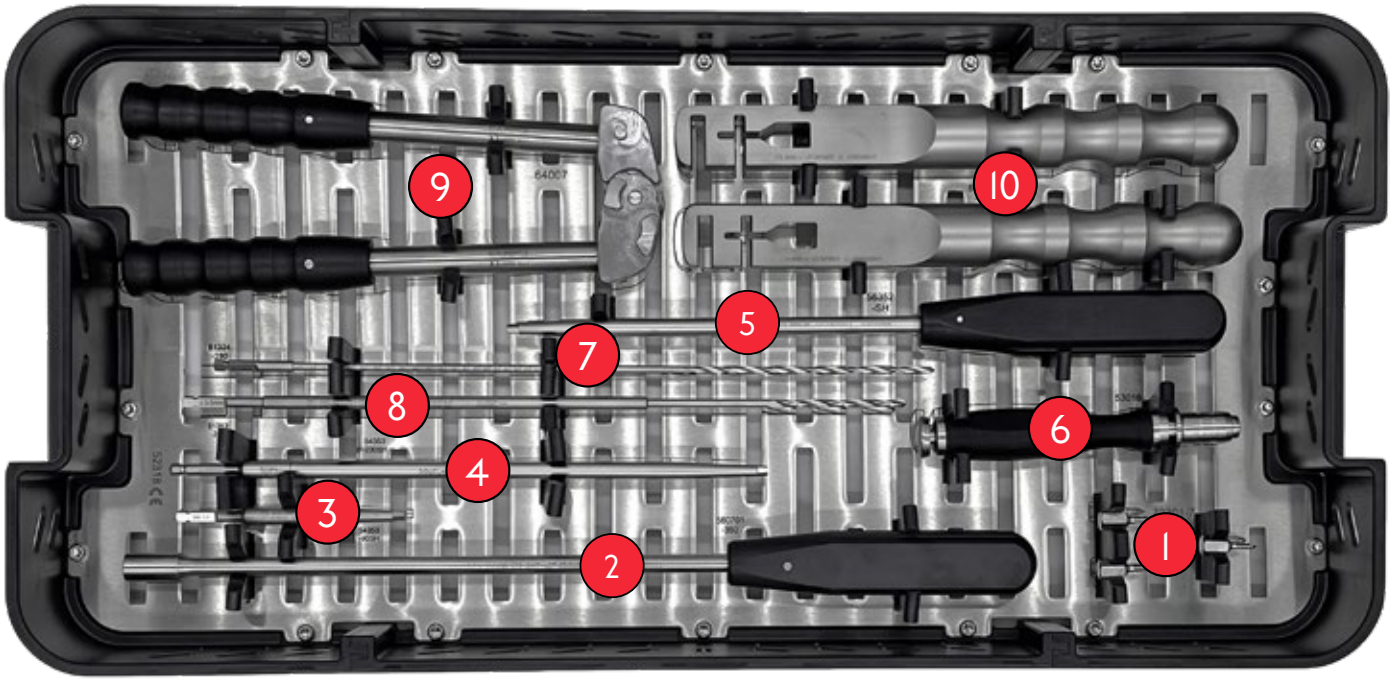
Cancellous Screw, D=5.9	Length	Article Number
Non-Locking	90	30591-90
	95	30591-95
	100	30591-100
	105	30591-105
	110	30591-110
	115	30591-115
	120	30591-120

Cortical Screw, D=4.5	Length	Article Number
Locking	16	37455-16
	20	37455-20
	24	37455-24
	28	37455-28
	32	37455-32
	36	37455-36
	40	37455-40
	44	37455-44
	48	37455-48
	52	37455-52
	56	37455-56
	60	37455-60
	65	37455-65
	70	37455-70
	75	37455-75
	80	37455-80
	85	37455-85
	90	37455-90
	95	37455-95
	100	37455-100
	105	37455-105
	110	37455-110
	115	37455-115
	120	37455-120

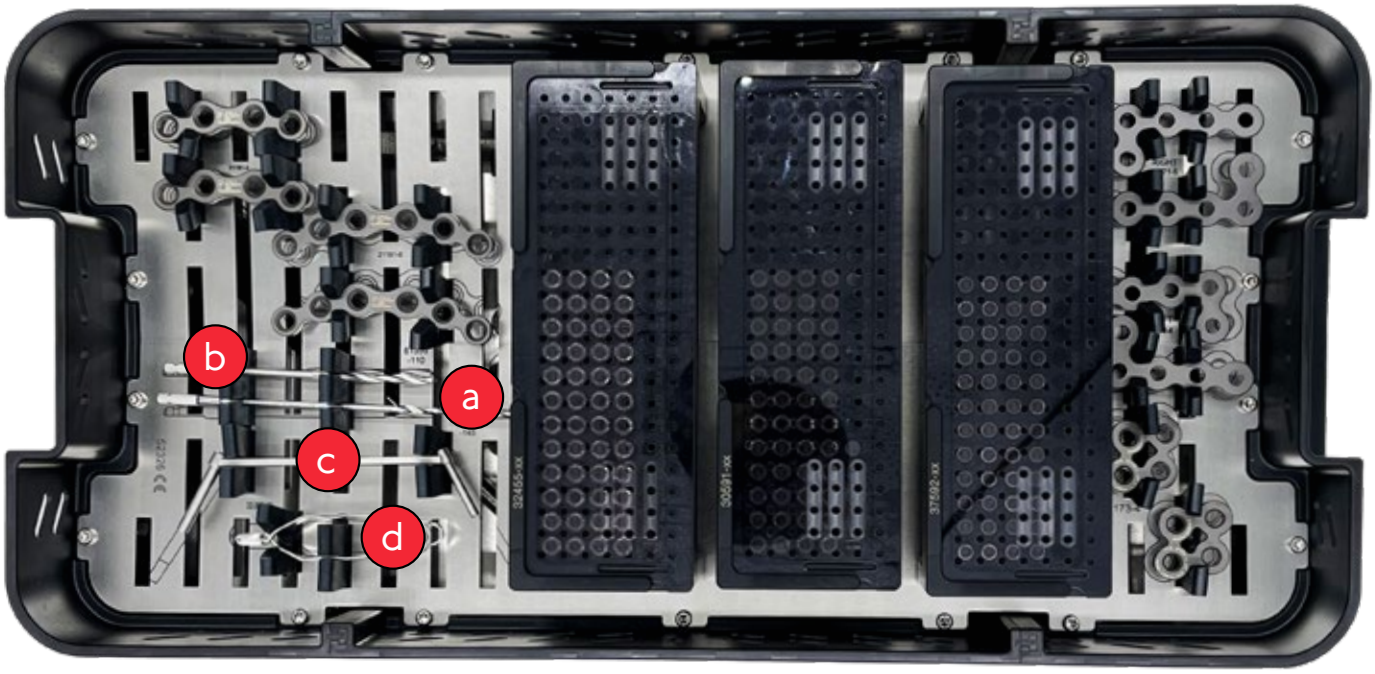
Large Fragment Instruments (B)



	Description	Article Number
A	Depth Gauge	9-114
B	Drill Guide, Long	62351



	Description	Article Number
1	Spike	70301-7
2	Socket Spanner with Handle	560701-350
3	Screwdriver Shank, PRS, Solid; WS 3.5, L=90mm, AO Connector	54353-90SH
4	Screwdriver Shank, PRS, Solid; WS 3.5, L=230mm, AO Connector	54353-230SH
5	Screwdriver	56352-SH
6	AO Silicone Handle	53016
7	Spiral Drill, D=3.2mm, L=280mm, AO-Connector	61324-280
8	Spiral Drill, D=3.5mm, L=280mm, AO-Connector	61353-280
9	Bending Forceps	64007
10	Bending Iron	66252-14



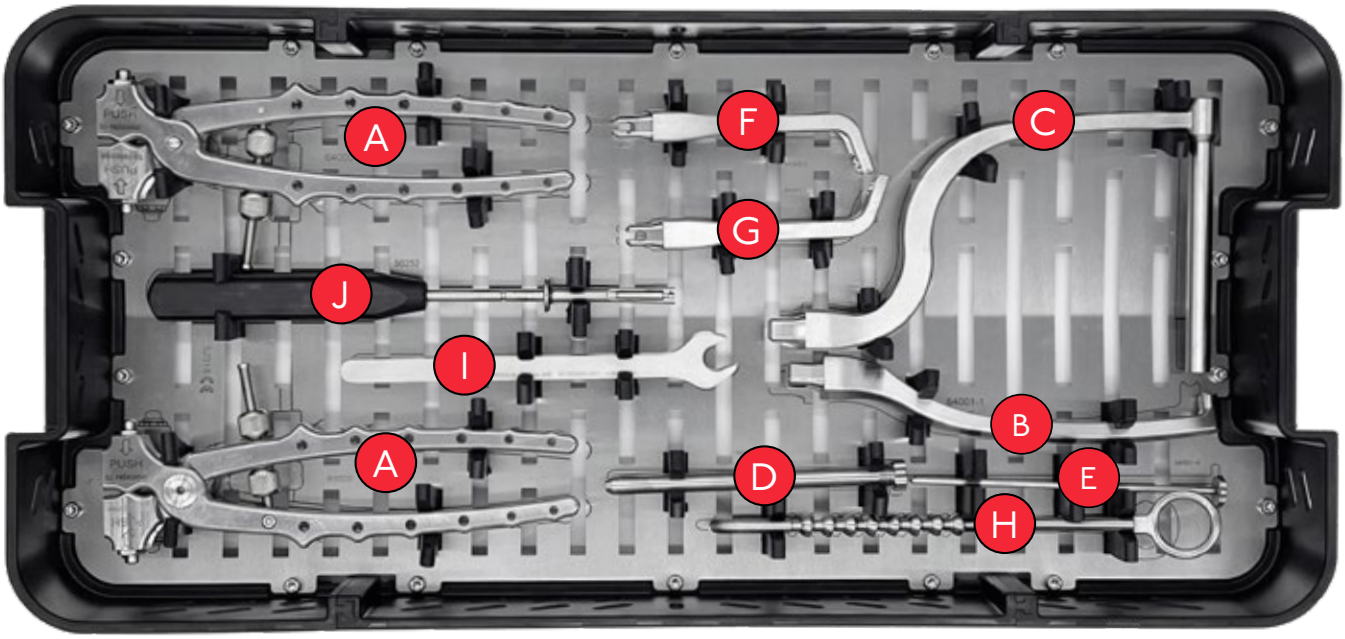
	Description	Article Number
a	Spiral Drill, D=3.2mm, L=145mm, AO Connector	61323-145
b	Spiral Drill, D=3.5mm, L=110mm, AO Connector	61353-110
c	Drill Guide	62252
d	Screw Tweezers	33.839.09
	Sterilization Tray	50313-PHX

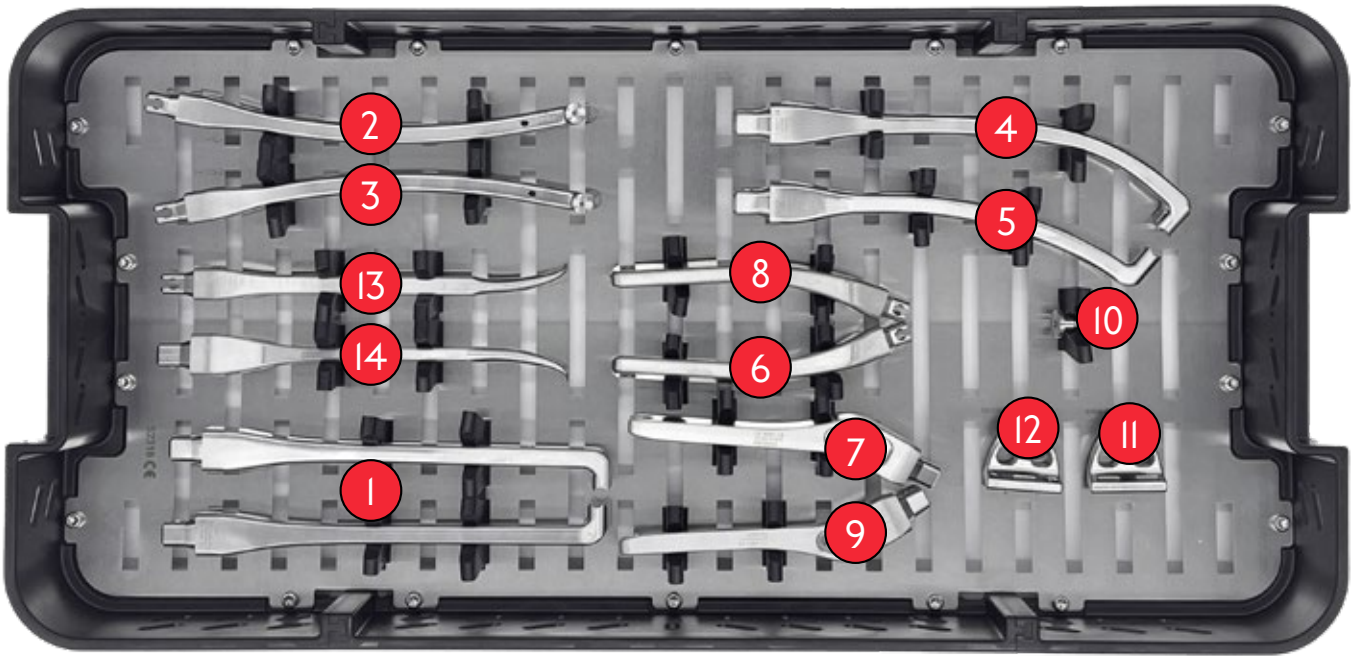
All instrumentation is surface contacting only

(OPTIONAL IMPLANTS)

Optional Implants	Article Number
Fixation Spike Short	70304

Reduction Instrumentation (C)





Reduction Instruments	Description	Article Number
A	Universal Handle	64000
B	Posterior Wall, Arm Straight	6400I-I
C	Posterior Wall, Arm Wide	6400I-2
D	Posterior Wall, Arm Wide k-Wire Sleeve	6400I-3
E	Posterior Wall, Arm Wide, Trochar	6400I-4
F	Jungbluth, Arm A	64005-I
G	Jungbluth, Arm B	64005-2
H	Hook, Ischium, Pelvic Linear Hook Attachment	64006-8
i	Flatwrench	700II
J	Screwdriver WS 2.5. Self Holding Sleeve	56252
I	Standard, Straight	64002
2	Standard, Curved, Arm A	64003-I
3	Standard Curved, Arm B	64003-2
4	Angled, Arm A	64004-I
5	Angled, Arm B	64004-2
6	Thrust Arm, Left Pelvic Linear Hook Attachment	64006-I
7	Hook Arm, Left, Pelvic Linear Hook Attachment	64006-2
8	Thrust Arm, Right, Pelvic Linear Hook Attachment	64006-3
9	Hook Arm, Right, Pelvic Linear Hook Attachment	64006-4
I0	Connection Screw, Pelvic Linear Hook Attachment	64006-5
II	Thrust, Pelvic Ring, Toothed, Pelvic Linear Hook A	64006-6
I2	Thrust, Pelvic Ring, Ballspike, Pelvic Linear Hook	64006-7
I3	Reduction Forceps Attachment, Weber, Arm A	64008-I
I4	Reduction Forceps Attachment, Weber, Arm B	64008-2

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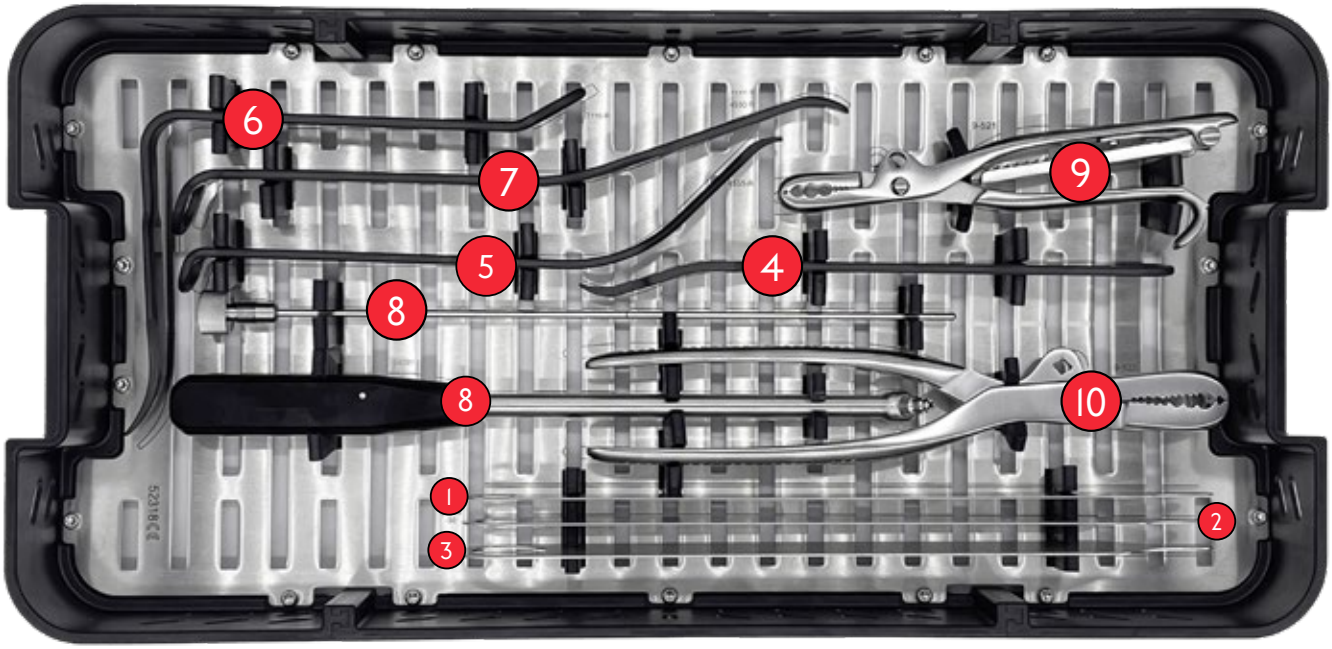
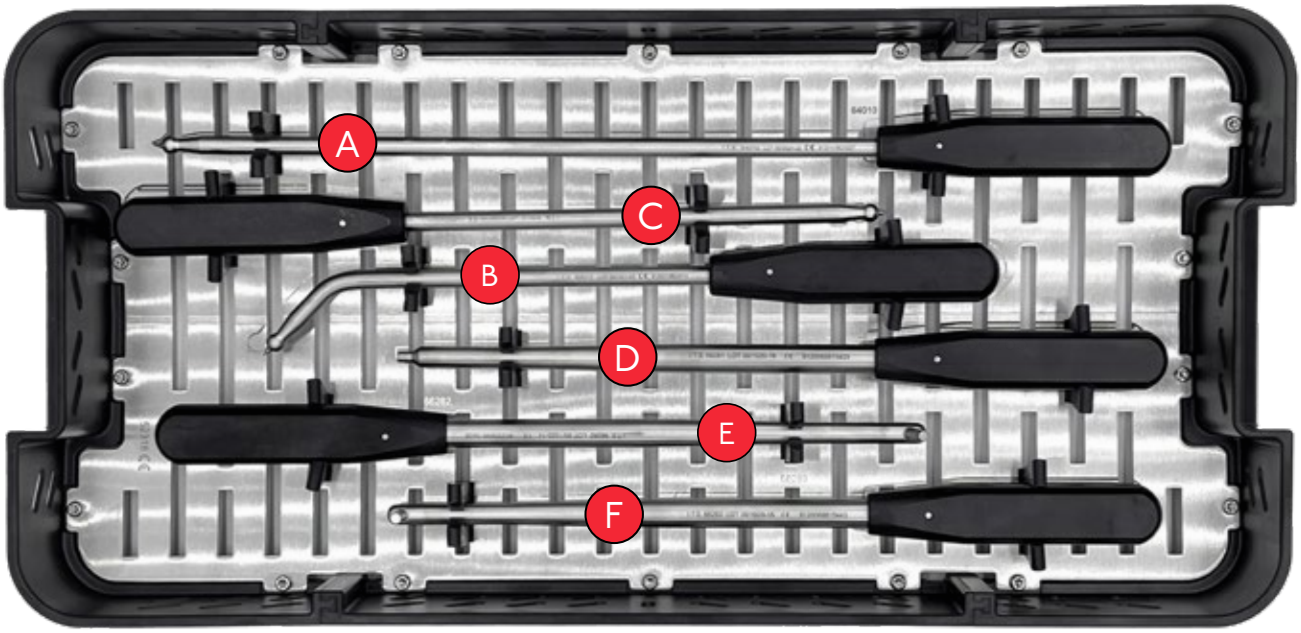


Retractors	Description	Article Number
1	Retractor, Malleable, 25mm	64013-25
2	Retractor, Malleable, 30mm	64013-30
3	Retractor, Malleable, 45mm	64013-45
4	Retractor, Radiolucent, Standard	64014
5	Retractor, Radiolucent, Narrow, 90°	64015
6	Retractor, Radiolucent, Narrow, Bent	64016
7	Retractor, Radiolucent, Blunt	64017

Plate Holder	Description	Article Number
8	Plate Holder, Small Fragment	64009
	Handle Cannulated, Plate Holder, Small Fragment	64009-1
	Sleeve, Plate Holder, Small Fragment	64009-2
	Slider, Plate Holder, Small Fragment	64009-3
	Nut, Plate Holder, Small Fragment	64009-4

Other Reduction Instruments	Description	Article Number
9	Reduction Forceps, Farabeuf, 190mm, with Ratchet	9-521
10	Reduction Forceps, Farabeuf, 260mm	9-522

All instrumentation is surface contacting only



Ballspike	Description	Length	Article Number
A	Straight	300mm	64010
B	Angled	300mm	64011
C	Straight	200mm	64012

In Situ Bending irons (for Small Fragment Plates)	Description	Article Number
D	Straight	66261
E	Oblique	66262
F	90°	66263

(OPTIONAL INSTRUMENTS)

Optional Instruments	Article Number
Pushing Plate, Ballspike	64019-1

8.5 Cannulated Screws (D)

Cancellous Screw, D=8.5	Length	Article Number
Fully Threaded	60	31851-60
	65	31851-65
	70	31851-70
	75	31851-75
	80	31851-80
	85	31851-85
	90	31851-90
	95	31851-95
	100	31851-100
	105	31851-105
	110	31851-110
	115	31851-115
	120	31851-120
	125	31851-125
	130	31851-130
	135	31851-135
	140	31851-140
	145	31851-145
	150	31851-150
	155	31851-155
	160	31851-160
	165	31851-165
	170	31851-170
	175	31851-175
	180	31851-180
	185	31851-185
	190	31851-190
	195	31851-195
	200	31851-200

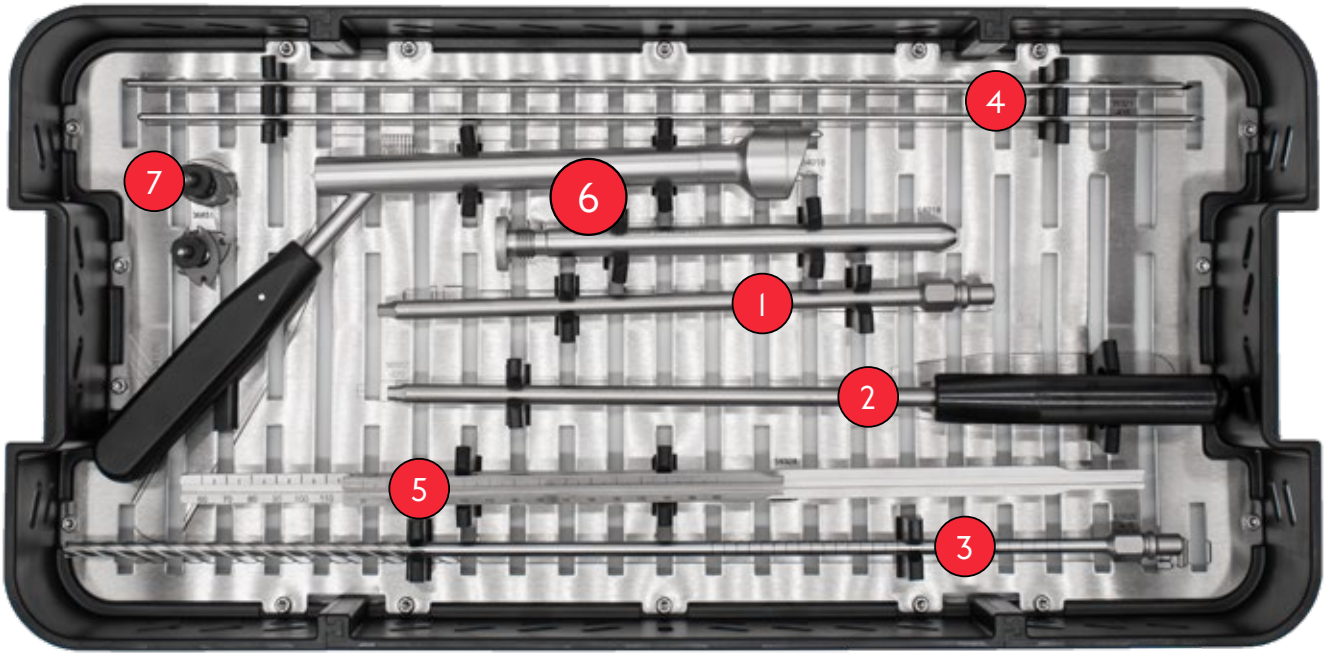
Cancellous Screw, D=8.5	Length	Article Number
Partially Threaded	60	31854-60
	65	31854-65
	70	31854-70
	75	31854-75
	80	31854-80
	85	31854-85
	90	31854-90
	95	31854-95
	100	31854-100
	105	31854-105
	110	31854-110
	115	31854-115
	120	31854-120
	125	31854-125
	130	31854-130
	135	31854-135
	140	31854-140
	145	31854-145
	150	31854-150
	155	31854-155
	160	31854-160
	165	31854-165
	170	31854-170
	175	31854-175
	180	31854-180
	185	31854-185
	190	31854-190
	195	31854-195
	200	31854-200

(OPTIONAL)

Cancellous Screw, D=8.5	Length	Article Number
Fully Threaded	205	31851-205
	210	31851-210
	215	31851-215
	220	31851-220
	225	31851-225
	230	31851-230
	235	31851-235
	240	31851-240
	245	31851-245
	250	31851-250

Cancellous Screw, D=8.5	Length	Article Number
Partially Threaded	205	31854-205
	210	31854-210
	215	31854-215
	220	31854-220
	225	31854-225
	230	31854-230
	235	31854-235
	240	31854-240
	245	31854-245
	250	31854-250

8.5 Cannulated Screw Instruments (D)



	Instrumente	Artikelnummer
1	Screwdriver Shank, Cannulated, Large AO Connector, WS 5, L=250mm	54502-250
2	Screwdriver, Cannulated, Large AO Connector, SW 5mm, L=220mm	56502-220
3	Spiral Drill, Cannulated, Large AO Connector, D=6.2mm, L=420mm	61620-420
4	Guide Wire, Steel, D=3.2mm, L=435mm, TR, RD	35321-435
5	Depth Gauge 3.2mm, Cannulated 8.5mm Screw	59328
6	Tissue Protection Sleeve, Cannulated Cancellous Screw D=8.5mm	64018
	Sterilization Tray, PRS Phoenix 8.5mm Can. Screws	50327-PHX

	Washer	Article Number
7	OD=16/25; ID=9	36851


SCENA XIV
XIV
detta. (siedono)
denken. (sie setzen sich)
un poco cresc.

Disclaimer:

The intended users are limited to medical personnel with appropriate product training by the medical product consultants or knowledge of the surgical procedure to be applied. The medical staff must ensure that the use of I.T.S. GmbH medical devices is appropriate, taking into account the medical condition and medical history of the patient. Prior to product use, medical personnel must refer to complete information on product label and in IFU, including, but not limited to, indications, contraindications, warnings and preventative measures, and cleaning and sterilization instructions. Product availability is dependent on country registrations and clearances. For more information, please visit www.its-implant.com or contact us at office@its-implant.com. Unless otherwise noted, all information herein is the intellectual property of I.T.S. GmbH.

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