



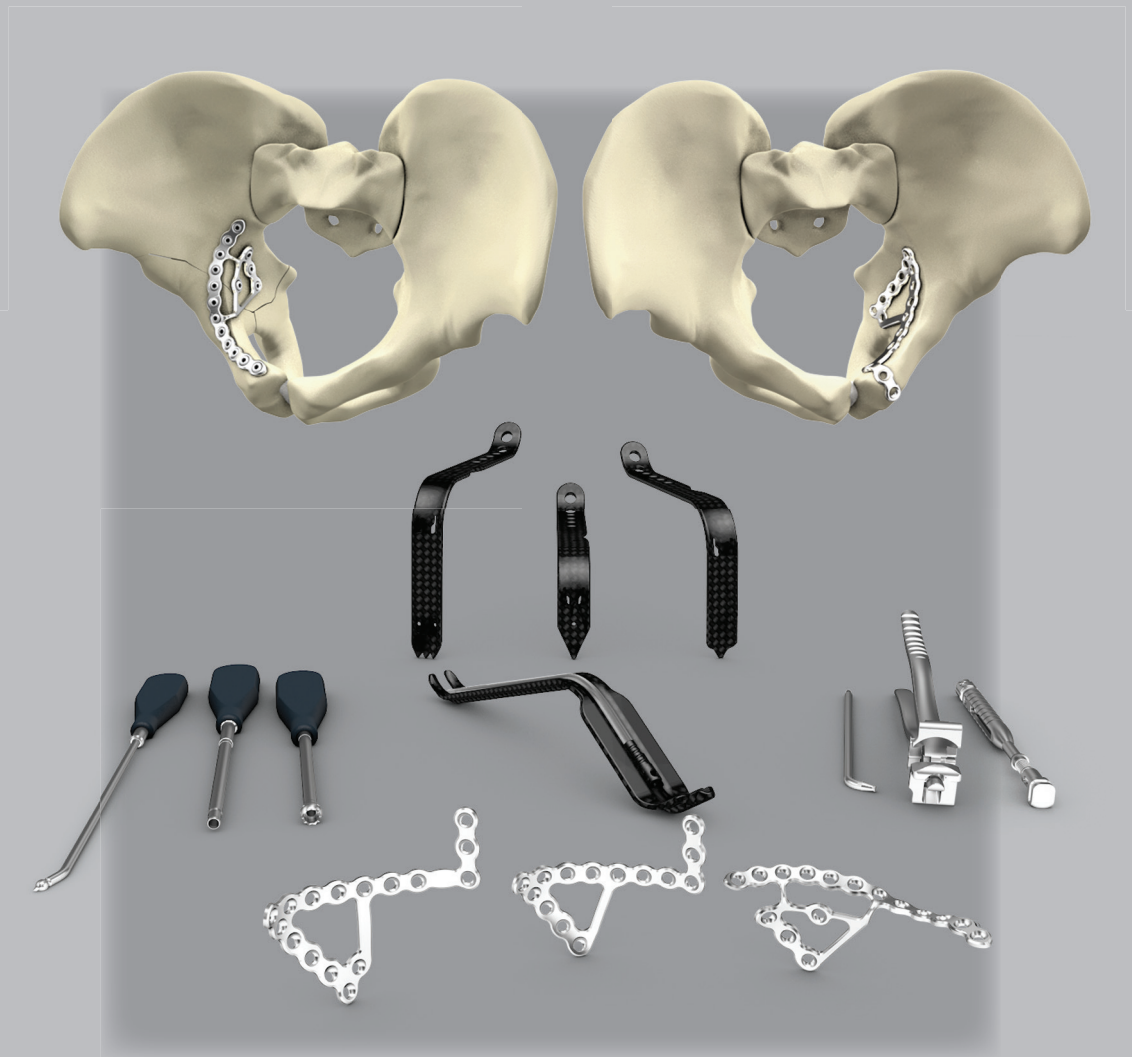
stryker®

Trauma & Extremities

Pelvis II

System Overview

Pelvis & Acetabulum



Pelvis II

Matta

Pelvic & Acetabular Fracture Treatment Solutions

Acknowledgments

Stryker acknowledges Dr. Michael Archdeacon, M.D, Dr. Pierre Guy, M.D., Dr. Joel Matta, M.D., and Dr. H. Claude Sagi, M.D. for their support in the preparation of this material.

Warning:

All bone screws referenced in this document here are not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic or lumbar spine.

This publication sets forth detailed recommended procedures for using Stryker devices and instruments. It offers guidance that you should heed; but, as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required.

The surgical approaches and operative techniques described on the pages to follow are for the treatment of complex injuries to the Pelvis structures.

- In order to treat these injuries successfully, the surgeon must be well-trained and/or have some years of experience as a Pelvis specialist.
- Workshop or specimen lab training is absolutely required prior to attempting the surgery techniques herein described.
- Surgeon education programs are offered by Stryker on a local and regional basis.

See package insert (L22000007) for a complete list of potential adverse effects, contradistinctions, warnings and precautions.

The package inserts for all unsterile components of the Pelvis System (“Instructions for Use”) contains the instructions for sterilization.

Please refer to the Instructions for Cleaning, Sterilization, Inspection and Maintenance of Osteosynthesis Medical Devices (L22000007)

The surgeon must discuss all relevant risks, including the finite lifetime of the device, with the patient, when necessary.

Contents

	Page
1. Introduction	5
2. Pelvis II System Solutions Overview	6
3. Plating Options for Pelvis Fractures	7
4. Indication, Precautions & Contraindications for Stryker Pelvis II Products	8
5. Pelvis II System Design – Implants	9
Matta Pelvis Plates	10
Quadrilateral Surface Plates	11
Screws	13
6. Pelvis II System Design – Instruments	14
7. Retraction & Reduction Instruments	
Carbon Fiber Retractors	
Illumination	
Imaging	
Suction Feature	
Handling	
Sciatic Nerve Retractors	
Retractor 1	
Retractor 2	
Retractor 3	
Suction Retractor	
Angled Ball Spike	
Straight Ball Spike Pusher	
Angled Ball Spike Pusher	
Matta Reduction Forceps	
Reduction Forceps for Screws, Jungbluth	
Verbrugge Forceps	
Reduction Forceps with Points	
Faraboef Forceps	
Reduction Forceps, King Tong	
8. Pelvis II System Design – Trays	23
9. Pelvic Ring Fracture Types & Fixation	24
Symphysis Pubis Disruption	
Ilium Fracture	
Sacroiliac Dislocation	
Sacroiliac Fracture/Dislocation	
Sacrum Fracture	

10.	Acetabular Fracture Types & Fixation	26
	Posterior Wall	
	Posterior Column	
	Anterior Wall	
	Anterior Column	
	Transverse	
	T-Shaped	
	Posterior Column & Posterior Wall	
	Transverse & Posterior Wall	
11.	Plate Contouring & Fixation	32
12.	Bending Techniques	33
13.	Screw Fixation	34

“The perfect restoration of the articular surface and associated osseous architecture” was the goal set forth by R. Judet and E. Letournel in their surgical treatment of fractures of the Pelvis and the Acetabulum.

However, before surgical intervention on a fractured Acetabulum can be accepted as a means of treatment, accurate diagnosis based on radiology is essential. As in other conditions, classification also aids in the accurate understanding of these sometimes complex fractures.

The Letournel classification was first published in 1961. Apart from some minor early modifications, it has since remained unchanged and is now the most widely used classification system for acetabular fractures. This classification proposes the division of the various fracture types into two large groups:

Elementary Fractures comprise those in which a part or all of one or both columns supporting the Acetabulum has been detached by a single fracture line. The five elementary fracture types are:

- Fracture of the posterior wall
- Fracture of the posterior column
- Fracture of the anterior wall
- Fracture of the anterior column
- Transverse fracture

Associated Fractures comprise those in which two or more elementary patterns are combined. The five associated fracture types are:

- T-shaped fracture
- Posterior column and posterior wall fracture
- Transverse and posterior wall fractures
- Anterior column or anterior wall with posterior hemi-transverse fractures
- Both-column fracture

In complex fracture cases, it is often necessary to use a combination of surgical approaches applicable to the anatomic region, the complexity of the acetabular or Pelvis fractures, and appropriate to the surgeon’s skills. A surgical approach is selected with the expectation that the entire reduction and fixation can be performed through the surgical approach or effective additional “windows”. Letournel and others promoted classic approaches or dissections that allow the surgeon to have the best visibility and access for safe, accurate reduction and fixation of fractures. Currently, as surgeons have gained more experience with evolving more complex fractures, the successes and advantages of alternatives to the classic dissections are now being published in peer-reviewed orthopaedic journals.

An example of such is the Modified Stoppa Approach. This approach was described by Cole and Hirvensalo in the early 1990s. Their conclusion suggested that this could be a potentially safer approach for dissection and access to acetabular fractures. It was later described as the Anterior Intrapelvic Approach (AIP). This approach can be used as a single approach, for specific fractures, or as an adjunct approach with other dissection techniques. The approach allows the surgeon to perform the appropriate reductions and fixations well. It allows access to the pubic body, superior ramus, pubic root, the Ilium above and below the pectineal line, the medial aspect of the posterior column, the sciatic buttress, the quadrilateral surface (QLS) and the anterior portion of the sacroiliac (SI) joint.

Acetabular fractures can present with medial fractures, with displacement and centralized comminution of the quadrilateral surface (QLS). The treatment of such fractures can be challenging for the surgeon for a number of reasons related to: the quality

of the patient’s bone, due to location and surrounding tissue access is limited and the complexities of achieving stable fixation in this portion of the Pelvis.

The ability to place a precontoured plate below the iliopectineal line to buttress the QLS can be advantageous. To work well as a buttressing device, the plates should have a slight undercontour, so that the undersurface of the plate supports the medial wall of the Acetabulum. The Stryker plates allow secure fixation by their design, as all plate extend posteriorly along the sciatic buttress, The design of the plates also have an extension that courses anteriorly, up to the pubic ramus.

Judet and Letournel concluded early on that the most important factor in a successful operation is a thorough pre-operative, three-dimensional understanding of the X-Rays and fracture patterns. The same is true today. The surgeon’s knowledge, skill and dedication remain the primary determinants of the patient’s outcome.

Note
The decision to use specific approaches is solely that of the surgeon. This decision is based on the careful review of required radiographic examinations, examination of the patient and the surgeon’s personal surgical skills and level of experience that might apply from case to case. Stryker is in no way promoting or attempting to influence the use of any one procedure or technique over another.

Pelvis II System Solutions Overview

As new techniques in the operative management of pelvic fractures are introduced and accepted, they are often followed by the need for new, enhanced, and refined implants and instrumentation. This is due to the highly irregular shape of the Pelvis, as well as the various approaches that attempt to spare unnecessary dissection, to prevent injury, and to preserve major neurovascular structures and viscera.

In order to stay current and to address surgeon needs, Stryker has developed new instruments and area specific plating options for the treatment of Pelvis & Acetabulum fractures to be known as the Pelvis II System. These new developments will be described in detail in the pages to follow.

Previous Stryker Pelvis fixation tools, as well as all new instruments will be merged in the Pelvis II System. It should be noted that as new instruments and fixation devices were being conceived and designed with the collaboration of surgeon experts from around the world, an effort was made to maintain retro-compatibility with the implants and instruments that were offered before.

For example, all screws that are used with the Matta Plates will also be used with the new Pelvis II Quadrilateral Surface (QLS) Plates. The characteristics of fit and performance of screws seen with Matta Plates are designed to be the same with the QLS plates. Additionally, screws used for adjunct fixation outside of the plates can be used with either set of plates.

Similarly, instruments used for preparing the plates – contouring and shaping, drilling, measuring screw lengths and screw insertion have been enhanced.

The new instruments were designed to make steps of fixation easier for the surgeon, when using the newer approaches to the quadrilateral surface and other deep dissections. However, during the development phase, it was found that the use of these instruments can be applied to other approaches and areas of fixation, as the surgeon deems appropriate.



Plating Options for Pelvis Fractures

Pelvis II Quadrilateral Surface Plates

The Pelvis II System offers new solutions for those complex fractures of the Acetabulum that include the Quadrilateral Surface. These precontoured implants were designed using the SOMA Bone Database, and have desirable bending characteristics that are well suited for use on the irregular topography of pelvic bony anatomy.



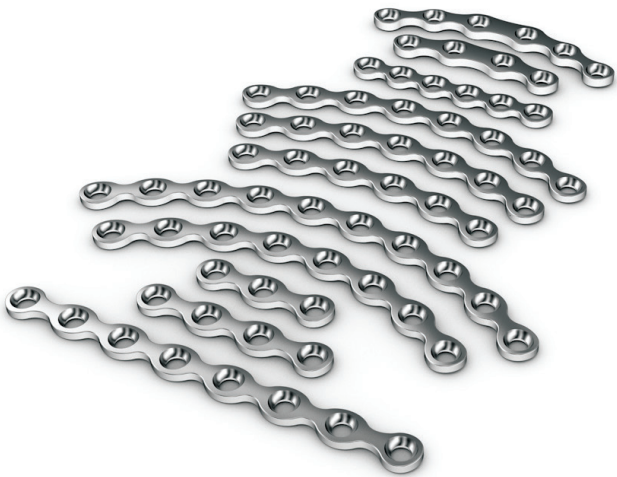
Infrapectineal Plate (large)

Infrapectineal Plate (small)

Suprapectineal Plate

Matta Plates

The Matta Pelvis Plates are designed to address all fractures of the Acetabulum and Pelvis. The shape, material properties, plate malleability and hole spacing of the plates take into account today's physicians' needs for sufficient fatigue strength, transfer of loading forces, and a standardized operative technique with broad applicability.



Indication, Precautions & Contraindications for Stryker Pelvis II Products

Indications

Matta Pelvis Plates

- Acetabulum fractures
- Pelvic Ring fractures
- Sacrum fractures
- Ilium fractures
- Sacroiliac joint dislocations
- Symphysis Pubis disruption
- Revision surgery of pseudoarthroses, non-unions and malunions
- Osteotomies
- Pelvic arthrodesis

Quadrilateral Surface Plates

Fractures of:

- Anterior Column
- Anterior Column combined with posterior hemi-transverse
- Quadrilateral surface

Precautions

Stryker Osteosynthesis systems have not been evaluated for safety and compatibility in MR environment and have not been tested for heating or migration in the MR environment, unless specified otherwise in the product labeling.

Note:

In the case of the Quadrilateral Surface Plates and the pre-curved Matta Plates, the radii of curvature and the contouring of the plates to match the irregular topography of the pelvic bony anatomy were achieved by anatomic studies and more recently, with C-T scan technology. This led to the design of implants that could approximate the appropriate size and shape of the bone for the majority of patients. However, there may be some cases where the implants do not provide best fit and additional contouring and/or other solutions for fixation may be required.

Contraindications

The physician's education, training and professional judgment must be relied on to choose the most appropriate device and treatment unless specified otherwise in the product labeling or respective operative technique.

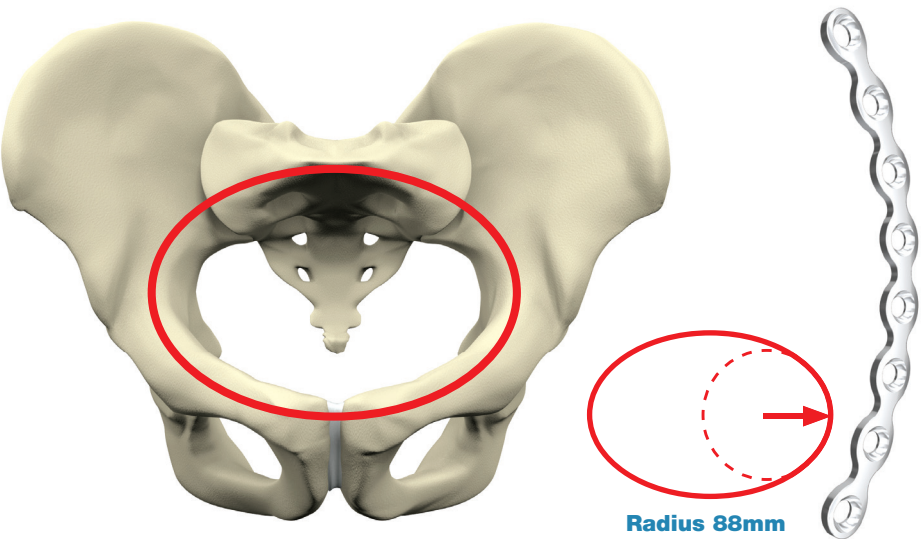
Conditions presenting an increased risk of failure include:

- Any active or suspected latent infection or marked local inflammation in or about the affected area.
- Compromised vascularity that would inhibit adequate blood supply to the fracture or the operative site.
- Bone stock compromised by disease, infection or prior implantation that cannot provide adequate support and/or fixation of the devices.
- Material sensitivity, documented or suspected.
- Extreme morbid obesity wherein the patient can produce loads on the implant that can lead to failure of the fixation, of the device, or to failure of the device itself.
- Patients having inadequate tissue coverage over the operative site.
- Implant utilization that would interfere with anatomical structures or physiological performance.
- Any mental or neuromuscular disorder that would create an unacceptable risk of fixation failure or complications in postoperative care.
- Other medical or surgical conditions that would preclude the potential benefit of surgery.

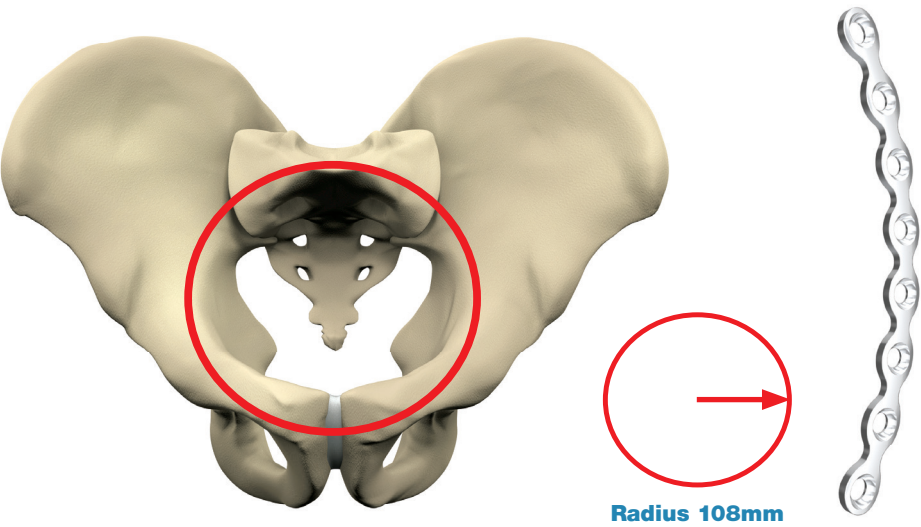
Pelvis II System Design – Implants

Matta Pelvis Plate Types

Female Pelvis



Male Pelvis



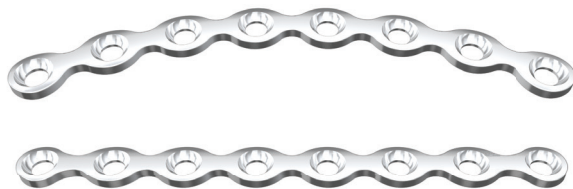
Pelvis II System Design – Implants

Curved and Straight Plates

Hard (cold-worked) material, 2.5mm thick, 16mm spacing between the holes.

Curved Plates offered in 4 hole to 20 hole options.

Straight Plates offered in 2 hole to 20 hole options.



Flex Plates

Soft (annealed) material, 2.5mm thick, 12mm spacing between the holes, higher malleability than in hard plates.

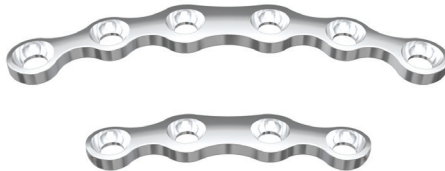
Flex Plates offered in 4 hole to 22 hole options.



Symphysis Plates

Hard (cold-worked) material, 3.2mm thick, 16mm spacing between the holes, 75mm radius.

Symphysis Plates offered in 4 hole & 6 hole options.



Matta Pelvis Plates Design Summary

Stainless steel cold-worked and annealed plates

Curved Plates for male and female Pelvis

Dedicated pubic symphysis plates

Equal hole spacing on plates

Round and tapered plate edges

Increased screw angulation with 3.5mm screws

Variety of rigid and flexible plates allows for fit to Pelvis surface characteristics.

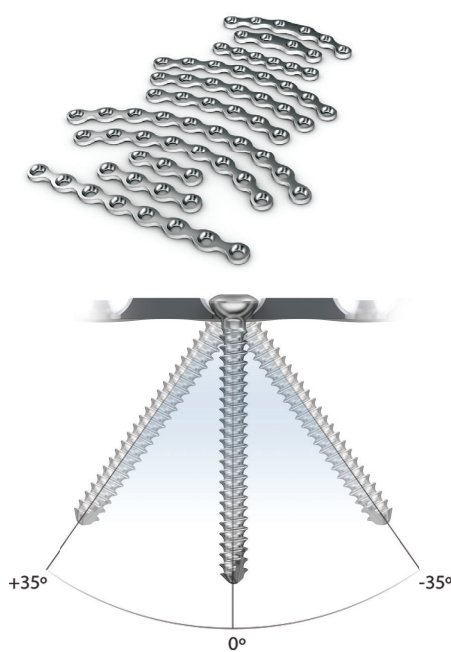
Designed for precontoured fit to pelvic brim radii that contributes to broader indications of use.

Plate thickness offers stability and the precontoured plate shape reduces the amount of additional bending.

Allows operative flexibility for screw & plate placement.

Facilitation of plate sliding submuscularly.

Optimized for more choices of screw placement angulation, especially for posterior wall fixations. 3.5mm screws allow for a 70 degree cone of angulation.



Pelvis II System Design – Implants

Quadrilateral Surface Plate Types

3 new QLS plates are offered in the Pelvis II system: Small and large sizes of Infrapectineal Plates and one Suprapectineal Plate.

- Designed using the SOMA Bone Database
- Material: Stainless Steel annealed
- Thickness: 2.5mm
- 3.5mm and 4.5mm screws may be used with all plates
- Pre-countoured & available in left and right options

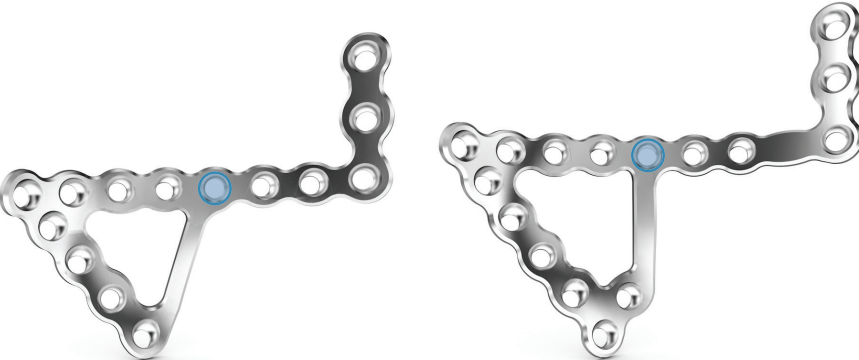
Note:
The design of these plates limits their use to the fixation of fractures in the area of the quadrilateral surfaces (QLS). Alternatively, the appropriate QLS plate can be used



as part of the surgeon's fixation plan for transverse acetabular fractures, T-fractures, and fractures of the posterior column, where the fracture patterns may have included the quadrilateral surface.

Infrapectineal Plate, large and small

- 14 screw holes in small and 16 screw holes in large Infrapectineal Plate accepting 3.5mm and 4.5mm screws
- Screw holes are pre-angulated to help ensure screw placement away from the Acetabulum
- Dedicated hole for attachment of the Handle for Plate Insertion. (See figure to right) (blue circles)
- The extension on the plate can be bent over the pubic ramus, to secure fractures in this region



Infrapectineal Plate (small)

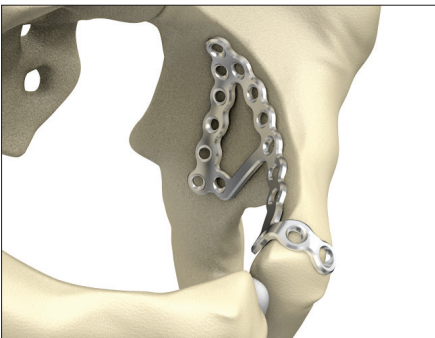
Infrapectineal Plate (large)

Suprapectineal Plate

- 16 screw holes accepting 3.5mm and 4.5mm screws
- Screw holes are pre-angulated to help ensure screws placement away from the Acetabulum
- Dedicated hole for attachment of the Handle for Plate Insertion (see figure to right)
- Extensions from the delta portion bridge the pelvic brim, fixing fractures whose lines span the pelvic brim onto the Iliac Wing



Suprapectineal Plate



L extension bent over pubic ramus

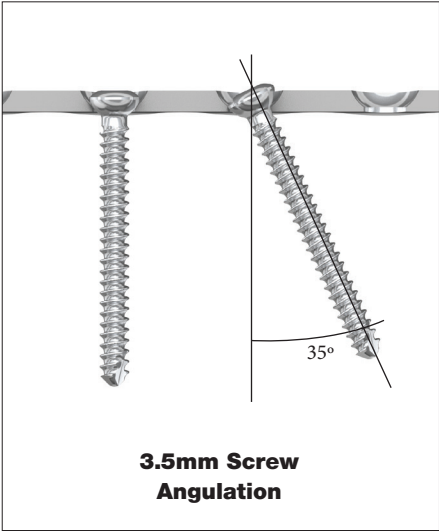
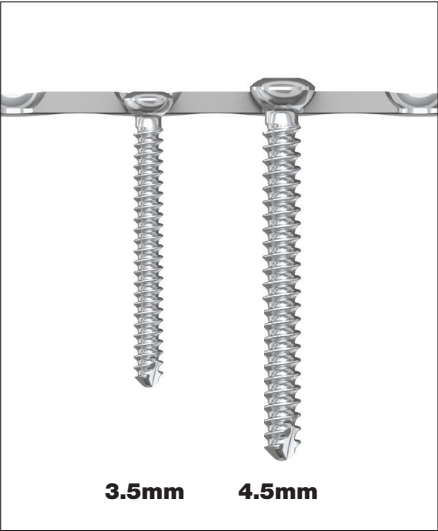
Pelvis II System Design – Implants

3.5/4.5mm MPS Screws used with Matta and QLS Plates

The 3.5mm self-tapping cortical screws are the recommended screws for plate fixation and are best adapted to the pelvic bone. The 4.5mm cortical screws may also be used, however are less common. **Plates are designed to have low plate/screw profiles.**

The plate holes are designed to accept 3.5mm screws inserted at angles up to +/- 35° in all directions (image on right).

This capability is essential, as it must be possible to avoid penetrating the hip joint or to be able to drive a screw obliquely in the area of the iliac bone, avoiding a previously inserted, isolated screw.



Note:

Instrumentation is provided to assist the surgeon in fixing the plates to the bone and for accurate placement of independent screws. In order to achieve this without difficulty, please adhere to the following:

1. Use a sharp drill bit when drilling bone, particularly in areas of hard, dense bone.
 - Gives the surgeon more control of the drill and helps to prevent plunging that may injure neurovascular structures, viscera, or other soft tissue structures.
 - Lessens the possibility of heat build-up.
 - Blunt drills should be discarded and replaced with new ones.

2. When drilling, especially in plates, the surgeon should use the designated drill sleeves or the new Plate Screw Inserter.
 - This assures the most accurate placement of the screw, centered in the screw hole.
 - The sleeve acts as a guide to indicate the direction of drilling.
 - The drill sleeves protect the adjacent soft tissues.
 - Prevents heat buildup and the creation of debris.
 - Prevents the drill from being seized and blocked in the sleeve or drill guide.
 - Prevents damage to drills.

Pelvis II System Design – Implants

Quadrilateral Surface Plates Design Summary

Design is based on the anatomy of the quadrilateral surface using the SOMA Bone Database

Stainless steel, annealed plates

Holes on or near the brim are pre-angulated.

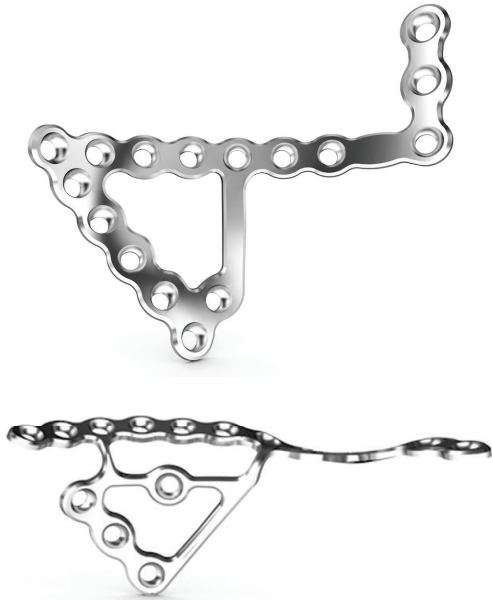
Increased screw angulation when using 3.5mm screws

Precontoured to fit the quadrilateral surface as a single implant or as a combined design, with a pelvic brim component with an anterior extension.

Designed to be in the mid-range of rigidity, yet flexible enough to allow desired fit to the irregularities of the pelvic surface contours.

Assists the surgeon in screw & plate placement for desired fixation options.

Optimized for better screw placement options especially for posterior wall fixation – up to 35° in all directions (70 degree cone).



Screw Design Summary

Compatibility of 3.5 & 4.5mm screws with all plates

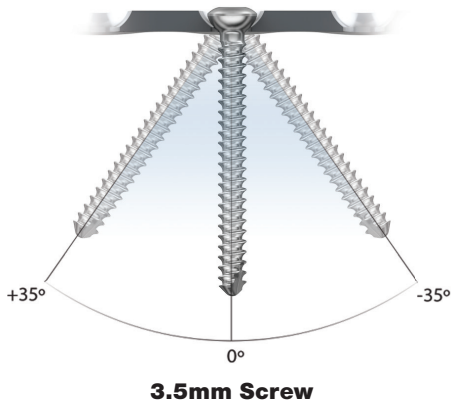
Self-tapping cortical screws

Low screw head profile in plate hole

Flexibility in screw choices, according to bony structures. May be used with either the Matta Plates or the QLS Plates.

Quick, simple and efficient screw placement.

Helps to prevent screw head prominence that could be problematic to soft tissues.



Pelvis II System Design – Instruments

Instrument Design Summary

Advanced Plate Bender

Designed to help with three-dimensional contouring of all Matta and QLS Plates.



New Plate Bending Holder

Provides a mechanism for secure and controlled plate bending for both Matta & QLS plates.



Bending Stick

Provides an option for in-situ plate bending.



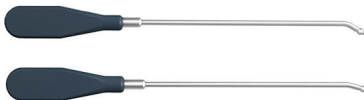
Carbon Fiber Retractors

Four options designed to match the anatomic region being dissected. Retractors accept the LightPipe for improved illumination in deeper cavities. Retractors can be fixed in place with pins to improve visibility and to help protect soft tissues. Because they are made of radiolucent carbon fiber, there is no need to remove them for fluoroscopy.



Angled Ball Spikes

New long ball spike pushers offered at 15 & 30 degree angles provide for bone fracture reduction in deep spaces.



Spiked Screw Inserter

The Spiked Screw Inserter is an instrument for reduction and independent placement of 3.5mm screws. The Inserter is cannulated and allows for drilling and screw insertion through the instrument.



Washer Loading Stand

A washer may be loaded into the Spiked Screw Inserter utilizing the Washer Pick-Up Stand and allows for easy washer placement & screw insertion in a single step.



Plate Screw Inserter

The Cannulated Plate Screw Inserter can be used to push the plate down to the bone. It is also cannulated to allow for drilling & screw insertion through the instrument. Tip allows for swiveling / centering in screw hole.



Spiked Disk for Spiked Screw Inserter

New larger spiked disks with K-Wire holes may be used with the Spiked Screw Inserter to provide increased bone contact to aid with reduction.

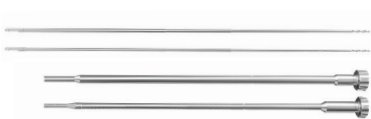


Pelvis II System Design – Instruments

Instrument Design Summary

Long Scaled Drills & Drill Guides

Now offered in the Pelvis II system to allow for drilling into deep spaces and work with the Spiked Screw Inserter & Plate Screw Inserter.



Long Screwdriver

Now offered in the Pelvis II system to allow for screw insertion through the cannulated Spiked Screw Inserter & Plate Screw Inserter.



Angled Depth Gauge

New design allows for additional functionality when working in deep spaces.



Range of reduction instruments

Larger variety of Reduction Forceps and optimized Clamp designs offer many options for fracture repositioning.



Screwdriver Holding Sleeve

Efficiency in screw pick-up and insertion as well as removal via “no-touch” technique.



Elastosil handles

Surgeon can choose a handle according to his/her preference.



Elastosil Handle

Four options of reduction pins (5mm or 6mm in 150mm or 180mm lengths)

Greater flexibility to select a pin appropriate to fragment or bone size.



Sciatic Nerve Retractors

Availability of 2 sizes creates potential for more adequate soft tissue protection.



Spiked Disks

Offer increased utility options with Reduction Forceps and Ball Spike Pusher, for increased bone contact.



MPS Plate Templates

Allow plate bending outside of the operative field.



Retraction & Reduction Instruments

Key components

Carbon Fiber Retractors

Four new retractors have been added to the system. The new retractors are designed to address the major issues related to working in deep wounds:

- Illumination
- Obstructing of fluoroscopy images by retractors
- Limited visibility of structures due to fluids in the wound
- Handling



Illumination

To improve illumination of the surgery field, three of the newly designed retractors (Retractor 1 – 3) can be equipped with the Light Pipe.

This single-use, disposable fiber optic clip-on provides a consistently enhanced delivery of light to the deepest part of the dissected area. The surgeon's preference will dictate which Retractor will be used as the light source.

The Light Pipe may be attached to the fiber optic cable of the Stryker X6000 Light Source or a standard endoscopic light source found in the OR.

Note:
The quality of the light emitted by the Light Pipe is proportional to the quality and condition of the fiber optic light source and cable. A damaged light cable will deliver inferior lighting to the wound.

From a safety point of view, keep in mind that though these are fiber-optic devices, heat will build up in the Light Pipe. Therefore, if used for long periods of time or constantly at higher levels of light output, the Light Pipe should be checked for heat build-up. If there is excessive heat, the light source should be turned off until the Light Pipe has sufficiently cooled.

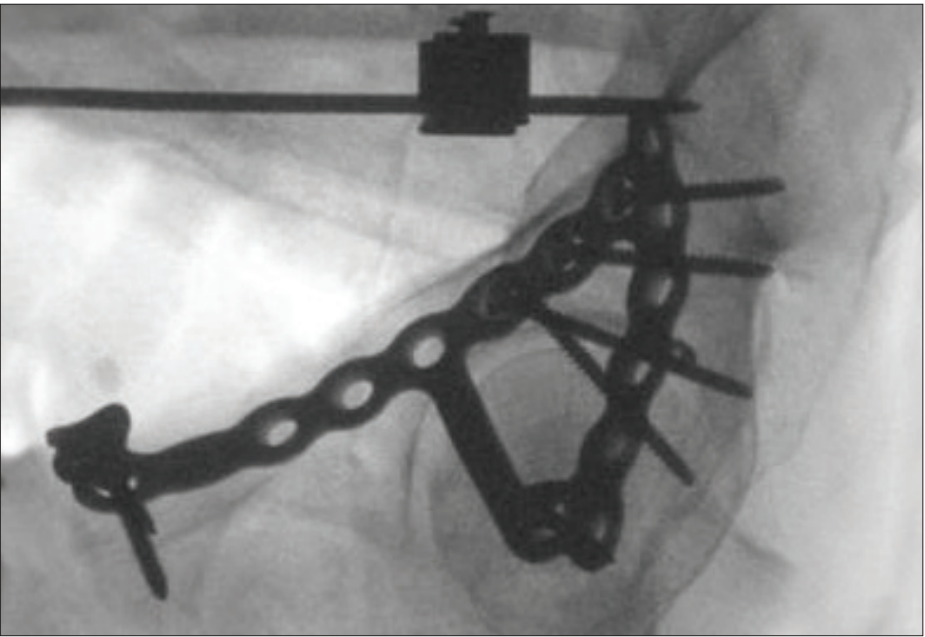


Retraction & Reduction Instruments

Key components

Imaging

The new retractors are made of laminated carbon fiber and are radiolucent, therefore they do not need to be removed for fluoroscopy.



Suction Feature

The Suction Retractor is a new and specially designed retractor that not only functions as a deep retractor in the areas of the greater or lesser Sciatic Notches, but additionally serves as a suction device at the same time.

Sterile, 1/4" suction tubing is attached to the suction tip that is part of the system. A groove that runs the length of the Suction Retractor accommodates the tubing.

Starting at the working end of the retractor, seat the tip first and progressively insert the tubing into the full length of the groove in the retractor.

Note:
Because of best fit characteristics, suction tubing from the companies to the right is recommended:

It might be that the suction tubing has to be cut at one side prior the attachment of the Suction Tip.



Producer	Description	REF	Inner Ø*
Dahlhausen	SCT - Connector: funnel / vac.control	07.068.25.210	~5.6mm (-)
Covidien	Argyle: Suction tube, molded connectors	8888301606	~6.3mm (")
Amsino	Suction Connecting Tube	AS825	~6.3mm (")
Cardinal Health	Medi-Vac Non-Conductive Suction Tube	CAT . 66A	~6.3mm (")
Legend M.D.	Suction Connecting Tube	Item#: RSCT201	~6.8mm (")
Medline	Non-Conductive Connecting Tube	DYND50246	~6.3mm (")
Medi Plast	Orthopaedic Suction Set	60QP09061	~6.3-6.6mm (-)

Retraction & Reduction Instruments

Key components

Handling

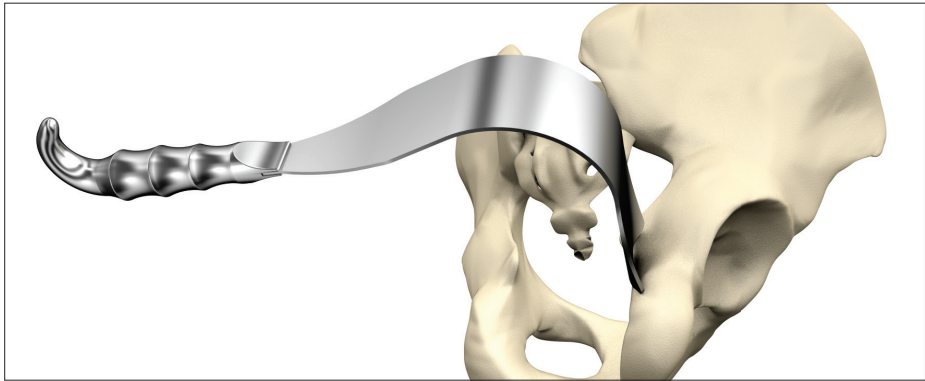
Once the final position of the retractors is established, they may be fixed in position with K-Wires provided in the retractor set.

Note:
The surgeon must keep in mind that the retractors may be used near critical vessels, nerves, or intra-abdominal organs. Therefore, careful attention must be paid to not put undue tension or pressure on these structures and to periodically adjust the retraction to ensure the safe use of the devices.

Sciatic Nerve Retractors



Two sciatic nerve retractors are available, small and large versions, to safely retract in this area of importance.

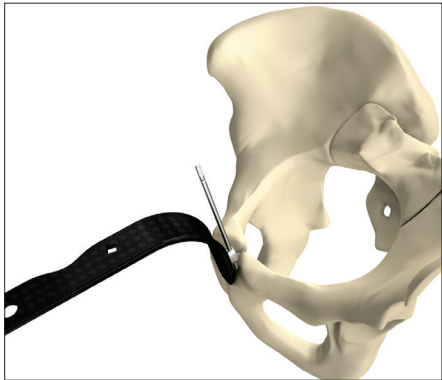


Sciatic Nerve Retractor

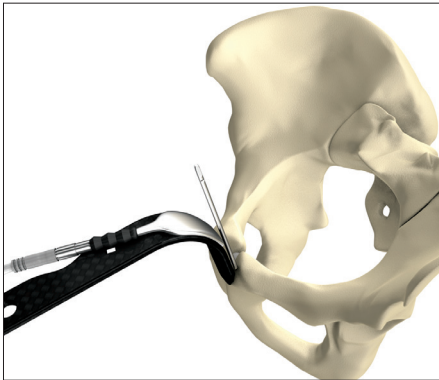


Originally designed to be placed near the pubic tubercle, Retractor 1 is equipped with a Light Pipe attachment and a pin to hold the retractor in place.

The retractor may be used in additional anatomic areas as the surgeon sees fit.



Retractor 1

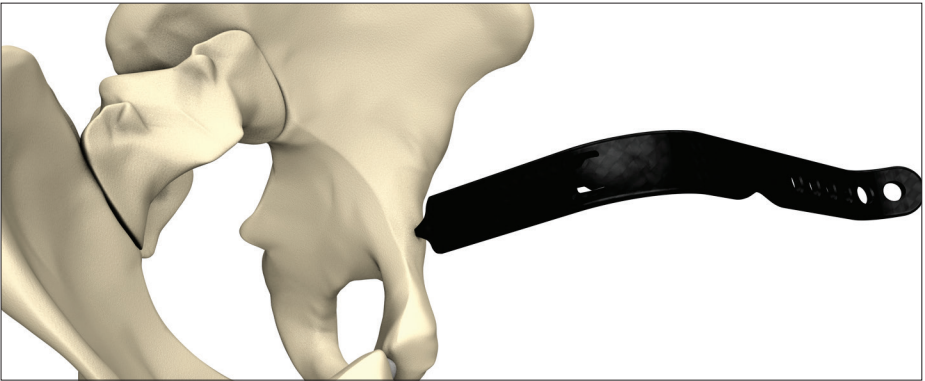


Retraction & Reduction Instruments

Retractor 2



Originally designed to be placed near the ilio-pubic eminence, Retractor 2 is equipped with a Light Pipe attachment. No opportunity for K-Wires is provided in this retractor to reduce the risk of placing K-Wires inadvertently into the joint. The retractor may be used in additional anatomic areas as the surgeon sees fit.



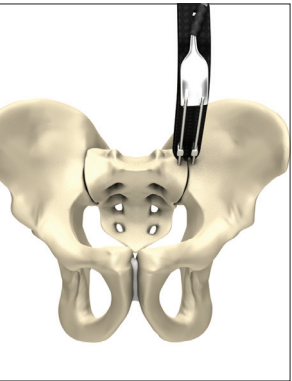
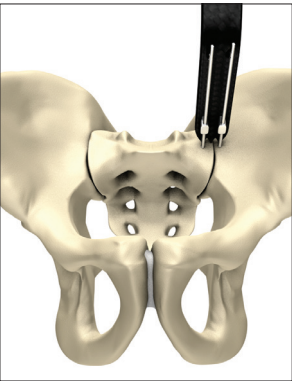
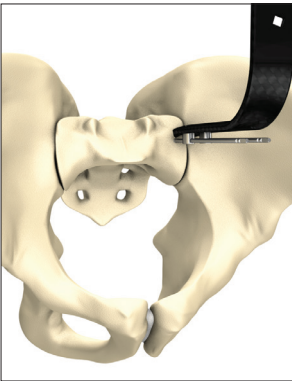
Retractor 2

Retractor 3



Originally designed to retract the iliac vessels, Retractor 3 is equipped with a Light Pipe attachment and 2 pins to hold the retractor in place and prevent rotation. Retractor 3 may be the most ideal for Light Pipe attachment.

The retractor may be used in additional anatomic areas as the surgeon sees fit.



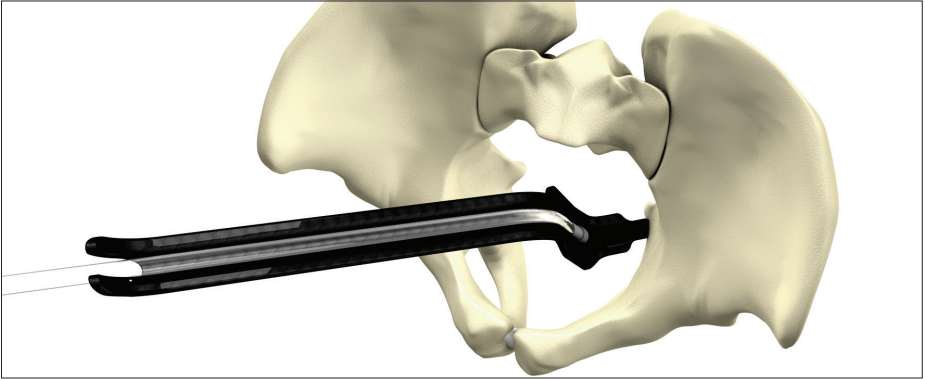
Retractor 3

Suction Retractor



Originally designed to be placed in the lesser sciatic notch, the Suction Retractor has the ability to run standard tubing through the channel in the retractor to simultaneously provide suction & retraction.

The retractor may be used in additional anatomic areas as the surgeon sees fit.



Suction Retractor

Retraction & Reduction Instruments

Retraction and Reduction Instruments

Angled Ball Spike

The Angled Ball Spike is especially useful when working in narrow corridors or in areas where the irregular contours of the bone do not allow reduction clamps to be used.

They may be used in conjunction with the reduction clamps to fine tune reduction. New angled ball-spikes have been designed for working on the interior intrapelvic and quadrilateral surface areas.

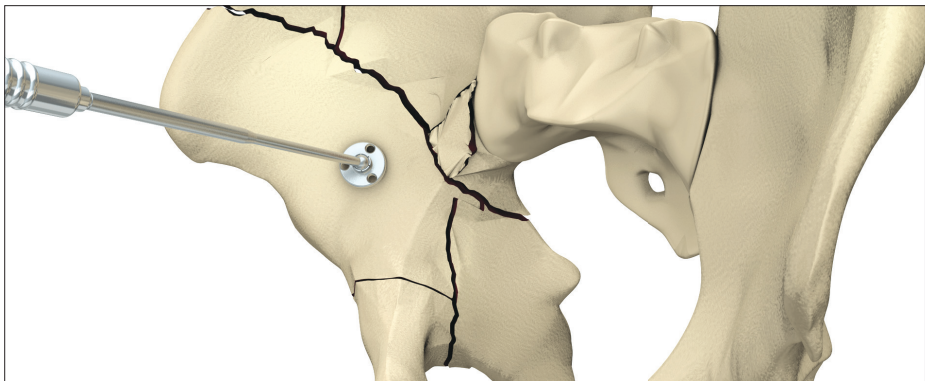
The instruments are angled 15° and 30°, respectively. Each will accept the Spiked Disk from the Matta System.



Straight Ball Spike Pusher



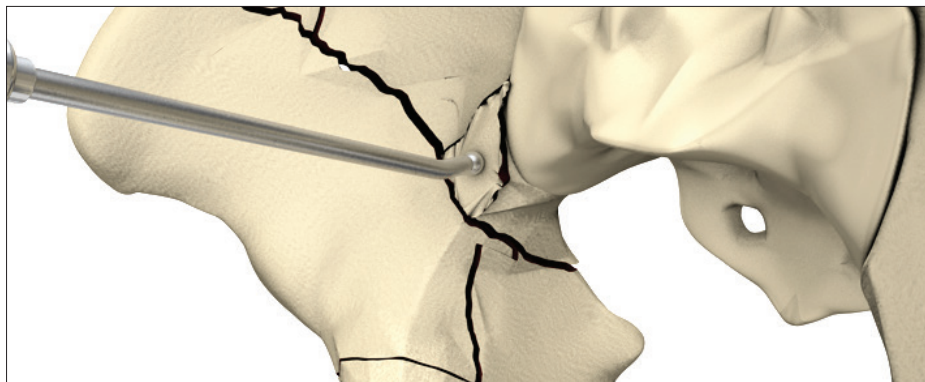
This reduction instrument is used as a pusher with pointed ball tip to reduce bone fragments. To distribute the reduction forces over an increased area, the Spiked Disk can be clipped onto the ball tip.



Angled Ball Spike Pusher



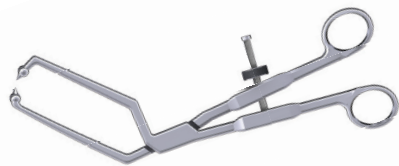
Angled Ball Spike Pusher with increased length and tip angles of 15° and 30° are newly included in the system. These may be particularly useful, when working in areas where the dissection space is deep and narrow. The Spiked Disk may also be used with the angled Ball Spike Pushers.



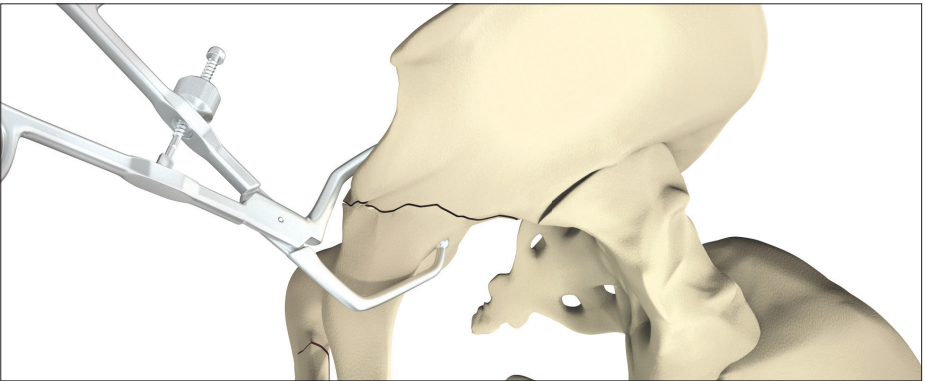
Retraction & Reduction Instruments

Additional Reduction Instruments

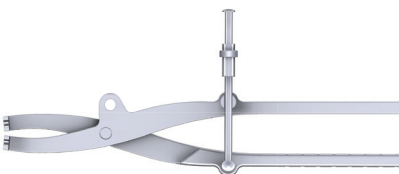
Matta Reduction Forceps



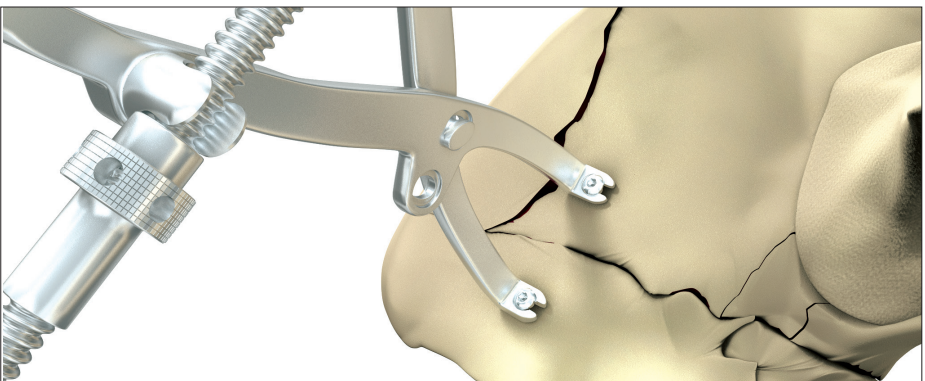
These two oblique forceps are designed so that the handles angle away from both the surgeon's line of sight and critical soft tissue structures. The sharp points provide a secure hold on the pelvic surfaces, while the balls prevent penetration of bone with a thin cortex.



Reduction Forceps for Screws, Jungbluth



These two forceps have been designed to be used with either 3.5mm or 4.5mm screws (3.5mm version available in left or right option). Screws inserted on the opposite side of the fracture allow considerable reduction forces and manipulation in all three planes.

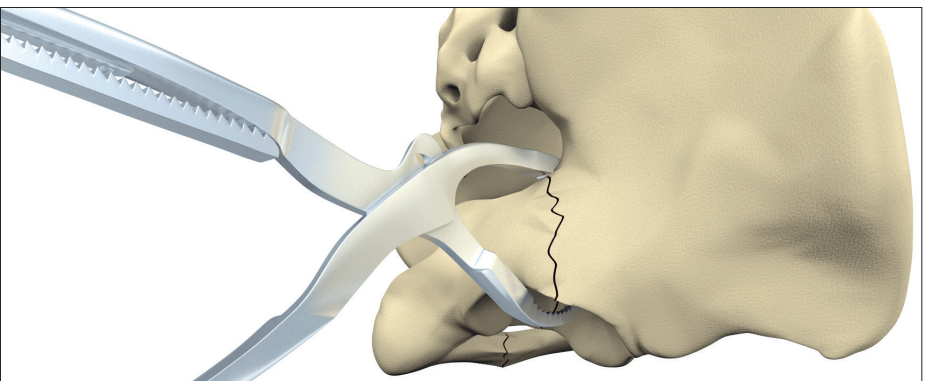


Verbrugge Forceps



For easier reduction, there are times when only one screw is inserted, requiring the application of one jaw of the Verbrugge forceps. The other jaw takes direct hold on another part of the bony surface.

Example: The angle of the greater sciatic notch.



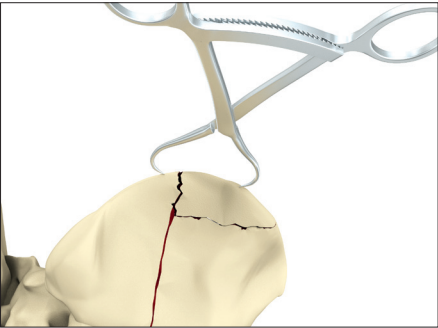
Retraction & Reduction Instruments

Forceps

Reduction Forceps with Points



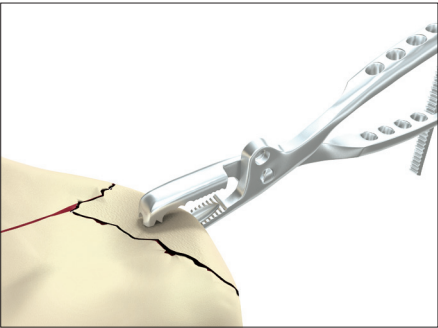
These forceps can be applied directly to the bone surface or be used with shallow drill holes.



Faraboeff Forceps



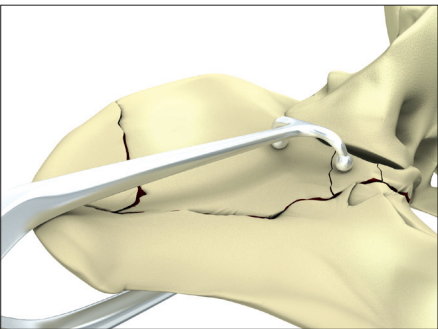
The versatile Faraboeff clamps can be used to grasp and manipulate the iliac wing, or as reduction forceps with provisional screws of either 3.5mm or 4.5mm diameter.



Reduction Forceps, King Tong



This long forceps with three-pointed ball tips allows reduction of perpendicular fractures. The long handles provide increased leverage for difficult reductions. These forceps are also available in a 1x1 jaws version.



Pelvis II System Design – Trays

Trays Design Summary

Features

Trays with modular design
Dedicated Basic Instrument Tray with all instruments for three screw sizes

Basic Instrument Tray now includes instrumentation designed to be used when working in deep incisions

Dedicated Retractor Tray

Pre-formed Inserts

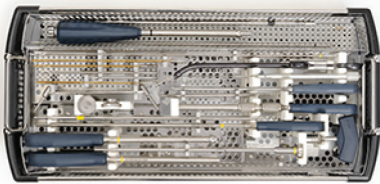
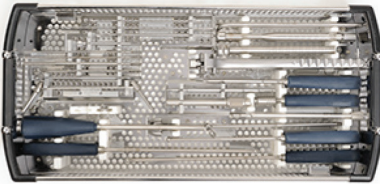
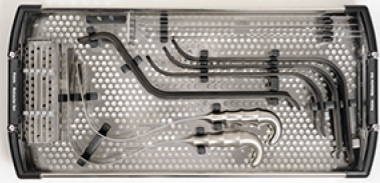
Benefits

Flexibility for storage and sterilization.
Trays accommodate the newly added, more ergonomic instruments. Designed with classic and other approaches in mind.

No matter what approach is to be used or modifications required, the surgeon has an array of instruments available to him during the procedure, allowing greater adaptability.

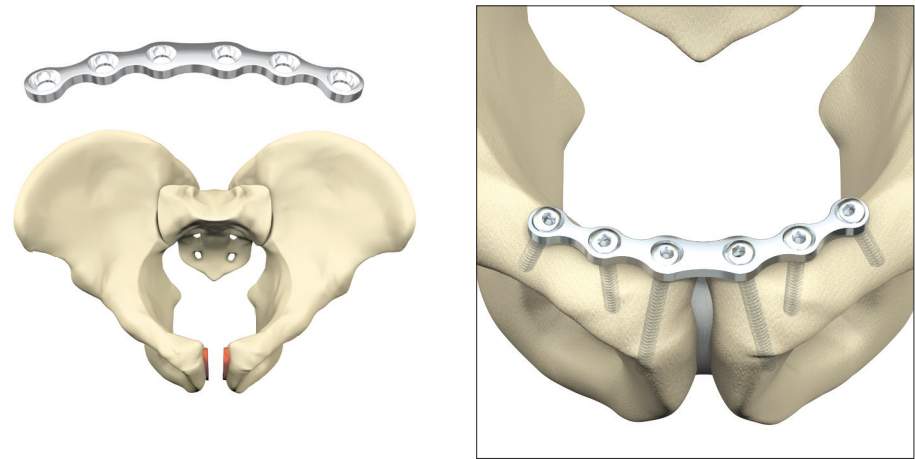
A larger assortment of Retractors are now included with the system. They are well organized to assist the surgeon and O.R. Staff to quickly get the correct instrument to the operative field.

An organized arrangement, with easy access to the instruments.



Pelvic Ring Fracture Types & Fixation

Symphysis Pubis Disruption

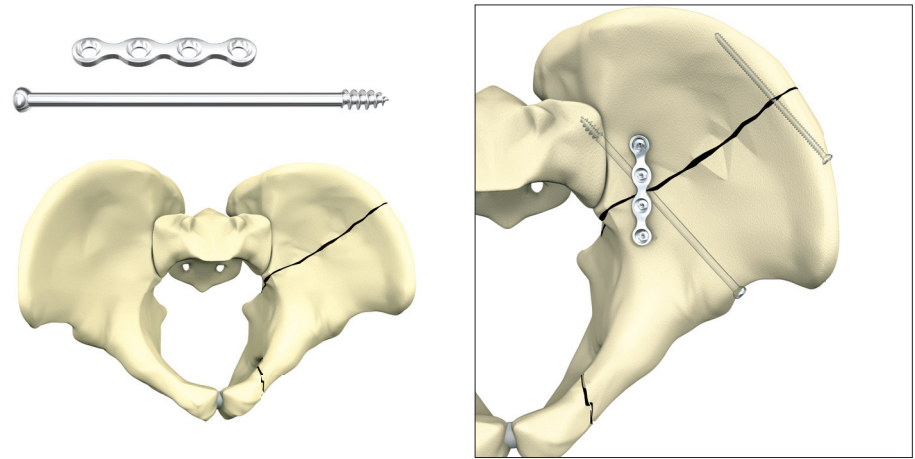


Approach:
The Pfannenstiel approach to the anterior pelvic ring represents a standard for ORIF of a disrupted Symphysis Pubis.

Fixation:

- Isolated Symphysis Pubis Disruption can be fixed using a dedicated four-hole or six-hole Matta Symphysis Pubis Plate.

Ilium Fracture



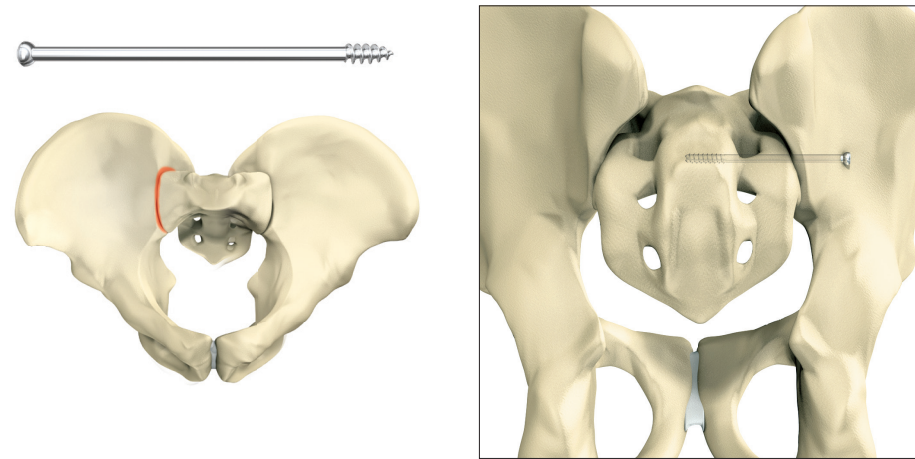
Approach:
Fractures of the Ilium can be operated through the first window using the Ilioinguinal approach or a Posterior Pelvic Ring surgical approach is used.

Fixation:

- One 6.5mm partially threaded cancellous screw is inserted from the Anterior-Inferior Iliac Spine, passing 1cm to 2cm above the Acetabulum.
- Additionally, a 3.5mm independent lag screw in the iliac crest is placed, starting from the anterior branch.
- One Matta Straight Four-hole Plate can be used to traverse the fracture line in the area of the pelvic brim.

Pelvic Ring Fracture Types & Fixation

Sacroiliac Dislocation

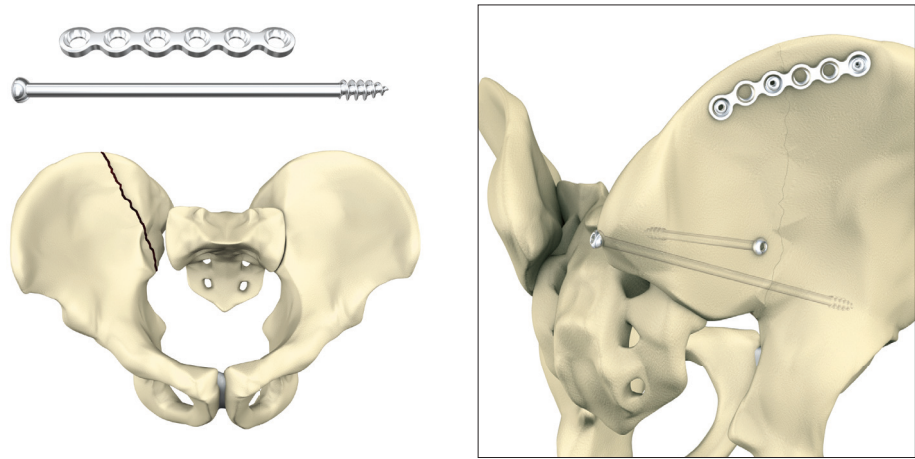


Approach:
Sacroiliac dislocations can be operated through the Posterior or Anterior Pelvic Ring approach.

Fixation:

- Fixation of dislocation by using a 6.5 or 8.0mm Asnis III cannulated iliosacral screw.

Sacroiliac Fracture/Dislocation



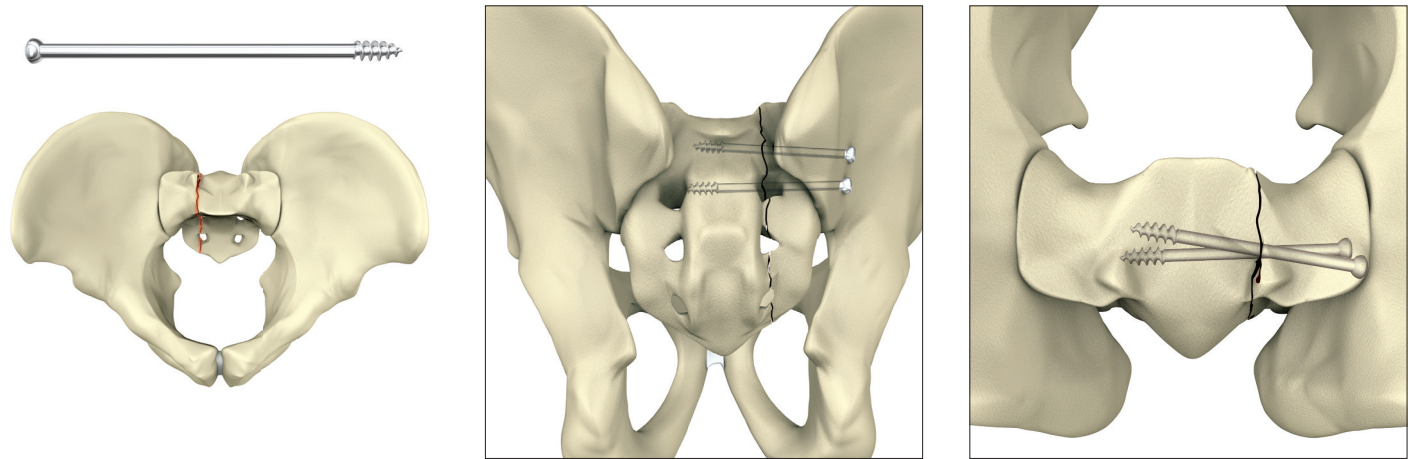
Approach:
A Posterior Pelvic Ring surgical approach is used to reduce and fix a sacroiliac fracture dislocation.

Fixation:

- One 4.5 or 6.5mm independent lag screw is placed starting from the posterior-inferior iliac spine to stabilize the reduction of the inferior aspect of the iliac wing.
- One Matta Flex Six-hole plate stabilizes the reduction of the iliac crest.
- One 6.5 or 8.0mm Asnis III cannulated iliosacral lag screw fixes the sacroiliac joint.

Pelvic Ring Fracture Types & Fixation

Sacrum Fracture

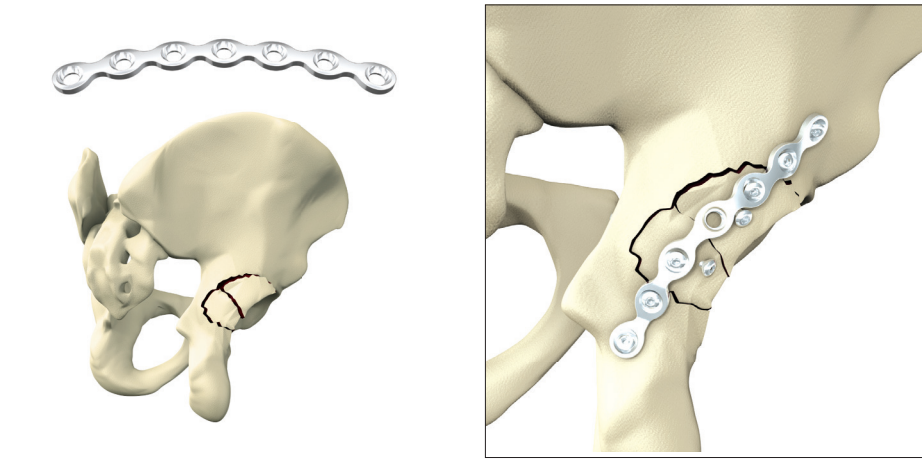


Approach:
A Posterior Pelvic Ring surgical approach allows an ORIF of Sacrum Fractures.

- Fixation:**
- Fixation of a sacroiliac dislocation by A sacrum fracture is fixed by placing two 6.5 or 8.0mm Asnis III cannulated lag screws (preferably 16mm thread).
 - Alternatively, a 6.5mm cancellous screw is placed into the S1 or S2 vertebral bodies through the lateral iliac wing.

Acetabular Fracture Types & Fixation

Posterior Wall

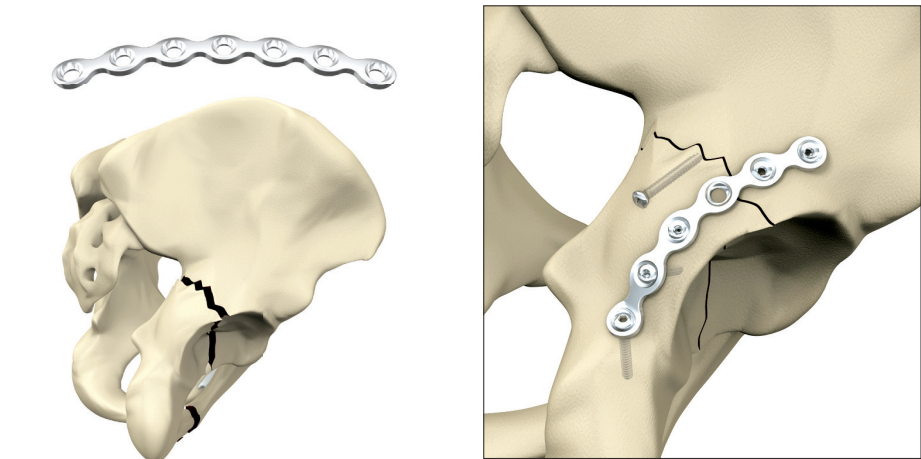


Approach:
Posterior Wall Fractures are reduced/ fixed through the Kocher-Langenbeck approach.

- Fixation:**
- Two 3.5mm independent lag screws initially fix the fragments with the desired anatomical reduction.
 - One MPS Curved R108 six or seven-hole Plate or alternatively a MPS Flex eight-hole Plate spans the fragments along its axis (neutralization plate).

Acetabular Fracture Types & Fixation

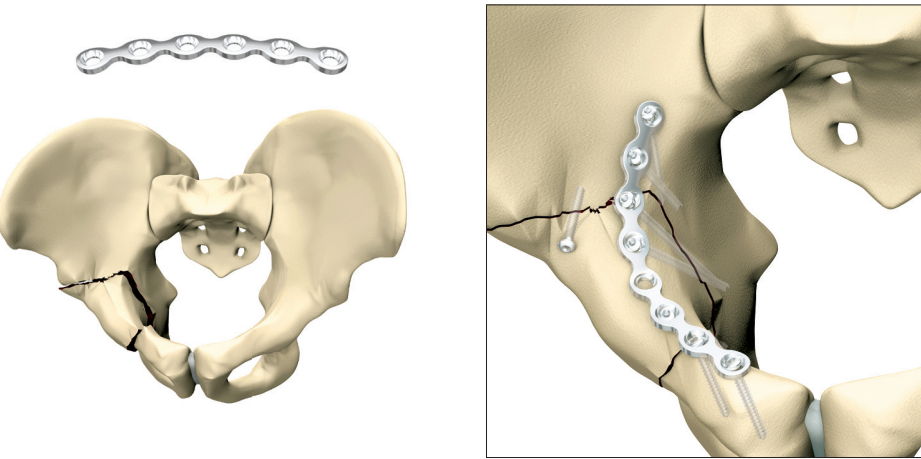
Posterior Column



Approach:
A Kocher-Langenbeck approach is used to reduce/fix the Posterior Column.

- Fixation:**
- Definitive fixation can be started with an independent lag screw from the distal fragment into the posterior buttress of the Ilium.
 - One six-hole Matta Curved Plate or, alternatively, an eight-hole Matta Flex Plate along the acetabular margin maintains the reduction.
 - All central screws should be parallel to the quadrilateral surface.

Anterior Wall

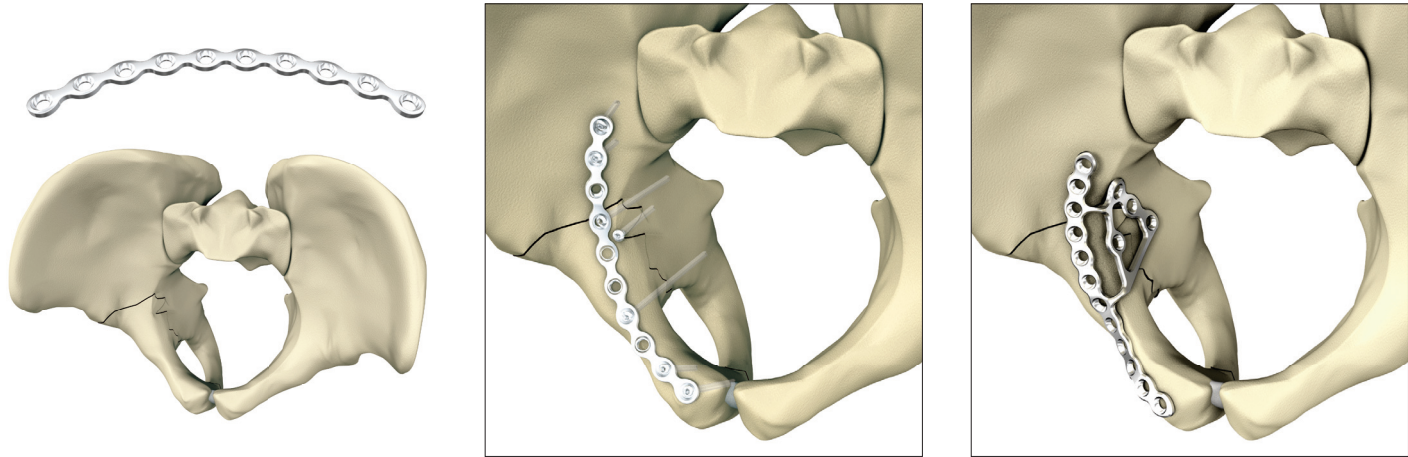


Approach:
Anterior Wall fractures can be fixed using the Ilioinguinal surgical approach.

- Fixation:**
- One or two independent lag screws fix the reduced fragments.
 - One Matta Curved Plate bridges the fragment on the pelvic brim, from the iliac fossa to the intact part of the pubic ramus.

Acetabular Fracture Types & Fixation

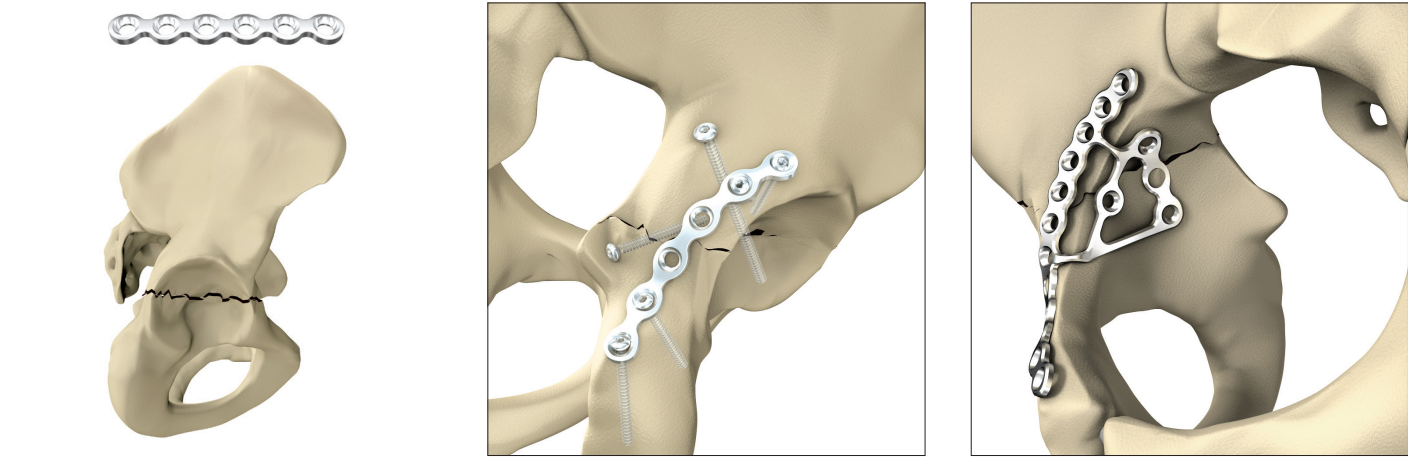
Anterior Column



Approach:
The Ilioinguinal or the Modified Stoppa / AIP surgical approach can be used to reduce/fix Anterior Column Fractures.

- Fixation:**
- An independent lag screw maintains the reduction.
 - Then a 10-hole Matta Curved Plate is shaped to adapt it to the pelvic brim, going from the pubic tubercle to the vicinity of the sacroiliac joint.
 - A minimum of two screws should be placed beyond the fracture line.
 - New Pelvis II QLS plate may be used.

Transverse

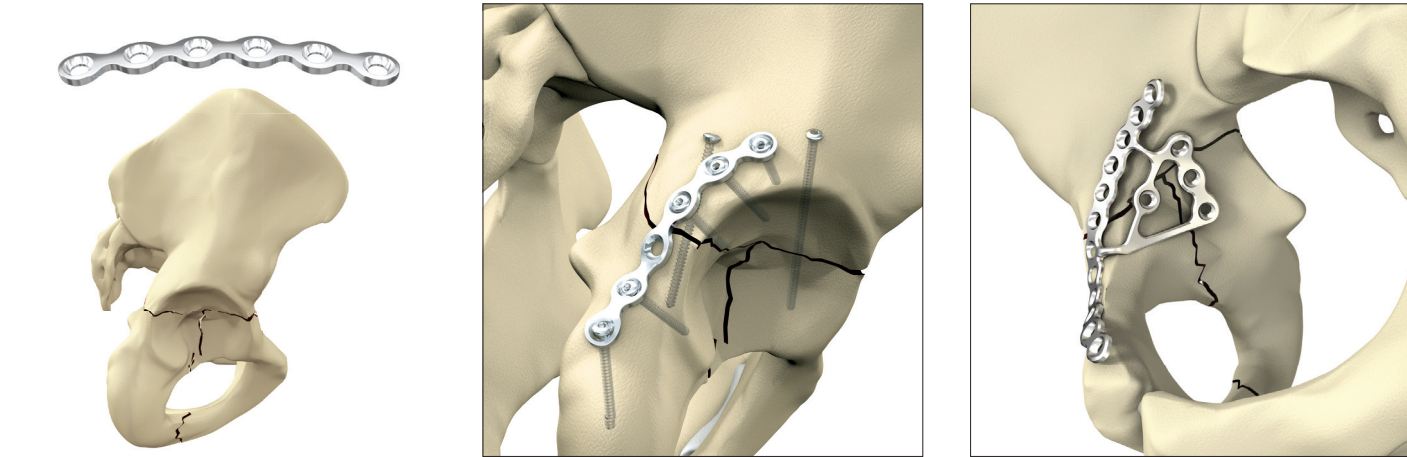


Approach:
The Kocher-Langenbeck approach can be used to access Transverse fractures.

- Fixation:**
- The posterior column is stabilized with an independent 3.5 or 4.5mm lag screw and a six-hole Matta Flex Plate (neutralization plate).
 - The anterior column is stabilized with an independent 4.5mm lag screw.
 - New Pelvis II QLS plate may be used.

Acetabular Fracture Types & Fixation

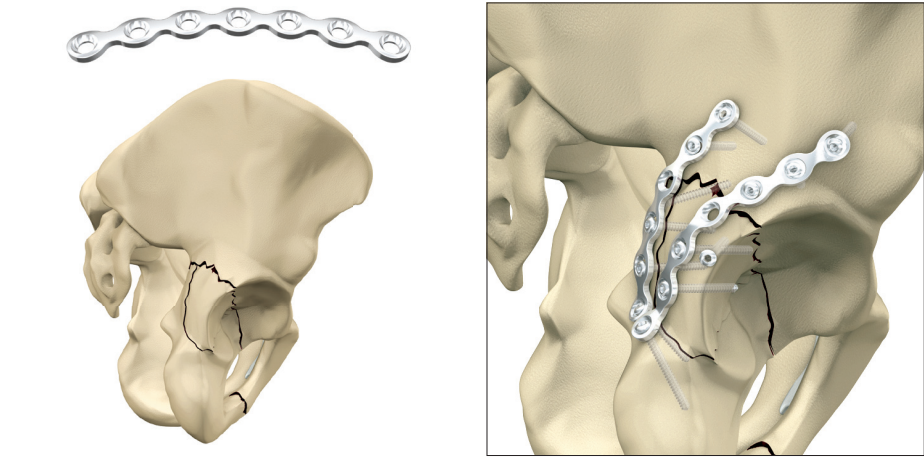
T-Shaped



Approach:
A Kocher-Langenbeck or an Extended Iliofemoral approach are options to perform an ORIF of T-Shaped fractures.

- Fixation:**
- The posterior column is stabilized with an independent 3.5 or 4.5mm lag screw and a Matta Curved or Matta Flex Plate (neutralization plate).
 - The anterior column is then fixed with an independent 4.5mm lag screw.
 - Alternatively, the Intrapectineal QLS Plate may be used.
 - New Pelvis II QLS plate may be used.

Posterior Column & Posterior Wall



Approach:
Combined Posterior Column & Posterior Wall Fractures can be reduced/fixated using the Kocher-Langenbeck approach.

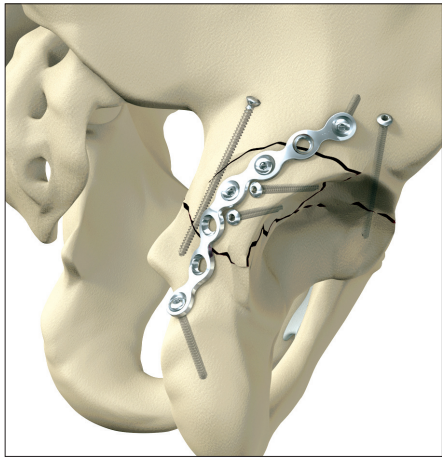
- Fixation:**
- Initial fixation of the posterior column with an independent lag screw and/or a five or six-hole plate.
 - If the posterior wall fragment is large enough, it should be fixed into its bed with one or two lag screws.
 - Definitive stabilization of the posterior wall and column with a seven - or eight-hole Matta Curved Plate, buttressing the posterior wall and anchored securely to the Ilium and Ischium using 3.5mm screws.

Acetabular Fracture Types & Fixation

Transverse & Posterior Wall



Approach:
Reduction/Fixation of Transverse & Posterior Wall fractures can be done through the Kocher-Langenbeck approach.



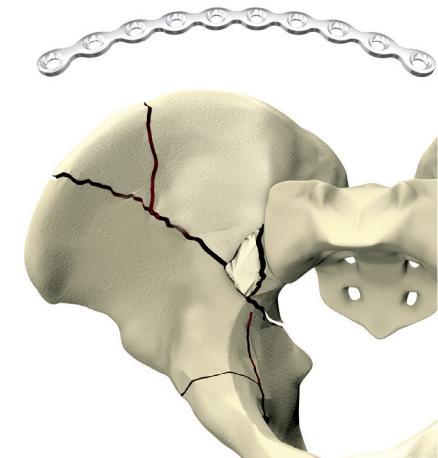
Fixation:

- Two 3.5 or 4.5mm independent lag screws stabilize the transverse fracture component.
- One or two independent 3.5mm lag screws maintain the reduction of the posterior wall fragment.

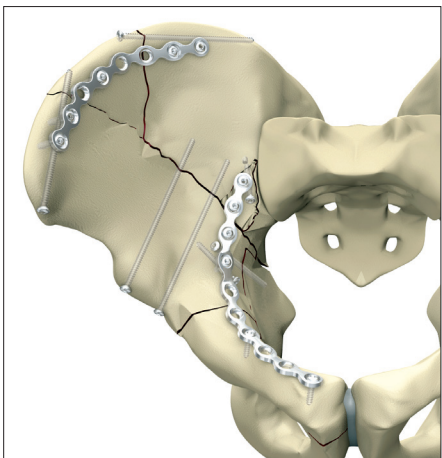


- A Matta Flex eight-hole Plate or alternatively a six- or seven-hole Matta Curved Plate is applied to buttress the posterior wall.

Both Column

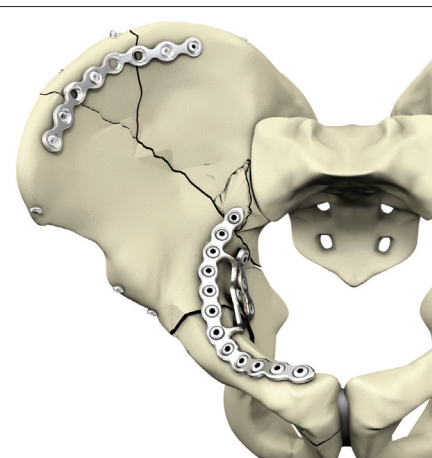


Approach:
Both Column Fractures are operated through the Ilioinguinal, Extended Iliofemoral approach, or the Anterior Intrapelvic Approach.



Fixation:

- Two 3.5mm independent lag screws in the iliac crest fix the reduction of the wing fracture lines.
- One or two 3.5mm independent lag screws should run from the upper aspect of the true Pelvis to fix the reduction of the posterior column.
- One independent lag screw fixes the reduction of a separated posterior

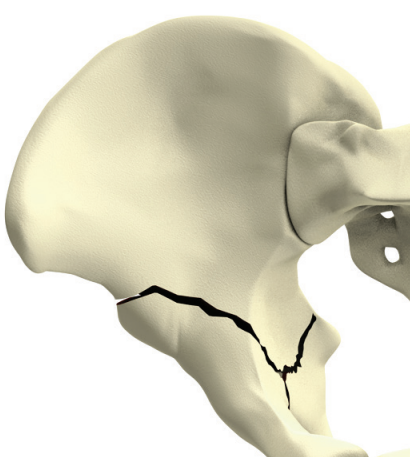


fragment of the pelvic brim, just lateral to the sacroiliac joint.

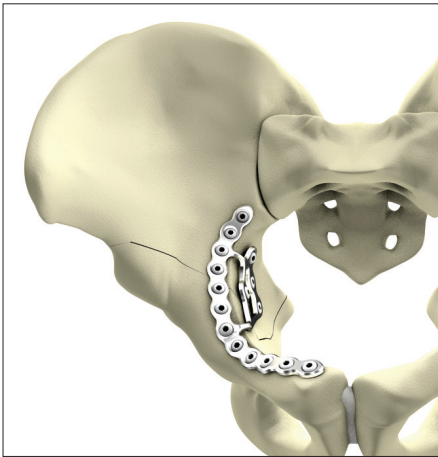
- One eight-hole Matta Flex Plate should be placed along the iliac crest to stabilize the iliac wing fracture.
- A 10- or 12-hole Matta Curved Plate along the pelvic brim stabilizes the anterior column.
- Alternatively, a QLS plate may be used.

Acetabular Fracture Types & Fixation

Anterior Column / Posterior Hemi Transverse



Approach:
Anterior column / posterior hemitransverse fractures may be operated via an ilioinguinal approach or the AIP approach.



Fixation:
Anterior Column Reduction: Reduction typically starts with the anterior column first.

Anterior Column Fixation: Plate and screw fixation

Stabilization of the anterior column normally starts peripherally, with the crest, and can be achieved with either screws or plates.

This may be augmented by a buttress plate placed along the pelvic brim extending from the area lateral to the sacroiliac joint to the superior pubic ramus.

In some cases it is possible to achieve stable fixation with lag screw technique alone.

Posterior Column Reduction:
Following reduction and provisional or definitive stabilization of the anterior column, the posterior column can then be addressed.

Posterior Column Fixation: Screw fixation

Fixation of the posterior column is usually provided by lag or position screws which are inserted from the pelvic brim into the safe zone that extends from the cranial limit of the greater sciatic notch distally to the ischium, depending on the starting point.

Pelvic buttress plate
A plate can be placed on the quadrilateral surface to buttress comminution or counteract posterior column medial displacement.

In addition, one or two 3.5mm independent lag screws can also be placed in the posterior portion of the plate taking care to avoid joint penetration.

Plate Contouring & Fixation

The plate must be shaped correctly to fit the reduced Pelvis and/or Acetabulum contours.

The fit of the plate on the bony surface should be as precise as possible, so the insertion of screws will maintain position of the fragments (Figure 1).

During plating and screw insertion, it is common that the bone is drawn toward the plate and not the plate toward the bone (Figure 2).

In certain instances it may be advantageous to contour the plate to a slight mismatch with the bone. Subsequent insertion and tightening of the screws may cause the plate to manipulate the bone, therefore aiding in obtaining or maintaining the optimal reduction.

It is important to use the plate bending instrumentation when manipulating plates.

Utilize good bending techniques:

- Ensure correct contouring.
- May help to prevent wedging of the plate by the bending tools.
- May help to prevent weakening of the plate by repeated, corrective contouring. (Discussed on pages to follow).

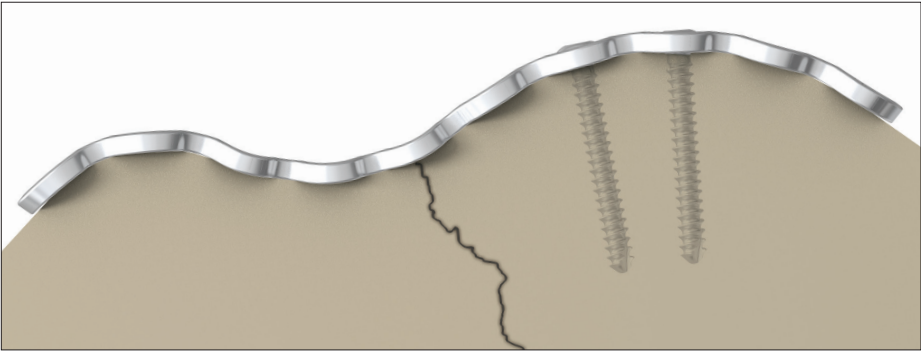


Figure 1 – Correct
If the plate fits precisely.

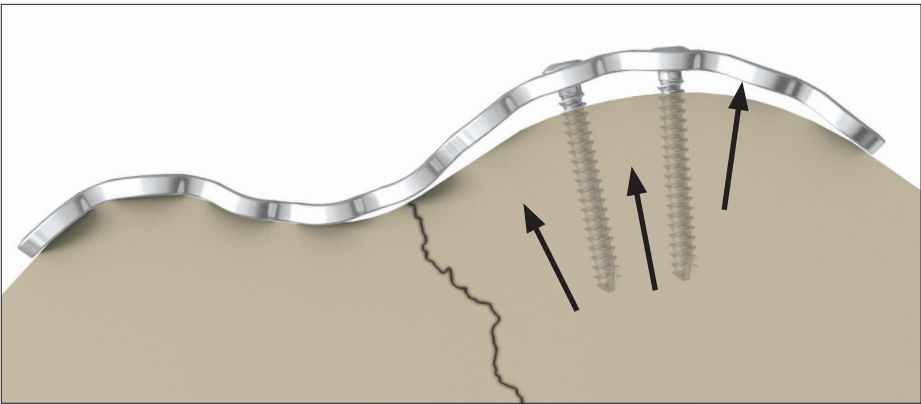


Figure 2 – Incorrect
When tightening the screws, the fragment will be drawn towards the plate.

Bending Techniques

Key Components

Plate Bender

The Plate Bender is designed to work with all plates in the Matta and Pelvis II System.

There are two sides that provide the surgeon multiple options to contour the plate.

For a plate to fit adequately on a bone, it should be possible to shape it in all directions.

Plates may be:

Curved

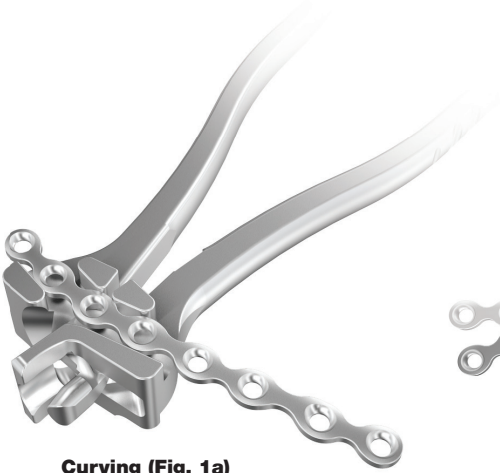
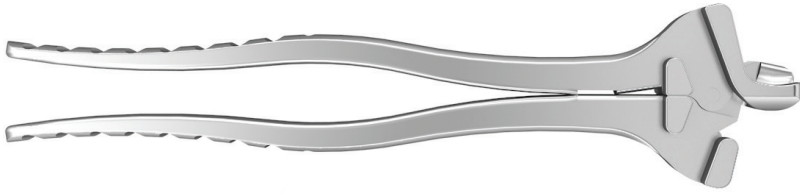
(Figures 1a, 1b)
To adapt to the shapes of the Pelvis and Acetabulum.

Bent

(Figures 2a, 2b)
Along its main axis.

Twisted

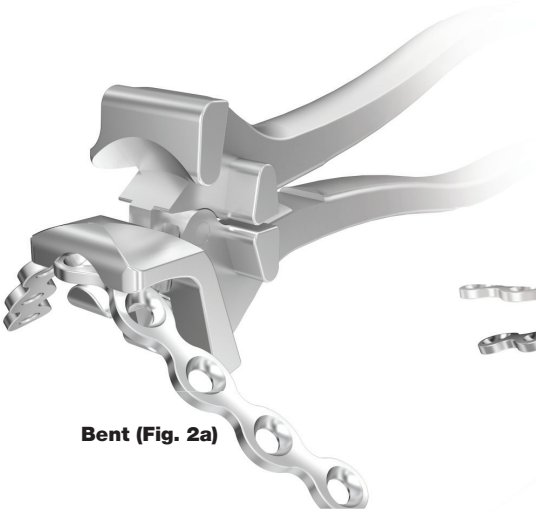
(Figures 3a, 3b)
Along its main axis, to give it a helicoidal shape.



Curving (Fig. 1a)



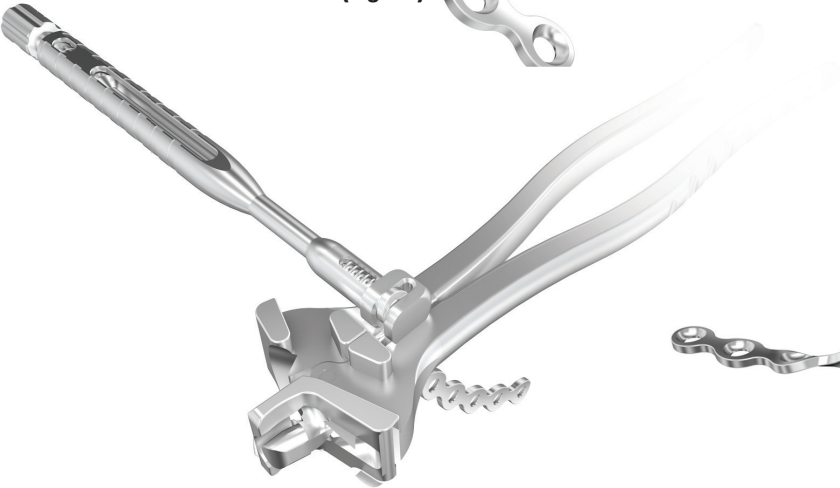
Curving (Fig. 1b)



Bent (Fig. 2a)



Bent (Fig. 2b)



Twisted (Fig. 3a)



Twisted (Fig. 3b)

Screw Fixation

Key Components

Plate Bending Holder

A Plate Bending Holder is available to assist when contouring the Infrapectineal and Suprapectineal implants and/or Matta plates.

Figure 4 shows the Plate Bending Holder instrument that will assist the surgeon in making finite adjustments of the plate's contours along its long axis. This is very useful in adjusting the angle between the two surfaces of the Suprapectineal plate. The Plate Bending Holder is designed to prevent the plate from slipping, giving the surgeon more control of the process. Note that certain bends in the plates may be made with conventional, paired Bending Tools (Figure 5). The newly designed Plate Bender may be used, particularly for out-of-plane bending of the suprapectineal portion of the plate. Figure 6.

Note:

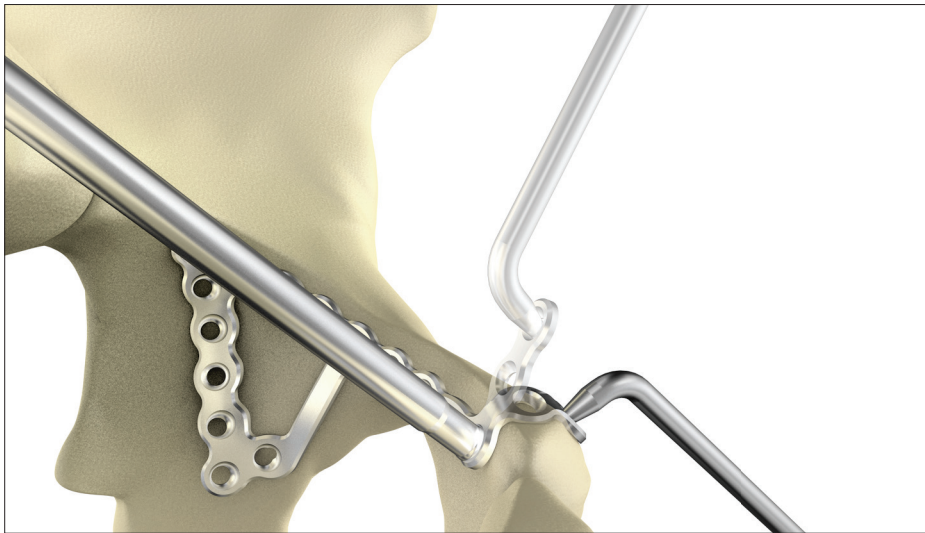
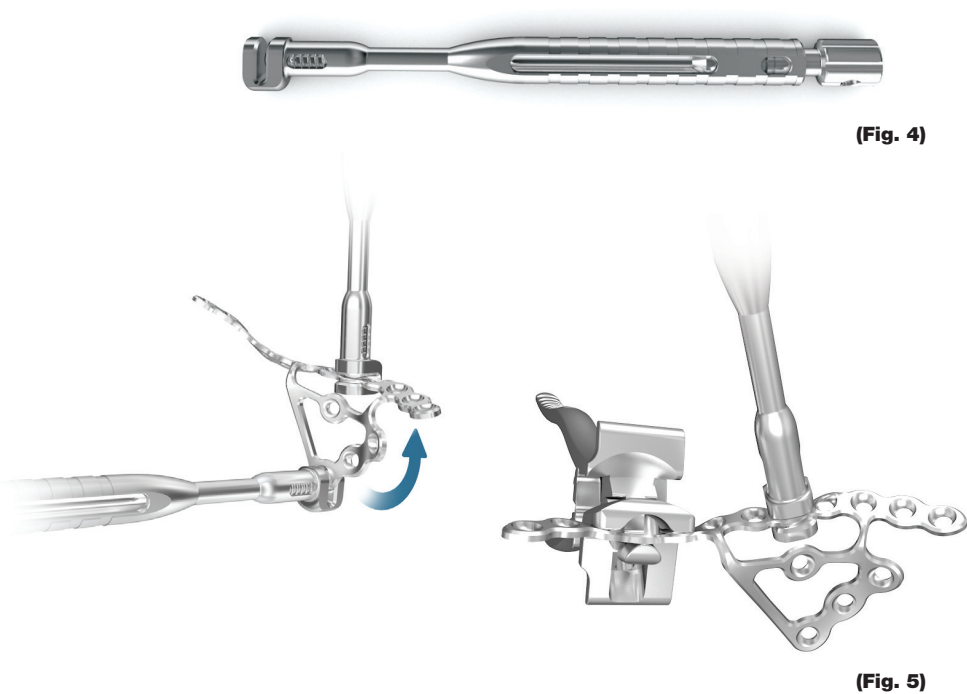
The Plate Bending Holder may be used with both the QLS Plates and the Matta Plates.

Bending Stick

A Bending Stick is provided to perform in-situ adjustments to the plate's contours when the plate is partially fixed to the bone. It has dual functioning ends – one straight and one angled. The L extension on the infrapectineal plate is designed to allow the surgeon the ability to use the bending stick to create conformity of the plate to the pubic tubercle. Then the surgeon has the ability to place a screw through the tubercle for anterior fixation of the plate.

Note:

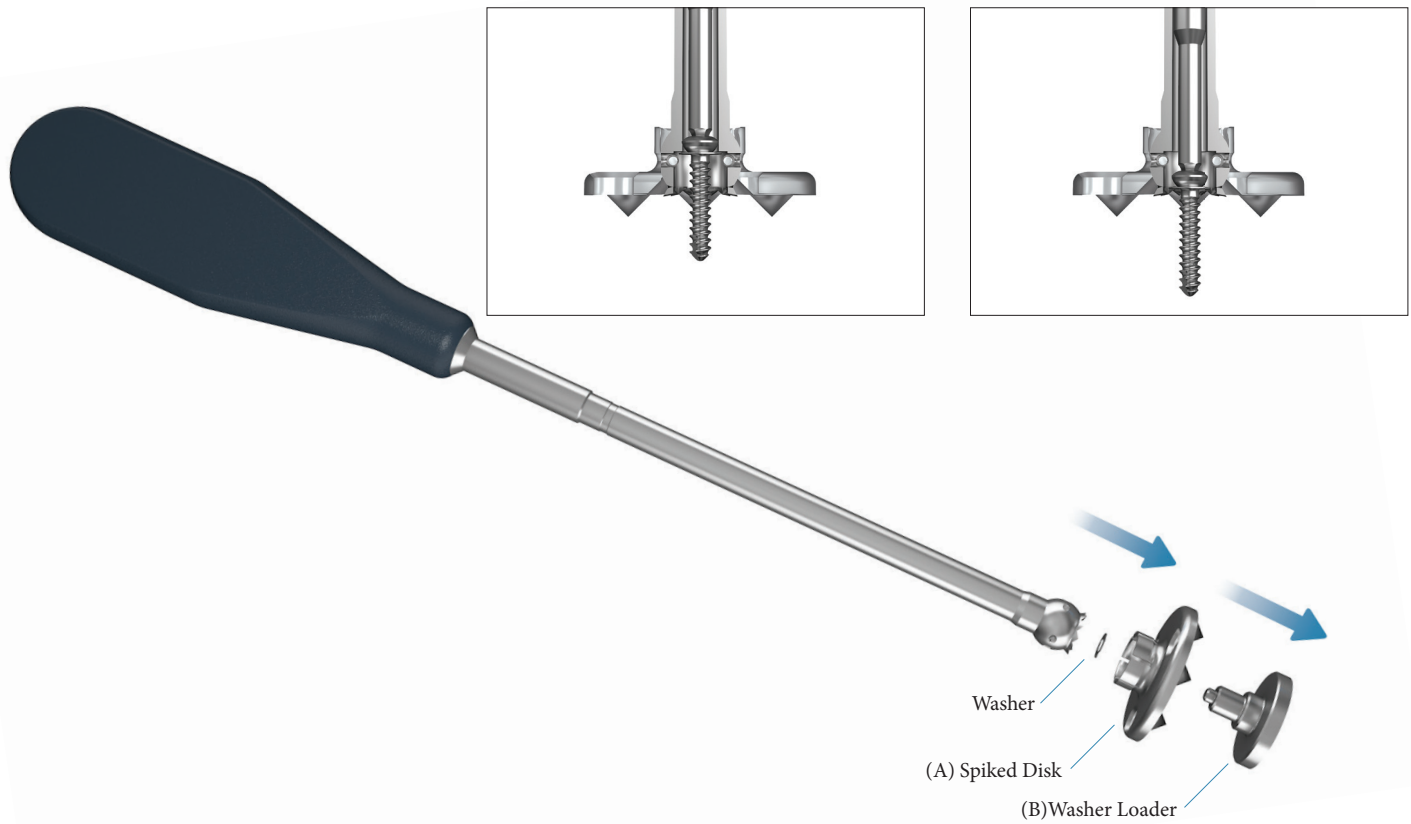
Clinicians should be cautious when repeatedly contouring non-annealed Stryker MPS Straight Plates. Extensive repeated bending can lead to loss of strength in the plates. Contouring does not decrease fatigue resistance for annealed Stryker BFS Reconstruction Plates or MPS Flex Plates.



(Fig. 6)

Screw Fixation

Key Components



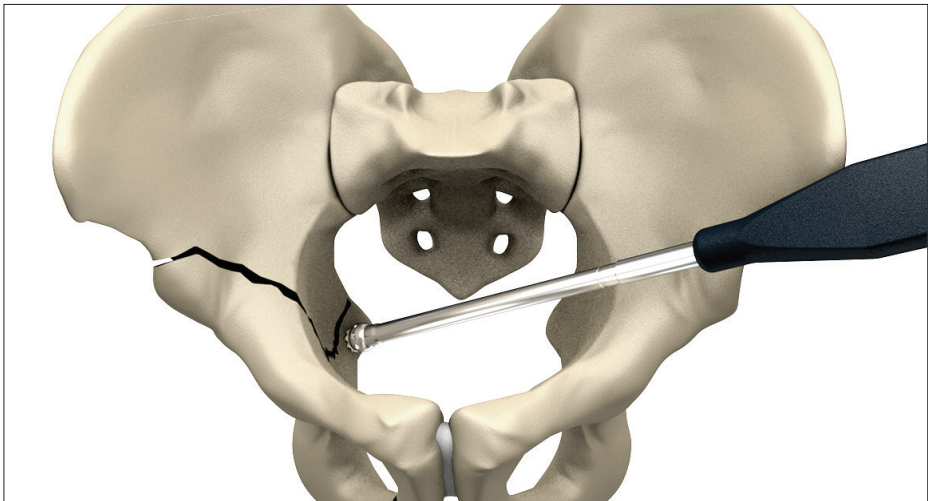
Spiked Screw Inserter

The Spiked Screw Inserter is an instrument for reduction and independent screw placement of 3.5mm. The instrument is cannulated through which a drill can be passed. Once drilled, a measurement can be read off of the scaled drill bit.

A screw may be inserted through the cannulation in the handle.

The Spiked Screw Inserter can be used with or without the Large Spiked Disk (A).

A washer can also be preloaded with a special loading stand (B). The washer is stored inside the 'crown' portion of the Spiked Screw Inserter and releases when the screw head passes through the tool. (Note – Washer function is only available for 3.5mm screws).



Note:

- The measurement for correct screw length must be taken with the drill sleeve touching the bone. The measurement is read directly off the drill.
- Care must be taken when inserting the Drill Sleeve, when a washer is loaded.

It is recommended that the Drill Sleeve be inserted into the Spiked Screw Inserter outside of the wound, observing it pass beyond the washer. This ensures that there will not be an inadvertent release of the washer into the wound.

Key Components

Plate Screw Inserter

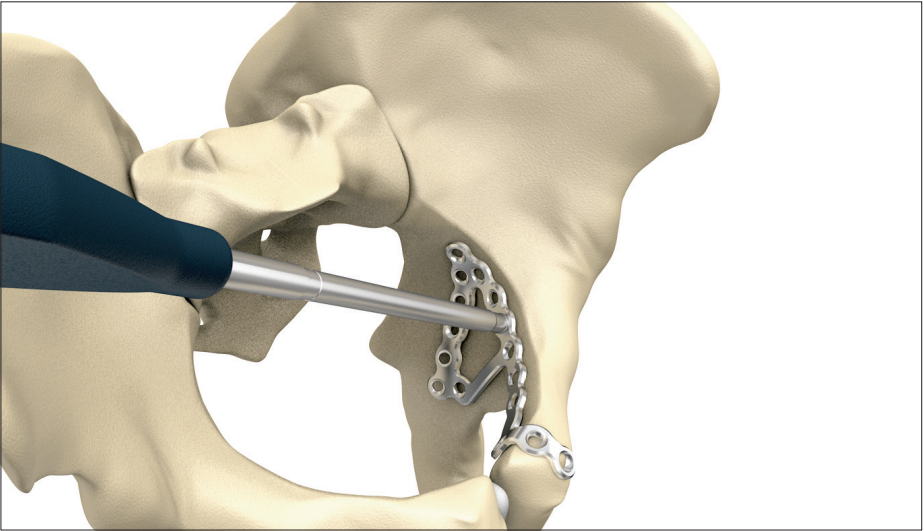
The Plate Screw inserter allows drilling and screw placement through the plate with one instrument.

The tip of the instrument can swivel in the plate holes to allow accurate placement of screws that need to be angulated.

The Plate Screw Inserter uses the same Drill Guides, Drills and Screwdrivers as the Spiked Screw Inserter.

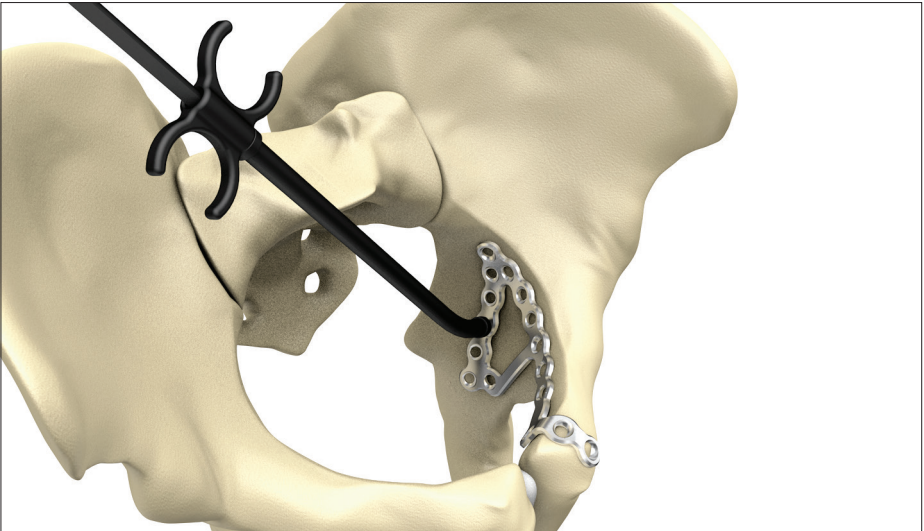
The accessories are color coded, with a yellow ring indicating drill guide, drill and screwdriver for 3.5mm screws.

Note:
When inserting screws through the Plate Screw Inserter under acute angles, the instrument should be pulled back slightly from the plate before final tightening to avoid clamping of the instrument.



Angled Depth Gauge

Angled Depth Gauge offers a new design specially for the quadrilateral surface to allow for measurement of screws up to 70mm.





Reconstructive

Hips
Knees
Trauma & Extremities
Joint Preservation
Orthobiologics

Medical & Surgical

Power Tools & Surgical Accessories
Image Guided Navigation
Endoscopy & Arthroscopy
Integrated Communications
Beds, Stretchers & EMS
Sustainability Solutions

Neurotechnology & Spine

Cranio-maxillofacial
Interventional Spine
Neurosurgical, Spine & ENT
Neurovascular
Spinal Implants

Manufactured by:

Stryker Trauma AG
Bohnackerweg 1
CH - 2545 Selzach
Switzerland

www.osteosynthesis.stryker.com

Distributed by:

Stryker
325 Corporate Drive
Mahwah, NJ 07430
t: 201 831 5000

www.stryker.com

This document is intended solely for the use of healthcare professionals. A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery.

The information presented is intended to demonstrate a Stryker product. A surgeon must always refer to the package insert, product label and/or instructions for use, including the instructions for Cleaning and Sterilization (if applicable), before using any Stryker product. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your Stryker representative if you have questions about the availability of Stryker products in your area.

Stryker Corporation or its divisions or other corporate affiliated entities own, use or have applied for the following trademarks or service marks: Apex, Asnis, Hoffmann, HydroSet, Monotube, Stryker, Triax. All other trademarks are trademarks of their respective owners or holders.

The products listed above are CE marked.

Literature Number: MT-ST-1.
10/11

Copyright © 2013 Stryker